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## « Do natural resources condition the aid- governance relationship? Evidence from Africa »

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**Do natural resources condition the  
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### Abstract

This paper offers some evidence on why the governance effect of foreign aid is shadowy in African countries. The evidence suggests that the aid-governance linkages can be robust if the type of aid is differentiated between bilateral and multilateral aid and if the governance effect of aid is conditioned on the size of natural resources rents. A dynamic panel data analysis over the period 1997 – 2008 reveals that (i) foreign aid improves governance if and only if aid is allocated by multilateral agencies; and (ii) the effect of multilateral aid is the stronger the less the recipient country is dependent on natural resources, in particular on oil resources. The combination of multilateral aid and oil rents independence favour the development of good governance in Africa.

*Keywords:* Governance, Natural resources, Oil, Multilateral aid.

*JEL classification:* F35, D73, Q30, O11, C33.

## 1. INTRODUCTION

Nine of the fifteen poorest governed countries in the world are located in Africa.<sup>1</sup> The substantial empirical evidence shows that because of poor governance – namely corruption, non accountability or rent-seeking – underdevelopment and low income persist (see, for example, [Hall and Jones \(1999\)](#), [Mauro \(1995\)](#), and [Sachs and Warner \(1997\)](#)). Therefore, if governance could be improved, the well-being of poor people in poor countries would also ameliorate. A potential mechanism for improving governance is the allocation of foreign aid. A wide literature has investigated the aid-governance relationship without reaching any consensus. [Alesina and Weder \(2002\)](#), [Bräutigam and Knack \(2004\)](#), [Knack \(2004\)](#), [Knack and Rahman \(2007\)](#), and [Rajan and Subramanian \(2011\)](#) found that aid harms governance, either significantly or not. Conversely, [Tavares \(2003\)](#), [Dunning \(2004\)](#), [Jensen and Wantchekon \(2004\)](#) and [Goldsmith \(2001\)](#) found that aid increases the quality of governance. It thus seems unclear whether doing so would even be counterproductive.

In this paper, I shift the focus of the debate among academics and policy makers by changing the question from *whether* aid improves governance to *why* aid does (not) improve governance. The overall effect of foreign aid is unclear. But there are some reasons to believe that the rents derived from the exploitation of natural resources in the recipient country condition the aid effect on governance. A strand of the governance literature has established that rents on natural resources hinder the development of "good" governance.<sup>2</sup> Natural resources in recipient countries may affect the aid-governance relationship for two reasons. First, rents on resources are typically generating discretion in public resources allocation and dictatorial regimes ([Jensen and Wantchekon, 2004](#)). Hence, aid is potentially more easily misused when the government is used to extract rents from natural resources. Second, resource-rich countries could attract more aid because of donors' political

interests (see, for example, [Tull, 2006](#); [Dreher et al., 2011](#)). Therefore, as rents from natural resources are tightly controlled by the government, donors may gain in having close ties with the government, which is easier under "bad" governance.

Furthermore, the overall effect of foreign aid may be unclear because of different types of donors. Different aid components may affect differently the state of governance because different types of donors – namely bilateral donors and multilateral donors – have apparently different motives ([Minoiu and Reddy, 2007](#)). While multilateral donors are more explicitly attentive to governance issues since the end of 1990's and the Monterrey commitment (2000), bilateral donors are presumably tied to their own political interests.<sup>3</sup> One may expect that multilateral aid is more beneficial for governance in aid-recipient countries.

There has been barely any empirical research on the relationship between aid types, natural resources, and governance so far. There are two published articles that distinguish between multilateral and bilateral aid, namely [Alesina and Weder \(2002\)](#) and [Charron \(2011\)](#), but no study covering the potential interaction effect between aid and natural resources on governance. Because rents on natural resources can presumably affect the aid-governance linkages, the combination between the type of aid and the size of natural resources rents may shed the light on the governance effect of foreign aid. This study takes into consideration the persistent nature of governance, donors heterogeneity, and the relevance of natural resources in conditioning the relationship between aid and governance in African countries. This paper is the first study that interacts the rents on natural resources with the nature of foreign aid, bilateral or multilateral, to characterize the complex relationship between aid and governance of recipient countries.

I estimate a dynamic panel data model applying the "system" GMM estimator<sup>4</sup> proposed by [Blundell and Bond \(1998\)](#) to address dynamic, endogeneity and heterogeneity issues. Because Africa is often taken as an example of the adverse

aid effects on political outcome (Bräutigam and Knack, 2004; Goldsmith, 2001; Dunning, 2004), I focus specifically on the African countries. I cover the post Cold War period in which aid presumably has turned to be more policy oriented and selective to policy performance because of international commitments and academic insights (World Bank, 1998; Burnside and Dollar, 2000). Using panel data covering 52 African countries over the period 1997–2008, I show that rents on natural resources alter the aid-governance relationship in African countries. I find that aid increases the quality of governance if and only if aid is allocated by multilateral agencies but not by bilateral donors. The less the recipient country depends on natural resources rents the stronger is the beneficial effect of foreign aid. I also disaggregate the measure of natural resources rents into its three components – oil, gas, and minerals – as shares of GDP. The relationship between aid and governance is partly altered by the dependence on natural resources and, in particular, by the dependence on oil resources. Finally, I show that results are robust across regressions. They hold for different estimation procedures, measures of governance, and sample selection. Neither does the inclusion of times dummies alter the findings.

The remained of the paper is organized as follows. Section 2 presents the literature and hypotheses. Section 3 presents the data and descriptives statistics. Section 4 outlines the econometric procedure. Section 5 reports and discusses the results. Section 6 discusses the robustness of the core result. Section 7 concludes.

## 2. LITERATURE AND HYPOTHESES

### a. Literature

The consequences of foreign aid for recipient countries have led to a huge literature striving for understanding why "decades of large-scale foreign assistance left not a trace of progress" (World Bank, 1998, p 1). First interested in the causal effect

of aid on growth, aid empirical studies pointed out that the direct effect of aid on growth is undetermined because of interactive channels.<sup>5</sup> In particular, as foreign aid – allocated by international donors – ends up in the public budget of recipient governments, the quality of their governance may condition the aid-growth relationship ([Burnside and Dollar, 2000](#)). Since the end of the nineties, aid empirical studies have turned to investigate the direct effect of foreign aid on governance outcomes.

Some scholars, supported by [Knack and Rahman \(2007\)](#) and [Busse and Gröning \(2009\)](#), have upheld that foreign aid is adverse to good governance. [Knack \(2001\)](#), for example, found that foreign aid undermines the rule of law and the quality of bureaucracy, both measured by International Country Risk Guide (ICRG) indicators. Controlling for aid endogeneity – say that well-governed countries tend to attract more aid – [Knack \(2004\)](#) shows that the quality of institutions decreases in countries receiving high aid inflows, namely aid-dependent countries. [Bräutigam and Knack \(2004\)](#) use an aggregate measure of governance provided by the ICRG to confirm that African aid-dependent countries have a poor governance. They provide a well documented<sup>6</sup> explanation: aid-dependent countries rely more on foreign aid than on their citizen's taxation, which lowers pressure for accountability. Foreign aid may also attract greeds over aid funds and may postpone necessary reforms by making easier to bear the cost of non reforming. [Rajan and Subramanian \(2007\)](#) support these results. They claim that the manufacturing sector is dependent on a good governance – as contracts enforcement and investment protection. They conclude that foreign aid is associated to a decrease in the share of manufacturing in GDP because aid lowers the quality of institutions. [Djankov et al. \(2008\)](#) corroborate the "curse" of aid in recipient country, no matter how governance is measured: they use a model based on a sample panel of 108 countries between 1960 and 1999 to show that the adverse effect of aid is even stronger

that the relationship between institutions and oil.

On the other hand, there are several studies that argued that foreign aid is beneficial for governance. An argument for a positive channel is the aid conditionality, which requires that institutional reforms are undertaken by the current recipient country in order to be eligible again as an aid recipient country. Another argument is that considering the time period matters. "Cold war did not encourage the development of effective state institutions and good governance in Africa" (World Bank, 2006, p 275). Once controlled for the Cold war period, the aid-governance relationship turns to be positive. Focusing on African countries, [Goldsmith \(2001\)](#) claims that political institutions, measured by the Freedom House indicators, rely on foreign aid funds to keep operating public services and reforms. [Dunning \(2004\)](#) confirms this positive association between aid and good governance and shows that the aid effect on political outcomes strengthens in the post Cold War period. [Tavares \(2003\)](#) finds that foreign aid decreases corruption, partly thanks to higher public salaries and knowledge transfers.

The aid governance literature does not point out a clear theoretical nor an empirical agreement on the effects of aid on governance outcomes. This study interlinked to this literature provides a new contribution that explains why foreign aid does or not improve governance.

#### b. Hypotheses

The central contribution of this paper is the hypothesis that both the dependence of a country on natural resources and the type of aid donors matter in determining the relationship between foreign aid and governance.

**Rents on natural resources.** Natural resources revenues in aid-recipient countries may explain why there are differences in the aid empirical literature. This analysis explores whether the dependence of a recipient countries on rents gener-



ated from the exploitation of natural resources conditions the aid effects on the governance quality. I hypothesize that rents on natural resources alter the presumable positive effect of foreign aid on governance for the following reasons. Revenues from natural resources hinder particularly the quality of governance (Jensen and Wantchekon, 2004; Vicente, 2010; Ades and Di Tella, 1999; Bhattacharyya and Haodler, 2010; Collier, 2006). Producing high rents, natural resources activities are a honey pot, which increases rent-seeking behaviours, patronage politics, corruption and high inequalities between those who hold this rent (namely the oligarchy) and the others (Collier and Hoeffler, 2009). Rents from natural resources held by oligarchies tend to create political instability and weak governance. Oligarchies are able to avoid taxation and to resist the adoption of institutional reforms that would limit their choices and force them to be more responsible (see, for example, Djankov et al. (2008)). I expect that foreign aid is less likely to be managed with transparency or used in a way that improves governance when allocated to governments that rely on natural resources revenues.

**Type of donors.** The second point is that aggregating different types of foreign aid may hide intrinsic variations derived from the donors aid motives. The mechanism to successfully improve governance is assumed to have something to do with the way in which aid is allocated. This topic has been, however, largely omitted from the academic discussion of the effect of aid on governance.

The recent literature agrees on the necessity to consider that the effect of foreign aid is different before and after the Cold War, partly because of geopolitical interests.<sup>7</sup> But even in the post Cold War period, empirical studies do not agree on the effect of aid on governance. The growing debate on that different types of donors may behave differently has lead to the conclusion that bilateral donors have different motives than multilateral donors. However, there is only one empirical evidence that receiving multilateral aid will improve the quality of governance

while receiving bilateral aid will not (see [Charron \(2011\)](#)). I enter into the debate by considering the distinction between both types of aid and I analyse their effects on the quality of governance.

I assume that different aid components may affect differently governance because of the motives of aid allocation, say that the type of the donor matters in determining the effect of foreign aid on governance. An important literature on the motives of aid allocations have enhanced the differences in donors behaviours, specifically between bilateral and multilateral donors. According to [Acharya et al. \(2006\)](#), foreign aid would be more effective if allocated by multilateral agencies. The success of the Marshall Plan (1947) is often attributed to the fact that the United States were the only donor responsible for the program ([Knack and Rahman, 2007](#)). Multilateral agencies appear generally to have a greater developmental focus than bilateral donors do ([Burnside and Dollar, 2000](#); [Alesina and Dollar, 2000](#); [Neumayer, 2003](#)). Though multilateral institutions are not totally preserved from political influence ([Frey and Schneider, 1986](#)), bilateral donors are less likely to pressure on multilateral funds than on their own allocations. [Alesina and Dollar \(2000\)](#) estimates an aid allocation equation to find that bilateral donors target poor countries but as well countries with whom they have close commercial, political and historical ties. These connections may affect the aid effectiveness because close ties between donors and recipients give to recipient countries the possibility to resist institutional reforms asked by donors ([Headey, 2008](#); [Ram, 2003](#)). Multilateral aid is less tied to political interests because individual donor interests are diluted. Besides, there is a consensus among multilateral agencies to be more explicitly attentive to governance issues since the end of 1990's and the Monterrey commitment (2000). Allocating aid to countries that commit on political reforms – aid conditionality – means that recipient countries either make some minimal reforms or are threatened to receive lower aid funds. In order to be credible, mul-

tilateral donors have incentives to make recipient countries fulfil minimal reforms to increase their governance quality.

All these studies have shown that bilateral aid and multilateral aid have a different effect on economic growth or have different motives. But a few have investigated whether the type of the donor affects or not the aid effect on governance. [Alesina and Weder \(2002\)](#) open this branch by investigating the effect of aid on corruption in an OLS estimation. But they found no significant difference between bilateral and multilateral donors in reducing corruption between 1975 and 1995. [Charron \(2011\)](#) nuances this result showing that the difference between both types of donor becomes significant after the end of the Cold War. Specifically, after 1997 due to international commitments on governance issues, multilateral aid decreases corruption while bilateral does not, no matter the time period. [Charron \(2011\)](#) applies the "difference" GMM estimator on dynamic panel data covering 82 recipient countries. But according to [Blundell and Bond \(1998\)](#) the "difference" GMM estimator uses poor instruments to control for endogeneity, in particular for aid regressors.

This paper is in line with this literature by assuming that different types of donors affect differently the quality of governance. Using the "system" GMM estimator, which provides better estimates than the "difference" GMM estimator, this study investigates whether rents on natural resources affect both bilateral and multilateral aid effects on governance.<sup>8</sup>

### 3. THE DATA AND THE VARIABLES

I use annual data for 52 African aid-recipient countries, from 1997 to 2008 (see the appendix A for the list of countries). Following [Busse and Gröning \(2009\)](#), I average the data over three years to flatten out cyclical fluctuations.<sup>9</sup> The sources and definitions of the variables are reported in appendix B. Descriptive statistics for the variables are provided in appendix C.

## (a) Governance

The dependent variable is a proxy for the quality of governance. There are many sources that provide ratings on the quality of governance. The most frequently used measure in academic research is that compiled from the International Country Risk Guide (ICRG), a commercial service providing information on governance for investors and lenders. The ICRG quality of governance is the mean value of the ICRG measures of corruption, law and order, and bureaucracy quality (source: Quality of Governance<sup>10</sup>). Corruption stands for the efficiency of government (whether positions are assumed through nepotism or ability) and its stability. Law and order stands for the impartiality of the legal system and the enforcement of law. Bureaucracy quality stands for the quality in public services. The ICRG indicator is scaled from 0 to 1. Higher scores indicate higher quality of governance. The lowest value of the quality of governance within the sample is 0.083 for Somalia in 2008 and the highest value is 0.875 for Namibia in 1996.

## (b) Foreign aid

To account for foreign aid I use the Net Official Development Assistance (ODA), which refers to the disbursement amount which is granted and the loans with a grant proportion of at least 25 percent. Among the aid measures used in the empirical analysis, the aid intensity scales the ODA by the recipient's GDP. This measure accounts for the dependence of a country on foreign aid (source: World Bank). Multilateral ODA is the ODA amount allocated by an international agency, institution, or organization to an aid-recipient country. Bilateral ODA is the ODA amount allocated directly by one donor to an aid-recipient country. Annual data of total ODA and multilateral ODA are available from the World Development Indicators (WDI) and from the Organization for Economic Cooperation and Development (OECD). Bilateral ODA is computed as the difference between total and multilateral ODA. In average in the sample, recipient countries have received

12.7 percent of their GDP of total foreign aid (among which 5 percent of multilateral aid). The highest allocation (144% of total aid flows) was directed to Liberia in 2008.

#### (c) Natural resources

I use three measures of natural resources, denoted *Oil*, *Gas*, and *Min*, measured in percentage of GDP, and an aggregate, denoted *Nat*, where  $Nat = Oil + Gas + Min$  (source: WDI). These measures provide the share of oil, gas, and minerals in the GDP of the recipient country. These measures, that capture a country's dependence on natural resources, give an information about the core result of this paper, say that the positive effect of aid is reduced in resource-rich countries.

#### (d) Control variables

Following the existing literature, control variables are used to capture the determinants of the quality of governance and recipients characteristics.<sup>11</sup> The literature on the determinants of governance usually imposes economic growth, social development, conflicts, ethnic heterogeneity, natural resources, history, and geographical location as determinants of governance.

**Socio-economic development.** I use the annual economic growth rate (source: WDI) to capture the extent of the influence of economic growth on governance, and the share of rural population (source: WDI) to proxy for social development. [Gundlach and Paldam \(2009\)](#) find that income explains the long-term quality of institutions, partly because economic growth can lead citizens to ask for institutional changes suitable for investments. Accordingly, country elites would not easily resist institutional reforms. The preponderance of agriculture has been shown to leave aside the available human capital ([Lucas Jr, 2004](#)) and the development of

manufacture, which requires strong institutional rules (Rajan and Subramanian, 2011).

**Conflict and ethnic fragmentation.** I use the ethno-linguistic fractionalization index, which measures the probability that two citizens in a country belong to the same ethnic or linguistic group (source: Alesina et al., 2003) and the number of deaths occurred in an internal or external conflict<sup>12</sup> (source: WDI) to control for conflict and ethnic heterogeneity (see La Porta et al. (1999) and Collier (2001)). The degree of fractionalization, say the degree of heterogeneity among citizens, reflects the number of groups in competition. In heterogeneous countries, public resources are more likely to be diverted towards military, non-productive or rent-seeking sectors (Aghion et al., 2004), and governance presumably weakens (see Alesina et al., 1999). Similarly, because conflicts need more public resources dedicated to the military sector, conflicts presumably decrease the quality of governance (Addison et al., 2001; Busse and Gröning, 2009). Note that do not control for conflicts may bias the estimated aid coefficient because, as maintained by Bräutigam and Knack (2004), countries in conflicts may attract more aid (specifically humanitarian aid).

**Geography.** I use a dummy that equals unity for tropical countries (source: CIA Factbook) to point out that tropical location tends to slow down the development of institutions (La Porta et al., 1999; Easterly and Levine, 2003). According to Acemoglu et al. (2001), a potential explanation is the inheritance of colonial history. Settlers were not able to build metropolitan institutions where they could not permanently settle. Instead, in the area where they had to face tropical diseases and mortality, they have built extractive institutions, a phenomenon that persists even after independence.

**Historical legacy and religion.** The empirical literature to explain governance usually uses measures of the historical and religion characteristics (see, for example, [La Porta et al., 1999](#); [Goldsmith, 2001](#); [Treisman, 2000](#); [Alesina and Dollar, 2000](#)). As the dummy tropical location may not capture all the historical legacy, I consider three other measures of historical legacy: (i) legal system legacy, (ii) religion legacy, and (iii) institutional legacy. To proxy for these variables, I use a dummy that takes one for English common law countries (source: [La Porta et al., 1999](#)); the shares of Catholic and Muslim populations in countries in 2007 (source: CIA Factbook); and the degree of political freedom (source: Freedom House). All these characteristics are country specific effect so that aid coefficients may not be biased by capturing more than the pure effect of aid on governance. Yet, even if the inclusion of historical legacy variables does not have any effect on aid coefficients, these variables could enhance the explanatory power of the model.

#### 4. ESTIMATION PROCEDURE AND ASSESSMENT FOR ENDOGENEITY

##### (a) Benchmark model

I explore the causal relationship between aid and governance in aid-recipient countries using dynamic panel data. Panel data allows to control for the possible bias due to unobserved country heterogeneity on estimated coefficients. I estimate the following benchmark equation:

$$\begin{aligned}
 gov_{it} = & \alpha_i + \rho gov_{it-1} + \beta_1 maid_{it} + \beta_2 baid_{it} + \gamma_1 nat_{it} + \\
 & \gamma_2 maid_{it} \times nat_{it} + \gamma_3 baid_{it} \times nat_{it} + \phi' X_{it} + \lambda_t + \varepsilon_{it}
 \end{aligned} \tag{1}$$

where  $gov_{it}$  indicates the measure of the quality of governance for the country  $i$  at time  $t$ ;  $\alpha_i$  indicates the fixed individual effects on each country;  $gov_{it-1}$  is the lagged value of the dependent variable;  $maid_{it}$  and  $baid_{it}$  are respectively multilateral and

bilateral aid flows divided by GDP;  $nat_{it}$  is the share of natural resources rents in GDP;  $maid_{it} \times nat_{it}$  and  $baid_{it} \times nat_{it}$  are interaction terms;  $X_{it}$  is a vector of control variables;  $\lambda_t$  indicates temporal dummies, and  $\varepsilon_{it}$  is the error term.<sup>13</sup>

To estimate equation (1), I use the [Blundell and Bond \(1998\)](#) estimator, designed for dynamic panel data. It estimates simultaneously equation (1) written in levels and equation (1) written in first differences. The "system" GMM estimator performs better than the "difference" GMM estimator as it uses additional moment conditions. Precisely, estimations are much more efficient in small T samples. Independent variables are treated as strictly exogenous, with the exception of the lagged measure of governance, aid, economic growth, and conflicts that are considered to be endogenous.

#### (b) Econometric issues

I now comment on some estimation issues. First, using dynamics to capture the effect of lagged governance on current governance makes the lagged dependent variable inherently correlated with the error term. Second, as discussed in the literature, the governance-aid relationship is likely to be subject to a simultaneous bias. Aid donors' allocation may be conditioned on the recipient's quality of governance. According to [Burnside and Dollar \(2000\)](#), donors, either bilateral or multilateral, tend to condition their aid allocation on governance issues (see, for example [Alesina and Dollar \(2000\)](#), [Svensson \(2000\)](#), [Younas \(2008\)](#) and [McGillivray \(2005\)](#) for a discussion on the donors' motives). In turn, aid is potentially endogenous to governance and correlated with the error term. Note that as aid is endogenous to governance, interactions terms including aid are also endogenous to governance. Third, the growth-governance literature finds that the quality of governance explains economic growth (see, for example, [Knack and Keefer \(1995\)](#)). [Mauro \(1995\)](#) shows that corruption decreases economic growth, either directly or through political instability. Finally, according to [Le Billon \(2003\)](#), a



change in corruption or political liberalization affects significantly the probability and duration of conflicts.

The lags of endogenous variables are used as instruments for the difference equation and the lagged differences of the endogenous variables are used as instruments for the level equation. I do not include additional (external) instruments.

The two-step "system" GMM estimator provides asymptotically efficient, robust and reliable results when facing endogeneity, dynamic issue and heteroscedasticity (see [Windmeijer, 2005](#)). Specifically, the estimated aid coefficient is not biased by reverse causality and only measures the direct effect of aid on governance.

This estimation procedure assumes that there is no first-order and second-order autocorrelation in the error terms. Hence, for each regression, I test for autocorrelation and for the validity of the instruments. The statistics always indicate that there is no second-order serial correlation and that instruments are not correlated with residuals. The Hansen J test for overidentifying restrictions loses power when the number of instruments exceeds the cross section sample size ([Roodman, 2009](#)). When the ratio of countries to instruments is lower than one, the estimation procedure may be biased and coefficients may be significant even if there is no statistical association. This is precisely the problem faced when using as a dependent variable the ICRG quality of governance. The data are available only for 34 countries. To overcome a possible bias in the significance of results, I control for the relative number of instruments so that this number is never large relative to the number of countries. For example, in the second regression reported in Table 6, 35 lags are used to instrument for endogenous variables. The ratio of countries to instruments (35/34) is lower than one so that I limit the number of instruments.

## 5. BENCHMARK REGRESSIONS

The empirical results for equation (1) are reported in Table 6. They are designed to answer the following questions.

- (a) Do multilateral and bilateral aids have a direct effect on governance?
- (b) Do natural resources undermine the positive effect of aid on governance?
- (c) Does the effect of aid on governance depend on the type of natural resources?

(a) Do multilateral and bilateral aids have a direct effect on governance?

To answer this question I estimate equation (1) without interaction terms. The parameters of interest are  $\beta_1$  and  $\beta_2$ , the respective coefficients of multilateral and bilateral aid.  $\beta_1$  is positive and  $\beta_2$  is negative, both significant at the 5% level. The results suggest that all else equal, aid increases the quality of governance when allocated by multilateral agencies.

Let us look at two examples to illustrate the propitious effect of multilateral aid on governance. Consider two countries, the Republic of the Congo and the Democratic Republic of the Congo (DRC). Their GDPs are comparable (a few more than 11,500 millions current US dollars in 2008). The Republic of the Congo has received more than 5.67% of GDP in terms of multilateral aid and the DRC around 0.78% in 2008. The regression shows that an increase in multilateral aid from the amount received by the DRC to the amount received by the Republic of the Congo will increase the ICRG indicator by about 0.03 units, from 0.11 to 0.14 ( $\partial gov / \partial maid = 0.007x \times (5.67 - 0.78) \approx 0.035$ ), say by 25%. Consider now Burundi and Eritrea that also have comparable GDPs (about 1,500 millions current US dollars in 2008) but have received extremely different multilateral aid amounts in 2008. Then, the regression shows that an increase in multilateral aid from the level of Eritrea (5.06% of its GDP) to the level of Burundi (21.73% of its GDP) will increase appreciably the quality of governance (which is scaled from 0 to 1) by 0.12 units ( $\partial gov / \partial maid = 0.007 \times (21.73 - 5.06) \approx 0.120$ ).

I briefly move to the other variables. Tropical location has a significant adverse effect on the quality of governance. The coefficients of the share of rural population and the shares of Muslim and Catholic populations are positive and significant.

Though natural resources, the heritage of English common law, conflicts and economic growth are not statistically significant, they have the expected sign. The estimated coefficient of lagged quality of governance is positive, suggesting that current governance is positively correlated with future governance.

(b) Do natural resources undermine the positive effect of aid on governance?

I now estimate equation (1) with both interaction terms,  $maid \times nat$  and  $baid \times nat$ . Now, the parameters of interests are  $\beta_1$ ,  $\beta_2$ ,  $\gamma_2$  and  $\gamma_3$ . Note that the ratio of countries to instruments is slightly lower than one. The hypotheses underlying the estimation procedure may be violated. As seen in section 3.2, I restrict the number of instruments.<sup>14</sup> All parameters of interests are significant at the 1% level, and the estimates of  $\beta_1$  and  $\beta_2$  are similar to those of the previous regression. Note that  $\beta_2$  and  $\gamma_1$  are negative, and  $\beta_1$  and  $\gamma_2$  positive, both significantly. This suggests that natural resources alter the relationship between multilateral aid and governance by diminishing the propitious effect of aid on governance. But surprisingly, estimation results suggest as well that the negative effect of bilateral aid is reduced in resources-rich recipients. While bilateral donors are shown to be tied to political and strategical interests, bilateral aid tend to be less detrimental to the quality of governance in resources-rich countries. One may think that bilateral donors impose further constraints on aid in resource-rich countries implying more pressure on the recipient government spending resource rents with discretion. Another explanation might be that both bilateral and multilateral donors give less aid on average to resource-rich countries (almost four times less in the sample), which may reduce the positive effect of multilateral aid and reduce the negative effect of bilateral aid.

(c) Does the effect of aid on governance depend on the type of natural resource?

The share of natural resources,  $Nat$ , cumulates the share of natural gas, minerals and oil resources in the aid-recipient's GDP. According to [Boschini et al. \(2007\)](#), different natural resources do not affect similarly governance. For this reason, I disaggregate the natural resource measure. To investigate whether the type of natural resources is pertinent in determining the effect of aid on governance, I re-estimate equation (1) with the three measures of natural resources, the share of natural gas rents, the share of minerals rents and the share of oil rents in the aid recipient's GDP. Equation (1) becomes:

$$\begin{aligned}
 gov_{it} = & \alpha_i + \rho gov_{it-1} + \beta_1 maid_{it} + \beta_2 baid_{it} + \theta_1 oil_{it} \\
 & + \theta_2 oil_{it} \times maid_{it} + \theta_3 oil_{it} \times baid_{it} + \omega_1 gas_{it} + \omega_2 gas_{it} \times maid_{it} + \omega_3 gas_{it} \times baid_{it} \\
 & + \sigma_1 min_{it} + \sigma_2 min_{it} \times maid_{it} + \sigma_3 min_{it} \times baid_{it} + \phi' X_{it} + \lambda_t + \varepsilon_{it}
 \end{aligned}
 \tag{2}$$

where  $oil_{it}$  is the share of oil rents in GDP;  $gas_{it}$  is the share of natural gas rents in GDP;  $min_{it}$  is the share of minerals rents in GDP;  $maid_{it} \times oil_{it}$ ,  $baid_{it} \times oil_{it}$ ,  $maid_{it} \times gas_{it}$ ,  $baid_{it} \times gas_{it}$ ,  $maid_{it} \times min_{it}$ , and  $baid_{it} \times min_{it}$  are interaction terms.

As aid is endogenous to governance, interactions terms including aid are also endogenous to governance. Again, in equation (2), the number of necessary instruments is larger than the cross section sample size. I restrict the number of instruments so that the ratio of countries to instruments becomes equal or larger than one. To increase the credibility of my results, I estimate equation (2) following two specification types. First, I include separately interaction terms relative to each natural resource rents. Second, I include simultaneously all interaction terms. The number of lags of the endogenous variables used for instrumentation is always restricted.

Results reported in Table 6 show that the partial effect of aid on governance is different from one resource to another. In all the regressions, multilateral aid is propitious for governance while bilateral aid is not. Note that  $\theta_2$  is negative and  $\theta_3$  positive, both significantly. This suggests that oil resources affects the relationship between multilateral aid and governance by diminishing the positive effect of aid on governance. Again, estimation results show that the negative effect of bilateral aid is reduced in oil-rich recipient countries. Note that  $\omega_2$ ,  $\omega_3$ ,  $\sigma_2$ , and  $\sigma_3$  are either positive or negative but never significant across regressions, suggesting that neither natural gas nor mineral rents are altering the aid-governance relationship. Disaggregating natural resources into its components indicates that the type of natural resource rents is relevant for investigating the interaction effect of aid and resources on governance. The dependence of a country on the rents of its oil resources, which provides larger rents than other natural resources, is particularly adverse for an aid-recipient country.

[Table 6 here]

## 5. ROBUSTNESS REGRESSIONS

Results in Table 6 show a propitious effect of multilateral aid on governance, though reduced in resource-rich countries. But the results may be sensitive to specification or methodological choices. This section discusses the benchmark model results. Alternative measures of the dependent and interest variables, alternative estimators and multiple sample selections are used as robustness checks. To keep the discussion focused and to save space I report a summary of the results in tables 4 and 5. The full estimation results are available in the supplementary file, available upon request.

(a) Alternative measure of governance

Diverse measures and indicators of governance exist. Based on different definitions, they do not cover the same information. None of the measures of governance is perfect and each might produce different results. Therefore, it is possible that my results on aid are dependent on the governance measurement, even though both indicators are highly correlated.<sup>15</sup> I consider an alternative measure compiled by the World Bank Institute, namely the control of corruption. The control of corruption, based on 25 data sources constructed by 18 different organizations, measures the abuse of the public power to achieve self-interest and lucrative aims and to misappropriate public goods. The control of corruption is scaled -2.5 to 2.5. Recall that the ICRG indicator is scaled 0 to 1. The lowest value of the control of corruption is -2.22 for the Democratic Republic of the Congo in 1997. The highest value is 1.07 for Botswana in 2003.

I test whether the aid-governance relationship resists the alternative coding of governance. Recall that now governance is only measured by the degree of corruption. I estimate equation (1) and equation (2) with all interactions terms. As the ratio of countries to instruments is above one when estimating equation (2), I restrict the number of lagged levels used as instruments. The results are reported in Table 7. In all regressions, results hold for  $\beta_1$ ,  $\beta_2$ , and  $\theta_2$ , but the significance disappears for  $\theta_3$  and  $\gamma_2$ . These results suggest that the positive effect of multilateral aid on governance is specifically reduced in oil-resource countries, while the fact that bilateral aid is less detrimental to governance depends on the governance measure.

[Table 7 here]

#### (b) Alternative estimators

As seen in section 4, dynamic panel data models contain unobserved individual effects that are correlated with the lagged term of the dependent variable. Likewise,

aid, growth and conflict are potentially endogenous. Both issues make standard estimators not consistent. Even though the assumption that aid is subject to reverse causality is reasonable, I first reassess this issue by applying an OLS estimation. OLS results of equation (1) and (2), and of equation (2) with only the terms involving oil resources are reported in Table 8. Second, I use an alternative to the "system" GMM estimator. The "difference" GMM estimator takes the first difference of the data and uses as instruments lagged values of the endogenous variables. The "difference" estimator is shown to be less efficient than the "system" one and to use poorer instruments (Blundell and Bond, 1998). But it can produce different results. To increase the credibility of the "system" GMM results, the "difference" GMM estimation results of equation (1) and (2), and of equation (2) with only the terms involving oil resources are reported in Table 7. Clearly,  $\beta_1$ ,  $\beta_2$ ,  $\theta_2$ , and  $\theta_3$  are robust across regressions.

### (c) Sample selection

I now turn to examine the effect of aid on governance in sub-samples, listed in the annex. I run separate regressions for two different samples. While the effect of aid on governance may be lower in Sub-Saharan African countries because these countries are highly aid-dependent (Bräutigam and Knack, 2004), the aid-governance relationship may be improved in low or not resource-dependent countries. I replicate the estimation of equations (1) and (2), and of equation (2) with only the terms involving oil resources on Sub-Saharan African countries and excluding all resource-rich countries. I exclude from the whole sample the countries whose rents derived either from natural resources extraction exceed 10 percent of their GDP (on average over the whole period). The results are reported in Table 8. Again, multilateral aid is positively associated with governance in all the regressions but specifically reduced in oil countries. The results do no longer hold when highly resource-dependent countries are excluded from the sample. This suggests that

the positive aid effect is not reduced in less resource-dependent countries. Non-linearities in the aid-governance relationship are more likely to occur in resource-rich countries.

(d) Alternative aid measure

Another concern in checking the robustness of the core result is the measure of foreign aid. Recall that bilateral aid has been self-computed. Though the calculation of bilateral aid amount is credible, it might be possible that my estimates are biased by the way aid is computed. To be conscientious, I use the measure provided by the OECD that gathers the main twenty-four Development Assistance Committee (DAC) donors in charge of aid purpose (source: OECD).<sup>16</sup> I show that the results do not change if the measure of bilateral aid is changed. Though the DAC-OECD countries target officially developmental and institutional issues, the coefficient of DAC donors aid is significantly negative. Again, this adverse effect is statistically significant across regressions, though lower in resource-rich countries.

(e) Time fixed effect

The last concern is whether time influences the regression results. To control for time fixed effect, I include in the benchmark regression time dummies.<sup>17</sup> The results displayed in table 5 show that the change in specification does not affect the propitious effect of multilateral aid on governance. The results show that the parameters of interest are significant and clearly robust.

[Table 8 here]

## 7. CONCLUSION

This study has provided an empirical examination of the effect of foreign aid on domestic governance. The governance effect of aid is not straightforward. Most



examinations of the aid-governance relationship have focused upon total foreign aid, aggregating different types of foreign aid across different types of donors, ignoring hence very important variations due to the different motives of each type of donors. Not all foreign aid is allocated toward the same developing aim. Moreover, domestic conditions, namely the size and type of natural resources rents, can affect the aid-governance relationship(s) because a resource-rich country may manage foreign aid inflows as resources rents are managed. I argue that if one wants to know whether foreign aid affects the quality of governance in a recipient country, one should differentiate between bilateral and multilateral donors and investigate the effect of aid conditioning on natural resources rents importance.

The results show a strong empirical support for a propitious effect of multilateral aid only on the quality of governance in aid-recipient countries. Both bilateral and multilateral aid effects are conditioned on the dependence on natural resources. The evidence strongly indicates that multilateral aid is much more effective at improving governance in non major oil producing countries. Both oil and aid resources are transfers to governments. Then, the deep difference in their consequences presumably results from how aid funds are allocated. The type of donors matter in determining how foreign aid is allocated.

There is scope for innovations. Foreign donors could support a strategy that has so far been questioned: a big push concentrating large resources allocated by multilateral agencies in favourable environment, namely in oil-poor countries. An increase in governance, resulting from such a big push, would generate externalities across Africa and reduce poverty.

Evaluating what exactly makes multilateral aid works better than bilateral aid would inform about complementary policies that would enhance the multilateral aid effects on governance in recipient countries. Is the governance conditionality to build improved institutions this policy? If so, if a big push in foreign aid would

be enough to reorient oil resources rents that are large flows in several African countries in order to have positive effects on governance?

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## APPENDIX A. Data

Table 1: List of recipient countries – all data set – 52 countries

Algeria	Egypt	Libya	Senegal
Angola	Equatorial Guinea	Madagascar	Seychelles
Benin	Eritrea	Malawi	Sierra Leone
Botswana	Ethiopia	Mali	Somalia
Burkina Faso	Gabon	Morocco	South Africa
Burundi	Gambia	Mauritania	Sudan
Cameroon	Ghana	Mozambique	Swaziland
Cape Verde	Guinea	Namibia	Tanzania
Central African Republic	Guinea-Bissau	Niger	Togo
Chad	Ivory Coast	Nigeria	Tunisia
Comoros	Kenya	Republic of Congo	Uganda
Democratic Republic of Congo	Lesotho	Rwanda	Zambia
Djibouti	Liberia	Sao Tome et Principe	Zimbabwe

Data set "Sub-Sahara Africa" (45 countries) includes Data set "all data set" minus: South Africa, Algeria, Morocco, Equatorial Guinea, Libya, Sao Tome et Principe, and Tunisia.

Data set "Africa minus resource-rich countries" (46 countries) includes Data set "all data set" minus: Angola, Democratic Republic of Congo, Gabon, Equatorial Guinea, Libya, Nigeria.

This grouping of countries gathers resource-rich countries that depend on natural resources rents for 10% or more of GDP in average during the whole period.

## APPENDIX B. Data sources and definitions

Table 2: Data sources and definitions

Variable	Definition	Source
Bilateral aid	"Bilateral ODA transactions are those undertaken by a donor country directly with an aid recipient. They also include transactions with national and international non-government organizations active in development and other internal development-related transactions such as interest subsidies, spending on promotion of development awareness and administrative costs. Bilateral ODA includes project and programme aid, technical cooperation, developmental food aid, debt relief and humanitarian aid."(World Bank definition).	Total ODA minus Multilateral ODA
Catholic share	Percentage of Catholics in the population of a country	www.wholesomewords.org and CIA-Factbook
Conflicts	"Deaths in battle-related conflicts between warring parties in the conflict dyad (...). The targets are usually the military itself and its installations or state institutions and state representatives" (World Bank definition).	WDI
DAC aid	Bilateral aid allocated by the 24 members of the Development Assistance Committee	OECD
Economic Growth rate	"Annual percentage growth rate of GDP (...). Aggregates are based on constant 2000 U.S. dollars" (World Bank definition).	WDI

*Continued on next page*

Table 2 – *Continued from previous page*

Variable	Definition	Source
English common law	The dummy takes 1 if the legal origin of the Company Law or Commercial Code of the country is English and zero otherwise.	<a href="#">La Porta et al. (1999)</a>
ELF	Ethno-linguistic fractionalization is the « probability that two randomly drawn individuals from the population belong to two different groups. » (Alesina et al. 2003, p.5).	<a href="#">Alesina et al. (2003)</a>
Gas	"Natural gas rents are the difference between the value of natural gas production at world prices and total costs of production divided by GDP" (World Bank definition).	WDI
ICRG governance	The mean value of the ICRG variables “Corruption”, “Law and Order” and “Bureaucracy Quality” (definition of the QoG codebook, p.53), scaled 0-1.	The QoG datasets
Minerals	"Mineral rents are the difference between the value of minerals production at world prices and total costs of production divided by GDP" (World Bank definition).	WDI
Multilateral aid	Aid is multilateral ODA if aid is « made to an international institution whose members are governments and which conducts all or a significant part of its activities in favour of development ; and [if aid is] pooled with other amounts received so that [aid loses its] identity and become[s] an integral part of the institution’s financial assets (OECD definition).	WDI.

*Continued on next page*

Table 2 – *Continued from previous page*

Variable	Definition	Source
Natural resources	re-rents Resources rents are the sum of oil, minerals and natural gas rents	Self computation
Rural population	« People living in rural areas » (World Bank definition). It is calculated as a percentage of total population.	WDI
Muslim share	Percentage of Muslims in the population of a country	www.wholesomewords.org and CIA-Factbook
Foreign aid	"ODA consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the DAC, by multilateral institutions, and by non-DAC countries to promote economic development and welfare (...). It includes loans with a grant element of at least 25 percent" (World Bank definition).	World Development Indicator.
Oil	"Oil rents are the difference between the value of crude oil production at world prices and total costs of production divided by GDP" (World Bank definition).	WDI
Tropical location	Dummy taking 1 if the country is within the tropics.	CIA-Factbook
World Bank governance	The control of corruption, scaled in the interval [-2.5; 2.5] is the "abuse of the public power to achieve self-interest, particularly lucrative and including the misappropriation of public goods by elites" (World Bank definition).	WDI

## APPENDIX C. Data Summary Statistics

Table 3: Summary statistics

Variable (3-year average)	Mean	Std. Dev.	Min.	Max.	N
Multilateral aid	5.06	5.81	-0.22	41.38	251
Bilateral Aid	7.03	7.71	0	52.96	251
DAC aid	6.92	7.60	0	51.47	251
ICRG Quality of governance	0.41	0.14	0.08	0.87	185
WB Quality of governance	-0.63	0.62	-2.22	1.06	238
Economic growth	4.68	5.79	-8.52	52.97	250
Deaths in conflicts	0.48	2.41	0	24.90	250
Ethno-linguistic fractionalization	0.62	0.27	0,03	0.92	250
Oil rents/GDP	6.83	16.51	0	76.54	260
Gas rents/GDP	0.64	2.50	0	21.12	260
Mineral rents/GDP	0.82	2.94	0	29	260
Resources rents/GDP	7.40	17.03	0	76.53	260
Tropical location	0.77	0.42	0	1	260
Rural population	61.40	17.54	13.1	92.79	260
English law	0.33	0.47	0	1	255
Catholic share	24.51	27.06	0	95.90	260
Muslim share	35.33	37.68	0	99.80	260

## Notes

<sup>1</sup>Somalia, Zimbabwe, Congo, Dem. Rep., Sudan, Chad, Eritrea, Guinea, Eritrea, Central African Republic, Equatorial Guinea. Data from the World Bank Development indicators for 2009.

<sup>2</sup>See [Jensen and Wantchekon \(2004\)](#) for a theoretical discussion on the relationship between natural resources and governance

<sup>3</sup>See [Frey and Schneider \(1986\)](#), [Burnside and Dollar \(2000\)](#), [Alesina and Dollar \(2000\)](#) [Ram \(2003\)](#), and [Headey \(2008\)](#) for a detailed discussion about the theoretical difference between multilateral and bilateral donors.

<sup>4</sup>Throughout this paper, the "system" GMM will refer to the [Blundell and Bond \(1998\)](#) GMM estimator, and the "difference" GMM estimator to the [Arellano and Bond \(1991\)](#) GMM estimator.

<sup>5</sup>See [Dalgaard et al. \(2004\)](#) for a theoretical and an empirical discussion.

<sup>6</sup>The explanation is however theoretical.

<sup>7</sup>See [Dunning \(2004\)](#) for a detailed explanation.

<sup>8</sup>Not reported results show that the estimated total aid coefficient is never significant and positive but equal to zero.

<sup>9</sup>[Tavares \(2003\)](#) constructs also five years averages

<sup>10</sup>The data are available on <http://www.qog.pol.gu.se/data/qogstandarddataset/>

<sup>11</sup>Various measures are used in the literature to proxy for these variables. Unreported results show that alternative measures of control variables provide similar estimation results.

<sup>12</sup>Internal or external conflicts involve at least the government of one state and causing at least 25 deaths per year.

<sup>13</sup>Preliminary results show that the aid influence is rather immediate: the coefficient of the direct effect of aid is exactly similar and the long-run effect (measured by one lag of the aid coefficient) is not significant and fairly low.

<sup>14</sup>Preliminary results show that the size and significance of results hold even without the lag restriction.

<sup>15</sup>The correlation coefficient,  $\rho$ , is 0.69 for the ICRG measure and the World Bank measure.

<sup>16</sup>The correlation coefficient between DAC aid and bilateral aid is 0.98. Notice that non DAC donors, namely new donors as China, may have more self-interest motives according to [Dreher et al. \(2011\)](#), which can presumably undermine the potential beneficial effect of DAC donors, namely old donors.

<sup>17</sup>Time fixed effect causes differences in slope coefficients between time periods. The estimated coefficient of one of the  $n-1$  time dummy included (if  $n$  periods) is the estimated difference between the slope coefficient in that period and the slope coefficient in the omitted period.



Table 4: The direct effect of aid and the interaction effect  
of aid and natural resources on governance.

	(1)	(2)	(3)	(4)	(5)	(6)
Governance <sub>t-1</sub>	0.469*** (3.34)	0.460*** (2.68)	0.621*** (6.30)	0.486*** (3.75)	0.517*** (4.05)	0.363** (2.14)
Multilateral aid	0.007** (2.50)	0.007*** (2.74)	0.010*** (3.81)	0.007*** (3.02)	0.009*** (5.45)	0.013*** (2.80)
Bilateral aid	-0.005** (-1.99)	-0.005** (-2.38)	-0.008*** (-3.39)	-0.003* (-1.67)	-0.007*** (-4.02)	-0.009** (-2.54)
Mult. aid × Nat.		-0.001*** (-2.76)				
Bil. aid × Nat.		0.000** (2.50)				
Mult. aid × Oil.			-0.001*** (-2.83)			-0.002*** (-6.35)
Bil. aid × Oil			0.000* (1.87)			0.000** (2.54)
Mult. aid × Min.				-0.003 (-1.22)		0.002 (0.32)
Bil. aid × Min.				-0.000 (-0.15)		-0.002 (-0.96)
Mult. aid × Gas					-0.001 (-0.37)	-0.003 (-0.85)
Bil. aid × Gas					0.001 (0.57)	0.003 (0.98)
Oil rents			-0.000 (-0.68)	-0.001 (-0.97)	-0.000 (-0.85)	-0.001 (-1.10)
Mineral rents			0.005** (2.50)	0.015** (2.51)	0.004** (2.22)	0.016*** (3.46)
Gas rents			-0.000 (-0.02)	-0.003 (-0.91)	-0.002 (-0.94)	-0.003 (-0.85)
Natural resources rents	-0.000 (-0.64)	0.000 (0.11)				
Rural population	0.002** (2.34)	0.002* (1.84)	0.001*** (2.98)	0.002** (2.33)	0.002*** (3.13)	0.003** (2.48)
Tropical location	-0.115**	-0.116	-0.054	-0.127**	-0.110**	-0.167**

*Continued on next page*

Table 4 – *Continued from previous page*

	(1)	(2)	(3)	(4)	(5)	(6)
	(-2.04)	(-1.49)	(-1.35)	(-2.15)	(-2.47)	(-2.15)
English law	0.030 (1.02)	0.039 (1.38)	0.020 (1.03)	0.030 (1.06)	0.017 (0.92)	0.028 (1.03)
Muslim share	0.002** (2.28)	0.003* (1.94)	0.002** (2.18)	0.003** (2.46)	0.002** (2.17)	0.004*** (3.73)
Catholic share	0.001** (2.45)	0.002** (2.25)	0.001** (2.15)	0.002*** (2.96)	0.001** (2.24)	0.002*** (3.43)
Political freedom	0.000 (0.05)	-0.001 (-0.12)	-0.001 (-0.17)	0.002 (0.33)	0.002 (0.29)	0.004 (0.42)
ELF	0.076 (1.29)	0.079 (0.91)	0.012 (0.28)	0.070 (1.13)	0.079 (1.39)	0.095* (1.95)
Economic growth	0.001 (0.37)	0.000 (0.05)	0.002 (0.97)	0.000 (0.47)	0.001 (0.31)	-0.002 (-0.58)
Deaths in conflicts	-0.002 (-0.78)	-0.001 (-1.58)	-0.001 (-0.86)	-0.002 (-1.26)	-0.003 (-1.42)	-0.003** (-2.16)
Observations	133	133	133	133	133	133
Lag restriction?	No	Yes	Yes	Yes	Yes	Yes
Countries/Instruments	34/27	34/33	34/34	34/34	34/34	34/34
Hansen J test (Prob)	0.750	0.477	0.636	0.429	0.486	0.872
AR(2) test (Prob)	0.641	0.080	0.813	0.665	0.601	0.926

*Notes:* a. Table 3 reports the "system" GMM estimation results of 3-years averages between 1997 and 2008 of equations (1) and (2). b. The ICRG quality of governance is the dependent variable. See Appendix for more detailed variable definitions and sources. c. The ratio countries/instruments is below 1 in all the regressions reported in Columns (2) to (6). The number of lagged levels used to instrument the endogenous variables is restricted up to the ratio is higher or equal than one. d. Column (1) reports the estimation results of equation (1) without interaction terms. Column (2) reports the estimation results of equation (1). Column (3) reports the estimation results of equation (2) including only interactions terms involving oil. Column (4) reports the estimation results of equation (2) including only interactions terms involving minerals. Column (5) reports the estimation results of equation (2) including only interactions terms involving gas. Column (6) reports the estimation results of equation (2) including all interactions terms. e. The null hypothesis of the Sargan Hansen test is that the instruments are not correlated with the residuals. The null hypothesis of the AR(2) test is that the errors in the first difference regression exhibit no second order serial correlation. *t* statistics in parentheses.

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table 5: Robustness regressions (1).

	(1)	(2)	(3)
	Include total re-	Include oil only	Include all re-
	sources		sources
Control of corruption <sub>t-1</sub>	0.270 (0.60)	0.436*** (3.23)	0.413*** (3.22)
Multilateral aid	0.040** (2.00)	0.038*** (3.54)	0.037*** (2.77)
Bilateral Aid	-0.026* (-1.71)	-0.025** (-2.40)	-0.021*** (-2.71)
Mult. aid × Nat.	-0.001 (-0.48)		
Bil. aid × Nat.	0.000 (0.16)		
Mult. aid × Oil		-0.004** (-2.51)	-0.005* (-1.86)
Bil. aid × Oil		0.000 (0.49)	0.000* (1.66)
Mult. aid × Min.			-0.000 (-0.12)
Bil. aid × Min.			0.002 (0.37)
Mul. aid × Gas			-0.046 (-0.97)
Bil. aid × Gas			0.030 (1.10)
Observations	166	166	166
Lag restriction?	No	No	Yes
Countries/instruments	46/35	46/37	46/43
Hansen J test (prob)	0.737	0.701	0.860
AR(2) test (prob)	0.070	0.066	0.050

*Notes:* a. Table 4 reports the "system" GMM estimation results of 3-years averages between 1997 and 2008 of equations (1) and (2). b. The World Bank control of corruption is the dependent variable. See Appendix for more detailed variable definitions and sources. c. The ratio countries/instruments is below 1 in the regression reported in Column (3). The number of lagged levels used to instruments the endogenous variables is restricted up to the ratio is higher or equal than one. d. Column (1) reports the estimation results of equation (1). Column (2) reports the estimation results of equation (2) including only interactions terms involving oil. Column (3) reports the estimation results of equation (2) including all interactions terms. *t* statistics in parentheses.  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table 6: Robustness regressions (2).

	(1)	(2)	(3)
	Include total re-	Include oil only	Include all re-
	sources		sources
<i>Panel A: "Difference" GMM estimation</i>			
Multilateral aid	0.004*** (2.71)	0.004*** (2.73)	0.004* (1.72)
Bilateral Aid	-0.004*** (-4.66)	-0.004*** (-4.28)	-0.003 (-1.56)
Mult. aid × Nat.	-0.000** (-2.11)		
Mult. aid × Nat.	0.000*** (5.43)		
Mult. aid × Oil		-0.001*** (-2.64)	-0.001*** (-3.37)
Bil. aid × Oil		0.000*** (4.39)	0.000*** (4.25)
<i>Panel B: OLS estimation</i>			
Multilateral aid	0.006*** (3.75)	0.007*** (4.25)	0.006*** (3.24)
Bilateral Aid	-0.004*** (-3.87)	-0.005*** (-4.14)	-0.004** (-2.47)
Mult. aid × Nat.	-0.000 (-0.54)		
Bil. aid × Nat.	0.000 (1.31)		
Mult. aid × Oil		-0.001*** (-2.92)	-0.001*** (-3.16)
Bil. aid × Oil.		0.000** (2.44)	0.000** (2.20)
<i>Panel C: Sub Saharan Africa sample</i>			
Multilateral aid	0.007*** (3.82)	0.011*** (3.37)	0.014*** (2.97)
Bilateral Aid	-0.005*** (-3.03)	-0.007*** (-3.60)	-0.010*** (-3.50)
Mult. aid × Nat.	-0.001** (-2.34)		
Bil. aid × Nat.	0.000 (1.17)		
Mult. aid × Oil		-0.001*** (-4.92)	-0.001*** (-3.77)
Bil. aid × Oil		0.000** (2.12)	0.000** (2.18)
<i>Panel D: Low or not resource dependent countries sample</i>			
Multilateral aid	0.010*** (6.03)	0.017*** (2.74)	0.011*** (3.66)

*Continued on next page*

Table 6 – *Continued from previous page*

	(1)	(2)	(3)
Bilateral Aid	-0.008*** (-5.09)	-0.011*** (-3.05)	-0.008*** (-3.23)
Mult. aid × Nat.	-0.001 (-0.72)		
Bil. aid × Nat.	0.001 (0.69)		
Mult. aid × Oil		-0.009** (-2.29)	-0.002 (-0.26)
Bil. aid × Oil		0.002** (2.48)	0.001 (0.34)
<i>Panel E: Alternative measure of bilateral aid</i>			
Multilateral aid	0.007*** (2.97)	0.009*** (3.65)	0.012*** (2.90)
DAC aid	-0.005** (-2.43)	-0.007*** (-3.26)	-0.009** (-2.52)
Mult. aid × Nat.	-0.001*** (-2.83)		
DAC aid × Nat.	0.000*** (2.58)		
Mult. aid × Oil		-0.001*** (-2.80)	-0.002*** (-6.43)
DAC aid × Oil		0.000* (1.75)	0.000*** (2.78)
<i>Panel F: Time fixed effect</i>			
Multilateral aid	0.005* (1.78)	0.009*** (3.00)	0.008** (1.99)
Bilateral Aid	-0.005** (-2.18)	-0.008*** (-3.42)	-0.007** (-2.47)
Mult. aid × Nat.	-0.001*** (-2.74)		
Bil. aid × Nat.	0.000* (1.67)		
Mult. aid × Oil		-0.001*** (-2.95)	-0.001*** (-2.67)
Bil. aid × Oil		0.000** (2.57)	0.000** (2.28)

*Notes:* a. Table 5 reports the estimation results of 3-years averages between 1997 and 2008 of equations (1) and (2). b. The ICRG quality of governance is the dependent variable. c. When the ratio countries/instruments is below 1, the number of lagged levels used to instruments endogenous variables is restricted. d. The probabilities of the Hansen J test and the AR(2) test are not reported in the table but indicate always a non rejection of the null hypothesis. e. Column (1) reports the estimation results of equation (1). Column (2) reports the estimation results of equation (2) including only interactions terms involving oil. Column (3) reports the estimation results of equation (2) including all interactions terms. *t* statistics in parentheses. \* $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

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*This list contains the Working Papers written after January 2012, 1st. The complet list is available upon request.*