THE GRADUATE INSTITUTE | GENEVA
CENTRE FOR INTERNATIONAL
ENVIRONMENTAL STUDIES

Research Paper 15 | 2013

# AIDING AND ABETTING THE LOOTING OF NATIONS: THE IMPACT OF AID ON GROWTH IN AUTOCRACIES

M. SARR, T.SWANSON, C.RAVETTI AND S.WINGAARD

Research Paper 15 | 2013

# Aiding and Abetting the Looting of Nations: The Impact of Aid on Growth in Autocracies*

Mare Sarr† Tim Swanson‡ Chiara Ravetti§ Siri A. H. Wingaard¶

22nd November 2012

**Abstract**

We examine the link between international aid, political instability and economic growth in autocratic countries. First, we discuss the manner in which externally provided liquidity can affect looting and instability in an autocratic country, through the generation of outside options for a dictator who has property rights over the resource wealth of the country. We then use a treatment-effects approach to analyze empirically the role of natural resource wealth and aid on instability and, in turn, on growth. We find that the interaction of natural resources with most forms of international aid results in increased political instability and reduced growth. Interestingly, some forms of government aid (principally humanitarian aid) do not have this effect. We explore the reasons behind the interaction between resources and specific flows of aid, and find that both flows of aid and *the structure of those flows* depend upon the presence of resource wealth. Specifically, we find that aid flows toward poor countries (in terms of resources, income and indebtedness), but that aid structured as loans is more likely to flow toward resource-rich countries. We conclude that aid can generally have the effect of inducing instability in resource-rich autocratic countries, and that this instability is the instrument through which growth is reduced.

Keywords: Foreign Aid; Economic Growth; Dictatorship; Looting; Resource Curse

JEL Classification: O11; O13; F35

*We would like to thank Kirk Hamilton and Giovanni Ruta for sharing their data on natural resources with us. We also thank our collaborators on other papers - Erwin Bulte and Chris Meissner - for their contributions to this body of work and to our thinking in this area. The usual disclaimer applies.

†School of Economics, University of Cape Town, Private Bag, Rondebosch 7701, South Africa. Email: mare.sarr@uct.ac.za

‡Graduate Institute of Geneva, Voie Creuse 16, 1211 Genève 21, Switzerland. Email: tim.swanson@graduateinstitute.ch

§Graduate Institute of Geneva, Voie Creuse 16, 1211 Genève 21, Switzerland. Email: chiara.ravetti@graduateinstitute.ch

¶Ministry of Finance, Akersgata 40, 0030 Oslo, Norway. Email: siri_wingaard@hotmail.com

# 1 Introduction

The literature on aid and growth demonstrates that aid's effects on countries can vary widely. It is argued that aid can have a positive impact upon growth, or not, depending upon the policies and governance of the recipient country.[1] The empirical studies identify numerous policies which determine the impact of aid: exchange rates (Rajan and Subramanian 2011); fiscal, monetary and trade policies (Burnside and Dollar 2000). With regard to governance, the primary divide is between aid provided to democratic countries and autocracies. When aid flows toward democracies with some degree of political and civil liberties, it has been found to have a positive impact upon growth. (Svensson 1999; Kosack 2003). Conversely, the same authors have found that aid that flows toward autocracies has a demonstratively negative impact upon growth. (Svensson 2000) Our results agree with these earlier analyses to a large extent, and we provide both an explicit analytical framework for considering the problem of aid to autocracies as well as empirical evidence regarding the impact of aid on growth in such countries; however, it is our conclusion that it is the policies and governance of aid provided by the *donor countries* that determines the ultimate impact of aid on autocracies.

In short, we argue here that autocratic states that receive external sources of liquidity are "accidents waiting to happen" and poorly structured interventions are likely to result in instability and reduced growth. Our argument devolves to the insight that autocrats sit on the cusp of a dilemma regarding departure—should the autocrat stay and invest in its implicit property or should the autocrat liquefy as much as possible and move on immediately? (Sarr et al. 2011, Sarr and Swanson 2012) The decision is essentially one of the choice of the timing of "looting" of the nation by the autocrat. (Akerlof and Romer 1993)[2] The impact of many sorts of external interventions in such a framework is likely to be destabilising. Given the uncertainty surrounding continuing tenure, the only way in which autocrats can be incentivised to invest in their countries is to eliminate most other outside options. External agents who provide or enhance any outside option, such as the provision of some sort of liquidity to the autocrat, place an enhanced value on the choice of departure, and hence increase its likelihood. In these previous analyses we found substantial evidence of a link between the provision of commercial lending, heightened political instability and consequent reduced growth. We have termed this phenomenon of induced departures "the looting of nations". (Sarr et al. 2011)

In this paper we explore the capacity for inter-governmental aid to function in the same way as commercial lending in this story. Will the increased liquidity from aid payments also function to enhance the benefits from looting? Aid is of course very different from commercial lending in many respects, in that it may target circumstances (such as poverty, crisis or conflict) other than collateral. In addition, commercial loans will always result in greater debt burdens while aid may arrive in the form of interest-free grants. Clearly, commercial lending and inter-governmental aid potentially constitute very different flows of funding, in terms of source and motivation. In our theorizing about autocratic resource-rich states, however, these differences should not matter much in determining the domestic outcome. Any source of enhanced liquidity under the control of the autocrat would heighten the perceived attraction of the looting strategy.

Our analysis is related to, but quite distinct from, the literature on the general "effectiveness" of aid. This literature has focused on the issues of aid ineffectiveness on account of pre-existing (and poor) domestic governance institutions.[3] This literature also surveys the direct but marginal impacts of aid on internal prices and incentives.[4] Our argument is different: we argue that, for a small set of governance situations (resource-rich autocracies), aid can have major impacts and non-marginal outcomes.

[1] The seminal reference for this proposition is(Burnside and Dollar 2000). There is a significant amount of debate concerning various aspects of the empirical findings in this literature. (Easterly, Levine and Roodman 2004; Hansen and Tarp 2000). We find the argument that aid can potentially have positive impact persuasive, if sufficient structure and governance is put into place.

[2] Akerlof and Romer (1993) modelled the problem of looting first in a commercial context, in regard to the executive in charge of an inadequately regulated bank. Swanson and Mason (1998) modelled the problem in an environmental context, in regard to the head of a firm disposing of toxic wastes.

[3] Although the aid effectiveness literature is inconlusive, many studies find that aid often has little positive impact. For instance Knack (2001) finds a deterioration of the risk profile of a country with increasing aid flows. Brautigam and Knack (2004) identify several reasons why aid could demonstrate little positive impact on growth: first and foremost aid can reduce the internal pressure for change in the context of poor governance.

[4] Aid transfers may also have deleterious impacts by reason of distorting internal prices and incentives. Project based funding may siphon the most capable workers away from other positions by offering better salaries and future opportunities. Prices of resources and activities may be generally distorted because of the external demand represented by aid funds. It has even been argued that prices may be rendered uncompetitive externally, due to a potential impact of aid flows on real exchange rate appreciation. (Rajan and Subramanian 2005) Moreover, aid has been argued to distort incentive structures and creates moral hazard problems, the so called "Samaritan's dilemma". (Buchanan 1975) Governments are then able to spend money without precise budget constraints, effectively insured by the contributions from foreign donors. This distorted governance structure can create dependence upon aid, so that the state becomes incapable of performing many of its core functions.

That is, aid can be highly effective in substantially undesirable ways.[5]

Finally, our paper is also related to the literature on the strategic motivations for aid. One of the conclusions of the aid and growth literature is that aid is often poorly targeted at the needs of recipients. (McGillivray 1989) This has been argued to be the case because aid has been motivated more by the strategic interests of the donors than the needs of the beneficiaries. (Maizels and Nissanke 1984) Aid is not channeled toward countries with better governance, i.e. more democratic countries. (Svensson 1999) It is not targeted at those with good policy environments. (Burnside and Dollar 2000) The most common explanations for aid flows are more strategic, and based in the interests of the donor. Fundamental factors determining these strategic flows include colonial and political linkages. (Alesina and Dollar 2000) We show here that another important factor in motivating some flows of aid is the presence of resources in the recipient country, and the potential for aid to translate into claims upon those resources.

In this paper we attempt to demonstrate that aid can have substantial impacts in some countries and yet still very negative outcomes, political and economic. We show this by demonstrating that aid may have a direct and negative impact upon the operation of institutions in a particular set of developing countries (autocratic, resource rich ones) and for particular categories of aid (sectoral and resource-driven aid). In these cases, aid does not simply operate as a benign influence in the presence of poor domestic governance institutions, nor does aid simply act to introduce marginal distortions in the price system of a developing economy. Aid can be a very effective way of generating very poor outcomes, institutional and economic, in autocratic countries.[6] We argue that this is not an unintended consequence of aid in these countries, but more likely driven by the strategic interest of the donors in the resources concerned.

The paper proceeds as follows: in section 2 we briefly set out our theory of liquidity-based instability, and how this relates to the effect of aid flows on growth outcomes. In section 3 we set out our hypotheses regarding the relationship between inter-governmental aid, instability and growth, and review the evidence regarding each of these. In section 4, we discuss the manner in which different flows of aid are structured, and what this means for the impact of aid flows. Section 5 concludes.

## 2 Theory: The Dictator's Choice Model[7]

We restrict our analysis here to that set of countries that are controlled by an unchecked autocrat. We theorise concerning the perilous position of this "transient dictator": someone who is subject to potential displacement each day of his dictatorship. While in this position, he will sit as an unchecked monopolist over all of the resources within that country and over all of its productive capacity. However, if he has not departed before a coup displaces him, then he receives no pay-off from this position of power. His choice then concerns when to "loot" the country given his perilous position.

Specifically, we have described the "dictator's choice" as comprising a situation in which this autocrat faces a series of decisions described by the decision tree in Figure 1 below.[8] The autocrat could elect to depart the country immediately with whatever liquidity his status makes available, or the autocrat could decide to remain in office for one more period for the purpose of consuming from state resources and extracting greater liquidity in the future. If he elects to stay, he faces the prospect of a coup, and removal from office without receiving any returns from that office, neither liquidity nor consumption. For this reason, the basic calculus of such an autocrat is to compare the returns available from placing immediately available liquidity into foreign investments (foreign bank accounts) against appropriately risk-discounted domestic investments (domestic investment and production). Liquidity is assumed to be conferred at the time of the decision, so there is no risk attached to the

[5] This places our paper within the literature that relates aid to the resource curse. It has been found that aid acts as another form of non-tax revenue for developing countries that has often been associated to poor growth and development outcomes (Morrison 2009). In the literature, the so called "resource curse" (Sachs and Warner 1995) has been explained related to both external and internal factors. On the one hand, resource-richness may be associated with many phenonena that arise externally: increased indebtedness (Manzano and Rigobon 2003), volatile revenues (Humphreys and Sandbu 2007), or the so called "Dutch disease", an appreciation of the exchange rate due to the export of the resource, which penalizes domestic industries by inflows of cheap imports and unfavourable conditions for exports (Sachs 2007). On the other hand, the curse could hinge more on things internal: higher rent-seeking and corruption (Leite and Weidmann 2002), domestic conflict and political instability (Collier and Hoeffler 2004), autocratic regimes and poor institutions (Ross 2001; Isham et al. 2005) and in general with weaker accountability of the political leadership (Ross 2001). Our analysis, here and elsewhere, finds that the resource curse is sometimes sourced in the combined phenomenon of poor internal governance and strong external intervention. (Sarr and Swanson 2012)

[6] We are not the first to note that aid may have a negative impact on institutions. Djankov et al. (2008) conclude that aid has an even more detrimental impact on institutions than revenues from oil. We provide a specific mechanism for examining how poor institutions can be generated by some forms of aid.

[7] This model is treated in full in Sarr and Swanson, 2012, and summarised with regard to its growth impacts in Sarr et. al. 2011.

[8] A description of the dictator's choice model is included for reference in Appendix A. It is covered in detail in Sarr and Swanson (2012).

looting decision (i.e. the decision to depart immediately), while the decision to take the higher rates of return from productive domestic investments takes time and hence incurs the risk of removal in the interim. For this reason the dictator is seen to sit on the cusp of a decision about departure at all times—the incentives to loot loom large.

External agencies can influence the autocrat's decision (intentionally or inadvertently) by means of any intervention that might either a) enhance the liquidity immediately available to the dictator; or b) reduce the prospects for current or future consumption from the economy. If an external agent increases the proportion of liquefiable assets in a given period, or decreases the expected level of future flows from the economy, then the dictator is more likely to depart immediately. The analytics of the model are straightforward. Any conferment of enhanced liquidity available immediately increases the prospects for immediate departure. Hence, we have demonstrated that "the looting of nations" is occasioned in autocracies by the provision of liquidity levels that are "too high" in the sense described in our Dictator's Choice model (attached in Appendix A). The dictator's choice to loot is aided by any external agency that provides un-structured liquidity, available for immediate taking by the autocrat. (Sarr and Swanson 2012)

For example, we found evidence in our earlier analysis that commercial lending enhanced the likelihood of political instability (on account of increased liquidity) while increased debt levels had the same effect (on account of reduced consumption prospects). We further demonstrated that the presence of liquidity-linked instability detracted from growth prospects in autocratic countries, resulting in an institution-linked explanation for the resource curse. (Sarr et al. 2011)

In the remainder of this paper we wish to examine whether governmentally-supplied liquidity has the same effect as commercially-supplied liquidity on the existence of political instability within autocratic countries and, if so, we also wish to investigate whether there are similar implications for the growth prospects in these countries. That is, do inter-governmental aid flows aid the looting of nations? We turn to the examination of the evidence on this question in the next section.

# 3 Empirical Analysis

The empirical analysis of the theory's implications, in the context of aid transfers, requires an examination of the manner in which aid-based liquidity directly impacts political instability (looting) and through this growth. In this section, we wish to test two claims similar to those made in Sarr et al. (2011); specifically:

**Claim 1)** Larger amounts of inter-governmental aid transfers (at a fixed level of natural resource wealth) enhance the likelihood of political instability in an autocratic resource-rich country.

**Claim 2)** The occurrence of liquidity-driven irregular turnover generates an environment of political instability, which results in reduced economic growth in the autocratic resource-rich state.

## 3.1 Empirical Model

Our empirical strategy follows from the treatment regressions approach developed in Sarr et al. (2011), to which we refer the reader to for a detailed account. Essentially, in order to address the possible problem of selection bias due to unobservable characteristics (e.g. unobservable forces that drive both growth and political instability), we jointly estimate a treatment equation (political instability regression) and an outcome equation (growth regression) by maximizing a bivariate normal likelihood function. In doing so, we allow for the correlation of the error terms of the two equations to be modelled directly, thereby eliminating the omitted variable bias. These equations are specified as follows:

$$\Delta log(GDPcap)_{it} = \alpha_0 + \alpha_1 Loot_{it} + \alpha_2 NRRent_{it-1} + \alpha_3 \mathbf{X}_{1it} + u_{it} \quad (1)$$

$$Loot_{it} = \begin{cases} 1 & \text{if } Loot^*_{it} > 0 \\ 0 & \text{otherwise} \end{cases} \tag{2}$$

$$Loot^*_{it} = \beta_0 + \beta_1 NRStock_{it} + \beta_2 Aid_{it-1} + \beta_3 \left(NRStock_{it} \times Aid_{it-1}\right) + \beta_5 \mathbf{X}_{2it} + \eta_{it}$$

where *NRStock*, *NRRent*, *Loot* and *Aid* denote respectively the resource stock and resource rent, the proxy for looting and aid (more precisely, aid sector or aid type). **X**'s are the vectors of control variables in each equation. Practically, the joint estimation will be performed using the Stata program cmp developed by Roodman (2011).

The dependent variable of the probit model, the irregular leadership turnover *Loot*, is the proxy for looting used by Sarr et al. (2011).[9] The data come from Archigos, a database of political leaders developed by Goemans et al. (2009). In our baseline sample there are 128 country-year observations out of 2852 when *Loot* equals 1. The explanatory variables of interest for the treatment into looting are the stock of natural resources and foreign aid. The natural resources data are provided by the World Bank Environment Department (K. Hamilton and G. Ruta), while the aid *commitment* series come from the OECD-DAC aid statistics.[10] In our analysis, bilateral aid *commitments* from the Creditor Reporting System (CRS) are disaggregated according to the broad sectors targeted by the aid funds (infrastructure, production, humanitarian, multi-sector and programme assistance).[11] This disaggregation enables us to analyze whether different categories of aid flows yield different incentives. Importantly, we control for past commitments (one year lag) of either category of aid because these are likely to generate actual liquidity in the near future. We also distinguish between bilateral grants and loans commitments.

Claim 1 hypothesizes that the marginal effect of foreign aid on the likelihood of looting-led political instability is positive and increases with the level of natural resource wealth. That is:

$$\frac{\partial Pr(Loot = 1 | Aid_{it-1}, NRStock_{it}, \mathbf{W}_{1it})}{\partial Aid_{it-1}} = \left(\beta_2 + \beta_3 NRStock_{it}\right) \phi \left(\beta \mathbf{W}_{it}\right) > 0 \tag{3}$$

where $\phi$ is the standard normal density function. This requires that $\beta_2 + \beta_3 NRStock_{it} > 0$ and $\beta_3 > 0$. Thus, the interaction between aid and resources is of particular importance because its sign will indicate whether aid to resource-rich developing countries produces enhanced political instability.

We further hypothesize in Claim 2 that looting-led political instability adversely affects economic growth in resource-rich states that are recipients of aid, i.e. we are interested in the *indirect* effect of aid and resources on growth due to political instability, that is:

$$\frac{\partial E(\Delta log(GDPcap)_{it} | Loot(Aid_{it-1}, NRStock_{it}) = 1)}{\partial Aid_{it-1}} = \alpha_1 \frac{\partial Pr(Loot = 1 | Aid_{it-1}, NRStock_{it})}{\partial Aid_{it-1}} \tag{4}$$

If the evidence supports our hypotheses, then foreign aid could well be another channel through which the resource curse

[9] This is binary variable that is equal to 1 if the executive has been changed through irregular means, i.e. if a ruler or regime has been deposed or forced from power in a non-constitutional manner. Because looting is often unobservable, the latent variable $Loot^*$ is assumed to be positive when $Loot = 1$. The theoretical model developed in Sarr et al. (2011) explains the rationale for a looting-led political instability. Their model suggests that, if enough looting occurs, a regime could be overthrown either due to low investment in capital stock (popular dissatisfaction), or because some factions attempt to seize power, or, alternatively, because the dictator would choose to depart from office in order to consume abroad the fruits of his malfeasance.

[10] A limitation of this dataset is that only countries and institutions that voluntarily report their aid levels are present. These include: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland UK and USA. Less regular time series are available for non-DAC countries: Chinese Taipei, Czech Republic, Estonia, Hungary, Iceland, Israel, Kuwait, Poland, Saudi Arabia, Slovak Republic, Slovenia Thailand, Turkey, United Arab Emirates.

[11] It is important to point out that, for sectoral aid data, *commitments* are preferred to *disbursements* due to availability and reliability of the former. The OECD CRS User's Guide advises that *"in general data on a commitment basis is of a better quality than based on disbursement [...]. Analysis on CRS disbursements [...] is not recommended for flows before 2002, because the annual coverage is below 60%"* (User's Guide to the CRS Aid Activities Database 2012 http://www.oecd.org/development/aidstatistics/usersguidetothecreditorreportingsystemcrsaidactivitiesdatabase.htm)

operates in the same manner as imperfect lending markets are showed to be a critical factor generating the resource curse in Sarr et al. (2011).

In addition to including the looting variable in the growth equation, we also incorporate a proxy for human capital accumulation (the number of years of schooling), investment, inflation, a measure of trade openness as well as year and country dummies. Note that to ensure the robustness of our results, we also control for regional dummies in the growth equation instead of country dummies. In line with Sarr et al. (2011) our analysis focuses essentially on authoritarian regimes. The classification of authoritarian regimes comes from Cheibub et al. (2010). We also test for the presence of the Dutch Disease, by including the level of resource rents relative to GDP.

To ensure that the model is duly identified, two exclusion restrictions are made. First, we control for the rulers' length of tenure (in years) and for riots (level of civil unrest and disorder). We assume that these variables only affect growth via the impact on political instability. We conduct our analysis on a panel of 71 countries, over the period 1970-2000. The main variables and sources are listed in Table 1.

Finally, we undertake a preliminary analysis to investigate the reasons why resources might interact negatively with liquidity, by adding a third stage exploring the motivations for aid transfers to the treatment effects model presented above. The third equation is specified as follows:

$$Aid_{it} = \gamma_0 + \gamma_1 NRStock_{it} + \gamma_2 \mathbf{X}_{3it} + \varepsilon_{it} \tag{5}$$

The Stata program cmp developed byRoodman (2011) is also used to estimate our three-equation mixed-process model.

## 3.2 Results: The Impact of Aid on Growth in Autocracies

Tables 2 to 5 report the results of our empirical analysis. Much of our discussion pertains to the baseline model which accommodates country fixed effects as shown in Tables 2 to 3.[12] Our analysis considers the impact of inter-governmental transfers in aggregate (Total Aid) and disaggregated along various sectoral and motivational lines. We initially consider all forms of transfer in aggregate (both loans and grants) and then later disaggregate them to demonstrate the difference in effects between grants and loans. We commence with a treatment-effects two-stage analysis in order to investigate whether aid-sourced liquidity has a direct impact upon political instability, and instability upon growth.

### 3.2.1 Aid and Political Instability

We commence with a discussion of the impact of aid on instability in all autocratic countries (with instability measured as the incidence of "irregular turnover" in government). Panel B of Table 2 shows the impact on political instability for each category of aid. Our initial finding is that aid commitments (Total Aid and the disaggregated sectoral aid transfers) do not induce increased instability in general across autocracies. In fact, aggregate aid commitments have a negative impact on irregular turnover, as shown in Column 1. The coefficient of Total Aid is significantly different from zero at the 1% significance level. It is also interesting to consider this relationship across various categories of aid.[13] We find similar statistically significant negative results for aid commitments categorised as Infrastructure and Production, respectively at the 5% and 10% level of significance. On the other hand, the direct effect on instability is statistically insignificant for aid flows categorised as Humanitarian, Multi-sector and Programme Assistance. So aid appears to have differing impacts upon stability in autocratic countries, depending upon the category under which the aid event is listed, but in aggregate the effect is negative.

To this point we have little evidence in support of our initial claim regarding the impact of aid-based liquidity on political instability. We now consider how aid impacts autocratic states when *resource-richness* is an important characteristic of the country concerned. Panel B of Table 2 demonstrates this effect—the interaction of aid with natural resource stocks generates

[12]The findings presented in Table 4 and in Column (3) and (4) of Table 5 (these specifications control for regional dummies) do not warrant further discussion since they are very similar to those reported in Tables 2 to 3.

[13]The categories of aid for which we have data are: Infrastructure, Production (among others energy and transport), Humanitarian, Multi-sector (mostly environmental, and general developmental aid) and Programme Assistance (mostly budget support and food aid).

statistically significant (at the 1% level) increases in political instability for Total Aid. In effect, the impact of aid is reversed when total aid is interacted with substantial resource stocks. In general, aid transfers to resource-rich states are destabilising whereas there is no sign of such a relationship in the absence of resources. We examine the possible explanations for this difference in section 4.

It is also interesting to note that this relationship is not apparent for all categories of aid transfers. It is found only for aid transfers categorised as Infrastructure, Production, and Programme Assistance. Meanwhile the interaction coefficient remains insignificant for Humanitarian aid and Multi-sector aid. This insignificance for some categories of aid transfers hints at a relationship between types of aid and their impacts. We will return to examine this relationship in section 4.

In order to illustrate the impact of these findings in regard to Claim 1, we calculate the marginal effect of the aid measures on the probability of irregular turnover, given natural resource wealth (and all other controls). To do so, we consider the impact of an increase of aid by one standard deviation from the mean and fix all the right hand side variables in the probit model at their sample mean. Figure 2 to Figure 5 illustrate these marginal effects for Total Aid, Infrastructure, Production, and Programme Assistance. They show that for sufficiently large levels of resource wealth, the marginal effect is positive and statistically significant at the 5% level for all the aid categories considered in this paper. The value of the resource wealth threshold varies across aid categories from 132% of GDP (62th percentile) for Programme Assistance to 378% of GDP (84th percentile) for Infrastructure aid. These results provide clear and robust evidence in support of our hypothesis that the provision of increased amounts of foreign aid to resource-rich dictators has the potential to generate the political instability associated with looting.[14] We will now turn to the impact of aid on growth, via this mechanism of instability.

### 3.2.2 Aid, Instability and Growth

We now examine the evidence regarding the impact of aid on growth (through the mechanism of induced instability) in autocracies. The findings pertaining to our Claim 2 are reported in (upper) Panel A of Table 2. As predicted, irregular turnover, our proxy for looting, has a strong and significantly negative impact on economic growth for Total Aid, and for all categories of aid (other than Humanitarian aid).

The size of the impact is substantial. The point estimate indicates that output per capita drops by 4 to 5 percent in the event of one unconstitutional political change. Put differently, the indirect effect of 1% increase in aid[15] to autocratic states through looting-led political instability suggests that a country - that is average in all respects except in regard to its resource wealth (we use Nigeria's resource-richness as an example) - would result in a loss of up to 0.89 percentage point of economic growth (see Table 3).[16] In short, for the set of autocratic countries, liquidity-linked instability appears to be an important vehicle for explaining reduced growth prospects in these countries.

We believe that these findings support our claims that an offer of liquidity to dictators may tend to increase looting-led political instability, which in turn may result in reduced economic growth. There are two fundamental caveats to our findings: liquidity-induced instability is only a problem for resource-rich countries[17] and for certain categories of aid (all except Humanitarian and Multi-Sectoral). We turn to investigate these exceptions to our general findings in section 4, below.

[14] The other explanatory variables in the probit model yield expected results. Thus, increased per capita GDP levels tend to reduce the probability of irregular turnover in dicatorships, while the frequent occurrence of riots enhances the likelihood of such events.

[15] Here we are only interested in the indirect effect. Note that we have estimated model specifications that include $Aid$ and $Aid^2$ in the growth equation for all aid categories. The coefficients of both variables turned out to be systematically insignificant. For this reason, we excluded them from our baseline outcome (growth) equation. These results are available upon request.

[16] Our analysis indicates that this relationship does not hold true for countries that are not resource-rich. A country that is average in all respects including in its resource wealth does not demonstrate this effect; in fact, an autocratic state that is not resource-rich experiences heightened political stability, which in turn would translate into a marginal increase of 0.05 percentage point in growth. This points to the role that resources play in attracting the "wrong sorts of transfers", as will be examined further below.

[17] And the only manner in which resource-richness translates into reduced growth prospects, for our sub-sample of autocratic states, is via induced instability. In our sample, there is no evidence of any directly negative effect of resources on growth - the effect of natural resource rents on growth is never distinguishable from zero. The other determinants of growth mostly provide expected results. Education and investment have the expected positive effect while inflation has a negative one.

# 4 Discussion: the structure of aid flows

We have found that inter-governmental aid flows have significantly negative effects on growth in autocracies, but only in regard to those countries which are *resource-rich* and only for certain *categories of aid* (specifically, Infrastructure, Production and Programme Assistance, but not Humanitarian or Multi-Sector). The fact that aid does not always operate to enhance the rate of departure is important. We are left to explain how it is that sometimes the external provision of liquidity has the expected impact on instability and growth, and in other cases liquidity does not.

The most straightforward explanation would be that it is the outcome of a different structure supplied to some forms of transfers, and not to others.[18] We have argued elsewhere that it is only *unstructured liquidity* that creates incentives for instability. That is, transfers of liquidity that are structured by donors in such a way that they must be invested in the domestic economy would not have the effect of inducing instability.(Sarr et al. 2011)[19] Hence, we wish investigate whether there is any evidence to indicate that there is a different structure provided to aid flowing toward those categories of states demonstrating instability (i.e. those states that are resource-rich).

This part of our investigation is related to the literature on the motivations for aid transfers. That literature has demonstrated that aid flows may be explained more by strategic motivations on the part of the donor state than demonstrable needs on the part of the beneficiary. (Maizels and Nissanke 1984; Alesina and Dollar (2000))[20] Our investigation wishes to explore whether both the *flows* and the *structure* of aid transfers might be strategically determined. Our hypothesis is that both aid flows and structure will be determined by the presence of resource-richness in beneficiaries.

In order to investigate this hypothesis, we perform a three-stage analysis in which we jointly estimate the instability and growth equations together with the aid allocation equation, in which we control for per capita GDP, debt service, British and French colonial ties as well as natural resource wealth. The results of the estimation of this three-equation system are reported in Table 7 (total and sectoral aid) and Table 8 (aid in the form of loans and grants). The results are striking.

First, the results demonstrate that the aggregate flows under all categories of aid are determined more by the needs of beneficiaries than by the strategic objectives of the donors. Table 7 suggests that natural resource wealth is not a major attractor of any form of aid. Most of the natural resource coefficients are insignificant and those that are significant are negative, indicating that donors tend to provide aid to countries that are less well endowed in natural resources. This is true across all categories of sectoral aid, and for Total Aid as well. Instead, it is low per capita incomes, high indebtedness, and long-standing political ties that explain all categories of aid flows. Therefore we find that, in general, aid is motivated to generate transfers in the direction of more needy countries (in terms of income), those that are facing challenges in terms of servicing their debt, and those countries with colonial ties. These flows of aid continue to have a deleterious impact upon instability and, through this, on growth, but it would appear from this analysis to be an unintended effect of the liquidity provided.

There is an important exception to this general finding. This difference is demonstrated when we disaggregate aid transfers between *loans* and *grants*, where the impact of resource-richness on aid flows is clarified. As before, grants flow toward resource-poor countries, as indicated by the negative and significant relationship in Table 8 Column 2. However, in the context of loans (but not grants) resource-rich countries attract significantly greater aid flows. The impact of resource wealth on aid transfers becomes positive and statistically significant at the 10% level. (Table 8 Column 1)

Aid transfers that are *structured as loans* are responding positively to resource-richness, while grants are responding positively to resource-poorness. The remainder of the results between the aggregated and the disaggregated analyses are nearly identical. Although the coefficients are somewhat reduced, the significance and signs for income and debt burdens remain the same. This indicates that aid continues to flow toward poorer countries in general, but it is *structured* in different ways by the donor state, depending upon the circumstances of the recipient state. Therefore, poorer states with substantial resource-riches are receiving aid structured as loans, while similarly situated states without resources are not; the only exceptions being in the case of Humanitarian and Environmental aid flows.

[18] There may be two competing hypotheses - one is that resources act as attractors for poorly-structured transfers and the second is that resource-richness proxies for some other problem that is internal to the autocratic country such as conflict or poor governance. We examine both here.

[19] We define *structured liquidity* as being the transfer of funds with conditions requiring its investment in specific sunk assets retained within the state concerned.

[20] The alternative motivations for aid flows include: a) needs of the beneficiary; b) political and colonial ties between the beneficiary and donor; or c) the strategic pursuit of assets on the part of the donor.

Donor states determine both the amount of aid flows, as well as the structure of those flows. We have presented evidence on the motivations for aid flows that demonstrates that, in aggregate, these flows respond to the needs of beneficiary country (in terms of resource wealth, national income, indebtedness as well as colonial ties). These flows of aid still have the expected effects on instability and growth, but they are likely to be inadvertent. More interestingly, we find that the structure of aid flows also varies with the presence resources, but the effect here is the opposite. Aid flows are structured as loans when resource-richness is a factor, providing the basis for claims on assets if instability and indebtedness results. The motivations for this impact of resources on the structuring of aid are more dubious. This liquidity-induced instability may then redound to the benefit of the donor state, in terms of providing the basis for reverse flows of resources in future. We find that the only categories of aid for which this impact is never present are Humanitarian and Multi-Sector (or Environmental). There is little evidence that these forms of aid ever produce instability.[21]

# 5 Conclusion

We have found that, in many cases, aid impacts negatively upon growth in autocratic countries. Our contribution is to have provided an analytical framework for explaining why this might be the case. We have hypothesised that aid operates as a source of liquidity for autocrats, enticing them to depart more quickly, and resulting in consequentially increased instability and reduced growth prospects. It is this phenomenon of liquidity-induced "looting" by autocrats that is our fundamental explanation for how aid is capable of generating poor economic outcomes. Our first empirical finding of note is that aid is related to instability, but that this is the case only for resource-rich countries. We believe that this is evidence in support of our hypothesis concerning liquidity-induced instability, but note that there are exceptions that limit the applicability of our analysis.

Our second empirical finding of note is that liquidity-induced instability occurs for most, but not all, categories of aid. Humanitarian aid and Multi-sectoral (mainly environmental) aid do not result in significantly increased instability. Again, we find this to be broad support for our hypothesis concerning the impact of liquidity, and indicative of the limits of its applicability. For some reason, liquidity has a destabilising impact only on some autocratic countries and for some categories of aid, but not otherwise.

So, our first point is that aid-based liquidity to autocracies does in many cases result in heightened instability, and consequentially in reduced growth prospects, and we interpret this to be broad evidence in support of our looting framework. The impact of such aid-induced instability is significant; the indirect impact of a 1% increase in aid results in a 0.89 percentage point decrease in growth prospects. Aid to autocracies does indeed generate significantly reduced growth via this mechanism of liquidity-induced instability.

Our second point concerns the reasons for the exceptions that we have found - restricting the applicability of our framework to those countries that are resource-rich and to some categories of aid. We have argued that it is likely that these differences in impacts can be attributed to differences in the *structuring* of aid flows by the donors concerned. Our third empirical finding of note is that resource-richness is an attractor of *loans* while resource-poorness is an attractor of *grants*. Although we find that aid flows generally toward poorer countries (in terms of resources, per capita income, debt burden), we also find that the *structure* that is provided to aid is highly dependent upon the presence of resources. These findings suggest that some flows of aid are related to the presence of resources, and that the structuring of those flows is also tailored to the presence of resource wealth. In general, it appears that the impact of aid to autocracies is to generate flows of resources toward those that are resource-poor, and to generate flows of resources away from those that are resource-rich.[22]

Our conclusion is that aid to autocracies has generally poor impacts on growth in those countries. Our contribution is to demonstrate that this is *not* because aid acts as a benign instrument working through poor domestic political institutions to generate

[21] These exceptions, to our minds, are more evidence to prove the rule: donors are able to structure aid in the manner that they intend, and achieve the results that they pursue in the provision of aid transfers. Sometimes aid transfers are structured to produce humanitarian outcomes, and other times they are structured to produce the possibility of future claims and reverse transfers.

[22] We believe that this is because donors elect to structure aid in ways that generate looting. The only other possibility is that aid recipients loot certain forms of unstructured liquidity at reduced rates (e.g. a certain reticence on the part of autocrats to siphon off funding intended for crisis or famine victims). However, this would not explain why it is that resource-rich countries tend to experience liquidity-induced instability at increased rates over resource-poor ones, or why resource-rich countries attract loans at increased rates relative to resource-poor ones.

poor quality outcomes. Rather, poorly structured aid itself can contribute directly to producing the enhanced instability and poor economic performance frequently observed in resource-rich autocracies. Nations who provide unstructured liquidity to autocratic resource-rich countries are enhancing the prospects for unplanned departures, corruption and poor growth: nations aiding and abetting the looting of nations.

# References


Acemoglu, D., Robinson, J. A. and Verdier, T.: 2004, Kleptocracy and divide-and-rule: A model of personal rule, *Journal of the European Economic Association* **31**, 162–192.

Akerlof, G. and Romer, P.: 1993, Looting: the economic underworld of bankruptcy for profit, *Brookings Papers on Economic Activity* **2**, 1–73.

Alesina, A. and Dollar, D.: 2000, Who gives foreign aid to whom and why?, *Journal of Economic Growth* **5**(1), 33–63.

Azam, J.-P.: 1995, How to pay for the peace? a theoretical framework with references to african countries, *Public Choice* **83**, 173–184.

Brautigam, D. and Knack, S.: 2004, Foreign aid, institutions, and governance in sub-saharan africa, *Economic Development and Cultural Change* **52(2)**, 255–285.

Buchanan, J.: 1975, *Altruism, morality and economic theory*, New York: Russel Sage foundation, chapter The Samaritan's Dilemma.

Bulow, J. and Rogoff, K.: 1989, A constant recontracting model of sovereign debt, *Journal of Political Economy* **97**, 155–178.

Burnside, C. and Dollar, D.: 2000, Aid, policies, and growth, *American Economic Review* **90(4)**, 847–68.

Cheibub, J., Gandhi, J. and Vreeland, J.: 2010, Democracy and dictatorship revisited, *Public Choice* **142**, 67–101.

Collier, P. and Hoeffler, A.: 2004, Greed and grievance in civil war, *Oxford Economic Papers* **56**, 563–595.

Djankov, S., Montalvo, J. and Reynal-Querol, M.: 2008, The curse of aid, *Journal of Economic Growth* **13(3)**, 169–194.

Eaton, J. and Gersovitz, M.: 1981, Debt with potential repudiation: Theoretical and empirical analysis, *Review of Economic Studies* **48**(2), 289–309.

Goemans, H. E., Gleditsch, K. S. and Chiozza, G.: 2009, Introducing archigos: A data set of political leaders, *Journal of Peace Research* **46**(2).

Humphreys, M. and Sandbu, M.: 2007, *Escaping the Resource Curse*, New York: Columbia University Press.

Isham, J., Woolcock, M., Pritchett, L. and Busby, G.: 2005, The varieties of resource experience: natural resource export structures affect the political economy of economic growth., *World Bank Economic Review* **19**, 141–174.

Knack, S.: 2001, Aid dependence and the quality of governance : cross-country empirical tests, *Southern Economic Journal* **68**, 310–329.

Kosack, S.: 2003, Effective aid: How democracy allows development aid to improve the quality of life, *World Development* **31**(1), 1–22.

Leite, C. and Weidmann, J.: 2002, *Governance, Corruption, and Economic Performance*, Washington, D.C.: International Monetary Fund, chapter Does Mother Nature Corrupt - Natural Resources, Corruption, and Economic Growth.

Maizels, A. and Nissanke, M.: 1984, Motivations for aid to developing countries, *World Development* **9**, 879–900.

Manzano, O. and Rigobon, R.: 2003, *Natural Resources and Development: Are They a Curse? Are They Destiny?*, Stanford University Press, chapter Resource Curse or Debt Overhang?

Mason, R. and Swanson, T.: 1996, Long-term liability and the choice of liquidation, *The Geneva Papers on Risk and Insurance* **21**, 204–223.

McGillivray, M.: 1989, The allocation of aid among developing countries: A multidonor analysis using a per capita aid index, *World Development* **17**(4), 561–568.

Morrison, K. M.: 2009, Oil, nontax revenue, and the redistributional foundations of regime stability, *International Organization* **63**(1), 107–138.

Overland, J., Simons, K. and Spagat, M.: 2005, Political instability and growth in dictatorships, *Public Choice* **25**, 445–470.

Rajan, R. G. and Subramanian, A.: 2005, What undermines aid's impact on growth?, *NBER Working Papers* **No 11657**.

Rajan, R. G. and Subramanian, A.: 2011, Aid, dutch disease, and manufacturing growth, *Journal of Development Economics* **94**(1), 106–118.

Roodman, D.: 2011, Fitting fully observed recursive mixed-process models with cmp, *The Stata Journal* **11**, 159–206.

Ross, M.: 2001, Does oil hinder democracy?, *World Politics* **53**, 325–361.

Rust, J.: 1987, Optimal replacement of gmc bus engines: An empirical model of harold zurcher, *Econometrica* **55**, 999–1033.

Rust, J.: 1994, *Handbook of econometrics*, chapter Structural estimation of Markov decision processes.

Sachs, J.: 2007, *Escaping the Resource Curse*, Columbia University Press, chapter How to Handle the Macroeconomics of Oil Wealth.

Sachs, J. and Warner, A.: 1995, Natural resource abundance and economic growth, *NBER working paper* **No 5398**.

Sarr, M., Bulte, E., Meissner, C. and Swanson, T.: 2011, On the looting of nations, *Public Choice* **148**, 353–380.

Sarr, M. and Swanson, T.: 2012, Corruption and the curse: The dictator's choice, *Mimeo* .

Stiglitz, J. E. and Weiss, A.: 1981, Credit rationing in markets with imperfect information, *American Economic Review* **71**(3), 393–410.

Svensson, J.: 1999, Aid, growth and democracy, *Economics and Politics* **11**(3), 275–297.

Svensson, J.: 2000, Foreign aid and rent-seeking, *Journal of International Economics* **51**, 437–461.

# A Appendix: A generalised model of the Dictator's Choice (based on Sarr and Swanson 2012)

## A.1 Autocratic resource-rich states

We are restricting our analysis to states endowed with substantial stocks of natural resources, and led by un-checked autocrats. The states concerned, and thus the autocrats, hold these fixed natural resource stocks as sovereign assets; there are no intermediate entities (corporations, individuals) holding rights to these resources. Once in power, the autocrat has the unchecked authority to mine the resources or to enter into all forms of contracts on behalf of the state in regard to the natural resource assets. These natural resources are sunk assets, but are assumed to be capable of providing a constant stream of revenues into the indefinite future. The autocrat makes all decisions concerning the exploitation of the state's resources, the investment or consumption of their rents, and the financial structure of that resource development.

Consider such an autocratic resource-rich state, with a small open economy producing output $y_t$ according to the function $y_t = f(k_t) + \varphi(Z)$, where $f$ and $\varphi$ are two increasing, concave, and continuously differentiable functions of capital $k_t$ and resources $Z$. $\varphi(Z)$ is the flow of resource rents deriving from the state's sunk resource wealth $Z$. We will assume here that the flow of rents from resources remains constant throughout the program, while the productivity of the economy may be enhanced by means of investment in capital. In this economy, investment in capital is given by $i_t = k_{t+1} - (1-\delta)k_t$, where $i_t$ and $\delta$ represent the current gross investment and the depreciation rate. The capital stock $k_t$ evolves according to the transition equation $k_{t+1} = (1-\delta)k_t + i_t$.

## A.2 External Agencies

External agents (foreign banks, foreign firms, foreign states or international donors) can make liquidity available to the resource-rich states in recognition of expected future flows of value from the resource base. These parties recognise the authority of rulers of autocratic resource-rich states to enter into contracts on behalf of the states in regard to these resources. Any contracts entered into by a ruler continue as obligations of that state beyond the individual tenure of that ruler. These contracts may take the form of either debt or something more like equity (such as concessions or licenses to exploit the natural resources of the state). Hence foreign lenders may offer liquidity to the current leader for purposes of securing future rights of access to flows from the state's natural resources.

These external agencies provide an *immediate* source of liquidity, in contrast to the more standard source of revenue flows deriving from a capital base which relies on production and revenues received over time from these prior investments. This immediate liquidity is available without any production. Thus, the autocrat receives liquidity, $l_t$, in the form of transfers from outside agents at the beginning of each period so that it faces the following budget constraint: $c_t + i_t + rd_t = y_t + l_t$, where $r$ is the interest rate paid on accumulated debt, $d_t$. Only a proportion of liquidity $(1-g)l_t$ adds to the stock of debt. In other words, the proportion $gl_t$ is received as grants or transfers in return for interests other than debt contracts. Hence, the country's stock of debt evolves according to the following transition equation:

$$d_{t+1} = d_t + (1-g)l_t$$

The interest on the debt must be paid each period. So, the cost of servicing the debt (implicit or explicit) $rd_t$ is incurred each period. Other transfers of interests from the autocratic state may give more direct rights in the resources (contracts, concessions). Hence, foreign entities have pre-existing rights to capture the rental flows from $\alpha Z$ of resource stocks, due to outstanding contracts, licenses and concessions. That is, the "collateral" value of the economy for the autocrat is reduced to $(1-\alpha)Z$ by reason of all prior commitments of resources to external agents.

Note that natural resources (more specifically the so-called "point source" resources such as oil and minerals) differ from other forms of capital such as physical infrastructure, hospitals, schools or factories in that they may attract more ready liquefication i.e. flows of current funds. We capture this notion by assuming that the liquidity parameter $\theta_z$ for the natural resource capital

is larger than for other forms of capital, $\theta_k$, i.e., $\theta_z > \theta_k \geq 0$. In short, physical capital is more "sunk" in nature than natural capital.

Liquidity always remains available in the form of secured loans so long as the economy retains positive "collateral value". Outside lenders recognise that adverse selection can result from price-based lending and so limit lending levels instead (Stiglitz and Weiss 1981). Credit rationing here is limited by both the immediate and aggregate flows from the resource base available for repayment (Bulow and Rogoff 1989). This means that, so long as the state is not in default (i.e., prior commitments and debts are serviced), the lenders are willing to provide a maximum amount of aid in any given period in proportion to the total amount of longer term resources still available. The first point indicates that there is a certain proportion of resource-based capital and physical capital that is liquefiable in any given period, i.e., $(1-\alpha)\theta_z Z + \theta_k k_t$ [$l_t \leq (1-\alpha)\theta_z Z + \theta_k k_t$]. The second point captures the idea of a credit ceiling (Eaton and Gersovitz 1981). We assume that the aggregate debt level is limited to the amount serviceable by the present value of the stream of liquidity derivable from all capital stocks.

$$d_{t+1} \leq \frac{(1+r)}{r}\left((1-\alpha)\theta_z Z + \theta_k k_t\right) \tag{6}$$

## A.3 The dictator

The ruler of the state concerned is a dictator in that he has unchecked power over the resource wealth and other assets of the state for the duration of his tenure. His problem is to determine how best to appropriate maximum utility from his period of tenure over these resources. These resources are sunk, so that there is only a fixed proportion of the resources realisable in any given period of his tenure. These flows may then be consumed immediately or invested in the productive capacity of the economy, which makes them available for future consumption. The ruler can affect the length of his tenure by means of investments in societal betterment (shared consumption) and repression, but there remains uncertainty in each period concerning whether the regime will end at that time. With the availability of immediate liquidity from outside agents, the ruler has the option of liquefying some additional proportion of the state's resource wealth in any given period (through the international transfers of some sort), at the cost of either an increase in the state's debt or a transfer of a share of remaining collateral value.

**The dictator's choice.** The above discussion is sufficient for establishing the structure of our autocrat's choice problem, which is built upon the premise that the ruler is pursuing his own agenda after assuming control of the state (Acemoglu et al. 2004). We assume that the self-interested dictator is faced with the problem of maximizing his own life-time utility largely by means of making the decision concerning his optimal length of tenure.

$$\begin{aligned} V(k_t, d_t, \varepsilon_t) \quad = \quad & \max_{\chi_t \in \{stay, loot\}} E_t\left[\sum_{j=0}^{\infty} \beta^j U(k_{t+j}, d_{t+j}, \varepsilon_{t+j}, \chi_{t+j})\right] \\ & \text{s.t. } \chi_t \geq \chi_{t-1} \end{aligned} \tag{7}$$

where $\chi_t$ is the dictator's binary choice between staying ($\chi_t = 0$) and looting ($\chi_t = 1$); and $\varepsilon_t$ is an unobservable state variable for the analyst.[23] Time is discrete and the dictator faces an infinite time horizon.

In each period, the incumbent dictator decides whether to stay in power or to loot the country and leave immediately (Sarr et al. (2011); Sarr and Swanson 2012). The dictator's choice resembles that of the manager of a firm who selects strategically the point in time of the liquidation of a limited liability corporation (Mason and Swanson 1996), but it is occurring at the level of the nation-state. The basic decision comes down to whether to abscond with maximum immediate liquidity available today, or whether to stay and invest in tenure, productivity and repression in order acquire a return from holding control over the productive capacities of the enterprise in the future. If the dictator decides to stay, he captures part of the benefits from production, and then faces the decision regarding looting again in the next period. By staying, the dictator faces the possibility

[23] The state variables $k_t$ and $d_t$ are observable unlike $\varepsilon_t$.

that he will be ousted, and lose everything along with his loss of control. The optimal stopping decision whether to stay one more period or to loot is a recursive discrete choice problem described by the following equation:

$$V(k_t, d_t, \varepsilon_t) = \max_{\chi_t \in \{stay, loot\}} \left[ v^{\chi}(k_t, d_t) + \varepsilon_t(\chi_t) \right] \tag{8}$$

This equation relies on the assumption of additive separability (AS) of the utility function between observed and unobserved state variables. We will also assume that 1) $\varepsilon_t$ follows an extreme value distribution; and 2) $\varepsilon_{t+1}$ and $\varepsilon_t$ are independent conditional on the observed state variables $k_t$ and $d_t$. These assumptions follow Rust 1987 and Rust 1994) and greatly simplify this complex problem.

**The decision to retain control.** Given a decision to stay and maintain control, the dictator will choose current period consumption $c_t$, capital level $k_{t+1}$, debt level $d_{t+1}$ and repression level $s_t$ to secure his rule. He enjoys an instantaneous utility $u(c_t)$ where $u > 0$, $u' > 0$ and $u'' < 0$, and an expected stream of future utilities should he remain in power. He decides the investment level in productive capital each period by choosing $k_{t+1}$ according to the following law of motion:

$$k_{t+1} = f(k_t) + \varphi((1-\alpha)Z) + (1-\delta)k_t - c_t - rd_t + l_t - cost(s_t) \tag{9}$$

where $s_t$ measures the repression level chosen by the dictator (e.g. expenditures on secret services, police and army) and $cost(s_t)$ are the associated costs.

**The risk from retaining control.** Within each period $t$, the dictator experiences the realization of a discrete random variable $\xi_t = \{0, 1\}$, where $\xi_t = 1$ indicates that the dictator is toppled, and $\xi_t = 0$ indicates that the dictator remains in power. We assume that the realization of the shock depends both on the choice of next period's capital stock and repression level. This specification captures the idea that both consumption-sharing and repression are strategies for maintaining control over the economy. Let $\rho(k_{t+1}, s_t) = \rho(\xi_t = 1 \mid k_{t+1}, s_t)$ denote the probability of the dictator being deposed next period given that he was in power this period; $\rho(k_{t+1}, s_t)$ is assumed to be strictly decreasing and strictly convex in both arguments - see Overland et al. (2005) for a similar idea. That is, increased $k_{t+1}$ and $s_t$ decrease the probability of being toppled at a decreasing rate. The idea here is that the dictator may invest in repression to secure his tenure and may also attempt to buy peace by sharing some of the output with the population ($k_{t+1}$). This dilemma has also been analysed by Azam (1995).

The recursive problem faced by the dictator does not depend on time *per se*, so that the programme is written as:

$$v^{stay}(k, d) = \max_{c, k', d', s \in \Gamma(k,d)} \left(1 - \rho(k', s)\right) \left[ u(c) + \beta E_{\varepsilon'} V(k', d') \right] \tag{10}$$

$$\text{s.t. } \Gamma(k, d) = \begin{cases} k' = f(k) + \varphi\left((1-\alpha)Z\right) + (1-\delta)k - c - \left(\dfrac{1}{1-g} + r\right) d + \dfrac{d'}{1-g} - cost(s) \\ d' = d + (1-g)l \\ d' \leq \dfrac{(1+r)}{r}\left((1-\alpha)\theta_z Z + \theta_k k\right) \\ l \leq (1-\alpha)\theta_z Z + \theta_k k \\ c \geq 0;\ s \geq 0 \\ k \geq 0;\ d \geq 0; \\ k(0) = k_0;\ d(0) = d_0 \end{cases} \tag{11}$$

where $\beta$ is the discount factor, and $k'$, $d'$, and $\varepsilon'$ represent next period's state variables.

**The Decision to Exit.** The dictator also has the choice to loot the economy's riches and exit. Conditional on looting, the dictator leaves with the maximum loan amount he can contract, i.e. the share of non-sunk capital $\theta_z(1-\alpha)Z + \theta_k k$ representing the current value of the liquefied natural and physical capital assets. It is assumed that the dictator absconds with

this maximum amount of liquidity, without making any effort at retaining power, paying debts or investing in the economy. On departure, he invests the looted sum to live off a constant flow of consumption $c^{exit}$. The value of looting is then given by:

$$v^{exit}(k,d) = \frac{u(c^{exit})}{1-\beta} \quad \text{where } c^{exit} = \frac{rW_0}{1+r} = \frac{r}{1+r}\left((1-\alpha)\theta_z Z + \theta_k k\right) \tag{12}$$

Figure 1 illustrates the dictator's decision tree.

The dictator compares the returns from the two distinct options and chooses the strategy with the highest pay-off. Hence, the optimal solution solves:

$$\chi^*(k,d,\varepsilon) = argmax\left[v^{stay}(k,d) + \varepsilon(0),\ v^{exit}(k,d) + \varepsilon(1)\right] \tag{13}$$

where the value of staying $v^{stay}(k,d)$ and the value of exiting $v^{exit}(k,d)$ are defined above. This amounts to an optimal stopping problem, where the decision to exit is an absorbing state. We have discussed the nature of the solutions to the "Dictator's Choice" problem elsewhere. (Sarr and Swanson 2012)

## A.4 Implications of the Dictators Choice Model

We demonstrated in our earlier analysis that the factors determining the dictator's choice between staying and looting are likely to be as follows:

a) the degree of liquidity proferred to the dictator in any given time period ($l$);

b) the amount of debt ($d$) and share of the economy ($\alpha$) under control of external agents;

c) the returns on domestic investments relative to the returns on funds deposited elsewhere ($f'(k)$ and $r$); and

d) the likelihood of a coup or other event that would remove resource rights from the autocract ($\rho$).

In essence, in the Dictator's Choice model, an autocrat sits at the cusp of a dilemma - choosing between looting the proferred liquidity (and the lower returns available on its investment elsewhere) or staying and consuming the returns from the natural resources through the domestic economy. The additional element that focuses the mind of the autocrat is the likelihood of a coup that would result in the immediate termination of the dictator's choice. The greater the amount of liquidity on offer in a given period, the more difficult it is for the dictator to resist the temptation to "loot and run".

Given the minor modifications made here to our previous model, the trade-offs faced by the dictator will be the same as in Sarr and Swanson (2012), and will hold irrespective of the external source of the liquidity (bank, firm, state or other donor). That is, the supply of liquidity from any source (whether it is commercial bank loans or inter-governmental transfers) should enhance the likelihood of looting in resource rich autocracies. In particular, we would anticipate that inter-governmental aid transfers would have much the same effect as commercial lending, i.e. increased instability and reduced growth. In the remainder of this paper we investigate the empirical basis for these claims.

Figure 1: Dictator's decision tree

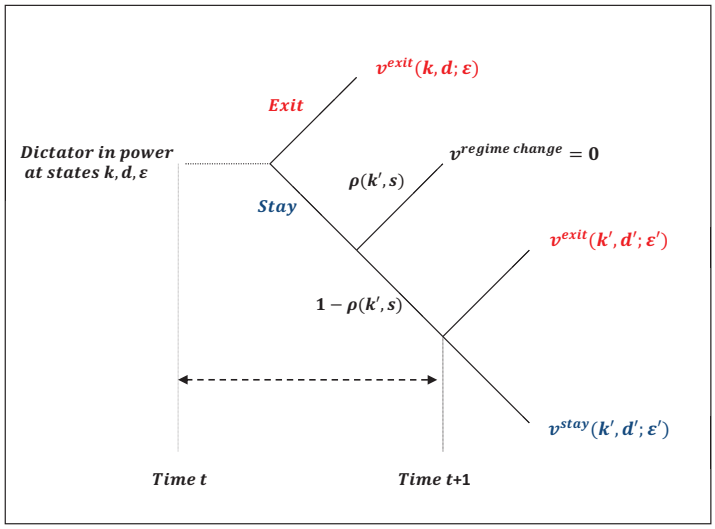


Table 1: Definitions of Variables and Source

| Variables | Definition | Data Source |
|---|---|---|
| Loot (Irregular departure) | The leader departed in manner other than that established by explicit rules or conventions, including coup d'etat, assassination, intervention by a foreign power, self-imposed exile or imprisonment. | Archigos 2009 |
| Resource Rent (% GDP) | Quantity $*$ (Commodity price $-$ Unit extraction cost)$/GDP$ | World Bank, Environment Dept |
| Resource Stock (% GDP) | Ratio of the stock of resource over GDP | World Bank, Environment Dept |
| Foreign Aid | Aid commitments as % of GNI | OECD-DAC |
| Total Debt Service (% GNI) | Ratio of debt service over GNI | Global Development Finance 2006 |
| Real per capita GDP (log) | Real per capita GDP (PPP-adjusted) | Penn World Tables 6.2 |
| Real per capita GDP Growth (%) | Real per capita GDP Growth (PPP-adjusted) | Penn World Tables 6.2 |
| Inflation (%) | Annual consumer price index | World Development Indicator 2006 |
| Population Growth (%) | Population Growth | Calculation from WDI 2006 |
| Average Years of Schooling | Years of Schooling | Barro-Lee 2000 |
| Investment (% GDP) | Investment share of real GDP | Penn World Tables 6.2 |
| Trade (% GDP) | Export+Import over real GDP | Penn World Tables 6.2 |
| Tenure | Leaders' length of tenure in years | Bueno de Mesquita, et al. 2003 |
| Riots | Violent demo./clash of 100+ citizens involving physical force | Banks 2001 |

Years of schooling has a 5-year frequency. Each data point is applied on a yearly basis in the 4 preceding years.

Table 2: Growth and Political Instability: Impact of Sectoral ODA (Commitments) – Fixed Effects

| | (1) Total Aid | (2) Infrastructure Aid | (3) Production Aid | (4) Programme Assistance Aid | (5) Humanitarian Aid | (6) Multi-sector Aid |
|---|---|---|---|---|---|---|
| **Panel A: Growth Equation** | | | | | | |
| Irregular exit (Leader's loot) | -4.374*** | -4.858*** | -4.817*** | -5.061*** | -2.411 | -5.208*** |
| | (1.565) | (1.390) | (1.546) | (1.610) | (1.849) | (1.534) |
| Lag resource rent(% GDP) | 0.00130 | 0.00244 | 0.000197 | 0.0000213 | 0.00204 | 0.000712 |
| | (0.0516) | (0.0516) | (0.0516) | (0.0519) | (0.0515) | (0.0507) |
| Lag real per capita GDP | -7.032*** | -7.146*** | -7.103*** | -7.080*** | -6.911*** | -7.099*** |
| | (1.332) | (1.334) | (1.326) | (1.321) | (1.326) | (1.313) |
| Average years of schooling | 1.273** | 1.305** | 1.264** | 1.259** | 1.232** | 1.341** |
| | (0.532) | (0.534) | (0.530) | (0.529) | (0.527) | (0.542) |
| Inflation | -0.00125*** | -0.00125*** | -0.00124*** | -0.00124*** | -0.00124*** | -0.00122*** |
| | (0.000326) | (0.000316) | (0.000313) | (0.000311) | (0.000343) | (0.000301) |
| Investment (% GDP) | 0.157* | 0.155* | 0.154* | 0.155* | 0.153* | 0.148* |
| | (0.0857) | (0.0863) | (0.0864) | (0.0866) | (0.0852) | (0.0837) |
| Trade (%GDP) | -0.0106 | -0.0110 | -0.0109 | -0.0107 | -0.0109 | -0.0105 |
| | (0.0145) | (0.0145) | (0.0145) | (0.0145) | (0.0145) | (0.0144) |
| **Panel B: Political Instability Equation** | | | | | | |
| Resource stock (% GDP) | 0.000117 | 0.000112 | 0.000295 | 0.000282 | -0.000415 | -0.000177 |
| | (0.000244) | (0.000351) | (0.000350) | (0.000346) | (0.000736) | (0.000295) |
| Aid sector (% GNI) | -0.0682*** | -0.277** | -0.295* | -0.0685 | -0.00945 | -0.711 |
| | (0.0207) | (0.138) | (0.168) | (0.0532) | (0.0514) | (0.458) |
| Resource stock×Aid sector | 0.000256*** | 0.000703** | 0.00140*** | 0.000503*** | -0.00224 | 0.00117 |
| | (0.0000714) | (0.000310) | (0.000538) | (0.000168) | (0.00390) | (0.00190) |
| Lag real per capita GDP | -0.536*** | -0.376** | -0.465*** | -0.368** | -0.376* | -0.435*** |
| | (0.135) | (0.148) | (0.149) | (0.149) | (0.204) | (0.158) |
| Leader's tenure | -0.0149 | -0.0273** | -0.0274** | -0.0273** | -0.00983 | -0.0306** |
| | (0.0123) | (0.0129) | (0.0129) | (0.0123) | (0.0121) | (0.0139) |
| Riots | 0.165*** | 0.155*** | 0.149*** | 0.158*** | 0.185*** | 0.169*** |
| | (0.0399) | (0.0517) | (0.0497) | (0.0476) | (0.0522) | (0.0594) |
| Observations | 1283 | 1245 | 1254 | 1260 | 1140 | 1186 |
| Number of Countries | 67 | 67 | 67 | 67 | 67 | 67 |
| Log Pseudo-Likelihood | -3274.6 | -3251.5 | -3268.3 | -3274.5 | -3218.2 | -3206.3 |
| Error terms Correlation | 0.2392 | 0.3446* | 0.3111 | 0.3373* | -0.07489 | 0.5111* |
| | (0.1858) | (0.1802) | (0.1855) | (0.1886) | (0.2385) | (0.2245) |

Standard errors in parentheses clustered at at country level. $^{*}$ $p < 0.10$ , $^{**}$ $p < 0.05$ , $^{***}$ $p < 0.01$ .

Dependent variables: GDP growth in Panel A (outcome equation) and Instability in Panel B (treatment equation).

All Growth equations control for time dummies. Country fixed effects controlled for in all the growth regressions.

The probit equation controls only for regional dummies: country fixed effects produce inconsistent estimates in a standard probit model due to the incidental parameters problem.

Table 3: Effect of total aid on growth with Fixed effects

| | Growth | Growth |
|---|---|---|
| Effect of lending on growth | (1) | (2) |
| Coefficient loot | -4.374*** | -4.374*** |
| | | |
| Pr(loot=1—Mean total aid, other controls) | 0.046 | 0.149 |
| Pr(loot=1—Mean total aid+std dev, other controls) | 0.035 | 0.353 |
| Increase in probability of loot | -0.011** | 0.204** |
| | | |
| Total | +0.05 | -0.89 |

In Column (1) all variables are set at their mean level (average country). Note mean resource levels is 166% GDP.
In Column (2) all variables are set at their mean level (average country) except for resource levels,
which are set as in Nigeria in the year 1998 at the end of Abacha's dictatorship (750% of GDP)
We test whether the partial effect of lending on the probability of looting is different from 0.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Growth and Political Instability: Impact of Sectoral ODA (Commitments)–Regional dummies

| | (1) Total Aid | (2) Infrastructure Aid | (3) Production Aid | (4) Programme Assistance Aid | (5) Humanitarian Aid | (6) Multi-sector Aid |
|---|---|---|---|---|---|---|
| **Growth Equation** | | | | | | |
| Irregular exit (Leader's loot) | -3.942** | -4.506*** | -4.567*** | -4.830*** | -1.682 | -4.604*** |
| | (1.540) | (1.405) | (1.586) | (1.601) | (1.593) | (1.540) |
| Lag resource rent(% GDP) | -0.0358 | -0.0347 | -0.0344 | -0.0347 | -0.0384 | -0.0343 |
| | (0.0285) | (0.0285) | (0.0284) | (0.0282) | (0.0289) | (0.0286) |
| Lag real per capita GDP | -1.323** | -1.347** | -1.351** | -1.351** | -1.210** | -1.344** |
| | (0.596) | (0.587) | (0.597) | (0.590) | (0.596) | (0.584) |
| Average years of schooling | 0.367 | 0.373* | 0.370* | 0.367* | 0.337 | 0.379* |
| | (0.225) | (0.223) | (0.223) | (0.222) | (0.222) | (0.221) |
| Inflation | -0.00139*** | -0.00137*** | -0.00136*** | -0.00136*** | -0.00141*** | -0.00136*** |
| | (0.000425) | (0.000399) | (0.000393) | (0.000391) | (0.000453) | (0.000393) |
| Investment (% GDP) | 0.0889 | 0.0904 | 0.0907 | 0.0908 | 0.0865 | 0.0861 |
| | (0.0599) | (0.0594) | (0.0594) | (0.0592) | (0.0592) | (0.0585) |
| Trade (%GDP) | 0.000121 | -0.000284 | -0.000254 | -0.000233 | 0.000386 | 0.0000179 |
| | (0.00525) | (0.00517) | (0.00518) | (0.00520) | (0.00528) | (0.00518) |
| **Panel B: Political Instability Equation** | | | | | | |
| Resource stock (% GDP) | 0.000107 | 0.000131 | 0.000303 | 0.000284 | -0.000423 | -0.0000899 |
| | (0.000245) | (0.000349) | (0.000354) | (0.000357) | (0.000747) | (0.000324) |
| Lag Aid (by sector in % GNI) | -0.0704*** | -0.285** | -0.302* | -0.0725 | -0.00862 | -0.759 |
| | (0.0214) | (0.140) | (0.175) | (0.0555) | (0.0511) | (0.483) |
| Resource stock×Lag Aid | 0.000263*** | 0.000716** | 0.00144*** | 0.000513*** | -0.00286 | 0.00117 |
| | (0.0000735) | (0.000311) | (0.000552) | (0.000178) | (0.00528) | (0.00192) |
| Lag real per capita GDP | -0.539*** | -0.380*** | -0.465*** | -0.366** | -0.383* | -0.431*** |
| | (0.132) | (0.144) | (0.145) | (0.144) | (0.205) | (0.157) |
| Leader's tenure | -0.0139 | -0.0255** | -0.0259** | -0.0255** | -0.0105 | -0.0272* |
| | (0.0123) | (0.0127) | (0.0129) | (0.0124) | (0.0121) | (0.0142) |
| Riots | 0.166*** | 0.155*** | 0.151*** | 0.160*** | 0.182*** | 0.166*** |
| | (0.0411) | (0.0531) | (0.0523) | (0.0503) | (0.0514) | (0.0613) |
| Observations | 1283 | 1245 | 1254 | 1260 | 1140 | 1186 |
| Number of Countries | 67 | 67 | 67 | 67 | 67 | 67 |
| Log Pseudo-Likelihood | -3351.4 | -3328.7 | -3345.2 | -3351.2 | -3294.3 | -3284.2 |
| Error terms Correlation | 0.2069 | 0.3143 | 0.2963 | 0.3223* | -0.1456 | 0.4283 |
| | (0.1821) | (0.1883) | (0.1913) | (0.1828) | (0.1761) | (0.2366) |

Standard errors in parentheses clustered at at country level. $^{*}$ $p < 0.10$ , $^{**}$ $p < 0.05$ , $^{***}$ $p < 0.01$

Dependent variables: GDP growth in Panel A (outcome equation) and Instability in Panel B (treatment equation).

All Growth equations control for time dummies. The equations in both panels controlled for regional dummies.

Figure 2: Marginal Effect of Total Aid on Looting

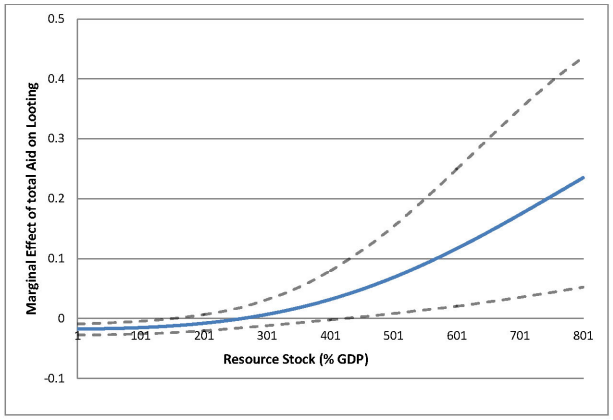



Figure 3: Marginal Effect of Infrastructure on Looting

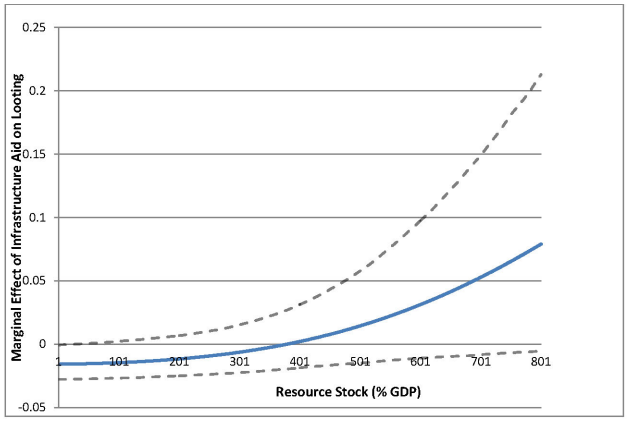



Figure 4: Marginal Effect of Production Aid on Looting

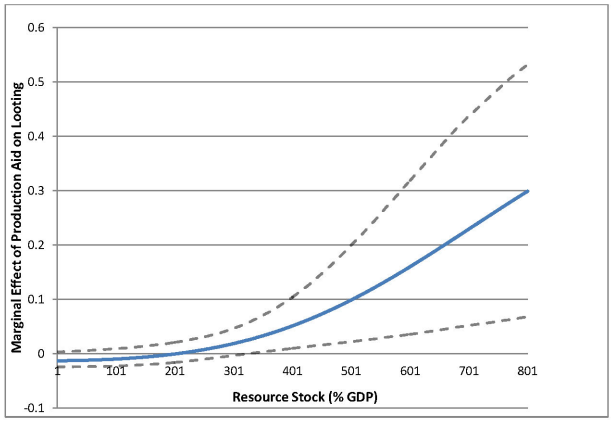
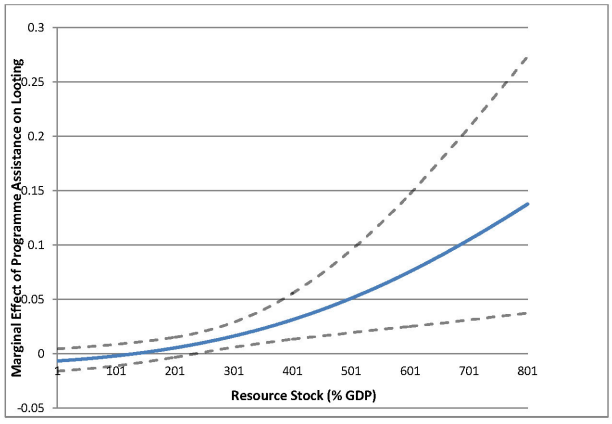



Figure 5: Marginal Effect of Program Assistance on Looting




The full line represents the marginal effect of lending on the probability of looting as the resource stock increases from 0 to 800% of GDP. The dotted lines represent the confidence interval at 5% level. These graphs relate to the baseline regressions performed in Table 2.

Table 5: Growth and Political Instability: Impact of ODA Grants and Loans (**Commitments**)

| | (1) Grants (FE) | (2) Loans (FE) | (3) Grants | (4) Loans |
|---|---|---|---|---|
| **Panel A: Growth Equation** | | | | |
| Irregular exit (Leader's loot) | -5.593*** | -4.931*** | -5.231*** | -4.649*** |
| | (2.038) | (1.642) | (1.998) | (1.597) |
| Lag resource rent(% GDP) | -0.000973 | 0.00160 | -0.0347 | -0.0350 |
| | (0.0523) | (0.0517) | (0.0281) | (0.0282) |
| Lag real per capita GDP | -7.087*** | -7.076*** | -1.353** | -1.332** |
| | (1.338) | (1.334) | (0.599) | (0.592) |
| Average years of schooling | 1.255** | 1.235** | 0.366 | 0.357 |
| | (0.533) | (0.531) | (0.225) | (0.221) |
| Inflation | -0.00128*** | -0.00126*** | -0.00141*** | -0.00138*** |
| | (0.000324) | (0.000321) | (0.000421) | (0.000409) |
| Investment (% GDP) | 0.153* | 0.153* | 0.0877 | 0.0893 |
| | (0.0845) | (0.0861) | (0.0590) | (0.0590) |
| Trade (%GDP) | -0.0101 | -0.0104 | 0.000181 | -0.0000783 |
| | (0.0144) | (0.0145) | (0.00523) | (0.00518) |
| **Panel B: Political Instability Equation** | | | | |
| Resource stock (% GDP) | 0.000176 | 0.000143 | 0.000179 | 0.000146 |
| | (0.000326) | (0.000371) | (0.000321) | (0.000378) |
| Lag Grants Commitment (% GNI) | -0.0220 | | -0.0241 | |
| | (0.0158) | | (0.0161) | |
| Resource stock×Lag Grants Commitment | 0.000206*** | | 0.000207*** | |
| | (0.0000644) | | (0.0000617) | |
| Lag Loans Commitment (% GNI) | | -0.0609 | | -0.0596 |
| | | (0.0441) | | (0.0441) |
| Resource stock×Lag Loans Commitment | | 0.000278*** | | 0.000286*** |
| | | (0.0000809) | | (0.0000831) |
| Lag real per capita GDP | -0.342*** | -0.354*** | -0.339*** | -0.349*** |
| | (0.128) | (0.127) | (0.126) | (0.125) |
| Leader's tenure | -0.0168 | -0.0188 | -0.0152 | -0.0171 |
| | (0.0104) | (0.0119) | (0.0108) | (0.0120) |
| Riots | 0.151*** | 0.145*** | 0.154*** | 0.147*** |
| | (0.0371) | (0.0403) | (0.0386) | (0.0418) |
| Country fixed effects | Yes | Yes | No | No |
| Regional Dummies | No | No | Yes | Yes |
| Observations | 1357 | 1278 | 1357 | 1278 |
| Number of Countries | 71 | 70 | 71 | 70 |
| Log Pseudo-Likelihood | -3313.9 | -3270.6 | -3390.8 | -3347.3 |
| Error terms Correlation | 0.3489* | 0.3079 | 0.3188 | 0.2891 |
| | (0.1998) | (0.1944) | (0.1924) | (0.1835) |

Standard errors in parentheses clustered at at country level. * $p < 0.10$ , ** $p < 0.05$ , *** $p < 0.01$

Dependent variables: GDP growth in Panel A (outcome equation) and Instability in Panel B (treatment equation).

All Growth equations control for time dummies. Country fixed effects controlled for in the growth regressions of Column (1) and (2).

The probit equation controls only for regional dummies: country fixed effects produce inconsistent estimates in a standard probit model due to the incidental parameters problem.

Figure 6: Marginal Effect of Grants on Looting

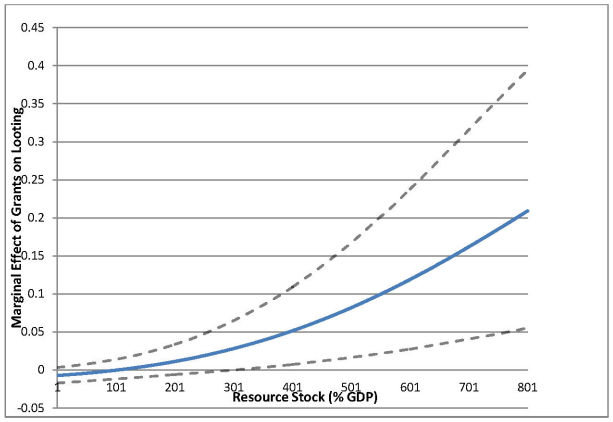
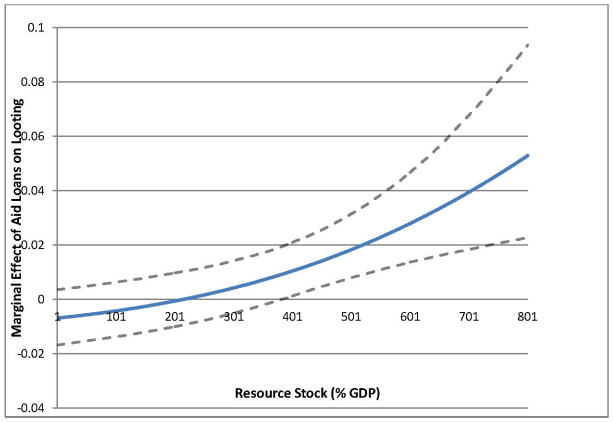



Figure 7: Marginal Effect of Loans Aid on Looting




The full line represents the marginal effect of lending on the probability of looting as the resource stock increases from 0 to 800% of GDP. The dotted lines represent the confidence interval at 5% level. These graphs relate to the baseline regressions performed in Column (1) and (2) of Table 5.

Table 6: Growth and Political Instability: Impact of ODA Grants and Loans (**Disbursements**)

| | (1) Grants (FE) | (2) Loans (FE) | (3) Grants | (4) Loans |
|---|---|---|---|---|
| **Panel A: Growth Equation** | | | | |
| Irregular exit (Leader's loot) | -5.834*** | -5.048*** | -5.439*** | -4.631** |
| | (2.009) | (1.960) | (1.991) | (1.878) |
| Lag resource rent(% GDP) | -0.00159 | 0.000613 | -0.0340 | -0.0350 |
| | (0.0524) | (0.0518) | (0.0279) | (0.0282) |
| Lag real per capita GDP | -7.086*** | -7.088*** | -1.363** | -1.340** |
| | (1.336) | (1.345) | (0.594) | (0.603) |
| Average years of schooling | 1.248** | 1.244** | 0.367* | 0.360 |
| | (0.532) | (0.532) | (0.223) | (0.224) |
| Inflation | -0.00129*** | -0.00127*** | -0.00141*** | -0.00140*** |
| | (0.000323) | (0.000324) | (0.000419) | (0.000423) |
| Investment (% GDP) | 0.152* | 0.153* | 0.0875 | 0.0873 |
| | (0.0845) | (0.0850) | (0.0589) | (0.0594) |
| Trade (%GDP) | -0.00999 | -0.0102 | 0.000200 | 0.000210 |
| | (0.0144) | (0.0145) | (0.00524) | (0.00525) |
| **Panel B: Political Instability Equation** | | | | |
| Resource stock (% GDP) | 0.000369 | 0.000333 | 0.000367 | 0.000307 |
| | (0.000375) | (0.000324) | (0.000372) | (0.000322) |
| Grant disbursements | 0.0157 | | 0.0140 | |
| | (0.0151) | | (0.0155) | |
| Interaction Grant x NR | 0.000183** | | 0.000189** | |
| | (0.0000767) | | (0.0000778) | |
| Loan disbursements | | -0.0907 | | -0.0952 |
| | | (0.0709) | | (0.0710) |
| Interaction Loan x NR | | 0.000404** | | 0.000466** |
| | | (0.000199) | | (0.000207) |
| Lag real per capita GDP | -0.278** | -0.377*** | -0.276** | -0.371*** |
| | (0.122) | (0.121) | (0.122) | (0.120) |
| Leader's tenure | -0.0118 | -0.0171 | -0.00978 | -0.0158 |
| | (0.0108) | (0.0111) | (0.0111) | (0.0114) |
| Riots | 0.145*** | 0.160*** | 0.148*** | 0.163*** |
| | (0.0351) | (0.0386) | (0.0366) | (0.0398) |
| Country fixed effects | Yes | Yes | No | No |
| Regional Dummies | No | No | Yes | Yes |
| Observations | 1365 | 1312 | 1365 | 1312 |
| Number of Countries | 71 | 70 | 71 | 70 |
| Log Pseudo-Likelihood | -3313.6 | -3298.2 | -3390.6 | -3375.1 |
| Error terms Correlation | 0.3733* | 0.2896 | 0.3362* | 0.2569 |
| | (0.1916) | (0.2029) | (0.1872) | (0.1906) |

Standard errors in parentheses clustered at at country level. $^{*}\ p < 0.10$ , $^{**}\ p < 0.05$ , $^{***}\ p < 0.01$

Dependent variables: GDP growth in Panel A (outcome equation) and Instability in Panel B (treatment equation).

All Growth equations control for time dummies. Country fixed effects controlled for in the growth regressions of Column (1) and (2).

The probit equation controls only for regional dummies: country fixed effects produce inconsistent estimates in a standard probit model due to the incidental parameters problem.

Table 7: Growth and Political Instability with endogenous sectoral ODA (Commitments)

| | (1) Total Aid | (2) Infrastructure Aid | (3) Production Aid | (4) Programme Assistance Aid | (5) Humanitarian Aid | (6) Multi-sector Aid |
|---|---|---|---|---|---|---|
| **Panel A: Growth Equation** | | | | | | |
| Irregular exit (Leader's loot) | -4.396*** | -4.704*** | -4.741*** | -4.981*** | -2.422 | -5.195*** |
| | (1.563) | (1.379) | (1.536) | (1.582) | (1.839) | (1.534) |
| Lag resource rent (% GDP) | 0.00294 | 0.00228 | 0.000193 | 0.000288 | 0.00196 | 0.000596 |
| | (0.0516) | (0.0510) | (0.0515) | (0.0527) | (0.0516) | (0.0505) |
| Lag real per capita GDP | -7.011*** | -7.151*** | -7.154*** | -6.964*** | -6.912*** | -7.112*** |
| | (1.323) | (1.328) | (1.310) | (1.306) | (1.324) | (1.308) |
| Average years of schooling | 1.273** | 1.281** | 1.285** | 1.237** | 1.234** | 1.343** |
| | (0.527) | (0.531) | (0.518) | (0.532) | (0.529) | (0.538) |
| Inflation | -0.00125*** | -0.00124*** | -0.00124*** | -0.00124*** | -0.00124*** | -0.00121*** |
| | (0.000321) | (0.000321) | (0.000316) | (0.000317) | (0.000343) | (0.000301) |
| Investment (% GDP) | 0.156* | 0.156* | 0.158* | 0.157* | 0.153* | 0.149* |
| | (0.0856) | (0.0853) | (0.0859) | (0.0866) | (0.0853) | (0.0837) |
| Trade (% GDP) | -0.0105 | -0.0115 | -0.0115 | -0.0107 | -0.0109 | -0.0106 |
| | (0.0143) | (0.0144) | (0.0147) | (0.0146) | (0.0145) | (0.0144) |
| **Panel B: Political Instability Equation** | | | | | | |
| Resource stock (% GDP) | 0.0000652 | -0.000191 | 0.000299 | 0.000209 | -0.000379 | -0.000225 |
| | (0.000275) | (0.000377) | (0.000394) | (0.000354) | (0.000706) | (0.000352) |
| Lag aid (by sector as % GNI) | -0.0781*** | -0.729*** | -0.296 | -0.264 | 0.138 | -0.925 |
| | (0.0288) | (0.228) | (0.215) | (0.194) | (0.254) | (0.820) |
| Resource stock×Lag Aid | 0.000257*** | 0.000485* | 0.00139** | 0.000479*** | -0.00183 | 0.00116 |
| | (0.0000675) | (0.000301) | (0.000545) | (0.000165) | (0.00282) | (0.00188) |
| Lag real per capita GDP | -0.554*** | -0.478*** | -0.466*** | -0.439*** | -0.332 | -0.458** |
| | (0.139) | (0.145) | (0.163) | (0.165) | (0.233) | (0.190) |
| Leader's tenure | -0.0146 | -0.0175 | -0.0274** | -0.0251** | -0.0103 | -0.0301** |
| | (0.0123) | (0.0130) | (0.0129) | (0.0122) | (0.0121) | (0.0138) |
| Riots | 0.162*** | 0.122** | 0.148*** | 0.156*** | 0.183*** | 0.168*** |
| | (0.0399) | (0.0560) | (0.0499) | (0.0481) | (0.0497) | (0.0611) |
| **Panel C: Aid Equation** | | | | | | |
| Lag real per capita GDP | -5.774*** | -0.189 | -0.247 | -0.519*** | -0.248* | -0.0914*** |
| | (1.009) | (0.311) | (0.158) | (0.162) | (0.149) | (0.0281) |
| Lag Resource stock | -0.00541** | 0.00111 | -0.000515 | -0.000524 | -0.000219 | -0.000257** |
| | (0.00247) | (0.000743) | (0.000343) | (0.000510) | (0.000251) | (0.000118) |
| Lag debt service (% GNI) | 0.170*** | 0.00671 | 0.0150** | 0.0662*** | 0.000136 | 0.00318 |
| | (0.0414) | (0.00763) | (0.00747) | (0.0230) | (0.00548) | (0.00335) |
| Former French Colony | 2.518*** | 0.456*** | 0.597*** | -0.852 | -0.868*** | -0.196 |
| | (0.551) | (0.147) | (0.138) | (0.580) | (0.274) | (0.169) |
| Former British Colony | 0.820** | 0.734*** | 0.294** | -0.267 | -0.769*** | -0.160 |
| | (0.388) | (0.0998) | (0.135) | (0.545) | (0.258) | (0.156) |
| Observations | 1295 | 1257 | 1266 | 1269 | 1148 | 1197 |
| Number of Countries | 67 | 67 | 67 | 67 | 67 | 67 |
| Log Pseudo-Likelihood | -5794.4 | -4368.7 | -4345.7 | -4888.4 | -4092.9 | -3614.4 |
| Correlation (Growth,Instability) | 0.2367 | 0.3041* | 0.3039 | 0.3229* | -0.0724 | 0.5082* |
| Correlation (Growth,Aid) | -0.0396 | 0.0730* | 0.0466 | 0.0432 | 0.0040 | 0.0123 |
| Correlation(Instability,Aid) | 0.0748 | 0.6071* | 0.0085 | 0.3102 | -0.1597 | 0.0985 |

Standard errors in parentheses clustered at at country level. * $p < 0.10$ , ** $p < 0.05$ , *** $p < 0.01$ .

Dependent variables: GDP growth in Panel A, Instability in Panel B and Aid in Panel C.

All Growth equations control for time dummies. Country fixed effects controlled for in all the Growth and Aid regressions.

The probit equations control only for regional dummies: country fixed effects produce inconsistent estimates in a standard probit model due to the incidental parameters problem.

Table 8: Growth and Political Instability with endogenous ODA Grants and Loans (Commitments)

| | (1) Grants | (2) Loans |
|---|---|---|
| **Panel A: Growth Equation** | | |
| Irregular exit (Leader's loot) | -5.610*** | -4.896*** |
| | (2.017) | (1.620) |
| Lag resource rent (% GDP) | -0.000485 | 0.00351 |
| | (0.0523) | (0.0514) |
| Lag real per capita GDP | -7.069*** | -7.169*** |
| | (1.334) | (1.324) |
| Average years of schooling | 1.229** | 1.225** |
| | (0.535) | (0.531) |
| Inflation | -0.00128*** | -0.00128*** |
| | (0.000319) | (0.000330) |
| Investment (% GDP) | 0.151* | 0.153* |
| | (0.0844) | (0.0862) |
| Trade (% GDP) | -0.00998 | -0.0106 |
| | (0.0144) | (0.0146) |
| **Panel B: Political Instability Equation** | | |
| Resource stock (% GDP) | 0.000190 | 0.000137 |
| | (0.000336) | (0.000404) |
| Lag aid (% GNI) | -0.0163 | -0.103 |
| | (0.0211) | (0.113) |
| Resource stock×Lag aid | 0.000213*** | 0.000263*** |
| | (0.0000641) | (0.0000776) |
| Lag real per capita GDP | -0.327** | -0.369*** |
| | (0.130) | (0.129) |
| Leader's tenure | -0.0170 | -0.0183 |
| | (0.0104) | (0.0123) |
| Riots | 0.152*** | 0.142*** |
| | (0.0375) | (0.0417) |
| **Panel C: Aid Equation** | | |
| Lag real per capita GDP | -4.611*** | -1.455** |
| | (1.205) | (0.568) |
| Lag Resource stock | -0.00491* | 0.00139* |
| | (0.00262) | (0.000832) |
| Lag debt service (% GNI) | 0.109*** | 0.0704** |
| | (0.0349) | (0.0289) |
| Former French Colony | -1.256 | 0.232 |
| | (0.921) | (0.438) |
| Former British Colony | 0.931*** | -0.451* |
| | (0.303) | (0.271) |
| Observations | 1381 | 1296 |
| Number of Countries | 72 | 71 |
| Log Pseudo-Likelihood | -5933.2 | -5078.7 |
| Correlation (Growth,Instability) | 0.3485* | 0.3080 |
| Correlation (Growth,Aid) | -0.0430 | 0.0751 ** |
| Correlation (Instability,Aid) | -0.0598 | 0.1138 |

Standard errors in parentheses clustered at at country level. * $p < 0.10$ , ** $p < 0.05$ , *** $p < 0.01$ .

Dependent variables: GDP growth in Panel A, Instability in Panel B and Aid in Panel C.

All Growth equations control for time dummies. Country fixed effects controlled for in all the Growth and Aid regressions. The probit equations control only for regional dummies: country fixed effects produce inconsistent estimates in a standard probit model due to the incidental parameters problem.