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Aid and Growth in Malawi

Daniel Chris Khomba
School of Economics and Finance, University of St. Andrews

Alex Trew
School of Economics and Finance, University of St. Andrews

Abstract

We study the impact on local growth of foreign aid flows in Malawi over the period 2000–13. Using household surveys, we show that growth in light density is a good proxy for growth in household consumption. To isolate a causal impact of aid on growth, we employ two exogenous determinants of within-country disbursement: First, the ethnic affinity of a constituency or district with the sitting President; second, the portion of Parliamentarians in a constituency or district that defect to the ruling party. Using these instruments, alone or together, we identify a robust and quantitatively significant role for aid flows in causing higher growth in light density at both constituency and district level. Constituency level regressions suggest a higher effect than district level regressions, suggesting that aid flows cause a relocation of economic activity across space. We find a hump-shaped growth response over the course of three years. Bilateral aid appears to be better in causing growth than multilateral aid while grants have more impact than loans.

Author Information

Daniel Chris Khomba
School of Economics and Finance, University of St. Andrews
dck2@st-andrews.ac.uk

Alex Trew
School of Economics and Finance, University of St. Andrews
alex.trew@st-andrews.ac.uk
+44(0)1334 461950
For correspondence: School of Economics and Finance, University of St. Andrews, St. Andrews, Fife, UK, KY16 9AJ

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1 Introduction

Clear evidence to support the hypothesis that development assistance stimulates economic growth has until recently been limited.[1] Despite this, international development institutions, regional bodies and individual country agencies continue to allocate large sums to less developed countries. Between 2000 and 2014, net Official Development Assistance (ODA) of about US$\$1.2$ trillion was disbursed by donor countries, of which US$\$528.7$ billion went to the Least Developed Countries.[2]

Our understanding of the role of aid in causing growth has long been bedevilled by problems of identification. Since the allocation of aid can be related to the growth rate of the recipient it is necessary to isolate exogenous variation in aid to establish a causal connection. The recent contribution of Galiani et al. (forthcoming) develops a country-level instrument based on the crossing of the International Development Association (IDA) threshold for receiving concessional aid. That study finds an economically and statistically significant role for aid in causing growth. Aid is not uniformly distributed within a country, however. Given the importance of urbanization and industrialization to growth, it could be informative to examine the disaggregated aid disbursement pattern and the spatially proximate consequences for growth. Recent efforts to use the Galiani et al. instrument at a regional level (Dreher and Lohmann, 2015) have failed to find any causal effect on regional growth as measured by nighttime light data. That aid matters at a national level, but apparently not at a regional level, presents a puzzle. However, the absence of a finding at the regional level reflects only the average treatment effect associated with the particular instrument used.

In this paper we evaluate the effectiveness of aid flows to different regions (either parliamentary constituencies or administrative districts) in Malawi over the period 2000–2013. We use two determinants of the internal distribution of development aid[3] that are based on the particular institutional and cultural environment in Malawi. Our instruments exploit the Presidential powers to influence the disbursement of the Malawian development budget. The first instrument is a variable for *ethnic affinity* that is measured as the proportion of a district population that is co-ethnic with the president. The second instrument is *political switching* measured as the proportion of Members of Parliament (MPs) in a district that defect from the party with which they won their Parliamentary seat to join the party of the ruling President. Using each of these instruments, and both combined, we find economically and statistically significant evidence on the effectiveness of aid in causing growth (as proxied by the log change in nighttime light intensity). The growth impact of aid is quantitatively significant and robust to a number of controls. We show that the effect on growth is hump-shaped (with a peak at a lag of one year). Aid for agriculture and education projects is the most beneficial while multilateral aid appears to be less effective than bilateral aid.

Our use of these instruments is related to recent work on political favoritism. Hodler and Raschky (2014) document the existence of regional favoritism in 126 countries. That study finds a significant effect of a leader's birthplace on the log of the average lighttime night in a region. It also finds a positive interaction between aid and birthplace, which Hodler and Raschky interpret as aid exacerbating the extent of

[1] See, for example, Boone (1996), Easterly et al. (2004), Rajan and Subramanian (2008), Doucouliagos and Paldam (2009), Dalgaard and Hansen (2010), Dreher and Lohmann (2015).

[2] Data reported in constant 2014 prices and obtained from OECD's Development Co-operation Report 2015.

[3] Throughout, we refer to non-humanitarian/food aid.

favouritism. There are a number of difficulties in using favoritism to instrument for aid, however. First, in many countries the aid budget is only a small portion of the total discretionary budget being influenced by the political elite. Favoritism may thus capture the allocation of non-aid spending and bias the measured effect of aid on growth. Second, regions that vote for a particular leader may do so with the expectation of returns – co-ethnic support for a President may be on the back of explicit campaign promises of post-election investment. Third, using birthplace of the leader alone limits the spatial and time variation of the possible instrument in countries where Presidents can remain incumbent for extended periods.

A number of features of Malawi over the period 2000–2013 help us address these concerns. First, aid comprises a substantial portion of the budget controlled by the President. Over our period of study, aid is 73% of development expenditures in Malawi.[4] As we argue below, non-development expenditures are not subject to the same Presidential interference. Second, we show that votes in Malawian elections are not historically along ethnic lines. Third, the political environment over our study period is particularly volatile with three different Presidents and three different ruling parties. As a result, we have substantial variation over time in both of our instruments.

This study makes use of two key datasets. The first is of sub-national allocation of foreign aid projects which comes from Malawi's Aid Management Platform (AMP). AMP contains 623 different projects from 43 different donors comprising US$7.1 billion in aid (which is 82% of the total over our period). The AMP was initially based on AidData (see Peratsakis et al., 2012), since it was created using data collected during the geo-coding exercise conducted in conjunction with AidData. A benefit of using the AMP is that it contains annual figures (commitments and disbursements) as well as the planned implementation period as per the project contract. AMP data also takes into account project extensions or modifications (to, for example, project length or locations). The second set of data is nighttime light data which is used to proxy for economic activity. We thus have an exceptionally high level of information on actual annual disbursements of aid. There is a growing literature that finds nighttime light images can be used as a proxy for output growth and correlate well with other GDP-based measures of economic growth.[5] In addition to these data, we use district and year fixed effects as well as employing a wide range of district-level controls, including population density, non-development public expenditure, the poverty rate and rainfall. We also control for a variety of measures of development need, such as gross primary school enrolment, the number of classroom buildings, life expectancy, infant mortality and maize production as well as the number of people in a district that are food insecure.

Our contribution is related to the existing body of literature on aid effectiveness. After the early work of Boone (1996), cross-country studies have used instruments such as population size (Burnside and Dollar, 2000; Rajan and Subramanian, 2008) or bilateral relationships (Bjornskov, 2013). However, these approaches suffer from possibly direct effects on growth (see Bazzi and Clemens, 2009; Dreher et al., 2013). Temple and Van de Sijpe (2015) studies the consequences of aid for macroeconomic ratios. They find that aid increases consumption and has an impact on investment with a lag. Galiani et al. (forthcoming) uses a convincingly excludable instrument and identifies a sizeable impact of aid on real per capita growth. Studies at a regional level have found mixed evidence of a causal effect of aid on growth. To address causality, Dreher and Lohmann (2015) use an interaction between a country's crossing of the IDA

[4] Data from Ministry of Finance's annual Financial Statements)

[5] See Henderson et al. (2012) Michalopoulos and Papaioannou (2013), Lowe (2014) and Storeygard (2014).

threshold and a measure of the region's historical probability of receiving aid (see Nunn and Qian, 2013). Dreher and Lohmann find no effect of aid when using this instrumental variable. Dreher et al. (forthcoming) find that the effect of short-term political favoritism at a country level reduces the effectiveness of aid. Our estimates of the effect of aid may be lower bounds for the true causal role played by aid.

There are recent papers that consider the impact of aid in Malawian regions. Rajlakshmi and Becker (2015) investigates the allocation and effectiveness of geo-coded aid projects from 30 agencies over 2004-2011. They find that aid reduces disease severity and diarrhoea incidence while it also increases school enrolment. Dionne et al. (2013) also use co-ethnicity to understand the allocation of aid across districts. In their study, aid has a limited impact on health and education outcomes. Marty et al. (2017) finds that health projects reduced the incidence of malaria and improved self-reported health outcomes.

Our study is also related to the literature on the ethnic and political distribution of resources in African countries. Posner (2005), Wrong (2009), Francois et al. (2015) and Hodler and Raschky (2014) find evidence for the importance of ethnicity in the distribution of resources (including development aid). A growing literature following Alesina and Dollar (2000) has found a role for political influence in both the distribution of aid and in diminishing its effectiveness in generating development (see, for example, Dunning, 2004; Heady, 2008; and, Jablonski, 2014). We use these insights in the particular context of Malawi to motivate our instruments.

The rest of this paper is organized as follows. We discuss the Malawian political and economic context in Section 2. In Section 3 we introduce the data and develop our empirical strategy in section 4.Section 5 presents our main results first at the level of 193 constituencies, with an available but limited set of controls, and then at the level of the 28 administrative districts with a wider set of controls. Section 5 also presents a number of robustness checks. Section 6 considers the effect of aid by project type, investigates the dynamic effects of aid and explores the existence of spatial spillovers. Finally, Section 7 offers some concluding remarks.

2 Malawi

Malawi is a landlocked country in South Eastern Africa with a population in 2015 of 17.2 million (up from 3.6 million in 1960). With few natural resources, 85% of its population is rural and relies upon small-scale subsistence farming of the staple food, maize. Over 29% of GDP comes through exports and over half of that export revenue comes from one crop (tobacco). Malawi has historically suffered from high poverty, poor health outcomes and volatile growth. Nearly half (47.8%) of children under five years of age are malnourished according to stunting data (the average for sub-Saharan Africa is 39.9%. Based on figures from 2010, 70.9% of the population live below $1.90 a day (2011 PPP).[6] The 2015 United Nations Human Development Index (HDI) ranked Malawi 173rd out of 186 countries.

[6]Data from Malawi National Statistical Office (NSO), World Bank, and the Human Development Report (2015).

2.1 Foreign Aid

Given the low tax base, and the susceptibility to domestic supply and international demand shocks, foreign aid has constituted a significant proportion of government expenditures. Over 40 multilateral and bilateral development partners[7] have contributed an average 40% of the national budget over the last decade (Malawi Government (2011)). Figure A.1 depicts ODA[8] per capita (panel a) and aid as a share of GNI (panel b) for Malawi against the average for Sub-Sahara Africa (SSA) and the average for Low Income Countries (as defined by the World Bank for the World Development Indicators). As can be seen, the per capita trend in aid flow to Malawi has followed that to other LICs but, since it is one of the poorest, aid as a share of income is relatively high. The majority of aid goes to health, education, agriculture and governance. Over the period of study, 8% of assistance has been given as humanitarian (non-development) aid.

2.2 Politics and Spending

Malawi is divided into 28 administrative districts with the capital in Lilongwe. Following independence from British colonial administration in 1965, Malawi was for nearly three decades a one-party State. Since 1993, Malawi has been a multi-party democracy with a Parliament and President elected every five years. As can be seen in Figure A.2, elections have regularly resulted in a change of President and party. However, as typical in many African countries, a 'Big Man' syndrome persists in Malawi – the President has significant discretionary power and tends to favour a group of trusted co-ethnics (see Francois et al., 2012). Some of the resources of the State are the patronage of this powerful ruler. In a country without any notable natural resources, state resources in Malawi means control over bureaucratic positions, powers to allocate rents (including foreign aid), public services and determine policies and their beneficiaries.

Important for the purposes of this paper is the nature of the political system as it relates to control of expenditure. Public spending is divided into the recurrent budget and the development budget. As we describe below, the Malawian development budget is that portion of the public spending that is under the most influence of the President and this development budget is nearly three quarters of this is comprised of development assistance from overseas.

3 Data

This study uses parliamentary and district level data for the period 1999 to 2013. There are 193 constituencies and 28 administrative districts in Malawi (see the left panel of Figure A.3).[9] In most speci-

[7] Among these are USAID, the World Bank, the Global Fund (to fight HIV/AIDS, malaria and tuberculosis), the European Union (EU), and, more recently, China.

[8] ODA is technically the same as development aid, as classified by OECD. It excludes aid to non-governmental organisations and charitable institutions. It covers all the aid disbursed to governments.

[9] Table B.1 gives all data and sources used. Table B.2 lists all the districts in Malawi.

fications we omit those constituencies or districts that were recently formed or split.[10] Further the two major cities of Lilongwe (the capital city) and Blantyre are omitted from most estimations. In constituency regressions we also omit each district's Boma (the constituency in the district that hosts administrative office).

Data on projects financed by foreign aid is from the Aid Management Platform (AMP), managed at the Ministry of Finance (MoF) in Malawi. The AMP is the government's main tool for tracking and reporting progress of aid-funded activities in Malawi and began with AidData's Malawi Geocoding Project which was the first effort to compile comprehensive geocoded data of all donor activities in a single recipient country in Africa. Based on information reported by both donors and the Malawi Government, the AMP contains geocoded data on projects from over 40 donor agencies covering 623 projects across 706 project locations. These projects total $7.1 billion (82% of total foreign aid to Malawi between 2000 and 2013). Figure A.3 (right panel) shows a map of Malawi with the geocoded projects. The AMP data disaggregates cumulative project totals into annual commitments and actual disbursements of each project in a particular district. For this study, we use actual disbursement figures. Those projects in the AMP without location information have been excluded, reducing the number of projects used in this study to 593 projects.

To proxy for economic growth we use nighttime light data.[11] Geographers (Elvidge et al., 1997; Sutton et al., 2007) and ecologists (Doll et al., 2006) first used light density to study urbanization. Chen and Nordhaus (2011) and Henderson et al. (2012) subsequently showed that light intensity at night is a good proxy for local economic activity. By using luminosity, we have reliable data at high spatial resolution for those countries in which data availability is otherwise limited. Among more recent examples of its use are Michalopoulos and Papaioannou (2013), which studies development in Africa, and the aforementioned Hodler and Raschky (2014). We use the light data with intercalibration correction for sensor degration and orbital changes, though this makes little difference when studying one relatively small country (see Elvidge et al., 2014).

A further advantage of basing our study on Malawian data is that we can check our proxy for development using the World Bank Living Standards Measurement Study in the years 2010, 2011 and 2013. The Integrated Household Surveys contain a great deal of information including real annual household consumption. In Table B.3 we report correlations between the log level of light density and the District level average of the log level real annual consumption per capita and per household. The correlation is high and consistent across years. Moreover, the correlation between average growth in real consumption and growth in light density is just as strong. The correlation between the growth in light density and the growth in per capita consumption is 0.53 over the period 2010–13.

Figure A.4 depicts luminosity at the pixel level for Malawi in 1999 and 2010 against the district borders.[12] For analysis in this paper, we calculate average light density at the constituency or district level (average

[10] Neno and Likoma districts were formed after splitting from Mwanza and Nkhatabay districts respectively. For these new districts, some data on most of the variables is missing not because they are not necessarily reported, but rather because for most of the years under study they were still being reported as part of the districts they were split from. Thus they are entirely excluded but they are subsumed as part of the parent districts.

[11] The light dataset is available at the National Geophysical Data Center's website: `http://ngdc.noaa.gov/eog/dmsp/downloadV4composites.html`.

[12] Maps for administrative districts are downloaded from DIVA-GIS, available at `http://www.diva-gis.org/gdata`

light intensity per square kilometer) in each year over the period 1999 to 2013.

At constituency level, we use a number of additional controls including the log of population and the poverty rate from the National Statistic Office (NSO) census reports. Data on party affiliations of Members of Parliament, as well as list of Cabinet Ministers, is from Parliamentary Hansards found at the Malawi National Assembly library. Rainfall data is from meteorological reports provided by the 22 meteorological stations that form the weather network in Malawi. District-level regressions permit a wider range of controls controls. We include data on local public spending excludes aid (since aid is managed by central government Ministries), infant mortality, life expectancy and rate of food insecurity are from various reports from the NSO. Data on maize yields is compiled by the Ministry of Agriculture and Food Security (MoAFS). Education data (gross primary enrolment and number of primary school classroom buildings) is from the Ministry of Education, Science and Technology. Table B.1 gives a summary of the data used in the analysis and their sources while Table B.4 shows descriptive statistics of the variables in the baseline sample.

4 Empirical strategy

We wish to estimate a light density growth regression of the following form,

$$\Delta LD_{i,t} = \beta_0 + \beta_1 LD_{i,t-1} + \beta_2 Aid_{i,t} + \mathbf{X}'_{i,t}\boldsymbol{\beta} + \mu_i + \gamma_t + \varepsilon_{i,t} \tag{1}$$

where $LD_{i,t}$ is log light density in constituency/district i at period t, $Aid_{i,t}$ is the log of aid disbursements, $\mathbf{X}$ is a vector of control variables and μ_i and γ_t are constituency/district and time fixed effects. Robust standard errors are clustered at the level of the district in constituency regressions, and at the level of the three regions in district level regressions.

A first concern with the specification in equation (1) is that aid disbursements are not random. In particular, we may expect that development assistance is given to those areas with the lowest expected growth, or those that have suffered negative shocks in the past. Conversely, it may be that, particularly *within* a country, assistance is given to those areas that show the greatest potential for generating growth. Second, since we are using a proxy for economic activity is likely to be measured with error with subsequent attenuation bias. Third, there may be unobserved variables related to both aid and development, that make the role of aid appear significant.

To account for these concerns we employ two novel instruments that are related to the discretionary powers of the President to favour those in his/her inner circle but are not, we argue, related to development through other channels. We thus use our instruments in the following system,

$$\Delta LD_{i,t} = \beta_0 + \beta_1 \widehat{Aid}_{i,t} + \beta_2 LD_{i,t-1} + \mathbf{X}'_{i,t}\boldsymbol{\beta} + \mu_i + \gamma_t + \varepsilon_{i,t}, \tag{2}$$

$$Aid_{i,t} = \alpha_0 + \alpha_1 z_{i,t} + \alpha_2 LD_{i,t-1} + \mathbf{X}'_{i,t}\boldsymbol{\alpha} + \mu_i + \gamma_t + \nu_{i,t}, \tag{3}$$

where z is an instrumental variable. For the instrument to be valid, it must be relevant ($\alpha \neq 0$) and exogenous ($cov(\varepsilon, \nu) = 0$).

We discuss a number of potential concerns about the validity of each of these instruments below. One issue that is common to each regards the nature of the discretionary powers that the President has. It may be that the President allocates a large portion of State resources in addition to foreign assistance. In many countries, this would be a valid concern but, by focusing on Malawi, it is less problematic. The Malawian Development Budget is that portion of the public spending that is under the most influence of the President. Other departmental expenditure is comprised of recurrent expenses such as salaries, interest payments on public debt, procurement of goods and services, payment of pensions and gratuities, etc. There is limited scope for the President to exert discretion on the allocation of these budgets across districts. The allocation of transfers to districts is determined by the National Local Government Finance Committee (NLGFC) – a quasi-governmental institution mandated with effective mobilization, equitable distribution and efficient utilisation of financial resources in local councils. Finally, in Malawi, the Development Budget is 73% foreign aid over the period of study.

4.1 Ethnic Affinity as Instrument

Our first instrument is the proportion of the population in a district or constituency that is co-ethnic with the sitting President. Malawi people are of Bantu origin and comprise many different ethnic groups. Malawi Human Rights Commission (2005) finds that there are about 15 ethnic groups in Malawi. The major ones are shown in Figure A.5. The largest group, the Chewa people, make up 38.4% of Malawi's population and are mainly found in the center. As shown in Figure A.2, over our study period the President is either Lomwe (17.6% of the population, mainly in the South) or Yao (13.5%, in the East).

The relevance condition requires that the instrument be a predictor of aid disbursements. There is already evidence that disproportionate amounts of aid are allocated to an incumbent President's district of birth, especially in Sub Saharan Africa. Franck and Rainer (2012) use data from 18 African countries over 50 years and find significant evidence of large and widespread ethnic favoritism in the allocation of aid resources. As an example of this in Malawi, Figure A.6 shows district-level aid disbursements in Malawi under two Presidents of different ethnic origins. Despite the fact that President Bakili Muluzi received a majority of votes in districts in the Southern region, the Yao districts of Machinga (his birth district), Mangochi and Balaka are allocated disproportionately higher amounts of aid than any of the other districts. When President Bingu wa Munthalika of Lomwe origin was in office, and despite getting a bigger share of votes in the Yao districts than he got from his birth district, Figure A.6 shows that the Lomwe districts of Thyolo, Mulanje and Phalombe received more aid than the Yao districts.

One concern with the exogeneity of this instrument relates to the connection between co-ethnic voting behavior. There is a large literature on the role of ethnicity in African voting behavior (see, for example, Posner, 2005). If districts supported Presidential candidates primarily along ethnic lines then a President's ethnicity ceases to be random – a district's vote is for the candidate that will send the aid their way. If it is the poorest districts that most vote along ethnic lines, then our instrument is not exogenous.

There is evidence against this clientelistic interpretation, however. Recent studies in Ghana (Lindberg and Morrison, 2008) and South Africa (Anyangwe, 2012) find no or very limited evidence that voting is subsumed in ethnicity. For Malawi, we report in Appendix Table C.1 results from a regression of the vote share that a winning candidate received from each district in the 1999, 2004 and 2009 general elections on the proportion of the winning candidate's co-ethnics in a district. Ethnicity does not seem to affect the vote share that a candidate gets in the district, being found to be statistically insignificant. In contrast, party identification, a dummy variable that takes the value 1 if the winning President's party has a parliamentary majority in that district, or 0 otherwise, is statistically significant.

Finally, it is important to consider whether there are any other channels through which ethnicity could affect the level of economic activity at the district level. For instance, it may be that the cultural practices of a particular ethnic group are more consistent with higher economic activity. To account for this possible channel, for each of the five largest ethnic groups we include a dummy variable equal to 1 if a given district has a majority of that ethnicity.

4.2 Political Switching as Instrument

Another determinant of aid distribution can be the desire of the incumbent President to consolidate their political base. There is evidence that aid is distributed towards electorally-strategic regions and away from opposition dominated regions (Briggs, 2012; Jablonski, 2014). Our second instrument is thus the proportion of Members of Parliament (MPs) in a district that defect from the political party with which they won the Parliamentary seat to the party of the ruling President. In constituency regressions this is a dummy variable (i.e., the proportion is 1 if the constituency MP defects).

Political affinity is often viewed in a similar way as ethnicity in African politics.[13] In this view, a leader is constrained in exercising full ethnic exclusion since doing so may not adequately sustain a coalition of support. In order to consolidate their political base, leaders look to co-opt other powerful elites, often from ethnic groups in regions distinct from their own. In Malawi, this co-opting often takes the form of defection ('crossing the floor') rather than the formation of cross-party coalition governments. As in many Sub-Saharan countries, once the President is in power the biggest barrier to total control is not having a majority representation in Parliament. Defection is induced by the promise of personal gains (i.e., public office) and a flow of aid to the defecting MPs region. Districts that gave the President only limited electoral support may now be favored with aid flows.

Crossing the floor comes with risk for the politician, however. First, Section 65 of the Malawi Constitution prohibits MPs from crossing the floor. This is intended to keep the composition of Parliament close to that determined by the vote. By crossing the floor, they risk their seats being declared vacant. Second, defection reduces the chances of being re-elected in the next general elections. As discussed, party identification is key in voter behavior. By defecting, an MP is generally joining a party that does not have a stronghold in their own district. For example, of the 68 MPs that defected to the DPP in 2005, 35 MPs came from districts in the Central and Northern regions where the DPP did not have wide support. Of

[13] See Joseph (1987), Van de Walle (2007), Arriola (2009).

these, 32 seats were contested in the 2009 general elections for the DPP and 21 lost their seats.

Despite the possible costs of defection it has happened frequently in Malawi, especially over the period 2005 and 2012. The need to consolidate political power can emerge when coups threaten, when a sitting President dies or when the ruling political party is changed without an election. Table B.5 provides the breakdown of the composition by party of Malawi's Parliament. This period of volatility since 2005 was the result of non-electoral events. In 2005, Dr Bingu wa Munthalika formed the Democratic Progressive Party (DPP), abandoning the United Democratic Front (UDF) on whose ticket he contested in the 2004 elections. The DPP became the ruling party and the UDF, which had won the 2004 elections, became part of the opposition. In 2011, the then Vice President Dr Joyce Banda formed a new party, the Peoples Party (PP), abandoning the DPP with which she was Dr wa Munthalika's running mate in 2009 elections. Upon Dr wa Munthalika's death in 2012, she assumed the presidency and her PP became the ruling party while the DPP moved to opposition.

An example of the impact of the reconstitution of parties on aid disbursement is the period from 2004–2005. When Dr wa Munthalika abandoned the party with which he was elected president in 2004 (UDF) to form his own DPP in 2005, the DPP initially had no MPs in Parliament and had difficulties in passing policies and legislations. Through inducing defections, the DPP managed to co-opt MPs particularly from the Northern districts (see figure A.7). As can be seen in A.6, from 2005 some of these Northern region districts received significantly more aid disbursement than before.

For this instrument to be valid, we require that the likelihood of an MP's defection is unrelated with future economic growth in the constituency they represent. The motivation to defect depends on the type of defector. Independent MPs are generally the first to be targeted by a power-consolidating leader. They are often easily swayed by the opportunity to make quick and easy personal gains, though some may even be appointed into key positions. As the Table B.5 shows, almost immediately after each election, the number of independent MPs reduce to rapidly to 0 in subsequent years (from 40 in 2004 and from 32 in 2009). Figure A.7 shows that many of the newly DPP regions were formerly independent. A second type of defector is an influential, veteran MP that has already served for a long period. For these power brokers, where they lose their positions when the President changes, promise of re-appointment into the positions that accord them powers, and development assistance in their district, induces their switching of parties. A third type of defector is a member of a smaller or breakaway party. Table 4 shows that the number in 'Other' is generally nonzero in an election year but declines to zero once the winning party attracts them to defect. During 2004 election, National Democratic Alliance (NDA), which broke away from the UDF after a leadership dispute, won 9 seats and Peoples Progressive Movement (PPM) (another party formed from disputes) won 6 seats, however by 2005 when the DPP was formed and took power, they all defected and joined the new ruling party.

5 Main Results

We present results first at the constituency level and then at district level. Regressions at constituency level benefit from a larger cross section and the ability to cluster standard errors at the district level but

limits the set of control variables. District level regressions also permit a series of robustness checks and a wider range of extensions, which we introduce in Section 6.

5.1 Constituency Results

Table B.6 reports results using both instruments at the constituency level. All regressions include constituency and year fixed effects with robust standard errors clustered at the level of the 24 districts. In Column 1 we report the OLS regression results using all controls. The OLS result with all controls suggests a positive and statistically significant connection between growth and the log of aid. Two-stage least squares results are in columns 2–7 with a stepwise addition of control variables. The statistical significance of each instrument in the first stage regression is strong in all specifications. When we instrument for the log of aid using political switching and ethnic affinity, the size of the coefficient on aid increases and it is statistically significant at the 1% level across all specifications in Columns 2–7.

As we would expect, the coefficient on initial light density is negative and significant in all specifications, capturing a conditional convergence across districts. The log of population and the log of rainfall are positively related with light density growth. The poverty rate is not significant while a dummy for whether the constituency is represented by a minister and the local vote share for the President's party are all generally insignificant. The log of aid disbursements is highly statistically significant in all specifications.

Across all specifications, the Anderson-Rubin p-value is less than 0.05 and the F-statistic for instrument exclusion is greater than 10. The p-value of the Hansen J-statistic is between 0.33 and 0.44, so we fail to reject the over-identifying restriction across all specifications. Results from regressions using only the ethnic affinity instrument are in Appendix Table C.2; that from using only the political switching instrument are in Appendix Table C.3. Anderson-Rubin and KP statistics show that the instruments also perform strongly individually.

Our preferred constituency-level specification is that in Column 8 of Table B.7. This implies that a 10% increase in aid disbursed to a district causes light density to increase by 3.44% per year. The magnitude of the effect is close to that found in Galiani et al. (forthcoming), although that study uses real GDP growth as a dependent variable. While some of the effect of the aid disbursement may be to re-allocate activity across space, the results from district-level regressions also support the finding that aid is causally important.

5.2 District Results

Table B.6 reports results using both instruments at the district level. In addition to the baseline controls used at the constituency level, we add the log of public spending since the discretionary power of the President may influence spending other than aid. Regressions include district and year fixed effects. At the district level, the OLS regression with all controls (column 1) suggests a positive but statistically weak connection between growth and the log of aid.

Two-stage least squares results are in columns 2–11. The statistical significance of each instrument in the first stage regression is strong in all specifications. When we instrument for the log of aid using political switching and ethnic affinity, the size of the coefficient on aid increases and it is statistically significant at the 1% level across all specifications in Columns 2–11. The increase in the coefficient between OLS and 2SLS can be the result of measurement error. This is common to recent studies on aid and growth (including Dreher and Lohmann, 2015 and Galiani et al., forthcoming).

Public expenditure (excluding foreign aid) is insignificant, which is reassuring if we are concerned that an affect on growth may operate through a President's influence over non-development spending. Districts with greater population density grow faster, which is consistent with the literature on urbanization and development (see Desmet and Henderson, 2015). The log of rainfall appears to play no role in explaining variations in growth. In Column 3 we add the share of votes in the district for the winning President. Column 4 adds a dummy variable for whether a Cabinet Minister is from that district. Columns 5 and 6 add measures of education in a districts. The log of the gross primary enrolment rate is not statistically significant. The coefficient on the number of classroom buildings is positive and statistically significant in the preferred specification with all controls (column 10). Columns 7 and 8 add health outcome variables while Columns 9 and 10 add measures of agricultural security and production. All specifications except that in Column 11 exclude the districts with the biggest cities (Blantyre and the capital Lilongwe) since, as political and administrative centers, these may behave differently. As can be seen from comparing Columns 10 and 11, the inclusion of these districts does not qualitatively affect results.

Across all specifications, the Anderson-Rubin p-value is less than 0.05 and the F-statistic for instrument exclusion is greater than 10. The p-value of the Hansen J-statistic is between 0.33 and 0.55, so we fail to reject the over-identifying restriction across all specifications. Results from regressions using only the ethnic affinity instrument are in Appendix Table C.4; that from using only the political switching instrument are in Appendix Table C.5. Anderson-Rubin and KP statistics show that the instruments also perform strongly individually.

Our preferred specification is that in Column 10 of Table B.7. This implies that a 10% increase in aid disbursed to a district causes light density to increase by 1.5% per year. The difference in the size of the coefficient may result from aid causing some movement of economic activity *across* constituencies *within* a district. Since the standard deviation of the log of aid is 1.1076, the effect of a one standard deviation increase in aid disbursement is to increase light density by 16.6%. The effect of aid on growth is, in absolute terms, quantitatively important for short-run growth.

5.3 Robustness Checks

We conduct a number of additional robustness checks at the district level in Tables B.8 and B.9. First, we may be concerned that proximity to Malawi's capital (Lilongwe), where most international donors have offices, could make it more likely that a district would receive foreign aid because they have lower transaction costs of delivering aid and donors could have greater exposure to these areas. Further, such districts may benefit from spillover of urbanization from the capital city and hence have higher light density. Column 1 of Table B.8 controls for distance from each district to the capital and we see no little affect on

the estimate on aid. Column 2 includes the land area of each district. To test whether ethnicity may still play a role in growth, we include a dummy variable for the five major ethnic groups in Malawi. Columns 3–7 looks to account for possible economic differences between ethnicities. These include a dummy variable equal to 1 if a district majority of that ethnicity. The political switching instrument is measured by MPs that switch to the president's political party. Since there is heterogeneity across districts on the number of constituencies, one may suspect that districts with more constituencies (and hence more MPs to switch) may receive more aid. Column 8 adds the number of constituencies and we see no impact on the role of aid.

Lake Malawi is the center of the country's tourism industry. As such districts along its coast may benefit from preferential tourism-specific investments and may have higher light density than other districts. Table B.9 Column 9 includes a dummy for whether a district borders Lake Malawi. Column 10 includes a dummy for districts that grow one of the major cash crops in Malawi namely tobacco, tea, cotton and sugar. Since the cash crops are Malawi's main source of exports, cash crop growing districts may receive preferential agriculture aid allocation as a way of boosting production for the economy. The results suggest that neither being coastal nor growing a cash crop significantly changes the results.

Malawi is divided into 3 administrative regions; Northern, Central and Southern region. The results in columns 11-13 show that inclusion of regional dummies does not significantly alter the baseline results. Similarly, a further robustness check concerns the administrative differences between districts since regulations differ with regards to collection and use of revenues across different type of councils (city and town councils vs. district councils). Moreover, districts that have townships have a higher proportion of urban households within the townships. Column 14 introduces a dummy variable that takes the value 1 if a district has a town (or municipal) council rather than just a district council and we see no effect on the role of aid.

6 Extensions

We have detailed information on each aid project in addition to the geographical detail including the type of project and the nature of the funding (whether a loan or a grant; whether multilateral or bilateral donor). Moreover, one of the advantages of our identification strategy, is that it provides a way of isolating the variation in aid disbursement to different districts over time. We can thus look to understand impact of aid on growth over time.

6.1 Time Lags

In a first extension, we look at the effect of aid on growth over the medium-run. In Table B.10, we add lags of 1 to 4 years separately at first to the preferred specification from Table B.7. The results suggest a hump-shaped response of growth to an increase in aid flows, with a peak effect at one year since the aid was disbursed. The full specification with five lags, in Column 7, shows that the impact of aid is to increase contemporaneous growth, but that the impact of aid lagged one year is greater. Aid allocated two years

previously is statistically significant but quantitatively less strong. At 3-4 years lagged, aid disbursements no longer have an impact on growth.

6.2 Project Type

Some aid projects include information on the targeted outcome for the funding. Table B.11 shows results for those projects that go to agriculture, health and education (which comprise 56% of total aid flow in the dataset). Instruments perform relatively well for each of the sectors, apart from there is no connection between ethnic affinity and health aid. As can be seen, the largest coefficient is on aid to agriculture which makes sense given the importance of agriculture to the Malawian economy. However, the statistical significance is relatively weak. The most statistically significant impact on growth is from aid for education projects. There is no apparent connection between aid for health projects and short-run growth. Figure A.8 depicts the lagged effect of aid projects of different types. While health aid is not contemporaneously effective, it peaks and is statistically different from zero in the second year after the aid disbursement. The effect of an education project on growth peaks in the first lag. The impact on growth of agriculture projects is at its highest at the time of disbursement.

6.3 Funding Type

Table B.12 reports results of the effect of aid on growth broken down into the type of funding, multilateral or bilateral, grant or loan. The instruments work well in each of these types of aid except for loans. Table B.12 suggests that bilateral aid has a larger short-run impact on growth than multilateral aid. Individual countries, particularly China, have increased bilateral aid flows over recent years and these results suggest that the results from those projects in terms of growth have been successful. Moreover, grants have a greater impact than loans. However, the instruments have only a weak connection to aid flows when we focus on loans alone. This makes sense since donors who make loans will place conditions and will likely monitor the internal allocation and performance of the project much more closely than a grant.

7 Concluding Remarks

In focusing the disbursement of aid within one country, we have developed a new way of isolating the causal relationship between the flow of aid and the rate of growth. We have shown that there is a robust and qualitatively significant impact of aid on contemporaneous growth and a hump-shaped response up to two years after the initial disbursement.

The identification strategy we employ is particular to the political and institutional environment in Malawi. While there is evidence on the role of ethnicity (via birthplace) more broadly, the instrument based on attraction political defections could be tried in other countries. Malawi is among the poorest of the LICs, but the apparent success of aid in causing growth in this country suggests that some of the pessimism

regarding aid effectiveness that has emanated out of the mixed empirical evidence in recent years may have been misplaced.

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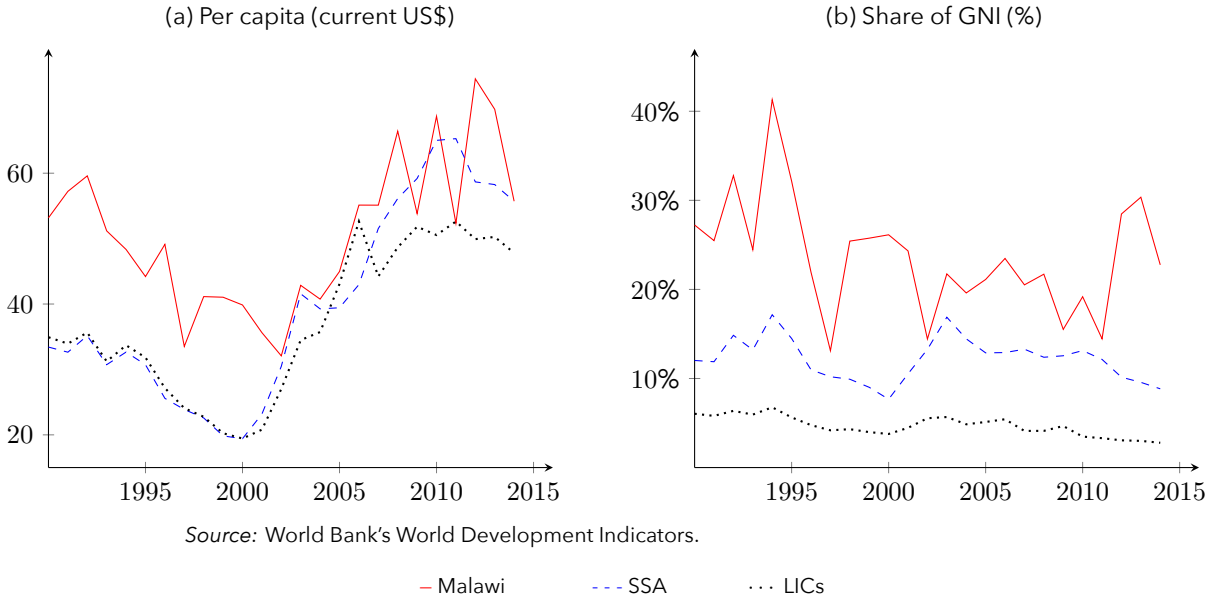
Appendix

A Figures

Figure A.1: Net aid to Malawi and other regions



Source: World Bank's World Development Indicators.

Figure A.2: Timeline of recent Malawian politics

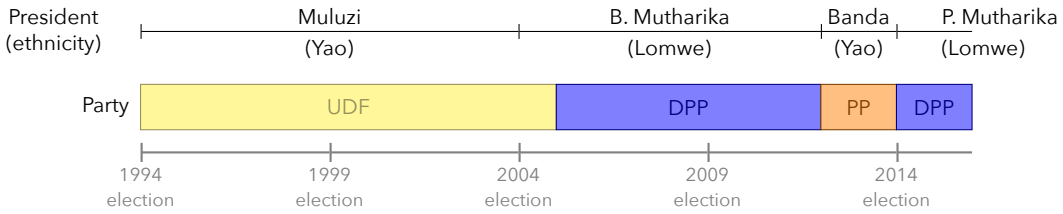


Figure A.3: Boundaries (l) and locations of geocoded projects (r)

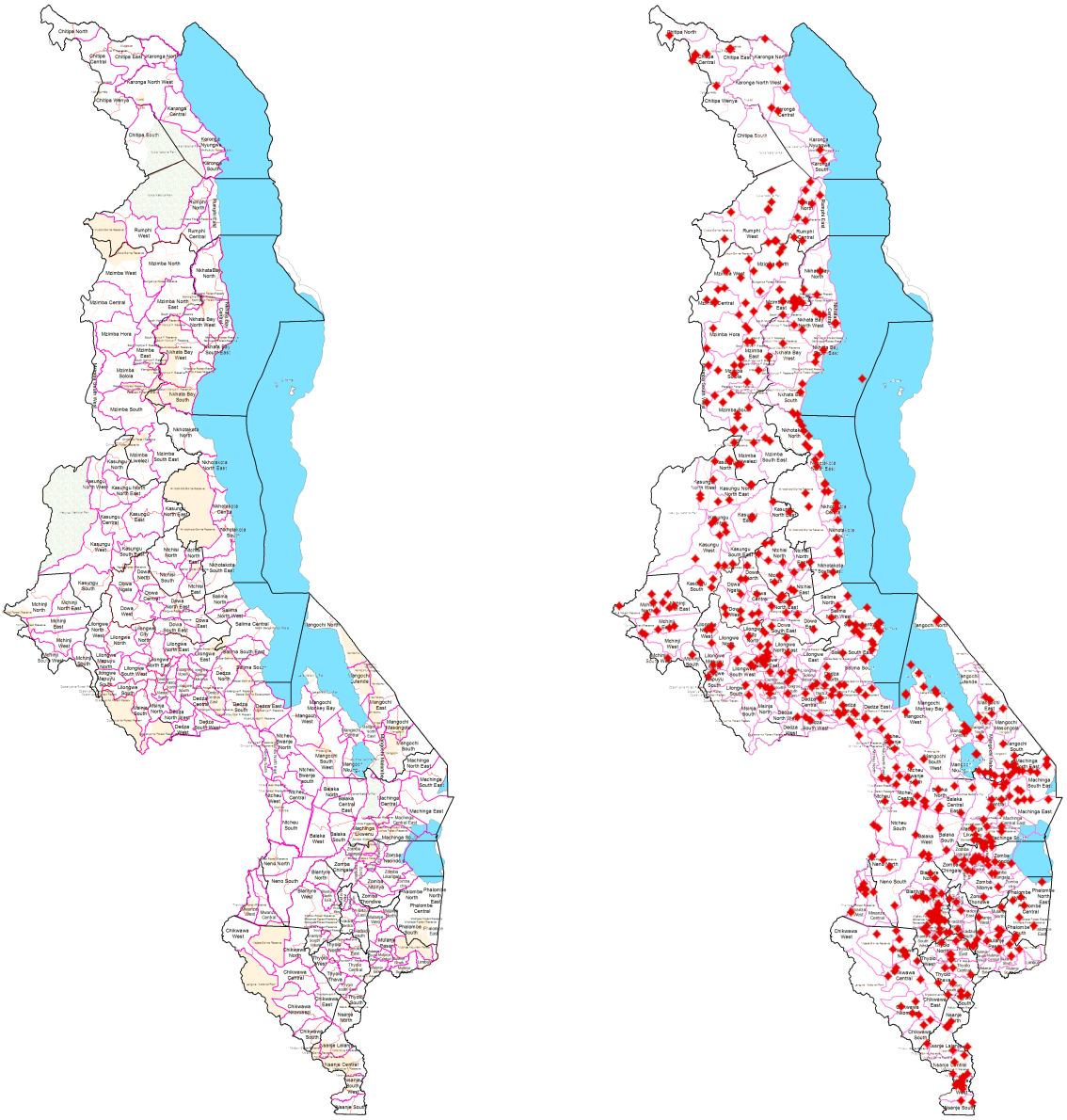


Figure A.4: Nighttime images for Malawi in 1999 (left) and 2010 (right)

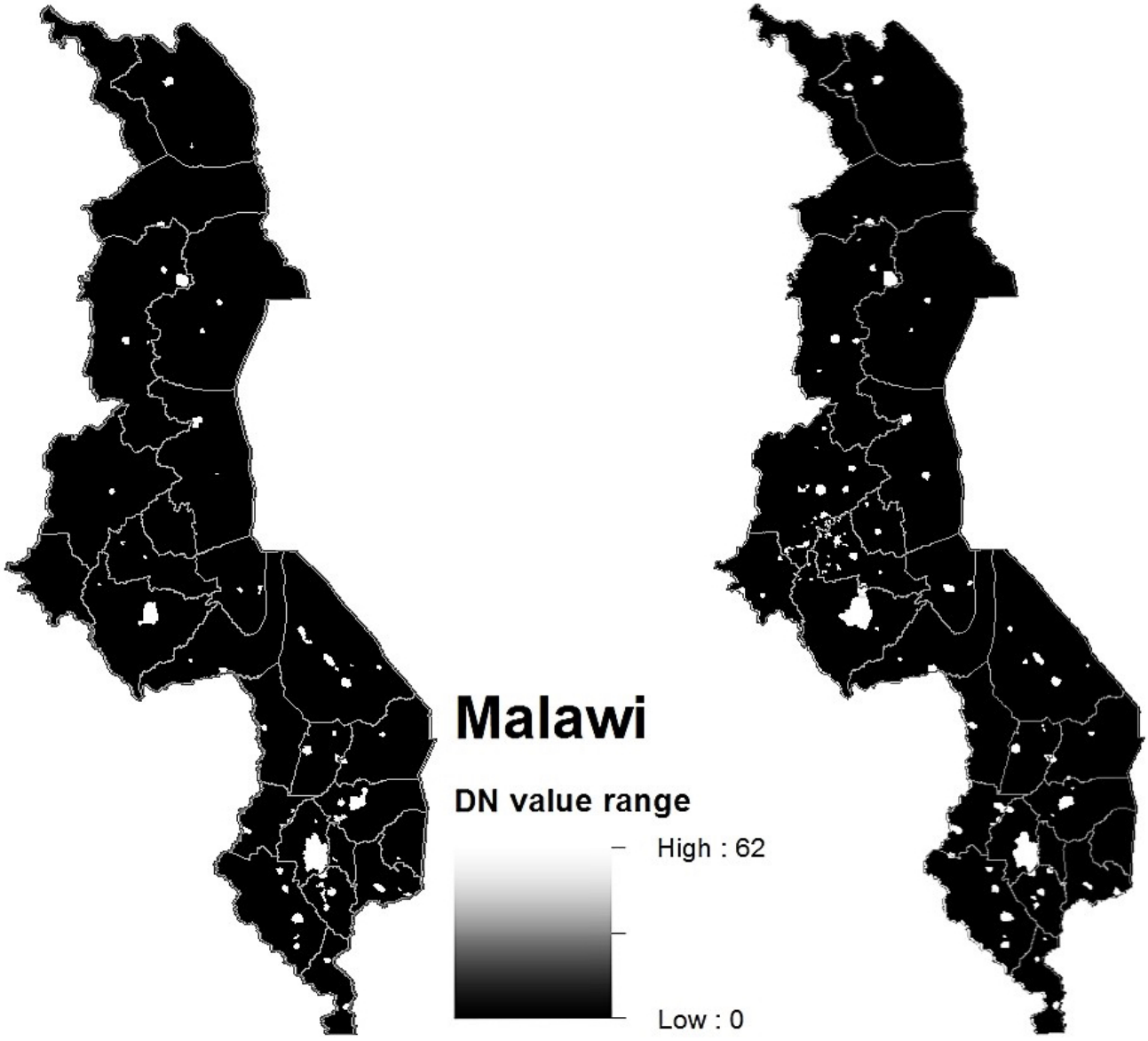
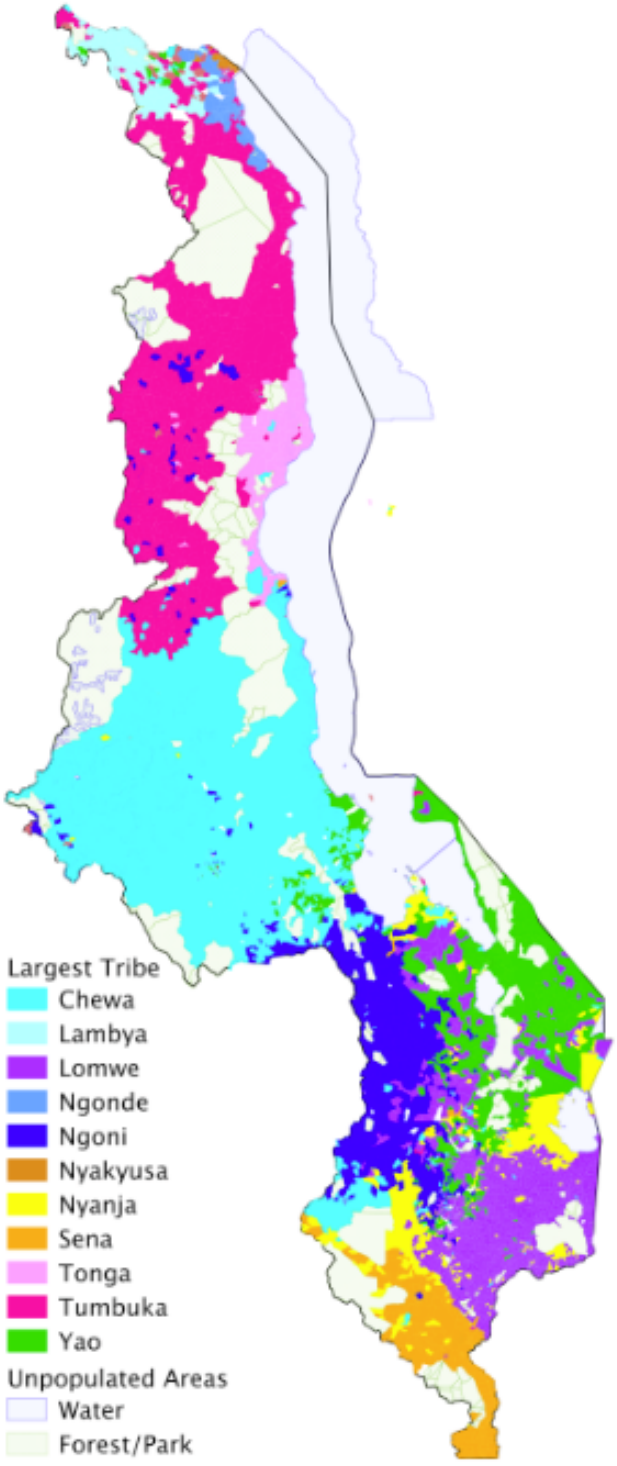


Figure A.5: Spatial distribution of ethnic groups in Malawi



Source: Figure from Robinson (2016)

Figure A.6: Allocation of aid under two Presidencies

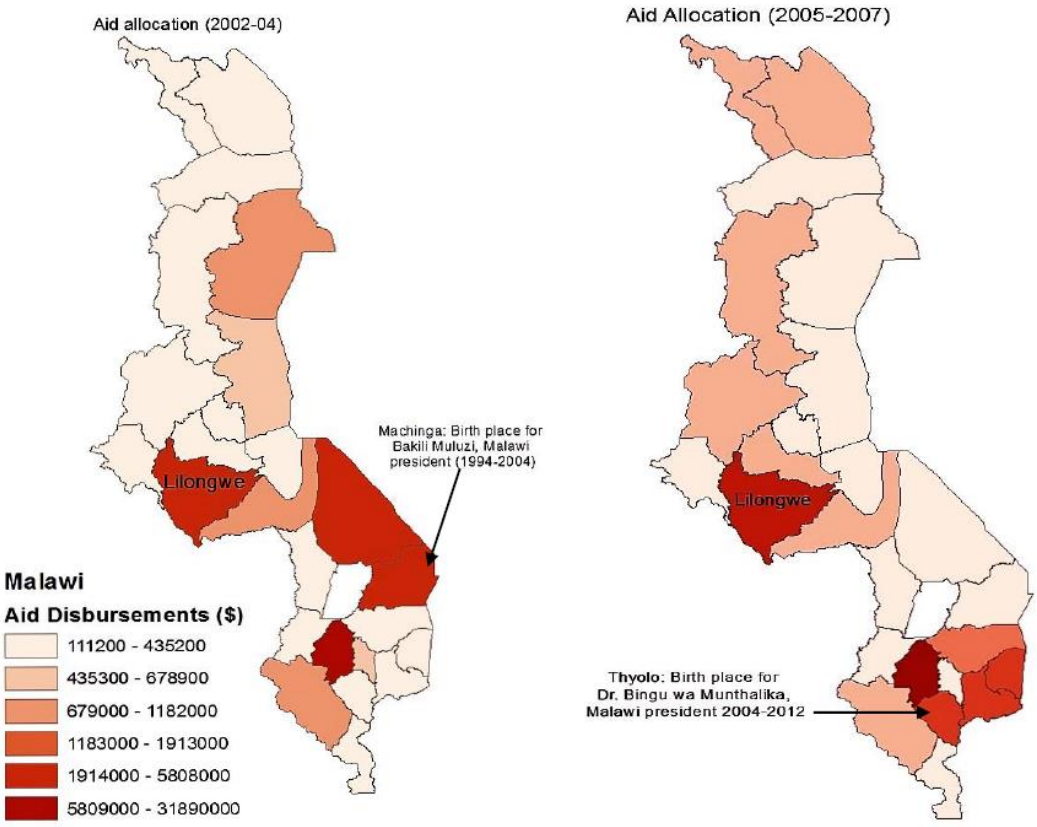
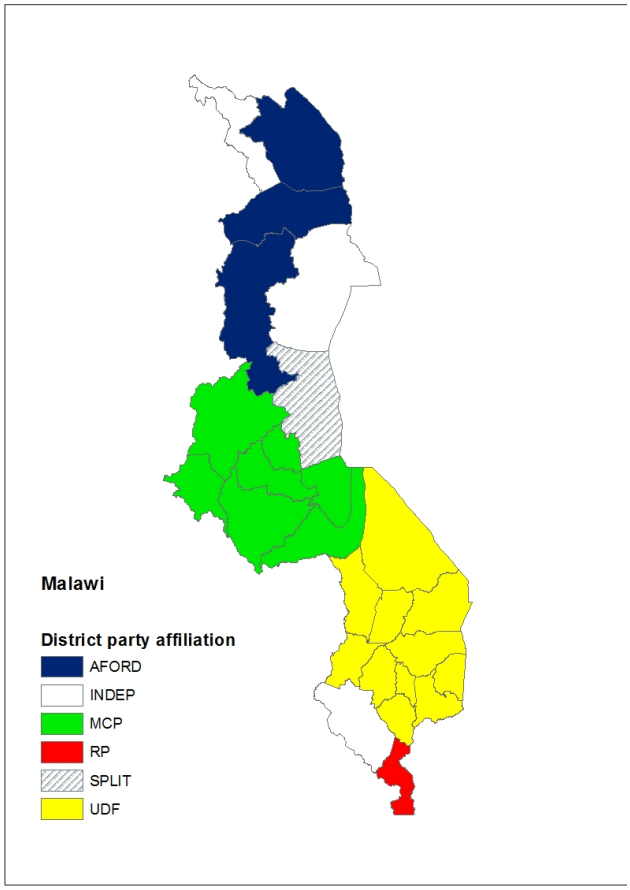


Figure A.7: Map of political change in Malawi between 2004 and 2005

(a) Malawi political landscape 2004



(b) Malawi political landscape 2005

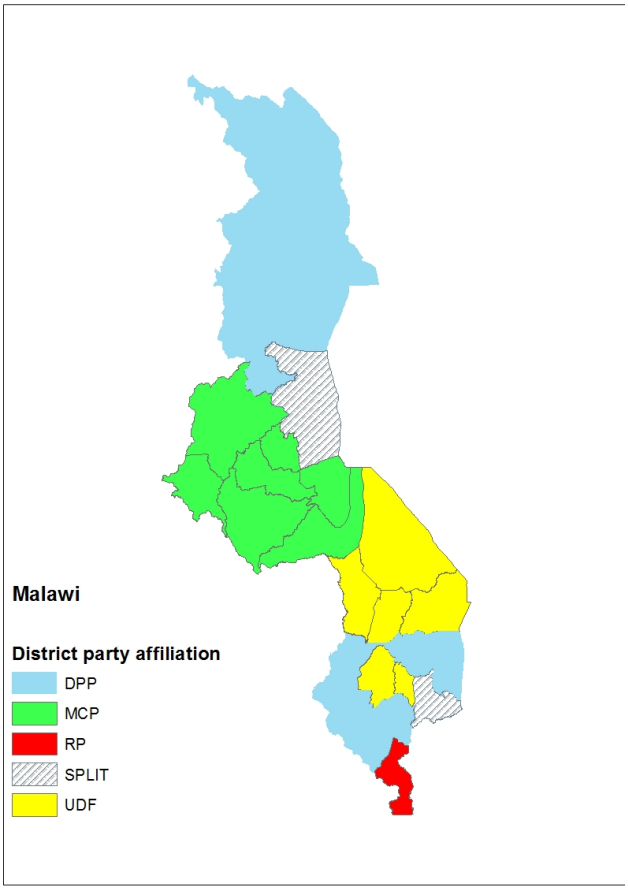
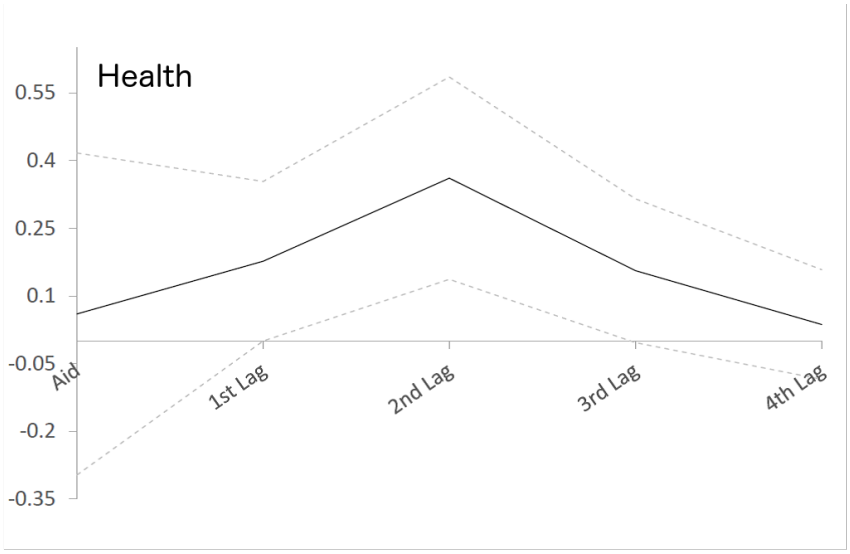
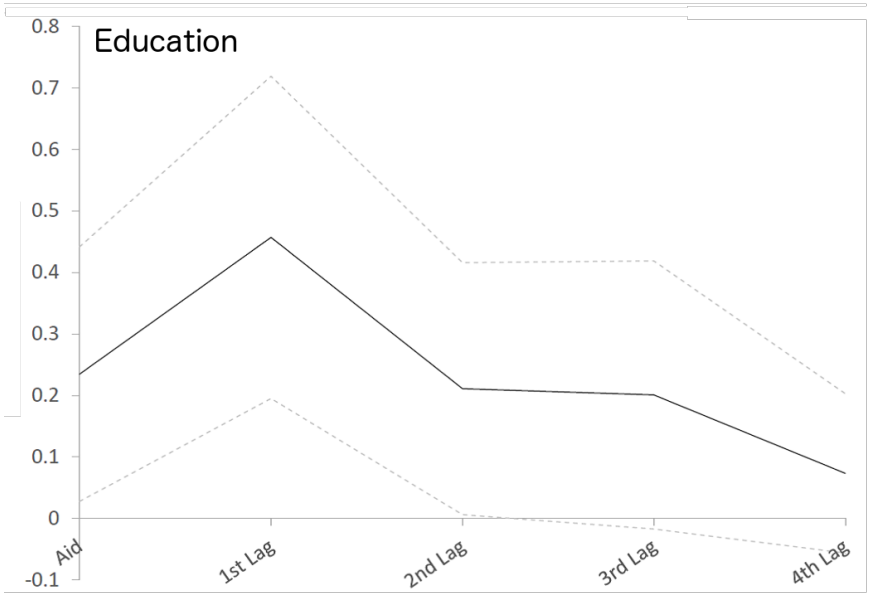
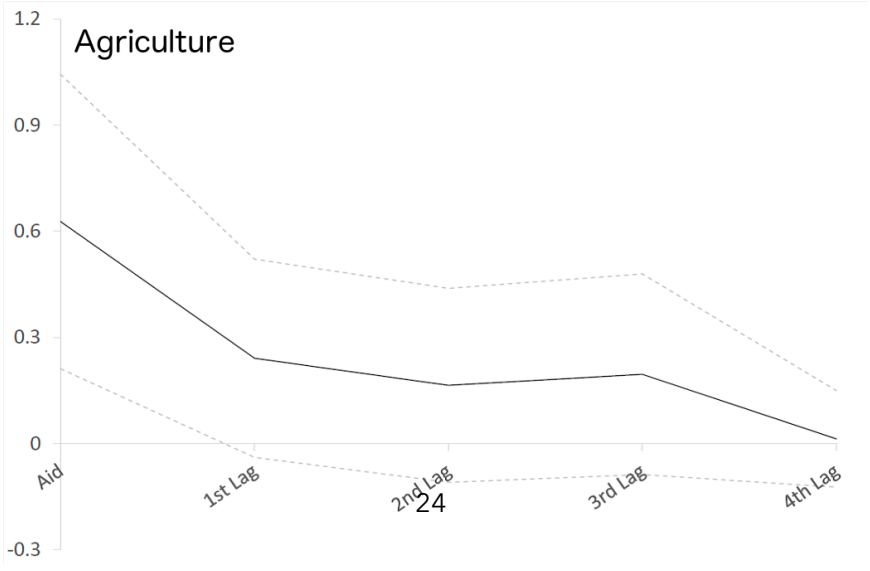


Figure A.8: Lagged growth effects by project type







B Tables

Table B.1: Data descriptions and sources

Variable	Description	Source	Years
Light density	Average nighttime light intensity per constituency or district	National Geographical Data Centre (http://ngdc.noaa.gov/eog/dmsp/downloadV4composites.html)	1999 - 2013
Household Consumption	District level averages of annual real consumption.	World Bank Living Standards Measurement Study, IHS3.	2010–11, 2013.
Distributed aid	Amount of aid distributed to each constituency or district, measured in million US dollars.	Malawi Ministry of Finance's Aid Management Platform (AMP) and AidData (http://www.aiddata.org)	2000 - 2013
Political Affinity	For constituency results, this is a dummy equal to 1 if the MP has defected from their political party to join the ruling party. For district results, it is the proportion of Members of Parliament in a district who defected.	Malawi Electoral Commission (MEC) Reports and Hansards from the Malawi Parliament Library	1999, 2004, 2009
Ethnic Affinity	The proportion of a district's population that belong to the same ethnicity as the ruling President. For constituencies, it is the proportion of the constituencies' population co-ethnic with the President, estimated based on the district averages.	National Statistical Office (NSO) population census reports (http://www.nsomalawi.mw)	1999 and 2008
Population density	Estimate of a district's population density (number of people per square kilometre).	National Statistical Office (NSO) population census reports (http://www.nsomalawi.mw)	2000 and 2008
Public expenditures	Estimate of all available financing at district level including central government transfers, but excludes foreign aid.	National Local Government Finance Commission (NLGFC) annual reports	2004 - 2013
Poverty rate	Percentage of population per district whose incomes are below the international poverty line ($1.25/day)	NSO's Integrated Household Surveys (IHS); Demographic and Health Surveys and Living standards Management Surveys	2000, 2004, 2010
Rainfall	Estimated amounts of rainfall received in each constituency or district.	Meteorological reports from Weather stations across Malawi	1999 - 2013
Minister	Dummy variable that which takes the value 1 if a constituency or district is home to a current Cabinet member, or 0 otherwise	Various reports from the Office of the President and Cabinet (OPC); Parliamentary Hansards	1999 - 2013
Constituencies	Total number of constituencies in district	Parliamentary Hansards	1999 - 2013
Distance from Lilongwe	This is an estimated distance from each particular district to the capital city (Lilongwe)	Google maps (https://www.google.co.uk/maps	
Total land area	Estimated total land area in each district	Google maps (https://www.google.co.uk/maps)	
President vote share	For districts, this is the share of votes that a winning president received from each district in a general election. For constituencies, this is the share of votes for the winning President's party.	Malawi Electoral Commission (MEC) Reports	1999, 2004, 2009
Gross primary enrolment	Number of students enrolled in primary school in a district	Ministry of Education, Science and Technology reports from the Education Management Information System (EMIS)	1999 - 2013
Number of classroom buildings	Total number of building used as classrooms in a district	Ministry of Education, Science and Technology reports from the Education Management Information System (EMIS)	2000 - 2013
Life expectancy	Estimated average life expectancy of the population in a district	NSO's Integrated Household Surveys (IHS); Demographic and Health Surveys and Living standards Management Surveys	2000, 2004, 2010
Infant mortality	Estimated number of deaths of infants (under 1 year) per 1000 live births in a district	NSO's Integrated Household Surveys (IHS); Demographic and Health Surveys and Living standards Management Surveys	2000, 2004, 2011
Food insecurity rate	Proportion of the population in a district who are reported to have inadequate food to sustain them throughout the year	NSO's Integrated Household Surveys (IHS); Demographic and Health Surveys and Living standards Management Surveys	2000, 2004, 2012
Maize production	Estimated yield of Malawi's staple food (Maize) per district	Ministry of Agriculture and Food Security's Annual Crop Yield reports.	1999 - 2013

Table B.2: List of Malawi districts used in the study

Region	Districts (Full sample)	Districts (Prefered sample)
Northern	Chitipa	Chitipa
	Karonga	Karonga
	Likoma	
	Mzimba	Mzimba
	Nkhatabay	Nkhatabay
	Rumphi	Rumphi
Central	Dedza	Dedza
	Dowa	Dowa
	Kasungu	Kasungu
	Lilongwe	
	Mchinji	Mchinji
	Nkhotakota	Nkhotakota
	Ntcheu	Ntcheu
	Ntchisi	Ntchisi
	Salima	Salima
Southern	Balaka	Balaka
	Blantyre	
	Chikwawa	Chikwawa
	Chiladzulu	Chiladzulu
	Machinga	Machinga
	Mangochi	Mangochi
	Mulanje	Mulanje
	Mwanza	Mwanza
	Neno	
	Nsanje	Nsanje
	Phalombe	Phalombe
	Thyolo	Thyolo
	Zomba	Zomba

Notes: The table lists Malawi's administrative districts. In the full sample column, are all the 28 districts while in the preferred sample column has the 24 districts that are used in the main/preferred specification.

Table B.3: District Light Density and Household Consumption

Correlations in levels

		Light Density	PC Cons.	HH Cons.
2010	Light Density	1		
	Per Capita Consumption	0.6048	1	
	Household Consumption	0.555	0.9796	1
2011	Light Density	1		
	Per Capita Consumption	0.5201	1	
	Household Consumption	0.547	0.9586	1
2013	Light Density	1		
	Per Capita Consumption	0.7254	1	
	Household Consumption	0.6809	0.9858	1

Correlations of growth rates

		Δ LD	Δ PC Cons.	Δ HH Cons.
2010-11	Δ Light Density	1		
	Δ Per Capita Consumption	0.7119	1	
	Δ Household Consumption	0.6434	0.9815	1
2011-13	Δ Light Density	1		
	Δ Per Capita Consumption	0.5865	1	
	Δ Household Consumption	0.5347	0.9736	1
2010-13	Δ Light Density	1		
	Δ Per Capita Consumption	0.5228	1	
	Δ Household Consumption	0.4793	0.9648	1

Notes: All data is from the World Bank LSMS Panel Surveys. All level variables are in logs. Per Capita Consumption is District average total real annual consumption per person; Household Consumption is District average total real annual consumption per household.

Table B.4: District level descriptive statistics

				Percentiles		
Variable	Obs	Mean	Std. Dev.	25th	50th	75th
Growth of light density	334	0.0673	0.4257	-0.1677	0.0352	0.2724
Aid (log)	252	15.6831	1.1076	15.0614	15.7485	16.4323
Initial Light	335	7.4503	0.8671	6.9129	7.548	7.9933
Ethnic affinity	336	0.2666	0.3073	0.01	0.09	0.61
Political switching	336	0.3644	0.447	0	0	0.9
Public expenditures (log)	336	14.0118	0.9927	13.1954	14.087	14.8704
Population density (log)	336	12.7865	0.5068	12.3869	12.8206	13.2056
Rainfall (log)	336	6.8324	0.2999	6.638	6.8243	7.0475
Poverty rate	336	57.9478	13.0457	47.85	59.6	67.2
District vote share	336	54.7473	28.2016	27.3388	54.4093	81.8651
Minister dummy	336	0.5361	0.4994	0	1	1
Gross primary enrollment (log)	335	11.5109	0.6026	11.1838	11.4755	11.8864
No classroom buildings (log)	335	6.8623	0.3951	6.608	6.8211	7.0825
Food insecurity rate	336	51.5426	17.3179	38.3	53.2	63.95
Maize production (log)	336	11.1356	0.6804	10.7866	11.1856	11.5834
Life expectancy	336	47.66	4.3921	44.33	46.89	50
Infant mortality (log)	336	4.4389	0.3269	4.2529	4.4015	4.5508

Notes: The table shows summary statistics of the main variables used in the analysis. Variables are means over 24 districts, excluding the major cities of Lilongwe and Blantyre as we as recently formed district of Neno and Likoma.

Table B.5: Composition of Parliament and Defections (1999 - 2013)

	Ruling party	**AFORD**	**DPP**	**MCP**	**UDF**	**RP**	**NDA**	**PPM**	**PP**	**Other**	**Ind.**	**Def.**
1999 (E)	UDF	29	–	66	93	–	–	–	–	0	5	0
2001	UDF	29	–	64	97	–	–	–	–	0	3	4
2003	UDF	30	–	64	99	–	–	–	–	0	0	9
2004 (E)	UDF	6	–	57	49	15	9	6	–	5	40	0
2005	DPP	1	74	53	37	3	0	0	–	0	25	68
2007	DPP	1	102	53	32	3	0	0	–	0	0	98
2009 (E)	DPP	1	114	26	17	0	0	0	–	3	32	0
2010	DPP	1	147	24	17	0	0	0	–	3	1	34
2012	PP	1	69	24	11	0	0	0	88	0	0	89
2013	PP	1	65	24	18	0	0	0	85	0	0	85

Notes: The table presents data on the composition of Parliament showing the number of seats held by each political party in the Chamber. (E) denotes a general election in that year. AFORD stands for Alliance for Democracy; DPP for Democratic Progressive Party; MCP for Malawi Congress Party; UDF for United Democratic Front; RP for Republican Party; NDA for National Democratic Party; PPM for Peoples Progressive Movement; PP for Peoples Party; Ind. is number of independent MPs; and Def. is the total number of MPs who have crossed the floor since the last elections. Entries marked '–' are years prior to the formation of the party.

Table B.6: Constituency results with both instruments

	1 OLS	2 2SLS	3 2SLS	4 2SLS	5 2SLS	6 2SLS	7 2SLS
Aid (log)	0.3419***	0.3583***	0.3529***	0.3519***	0.3547***	0.3514***	0.3442***
	(0.0282)	(0.0295)	(0.0322)	(0.0308)	(0.0309)	(0.0318)	(0.0316)
Initial light (log)	-0.6451***	-0.6303***	-0.6372***	-0.6413***	-0.6409***	-0.6412***	-0.6455***
	(0.0230)	(0.0181)	(0.0191)	(0.0191)	(0.0197)	(0.0197)	(0.0218)
Population (log)	1.5200*		1.6511**	1.5681*	1.4593*	1.4969*	1.5168**
	(0.7770)		(0.8106)	(0.8068)	(0.8351)	(0.8381)	(0.7520)
Poverty rate	-0.0021			-0.0025	-0.0023	-0.0024	-0.0021
	(0.0026)			(0.0025)	(0.0025)	(0.0025)	(0.0025)
Rainfall (log)	0.1189				0.1213*	0.1207*	0.1198*
	(0.0757)				(0.0706)	(0.0709)	(0.0725)
Minister	0.0368					0.0458**	0.0366
	(0.0242)					(0.0227)	(0.0233)
Vote share	0.0009						0.0009
	(0.0007)						(0.0006)
First stage							
Ethnic affinity		0.9732***	0.9726***	0.9579***	0.9502***	0.9518***	0.9483***
		(0.1710)	(0.1714)	(0.1655)	(0.1589)	(0.1589)	(0.1599)
Political switching		0.6199***	0.6220***	0.6246***	0.6198***	0.6281***	0.6262***
		(0.0747)	(0.0751)	(0.0683)	(0.0650)	(0.0642)	(0.0639)
Observations	*1,170*	*1,170*	*1,170*	*1,170*	*1,170*	*1,170*	*1,170*
Number of constituencies	*155*	*155*	*155*	*155*	*155*	*155*	*155*
Number of districts	*24*	*24*	*24*	*24*	*24*	*24*	*24*
Constituency FE	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Year FE	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
AR F-Test (p-value)		*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*
KP Wald F- stat (weak id)		*48.30*	*46.39*	*66.58*	*73.17*	*75.80*	*75.06*
Hansen J (p-value)		*0.438*	*0.346*	*0.371*	*0.361*	*0.332*	*0.339*

*Notes: The table presents results from regression of the change in the log of light intensity in each consitutency for the period 1999-2013. Each observation is a district-Year statistic and most variables have been transformed to natural logs. Two instrumental variables are used, political switching and ethnic affinity as already defined. All regressions do not include constituencies from the two cities of Blantyre and Lilongwe (two districts, namely Neno and Likoma, are also excluded from the entire sample as they were recently formed after splitting from other districts). Columns 2-8 use the preferred sample and stepwise inclusion of control variables. Robust standard errors, clustered at District level, are reported in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

Table B.7: District results with both instruments

	1	2	3	4	5	6	7	8	9	10	11
	OLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Aid (log)	0.0637*	0.1885***	0.1742***	0.1695***	0.1632***	0.1456***	0.1457***	0.1515***	0.1518***	0.1506***	0.1861***
	(0.0371)	(0.0350)	(0.0483)	(0.0490)	(0.0486)	(0.0442)	(0.0440)	(0.0427)	(0.0423)	(0.0422)	(0.0330)
Initial light density (log)	-0.7621***	-0.7568***	-0.7662***	-0.7673***	-0.7704***	-0.7800***	-0.7801***	-0.7730***	-0.7723***	-0.7765***	-0.7559***
	(0.1607)	(0.1415)	(0.1544)	(0.1544)	(0.1534)	(0.1553)	(0.1547)	(0.1526)	(0.1518)	(0.1507)	(0.1394)
Public expenditures (log)	-0.0233	0.0384	0.0407	0.0459	0.0425	0.0521	0.0496	-0.0150	-0.0157	-0.0204	0.0373
	(0.0558)	(0.0424)	(0.0414)	(0.0427)	(0.0421)	(0.0425)	(0.0418)	(0.0532)	(0.0532)	(0.0516)	(0.0437)
Population density (log)	0.8712	1.1947**	1.2049**	1.2087**	1.2542**	1.3663**	1.3543**	1.2437**	1.1469**	0.3710	0.3690
	(0.8888)	(0.5701)	(0.5904)	(0.5911)	(0.5781)	(0.5847)	(0.5935)	(0.5925)	(0.5256)	(0.7994)	(0.5482)
Rainfall (log)	0.0118	-0.0022	-0.0075	-0.0132	-0.0136	-0.0136	-0.0129	0.0481	0.0488	0.0516	-0.0081
	(0.1125)	(0.1302)	(0.1359)	(0.1376)	(0.1373)	(0.1347)	(0.1351)	(0.1248)	(0.1236)	(0.1265)	(0.1302)
Poverty rate	0.0939	0.0742	0.0716	0.0800	0.0932	0.0795	0.0843	0.1484	0.1441	0.1332	0.1263
	(0.1528)	(0.2144)	(0.2095)	(0.2056)	(0.2010)	(0.1913)	(0.1868)	(0.1799)	(0.1796)	(0.1752)	(0.1762)
District vote share (%)	0.1351		0.0833	0.0840	0.0843	0.0801	0.0863	0.0054	0.0043	0.0451	0.0063
	(0.1309)		(0.1627)	(0.1612)	(0.1592)	(0.1618)	(0.1596)	(0.1631)	(0.1614)	(0.1503)	(0.1631)
Minister dummy	0.0794*			0.0312	0.0395	0.0540	0.0541	0.0688*	0.0670*	0.0654*	0.0747*
	(0.0416)			(0.0471)	(0.0467)	(0.0474)	(0.0477)	(0.0398)	(0.0395)	(0.0390)	(0.0386)
Gross primary enrollment (log)	0.2193				0.0621***	0.3077**	0.3070**	0.2143*	0.2115*	0.2596**	0.2785**
	(0.1712)				(0.0133)	(0.1342)	(0.1367)	(0.1234)	(0.1200)	(0.1226)	(0.1210)
No classroom buildings (log)	-0.2908					-0.6243*	-0.6147*	-0.3450	-0.3427	-0.4140	-0.4541
	(0.4416)					(0.3544)	(0.3692)	(0.3379)	(0.3329)	(0.3245)	(0.3218)
Food insecurity rate	-0.0638						-0.0316	-0.0555	-0.0526	-0.0577	-0.0622
	(0.0952)						(0.0701)	(0.0740)	(0.0767)	(0.0779)	(0.0778)
Maize production (log)	0.2931**							0.2917***	0.2918***	0.2899***	0.3021***
	(0.1126)							(0.1034)	(0.1034)	(0.1063)	(0.1056)
Life expectancy	0.0003								0.0060	-0.0015	-0.0020
	(0.0160)								(0.0155)	(0.0153)	(0.0153)
Infant mortality (log)	-0.8446									-1.1879*	-1.1544
	(0.8053)									(0.7061)	(0.7052)
First stage effect											
Ethnic affinity		0.3998**	0.3908**	0.3942**	0.4011**	0.3860**	0.3889**	0.3895**	0.3888**	0.3939**	0.4086**
		(0.1748)	(0.1814)	(0.1822)	(0.1827)	(0.1923)	(0.1913)	(0.1941)	(0.1978)	(0.1800)	(0.1778)
Political switching		1.1892***	1.1363***	1.1378***	1.1253***	1.2182***	1.2171***	1.2222***	1.2213***	1.2594***	1.1947***
		(0.1322)	(0.1408)	(0.1398)	(0.1407)	(0.1599)	(0.1603)	(0.1650)	(0.1662)	(0.1677)	(0.1283)
Observations	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*272*
Number of districts	*24*	*24*	*24*	*24*	*24*	*24*	*24*	*24*	*24*	*24*	*26*
District, Year FE	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Including cities	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*Y*
AR F-Test (p-value)		*0.0001*	*0.0046*	*0.0057*	*0.0072*	*0.0130*	*0.0128*	*0.0067*	*0.0066*	*0.0077*	*0.0001*
KP Wald F-stat (weak id)		*96.48*	*88.22*	*93.26*	*92.02*	*68.13*	*68.15*	*69.47*	*69.11*	*85.78*	*92.54*
Hansen J (p-value)		*0.451*	*0.419*	*0.470*	*0.410*	*0.346*	*0.337*	*0.547*	*0.529*	*0.333*	*0.453*

*Notes: The table presents results from regression of change in the log of recorded nighttime light density in each district for the period 1999 to 2013. Each observation is a district-year statistic and most explanatory variables have been transformed into natural logs. Two instrumental variables are used, political switching and ethnic affinity as defined in the text. Columns 1-10 do not include the two cities of Blantyre and Lilongwe while column 11 includes the two cities (other districts, namely Neno and Likoma are also excluded from the entire sample as they were recently formed after splitting form other districts). Columns 2 – 10 use the preferred sample and stepwise inclusion of control variables. Robust standard errors clustered at district in all specifications are reported in parentheses. *p<0.10, **p<0.05, ***p<0.01.*

Table B.8: Robustness checks 1/2

	1	2	3	4	5	6	7	8
	Distance from LL	Land area	Chewa	Lomwe	Yao	Tumbuka	Ngoni	No. constituencies
Aid (log)	0.1502***	0.1492***	0.1503***	0.1459***	0.1498***	0.1531***	0.1486***	0.1549***
	(0.0417)	(0.0429)	(0.0415)	(0.0413)	(0.0418)	(0.0427)	(0.0424)	(0.0449)
Initial light density (log)	-0.7765***	-0.7958***	-0.7760***	-0.8295***	-0.7764***	-0.7867***	-0.7783***	-0.8090***
	(0.1513)	(0.1352)	(0.1533)	(0.1171)	(0.1506)	(0.1463)	(0.1487)	(0.1357)
Public expenditures (log)	-0.0200	0.0027	-0.0205	0.0014	-0.0209	0.0033	-0.0216	-0.0084
	(0.0504)	(0.0529)	(0.0514)	(0.0539)	(0.0512)	(0.0480)	(0.0506)	(0.0535)
Population density (log)	0.3958	0.9762	0.4098	0.5001	0.3961	0.2478	0.3996	1.0455
	(0.8447)	(0.8406)	(0.7216)	(0.8072)	(0.8022)	(0.6802)	(0.7900)	(0.8436)
Rainfall (log)	0.0512	0.0102	0.0517	-0.0069	0.0512	0.0525	0.0531	0.0100
	(0.1272)	(0.1088)	(0.1272)	(0.1042)	(0.1263)	(0.1238)	(0.1273)	(0.1112)
Poverty rate	0.1318	0.1868	0.1353	0.3221	0.1347	0.1056	0.1404	0.1324
	(0.1769)	(0.1661)	(0.1723)	(0.2181)	(0.1750)	(0.1405)	(0.1710)	(0.1743)
District vote share	0.0477	0.0968	0.0443	0.0597	0.0462	0.2151	0.0486	0.0261
	(0.1581)	(0.1333)	(0.1540)	(0.1222)	(0.1504)	(0.1417)	(0.1498)	(0.1521)
Minister	0.0648*	0.0605	0.0659*	0.0625	0.0680*	0.0348	0.0665*	0.0701*
	(0.0390)	(0.0395)	(0.0389)	(0.0422)	(0.0394)	(0.0366)	(0.0392)	(0.0377)
Gross primary enrollment (log)	0.2616**	0.2259*	0.2567**	0.2714**	0.2643**	0.2614**	0.2553**	0.2427**
	(0.1241)	(0.1222)	(0.1231)	(0.1275)	(0.1229)	(0.1225)	(0.1211)	(0.1181)
No classroom buildings (log)	-0.4171	-0.3435	-0.4102	-0.5203	-0.4250	-0.4705	-0.4085	-0.3437
	(0.3245)	(0.3191)	(0.3248)	(0.3287)	(0.3258)	(0.3154)	(0.3236)	(0.3200)
Food insecurity rate	-0.0566	0.0333	-0.0585	0.0225	-0.0591	0.0909	-0.0655	-0.0107
	(0.0786)	(0.0951)	(0.0801)	(0.0791)	(0.0776)	(0.0725)	(0.0840)	(0.0877)
Maize production (log)	0.2890***	0.2859***	0.2909***	0.2709***	0.2877***	0.3131***	0.2912***	0.2780**
	(0.1042)	(0.1032)	(0.1052)	(0.1022)	(0.1081)	(0.0960)	(0.1057)	(0.1080)
Life expectancy	-0.0015	0.0121	-0.0011	0.0136	-0.0012	0.0188	-0.0010	0.0036
	(0.0153)	(0.0142)	(0.0132)	(0.0107)	(0.0153)	(0.0173)	(0.0152)	(0.0138)
Infant mortality (log)	-1.1998	-1.3839*	-1.1548	-0.6029	-1.1693	-1.1060**	-1.2127*	-2.2254***
	(0.7438)	(0.7636)	(0.7307)	(0.7470)	(0.7135)	(0.5506)	(0.7099)	(0.8463)
Distance from LL (log)	-0.0000							
	(0.0000)							
Total land area (log)		-0.0000**						
		(0.0000)						
Chewa dummy			-0.0018					
			(0.0175)					
Lomwe dummy				0.0704*				
				(0.0397)				
Yao dummy					0.0001*			
					(0.0000)			
Tumbuka dummy						-0.0635***		
						(0.0140)		
Ngoni dummy							-0.0057	
							(0.0127)	
Number of constituencies								-0.0068**
								(0.0031)
First stage effect								
Ethnic affinity	0.3675**	0.4407**	0.3861**	0.4262**	0.4003**	0.3908**	0.3864**	0.4394**
	(0.1881)	(0.1842)	(0.1768)	(0.1839)	(0.1829)	(0.1869)	(0.1745)	(0.1867)
Political switching	1.2746***	1.2817***	1.2637***	1.2913***	1.2582***	1.2605***	1.2387***	1.2711***
	(0.1645)	(0.1690)	(0.1681)	(0.1696)	(0.1684)	(0.1685)	(0.1652)	(0.1707)
Observations	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*
Number of districts	*24*	*24*	*24*	*24*	*24*	*24*	*24*	*24*
District, Year FE	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Including cities	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*
AR F-Test (p-value)	*0.0069*	*0.0091*	*0.0064*	*0.0072*	*0.0077*	*0.0074*	*0.0081*	*0.0085*
KP Wald F-stat (weak id)	*67.91*	*78.46*	*83.86*	*78.07*	*84.02*	*82.18*	*82.29*	*63.08*
Hansen J (p-value)	*0.333*	*0.204*	*0.314*	*0.129*	*0.363*	*0.102*	*0.335*	*0.166*

*Notes: The table presents results from regression of change in the log of recorded nighttime light density in each district for the period 1999 to 2013. Each observation is a district-year statistic and most explanatory variables have been transformed into natural logs. All regressions use the preferred specification with the two instrumental variables are, political affinity and ethnic affinity as defined in the text. In all the regressions, district and year fixed effects are included and do not include the two cities of Blantyre and Lilongwe (neither are the two districts of Neno and Likoma). The first column controls for distance from Lilongwe, the second controls for total land area for each district. Columns 3-6 include a dummy variable that takes the value 1 if the majority of the people in that district belong to either of the main ethnic races in Malawi (Chewa, Lomwe, Yao and Tumbuka and Ngoni) and 0 otherwise, while column 7 includes the log of number of constituencies in a district. Robust standard errors clustered at district in all specifications are reported in parentheses. *p<0.10, **p<0.05, ***p<0.01*

Table B.9: Robustness checks 2/2

	9	10	11	12	13	14	15
	Coastal	Cash crop	Northern	Central	Southern	Urban/Town	2SLS
Aid (log)	0.1507***	0.1458***	0.1476***	0.1502***	0.1464***	0.1563***	0.1344***
	(0.0425)	(0.0423)	(0.0422)	(0.0422)	(0.0415)	(0.0460)	(0.0398)
Initial light density (log)	-0.7783***	-0.7787***	-0.7729***	-0.7757***	-0.7715***	-0.7997***	-0.7770***
	(0.1488)	(0.1577)	(0.1478)	(0.1501)	(0.1467)	(0.1406)	(0.1368)
Public expenditures (log)	-0.0153	-0.0181	-0.0193	-0.0202	-0.0281	-0.0234	-0.0279
	(0.0513)	(0.0503)	(0.0512)	(0.0517)	(0.0478)	(0.0522)	(0.0442)
Population density (log)	0.5332	0.2289	0.7783	0.5106	0.6997	0.9065	-0.4265
	(0.8088)	(0.7462)	(0.7522)	(0.7589)	(0.7065)	(0.8106)	(0.7844)
Rainfall (log)	0.0484	0.0443	0.0610	0.0527	0.0680	0.0324	0.0663
	(0.1256)	(0.1300)	(0.1274)	(0.1276)	(0.1299)	(0.1179)	(0.1186)
Poverty rate	0.1400	0.1651	0.1431	0.1404	0.1666	0.1411	0.2398
	(0.1746)	(0.2033)	(0.1589)	(0.1764)	(0.1679)	(0.1732)	(0.1668)
District vote share	0.0353	0.0153	0.0684	0.0416	0.0427	-0.0246	0.1251
	(0.1544)	(0.1397)	(0.1505)	(0.1530)	(0.1460)	(0.1592)	(0.1199)
Minister	0.0600	0.0522	0.0627	0.0656*	0.0656	0.0715*	0.0433
	(0.0407)	(0.0372)	(0.0419)	(0.0389)	(0.0410)	(0.0393)	(0.0457)
Gross primary enrollment (log)	0.2436**	0.2743**	0.2785**	0.2476**	0.2304*	0.2482**	0.1717
	(0.1233)	(0.1273)	(0.1273)	(0.1253)	(0.1273)	(0.1111)	(0.1241)
No classroom buildings (log)	-0.3831	-0.4597	-0.4829	-0.3988	-0.4185	-0.4402	-0.3771
	(0.3268)	(0.3422)	(0.3318)	(0.3281)	(0.3306)	(0.3102)	(0.3164)
Food insecurity rate	-0.0271	-0.0406	-0.0345	-0.0606	-0.0669	-0.0245	0.0817
	(0.0870)	(0.0858)	(0.0725)	(0.0799)	(0.0813)	(0.0950)	(0.0744)
Maize production (log)	0.2895***	0.2939***	0.3074***	0.2925***	0.3210***	0.3025***	0.3947***
	(0.1046)	(0.0982)	(0.1050)	(0.1048)	(0.0994)	(0.1031)	(0.0854)
Life expectancy	0.0034	-0.0022	0.0029	0.0005	0.0048	0.0049	0.0176
	(0.0136)	(0.0166)	(0.0150)	(0.0129)	(0.0131)	(0.0146)	(0.0131)
Infant mortality (log)	-1.0142	-1.3048*	-0.7080	-1.0568	-0.1073	-1.1095*	1.0982*
	(0.7022)	(0.7102)	(0.6907)	(0.7573)	(0.8681)	(0.6277)	(0.6470)
Coastal districts	-0.0132						
	(0.0116)						
Cash crop district		0.0197					
		(0.0232)					
Northern region			-0.0290*				
			(0.0168)				
Central region				-0.0070			
				(0.0164)			
Southern region					0.0239		
					(0.0158)		
Urban/town council						-0.0370**	
						(0.0167)	
x-y (4th polynomial)							0.0000***
							(0.0000)
First stage effect							
Ethnic affinity	0.3354**	0.4042**	0.3798**	0.3754**	0.3777**	0.3807**	0.3848**
	(0.1642)	(0.1913)	(0.1843)	(0.1748)	(0.1750)	(0.1727)	(0.1910)
Political switching	1.2394***	1.3000***	1.2522***	1.2673***	1.2330***	1.2612***	1.2671***
	(0.1560)	(0.1765)	(0.1656)	(0.1666)	(0.1712)	(0.1632)	(0.1801)
Observations	*250*	*250*	*250*	*250*	*250*	*250*	*250*
Number of districts	*24*	*24*	*24*	*24*	*24*	*24*	*24*
District, Year FE	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Including cities	*N*	*N*	*N*	*N*	*N*	*N*	*N*
AR F-Test (p-value)	*0.0087*	*0.0097*	*0.0088*	*0.0075*	*0.0089*	*0.0102*	*0.0151*
KP Wald F-stat (weak id)	*75.97*	*79.04*	*65.17*	*80.80*	*94.10*	*65.72*	*84.43*
Hansen J (p-value)	*0.259*	*0.226*	*0.346*	*0.286*	*0.241*	*0.250*	*0.141*

*Notes: The table presents results from regression of change in the log of recorded nighttime light density in each district for the period 1999 to 2013. Each observation is a district-year statistic and most explanatory variables have been transformed into natural logs. All regressions use the preferred specification with the two instrumental variables are, political affinity and ethnic affinity as defined in the text. In all the regressions, district and year fixed effects are included and do not include the two cities of Blantyre and Lilongwe (neither are the two districts of Neno and Likoma). Column 9 includes a dummy variable that takes the value 1 if the district lies along the coast of Lake Malawi and 0 otherwise; column 10 includes a dummy variable that takes the value 1 if the district produces one of Malawi's any of the main cash crops in Malawi and 0 otherwise; columns 11-13 each includes a dummy variable taking the value 1 if the district is in either of the three regions of Malawi (the Southern region or Central region or Northern region) and 0 otherwise while column 14 is a dummy that takes the value 1 if the district is classified as a town council rather than a district council, and 0 otherwise. Lastly, column 15 is specification that includes x-y coordinates of each district (4th polynomial). Robust standard errors clustered at district in all specifications are reported in parentheses. *p<0.10, **p<0.05, ***p<0.01.*

Table B.10: Lags of aid

	1	2	3	4	5	6	7
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Aid (log)	0.1385***	0.2128***	0.2257***	0.1488**	0.1283**	0.1047*	0.1269**
	(0.0521)	(0.0629)	(0.0699)	(0.0584)	(0.0563)	(0.0619)	(0.0555)
Initial light density (log)	-1.0031***	-0.9305***	-0.9896***	-1.2292***	-1.1689***	-1.1814***	-1.2548***
	(0.0922)	(0.1640)	(0.1639)	(0.0723)	(0.0791)	(0.0833)	(0.0984)
Public expenditures (log)	-0.0524	-0.0076	0.0141	-0.1584***	-0.0412	-0.0213	-0.0111
	(0.0549)	(0.0779)	(0.0805)	(0.0516)	(0.0716)	(0.0791)	(0.0841)
Population density (log)	4.7681***	4.5606***	4.0103***	3.9846***	4.0409***	3.9340***	3.8940***
	(1.0897)	(1.1928)	(1.1747)	(1.1824)	(1.1830)	(1.2037)	(1.1914)
Rainfall (log)	-0.1344	-0.1333	-0.1155	-0.0237	-0.2189**	-0.1308	0.1647
	(0.0826)	(0.1552)	(0.1612)	(0.2048)	(0.1071)	(0.1109)	(0.1585)
Poverty rate	0.0726	-0.2199	-0.7624**	-0.0198	0.0405	-0.4179	-0.6024
	(0.1760)	(0.2683)	(0.3169)	(0.3196)	(0.2817)	(0.3440)	(0.5169)
District vote share (%)	-0.0189	0.0095	-0.0646	-0.1651	0.0066	-0.0152	-0.0827
	(0.1027)	(0.1025)	(0.1047)	(0.1120)	(0.0822)	(0.1109)	(0.1702)
Minister dummy	0.0753	0.0615	0.0475	0.0115	0.0710	0.0942	0.0358
	(0.0528)	(0.0595)	(0.0639)	(0.0612)	(0.0687)	(0.0812)	(0.0902)
Gross primary enrollment (log)	0.2672*	0.0831	0.1510	0.1237	0.1422	0.1496	-0.0063
	(0.1412)	(0.1693)	(0.1521)	(0.1677)	(0.1221)	(0.1231)	(0.1525)
No classroom buildings (log)	-0.3120	0.1315	-0.0124	0.0751	0.0682	0.0780	0.5030
	(0.3591)	(0.4608)	(0.4231)	(0.4211)	(0.3379)	(0.3471)	(0.4050)
Food insecurity rate	-0.1162	-0.2412	-0.2306	-0.2286	-0.2197	-0.2511	-0.3710**
	(0.1202)	(0.1673)	(0.1602)	(0.1520)	(0.1844)	(0.1763)	(0.1506)
Maize production (log)	0.3290***	0.3135**	0.4178***	0.3240*	0.3120**	0.3411**	0.2390
	(0.1202)	(0.1384)	(0.1615)	(0.1891)	(0.1363)	(0.1676)	(0.1669)
Life expectancy	-0.0177	-0.0282	-0.0317	-0.0136	-0.0253	-0.0305	-0.0353**
	(0.0166)	(0.0210)	(0.0208)	(0.0181)	(0.0206)	(0.0195)	(0.0146)
Infant mortality (log)	-3.1925***	-2.3118**	-3.7471***	-4.1140***	-4.3681***	-5.2007***	-5.7447**
	(1.0949)	(1.0752)	(1.0389)	(1.3975)	(1.4003)	(1.6134)	(2.2434)
1st Lag	0.0646*				0.1506**	0.1675**	0.2163***
	(0.0348)				(0.0667)	(0.0803)	(0.0836)
2nd Lag		0.0390*			0.0427**	0.0746*	0.1052**
		(0.0205)			(0.0183)	(0.0402)	(0.0417)
3rd Lag			0.0029			0.0013	0.0587
			(0.0205)			(0.0278)	(0.0467)
4th Lag				0.0066			-0.0143
				(0.0182)			(0.0210)
First stage effect							
Ethnic affinity	0.3475**	0.3301**	0.3593**	0.4058**	0.3841***	0.3319**	0.3834**
	(0.1350)	(0.1468)	(0.1574)	(0.1612)	(0.1374)	(0.1409)	(0.1602)
Political switching	1.0701***	1.1067***	1.1035***	1.0732***	1.1213***	1.1400***	1.0968***
	(0.1129)	(0.1362)	(0.1198)	(0.1635)	(0.1478)	(0.1343)	(0.1574)
Observations	*211*	*190*	*172*	*152*	*183*	*160*	*136*
Number of districts	*24*	*24*	*24*	*24*	*24*	*24*	*24*
District, Year FE	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Including cities	*N*	*N*	*N*	*N*	*N*	*N*	*N*
AR F-Test (p-value)	*0.0365*	*0.0011*	*0.0017*	*0.0055*	*0.0123*	*0.0019*	*0.0112*
KP Wald F-stat (weak id)	*104.3*	*65.16*	*65.42*	*48.80*	*64.82*	*63.08*	*53.89*
Hansen J (p-value)	*0.103*	*0.0189*	*0.0258*	*0.0293*	*0.0224*	*0.0143*	*0.0418*

*Notes: The table presents results from regressionof change in the log of recorded nighttime light density in each district for the period 1999 to 2013. Each observation is a district-year statistic and most explanatory variables have been transformed into natural logs. All regressions use the preferred specification with the two instrumental variables are, political affinity and ethnic affinity as defined in the text. In all the regressions, district and year fixed effects are included and do not include the two cities of Blantyre and Lilongwe (neither are the two districts of Neno and Likoma). Columns 1-4 includes each of the lags (2nd - 5th lag) separately while columns 5-7 involves stepwise inclusion of the lags. Robust standard errors clustered at district in all specifications are reported in parentheses. *p<0.10, **p<0.05, ***p<0.01.*

Table B.11: Regression results by aid sector

	Agriculture 2SLS	Education 2SLS	Health 2SLS
Aid (log)	0.2066***	0.1347**	0.4558
	(0.0721)	(0.0456)	(0.2797)
Initial light density (log)	-1.1345***	-1.1385***	-0.8532***
	(0.0546)	(0.0682)	(0.1145)
Public expenditures (log)	0.1318	0.0517	-0.5029
	(0.1731)	(0.2306)	(0.3507)
Population density (log)	2.0083**	3.4652***	2.2130***
	(0.9162)	(1.3292)	(1.2011)
Rainfall (log)	0.0413	-0.1681	0.3384*
	(0.1198)	(0.1167)	(0.1844)
Poverty rate	-0.2487	0.0960	-0.2231
	(0.2712)	(0.2335)	(0.4619)
District vote share (%)	-0.0646	-0.1207	0.2005
	(0.1504)	(0.1886)	(0.2062)
Minister dummy	-0.0013	0.0040	-0.0965
	(0.0635)	(0.0536)	(0.1072)
Gross primary enrollment (log)	0.2526**	0.3583***	0.3815*
	(0.1008)	(0.1069)	(0.2072)
No classroom buildings (log)	-0.0919	1.1090*	1.3885
	(0.4448)	(0.5738)	(0.8618)
Food insecurity rate	0.2024*	-0.1180	0.6545
	(0.1087)	(0.1483)	(0.5075)
Maize production (log)	0.3014***	0.2561***	0.3403**
	(0.1010)	(0.0970)	(0.1403)
Life expectancy	0.0012	-0.0223	0.0414*
	(0.0139)	(0.0180)	-0.0208
Infant mortality (log)	-1.4360	-1.1717	-2.6165**
	(1.0525)	(1.5217)	(1.3617)
First stage effect			
Ethnic affinity	0.4905**	0.3837**	0.4484**
	(0.2398)	(0.1889)	(0.1890)
Political switching	1.2592***	1.2884***	1.1796***
	(0.1493)	(0.1428)	(0.1304)
Observations	*213*	*218*	*206*
Number of districts	*24*	*24*	*22*
District, Year FE	*Y*	*Y*	*Y*
Including cities	*N*	*N*	*N*
AR F-Test (p-value)	*0.0078*	*0.0355*	*0.0026*
KP Wald F-stat (weak id)	*25.26*	*16.38*	*21.68*
Hansen J (p-value)	*0.488*	*0.599*	*0.894*

*Notes: The table presents results from regression of change in the log of recorded nighttime light density in each district for the period 1999 to 2013. Each observation is a district-year statistic and most explanatory variables have been transformed into natural logs. All regressions use the preferred specification with the two instrumental variables are, political affinity and ethnic affinity as defined in the text. In all the regressions, district and year fixed effects are included and do not include the two cities of Blantyre and Lilongwe (neither are the two districts of Neno and Likoma). The first column presents results from estimation using aid to the agriculture sector, the second column has results for aid to the education sector and the final column has results for estimation using health sector aid. *p<0.10, **p<0.05, ***p<0.01.*

Table B.12: Regression results for estimation using types of aid

	1	2	3	4
	Bilateral	Multilateral	Grants	Loans
Aid (log)	0.3601**	0.1953***	0.3230**	0.1597*
	(0.1716)	(0.0754)	(0.1290)	(0.0851)
Initial light density (log)	-0.8449***	-0.9239***	-0.8452***	-0.7954***
	(0.2053)	(0.1689)	(0.2596)	(0.1255)
Public expenditures (log)	0.1318	0.1352	0.2265	0.2684
	(0.1731)	(0.1935)	(0.1532)	(0.1936)
Population density (log)	4.7652***	3.4652***	5.3174***	3.2263**
	(1.5347)	(1.3292)	(1.9778)	(1.3825)
Rainfall (log)	0.1248	-0.0142	0.2510	0.0964
	(0.1925)	(0.1292)	(0.2402)	(0.1330)
Poverty rate	-0.1686	0.0572	0.0615	0.0175
	(0.1871)	(0.1475)	(0.2080)	(0.1347)
District vote share (%)	0.0325	-0.0650	-0.0647	0.0744
	(0.1935)	(0.1017)	(0.1899)	(0.1136)
Minister dummy	0.0178	0.0301	0.0242	0.0136
	(0.0559)	(0.0361)	(0.0571)	(0.0545)
Gross primary enrollment (log)	0.3944***	0.4586*	0.4543***	0.5006**
	(0.1248)	(0.2609)	(0.1371)	(0.1974)
No classroom buildings (log)	0.5596	0.0770	0.5192	-0.2758
	(0.5430)	(0.4092)	(0.6188)	(0.2726)
Food insecurity rate	-0.1440*	-0.0671	0.1014	-0.1233**
	(0.0836)	(0.0970)	(0.1312)	(0.0575)
Maize production (log)	0.2687***	0.1903**	0.2510***	0.2591***
	(0.0837)	(0.0823)	(0.0810)	(0.0752)
Life expectancy	-0.0024	-0.0006	-0.0094	0.0044
	(0.0146)	(0.0143)	(0.0282)	(0.0136)
Infant mortality (log)	-2.7475**	-0.8314	-0.9281	-1.4567*
	(1.3907)	(1.0069)	(0.8941)	(0.8739)
First stage effect				
Ethnic affinity	0.4242***	0.3354**	0.3798**	0.3754**
	(0.1913)	(0.1642)	(0.1843)	(0.1748)
Political switching	1.3000***	1.2394***	1.2522***	1.2673***
	(0.1765)	(0.1560)	(0.1656)	(0.1666)
Observations	*252*	*231*	*237*	*246*
Number of districts	*24*	*24*	*24*	*24*
District, Year FE	*Y*	*Y*	*Y*	*Y*
Including cities	*N*	*N*	*N*	*N*
AR F-Test (p-value)	*0.0253*	*0.0188*	*0.0096*	*0.0117*
KP Wald F-stat (weak id)	*19.90*	*28.46*	*22.86*	*49.53*
Hansen J (p-value)	*0.268*	*0.460*	*0.354*	*0.939*

*Notes: The table presents results from regression of change in the log of recorded nighttime light density in each district for the period 1999 to 2013. Each observation is a district-year statistic and most explanatory variables have been transformed into natural logs. All regressions use the preferred specification with the two instrumental variables are, political affinity and ethnic affinity as defined in the text. In all the regressions, district and year fixed effects are included and do not include the two cities of Blantyre and Lilongwe (neither are the two districts of Neno and Likoma). The first column presents results from estimation using bilateral aid, second column has results for multilateral aid, the third column presents results for regressions using aid disbursed in the form of grants and the final column has results for estimation for aid in the form of loans. *p<0.10, **p<0.05, ***p<0.01.*

C Additional Tables (For Online Appendix)

Table C.1: Results for OLS regression of district vote share

	1	2	3	4	5	6	7
	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Winner's birth district	0.1230	-0.0014	-0.0061	0.0306	0.0288	-0.0234	-0.0153
	(0.1579)	(0.1860)	(0.1803)	(0.1004)	(0.1078)	(0.1061)	(0.1116)
Population	-0.9644	-1.3619	-1.2799	-0.9059	-0.5950	-1.0814	-0.7134
	(2.1541)	(1.9110)	(2.2686)	(0.8304)	(0.8840)	(0.7984)	(0.8382)
Poverty rate	-0.0003	0.0392	0.0156	0.0038	0.0126	0.0212	0.0210
	(0.1292)	(0.1197)	(0.1427)	(0.0574)	(0.0595)	(0.0602)	(0.0603)
Northern region	0.0921	0.1035*	0.1008	0.0436**	0.0357	0.0490**	0.0395*
	(0.0636)	(0.0558)	(0.0659)	(0.0208)	(0.0247)	(0.0190)	(0.0227)
Central region	0.0403	0.0526	0.0509	0.0255	0.0184	0.0311	0.0226
	(0.0692)	(0.0610)	(0.0675)	(0.0246)	(0.0249)	(0.0233)	(0.0234)
Southern region	0.0402	0.0526	0.0508	0.0254	0.0183	0.0310	0.0226
	(0.0691)	(0.0610)	(0.0674)	(0.0246)	(0.0249)	(0.0233)	(0.0234)
Urban districts	-0.0032	0.0003	0.0003	0.0134*	0.0133**	0.0148**	0.0142**
	(0.0143)	(0.0137)	(0.0125)	(0.0068)	(0.0063)	(0.0070)	(0.0065)
Chewa			0.0003		-0.0074		-0.0076
			(0.0173)		(0.0101)		(0.0100)
Yao			-0.0001*		0.0000		0.0000
			(0.0001)		(0.0000)		(0.0000)
Lomwe			-0.0091		0.0047		0.0021
			(0.0184)		(0.0068)		(0.0076)
Winner's ethnic population (%)		0.2180	0.2346			0.0959	0.0818
		(0.1887)	(0.1958)			(0.0731)	(0.0824)
Political identification				0.4771***	0.4824***	0.4729***	0.4781***
				(0.0418)	(0.0439)	(0.0404)	(0.0428)
Observations	*360*	*360*	*360*	*360*	*360*	*360*	*360*
R-squared	*0.2606*	*0.2800*	*0.2845*	*0.8075*	*0.8124*	*0.8112*	*0.8150*
District, Year FE	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Number of id	*24*	*24*	*24*	*24*	*24*	*24*	*24*

*Notes: The table presents results of fixed effects panel regression on the share of votes that a winning candidate received during a general election (held in 1999, 2004 and 2009) from each district on ethnicity, measured as the proportion of population that is co - ethnic with the winning candidate; and party identification, a dummy variable that takes the value 1 if the winner's party is dominant in the district, and 0 otherwise. Robust standard errors in parentheses: *p<0.10;**p<0.05;***p<0.01.*

Table C.2: Constituency results with ethnic affinity instrument

	1	2	3	4	5	6	7
	OLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Aid (log)	0.3420***	0.3786***	0.3781***	0.3763***	0.3795***	0.3780***	0.3710***
	(0.0280)	(0.0302)	(0.0327)	(0.0321)	(0.0313)	(0.0319)	(0.0321)
Initial light (log)	-0.6449***	-0.6362***	-0.6445***	-0.6478***	-0.6473***	-0.6481***	-0.6519***
	(0.0230)	(0.0175)	(0.0196)	(0.0199)	(0.0205)	(0.0205)	(0.0222)
Population (log)	1.5188*		1.6271**	1.5569**	1.4381*	1.4740*	1.4927**
	(0.7722)		(0.7968)	(0.7940)	(0.8242)	(0.8246)	(0.7462)
Poverty rate	-0.0021			-0.0022	-0.0019	-0.0020	-0.0017
	(0.0026)			(0.0023)	(0.0023)	(0.0023)	(0.0023)
Rainfall (log)	0.1189				0.1325*	0.1326*	0.1316*
	(0.0756)				(0.0748)	(0.0749)	(0.0766)
Minister (dummy)	0.0366					0.0456**	0.0371
	(0.0240)					(0.0232)	(0.0237)
Vote share	0.0009						0.0008
	(0.0007)						(0.0006)
First stage effect							
Ethnic affinity		1.1907***	1.1904***	1.1772***	1.1662***	1.1670***	1.1527***
		(0.2357)	(0.2337)	(0.2151)	(0.2060)	(0.2069)	(0.2076)
Observations	*1,170*	*1,170*	*1,170*	*1,170*	*1,170*	*1,170*	*1,170*
Number of constituencies	*155*	*155*	*155*	*155*	*155*	*155*	*155*
Number of districts	*24*	*24*	*24*	*24*	*24*	*24*	*24*
Constituency FE	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Year FE	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
AR Test (p-value)		*0.0002*	*0.0002*	*0.0001*	*0.0001*	*0.0001*	*0.0001*
KP Wald F-stat (weak id)		*25.53*	*25.95*	*29.96*	*32.06*	*31.81*	*30.82*
KP LM Test (under id)		*8.044*	*8.106*	*8.165*	*8.336*	*8.349*	*7.979*

*Notes: The table presents results from regression of the change in the log of light intensity in each consitutency for the period 1999-2013. Each observation is a district-Year statistic and most variables have been transformed to natural logs. The instrumental variable used (ethnic affinity) is measured as the proportion of a constituency's population that belong to the incumbent president's ethnicity. All regressions do not include constituencies from the two cities of Blantyre and Lilongwe (two districts, namely Neno and Likoma, are also excluded from the entire sample as they were recently formed after splitting from other districts). Columns 2-8 use the preferred sample and stepwise inclusion of control variables. Robust standard errors, clustered at District level, are reported in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

Table C.3: Constituency results with political switching instrument

	1	2	3	4	5	6	7
	OLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Aid (log)	0.3420***	0.3424***	0.3330***	0.3333***	0.3359***	0.3314***	0.3241***
	(0.0280)	(0.0421)	(0.0449)	(0.0430)	(0.0433)	(0.0443)	(0.0442)
Initial light (log)	-0.6449***	-0.6256***	-0.6315***	-0.6365***	-0.6361***	-0.6360***	-0.6407***
	(0.0230)	(0.0208)	(0.0209)	(0.0201)	(0.0206)	(0.0207)	(0.0227)
Population (log)	1.5188*		1.6700**	1.5765*	1.4754*	1.5141*	1.5349**
	(0.7722)		(0.8240)	(0.8178)	(0.8454)	(0.8505)	(0.7588)
Poverty rate	-0.0021			-0.0028	-0.0026	-0.0027	-0.0024
	(0.0026)			(0.0028)	(0.0028)	(0.0028)	(0.0028)
Rainfall (log)	0.1189				0.1129*	0.1117	0.1110
	(0.0756)				(0.0685)	(0.0689)	(0.0704)
Minister (dummy)	0.0366					0.0460**	0.0362
	(0.0240)					(0.0225)	(0.0233)
Vote share	0.0009						0.0010
	(0.0007)						(0.0007)
First stage effect							
Political switching		0.7236***	0.7264***	0.7275***	0.7212***	0.7291***	0.7220***
		(0.1044)	(0.1052)	(0.0949)	(0.0905)	(0.0898)	(0.0907)
Observations	*1,170*	*1,170*	*1,170*	*1,170*	*1,170*	*1,170*	*1,170*
Number of constituencies	*155*	*155*	*155*	*155*	*155*	*155*	*155*
Number of districts	*24*	*24*	*24*	*24*	*24*	*24*	*24*
Constituency FE	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Year FE	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
AR Test (p-value)		*0.0001*	*0.0001*	*0.0000*	*0.0000*	*0.0000*	*0.0000*
KP Wald F-stat (weak id)		*48.00*	*47.66*	*58.74*	*63.47*	*65.92*	*63.41*
KP LM Test (under id)		*9.226*	*9.193*	*9.935*	*10.24*	*10.24*	*10.23*

*Notes: The table presents results from regression of the change in the log of light intensity in each consitutency for the period 1999-2013. Each observation is a district-Year statistic and most variables have been transformed to natural logs. The instrumental variable used (political) is a dummy variable that takes the value 1 if the constituency's Member of Parliament (MP) defects from the party with which he/she won the seat to join the ruling President's party. All regressions do not include constituencies from the two cities of Blantyre and Lilongwe (two districts, namely Neno and Likoma, are also excluded from the entire sample as they were recently formed after splitting from other districts). Columns 2-8 use the preferred sample and stepwise inclusion of control variables. Robust standard errors, clustered at District level, are reported in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

Table C.4: District results with ethnic affinity instrument

	1 OLS	2 2SLS	3 2SLS	4 2SLS	5 2SLS	6 2SLS	7 2SLS	8 2SLS	9 2SLS	10 2SLS	11 2SLS
Aid (log)	0.0637*	0.2234***	0.2183**	0.2120**	0.2114**	0.2006**	0.2012**	0.1838**	0.1852**	0.2062**	0.2905***
	(0.0371)	(0.0698)	(0.0899)	(0.0944)	(0.0949)	(0.0903)	(0.0895)	(0.0795)	(0.0780)	(0.0823)	(0.0633)
Initial light density (log)	-0.7621***	-0.7689***	-0.7727***	-0.7732***	-0.7767***	-0.7883***	-0.7884***	-0.7779***	-0.7774***	-0.7857***	-0.6626***
	(0.1607)	(0.1498)	(0.1581)	(0.1579)	(0.1568)	(0.1595)	(0.1588)	(0.1556)	(0.1553)	(0.1548)	(0.1239)
Public expenditures (log)	-0.0233	0.0414	0.0423	0.0463	0.0434	0.0541	0.0519	-0.0134	-0.0141	-0.0186	0.0398
	(0.0558)	(0.0442)	(0.0425)	(0.0438)	(0.0433)	(0.0440)	(0.0436)	(0.0533)	(0.0534)	(0.0519)	(0.0454)
Population density (log)	0.8712	1.0603*	1.0623*	1.0737*	1.0983*	1.1940**	1.1822**	1.1437**	1.0412**	0.0508	0.0327
	(0.8888)	(0.5802)	(0.5882)	(0.5918)	(0.5859)	(0.5863)	(0.5938)	(0.5833)	(0.5089)	(0.8712)	(0.5620)
Rainfall (log)	0.0118	0.0132	0.0113	0.0057	0.0076	0.0113	0.0122	0.0625	0.0637	0.0770	0.0047
	(0.1125)	(0.1382)	(0.1450)	(0.1476)	(0.1479)	(0.1438)	(0.1442)	(0.1309)	(0.1288)	(0.1326)	(0.1363)
Poverty rate	0.0939	0.0992	0.0986	0.1036	0.1181	0.1074	0.1118	0.1642	0.1604	0.1584	0.1240
	(0.1528)	(0.2390)	(0.2383)	(0.2340)	(0.2302)	(0.2242)	(0.2197)	(0.2000)	(0.2007)	(0.2017)	(0.1749)
District vote share (%)	0.1351		0.0324	0.0359	0.0306	0.0165	0.0212	-0.0323	-0.0348	-0.0125	0.0476
	(0.1309)		(0.1944)	(0.1951)	(0.1938)	(0.1976)	(0.1976)	(0.1806)	(0.1777)	(0.1723)	(0.1503)
Minister dummy	0.0794*			0.0246	0.0312	0.0456	0.0457	0.0638	0.0618	0.0564	0.0608
	(0.0416)			(0.0497)	(0.0499)	(0.0497)	(0.0500)	(0.0425)	(0.0422)	(0.0430)	(0.1261)
Gross primary enrollment (log)	0.2193				0.0551***	0.3238**	0.3233**	0.2241*	0.2216*	0.2854***	0.2785**
	(0.1712)				(0.0185)	(0.1274)	(0.1293)	(0.1163)	(0.1134)	(0.1105)	(0.1210)
No classroom buildings (log)	-0.2908					-0.6860**	-0.6784*	-0.3831	-0.3820	-0.4929	-0.4541
	(0.4416)					(0.3474)	(0.3599)	(0.3232)	(0.3199)	(0.3039)	(0.3218)
Food insecurity rate	-0.0638						-0.0271	-0.0528	-0.0497	-0.0539	-0.0622
	(0.0952)						(0.0667)	(0.0707)	(0.0731)	(0.0734)	(0.0778)
Maize production (log)	0.2931**							0.2907***	0.2908***	0.2878***	0.3021***
	(0.1126)							(0.1038)	(0.1038)	(0.1072)	(0.1056)
Life expectancy	0.0003								0.0061	-0.0027	-0.0020
	(0.0160)								(0.0153)	(0.0153)	(0.0153)
Infant mortality (log)	-0.8446									-1.4076*	-1.1544
	(0.8053)									(0.7935)	(0.7052)
First stage effect											
Ethnic affinity		1.2886***	1.1179***	1.1048***	1.1029***	1.1274***	1.1303***	1.1306***	1.1370***	1.0958***	1.3148***
		(0.1602)	(0.1843)	(0.1887)	(0.1877)	(0.1989)	(0.1995)	(0.1985)	(0.1980)	(0.1830)	(0.1721)
Observations	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*272*
Number of districts	*24*	*24*	*24*	*24*	*24*	*24*	*24*	*24*	*24*	*24*	*26*
District, Year FE	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Including cities	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*Y*
AR F-Test (p-value)		*0.0083*	*0.0211*	*0.0320*	*0.0334*	*0.0389*	*0.0370*	*0.0296*	*0.0247*	*0.0172*	*0.0017*
KP Wald F-stat (weak id)		*64.69*	*36.78*	*34.28*	*34.51*	*32.14*	*32.11*	*32.43*	*32.96*	*35.87*	*38.88*

*Notes: The table presents results from regression of change in the log of recorded nighttime light density in each district for the period 1999 to 2013. Each observation is a district-year statistic and most explanatory variables have been transformed into natural logs. The instrumental variable used (ethnic affinity) is measured as the proportion of a district's population that belong to the incumbent president's ethnicity. Columns 1-10 do not include the two cities of Blantyre and Lilongwe while column 11 includes the two cities (two districts, namely Neno and Likoma, are also excluded from the entire sample as they were recently formed after splitting form other districts). Columns 2-10 use the preferred sample and stepwise inclusion of control variables. Robust standard errors clustered at district level in all specifications are reported in parentheses. *p<0.10, **p<0.05, ***p<0.01.*

Table C.5: District results with political switching instrument

	1 OLS	2 2SLS	3 2SLS	4 2SLS	5 2SLS	6 2SLS	7 2SLS	8 2SLS	9 2SLS	10 2SLS	11 2SLS
Aid (log)	0.0637*	0.1834***	0.1673***	0.1630***	0.1555***	0.1379***	0.1379***	0.1470***	0.1471***	0.1452***	0.1811***
	(0.0371)	(0.0328)	(0.0454)	(0.0457)	(0.0449)	(0.0412)	(0.0410)	(0.0412)	(0.0410)	(0.0410)	(0.0312)
Initial light density (log)	-0.7621***	-0.7550***	-0.7652***	-0.7664***	-0.7694***	-0.7788***	-0.7789***	-0.7723***	-0.7716***	-0.7756***	-0.7542***
	(0.1607)	(0.1405)	(0.1540)	(0.1540)	(0.1529)	(0.1549)	(0.1542)	(0.1522)	(0.1514)	(0.1504)	(0.1386)
Public expenditures (log)	-0.0233	0.0380	0.0405	0.0458	0.0424	0.0519	0.0492	-0.0152	-0.0159	-0.0206	0.0369
	(0.0558)	(0.0422)	(0.0413)	(0.0426)	(0.0420)	(0.0424)	(0.0417)	(0.0532)	(0.0532)	(0.0517)	(0.0435)
Population density (log)	0.8712	1.2145**	1.2271**	1.2295**	1.2792**	1.3905**	1.3788**	1.2575**	1.1616**	0.4019	0.4198
	(0.8888)	(0.5739)	(0.5966)	(0.5972)	(0.5838)	(0.5900)	(0.5987)	(0.5975)	(0.5327)	(0.8010)	(0.5518)
Rainfall (log)	0.0118	-0.0045	-0.0104	-0.0161	-0.0170	-0.0171	-0.0164	0.0461	0.0467	0.0491	-0.0100
	(0.1125)	(0.1294)	(0.1349)	(0.1365)	(0.1362)	(0.1339)	(0.1343)	(0.1243)	(0.1233)	(0.1261)	(0.1295)
Poverty rate	0.0939	0.0705	0.0674	0.0764	0.0893	0.0756	0.0804	0.1462	0.1418	0.1308	0.1411
	(0.1528)	(0.2114)	(0.2057)	(0.2019)	(0.1970)	(0.1873)	(0.1828)	(0.1776)	(0.1771)	(0.1730)	(0.1732)
District vote share (%)	0.1351		0.0913	0.0914	0.0929	0.0891	0.0955	0.0106	0.0097	0.0507	-0.0246
	(0.1309)		(0.1602)	(0.1586)	(0.1563)	(0.1595)	(0.1569)	(0.1629)	(0.1614)	(0.1496)	(0.1592)
Minister dummy	0.0794*			0.0322	0.0409	0.0552	0.0553	0.0694*	0.0677*	0.0663*	0.0715*
	(0.0416)			(0.0468)	(0.0463)	(0.0471)	(0.0474)	(0.0396)	(0.0392)	(0.0387)	(0.0393)
Gross primary enrollment (log)	0.2193				0.0632***	0.3054**	0.3047**	0.2129*	0.2101*	0.2571**	0.2482**
	(0.1712)				(0.0129)	(0.1364)	(0.1391)	(0.1251)	(0.1216)	(0.1250)	(0.1111)
No classroom buildings (log)	-0.2908					-0.6156*	-0.6057	-0.3398	-0.3372	-0.4064	-0.4402
	(0.4416)					(0.3596)	(0.3748)	(0.3425)	(0.3374)	(0.3302)	(0.3102)
Food insecurity rate	-0.0638						-0.0322	-0.0558	-0.0530	-0.0581	-0.0245
	(0.0952)						(0.0708)	(0.0746)	(0.0773)	(0.0785)	(0.0950)
Maize production (log)	0.2931**							0.2918***	0.2920***	0.2901***	0.3025***
	(0.1126)							(0.1034)	(0.1034)	(0.1063)	(0.1031)
Life expectancy	0.0003								0.0060	-0.0014	0.0049
	(0.0160)								(0.0155)	(0.0153)	(0.0146)
Infant mortality (log)	-0.8446									-1.1666*	-1.1095*
	(0.8053)									(0.7029)	(0.6277)
First stage effect											
Political switching		1.3347***	1.3241***	1.2640***	1.2624***	1.2532***	1.3423***	1.3422***	1.3456***	1.3456***	1.3553***
		(0.1048)	(0.1049)	(0.1111)	(0.1102)	(0.1109)	(0.1317)	(0.1321)	(0.1335)	(0.1337)	(0.1304)
Observations	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*272*
Number of districts	*24*	*24*	*24*	*24*	*24*	*24*	*24*	*24*	*24*	*24*	*26*
District, Year FE	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Including cities	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*Y*
AR F-Test (p-value)		*0.0000*	*0.0009*	*0.0015*	*0.0019*	*0.0035*	*0.0034*	*0.0015*	*0.0015*	*0.0018*	*0.0102*
KP Wald F-stat (weak id)		*159.2*	*129.4*	*131.3*	*127.8*	*103.8*	*103.3*	*101.5*	*101.2*	*108.0*	*65.72*

*Notes: The table presents results from regression of change in the log of recorded nighttime light density in each district for the period 1999 to 2013. Each observation is a district-year statistic and most explanatory variables have been transformed into natural logs. The instrumental variable, political switching, is measured as the proportion of Members of Parliament (MPs) in a district that defect from the party with which they won their Parliamentary seat to join the ruling President's party. Columns 1-10 do not include the two cities of Blantyre and Lilongwe while column 11 includes the two cities (two districts, namely Neno and Likoma, are also excluded from the entire sample as they were recently formed after splitting form other districts). Columns 2 to 10 use the preferred sample and stepwise inclusion of control variables. Robust standard errors clustered at district in all specifications are reported in parentheses. *p<0.10, **p<0.05, ***p<0.01.*