Does Foreign Aid Target the Poorest?

Ryan C. Briggs

Abstract:

This paper examines the extent to which foreign aid reaches people at different levels of wealth in Africa. I introduce a method for measuring the sub-national distribution of a country's population by levels of wealth using household surveys and match this information to data on the location of aid projects from two multilateral donors. Within countries, aid disproportionately flows to regions with more of the richest people. Aid does not favor areas with more of the poorest people. These results suggest that donors are not able to realize their preferences for a pro-poor distribution of aid and that aid is not being allocated effectively to alleviate extreme poverty.

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Keywords: Foreign aid, Africa, World Bank, African Development Bank

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AidData – a joint venture of the College of William and Mary, Development Gateway and Brigham Young University – is a research and innovation lab that seeks to make development finance more transparent, accountable, and effective. Users can track over $40 trillion in funding for development including remittances, foreign direct investment, aid, and most recently US private foundation flows all on a publicly accessible data portal on AidData.org. AidData's work is made possible through funding from and partnerships with USAID, the World Bank, the Asian Development Bank, the African Development Bank, the Islamic Development Bank, the Open Aid Partnership, DFATD, the Hewlett Foundation, the Gates Foundation, Humanity United, and 20+ finance and planning ministries in Asia, Africa, and Latin America.

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1. Introduction

> "We may not build every road in these countries, but we're going to build the roads that are going to increase the incomes of the poorest." –Dr. Jim Yong Kim, President of the World Bank[1]

> "...foreign aid is a process by which poor people in rich countries help rich people in poor countries." –Peter Bauer[2]

The World Bank's (WB) mission is literally carved in stone at its Washington Headquarters: "Our Dream is a World Free of Poverty." Foreign aid, in various forms, has been a part of this mission since the founding of the Bank. The link between aid and poverty alleviation was reiterated in the late 1990s when a WB document plainly stated that "the main aim of aid is to reduce poverty."[3] Since 2000, this focus has been sharpened by the first Millennium Development Goal of halving the global rate of extreme poverty and the proportion of people who suffer from hunger. In April 2013, with an eye towards a new set of development goals, the WB committed itself to ending extreme poverty and promoting shared prosperity, defined in terms of income growth in the poorest 40% of people in each country.[4] Poverty reduction is equally a founding and enduring goal of The African Development Bank (ADB), whose mission is to "promote sustainable economic growth and reduce poverty in Africa."[5]

Multilateral donors like the WB and ADB are known to be able to direct a great deal of their resources to the world's poorest countries, resisting the political pressures that skew bilateral aid away from the poorest countries and towards, for example, former colonies.[6] While multilateral donors are able to target aid to poorer *countries*, we have much less of an understanding about the distribution of their aid within countries. This paper directly answers this question by examining how aid targets people at various levels of wealth within a diverse sample of African countries. The analysis of sub-national aid targeting across many African countries helps us understand the extent to which multilateral donors are able to exercise control over aid

[1] Tavernise (2014).
[2] Bauer (1976, 115).
[3] World Bank (1998, 38).
[4] World Bank (2014a).
[5] (African Development Bank Group, 2014).
[6] Maizels and Nissanke (1984); Alesina and Dollar (2000); Dollar and Levin (2006). For an overview of the research examining donor behavior, see Neumayer (2003b). Multilateral donors are more resistant to these pressures than bilateral donors, but they are not completely resistant (e.g. Dreher, Sturm, and Vreeland (2009)).

allocations inside recipient countries in order to realize their stated preferences for a pro-poor allocation of aid. The question of if aid targets poverty within countries is practically quite important as well, as project aid will alleviate poverty more effectively when it is allocated to places where poor people live. The paper thus also speaks to the ability of foreign aid to relieve extreme poverty.

The question of how aid targets sub-national wealth is answered using a two-year sample of geolocated aid projects from two multilateral donors to 17 African countries containing a total of 195 regions. As part of the analysis, I produce estimates of the sub-national distribution of each country's population by their level of wealth. This novel approach allows us to move from looking at regional averages of wealth to understanding the unique effect of having more poor or rich[7] people living in a region. The analysis reveals that aid skews away from the regions that hold more of the poorest people and towards the regions that hold more of the richest people. It also reveals that non-ethnic, economic factors are important in explaining distributive politics in Africa, with the rich doing better than the poor. It also expands the sub-national study of aid targeting away from single country case studies, and in doing so it demonstrates that there are durable cross-national patterns in sub-national aid allocation in Africa.

2. Argument

Multilateral donors are uniquely good at directing their aid to poor countries, and the WB and ADB are among the most poverty sensitive of the multilateral donors.[8] Multilateral donors likely target a larger share of their aid to poor countries than bilateral donors because they have a mission to use aid to reduce poverty and because they have voting arrangements that prevent any one stakeholder country's government from forcing its preferences on all issues. This voting structure encourages aid to flow to areas where stakeholder preferences overlap, implying that it should be relatively easy to send multilateral aid to poor countries but harder to send aid to a country that is a close ally of only one stakeholder country.[9] Such impediments to political targeting do not exist for bilateral donors, and bilateral aid allocations are much more heavily

[7] It should also be noted in the context of this paper, "poor" or "rich" are always relative terms denoting the poorest or richest people within a country. They are not absolute judgments on levels of wealth.

[8] Maizels and Nissanke (1984); Dollar and Levin (2006).

[9] On the institutional arrangements that insulate multilateral donors from politics, see Rodrik (1996); Martens, Mummert, Murrell et al. (2002).

skewed by political factors.[10]

Once aid reaches a low-income country, it is generally used to either boost economic growth or directly improve the lives of poor people through the provision of goods or services.[11] Growth-boosting aid is typically aimed at either increasing investments, such as infrastructure, or it is aimed at promoting changes in economic policies that are thought to stifle growth. Due to almost intractable causal identification issues, there is no consensus on the effect of foreign aid on growth.[12] Bracketing this admittedly large identification issue, the most common current result from this literature is that under some circumstances aid seems to have a small, positive effect on growth.[13] While economic growth is clearly important, it does not always reduce poverty. Consider, for example, that fifteen years of impressive economic growth in Africa has had only a small effect on poverty rates and approximately half of all Africans still live below a $1.25 a day poverty line.[14]

However, if the goal of aid is to directly reduce poverty, then rather than trying to boost growth and then hoping that growth helps the poor, aid could be used to simply provide the poor with goods and services. This could be done through private goods provision, like cash transfers, or, more typically, through the provision of local public goods such as roads, schools, or health clinics.[15] Aid for local public goods can be especially valuable because even when communities get wealthier, they may still struggle to provide local public goods due to collective action problems.[16] However, the benefit of these kinds of goods declines as one moves away from them—a health clinic built near you is useful, a clinic built far away is less useful—so a necessary condition enabling this kind of aid to help the poor is that local public goods must be built where poor people live.

[10] Alesina and Dollar (2000); Dollar and Levin (2006). In the words of Neumayer, "To start with bilateral aid allocation, there is little doubt that economic, political, and sometimes military-strategic interests of donors play a significant and sometimes dominating role for practically all donors..." (Neumayer (2003a, 102)).

[11] Most aid is intended to boost growth *and* improve the lives of poor people. However, any given project typically aims to directly do only one of the two goals while the other is expected to come about as a second-order effect of attaining the first.

[12] Easterly (2003); Roodman (2007).

[13] Hansen and Tarp (2001); Dalgaard, Hansen, and Tarp (2004); Clemens, Radelet, Bhavnani et al. (2012). For a dissenting view see Doucouliagos and Paldam (2009).

[14] The World Bank (2013, 14).

[15] The World Bank explicitly provides projects for these purposes. A pamphlet describing the work of the International Development Association, the concessional side of the World Bank that provides aid to 40 countries in Africa, states "When the poorest are ignored because they're not profitable, IDA delivers. IDA provides dignity and quality of life, bringing clean water, electricity, and toilets to hundreds of millions of poor people" (World Bank (2014b, 11)).

[16] These collective action problems are usually harder to overcome in more ethnically diverse communities (Miguel (2004); Habyarimana, Humphreys, Posner et al. (2007); Lieberman and McClendon (2013)). This makes aid even more useful in sub-Saharan Africa, the world's most ethno-linguistically diverse region.

While the logic for using aid to provide local public goods is compelling, it is not obvious why donors would choose to provide these goods by funding discrete projects rather than providing recipient governments with forms of aid that have lower overhead, such as budget support, and then allowing the recipient government to allocate and build these goods themselves. One common answer to this puzzle is that project aid is used because it gives donors increased control over their aid.[17] For example, recipients with worse governance tend to receive WB loans that are targeted more precisely within countries.[18] The fact that donors are ostensibly in control of (especially project) aid allocations, combined with the simple fact that the donors are the ones with the resources that recipients want, has led many scholars to assert that foreign aid should be an exceptionally apolitical and developmental resource. One version of this claim is that aid is a uniquely "scrutinzed" resource and so it is able to produce public goods in environments that otherwise promote private goods provision and pork.[19] Another version is that control over aid by foreign donors means that aid should be largely immune to political influence by recipient politicians.[20] Given the discussion above, this paper conjectures that *if multilateral donors have strong control over aid targeting, then project aid should flow to poorer people within recipient countries.*

While donors give aid in the form of projects in order to increase their control, recent work has shown that donors sometimes fail to prevent recipients from using aid for their own purposes. For example, Jablonski and Briggs have both shown that recipients skew sub-national aid allocations according to local political incentives in Kenya.[21] These studies examine aid targeting in the same country at a high level of detail, but the extent to which recipient control over aid is a general phenomenon is unclear. Interestingly, this more recent work emphasizing recipient control is in line with anecdotal accounts from aid workers, one of whom has claimed that "The World Bank provides financing. And the client, as we call it, or the government then basically decides where they want to spend the money."[22] There is thus a divide between recent country-case studies and practical knowledge, which both suggest that recipient control over aid allocations is common, and older research that suggests that donors should be able to exert control over aid allocations and in doing so reduce the influence of local politics on aid. The present article speaks to both the cross-national and sub-national strands of the aid targeting literature by comparing sub-national

[17] Morrison (2012, 60).
[18] Winters (2010).
[19] Collier (2006).
[20] van de Walle (2007).
[21] Jablonski (2014); Briggs (2014).
[22] Masaki (2014, 8).

project aid allocations across many countries. It will be shown that aid does not target poor people within countries. This result is not only practically important, it also calls into question theoretical work stressing the dominant role held by donors in negotiations over the targeting of foreign aid.

Sub-national, cross-national work in Africa is complicated by a lack of comparable sub-national data,[23] and so one additional contribution of the present paper is to use comparable household surveys to produce estimates of the spatial distribution of wealth groupings across regions. This approach complements existing methods for measuring sub-national wealth. One increasingly popular approach to measuring the wealth of regions is to measure the intensity of night-time light. Hodler and Raschky, for example, use this method to show that birthplaces of leaders tend to see better economic outcomes than other areas.[24] While this approach is useful, as it measures the presence of economic activity and a working electric grid at a fine level of detail, it says little about the wealth mixture of individuals in a region. From space, a region with a large number of rich people and large number of poor people may look the same as a region with only a large rich population. The approach used in this paper complements strategies like measuring light at night by estimating the spatial distribution of wealth quintiles across regions within countries. Rather than simply working with the brightness of light or even average levels of wealth per region, the approach in this paper allows one to parse out the unique effects of richer and poorer people on aid allocation at a sub-national level.

In sum, this paper compares detailed, sub-national measures of wealth against geotagged aid projects to measure the degree to which foreign aid projects reach poor people inside countries. It will be shown that aid targets the rich rather than the poor. This finding holds in minimal regressions and after controlling for a number of potentially confounding factors. While descriptive, this relationship between aid and wealth suggests that multilateral donors likely do not exercise strong control over sub-national aid targeting in Africa. It also suggests that most project aid is not currently able to effectively reduce extreme poverty, as it does not actually reach the very poor.

[23] Jerven (2013).
[24] Hodler and Raschky (2014).

3. Data

I examine the relationship between wealth and aid using data on the sub-national distribution of aid projects and sub-national measures of wealth created from comparable household surveys. The dependent variable is a measure of aid projects per region.[25] The data on aid projects comes from AidData[26] and includes all projects from the ADB and WB that were approved in 2009 and 2010.[27] I included all projects that could be geolocated with a level of precision at the regional (ADM1) level or better and merged both years of data into one cross-sectional dataset. The final dataset includes about 1,400 geolocated projects across Africa.[28] Both donors spend on broadly similar sectors. The largest shares of the WB's aid goes to health and social services, followed by agriculture, transportation, and energy. The ADB's project aid goes to energy, then transportation, social, and agriculture.[29] The biggest sectoral difference in aid spending between the donors is the WB's emphasis on health and social services and the ADB's strong focus on energy.

The empirical analyses measure aid per region in three ways. The first measure is the region's share of a country's total number of aid projects. This measure implicitly considers all projects to be equal in terms of value. The second measure weights aid projects by their cost. This cannot be done in a straightforward manner because each geolocated project is typically part of a much larger project and the dataset only reports the cost of the larger project. For example, a national electrification project could involve many unique, small, geolocated projects across a country but the dataset only includes the cost of the high-level, national project. To calculate costs per geolocated project, I assume that the cost of a project is split equally across all of its sub-projects. This second approach then measures each region's share of a country's total dollar value of projects. Both of these initial measures range from zero to one. The third measure is the natural log of the total dollar value of each region's projects.[30]

[25] The shapefiles for the ADM1 regions under study come from the UN Food and Agriculture Organization's (FAO) Global Administrative Unit Layers (GAUL) dataset.

[26] Strandow, Findley, Nielson et al. (2011).

[27] The ADB data is only available for the period 2009/2010 and so the WB data were trimmed to this time period so that they would match.

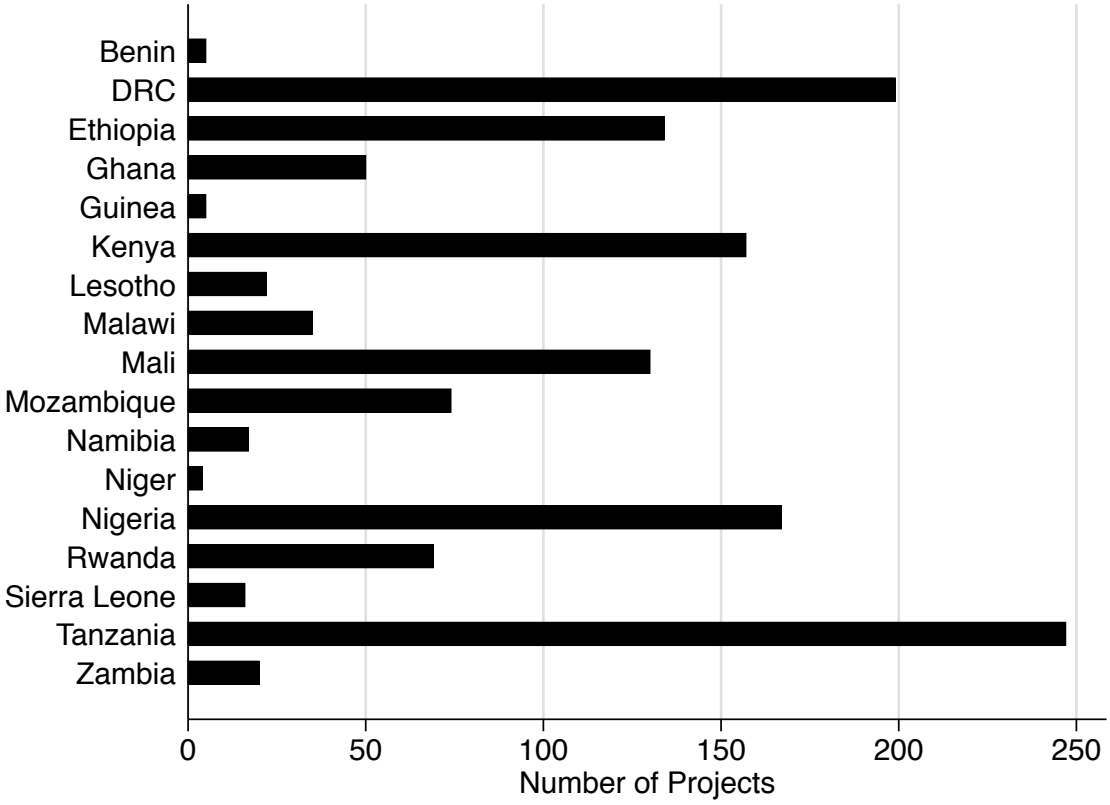
[28] Unless otherwise noted, when I speak of "projects" or "geolocated projects" and I am speaking of the unique subprojects that make up the lowest level of information in the AidData dataset. Technically, these geolocated subprojects are not projects themselves but rather subprojects that are a part of larger projects.

[29] The two donors do not use identical coding criteria for their sectors and so the categories are not directly comparable.

[30] The log transformation of the total value of aid is the preferred operationalization of the aid variable as the dollar value of aid per region exhibits strong positive skew. I report results from all three transformations for transparency. Technically, the logged aid variable is the natural log of the cost per region variable after 0.1 has been added to each region's total to remove zeros.

Due to a lack of good regional data on wealth (discussed below), the analysis will be limited to 17 countries. While this limitation is unfortunate, it represents a large widening of scope over the single-country focus in much of the aid targeting literature. The total number of aid projects ranges from a high of 247 in Tanzania to single digits in Benin, Guinea, and Niger. Figure 1 shows the number of aid projects per country for the 17 countries in the sample.

Figure 1. Number of sub-projects per country



3.1. Wealth Data

The key independent variables are drawn from measures of wealth quintiles created by the Demographic and Health Surveys (DHS). The DHS has carried out nationally representative household surveys across Africa for decades. These are high quality sources of data that are comparable across countries, removing

many of the concerns around using national statistics.[31] Regional information on wealth from the DHS can be matched to regional data on aid allocations, and this process allows us to examine if areas with more poor (or relatively rich) people receive more aid.

The sample is limited to include all Sub-Saharan African countries that had a DHS survey between 1999 and 2008 (inclusive). This ensures that the survey data are relatively close to, but always prior to, the 2009/10 period of the aid data. The sample was then restricted to countries that had DHS surveys that sampled within the country's standard regional boundaries. This procedure leaves 17 countries.[32] These countries include small countries like Lesotho and large ones like the Democratic Republic of the Congo. It includes countries that were colonized by the French, English, Belgians, and Portuguese. It includes populous countries like Nigeria and ones with much smaller populations such as Sierra Leone. In all, it is a diverse sample of African countries.

The DHS has constructed a wealth index for each country in the sample. The index is calculated at the household level and is based on respondents' answers to questions about their assets, such as if they own a bike or a radio, and the quality of their housing. Based on these answers, the DHS groups each respondent into a wealth quintile based on the wealth of their household.[33] To make these figures useful for the present paper, they have been recalculated so that they show the estimate of the fraction of each wealth quintile that lives in each region in a country.[34] This reveals the relative wealth composition of each region. We can also compare across quintiles because they are equally sized by definition. Within the same country, 10% of the richest quintile will represent the same number of people as 10% of the poorest quintile. In its focus on the location of people grouped by wealth quintile, this study moves away from looking at regional averages of variables and towards taking the underlying distribution and cross-regional variation of variables seriously. In the present case, it allows us to examine the relationship between people at various levels of wealth and sub-national aid allocations.

An example can serve to clarify the measure and demonstrate the value of tabulating the shares of wealth quintiles over regions. Table 1 shows how the share of wealth quintiles breaks down across regions in Kenya. Each column sums to 100% and represents one fifth of Kenya's total population. While the table

[31] Jerven (2013).

[32] Technically, we are left with 17 countries after this procedure and after dropping any countries that did not receive new aid commitments from the WB or ADB in 2009 or 2010.

[33] For a more in-depth discussion of the construction of the wealth index, see Rutstein and Johnson (2004).

[34] Appendix A includes more information on the construction of this variable.

does not tell us how many people live in Kenya, it does reveal the fraction of each wealth quintile that lives in each region. For example, Table 1 reveals that more than a third of Kenya's richest people live in Nairobi. At the other end of the spectrum is Kenya's North Eastern province, which is quite poor and is the site of the Dadaab refugee camp and the Millennium Village of Dertu.[35] However, while North Eastern is poor, it is also lightly populated. This mixture of poverty and low population comes through in the table as the region holds 10% of Kenya's poorest quintile and very small shares of all richer quintiles. This can be contrasted with Rift Valley, which has many people spread across all of the wealth quintiles. Rift Valley is unique in this regard, as most of Kenya's regions skew either towards the rich or the poor. While North Eastern and Nyanza skew towards the poor, Nairobi, and to a lesser extent Central, skew towards the rich.

Table 1. Kenya's distribution of wealth quintiles

	Poorest	2nd Poorest	Middle	2nd Richest	Richest
Central	1.2%	10.9%	19.5%	24.7%	11.9%
Coast	11.4%	4.9%	6.4%	6.5%	11.6%
Eastern	12.5%	18.8%	23.4%	22.5%	6.4%
Nairobi	0.0%	0.0%	0.0%	0.8%	36.3%
North Eastern	10.3%	1.7%	1.1%	0.7%	0.5%
Nyanza	19.4%	23.7%	15.0%	9.8%	8.5%
Rift Valley	32.1%	21.9%	17.8%	26.7%	21.5%
Western	13.0%	18.2%	16.8%	8.3%	3.3%

The segregation of the wealthy into regions that are geographically distinct from the poorer quintiles is a general phenomenon. Table 2 shows the mean of the correlations between wealth quintiles across the 17 countries that make up the sample.[36] The poorest quintiles of the population correlate highly with each other, implying that places with lots of the poorest people also hold many people from the second poorest segment of the population. This pattern holds all the way to the second richest quintile. Thus, if we see favoritism to the poorest, it could partially reflect aid that is also being targeted to the people from the second-poorest or middle quintiles that live in the same region. The richest group, however, does not match this trend. Aid going to the richest quintile is benefiting the relatively rich far more than anyone else because the richest people are the most likely to live in relatively homogeneous, wealthier regions. While simply descriptive, the empirical demonstration of this level of geographical segregation is a novel contribution to our understanding of the sub-national distribution of wealth in Africa.

[35] For an illuminating discussion of the challenges facing Dertu and the Millennium Villages Project, see the account by Munk (2013).

[36] A correlation table was calculated separately for each country and then the mean of each cell over all countries is presented in Table 2. This reveals the average country-level correlations between the wealth quintiles.

Figure 2. Validating the DHS measure against census data

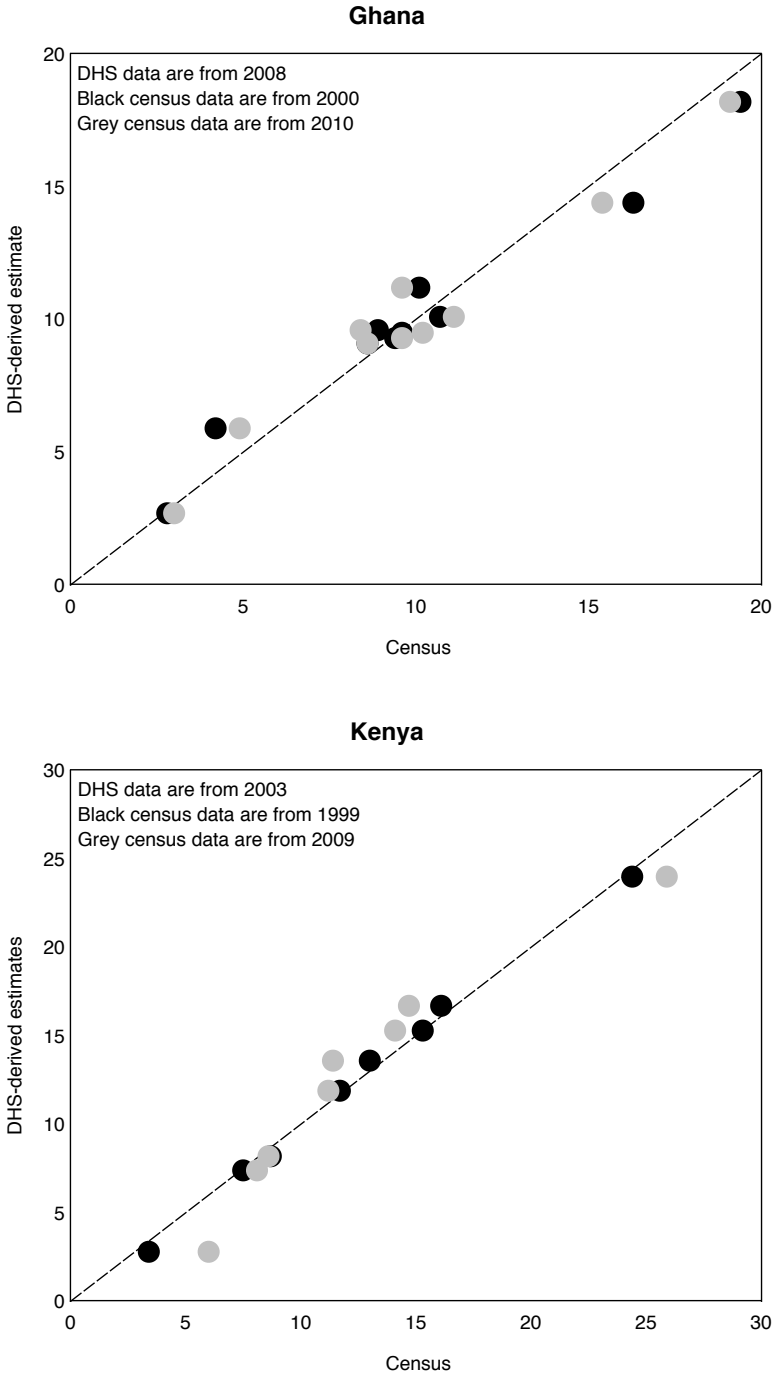


Table 2. Mean correlations between wealth quintiles over 17 African countries

	Poorest	2nd Poorest	Middle	2nd Richest	Richest
Poorest	1				
2nd Poorest	0.72	1			
Middle	0.51	0.82	1		
2nd Richest	0.27	0.47	0.67	1	
Richest	-0.21	-0.19	-0.11	0.27	1

The results above come from manipulations of household surveys, not census figures, and one may be concerned that this approach produces unreliable estimates of population shares.[37] To address this concern, we can calculate the expected share of the total population per region from the DHS data and compare this against the population shares from census data. Calculating the expected total population share per region from the DHS data requires multiplying each wealth quintile share for a region by 20 and summing the resulting numbers. This approach to validation is useful because it tests a core assumption of the paper, namely that each wealth quintile represents an equal fifth of a country's population. For example, to calculate Central Province's expected share of Kenya's total population one would multiply each percentage in the row representing Central in Table 1 by 20 and then sum the numbers to arrive at 13.6%. The expected shares are then compared against regional population share figures taken directly from Kenyan censuses from 1999 and 2009. These comparisons are done for two countries with reliable censuses, Ghana and Kenya, and the results are plotted in Figure 2. The results confirm that the DHS estimates are able to produce a good representation of subnational population distributions.

To briefly recap, the paper has so far argued that *project* aid from *multilateral* donors is a kind of aid that is most likely to reach the poor. It is from multilateral donors, who are known to more poverty-sensitive than bilateral donors, and it is project aid, which is given in order to increase donor control. I then introduced a method for measuring the distribution of people across regions by their relative level of wealth and validated this measure against census data. The analysis below leverages this new variable, and the fact that the poorest segments of the population positively correlate with each other while the richest live alone, to examine the extent to which aid skews towards the rich or poor within countries. The next section presents the formal analysis of how project aid and wealth overlap.

[37] An extended version of this validation technique and a full description of the creation of the wealth variables from the DHS data is presented in Appendix A.

4. Analysis

The analysis explains how aid is allocated across 195 regions inside 17 countries, and so all regressions use country fixed effects. Country fixed effects are important to the estimation, as they allow us to examine only the factors that vary across regions within countries. The fixed effects also are necessary for the wealth quintile variables to make sense, as all wealth quintiles are equally sized within countries but not across countries.[38] The dependent variable is measured in three ways: as each region's share of a country's total dollar value of aid, as each region's share of a country's total number of aid projects, and finally as the natural log of the total dollar value of aid to each region. The key independent variables are the share of each wealth quintile that resides in each region.

The initial results are presented in Figure 3 and show the bivariate relationships between the share of people in each wealth quintile and the region's level of aid.[39] The dependent variables in the left portion of the figure are each region's share of the total value of aid per country or each region's share of the total number of projects. The right portion uses the natural log of the total value of aid per region and the natural log of each wealth share variable.[40] The unconditional relationship between aid and wealth is descriptive—it does not try to answer why aid might skew to any given wealth grouping—but it is important and it reveals that aid is not reaching the poorest. In general, regions tend to receive more aid when they have more people in higher wealth quintiles. This effect holds across all three ways of measuring aid.

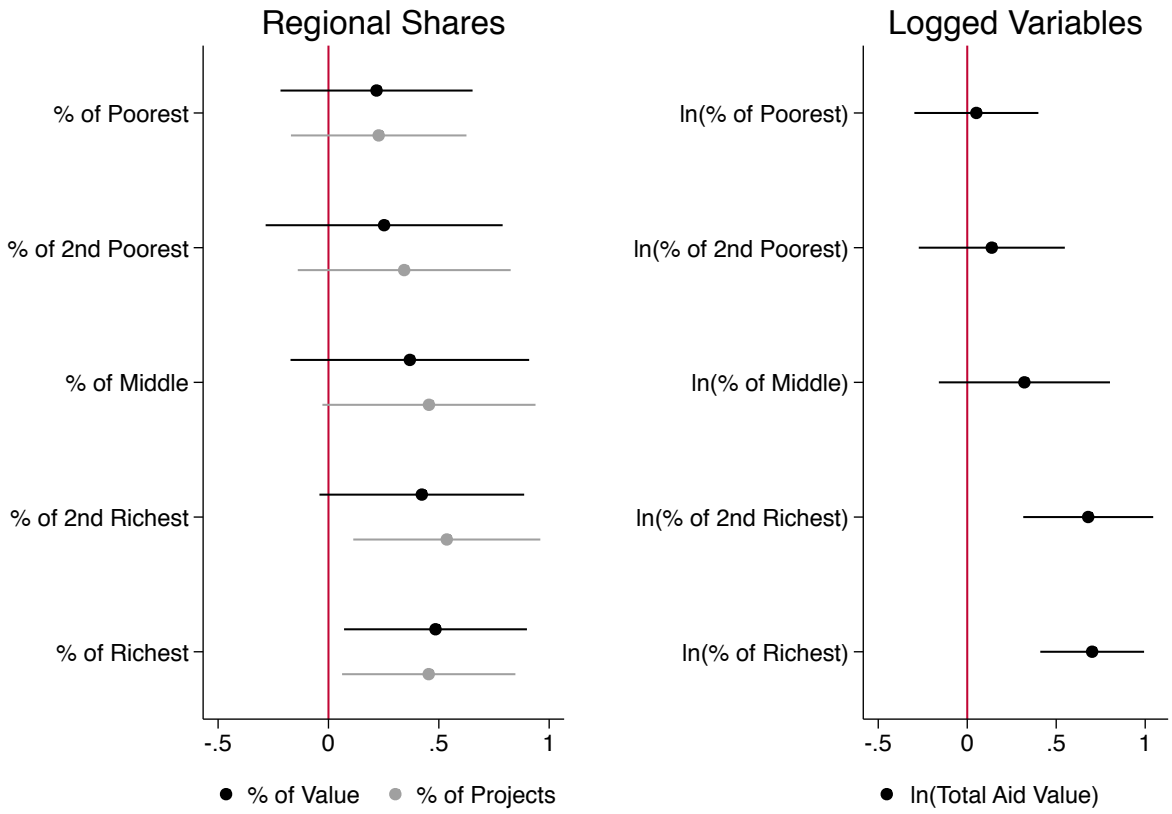
The remaining analyses work with the same dependent variables but only include the share of the richest and poorest quintiles as independent variables. Aside from the fixed effects, they also include each region's share of the country's total area, the region's share of conflict in the country, and a dummy variable marking if the region holds the country's capital. All of the independent variables are either fixed (e.g. area) or were measured before aid commitments were made in 2009 and 2010. The area control accounts for the fact that the optimal number of many aid-funded goods may increase with the area of a region. For example, all else equal, longer roads are needed in larger regions. The region's share of conflict controls for the fact

[38] Another reason that the fixed effects are important is because the cut points in the wealth quintiles are also country-specific. The poorest quintile in Nigeria, for example, likely does not have the same level of wealth as the poorest quintile in Malawi.

[39] The "bivariate" OLS regressions used to produce Figure 3 include one wealth variable at a time and country fixed effects. The figure shows point estimates and 95% confidence intervals. Standard errors are clustered on countries. All regressions include 17 countries and 195 regions.

[40] The wealth share variables range from 0 to 1, so I added 0.001 to the variables when taking the log to remove zeros.

Figure 3. Bivariate (fixed effects) results



that donors might direct aid away from regions that have worse security. This is measured as each region's share of the total number of battles in the two years leading up to 2009.[41] Finally, capital cities hold many of the wealthiest people[42] and aid recipients may want to skew aid or other resources towards capital cities because unrest in capital cities is uniquely dangerous to recipient governments.[43] The analyses control for the presence of a capital city in a region using a dummy variable. The results are shown in Table 3.

Table 3. Main results

	(1) Value	(2) Projects	(3) ln(Value)
% of Poorest	0.29	0.25*	
	(0.175)	(0.131)	
% of Richest	0.61**	0.66***	
	(0.218)	(0.214)	
ln(% of Poorest)			0.10
			(0.086)
ln(% of Richest)			0.72***
			(0.204)
% of Battles	-0.10	-0.06	
	(0.083)	(0.081)	
Battles			-0.00
			(0.002)
% of Area	0.39	0.45**	
	(0.227)	(0.207)	
ln(Area)			0.32***
			(0.087)
Capital	0.03	-0.03	1.13
	(0.068)	(0.056)	(0.765)
Fixed Effects	Yes	Yes	Yes
Number of countries	17	17	17
Number of regions	195	195	195
R-squared	0.23	0.25	0.24

Robust standard errors clustered on countries in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The key result is that while the effect of the fraction of the poorest people on aid is not statistically significant, the effect of the richest is consistently large and significant. This is the case when regional aid is measured as a fraction of the total cost of all projects, when aid is measured as a fraction of the total number of all projects, or when aid is measured as the log of a region's total value of aid (and the wealth share variables

[41] Battles are specific instances of violent conflict between two politically organized armed groups. There is no minimum level of violence required for an event to be a battle. For more details, see Raleigh, Linke, Hegre et al. (2010).
[42] This statement is supported by statistical results in Appendix B.
[43] Bates (1981).

are also logged). Even after controlling for area, violence, and capital city bias, aid is still skewing towards the rich. There is no evidence that violence or the presence of a capital city has any direct influence on aid.[44] The effect of the richest segment is also much larger than 0.2, which would be its expected value if aid was allocated equally by population.[45] While the point estimate is imprecise, it is also very large and the richest people are estimated to receive about three times more aid than their population share would suggest.

4.1. Robustness

The finding that aid is directed to the richest quintile of the population could be distorted by countries that received small numbers of aid projects or have only a small number of regions. These countries would by definition have very lumpy and probably unrepresentative sub-national distributions of aid shares across regions. For example, a country with only one aid project would necessarily report placing 100% of its aid in one region while the others received 0%. To ensure that this is not influencing the results, Table 3 is replicated while dropping any country with fewer than five regions or fewer than five aid projects. This act removes three countries from the analysis (Malawi, Sierra Leone, and Niger) and removes any statistically significant effect of the poorest. The strong favoritism towards the richest quintile remains.[46]

The strong favoritism towards the richest also holds in models that control for within region inequality. The inequality measure is the sum of the poorest and richest quintiles minus twice the middle quintile. The gives an approximation of the extent to which the region contains more people at the end points of the wealth distribution relative to the middle. The results are again very similar.

Thus far, I have not controlled for the most likely candidate for skewed regional aid distributions: ethnicity. This is important because one of the strongest results in African politics is that presidents tend to direct resources to co-ethnics.[47] Table 4 controls for ethnicity by adding a dummy variable for the region in which the recipient country's president (in 2008) was born. This approach has the benefit of reducing ambiguity

[44] The battles variable is also insignificant and does not change the results if it logged (after adding 0.1) or if it is entered as a dummy variable where it takes a value of one if there were any battles in the region in the past two years and zero otherwise.

[45] This is because the wealth variables measure the share of a population quintile, which itself represents 20% of the total population.

[46] This, along with other robustness tests, are in Appendix B.

[47] Foundational works include Ekeh (1975) and Joseph (1987). For a recent contribution shows widespread ethnic favoritism, see Franck and Rainer (2012).

around ethnicity (especially when some presidents come from mixed backgrounds), but it drops countries where the president was not born inside the country. I also drop countries where the president in 2008 lost power before the end of 2010. This results in Ghana, Guinea, and Zambia being dropped from this portion of the analysis.[48] Table 4 shows the results after controlling for the location of the president's home region. It also uses interaction terms to examine if the poorest or richest people within the president's home region are disproportionately favored with aid projects.

Model one in Table 4 is similar to Model 1 in Table 3, but it includes the Pres. Birth dummy and has a smaller sample size. Model two interacts Pres. Birth with % of Poorest and % of Richest, which reveals if the rich or poor are favored more if they live in the President's hometown. None of the hometown variables or interaction terms are statistically significant. Models three and four carry out the same analysis on the natural log of the total value of aid per region, and the results are similar. As before, the wealth variables are consistently important but sharing the president's ethnicity—as proxied by being in a region that holds the president's hometown—is not an important factor in explaining the location of aid projects.[49] While this result is unexpected, it is in line with other work suggesting that co-ethnics are not always favored by African presidents[50] or that co-ethnics are not evenly favored across various types of goods.[51]

In interpreting all of the above results, is useful to keep in mind the correlational structure of the data (see Table 2). Across the 17 countries under study, the poorest 3 quintiles of the population tend to live in the same regions while the richest quintile tends to live with the second richest quintile and away from areas with all poorer quintiles. In other words, the wealthy are segregated in regions that have below average shares of people who are at the median wealth level or lower. This implies that when aid provides local public goods to the richest fifth of the population, as it is doing in these countries, it is skewing away from bottom 60% of people.

It is important to stress that all of the results in this paper are produced using model-based, as opposed to design-based, empirical strategies.[52] While this implies that the causal effect of poor or rich people on

[48] Ghana had an election in 2008 and John Kufuor of the New Patriotic Party (NPP) was term limited. Nana Akufo-Addo ran for the NPP and lost, giving Ghana its second electoral turnover. Lansana Conté, former president of Guinea, died in 2008. Rupiah Banda was president of Zambia from 2008 to 2011, but he was born in what is now Zimbabwe.

[49] When the dependent variable is the share of the total number of projects instead of the share of the value of aid and models 1 and 2 in table 4 are estimated, the % of Richest p-value is consistently less than 0.02. Pres. Birth and % of Poorest are not statistically significant in these regressions.

[50] Kasara (2007).

[51] Posner and Kramon (2011).

[52] Sekhon (2009); Dunning (2010).

Table 4. Ethnicity interactions

	(1) Value	(2) Interaction	(3) ln(Value)	(4) Interaction
Pres. Birth	0.12	0.09	0.67	1.34
	(0.075)	(0.115)	(0.512)	(1.216)
% of Poorest	0.21	0.17		
	(0.205)	(0.220)		
Pres. Birth × % of Poorest		0.56		
		(0.430)		
% of Richest	0.41**	0.39**		
	(0.164)	(0.172)		
Pres. Birth × % of Richest		-0.40		
		(0.441)		
ln(% of Poorest)			0.07	0.07
			(0.092)	(0.098)
Pres. Birth × ln(% of Poorest)				0.09
				(0.201)
ln(% of Richest)			0.69**	0.67**
			(0.235)	(0.247)
Pres. Birth × ln(% of Richest)				0.16
				(0.299)
Capital	0.01	0.03	0.84	0.86
	(0.070)	(0.072)	(0.844)	(0.867)
% of Battles	-0.14	-0.11		
	(0.090)	(0.094)		
Battles			-0.00	-0.00
			(0.002)	(0.002)
% of Area	0.45*	0.43*		
	(0.227)	(0.237)		
ln(Area)			0.35***	0.35***
			(0.095)	(0.092)
Fixed Effects	Yes	Yes	Yes	Yes
Number of countries	14	14	14	14
Number of regions	168	168	168	168
R-squared	0.22	0.24	0.24	0.24

Robust standard errors clustered on countries in parentheses
*** p<0.01, ** p<0.05, * p<0.1

aid is not identified, this should not overshadow the importance of the above correlations. Aid is flowing to the rich instead of the poor, and this is not due to factors such as the size of regions, the location of capital cities, internal security, or ethnic targeting. This suggests not only that aid is likely not being targeted effectively to reduce extreme poverty, but it also suggests that multilateral donors have a low level of control over sub-national aid allocations in Africa. The next section discusses further implications of the results.

5. Discussion

The previous results have a number of implications for theory and policy. The first theoretical implication concerns urban bias in distributive politics in Africa. The capital region dummy is never significant in any of the models above. However, when the variable measuring the share of the richest quintile per region is dropped from the models, the capital dummy becomes substantively large, positive, and statistically significant. This suggests that while aid does flow disproportionately to regions with capital cities, there is no urban bias in the distribution of aid once we control for the location of the country's richest citizens. This implies that aid is not biased to capital cities because of any factor that is unique to cities, such as the notion that urbanites are more likely to organize or that protests in capital cities are uniquely threatening to the government.[53] Instead, wealthy people are more likely to live in capital cities[54] and the wealthy are the real targets of resource transfers. More fully explaining why sub-national aid allocations are pro-rich is one avenue for future research.

Second, this paper showed that aid from poverty-sensitive multilateral donors to low-income African countries skews away from the poorest when analyzed at a sub-national level. This finding is consistent with previous work that suggested that aid is insensitive to measures of regional need like mean rates of infant mortality or malnutrition.[55] This suggests that multilateral donors are not realizing their pro-poor preferences in aid allocation. While this finding contradicts current expectations around the relative power of multilateral donors and low-income aid recipients, it is in line with with case study work that stresses the influence of local politics over the preferences of donors.[56] On a related point, the present paper used sub-national

[53] Bates (1981).
[54] This is demonstrated in Appendix B.
[55] Öhler and Nunnenkamp (2014).
[56] Briggs (2014).

data on wealth and project aid to show that there are strong cross-national patterns in aid targeting across 17 diverse African countries. This suggests that the political nature of aid targeting is not something that is unique to Kenya. Instead, recipient control over aid seems to be the norm. We currently lack theory explaining how this process works, but it seems possible that recipients have better information on local economic or political conditions than donors and they may be able to use this information strategically. It may also be the case that the donors' desire to control aid has simply been overstated. More fully explaining these outcomes may help us understand how low-income countries negotiate successfully with major international institutions.

Third, this paper provided evidence that aid targets wealth even after controlling for a president's expected favoritism towards his home region. In general, ethnicity has a powerful role in influencing distributive outcomes in Africa. However, in this dataset there was little evidence of aid targeting a president's home region. Instead, these results support an explanation that hinges on the role of wealth in influencing distributive politics. While ethnicity is clearly an important factor influencing the distribution of goods and services in Africa, a strong focus on ethnicity may blind us to other politically relevant groupings. Future work can look more closely at the relative influence of ethnic and economic factors and the conditions under which governments are more sensitive to one factor over the other.

Fourth, this article presented a new way of measuring the relative spread of wealth across regions within countries. This approach complements other measures, such as measuring sub-national levels of light at night, by allowing one to parse out the unique influence of different wealth groupings. Thus, rather than simply knowing that an area has dense economic activity, the method in this paper allows a researcher to measure if a region is very middle-class or very poor or if it has a high level of inequality.[57] This measure is likely to be especially useful in countries where national statistical data are questionable or where sub-national measures are not easily comparable across countries.

[57] Also, and unlike light at night, the wealth measures in this paper are calculated from questions that directly ask people about their ownership of various assets and so rely on fairly weak assumptions linking measurement (of assets) to conceptualization (of wealth).

6. Conclusion

This paper combined new measures of wealth with sub-national information on project aid across 17 diverse African countries to show that aid favors the richest people within countries instead of the poorest. This result is quite robust and it tells us that the poorest people are benefiting less from project aid than they otherwise could be. The paper did not identify the causal effect of poor or rich people on aid allocations, but it did show that the results are not being driven by factors such as a region's size, the presence of a capital city, internal security, or presidents favoring their home regions. In line with recent research on the politics of foreign aid, but opposed to older theoretical work emphasizing the power of donors, the results suggest that political factors within aid recipients are skewing aid towards richer regions.

Appendix A: Making the Wealth Variables

This appendix first discusses how countries were selected into the sample in more detail and then discusses the construction of the wealth variables. The sample of countries was composed of every Sub-Saharan African country that had at least one regionally geolocated aid project from the WB or ADB in 2009 or 2010,[58] and that had a DHS survey that:

1. Was published between 1999 and 2008,
2. Was constructed to allow for estimates at the regional level,
3. Included the wealth index, and
4. Used the country's standard ADM1 regions.

If a country had more than one such DHS survey in the 10-year window, the most recent one was selected. Most of the countries that were cut from the sample were cut because they either did not have any DHS surveys or they did not have one in the decade before aid was disbursed. Additionally, six countries were not considered because they received no new commitments of aid from the WB or ADB in 2009 or 2010. This selection process produced a sample of 17 countries. The countries and the dates of their DHS surveys are listed in Table 5.

DHS surveys with the wealth index also include information placing each household within one of five wealth quintiles. These quintiles are constructed from questions asking about ownership of various assets such as televisions, toilet facilities, or the type of flooring material. The quintiles are constructed so that they should reflect the respondent's placement within the de jure household population. This is different from the population of individuals surveyed because it includes people younger than 15 and older than 49.

To calculate shares of wealth quintiles across regions, I divided the number of surveyed households in a given wealth quintile in each region by the total number of surveyed households in that quintile. In essence, this approach takes advantage of the fact that all of the DHS surveys under examination at some point

[58] At least one project had to be geolocated to the regional level or better. All data on aid projects comes from AidData (Strandow, Findley, Nielson et al. (2011)).

Table 5. DHS survey years

Country	Year of DHS Survey
Benin	2006
DRC	2007
Ethiopia	2005
Ghana	2008
Guinea	2005
Kenya	2003
Lesotho	2004
Malawi	2004
Mali	2006
Mozambique	2003
Namibia	2006
Niger	2006
Nigeria	2008
Rwanda	2007-2008
Sierra Leone	2008
Tanzania	2004-2005
Zambia	2007

divide the country into ADM1s and then sample within regions with probability proportionate to population. All calculations were done while weighting the figures by both the probability of being sampled and de jure household membership. In practice, these "household membership weights" are constructed by multiplying the sample weight (typically hv005) by household size (typically hv012). This allows us to take into consideration the fact some small populations are oversampled and the fact that households vary in size (in ways that are not caught by the sampling because they include people below 15 and above 49). While the use of the weights is clearly best practice, as it corrects for oversampling and for different sizes of households (outside of the 15–49 year sampling frame), in practice the use of the weighting scheme leads to only small changes when compared to similar calculations without the use of the weights.

While a wealth share variable constructed in this way from the DHS surveys must include some random error, it also produces estimates of regional populations that are very close to national censuses, as was shown in Figure 2. This section presents tables that show the raw data behind Figure 2. Table 6 reproduces Table 1 but also includes three extra columns. The first extra column estimates the fraction of the total Kenyan population in each region from the DHS wealth quintile distributions. It does this by multiplying every percentage in each row by 20 and then summing the resulting numbers. This number is then compared to the regional population distributions from the Kenyan censuses of 1999 and 2009 (the DHS report was carried out in 2003). The DHS and census results align closely.

Table 6. DHS wealth quintiles compared to Kenyan census reports

	Poorest	2nd Poorest	Middle	2nd Richest	Richest	Total	Census (1999)	Census (2009)
Central	1.2%	10.9%	19.5%	24.7%	11.9%	13.6%	13.0%	11.4%
Coast	11.4%	4.9%	6.4%	6.5%	11.6%	8.2%	8.7%	8.6%
Eastern	12.5%	18.8%	23.4%	22.5%	6.4%	16.7%	16.1%	14.7%
Nairobi	0.0%	0.0%	0.0%	0.8%	36.3%	7.4%	7.5%	8.1%
North Eastern	10.3%	1.7%	1.1%	0.7%	0.5%	2.8%	3.4%	6.0%
Nyanza	19.4%	23.7%	15.0%	9.8%	8.5%	15.3%	15.3%	14.1%
Rift Valley	32.1%	21.9%	17.8%	26.7%	21.5%	24.0%	24.4%	25.9%
Western	13.0%	18.2%	16.8%	8.3%	3.3%	11.9%	11.7%	11.2%

Table 7 repeats the same procedure for Ghana. As with Kenya, the results are very similar between the censuses and the manipulated DHS quintiles. There is also no obvious sign of bias. While Accra has a smaller population in the DHS output than in the Ghanaian census data, Nairobi is similar in the Kenyan census data and the DHS output. While the DHS figure for the rather poor Upper East is larger than the census figure in the Ghanaian data, the DHS figure for the similarly poor North Eastern is smaller than the Kenyan census data. No DHS estimate misses its nearest census by more than 1.5 percentage points and most differences fall much closer to 0. These similarities, as well as the good match between quintile distributions within countries and prior expectations (e.g. Nairobi is rich, North Eastern is poor and lightly populated, Rift Valley has a lot of people), reinforce the utility and validity of this way of measuring the distribution of people according to wealth across regions within countries. This is significant because it is very difficult to construct nuanced, sub-national, and cross-nationally comparable measures of relative wealth in Africa.

Table 7. DHS wealth quintiles compared to Ghanaian census reports

	Poorest	2nd Poorest	Middle	2nd Richest	Richest	Total	Census (2000)	Census (2010)
Ashanti	5.6%	18.3%	21.0%	24.6%	21.5%	18.2%	19.1%	19.4%
Brong Ahafo	11.7%	11.2%	10.6%	9.9%	3.1%	9.3%	9.6%	9.4%
Central	1.5%	13.5%	14.9%	11.7%	6.4%	9.6%	8.4%	8.9%
Eastern	6.4%	13.5%	13.7%	11.4%	5.3%	10.1%	11.1%	10.7%
Greater Accra	0.5%	1.8%	5.8%	18.1%	45.8%	14.4%	15.4%	16.3%
Northern	32.9%	9.6%	7.0%	4.2%	2.3%	11.2%	9.6%	10.1%
Upper East	21.2%	3.7%	1.4%	1.5%	1.8%	5.9%	4.9%	4.2%
Upper West	7.1%	3.0%	1.7%	1.3%	0.5%	2.7%	3.0%	2.8%
Volta	8.7%	12.7%	13.3%	7.3%	3.4%	9.1%	8.6%	8.6%
Western	4.3%	12.8%	10.6%	10.0%	9.9%	9.5%	10.2%	9.6%

Appendix B: Additional Information

This appendix holds additional statistical tables and robustness checks. It presents: summary statistics for the variables used in the regressions, an analysis replicating table 3 but carried out on a smaller sample of countries, an analysis replicating table 3 but including a control for inequality, an analysis of the dependent variables that are represented in percentages (share of total value of aid or share of total number of projects) that takes censoring at 0 and 1 into account, a table showing that the richest people are more likely to live in regions that hold capital cities, a robustness test that runs the regressions from table 3 while sequentially excluding each country in the sample, and a map of the aid projects under study.

Table 8 shows the summary statistics for variables included in the regressions. Variables that had true zeros or ones are expressed without decimal points. The first three variables are the dependent variables from the main analysis.

Table 8. Summary statistics

Variable	Obs	Mean	Std. Dev.	Minimum	Maximum
% of Aid Value	195	0.0872	0.1574	0	1
% of Count of Projects	195	0.0872	0.1483	0	1
ln(Aid Value)	195	1.5928	2.6612	-2.3026	7.1862
% of Poorest	195	0.0872	0.0976	0	0.4959
% of Richest	195	0.0872	0.1289	0.0014	0.6962
ln(% of Poorest)	195	-3.2767	1.6087	-6.9078	-0.6994
ln(% of Richest)	195	-3.2480	1.3054	-6.0529	-0.3607
Capital	195	0.0872	0.2828	0	1
% of Battles	195	0.0769	0.1880	0	1
Battles	195	5.3436	21.2995	0	227
% of area	195	0.0872	0.0934	0.0002	0.5263
Ln(Area)	195	9.9851	1.7336	4.0584	13.3468

Table 9 replicates table 3 but drops any country that has fewer than five regions or received fewer than 5 aid projects during the two years under study. This drops Malawi, Sierra Leone, and Niger from the analysis. The results for the rich stay the same while the (already weak) results for the poor are weakened further.

Table 9. Main analysis on trimmed sample

	(1) Value	(2) Projects	(3) Ln(Value)
% of Poorest	0.28	0.20	
	(0.207)	(0.160)	
ln(% of Poorest)			0.10
			(0.095)
% of Richest	0.61**	0.61**	
	(0.236)	(0.231)	
ln(% of Richest)			0.72***
			(0.215)
Capital	0.03	-0.03	1.20
	(0.079)	(0.062)	(0.837)
% of Battles	-0.06	-0.01	
	(0.080)	(0.073)	
Battles			0.00
			(0.002)
% of Area	0.33	0.45*	
	(0.269)	(0.244)	
ln(Area)			0.36***
			(0.081)
Fixed Effects	Yes	Yes	Yes
Number of countries	14	14	14
Number of regions	180	180	180
R-squared	0.22	0.23	0.25

Robust standard errors clustered on countries in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10 replicates Table 3 but includes a control for within-region inequality. The inequality measure is not typical, as I do not have absolute measures of wealth but rather a division of people into quintiles of the population according to wealth. The inequality control is thus a measure that captures the extent to which the region has more people at the first and fifth quintile relative to the middle quintile. The exact formula is: % of Poorest + % of Richest - 2 * % of Middle. While this measure makes sense on its own, in practice almost no regions have high shares of the poorest and richest and also low shares of people in the middle quintile. One of the only examples of this kind of inequality is Katanga in the DRC. Katanga has 17.5% of the poorest quintile, 17% of the richest quintile, and 7% of the middle quintile.

In general, the richest quintile tends to live in regions with below averages shares of the middle quintile while the poorest quintile tends to live in regions with above average shares of the middle quintile (see Table 2). This implies that the inequality measure is mostly being driven by regions that have high shares of the rich and low shares of the middle. These are usually capital regions.

Table 10. Main analysis with inequality control

	(1) Value	(2) Projects	(3) Ln(Value)
% of Poorest	0.30	0.26*	
	(0.179)	(0.134)	
ln(% of Poorest)			0.10
			(0.085)
% of Richest	0.67***	0.76***	
	(0.186)	(0.186)	
ln(% of Richest)			0.73***
			(0.195)
Capital	0.04	-0.01	1.25
	(0.071)	(0.056)	(0.927)
% of Battles	-0.09	-0.04	
	(0.082)	(0.080)	
Battles			-0.00
			(0.002)
% of Area	0.36	0.41*	
	(0.225)	(0.203)	
ln(Area)			0.31***
			(0.079)
Inequality	-0.09	-0.14	-0.48
	(0.121)	(0.113)	(1.333)
Fixed Effects	Yes	Yes	Yes
Number of countries	17	17	17
Number of regions	195	195	195
R-squared	0.23	0.26	0.24

Robust standard errors clustered on countries in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The dependent variables that measure regional aid as a share of total aid have censoring at 0 and 1, which could bias the results of the analysis. Table 11 examines the data using a random effects tobit model that takes this censoring into account and shows consistent favoritism to the rich and a lack of favoritism to the poor. The dependent variable in models one and two is each region's share of the country's total dollar value of aid and the dependent variable in models three and four is the region's share of the total number of projects. Models one and three use the full sample and models two and four drop countries with fewer than five projects or regions.

Table 11. Tobit models

	Share of Value		Share of Projects	
	Main	Small Sample	Main	Small Sample
	(1)	(2)	(3)	(4)
% of Poorest	0.21	0.19	0.16	0.11
	(0.154)	(0.178)	(0.142)	(0.162)
% of Richest	0.66***	0.68***	0.70***	0.67***
	(0.136)	(0.147)	(0.125)	(0.134)
Capital	0.02	0.02	-0.04	-0.04
	(0.063)	(0.068)	(0.058)	(0.062)
% of Battles	-0.08	-0.03	-0.04	0.02
	(0.071)	(0.078)	(0.065)	(0.071)
% of Area	0.36**	0.35*	0.42***	0.47***
	(0.164)	(0.195)	(0.151)	(0.178)
Random Effects	Yes	Yes	Yes	Yes
Number of Regions	195	180	195	180
Number of Countries	17	14	17	14

Standard errors clustered on countries in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12 provides support for the argument, expressed in the main text, that the rich are more likely to live in regions with capital cities. The unit of observation is the region and the dependent variable is the region's share of the wealthiest people in a country (*% of Richest*). The regressions are estimated with OLS and include country fixed effects. The capital dummy is substantively large and statistically significant. In these countries, the capital dummy alone explains about half of the within-country variation in the location of the richest quintile of the population.

The rich are more likely to be found in regions that hold the capital city. Also the main text showed that aid flows disproportionately to the rich. Once I control for the location of the rich, there is no direct effect of capital cities on aid. The finding that the capital city dummy only influences aid through *% of Richest* leads to the claim that capital city or urban bias may actually be bias to the rich.

Table 12. Explaining where the wealthy live

	(1)	(2)
Capital	0.30***	0.27***
	(0.050)	(0.054)
Ln(Area)		-0.01
		(0.009)
Fixed Effects	Yes	Yes
R-squared	0.50	0.51
Number of Regions	195	195
Number of Countries	17	17

Robust standard errors clustered on countries in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 4 shows coefficients and 95% confidence intervals for % of Poorest and % of Richest for a set of regressions where each country in the dataset is sequentially excluded. This implies that the first estimate for each coefficient reports the result when Benin is excluded, the second reports results when dropping the DRC, and so on. The left pane is based on model one in Table 3 and the right pane is based on model two. Model three is presented on the following page. The figure examines if the results are sensitive to the exclusion of possibly outlying countries. The results for the richest segment of the population are always significant. The results for the poorest become significant at $p < 0.05$ in only model two if Namibia or Guinea are excluded.

Figure 4. Aid targeting to the poorest and richest, dropping one country at a time

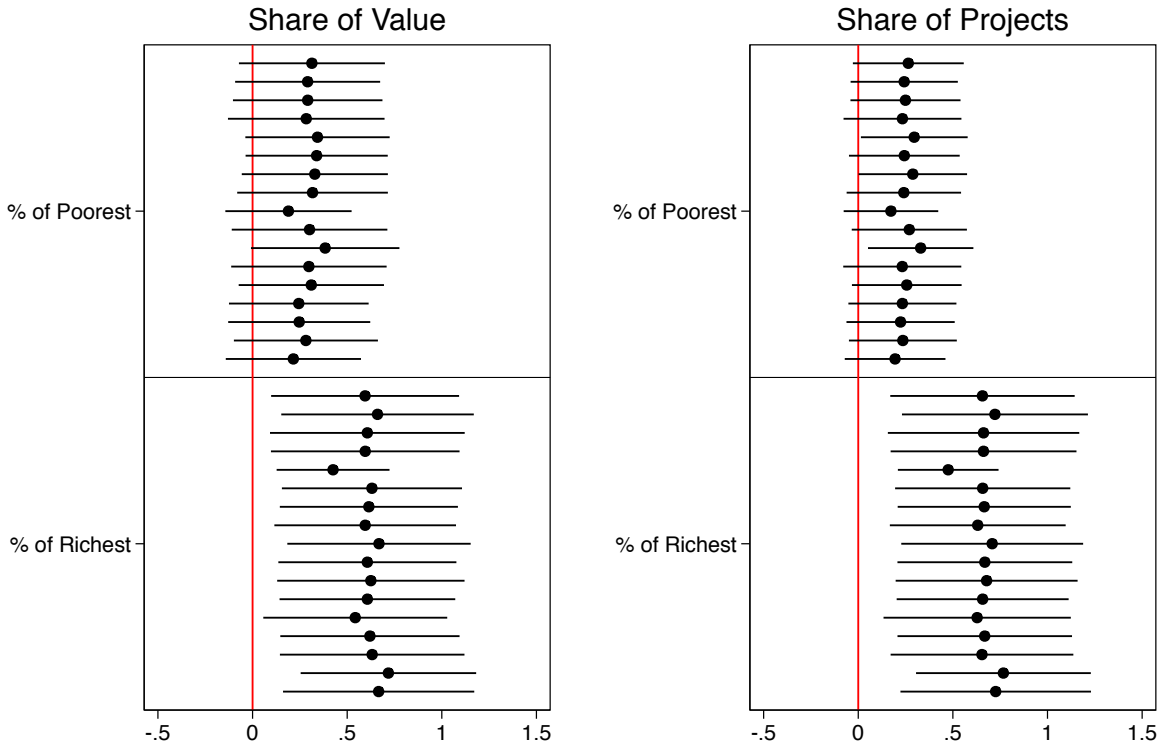


Figure 5 is the same as Figure 4, but it is based on the preferred specification of model three (logged variables) in table 3. As before, each point estimate per coefficient corresponds to one regression and each excludes one country from the sample. The logged model is less sensitive to dropping countries. In no regression is the flow of aid to the poorest significantly different from zero. All regressions show significant effects for the richest, though when Nigeria is excluded the point estimate of ln(% of Richest) drops to 0.45 and the p-value increases to 0.024. Across all of the manipulations in all of the models, the richest are always significantly favored with aid.

Figure 5. Aid targeting to poorest and richest, logged variables, dropping one country at a time

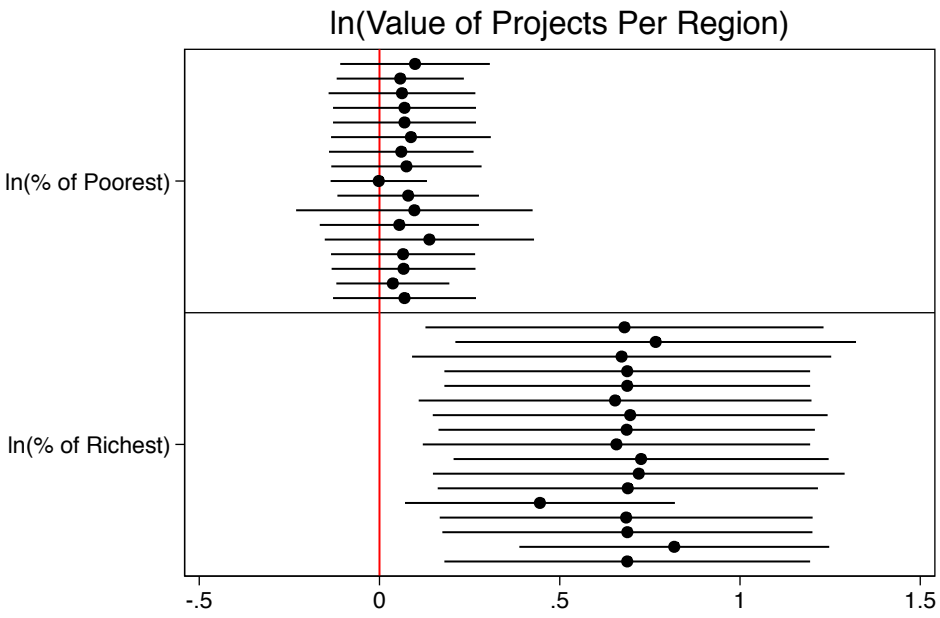
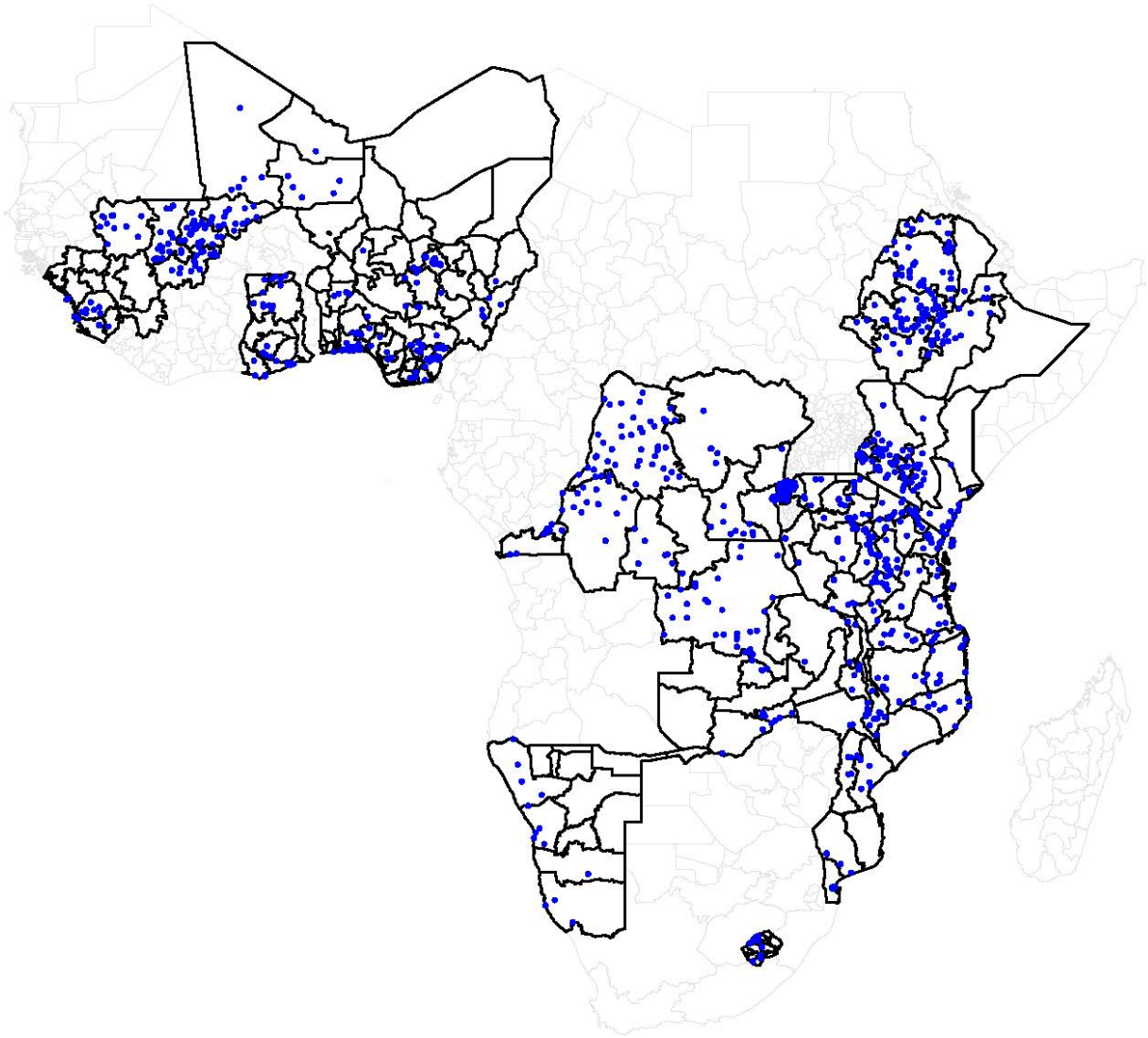


Figure 6 maps the regional-level (ADM1) boundaries of the countries in the sample (in black) and the location of many, but not all, of the aid projects used in the analysis. More specifically, the map plots all aid projects—covering both donors and both years under study—provided that the project could be geolocated at a level of precision that was better than the regional level (a level of precision of less than 4 in the AidData coding scheme). The analysis in the text uses all projects with a precision coding of less than 5, meaning that it include projects that were geolocated to a region but where the precise location of the project within the region is unknown. It makes little sense to plot these regionally-geolocated projects in the map and so they were dropped for this purpose only.

Figure 6. Regions in the sample and aid projects



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