

# Growth Impact of Aid Quantity and Quality in Africa

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## INTRODUCTION

Foreign aid has been the main avenue for providing development assistance to low- and middle-income countries for over 50 years. While some rapidly growing emerging economies have turned from recipients to donors over the past decade, foreign aid remains a major source of external financing for most developing countries. Its primary objective is to promote growth and development by providing financial assistance to countries with a weak domestic capital base and low levels of foreign direct investment. However, the amounts necessary to stimulate growth as well as the effectiveness of foreign aid have long been the subject of a vigorous debate.

Some empirical studies have shown that foreign aid exhibits growth-enhancing effects (Hansen and Tarp 2000; Karras 2006; Loxley and Sackey 2008; Minoiu and Reddy 2009; Moreira 2005), providing support for the argument that current flows of development assistance (*henceforth, aid*) are insufficient and need to be increased, especially to countries in sub-Saharan Africa (IMF and World Bank 2005; UNDP 2005; Marysee et al. 2007). Other works have found that aid is either neutral (Boone 1996; Easterly

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2005; Easterly et al. 2004) or even counterproductive with respect to growth (Bobba and Powell 2007). A third group of scholars argue that the effects of aid are positive but subject to diminishing returns (Gomanee et al. 2003; Lensink and White 2001).

Sound monetary, fiscal, and trade policies (Burnside and Dollar 2000; Collier and Dollar 2002) and good institutions (Chauvet and Guillaumont 2003; Svensson 1999; Driffield and Jones 2013) have been found to enhance the effectiveness of aid. In contrast, other studies have demonstrated that the impact of aid is largely independent of the policy and institutional environment in the recipient country (Hansen and Tarp 2000; Rajan and Subramanian 2008).

The goal of this chapter is to address some of the aforementioned issues concerning the aid-growth relationship in the African context. Consistent with studies on the takeoff hypothesis (IMF and World Bank 2005; Sachs 2005) and those that argue that the quality of aid matters for its effectiveness (Clemens et al. 2004; Bobba and Powell 2007; Headey 2007; Rajan and Subramanian 2008; Minoiu and Reddy 2009), we estimate the marginal effects of aid on growth by introducing measures of aid's quantity and quality in the regression analysis. The quantity component is proxied by a quadratic term of the aid variable. Due to lack of data on more direct measures, source-based proxies are used to capture the quality component. We employ nonlinear parametric as well as nonparametric regression models, which help us explore various forms of nonlinearity and identify thresholds for the reversal in the sign of the marginal effect of aid.

Furthermore, the analysis explores the role of governance in the aid-growth relationship. In the parametric regressions, broad measures of governance are used. The first measure is polity II index (from the polity IV project), which assigns numerical values to a country's position on a spectrum of governing authority [spanning from fully institutionalized autocracies (−10 to −6) through mixed-authority regimes (anocracies, −5 to 5) to fully institutionalized democracies (6 to 10)] in a given year. The index is a composite of six factors that include competitiveness of executive recruitment, openness of executive recruitment, constraint on chief executive, regulation of chief executive recruitment, competitiveness of political participation, and regulation of participation. Under each of these factors are various indicators with varying weights (Marshall et al. 2016). Overall, the index is measured on a 21-point scale that ranges from −10 to 10.

Since mixed-authority and democratic political regimes are expected to embrace some level of participatory governance, we assume that countries

with such political regimes will have efficient political, financial, and social institutions. These institutions will in turn determine how aid is distributed and utilized in these countries, and consequently, its effectiveness. Moreover, good governance is also expected to have a direct impact on economic growth. The average polity II index for the sample of countries used in this study for the 1975–2010 period was  $-1.8$ , with majority of these countries leaning toward mixed-authority political regimes (90 percent), compared to 6 and 4 percent of them leaning toward democratic and autocratic regimes, respectively.

The second proxy is legal origin, which refers to whether the country's legal system was founded on the common law tradition of Anglo-Saxon countries or on the Continental civil law tradition. Studies by La Porta et al. (1997, 1998, 2008) have argued that legal origin is a good predictor of a country's institutional quality, showing that unlike English common law tradition, the French civil code is associated among other things with less efficient contract enforcement, heavy hand of government ownership and regulation, weaker investors' protection, and possible higher corruption. Many African countries still maintain strong colonial ties, and have not significantly changed their constitution since attaining independence (UNCTAD 2005). Given that the constitution defines and sets up the government, and consequently, the accompanying institutions, it implies that the nature of institutions that were put in place during the colonial period are to a larger part still in operation (or are influencing the formation of new institutions) in these countries. Thus, in this chapter we use legal origin as a measure of the quality of an array of formal institutions in African countries. In this study, 63 and 35 percent of the countries in the sample are identified with French (civil law) and British (common law) legal origins, respectively.

In contrast to previous studies, we also use nonparametric regressions to understand the changes in the marginal effects of aid on growth for various levels of governance measures. Since nonparametric regressions have some flexibility on the functional form relative to parametric regressions, we are able to introduce specific indicators of governance (government stability, corruption, democratic accountability, law and order) without compromising the efficiency of the model (in the parametric regressions we are constrained by the sample size). Accordingly, we are able to evaluate the impact of aid on growth conditioned on different levels of various governance indicators. The results are expressed in three-dimensional graphs,

enabling us to detect the thresholds of the governance indicators at which the impact of aid on growth becomes more/less effective.

African countries are well suited for studying various aspects of the relationship between aid and growth for several reasons. Africa has traditionally been the largest recipient of aid. Mounting external debt, weak economic institutions, poor governance, and excessive reliance on primary sector exports are some of the persistent factors that have continued to cripple the region and keep it in a cycle of aid dependency. At the same time, the effectiveness of aid has been in doubt because a rapid increase in aid to African countries as a share of GDP between 1970 and the late 1990s coincided with a decline in GDP per capita (see Fig. 16.2 in Easterly 2003).

## METHODOLOGY AND DATA

### *Parametric Regression*

In the parametric analysis, two models are estimated to investigate the impact of aid on economic growth. In the first model, the aid variable is entered as a standalone argument, while in the second, it is interacted with a dummy variable for legal origin. The baseline model is as follows:

$$\begin{aligned} \Delta y_{it} = & \beta_0 + \beta_1 y_{it-\tau} + \beta_2 ODA_{it-\tau} + \beta_3 ODA_{it-\tau}^2 \\ & + \beta_4 Open_{it-\tau} + \beta_5 Inv_{it-\tau} + \beta_6 Fisc_{it-\tau} + \beta_7 Infl_{it-\tau} \\ & + \beta_8 Polity_{it-\tau} + \beta_9 dlegal_i + \beta_{10} Totgr_{it-\tau} \\ & + \beta_{11} Popg_{it} + \beta_{12} FD_{it-\tau} + \eta_t + v_i + \varepsilon_{it} \end{aligned} \quad (15.1)$$

Where  $y_{it}$  is the natural logarithm of real output per capita in country  $i$  at time  $t$ . Country-specific and time-fixed effects are denoted by  $v_i$  and  $\eta_t$ , respectively, while  $\varepsilon_{it}$  is the standard error term.  $\Delta y_{it}^1$  is the average annual growth rate of output per capita in country  $i$  between the years  $t$  and  $t-\tau$ , where  $\tau$  takes the value of 4. In line with the growth literature, growth rate is averaged across four-year non-overlapping periods. All independent variables are initial values at the beginning of each period.<sup>2</sup>

The main explanatory variable of interest is the official development assistance (*ODA*), which takes various forms to measure the quantity and quality aspects of aid. As previously mentioned, the quantity aspect is proxied by the quadratic term of the ODA variable ( $ODA^2$ ). Finding

good measures for the quality of aid can be tricky for cross-country empirical studies.<sup>3</sup> Employing project-based proxies or considering whether aid is tied provides a good starting point, but a more complex one for regression analysis. For example, while some project-type assistance may be related to investment spending, a closer look may reveal that such aid is de facto tied or has some untied components. On the other hand, fully untied aid may be disbursed toward consumption spending with little impact on long-run economic growth. Two recent studies, Birdsall et al. (2010) and Knack et al. (2011), offer an alternative framework for assessing aid quality. These studies develop different indices that form the basis for evaluating the quality of aid based on donor practices in recipient countries. Generally, they find that multilateral aid agencies rank higher than bilateral donors on the aid-quality scale (see Table 4 in Birdsall et al. 2010 and Table 3 in Knack et al. 2011). Accordingly, this chapter adopts a similar approach and employs source-based proxies for aid quality.

The first proxy is bilateral aid (*BODA*). In addition to total bilateral aid, aid from France and the United Kingdom (UK) is included on the basis that majority of the countries in this study are affiliated either with French (63 percent) or British (35 percent) legal origin. Bilateral aid from the European Union (EU) member countries is also included since collectively, these countries are the biggest donors to African countries. We assume that a large proportion of bilateral aid is geostrategic in nature. UK and France, in particular, tend to direct most of their aid to former colonies, with non-democratic former colonies receiving almost two times more aid than democratic non-colonies (Minoiu and Reddy 2009). Such geostrategic aid, which is dispersed regardless of the country's policy environment and institutional quality, is expected to have an undesirable impact on growth relative to non-geostrategic aid. The second proxy is multilateral aid (*MODA*). Unlike bilateral aid, multilateral aid is assumed to be non-geostrategic in nature, therefore, it should enhance growth of recipient countries.

Legal origin, represented by a dummy variable (*dlegal*), takes a value of one for civil law countries (that include former French, Spanish, and Portuguese colonies) and zero otherwise.<sup>4</sup> In an alternative specification (where legal origin is interacted with foreign aid) two dummy variables are used, *dFrench* (France) and *dBritish* (UK), which take the value of one for civil law and common law countries, respectively, and zero otherwise. Given the greater emphasis on collective rather than private property rights under the French civil law, the *dlegal* coefficient is expected to have a negative sign.

The growth literature (Barro 1991; Levine and Renelt 1992; Sala-i-Martin et al. 2004) guides us in selecting the core set of growth determinants, which include the initial level of output per capita ( $y_{it-\tau}$ ), trade openness (*Open*) measured as the percentage of merchandise trade in GDP, monetary policy (*Infl*) proxied by the CPI inflation rate (specified as the logarithm of (1+ inflation rate)), fiscal policy represented by government consumption spending (*Fisc*), financial market development (*FD*), population growth (*Popg*), domestic investment (*Inv*), and a control for external shocks represented by the terms of trade growth (*Totgr*). The polity II index (*Polity*) is used as a proxy for governance and is measured on a scale ranging from  $-10$  (autocratic regime) to  $+10$  (democratic regime). In the nonparametric analysis, disaggregated indicators of governance (government stability, bureaucracy quality, corruption, law and order, democratic accountability, and ethnic fractionalization) are introduced. The corresponding data were obtained from the *International Country Risk Guide* (PRS Group 2011). To ensure uniformity, the original measure of each variable is converted into a scale ranging from 0 (lowest level of governance quality) to 100 (highest level), the exception being corruption where the scale is inverted.

The estimation is conducted using the system generalized method of moments (SGMM) approach of Arellano and Bover (1995) and Blundell and Bond (1998) to control for endogeneity bias, measurement bias, unobserved country fixed effects, and other potentially omitted variables. SGMM is robust to weak instrument bias. It uses suitable lagged levels and lagged first differences of the regressors as their instruments. To minimize the number of GMM-style instruments used, we restrict the maximum lags of dependent and predetermined variables for use as instruments to one. In all specifications, time dummies are included to remove universal time-related shocks from the errors (Roodman 2006).

### *Nonparametric Regression*

The regression model in Eq. (15.1) captures the nonlinear effect of aid on growth via the squared term of the ODA variable; however, it still imposes a particular functional form onto the relationship between the two variables, even if the specification is more general in nature than the standard linear regression. In case this functional form does not correspond to the true functional relationship between aid and growth, the estimated coefficients will be biased. By including a squared term of the ODA variable, we assume

that the nonlinearity between aid and growth is either concave or convex, and that there is only one threshold where the marginal effect of aid reverses its sign. However, as Gomane et al. (2003) have shown, multiple thresholds and various forms of nonlinearity are equally plausible.

To address these issues, we employ a nonparametric regression, which has the advantage of being very flexible in that it relaxes all assumptions about functional form and linearity, homoscedasticity, and serial correlation. However, the model suffers from the “curse of dimensionality”, which makes it difficult to fit a regression in the presence of too many predictors. For this reason, we include only those explanatory variables in the estimation that achieve statistical significance at conventional levels in univariate significance tests.

Given that the nonparametric regression does not yield scalar estimates of marginal effects, the results are presented in three-dimensional plots, whereby each axis denotes the average annual growth rate over four-year periods, the aid variable, and a governance variable, respectively, while holding all other control variables constant at their sample means. Furthermore, we show the corresponding two-dimensional growth curve profiles, which represent the nonparametric regression line of the aid-growth relationship for three different levels of the governance variable. These profiles allow us to identify the thresholds for reversals in the sign of the marginal effect of aid and help us determine which governance indicators create the optimal environment for aid to stimulate growth.

## DATA

The regression analysis is conducted using two datasets. The first covers a sample of 48 African countries over the period 1975–2010, while the second contains data on 39 African countries over the period 1987–2010 and makes use of more detailed data on governance.<sup>5</sup> GDP per capita (in constant 2005 international dollars), government consumption spending, openness, investment spending, and population growth were collected from the Penn World Table version 7.1 (Heston et al. 2012).

Data on net ODA, net multilateral aid, and total bilateral aid flows from Development Assistance Committee donors (all expressed as percentage of GDP) were collected from the OECD’s *International Development Statistics* online database. Bilateral aid from France, the UK, and EU member countries as percentage of GDP, money and quasi money (M2) as percentage of GDP, and the annual CPI inflation rate were obtained from the

**Table 15.1** List of countries in the sample by legal origin

| <i>French legal origin</i> |                       | <i>British legal origin</i> | <i>Neither</i> |
|----------------------------|-----------------------|-----------------------------|----------------|
| Algeria                    | Guinea-Bissau         | Botswana                    | Ethiopia       |
| Angola                     | Madagascar            | Gambia, The                 |                |
| Benin                      | Mali                  | Ghana                       |                |
| Burkina Faso               | Mauritania            | Kenya                       |                |
| Burundi                    | Mauritius             | Lesotho                     |                |
| Cameroon                   | Morocco               | Liberia                     |                |
| Cape Verde                 | Niger                 | Malawi                      |                |
| Central African Republic   | Rwanda                | Namibia                     |                |
| Chad                       | Sao Tome and Principe | Nigeria                     |                |
| Comoros                    | Senegal               | Sierra Leone                |                |
| Congo, Dem. Rep.           | Seychelles            | Somalia                     |                |
| Congo, Rep.                | Togo                  | South Africa                |                |
| Cote d'Ivoire              | Tunisia               | Sudan                       |                |
| Djibouti                   | Mozambique            | Swaziland                   |                |
| Egypt, Arab Rep.           |                       | Tanzania                    |                |
| Equatorial Guinea          |                       | Uganda                      |                |
| Gabon                      |                       | Zambia                      |                |
| Guinea                     |                       | Zimbabwe                    |                |

World Bank's *World Development Indicators* database. Terms of trade indices data were downloaded from the online database of the UNCTAD, while the polity II index was collected from the Polity IV Project (Marshall and Jaggers 2011). Table 15.1 lists the countries in the sample according to their legal origin. Table 15.2 contains the descriptive statistics for the selected variables of the growth regressions.

## RESULTS

### *Parametric Results*

#### *Growth Effects of Aid Quantity*

The takeoff hypothesis postulates that a sustained flow of aid is necessary to help poor countries cross the threshold capital stock required for takeoff toward self-sustained growth (IMF and World Bank 2005). To test this hypothesis, we follow the literature and include both linear and quadratic specifications of the ODA variable in the regression model while controlling for legal origin and other relevant growth determinants. As shown in



**Table 15.2** Descriptive statistics for selected regression variables

| <i>Variable</i>                 | <i>Mean</i> | <i>Std. dev</i> | <i>Min</i> | <i>Max</i> | <i>N</i> |
|---------------------------------|-------------|-----------------|------------|------------|----------|
| Real GDP per capita growth      | 0.599       | 4.590           | -28.813    | 39.534     | 459      |
| Total ODA (% of GDP)            | 12.561      | 13.414          | 0.070      | 109.791    | 425      |
| Bilateral ODA (% of GDP)        | 7.216       | 8.104           | -0.103     | 64.684     | 425      |
| Multilateral ODA (% of GDP)     | 4.756       | 5.424           | -0.035     | 55.277     | 425      |
| UK Bilateral Aid (% of GDP)     | 0.501       | 1.097           | -0.114     | 10.728     | 425      |
| France Bilateral Aid (% of GDP) | 1.550       | 2.353           | -0.222     | 17.950     | 425      |
| EU Bilateral Aid (% of GDP)     | 1.378       | 1.664           | -0.070     | 10.937     | 425      |
| Financial development           | 45.265      | 347.279         | 0.918      | 7015.569   | 406      |
| Openness                        | 64.783      | 36.528          | 1.795      | 241.414    | 459      |
| Investment                      | 21.087      | 13.089          | 1.752      | 76.511     | 459      |
| Fiscal policy                   | 13.439      | 9.855           | 1.371      | 56.798     | 459      |
| Inflation                       | 89.447      | 1312.335        | -29.173    | 26762.020  | 426      |
| Terms of trade growth           | 0.271       | 13.990          | -44.059    | 255.363    | 459      |
| Population growth               | 2.467       | 1.677           | -15.506    | 12.067     | 459      |

*Note:* The real GDP per capita growth and TOT growth are averaged over four-year period. All other variables are initial values at the beginning of the period for the sample of 1975–2010

column (1) of Table 15.3, the estimated coefficient of the linear term for ODA has a negative sign, while that of the quadratic term is positive, both with significant effects. This suggests that the regression line describing the aid-growth relationship is convex and thus lends support to the argument of the takeoff hypothesis.

To assess whether the quantity effects of aid differ with respect to legal origin, we interact both the linear and quadratic terms for ODA with the dummy variables for French and British legal origin. The results in column (1) of Table 15.4 imply that the regression line is concave due to diminishing returns of aid, which contrasts with the estimates for the total sample. But what matters in this context is that the direction of the quantity effects does not vary across the two categories of legal origin. A closer look, however, reveals important differences in the magnitude of the coefficients. In particular, a 1 percent increase in aid as percentage of GDP boosts subsequent annual growth by 0.1 percent in countries with British legal origin, compared to 0.07 percent in their French counterparts. In addition, the coefficient for the quadratic term that indicates the negative marginal effect of aid due to diminishing returns is twice as large for French civil law countries as for their British counterparts.

**Table 15.3** Foreign aid effects on real GDP per capita growth of African countries (four-year averaged), SGMM estimation (1975–2010)

|                                 | (1)                   | (2)                   | (3)                   |
|---------------------------------|-----------------------|-----------------------|-----------------------|
| Real GDP per capita (ln)        | −17.160***<br>(1.837) | −14.760***<br>(0.595) | −15.200***<br>(1.088) |
| Total Aid                       | −0.062***<br>(0.021)  |                       |                       |
| Total Aid <sup>2</sup>          | 0.001**<br>(0.0003)   |                       |                       |
| Bilateral Aid                   |                       | 0.088**<br>(0.042)    |                       |
| Bilateral Aid <sup>2</sup>      |                       | −0.002***<br>(0.001)  |                       |
| Multilateral Aid                |                       | −0.059<br>(0.092)     |                       |
| Multilateral Aid <sup>2</sup>   |                       | −0.001<br>(0.001)     |                       |
| France Bilateral                |                       |                       | −0.331***<br>(0.128)  |
| UK Bilateral                    |                       |                       | 0.318*<br>(0.171)     |
| EU Bilateral                    |                       |                       | −0.236**<br>(0.115)   |
| Inflation                       | −0.00004<br>(0.00004) | −0.00006<br>(0.00005) | −0.00006<br>(0.0002)  |
| Financial development           | 0.024**<br>(0.011)    | 0.032***<br>(0.007)   | 0.038***<br>(0.008)   |
| Openness                        | 0.014***<br>(0.004)   | 0.015***<br>(0.003)   | 0.015***<br>(0.004)   |
| Legal origin ( <i>dfrench</i> ) | −0.489<br>(0.299)     | −0.468*<br>(0.277)    |                       |
| Polity index                    | −0.012<br>(0.031)     | −0.033<br>(0.031)     | −0.015<br>(0.029)     |
| Terms of trade growth           | 0.026<br>(0.028)      | 0.026<br>(0.023)      | 0.037<br>(0.033)      |
| Fiscal policy                   | −0.185***<br>(0.045)  | −0.164***<br>(0.057)  | −0.138*<br>(0.072)    |
| Investment                      | 0.135***<br>(0.040)   | 0.109***<br>(0.026)   | 0.134***<br>(0.031)   |
| Population growth               | 0.560***<br>(0.131)   | 0.539***<br>(0.139)   | 0.784***<br>(0.132)   |
| Observations                    | 271                   | 309                   | 309                   |

*(continued)*

**Table 15.3** (continued)

|                                       | (1)   | (2)   | (3)   |
|---------------------------------------|-------|-------|-------|
| Number of countries                   | 48    | 48    | 48    |
| Sargan Test (Prob >chi <sup>2</sup> ) | 0.127 | 0.175 | 0.297 |
| Arellano-Bond (Pr>z)                  | 0.353 | 0.736 | 0.769 |
| Time-fixed effects                    | Yes   | Yes   | Yes   |

*Note:* All variables (with the exception of TOT growth) are measured as initial values at the beginning of the four-year period. Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Arellano-Bond test that average autocovariance in residuals of order 2 is 0 has H0: no autocorrelation. All values are based on a two-step estimator. Maximum lags of dependent and predetermined variables for use as instruments are limited to 1

The observed positive effects from the quadratic specification of total aid are in line with the results from existing empirical studies (Dalgaard and Hansen 2001; Hansen and Tarp 2001; Lensink and White 2001) and concur with evidence from micro-level project impact evaluations. For example, a World Bank (2003) study found that countries with aid levels above 20 percent of GDP (most of them in Africa) grew on average by 1.3 percent per year in per capita terms over the period 1995–2000. Other success stories from countries such as Uganda and Mozambique show that increased shares of aid in GDP above 20 percent coincided with positive growth rates in the 1990s (Mavrotas 2007).

Nevertheless, our findings also imply that an increase in aid to African countries in the hope of achieving a takeoff toward self-sustained growth is not necessarily warranted. In particular, we show that the takeoff hypothesis might not hold once the sample is disaggregated according to legal origin. In fact, the results suggest that aid effects conditional on legal origin could be subject to diminishing returns, so that doubling current aid flows would have adverse effects on growth. This could occur because dramatically scaling up aid flows may overwhelm or displace local efforts (Calderisi 2006) or undermine other key sectors through the Dutch disease with undesirable effects on economic growth (Moyo 2009). Another plausible explanation is the overall governance quality effects inherent in legal origin.

#### *Growth Effects of Aid Quality*

The next issue is whether the quality of aid matters for economic growth, as suggested in related literature (Bobba and Powell 2007; Minoiu and Reddy 2009; Rajan and Subramanian 2008). Column (2) in Table 15.3 contains

**Table 15.4** Foreign aid effects on real GDP per capita growth of African countries, disaggregated by legal origin (four-year averaged), SGMM estimation (1975–2010)

|  | (1)                   | (2)                   |
|--|-----------------------|-----------------------|
| Real GDP per capita (ln)                       | −16.520***<br>(1.858) | −13.420***<br>(0.867) |
| <i>dbritish</i> *Total Aid                     | 0.099*<br>(0.0413)    |                       |
| <i>dbritish</i> *Total Aid <sup>2</sup>        | −0.001***<br>(0.0004) |                       |
| <i>dfrench</i> *Total Aid                      | 0.073***<br>(0.017)   |                       |
| <i>dfrench</i> *Total Aid <sup>2</sup>         | −0.002***<br>(0.0004) |                       |
| <i>dbritish</i> *Bilateral Aid                 |                       | 0.301***<br>(0.111)   |
| <i>dbritish</i> *Bilateral Aid <sup>2</sup>    |                       | −0.020***<br>(0.004)  |
| <i>dfrench</i> *Bilateral Aid                  |                       | 0.013<br>(0.034)      |
| <i>dfrench</i> *Bilateral Aid <sup>2</sup>     |                       | −0.0001<br>(0.001)    |
| <i>dbritish</i> *Multilateral Aid              |                       | −0.083<br>(0.122)     |
| <i>dbritish</i> *Multilateral Aid <sup>2</sup> |                       | 0.013***<br>(0.003)   |
| <i>dfrench</i> *Multilateral Aid               |                       | 0.138**<br>(0.058)    |
| <i>dfrench</i> *Multilateral Aid <sup>2</sup>  |                       | −0.008***<br>(0.003)  |
| Inflation                                      | −0.00002<br>(0.00003) | −0.0001<br>(0.00004)  |
| Financial development                          | 0.030***<br>(0.011)   | 0.042***<br>(0.008)   |
| Openness                                       | 0.017***<br>(0.005)   | 0.018***<br>(0.003)   |
| Polity index                                   | −0.021<br>(0.033)     | −0.019<br>(0.033)     |
| Terms of trade growth                          | 0.032<br>(0.026)      | 0.017<br>(0.021)      |
| Fiscal policy                                  | −0.185***<br>(0.045)  | −0.166***<br>(0.055)  |
| Investment                                     | 0.131***<br>(0.040)   | 0.111***<br>(0.026)   |
| Population growth                              | 0.364*<br>(0.131)     | 0.766***<br>(0.131)   |

*(continued)*

**Table 15.4** (continued)

|                                       | (1)     | (2)     |
|---------------------------------------|---------|---------|
|                                       | (0.195) | (0.224) |
| Observations                          | 271     | 309     |
| Number of countries                   | 48      | 48      |
| Sargan Test (Prob >chi <sup>2</sup> ) | 0.144   | 0.363   |
| Arellano-Bond (Pr>z)                  | 0.370   | 0.397   |
| Time-fixed effects                    | Yes     | Yes     |

*Note:* All variables (with the exception of TOT growth) are measured as initial values at the beginning of the four-year period. Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

the results for the linear and quadratic specifications of bilateral and multi-lateral aid. Contrary to our expectations, the linear term for bilateral aid exhibits a positive sign, while the quadratic term is negative, indicating the presence of diminishing returns. Increasing the initial share of total bilateral aid in GDP by 1 percent boosts annual economic growth of African countries by approximately 0.09 percent for the following four years. However, when aid share in GDP doubles, annual growth rates drops by 0.002 percent in subsequent years. In contrast, the coefficients for multilateral aid do not achieve statistical significance.

One possible reason for the unexpected results with regard to bilateral aid is revealed once we decompose it into country-specific components. The estimates in column (3) of Table 15.3 demonstrate that bilateral flows from France and EU member states had the hypothesized adverse effect on growth, while those from the UK seem to have stimulated growth in recipient countries. In fact, the literature indicates that French bilateral aid tend to be geostrategic in nature relative to UK aid. For instance, French aid has focused on military and cultural cooperation with their former colonies in Africa, while British assistance has targeted economic development and liberalization instead (Cumming and Chafer 2011; Pacquement 2010). In addition, bilateral aid from the UK consistently ranks higher than from France in terms of quality (Birdsall et al. 2010; Knack et al. 2011).

Furthermore, we hypothesized that the effects of bilateral and multilateral aid would vary due to differences in the institutional environment of recipient countries, which is proxied by legal origin. Accordingly, we interact the dummy variables for British and French legal origin with the two components of aid and present the results in column (2) of Table 15.4. First, robust bilateral aid effects are only present in former British colonies, reiterating the positive effects of the linear specification and the negative

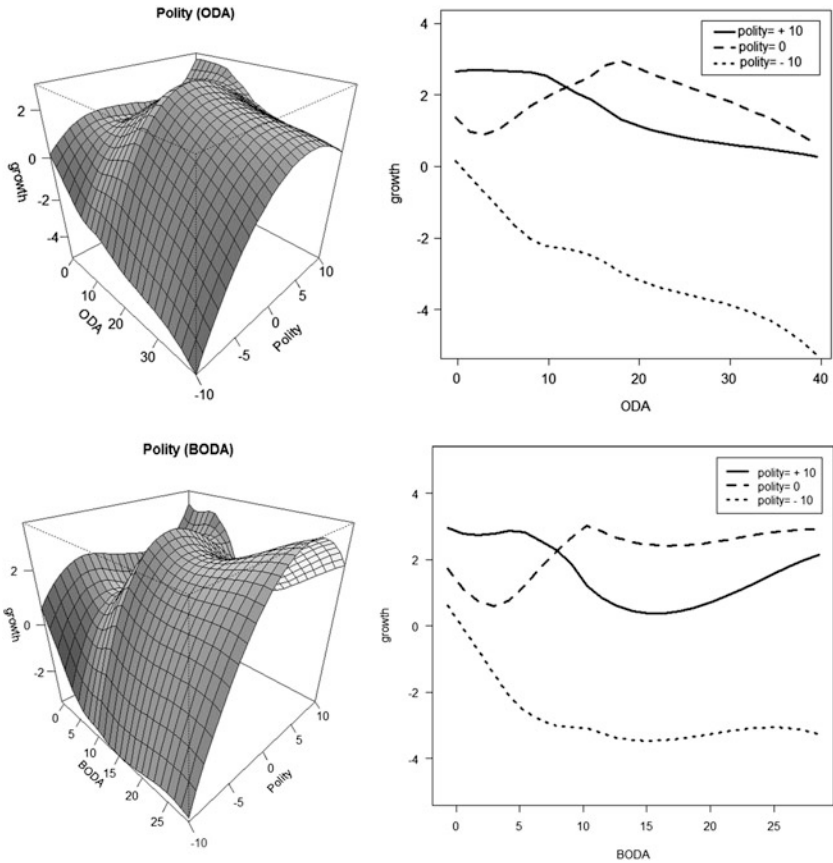
impact of the quadratic term on growth. Second, the effects of multilateral aid are significant in both groups, although the linear term is neutral in former British colonies. More importantly, the coefficients for multilateral aid in common law and civil law countries exhibit opposite signs, suggesting that legal origin does matter for the effectiveness of aid. When multilateral aid is doubled, former British colonies experience a significant growth boost of approximately 0.01 percent per year over the subsequent four-year period, while the economic growth of French legal origin countries deteriorates at the same rate.

Our regression results highlight the following key findings: (i) scaling up bilateral aid impedes growth in African countries, regardless of the legal origin; (ii) the current flow of bilateral aid is effective only if it originates from the UK and only in recipient countries with British legal origin; (iii) the current flow of multilateral aid does not seem to have a noticeable economic impact in former British colonies, but it promotes growth in former French colonies; (iv) however, should the current level of multilateral aid double, benefits will accrue mostly to countries with British legal origin, whereas French civil law countries will be adversely affected. Generally, based on these results, we can convincingly argue that the quality of aid matters and that the impact of aid on growth differs with respect to legal origin.

As a robustness check, we introduce five proxies for quality of governance (ethnic fractionalization, government stability, bureaucracy quality, corruption, law and order, and democratic accountability) that have been deemed relevant to growth and aid effectiveness by policy makers and donors (Court 2006). However, this reduces both the sampling period (1987–2010) and sample size (39 countries). To avoid duplication, we include the legal origin dummy and the five governance indicators in separate models. The results indicate that the growth effects of aid are robust and remain consistent with the predictions of the takeoff hypothesis. These results still hold when the five proxies are used instead of the legal origin dummy, indicating that legal origin acts as a proxy of an array of governance quality measures.<sup>6</sup>

### *Nonparametric Results*

The nonparametric analysis begins with a univariate specification test (Racine 1997; Racine et al. 2006), which shows that ODA is a significant determinant of growth in both datasets. The polity II index for 1975–2010 and four out of the five institutional variables for 1987–2010 are also significant. From the group of control variables, only openness is significant



**Fig. 15.1** The effects of foreign aid and political regimes (polity index) on growth, 1975–2010

in both datasets, while population growth and investment achieve statistical significance only for 1975–2010 and 1987–2010, respectively.

The regression results for 1975–2010 are illustrated in Fig. 15.1. The left column shows the effects of ODA and the polity index on growth in three-dimensional plots while holding the remaining control variables constant at their sample means. The column on the right presents the corresponding two-dimensional growth profile curves that describe the marginal effect of

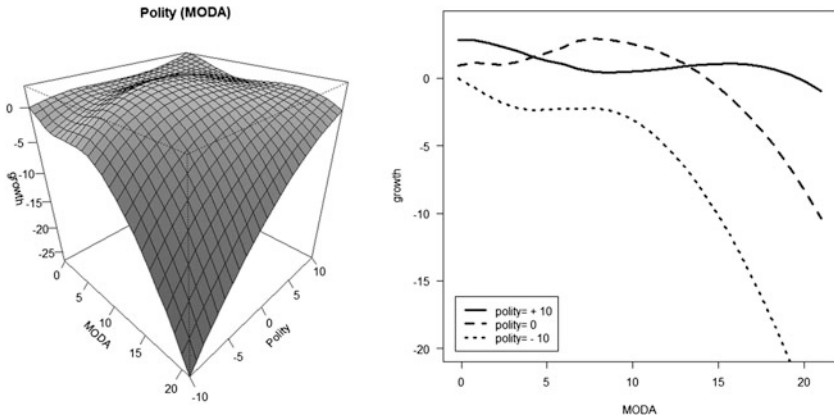


Fig. 15.1 (continued)

ODA on growth for three different levels of the polity index representing autocracy, anocracy, and democracy.

As evident from the graphs in the first row of Fig. 15.1, increasing aid has a negative effect on growth in autocracies. Under a full-fledged democratic regime, aid is largely ineffective at low levels and becomes obstructive to growth beyond 10 percent of GDP. In anocracies, the growth-enhancing effects of aid are observed for levels between 3 and 20 percent of GDP, while ODA is counterproductive below and above these thresholds. Other empirical studies have demonstrated that democracy promotes growth through a more effective allocation of aid because of institutionalized checks on power, such as free elections, transparency, and accountability (Kosack 2003; Svensson 1999). This minimizes the possibility that aid is embezzled or diverted toward nonproductive uses. Our results support this conclusion by showing that the complete lack of democratic features is detrimental to the influence of aid on growth. At the same time, we find that strengthening the democratic attributes of a political system on the continuum between anocracy and a full-fledged democracy weakens the effectiveness of aid. A possible explanation is that in democracies aid could be diverted to finance vote buying during electoral campaigns (Kuncic 2011) and to pay for populist measures with a short-run focus that are not necessarily conducive to medium- and long-term growth. In addition, democratic regimes and democratization reforms in recipient countries, particularly after long periods of dictatorial regimes, tend to attract an influx of aid, especially



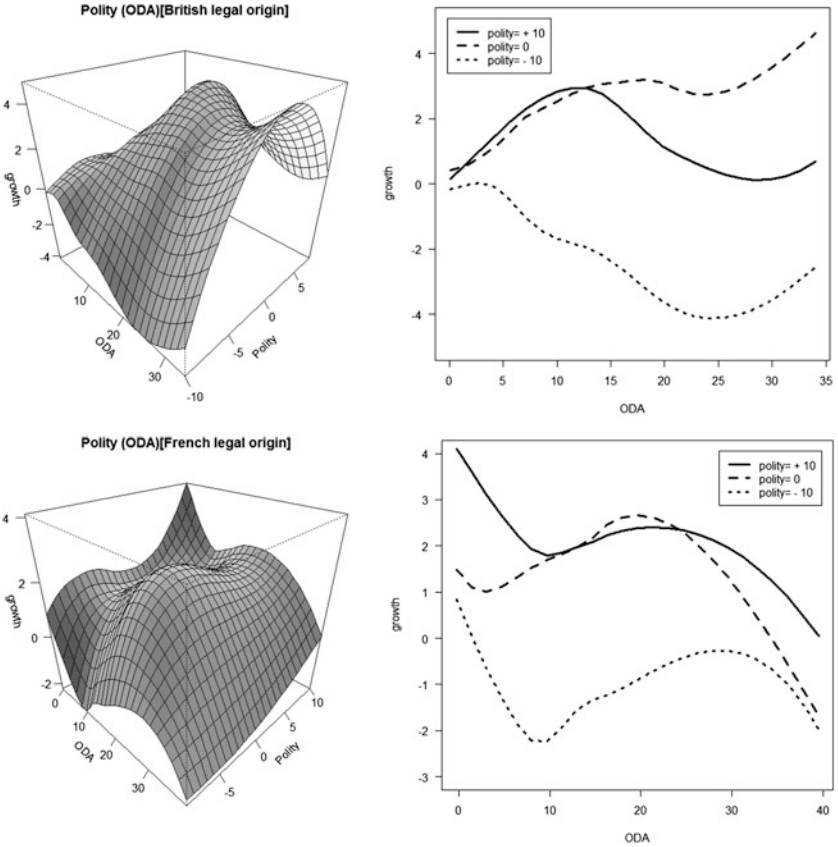
from democratic donor countries (Bermeo 2011). In such cases, especially in Africa, aid proliferation can reduce the growth-enhancing effects of aid (Kimura et al. 2012).

The graphs for the two components of ODA in the second and third rows of Fig. 15.1 show that bilateral aid exhibits largely the same patterns as total aid. An important difference is that in autocracies and anocracies it loses its relevance for growth in amounts exceeding 10 percent of GDP, whereas in democracies it contributes to a takeoff in growth above a threshold of 15 percent of GDP. With regard to multilateral aid, low levels promote growth in anocracies but have a weak negative impact at both extremes of the political regime spectrum. Once the 8 percent of GDP mark is crossed, annual growth in anocracies and autocracies deteriorates sharply by more than 1 percent for each additional percent of aid as a share of GDP, while aid becomes largely irrelevant for growth in democracies.

Further, we test for differences with respect to legal origin and present the results in Fig. 15.2. In countries with a French legal origin, aid impairs growth at lower levels and becomes effective in amounts exceeding 10 percent of GDP, only to revert back once aid reaches 25 percent of GDP. Although the pattern is almost identical across political regimes, the thresholds are significantly lower for anocracies. In contrast, aid in former British colonies boosts growth at levels below 15 percent of GDP, but diminishing returns weaken its effectiveness and reverse its effect above this threshold. In the case of autocracies, this occurs as well but at markedly lower levels. Aid reclaims its positive effect above 25 percent of GDP, regardless of the political regime. These results confirm the concave (convex) form of the regression line at lower levels of aid for countries with a British (French) legal origin observed in the parametric estimation.

In Fig. 15.3, we explore the effects of the four institutional factors found to be significantly related to growth in a nonparametric setting. The growth profile curves in the two-dimensional plots show the relationship between ODA and growth for the lowest, mean, and highest levels of a given governance indicator.

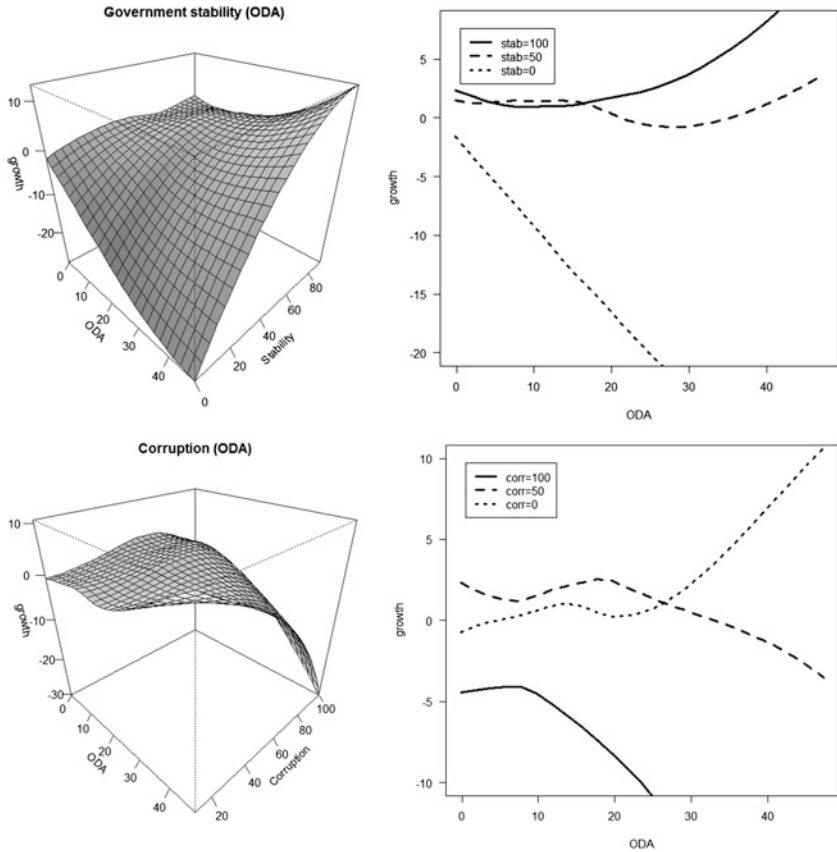
High levels of government stability improve aid effectiveness but only above 10 percent of GDP. In the case of extreme political instability, the regression curve has a steep negative slope implying a drop of almost 1 percent in the annual growth rate for every increase in ODA by 1 percent of GDP. At average levels of stability, aid is largely irrelevant for growth. Government stability reflects the unity within the government, its legislative strength, and the popular support it enjoys. As our results show, a fractured



**Fig. 15.2** The effect of foreign aid on growth in countries with British vs. French legal origin, 1975–2010

and impotent government that lacks the support of the electorate is very likely to impair the allocation and effective use of aid.

The strong presence of corruption is found to prevent aid from promoting growth, as suggested by the slope of the regression curve turning negative beyond aid levels of 8–9 percent of GDP. This is contrasted by the positive growth effect of aid when corruption is completely absent. At average levels of corruption, the negative effect of aid on growth becomes apparent only above 20 percent of GDP. Corruption can undermine the



**Fig. 15.3** The effects of foreign aid and various governance indicators on growth (1987–2010)

effectiveness of aid in various ways. For instance, the bidding process for development projects financed by aid can be rigged in favor of certain firms at inflated prices in exchange for kickbacks. In addition, government officials can embezzle funds and solicit bribes in order to ignore poorly implemented or unfinished projects financed by aid.<sup>7</sup>

High levels of democratic accountability ensure that aid is used to stimulate growth, although its marginal effect is relatively weak. A complete lack of democratic accountability is found to be much more conducive to

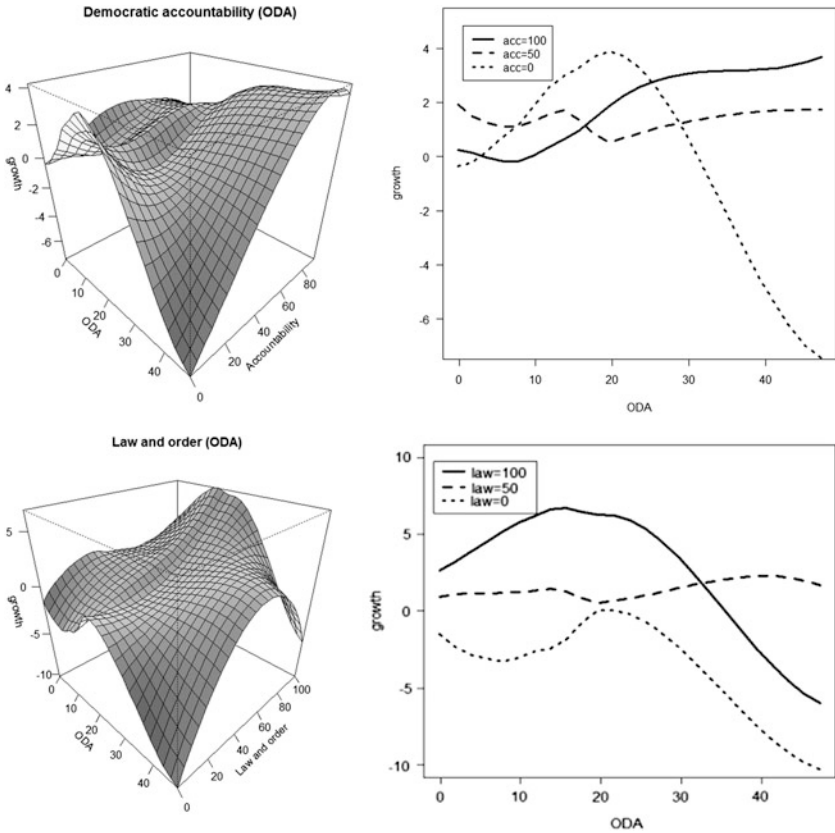


Fig. 15.3 (continued)

growth for levels of aid below 20 percent of GDP; however, above this threshold the effect of aid turns negative. This result is surprising since accountability is expected to reduce the likelihood of aid being diverted or embezzled. It is possible that the misappropriation of funds is not endemic at lower levels of ODA to the extent of rendering aid counterproductive. As we showed above, average levels of corruption also turn into a serious problem for the effectiveness of aid in excess of the same threshold of 20 percent of GDP, and this is apparently where accountability starts to make a difference as well.

Enforcing law and order was found to create an environment that helps aid stimulate economic activity but it is not able to prevent aid above 20 percent of GDP from impeding growth. In the extreme case of complete breakdown in law and order, aid has a negative effect on growth, especially at levels below 10 percent and above 20 percent of GDP.

## CONCLUSION

The empirical literature on the effectiveness of aid with respect to growth has produced conflicting results but previous studies have unambiguously established that the effect of aid on growth is nonlinear and depends on certain characteristics of recipient countries. With a focus on these two aspects, this chapter employs a combination of parametric and nonparametric methods that prove to be very advantageous in assessing the nonlinear relationship between aid and growth. In addition, we investigate the relevance of governance quality and identify the specific institutional components that promote the growth-enhancing effects of aid.

Our results indicate that aid is effective in stimulating growth but the pattern and magnitude of its impact is influenced by quality of governance in the recipient country. When governance factors are not taken into account, the relationship between aid and growth is found to be convex suggesting that only sustained flows of aid above a certain threshold can ensure a takeoff in growth. Differences in legal origin, however, reveal a different pattern where the effects of aid are subject to diminishing returns that weaken its impact in response to further increases. For countries with British legal origin, the resulting concave shape of the interaction between aid and growth is robust across various specification of the empirical model. In contrast, the aid-growth relationship in countries that follow the French legal tradition is conditional on the quality of governance. Furthermore, we find that the type of political regime plays a significant role with aid being most effective in anocracies, and counterproductive in autocracies.

The bilateral and multilateral components of aid, which are employed as measures of the quality of aid, exhibit the expected effects but only when the quality of governance is taken into account. In particular, multilateral aid representing flows that are not geostrategic in nature was shown to have a positive effect on growth, while bilateral assistance does not make a difference. Legal origin is also important in this aspect. Bilateral aid in former British colonies is subject to diminishing returns, while multilateral aid is

effective only above a certain threshold for both legal origin categories when governance quality is controlled for.

Given the importance of governance for aid effectiveness, we explore various components and find that political stability and low levels of corruptions are crucial for the growth-enhancing impact of aid. Enforcing law and order contributes to the effectiveness of aid only below a level of 20 percent of GDP, while democratic accountability makes a difference only above this threshold.

We can derive several policy lessons and recommendations from our findings, which, given our sample, are primarily aimed at African countries. Bilateral aid to former British colonies has a positive impact but scaling it up would diminish its effectiveness and eventually impair growth. Sustained increases in multilateral aid will generate growth benefits regardless of legal origin, but only above a certain threshold that depends on the political regime. In addition, good governance is a necessary condition for recipient countries with a French legal origin enjoying these benefits. More broadly, the conditionality of aid implemented by donor countries and multilateral organizations is crucial for the effectiveness of aid with respect to growth, especially if it targets stable governments, low levels of corruption, and the rule of law.

## NOTES

1. The average annual growth rate of output per capita between the years  $t-\tau$  and  $t$  is calculated as  $(y_{it} - y_{it-\tau})/\tau$ .
2. The only exception is the terms of trade growth ( $Totgr$ ), which is averaged over the four-year period to maximize data points.
3. Studies focused on a specific country have shown that certain components of aid are more effective in promoting growth than others. For instance, Kargbo and Sen (2014) found that grants improve pro-poor growth in Sierra Leone.
4. In this chapter, we adopt a broader definition of “legal origin”, similar to La Porta et al. (2008), as a style of social control of economic life. This definition encompasses assimilation of legal systems, social institutions, and infrastructure introduced in the African countries through conquest and colonization.
5. The sampling period for the 1975–2010 dataset was chosen to accommodate the maximum number of African countries.
6. The results of the robustness tests are available upon request.

7. Kangoye (2013) shows that aid unpredictability can also breed corruption in recipient countries.

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