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Do natural resources condition the aid-governance relationship? Evidence from Africa.

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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 relationship is dependent on the type of aid allocation and on the size of natural resources rents held by the recipient country. A dynamic panel data analysis on African countries over the 1997 – 2008 period 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.

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1 Introduction

Improving the quality of governance has become a great concern for international communities. Good governance presumably improves the socio-economic environment, encourages foreign investors, and wipes out incentives for corrupt behavior (see, for example, Globerman and Shapiro (2002)). 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, Goldsmith (2001), Tavares (2003), Dunning (2004), and Jensen and Wantchekon (2004) found that aid increases the quality of governance. It thus seems unclear whether providing foreign assistance would even be counterproductive.

The main contribution of this paper is to provide an explanation on why aid does (not) improve governance. The overall effect of foreign aid is unclear. But there are some reasons to believe that rents derived from the exploitation of natural resources condition the aid effect on recipient's governance. 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 tied and unconditioned aid because of donors' interests in such resources (see, for example, Tull (2006) and Dreher et al. (2011)). The recipient government may have less pressure to allocate aid funds towards institutional reforms.

Furthermore, the overall effect of foreign aid may be unclear because of different types of donors. Different aid types 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 (2002), bilateral donors are presumably tied to their own political interests.[1] One may expect that multilateral aid is more beneficial for governance in aid-recipient countries.

Because rents on natural resources can presumably affect the aid-governance linkage, the combination between the type of aid and the size of natural resources rents may shed light on the governance effect of foreign aid. Alesina and Weder (2002) and Charron (2011) have distinguished the governance effects of multilateral and bilateral aid but no study has so far addressed the potential interaction effect between aid and natural resources on governance. This study contributes to this line of research by taking 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.

Using panel data on 52 African countries over the 1997-2008 period and a GMM technique to take endogeneity into consideration, I find that multilateral aid has a positive effect on the quality of governance. This effect is, however, weakened in countries that depend on their rents on natural resources, in particular on oil resources. The reverse occurs for bilateral

[1] 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.

aid.

The remainder of this paper is organized as follows. Section 2 lays out the data and the methodology. Section 3 reports the empirical findings. Section 4 concludes.

2 Variables and the methodology

2.1 Data and variables

The main focus of this study is the relation between foreign aid and governance. The quality of governance (gov_{it}) is measured by a composite indicator based on the means of three components of the International Country Risk Guide (ICRG), namely, corruption, law and order, and bureaucracy quality. The ICRG indicator is scaled from 0 to 1. Higher scores indicate higher quality of governance. Net Official Development Assistance (ODA) is scaled by the recipient's GDP to account for foreign aid intensity. Multilateral aid in GDP ($maid_{it}$) is the ODA amount allocated by an international agency, institution, or organization to an aid-recipient country divided by the recipient's GDP. Bilateral aid in GDP ($baid_{it}$) is the ODA amount allocated directly by one donor to one aid-recipient country divided by the recipient's GDP. I use three measures of natural resources, denoted *Oil*, *Gas*, and *Min*, measured in percentage of GDP, and an aggregate, denoted *Nat*, where $Nat = Oil + Gas + Min$.

I employ other explanatory variables used in the standard literature of governance, namely economic growth, rural population share, the number of deaths in conflicts, ethnic heterogeneity, historical legacy, and geographical location. Increases in revenues can make available institutional reforms (Busse and Gröning, 2009). Following Buhaug and Urdal (2012), I also expect a positive impact of the rural population share on governance in developing countries, in particular because of a lower pressure on resources allocation in rural countries and a lower risk of state failure. The ethno-linguistic diversity and the number of deaths occurred in an internal or external conflict are both expected to decrease the quality of governance. 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 (Alesina et al., 1999). Similarly, because more public resources are dedicated to the military sector during conflicts, conflicts presumably decrease the quality of governance (Addison et al., 2001; Busse and Gröning, 2009). In addition, countries located in tropical areas should have a lower quality of governance (La Porta et al., 1999). According to Acemoglu et al. (2001), settlers were not able to build metropolitan institutions where they could not permanently settle due to tropical diseases. English common law and the extend of political freedom are supposed to improve accountability and to limit the power of the executive (La Porta et al., 1999)). Finally, countries having high shares of Catholic and Muslim populations are expected to have a lower quality of governance than others because, according to La Porta et al. (1999), the quality of bureaucracy is lower in these countries.

The analysis is carried out on a sample of 52 African aid-recipient countries, from 1997 to 2008 (see Table II) for the list of countries). Following Busse and Gröning (2009), data are averaged over three years to flatten out cyclical fluctuations. The sources and definitions of the variables are reported in Table III.

2.2 Methodology

The empirical specification consists of modeling the quality of governance by

$$gov_{it} = \alpha_i + \rho gov_{it-1} + \beta_1 maid_{it} + \beta_2 baid_{it} + \gamma_1 nat_{it} + \gamma_2 maid_{it} \times nat_{it} + \gamma_3 baid_{it} \times nat_{it} + \phi' X_{it} + \lambda_t + \varepsilon_{it} \quad (1)$$

where gov_{it} indicates the measure of the quality of governance for the country i at time t; α_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; λ_t indicates temporal dummies, and ε_{it} is the error term.

The main interest lies in the signs and magnitudes of β_1 (expected to be positive), β_2, γ_2 and γ_3 (expected to be negative). 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) and McGillivray (2005)). In turn, aid is potentially endogenous to governance and correlated with the error term. Economic growth and conflicts are also presumed to be endogenous to governance (Knack and Keefer, 1995; Le Billon, 2003). I apply the Blundell and Bond (1998) estimator, the Generalised Method of Moments (GMM) most efficient estimator in small T samples, to estimate the following equation.

This dynamic panel data estimator estimates simultaneously equation (1) written in levels and equation (1) written in first differences. 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 external instruments. This GMM estimator is able to provide consistent results for such models. The two-step GMM estimator provides asymptotically efficient, robust and reliable results when facing endogeneity, dynamic issue and heteroscedasticity (Windmeijer, 2005). The Hansen J test for overidentifying restrictions loses power when the number of instruments exceeds the cross section sample size (Roodman, 2009). The estimation procedure may be biased and coefficients may be significant even if there is no statistical association. 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.

3 Findings

The empirical results for equation (1) are reported in Table 1. We begin with a basic specification of equation (1), excluding interaction terms (column (I)). As expected, the results suggest that aid increases the quality of governance when allocated by multilateral agencies while bilateral aid leads to a worsening of governance.

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.

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

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Gov_{t-1}	0.469***	0.460***	0.621***	0.486***	0.517***	0.363**
	(3.34)	(2.68)	(6.30)	(3.75)	(4.05)	(2.14)
Maid	0.007**	0.007***	0.010***	0.007***	0.009***	0.013***
	(2.50)	(2.74)	(3.81)	(3.02)	(5.45)	(2.80)
Baid	-0.005**	-0.005**	-0.008***	-0.003*	-0.007***	-0.009**
	(-1.99)	(-2.38)	(-3.39)	(-1.67)	(-4.02)	(-2.54)
Maid × Nat		-0.001***				
		(-2.76)				
Baid × Nat		0.000**				
		(2.50)				
Maid × Oil			-0.001***			-0.002***
			(-2.83)			(-6.35)
Baid × Oil			0.000*			0.000**
			(1.87)			(2.54)
Maid × Min				-0.003		0.002
				(-1.22)		(0.32)
Baid × Min				-0.000		-0.002
				(-0.15)		(-0.96)
Maid × Gas					-0.001	-0.003
					(-0.37)	(-0.85)
Baid × Gas					0.001	0.003
					(0.57)	(0.98)
Oil			-0.000	-0.001	-0.000	-0.001
			(-0.68)	(-0.97)	(-0.85)	(-1.10)
Min			0.005**	0.015**	0.004**	0.016***
			(2.50)	(2.51)	(2.22)	(3.46)
Gas			-0.000	-0.003	-0.002	-0.003
			(-0.02)	(-0.91)	(-0.94)	(-0.85)
Nat	-0.000	0.000				
	(-0.64)	(0.11)				
Rural population	0.002**	0.002*	0.001***	0.002**	0.002***	0.003**
	(2.34)	(1.84)	(2.98)	(2.33)	(3.13)	(2.48)
Tropical location	-0.115**	-0.116	-0.054	-0.127**	-0.110**	-0.167**
	(-2.04)	(-1.49)	(-1.35)	(-2.15)	(-2.47)	(-2.15)
English law	0.030	0.039	0.020	0.030	0.017	0.028
	(1.02)	(1.38)	(1.03)	(1.06)	(0.92)	(1.03)
Muslim share	0.002**	0.003*	0.002**	0.003**	0.002**	0.004***
	(2.28)	(1.94)	(2.18)	(2.46)	(2.17)	(3.73)
Catholic share	0.001**	0.002**	0.001**	0.002***	0.001**	0.002***
	(2.45)	(2.25)	(2.15)	(2.96)	(2.24)	(3.43)
Political freedom	0.000	-0.001	-0.001	0.002	0.002	0.004
	(0.05)	(-0.12)	(-0.17)	(0.33)	(0.29)	(0.42)
ELF	0.076	0.079	0.012	0.070	0.079	0.095*
	(1.29)	(0.91)	(0.28)	(1.13)	(1.39)	(1.95)
Economic growth	0.001	0.000	0.002	0.000	0.001	-0.002

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Table I – *Continued from previous page*

	(1)	(2)	(3)	(4)	(5)	(6)
	(0.37)	(0.05)	(0.97)	(0.47)	(0.31)	(-0.58)
Deaths in conflict	-0.002	-0.001	-0.001	-0.002	-0.003	-0.003**
	(-0.78)	(-1.58)	(-0.86)	(-1.26)	(-1.42)	(-2.16)
Observations	133	133	133	133	133	133
Lag restriction?	No	Yes[a]	Yes[a]	Yes[a]	Yes[a]	Yes[a]
Countries/Instruments	34/27	34/33	34/34	34/34	34/34	34/34
Hansen J test (P-value)[b]	0.750	0.477	0.636	0.429	0.486	0.872
AR(2) test (P-value)[c]	0.641	0.080	0.813	0.665	0.601	0.926
Difference-in-Hansen test (P-value)[d]	0.476	0.128	0.915	0.671	0.737	0.267

Notes: Estimation based on two-step system-GMM estimator with robust standard errors. [a] The number of lagged levels used to instrument the endogenous variables (including interaction terms) is restricted up to the ratio is higher or equal than one. [b] Hansen J-test of overidentification [c] Arellano-Bond-test that second-order autocorrelation in residuals is 0 d. *t* statistics in parentheses. * *p<0.1,* ** *p<0.05,* *** *p<0.01.* [d] Difference-in-Hansen test of exogeneity of GMM instrument subsets. The null hypothesis is that the specified variables are proper instruments, i.e. instruments are exogenous.

To further examine the contribution of bilateral and multilateral aid to governance, I now estimate equation (1) with both interaction terms, $maid \times nat$ and $baid \times nat$. All parameters of interests, β_1, β_2, γ_2 and γ_3, are significant at the 1% level. The estimates of β_1 and β_2 are similar to those of the previous regression and γ_1 is negative while γ_2 is positive. Consistent with the intuition, the GMM estimates show that natural resources alter the relationship between multilateral aid and governance. But surprisingly, estimation results suggest as well that the negative effect of bilateral aid is reduced in resources-rich recipients. Bilateral and multilateral aid amounts, supposed to be partly conditioned on the governments' willingness to improve institutional reforms, are lower in resource-rich countries. In average, African resource-rich countries receive the quarter of the average aid amount allocated to all African countries. The negative effect of bilateral aid may hence be lower.

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.

Columns (3) to (6) assess whether the type of natural resources is pertinent in determining the effect of aid on governance. The partial effect of aid on governance is found to be different from one resource to another. In all the regressions, multilateral aid remains propitious for governance while bilateral aid is not. Oil resources are found to decrease the positive effect of multilateral aid on governance and, as well, the negative effect of bilateral aid on governance. However, neither natural gas nor mineral rents seem to alter the governance effects of bilateral and multilateral aid. The dependence of a recipient country on oil resources, which provide larger rents than other natural resources, reduces the strength of the aid-governance relationship.

4 Conclusion

This study has provided an empirical examination of the effect of foreign aid on domestic governance, disaggregating different types of foreign aid across different types of donors and accounting for the dependence of recipients on their rents on natural resources. Based on a panel of 52 African countries covering the period 1997-2008, the GMM results show a strong empirical support for a positive effect of multilateral aid on governance in recipient countries. Secondly, the evidence strongly indicates that multilateral aid is much more effective at improving governance in non major oil producing countries.

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. 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.

Appendices

Table II: List of recipient countries – 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

Table III: Data sources and definitions

Variable	**Definition**	**Source**
Baid	Bilateral Official Development Assistance in % of recipient's GDP.	OECD and World Bank (2010)
Catholic share	Percentage of Catholics in the population in 2007.	CIA-Factbook

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Table III – *Continued from previous page*

Variable	**Definition**	**Source**
Deaths in conflict	"Deaths in battle-related conflicts between warring parties in the conflict dyad." (World Bank definition).	World Bank (2010)
Economic Growth	Real growth of GDP in %.	World Bank (2010)
English law	The dummy takes 1 if the legal origin of the Company Law or Commercial Code of the country is English and zero otherwise.	La Porta et al. (1999)
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).	Alesina et al. (2003)
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 (2010)
Gov	The mean value of the ICRG variables "Corruption", "Law and Order" and "Bureaucracy Quality".	The QoG datasets
Min	"Mineral rents are the difference between the value of minerals production at world prices and total costs of production divided by GDP".	World Bank (2010)
Maid	Multilateral Official Development Assistance in % of recipient's GDP.	World Bank (2010).
Nat	Resources rents are the sum of oil, minerals and natural gas rents.	World Bank (2010)
Political freedom	Political rights (0-7).	Freedom House (2010)
Rural population	Share of population living in rural areas.	World Bank (2010)
Muslim share	Percentage of Muslims in the population of a country in 2007.	CIA-Factbook
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 (2010)
Tropical location	Dummy taking 1 if the country is within the tropics.	CIA-Factbook

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