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The Importance of Oil in the Allocation of Foreign Aid: The case of the G7 donors☆

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Abstract

While it is often alleged that oil endowment might influence the destination of foreign aid, there is lack of empirical evidence of how and why such an effect may come into play, and even less so of the channels through which it works. This paper aims to bring evidence that contributes to address those points. Specifically, we investigate the role of oil in aid allocation of the G7 donors, over the 1980-2010 period. Results show that, unsurprisingly, aid allocated by these donors increases significantly with oil endowment of recipient countries. Looking more deeply, we interestingly show that their strategic interests in terms of oil security play a role in their provision of aid. More importantly, we find evidence for competition for access to oil supplies among this group of donors.

Keywords: aid allocation, G7 donors, oil competition, spatial lag model
JEL Classification: F35, Q35, C31

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1. Introduction

Over the last two decades, global oil consumption has increased significantly and this trend has gone hand in hand with a sharp rise in oil prices (Barsky and Kilian, 2004; Hamilton, 2009). As part of this price boom, profits in the extractive industry have risen. According to UNCTAD (2007), the surge in the demand for oil, the high oil prices and the increase in profits have led to a substantial increase in the exploration and production of oil around the world.

This renewed growth has brought development issues related to the extraction of natural resources back into focus, including the role of foreign aid in this process. Indeed, during the past two decades, the foreign aid area has also evolved in several respects, with a change in the motive of aid allocation and the distribution of such aid among donor and recipient countries. New countries have begun to emerge in the donor field with a strategic resource motive in their aid allocation determinants. An example of this is the major role played by China in aid allocation towards sub-Saharan African countries (Dreher and Fuchs, 2011, Kafayat et al., 2016). As a result, several studies have highlighted that oil-rich developing countries now account for a noticeable share of foreign aid (Lee, 2012; Arezki and Banerjee, 2014).

Although this issue has begun to be examined by addressing the increasing strategic resource motive of non-traditional donors as China (Dreher and Fuchs, 2011, Kafayat et al., 2016), there remains some paucity in studies that provide empirical evidence that specifically addresses the importance of oil in aid allocation from traditional Western donors. Indeed, apart from some exceptions (Dreher and Fuchs, 2011; Lee, 2012; Arezki and Banerjee, 2014), the strategic role of oil in aid allocation provided by Western countries is found to be absent. Moreover this literature has mainly focused on the importance of oil endowment in the aid – oil nexus, without explicitly addressing the strategic resource motive of traditional Western donors.

However, given that energy security has been recently in the forefront of foreign policy concerns, there are substantial grounds for believing that Western donors also use aid to cover their energy security interests. In the light of this, their aid allocation in favor of oil producing countries can be considered as a central part of their foreign energy policy since oil remains a strategic good for most Western donor countries, whose economies still heavily rely on oil imports (International Energy Agency, 2014).

The aim of this paper is then to provide evidence of the influence of oil on the aid policy in the major OECD donors (G7 countries). In particular, we assess empirically the importance of oil endowment of recipient countries in the foreign aid allocated by the G7 donors. In addition, we consider the role played by the national interests of these donors in using foreign aid as means to ensure their energy security. Finally, we investigate whether this energy security motive leads to competition for oil markets among the

G7 donors, by analyzing their strategic interactions through the estimation of empirical spatial-lag models. By addressing all these issues, the major contribution of this paper is that we explicitly investigate, for the first time in the aid literature, the strategic role of oil on both aid allocation and competition between the G7 donors.

Several interesting results emerge from our analysis. First, we confirm that oil endowment of recipient countries impacts positively the aid allocation pattern of the G7 donors. Second, we show that donors energy security plays an important role in aid allocation: a higher oil import exposure of the G7 donors results in greater aid allocation. Third, when we investigate the potential competition for oil between donors, we evidence that the G7 donors account for the aid decisions of other donors with which they compete for oil supply. Indeed, the evidence suggests that recipient countries that increase their share in major OECD donor's oil imports are likely to benefit from an increase from all major OECD oil-importing donors. Finally, we find cross-country differences in the magnitude of competition that can be explained by the relevance of oil for the domestic economy. In particular, the impact of oil competition seems to matter more for the aid allocated by large European donors that are also more vulnerable to oil supply shocks.

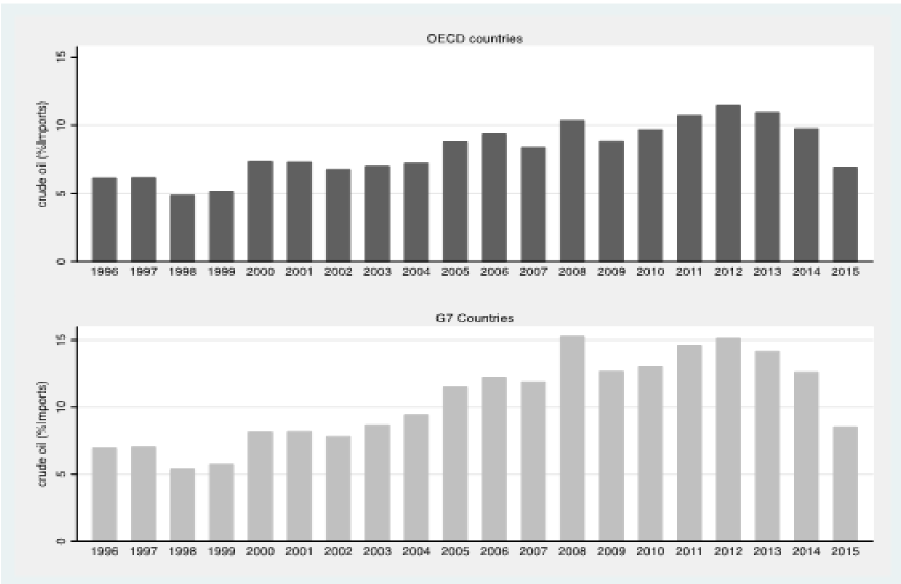
The paper proceeds as follows. Section 2 provides some background on the importance of oil in aid allocation provided by the G7 donors. In Section 3, we investigate empirically the different channels through which oil may influence aid allocation. In Section 4, we examine the importance of oil competition in aid allocation for all the G7 donors and by exploring the cross-country dimension. Finally, Section 5 reports some robustness exercises, and Section 6 concludes.

2. Stylized facts of the oil–aid nexus in the G7

Despite tremendous interest in, and speculation about, a link between oil and aid allocation, systematic research on Western donors has been slow to materialize. Scholars have highlighted a linkage between oil and aid allocation (Arezki and Banerjee, 2014), or conducted studies in which aid allocation is explained in light of the presence of oil (Dreher and Fuchs, 2011; Lee, 2012; Carbonnier and Voicu, 2014). However, it seems not clear whether the role of oil in aid allocation is more sensitive to donors interests or to recipients needs as these studies do not explicitly isolate the complex set of incentives associated with oil.

The close connection between oil and aid derives from the strategic nature of oil, which is likely to affect recipient and donor countries simultaneously, as well as their relationship. On the one hand, developing oil exporters possess a lucrative asset that can be used for great wealth and attractiveness. In that sense, the strategic nature of oil can be associated to opportunities in terms of export promotion and/or economic interests related to increased oil revenues. Burnside and Dollar (2000) argue that a country enjoying any positive shock to growth, as a commodity boom, may receive special favor from some donors. On the other hand, oil can also be considered as a key objective of the foreign policies followed by oil importers. Indeed, as oil plays a critical role in the stability of the global economic system, the national interests of most developed nations are closely tied to oil. In particular, any prolonged shortage in oil availability can produce a global economic recession, as evidenced by the two episodes of large increases in the price of oil during the 1970s.[1] Even if the effects of fluctuations in the oil price have somewhat changed over time, having now lower effects on inflation and activity in developed countries (Blanchard and Gali, 2007), oil still plays a central role in those economies. This holds true in particular for the G7 countries, which are still highly dependent on oil for meeting their energy requirements, as shown by Figure 1.

Figure 1: *Share of oil imports in total imports, OECD and G7 countries, current prices, 1996-2015*



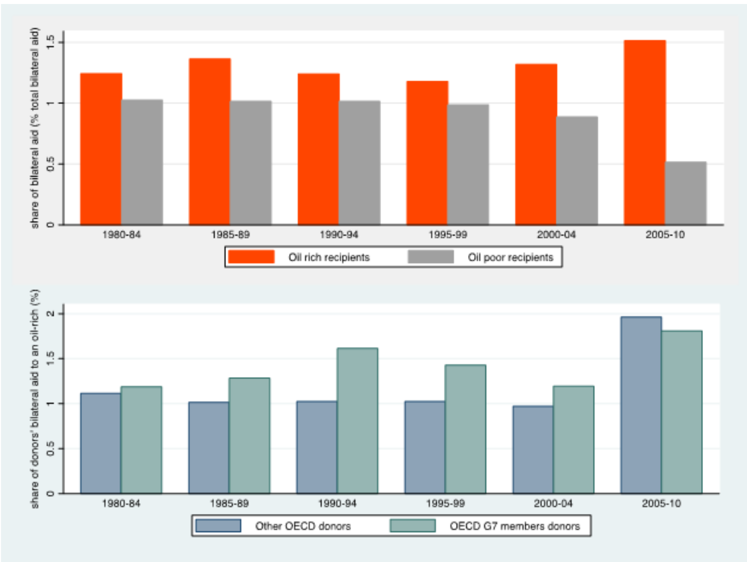
Note: The figures for the OECD and the G7 countries are based on unweighted averages.
Source: Authors calculation based on UNComtrade

As the reliance on imported oil exposes economies to disruption in global oil supplies and puts energy security at increased risk, oil importing countries have an interest in

[1] In 1974, following the Arab oil embargo and in 1979, following the Iranian revolution.

ensuring a reliable access to oil from foreign sources.[2] Therefore energy security is also an important feature of trade and foreign policies vis-a-vis resource abundant regions, especially in those industrialized countries that are very dependent on external sources for their energy procurement. The importance of expanding and ensuring access to energy resources has, for instance, encouraged the diversification of oil procurement and foreign investments towards oil-rich regions in Central Asia and Africa (see for instance Ikenberry, 1986; Li, 2005; Vivoda, 2009). It has also encouraged major donors to increase their aid assistance towards oil-rich countries, as illustrated by Figure 2. Indeed, since 1980, differences in oil endowment across recipient countries have played an increased role in aid allocation from members of the OECD's Development Assistance Committee (upper part of Figure 2), while at same time, amongst the group of OECD donors, the G7 countries have given a higher priority to oil-rich countries in their aid allocation (lower part of Figure 2).

Figure 2: *The importance of oil in aid allocation, G7 and OECD donors, 1985-2010*



Note: Share of oil-rich countries in aid allocation from OECD countries and share of all OECD donors versus seven major donors in aid allocation towards oil-rich countries.
Source: Authors calculation based on OECD CRS data.

[2]Developed countries have also been encouraged to invest in energy security through the development of domestic energy resources, such as natural gas and wind power as well as strategic stockpiling (Devarajan and Weiner, 1989, Cohen et al., 2011).

From all these facts and arguments, it seems reasonable to think that foreign aid in favor of oil-producing countries can be considered as a way to cover energy interests of the G7 donors. Indeed, as foreign aid policy can help to secure several aspects linked to oil supply, such as foreign investment for exploration, state ownership of production companies, long-term nature of supply contracts, etc., the G7 donors can be incited to distribute aid allocation in oil-rich countries as a policy option for coping with their dependence on external energy sources. Therefore, ignoring those strategic interests could significantly distort any assessment of the foreign aid bias in favor of oil-rich developing countries.

3. The role of oil in aid allocation from G7 donors: basic premise

3.1. Empirical strategy

To examine the different channels through which oil may influence aid allocation, we modify the traditional donor interest–recipient need framework, by adding several proxies that capture different incentives associated to oil to a set of usual variables that account for recipient countries' needs and donors' motives.

However, the model we estimate differs from and improves upon the existing literature on two major accounts. First, we avoid biased and inefficient estimates of log-linearized models estimated using Ordinary Least Squares (OLS). Indeed, as pointed out by Santos Silva and Tenreyro (2006), in the presence of heteroskedasticity, OLS estimation may not be consistent and nonlinear estimators should be used. Another challenge described in the literature concerns the zero values. To deal with these problems, we adopt the solution proposed by Santos Silva and Tenreyro (2006) which consists in estimating the model in levels, instead of taking logarithms. In that case, OLS problems are avoided. Second, all previously published works consider oil endowment of recipient countries in order to capture the influence of oil in aid allocation (Dreher and Fuchs, 2011; Lee, 2012; Carbonnier and Voicu, 2014). However, proxies such as oil production or oil reserves of recipient countries capture the economic resource motive and not necessarily the energy security motive of donors. Indeed, increased aid inflows following oil discoveries in recipient countries may reflect the commercial interests of donors which wish to take advantage of recipients potential revenue windfalls. Therefore to better capture the motive of reliable access to oil from foreign sources in donors aid allocation decisions, variables reflecting energy security interests are included in addition to the oil endowment variable in the regression.

Our empirical analysis examining the strategic role of oil in donor aid allocation is therefore based on a nonlinear model that takes the following form:

$$Aid_{ijt} = exp\left(\alpha_{ij} + \beta Aid_{ijt-1} + \gamma OilR_{jt} + \delta X_{jt} + \zeta Z_{ijt} + \theta Y_{it} + \varphi W_t + \eta_j + \mu_i + \lambda_t\right) + \varepsilon_{ijt} \quad (1)$$

where subscripts i, j and t indicate the donor country, the recipient country and the time period, respectively. The dependent variable, Aid_{ijt}, is defined as the share each recipient country j receives from a donor i in a given year t. Typically, research on aid allocation uses this variable because of its scale neutrality, as it is not affected by proportional increases in aid to all recipient countries (Barthel et al., 2014). X_{jt} is a $k-$dimensional vector of variables that control for recipients needs and merits. The variable $OilR_{jt}$ refers to oil endowment of recipient countries. Z_{ijt} is a vector of variables that reflect strategic links between donor and recipient countries. The variable Y_{it} accounts for energy security motives of donors and W_t are proxies reflecting instabilities in the oil market. Time-fixed effects, λ_t, country-fixed effects for recipient (η_j) and donor (μ_i) countries and time-invariant dyad-specific effect, α_{ij}, are included in order to control respectively for common shocks, fixed spatial characteristics and unobserved spatial heterogeneity. Finally, ε_{ijt} is an independent and identically distributed (i.i.d.) random term.

We use Poisson Pseudo Maximum Likelihood (PPML) to estimate our nonlinear model of aid allocation. Indeed, according to Santos Silva and Tenreyro (2006), the PPML estimator is more efficient than the standard Nonlinear Least Squares (NLS). The reason is that NLS gives more weight to noisier observations, reducing henceforth the efficiency of the estimator. Besides being consistent in the presence of heteroscedasticity and providing a way of dealing with zero values of the dependent variable, the PPLM estimator has a number of additional desirable properties. First, it is consistent in the presence of fixed effects, which can be entered as dummy variables as in simple OLS. Second, although the dependent variable for the Poisson regression is specified in levels rather than in logarithms, the coefficients of any independent variables entered in logarithms can still be interpreted as simple elasticities.[3]

3.2. Data description

We use for aid commitments Official Development Assistance (ODA) data taken from the OECD's Creditor Reporting System (CRS) dataset. This dataset provides, among other things, time-series data on the official statistics on aid flows to developing countries, provided and validated by the members of the OECDs Development Assistance Com-

[3]For robustness' sake, we also consider the Fixed Effects (FE) estimator of the log-linear version of the model. FE estimations are reported in Appendix B.

mittee (DAC).[4] We consider observations on aid flows from the G7 countries (Canada, Germany, France, Italy, Japan, the United Kingdom and the United States) – which are also the major donor countries – to 82 recipient countries.[5]

Our other main variable of interest, $OilR$, refers to oil reserves held by recipient countries. The hypothesis is that oil-rich recipient countries are more inclined to receive aid from the G7 countries that are oil-importing donors. Compared to proxies of oil dependence, which are usually used, such as oil exports or oil production, proxies of oil wealth, such as oil reserves, capture the oil abundance and are less likely to fall within reverse causality concerns. Oil reserves are drawn from the dataset compiled by Cotet and Tsui (2013).[6] The set of other control variables for recipient-related features, represented by the vector X_{jt} in Equation (1), follows the literature on aid allocation. It encompasses first indicators of beneficiary needs: the level of income measured as per capita Gross Domestic Product(GDP), multilateral aid per capita, a human development index, the Human Assets Index (HAI), combining indicators of health, nutrition and education, and taken from the database developed by the United Nations Department of Economic and Social Affairs (UN-DESA).[7] The conditions imposed on aid are also examined by including proxies of institutional quality that capture merits criteria for aid distribution. Following the aid allocation literature, we include the inflation rate (Inf) and the quality of governance of recipient countries. The governance variable is measured by the democracy indicator (*Democracy*), taken from the Democracy and Development Revisited dataset compiled by Cheibub et al. (2010). As numerous empirical studies found that donors tend to be biased toward countries with small populations (Isenman, 1976; Dowling and Hiemenz, 1985), we include population (Pop) to control for the recipient country size.

Considering that foreign aid allocation is also motivated by donors interest, political, economic and energy security motives of donors are included. The possibility of a political bias (Alesina and Dollar, 2000) is examined by using a dummy variable ($UNSC$) for United Nations Security Council membership of recipient countries, which is, according to Dreher et al. (2009), a credibly exogenous regressor, compared to other geo-political variables such as voting patterns in the United Nations General Assembly. The idea is

[4]Validated CRS data are made public by the OECD DAC Secretariat and are freely available on the OECD website: www.oecd.org/dac/stats /idsonline.

[5]For the list of countries included in our sample, see Appendix A.

[6]This dataset uses oil exploration and discovery data from the Association for the Study of Peak Oil (ASPO). Oil reserves for each country at any particular year are calculated by subtracting cumulative production from cumulative discovery.

[7]The HAI is a composite index based on the following indicators: (i) nutrition (percentage of the population that is undernourished); (ii) health (child mortality ratio); (iii) school enrolment (gross secondary school enrolment ratio); and (iv) literacy (adult literacy ratio). See `http://www.un.org/en/development/desa/policy/cdp/ldc/ldc_criteria.shtml`

that donors are more willing to give aid to recipient countries that are potential political allies. We also control for bilateral trade ($Trade$) between donor and recipient countries to account for their commercial linkages. Indeed, donors may be more motivated in giving aid to recipient countries that account for a significant part of their exports. Finally, the role played by oil security concerns in aid allocation is captured by the introduction of two different categories of variables: oil interests of donors and instabilities in the oil market. The net oil imports on oil consumption ratio of donors, $OilM_{it}$, is included with the idea that donors that are highly dependent of oil imports are more inclined to provide aid to oil-rich recipients, in order to secure their access to mineral resources. As an extension of the oil security motive hypothesis, we include the volatility of the oil price, $OilP_t$, measured as the annual standard deviation of oil prices to estimate the effect of instabilities in the oil market on aid allocation. The underlying rationale is that oil price fluctuations can give an indication of the supply in relation to demand on the oil market, reflecting scarcity and thus depletion of oil resources (Hamilton, 2009). We also account for political risks in Middle East and North African (MENA) countries, *Rivalries in MENA*, as an exogenous measure of instabilities in the oil market. This measure includes the total number of militarized interstate disputes, as well as the total number of episodes of political violence, engaged in the MENA zone. This variable better captures geopolitical risk than the volatility of the oil price, while it also affects global oil markets as a whole, and thus, all importing and exporting countries alike. Political risks in MENA countries are measured on the basis of the major rivalries in the region. In identifying rivalries, we rely on Klein et al. (2006) and Marshall (2016), who consider not only enduring rivalries but also shorter-term rivalries.

All data are annual series for the period 1980-2010. The sources and the definitions of all our variables are described in greater detail in Table A.1 (Appendix A). Summary statistics are presented in Table A.2 (Appendix A).

3.3. Results

Table 1 provides the results obtained by using the PPML estimator. The first column reports the results for the most parsimonious specification with the variable of interest, oil endowment, but without the additional controls. Column (2) shows the results when adding the set of usual control variables while columns (3) to (5) depict the results of the general specification that includes the controls for both donors' energy security and instabilities in the oil market. In column (6), we also consider the general specification after having excluded, from the donors sample, Canada and the United Kingdom that have become net exporters since the mid-1980s.

In all of the specifications of Table 1, the coefficient associated to the oil reserves variable is positive and statistically significant at the one and five percent levels, consistent with an oil effect on the aid allocation. The coefficient is also significant and positive with the Fixed Effects estimates (Table B.1, Appendix B). This initial finding suggests that oil motive is an important factor in aid allocation provided by the G7 donors: higher oil reserves significantly increase the share of a recipient country in the total aid commitments allocated by the G7 donors.

Table 1: *Oil and aid allocation, G7 countries, 1980-2010*

	(1)	(2)	(3)	(4)	(5)	(6)$^{(a)}$
$OilR$	0.0507***	0.0270***	0.0270***	0.0270***	0.0288***	0.0245**
	(0.00810)	(0.00941)	(0.00941)	(0.00941)	(0.00961)	(0.0106)
Rivalries in MENA			0.0332***			
			(0.00634)			
$OilP$				0.0298***	0.0282***	0.0425***
				(0.00899)	(0.00909)	(0.0120)
$OilM$					−0.191	1.014***
					(0.205)	(0.229)
Aid_{-1}	0.80***	0.70***	0.612***	0.70***	0.70***	0.70***
	(0.024)	(0.026)	(0.028)	(0.026)	(0.024)	(0.024)
Multilateral aid$^{(b)}$		0.193***	0.235***	0.235***	0.221***	0.182***
		(0.0365)	(0.0365)	(0.0365)	(0.0383)	(0.0441)
$Trade$		0.275***	0.275***	0.275***	0.272***	0.421***
		(0.0350)	(0.0350)	(0.0350)	(0.0357)	(0.0452)
Inf		$-2.48e^{-05}$	$-2.22e^{-05}$	$-2.48e^{-05}$	$-0.13e^{-05}$	$-0.17e^{-05}$
		(1.36e^{-05})	(1.43e^{-05})	(1.43e^{-05})	(0.000113)	(0.000151)
HAI		0.00016	0.00015	0.00015	0.00081	0.00357
		(0.0011)	(0.00264)	(0.00264)	(0.00277)	(0.00268)
$GDP^{(b)}$		−0.221***	−0.221***	−0.221***	−0.223***	−0.200***
		(0.0794)	(0.0794)	(0.0794)	(0.0814)	(0.0775)
Pop		0.263***	0.263***	0.263***	0.259***	0.107**
		(0.0425)	(0.0425)	(0.0425)	(0.0426)	(0.0480)
$UNSC$		-0.0071	-0.0071	-0.0071	0.0128	-0.0533
		(0.0510)	(0.0510)	(0.0510)	(0.0571)	(0.0725)
Democracy		−0.204***	−0.204***	−0.204***	−0.210***	−0.224***
		(0.0704)	(0.0704)	(0.0704)	(0.0732)	(0.0859)
Constant	−0.71***	−3.08***	−3.21***	−3.18***	−3.06***	−3.66***
	(0.11)	(0.54)	(0.54)	(0.57)	(0.58)	(0.75)
Observations	12,663	8,792	8,792	8,792	8,092	5,713
R-squared	0.180	0.551	0.55	0.551	0.538	0.527
Number of dyads	540	476	476	476	476	340
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Dyadic FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table presents the Pseudo Poisson Maximum Likelihood estimates of the gravity model of bilateral aid allocation. [(a)] *Canada and the United Kingdom excluded from the estimation.* [(b)] *Variables per capita. Standard errors are in parentheses. Independent variables are lagged to reflect aid allocation process and avoid simultaneity bias. ***, **, and * indicate 1%, 5%, and 10% significance levels. UNSC: United Nations Security Council.*

Turning to the other control variables specified in Equation (1), the coefficient of the lagged dependent variable is positive and robustly significant at the one percent level. This result confirms the administrative inertia in aid allocation. Consistent to expectations from the aid allocation literature that poorer countries would receive more aid, the coefficient of GDP per capita is negative and significant, suggesting that recipient needs are a significant factor in the allocation decision of the G7 donors. It also appears that Western countries provide more aid to recipient countries that receive higher shares of multilateral aid. As expected, bilateral trade is also positively associated with aid allocation, meaning that the G7 donors tend to provide more aid to countries with which they trade. The positive and statistically significant coefficient of the population variable suggests that the G7 donors prefer to give aid to recipients with larger populations. Contrary to expectations from the aid allocation literature that more democratic countries would receive more aid, the coefficient of the democracy variable is negative and statistically significant, suggesting that a lower level of democracy in the recipient countries results in receiving more aid from the G7 donors. A major reason provided to explain the bias towards less democratic recipients can be related to strategic considerations. The G7 donors may be more inclined to provide foreign aid to less democratic countries as they consider these recipient countries more prone to provide policy concessions in exchange for aid (Alesina and Weder, 2002; Bueno de Mesquita and Smith, 2009). Finally, the level of inflation, which captures economic performances of the recipient countries, as well as the human development index are not significant in the determination of the G7 donors aid allocation.

Regarding oil security motives (columns (3) to (6)), the two variables that capture instabilities in the oil market are significant at the one percent level. This result indicates that larger aid allocation is driven not only by oil endowment of recipient countries but also when the volatility of the oil price increases. The same holds for conflicts and political instability in the MENA region which also act as another driving force of aid allocation (column 3). This suggests that the G7 donors are likely to provide more aid when the instability in oil markets increases. As such instabilities put energy security at increased risk, Western donors are indeed more inclined to pledge more aid in order to secure their access to oil resources. The significance of energy security motive in aid allocation decision of the G7 donors is also highlighted by the positive and statistically significant coefficient of the oil dependence variable, except donors that are net oil-exporters as the United Kingdom and Canada. Indeed, oil dependence of the G7 donors, measured by the ratio of net oil imports to oil consumption, becomes significant when excluding, among these donors, net oil exporters. It appears therefore that energy security concerns encourage the G7 donors to provide more aid, especially those that are more oil dependent. Those results bring us to examine another dimension of donors behavior. Since foreign aid seems to be considered as a mean to ensure energy security, the G7 donors may have competing interests in recipient countries from which they import oil. In particular their decisions are likely to depend on the decisions of other donors competing for access to oil markets of recipient countries. Therefore, one interesting issue is to analyze whether oil can be regarded as a potential source of competition between the G7 donors.

4. Oil competition among the G7 donors

Several arguments with respect to oil competition among donors in their aid allocation can be advanced. First, if foreign aid is used to pursue oil security interests, we can expect that a donor also has to observe aid allocation decisions by other donors and take changes in their aid giving into account when allocating its own aid. Second, aid provided by other donors to oil-rich countries may serve as a signal for a good investment in this sector and reduce the uncertainty on the effectiveness of aid projects. Finally, as outlined by Gupta (2008), oil production in non-OPEC regions (such as the North Sea) has declined, which has caused oil importers to become more dependent on a few oil-exporting countries. Such an increasing dependence on oil may yield a fierce geopolitical competition among the G7 donors in order to secure their oil needs. For these various reasons, the G7 donors may then spatially depend on each other in their aid provision, especially when they allocate their aid in order to satisfy their strategic and economic interests in terms of energy security.
In this section, we examine empirically the potential competition for oil between the G7 donors with spatial lag models. Spatial lag techniques have been recently used as a tool to analyze strategic dependency patterns in aid allocation decisions (Neumayer and Plumper, 2010a; Barthel and Selaya, 2014; Steinwand, 2015). This tool allows capturing the reciprocal influences that donors exert on one another in their aid allocation decision, by including as endogenous right-hand side component a contagion effect. Specifically this effect measures the extent to which the aid flow between a donor i and a recipient j depends on the aid flows of other donors k to the same recipient country j.[8] With this type of model, it is therefore possible to quantify the existence, nature and strength of these strategic interactions between donors.

4.1. Panel data estimates

We perform the analysis by estimating a parsimonious spatial lag model (Equation (2)) and a spatial lag augmented model (Equation (3)), which in addition allows for dependence on several control variables previously used and specified in Equation (1):

$$Aid_{ijt} = \alpha_{ij} + \rho \Sigma_{k \neq i} W_{ikt} Aid_{kjt} + \eta_j + \mu_i + \lambda_t + \varepsilon_{ijt} \tag{2}$$

[8] For other forms of spatial contagion, such as aggregate source or aggregate target contagion, and specific target contagion, see Neumayer and Plumper (2010b).

$$Aid_{ijt} = \alpha_{ij} + \rho\Sigma_{k\neq i}W_{ikt}Aid_{kjt} + \gamma OilR_{jt} + \delta X_{jt} + \zeta Trade_{ijt}\eta_j + \mu_i + \lambda_t + \varepsilon_{ijt} \quad (3)$$

where W_{ik}, a N by N by T spatial weights matrix that captures the connectivity between dyads that form the spatial dependence, i.e. how much donors k influence i's aid decision when giving aid to j. ρ is the spatial autoregressive coefficient that measures mutual influence between donors in aid provision. If there is oil supply competition in aid provision, then ρ is expected to be positive: the G7 donors will increase their own allocations in reaction to increases by others. η_j and μ_i are country-fixed effects, α_{ij}, time-invariant dyad-specific effect and λ_t, time-fixed effects. ε_{ijt} is an independently and identically distributed error term.

A crucial decision when specifying spatial effects concerns the choice of weights in the matrix W_{ik} (Neumayer and Plumper, 2010b). Our intuition is that aid decision making among the G7 donors that compete for the same sources of oil procurement are interdependent. In order to capture this oil competition in aid provision, we create spatial weights that capture the degree to which donors compete in the same recipient country, according to their share of oil imports in a recipient's total oil exports. In other words, we assume that the influence of donor k over donor i regarding aid to recipient j depends on the share of the donor k in the oil exports of recipient j on the one hand and the share of donor i in the oil exports of recipient j on the other hand:

$$W_{ikt} = \frac{oilimports_{ijt}}{oilexports_{jt}} \times \frac{oilimports_{kjt}}{oilexports_{jt}} \quad (4)$$

Therefore the weights compare the oil trade flows between the G7 donors and the recipient country: the more important recipient j is for oil imports from both donor i and donor k, the stronger donor i will be influenced by donor k in its allocation to recipient j.

Given that oil dependence of donors is already included in spatial weights through the share of their oil imports in total oil exports of recipient countries, the control variables considered in the augmented spatial lag model refer to recipients' oil endowment ($OilR_{jt}$), recipients' needs and merits (X_{jt}) as well as bilateral commercial trade between donor and recipient countries ($Trade_{ijt}$).

As countries influence each others aid policies reciprocally, the spatially lagged aid variable, $\rho\Sigma_{k\neq i}W_{ikt}Aid_{kjt}$, in Equation (2) and Equation (3) is likely to be endogenous. Then estimating the spatial lag model by OLS (spatial OLS, S-OLS) will lead to biased results. Barthel and Selaya (2014) suggest that ignoring this endogeneity does not produce strongly biased results as long as the degree of interdependence, ρ, is small and exogenous factors are well specified. Arguing that this bias should be less pronounced in aid shares than in aid levels, the authors lag by one year the spatial lag to further mitigate this endogeneity problem[9] and estimate their empirical model by spatial OLS. An alternative solution suggested by Anselin (2001) and Franzese and Hays (2007) is to estimate the spatial lag model by Maximum Likelihood (spatial Maximum Likelihood, S-ML). While S-ML is computationally intense, especially when both cross-section and time dimensions increase, it produces parameter estimates consistent and asymptotically efficient (Ord, 1975).

Table 2 displays the results derived from the estimation of the two spatial lag models, using S-OLS and S-ML estimators. Looking at the estimation results, we find that the spatial coefficient is positive and statistically significant for both models, corroborating our intuition: if other donors provide aid to a specific recipient country from which they import oil, then this makes more likely that an oil-importing donor will also provide aid to this specific recipient country. The results from OLS estimations indicate a low level of oil competition between the G7 donors, but as aforementioned these results may be subject to bias. Indeed, the S-LM estimator leads to a higher spatial coefficient, revealing a downward bias in OLS estimations and the presence of a rather strong oil competition between the G7 donors. Specifically, recipient countries that increase their share in donor's oil imports by 10% are likely to benefit from an increase by 2.3% in aid from all oil-importing donors.

Regarding the other control variables, the coefficients associated to recipients' oil endowment and needs are statistically significant and have the expected signs, suggesting that bilateral aid is still positively related to oil endowment and needs of recipient countries. Concerning bilateral trade, there is evidence of a decreased significant role on commercial linkages as a determinant of aid allocation. On the contrary, the coefficient on the dummy variable ($UNSC$) for United Nations Security Council membership of recipient countries becomes slightly significant while we do not find any more a robust average effect of the variables democracy and multilateral aid per capita.

4.2. Cross-country differences

The findings obtained so far relate to aggregate bilateral aid. Hence, from them nothing can be said as to whether all G7 donors behave similarly. In particular, additionally to differences resulting from political and commercial situations, individual donors also differ with respect to their energy situation. Table 3 shows some key indicators of oil

[9] Franzese and Hays (2007) suggest that the omitted-variable biases of the current default practice of non spatial OLS generally are large, whereas the simultaneity biases of S-OLS are typically smaller, especially as the strength of interdependence remains quite modest, and when domestic and exogenous external factors are well specified as well as powerful explanatory variables.

exposure risks in the G7 economies as well as the OECD average values. The first indicator measures the exposure of the economies to supplies of oil. The second indicator relates to the magnitude of energy costs to national economies. Finally, the third indicator measures energy use in relation to economic output. All figures are obtained from the U.S. Chamber of Commerces Institute (Institute for 21st Century Energy, 2016) and are calculated over the period 1980-2010.

Table 2: *G7 Donors' competition for oil, 1980-2010*

Model	Spatial lag	Spatial lag augmented	Spatial lag	Spatial lag augmented
	S-ML	S-ML	S-OLS	S-OLS
W oil competition	6.322^{***}	2.255^{*}	0.116^{***}	0.0593^{**}
	(1.377)	(1.250)	(0.0301)	(0.0234)
OilR		0.125^{***}		0.110^{***}
		(0.0403)		(0.0375)
Aid_{-1}		0.620^{***}		0.333^{***}
		(0.026)		(0.0754)
Multilateral aid$^{(a)}$		0.133		0.243^{*}
		(0.119)		(0.138)
Trade		0.180^{*}		0.015
		(0.0924)		(0.191)
Inf		$-7.63e^{-05}$		$-8.73e^{-05}$
		$(14.5e^{-05})$		$(7.87e^{-05})$
HAI		-0.0185^{**}		0.0120
		(0.00765)		(0.0274)
GDP$^{(a)}$		-0.596^{**}		-1.043
		(0.299)		(0.765)
Pop		-0.016		-1.541
		(0.155)		(1.745)
UNSC		0.206^{*}		-0.040
		(0.123)		(0.166)
Democracy		-0.063		0.665^{***}
		(0.213)		(0.161)
Constant	-2.697^{***}	-2.932	-4.025^{***}	29.94
	(0.392)	(4.302)	(0.516)	(34.87)
Observations	1,097	668	1,068	627
R-squared	0.085	0.450	0.080	0.321
Number of dyads	137	91	135	92
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Dyadic FE	Yes	Yes	Yes	Yes

Notes: This table presents estimates of the two spatial lag model using OLS and maximum likelihood estimators. $^{(a)}$ *Variables per capita. The dependent variable is the share each recipient country j receives from a donor i. W is the spatial component, which captures donors competition for oil. Robust standard errors are in parentheses. Independent variables are lagged to reflect aid allocation process and avoid simultaneity bias.* ***, **, *and* * *indicate 1%, 5%, and 10% significance levels. UNSC: United Nations Security Council.*

Table 3: *Indicators of energy security risk, G7 countries and OECD average*

	Oil Import Exposure$^{(a)}$	Fossil Fuel Import Expenditure per GDP$^{(b)}$	Petroleum Intensity$^{(c)}$
Canada	3	4	948
France	1253	716	494
Germany	1282	751	518
Italy	1239	796	535
Japan	1300	874	595
United Kingdom	14	58	463
United States	572	575	854
OECD	799	640	708

Notes: Average values over the period 1980-2010. $^{(a)}$ *Net oil imports as percentage of total national oil supply;* $^{(b)}$ *Net fossil fuel import costs as a share of GDP;* $^{(c)}$ *Million Btu of petroleum consumed per 1,000 US dollars of real GDP.*
Source: Authors calculation over the period 1980-2010 based on U.S. Chamber of Commerces Institute data.

Oil exposure risks are clearly very different across the G7 countries. The United States, Japan and the three largest European economies (France, Germany and Italy) rely on imports for much of their energy supply. Import risks are therefore a big factor influencing energy security risk scores of those countries, compared to the United Kingdom and Canada, which are large energy producers. Oil imports risks are considerably higher in the European countries and Japan compared to the United States. The latter country also has a domestic oil producing sector that cannot be ignored. Finally, it appears that Canada and the United States are the most oil intensive economies. These numbers lend support to our initial assumption that as energy situations differ across donors, the weight given to oil interests as well as competitive incentives for oil markets in aid allocation decisions are likely to be different too.

Table 4 reports the results from the spatial lag augmented model estimated separately for each G7 country. The regression results largely substantiate the findings for aggregate bilateral aid. Indeed, we find evidence for oil competition-driven spatial dependence in the allocation of aid for most countries, except Japan and the United Kingdom. For countries for which estimates of the coefficient of the spatial dependence are significant, the range of variation of estimates of the parameter varies from about 6.62 for Canada to 49.1 for Italy and seems consistent with the range of variation in terms of energy security risk scores. In particular, European countries which are large consumer of oil have a high dependence on oil imports and seem to react more to oil competition.

Table 4: *The importance of oil competition: cross-country differences, 1980-2010*

	Canada	France	Germany	Italy	Japan	United Kingdom	United States
W oil competition	6.62***	10.29***	28.24***	49.10***	−9.78	1.91	11.39***
	(1.174)	(3.633)	(3.017)	(10.4)	(7.457)	(9.498)	(2.480)
OilR	0.268***	0.230**	0.268**	0.662***	1.203***	0.396	0.046
	(0.0758)	(0.113)	(0.111)	(0.171)	(0.332)	(0.559)	(0.0339)
Aid_{-1}	−3.302	6.300**	5.042***	5.582***	2.300	−2.259	7.374***
	(2.999)	(2.573)	(1.865)	(1.658)	(2.163)	(5.146)	(1.532)
Multilateral aid$^{(a)}$	0.640***	0.607***	0.569*	0.617***	0.412	0.833	0.815***
	(0.206)	(0.169)	(0.328)	(0.184)	(0.295)	(0.745)	(0.143)
Trade	0.143	1.013***	−0.751***	1.541**	0.791	0.936***	0.420*
	(0.193)	(0.391)	(0.277)	(0.627)	(0.525)	(0.282)	(0.215)
Inf	$49.9e^{-05***}$	$-44.6e^{-05**}$	$-6.25e^{-05}$	$-17.8e^{-05}$	$-12.7e^{-05}$	−0.0222	$-25.3e^{-05**}$
	$(16.6e^{-05})$	$(22.6e^{-05})$	$(18.5e^{-05})$	$(22.8e^{-05})$	$(19.4e^{-05})$	(0.0350)	$(11.0e^{-05})$
HAI	−0.0343*	−0.0250**	−0.0631***	0.0162	−0.0706***	0.0016	−0.0200*
	(0.0182)	(0.0113)	(0.0173)	(0.0188)	(0.0124)	(0.0395)	(0.0103)
GDP$^{(a)}$	0.265	−2.134***	−0.895*	−3.145***	−0.767**	−1.910	−0.453
	(0.621)	(0.512)	(0.543)	(0.993)	(0.384)	(2.606)	(0.443)
Pop	0.807**	−0.872***	0.708	−2.042**	−1.204	−0.193	0.356*
	(0.365)	(0.231)	(0.436)	(0.821)	(0.861)	(0.557)	(0.215)
UNSC	−0.593	−0.217	0.823	0.111	0.057	−0.755	−0.112
	(0.429)	(0.326)	(0.608)	(0.528)	(0.278)	(0.809)	(0.216)
Democracy	0.527	−0.275	−1.661**	−0.941*	−0.0170	0.875	−0.452
	(0.342)	(0.411)	(0.667)	(0.543)	(0.236)	(0.737)	(0.352)
Constant	−22.99**	9.12	1.24	29.40**	−4.63	−0.60	−12.87**
	(11.65)	(6.391)	(7.172)	(12.25)	(7.364)	(26.40)	(5.948)
Observations	134	204	185	161	100	108	218
R-squared	0.50	0.647	0.80	0.79	0.98	0.37	0.73

Notes: This table presents the coefficients estimates of W, the spatial component that captures donors competition for oil in our individual spatial lag model using maximum likelihood estimators. $^{(a)}$ *Variables per capita. The dependent variable is the share each recipient country j receives from a donor i. Robust standard errors are in parentheses. Independent variables are lagged to reflect aid allocation process and avoid simultaneity bias. ***, **, and * indicate 1%, 5%, and 10% significance levels. UNSC: United Nations Security Council.*

However, this finding does not hold for Japan who seems to pursue rather a needs-based aid allocation strategy. Indeed, for this latter donor, the spatial lag coefficient is not significant, while the (negative) coefficients on GDP per capita and on the human asset index prove to be significant. In support of this finding, Gupta (2008) find evidence of a low market risk for Japan, which has significantly lessened its overall oil vulnerability as compared to other countries. The particularity of Japan is also found by Kilian (2008) who show that in all G7 countries – but Japan – an exogenous oil supply disruption causes a decline in real growth. Another interesting finding is that other individual donor countries also seem to care about needs in recipient countries, except the United States and the United Kingdom for which trade concerns appear to be stronger. Finally, there is still evidence in Table 4 that recipient countries with abundant oil endowment receive larger aid allocation, while the (positive) coefficient on oil reserves proves to be insignificant at conventional levels with regard to donors that are producers of oil like the United Kingdom and the United States.

5. Robustness check

Our previous results are based on information collected through the Creditor Reporting System (CRS). The CRS is maintained by the OECDs Development Assistance Committee (DAC), which compiles annual statistics on aid commitments from its 22 member governments based on declarations from donors. In this section, we conduct additional tests considering aid data from another dataset of foreign assistance, AidData. This dataset aims to augment the CRS database with more donors, more projects, and more dollars by tracking and counting unreported donors aid activities (Tierney et al., 2011). Thus, the information provided by AidData covers some other dimensions of donors strategic behaviors that may not be captured by the CRS.

As can be seen in Tables 5, 6 and 7, using data from AidData instead of data from OECD-DAC's Creditor Reporting System (CRS) donor systems supports the results of our benchmark specifications. Oil endowment still appears to be an important determinant of aid allocation, even controlling for a spatial dependence between donors, although in this case, the effect is statistically significant only for the spatial lag-model estimated by Maximum Likelihood (S-ML).[10]

[10]The Fixed Effects estimations are reported in Table B.2 in Appendix B to save space.

Table 5: *Oil and aid allocation, G7 countries, 1980-2010, AidData database*

	(1)	(2)	(3)	(4)	(5)	(6)$^{(a)}$
OilR	0.0649***	0.0264**	0.0264**	0.0264**	0.0289**	0.0251*
	(0.00957)	(0.0110)	(0.0110)	(0.0110)	(0.0114)	(0.0136)
Rivalries in MENA			0.0355***			
			(0.00570)			
OilP				0.0571***	0.0584***	0.0707***
				(0.0134)	(0.0144)	(0.0179)
OilM					0.12	0.79***
					(0.249)	(0.039)
Aid_{-1}	0.567***	0.480***	0.450***	0.450***	0.460***	0.430***
	(0.052)	(0.051)	(0.029)	(0.029)	(0.032)	(0.044)
Multilateral aid$^{(b)}$		0.222***	0.222***	0.222***	0.214***	0.186***
		(0.0428)	(0.0428)	(0.0428)	(0.0456)	(0.0581)
Trade		0.333***	0.333***	0.333***	0.333***	0.503***
		(0.0396)	(0.0396)	(0.0396)	(0.0413)	(0.0508)
Inf		−0.000111**	−0.000111**	−0.000111**	−0.000139	−0.000102
		($4.42e^{-05}$)	($4.42e^{-05}$)	($4.42e^{-05}$)	($8.88e^{-05}$)	(8.54^{-05})
HAI		−0.000921	−0.000921	−0.000921	−0.000832	0.000844
		(0.00303)	(0.00303)	(0.00303)	(0.00322)	(0.00347)
GDP$^{(b)}$		−0.157*	−0.157*	−0.157*	−0.178*	−0.186**
		(0.0907)	(0.0907)	(0.0907)	(0.0931)	(0.0860)
Pop		0.290***	0.290***	0.290***	0.278***	0.131**
		(0.0469)	(0.0469)	(0.0469)	(0.0514)	(0.0560)
UNSC		-0.0610	-0.0610	-0.0610	-0.0185	-0.0672
		(0.0680)	(0.0680)	(0.0680)	(0.0706)	(0.0927)
Democracy		−0.305***	−0.305***	−0.305***	−0.309***	−0.382***
		(0.0826)	(0.0826)	(0.0826)	(0.0898)	(0.115)
Constant	−1.46***	−3.99	−7.29***	−6.98***	−6.96***	−7.65***
	(0.27)	(2.64)	(0.98)	(0.96)	(1.02)	(1.19)
Observations	10,052	7,515	7,515	7,515	6,996	5,036
R-squared	0.056	0.44	0.41	0.409	0.40	0.38
Number of dyads						
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Dyadic FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table presents the Pseudo Poisson Maximum Likelihood estimates of the gravity model of bilateral aid allocation. $^{(a)}$ *Canada and the United Kingdom excluded from the estimation.* $^{(b)}$ *Variables per capita. Standard errors are in parentheses. Independent variables are lagged to reflect aid allocation process and avoid simultaneity bias. ***, **, and * indicate 1%, 5%, and 10% significance levels. UNSC: United Nations Security Council.*

The estimated coefficient on oil dependence is positive and significant at the one percent level, when excluding the oil-exporting donors, confirming that in general, the G7 donors that rely most heavily on oil provide more aid. Our results also confirm that aid provision increases with instability in the oil market, including political instability in major oil exporters, especially those in the Middle East (Table 5).

Table 6: *G7 donors' competition for oil, 1980-2010, AidData database*

Model	Spatial lag	Spatial lag augmented	Spatial lag	Spatial lag augmented
	S-ML	S-ML	S-OLS	S-OLS
W oil competition	5.329***	2.994**	0.102***	0.055*
	(1.346)	(1.479)	(0.0317)	(0.0309)
OilR		0.125**		0.006
		(0.0521)		(0.0772)
Aid_{-1}		4.438***		0.283***
		(0.612)		(0.0626)
Multilateral aid[(a)]		0.124		0.318**
		(0.154)		(0.144)
Trade		0.353***		−0.152
		(0.114)		(0.185)
Inf		$-4.44e^{-05}$		$-1.54e^{-05}$
		$(14.7e^{-05})$		$(13.4e^{-05})$
HAI		−0.0189**		0.0453
		(0.00814)		(0.0369)
GDP[(a)]		−0.687**		−0.575
		(0.309)		(0.792)
Pop		−0.104		−0.031
		(0.181)		(1.645)
UNSC		0.0011		0.0389
		(0.125)		(0.187)
Democracy		−0.276		0.731***
		(0.253)		(0.232)
Constant	−2.920***	−3.164	−4.792***	0.899
	(0.423)	(4.945)	(0.387)	(33.46)
Observations	1,105	672	1,075	643
R-squared	0.081	0.334	0.092	0.272
Number of dyads	137	94	135	94
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Dyadic FE	Yes	Yes	Yes	Yes

Notes: This table presents estimates of the two spatial lag model using OLS and maximum likelihood estimators. [(a)] *Variables per capita. The dependent variable is the share each recipient country j receives from a donor i. W is the spatial component, which captures donors competition for oil. Robust standard errors are in parentheses. Independent variables are lagged to reflect aid allocation process and avoid simultaneity bias. ***, **, and * indicate 1%, 5%, and 10% significance levels. UNSC: United Nations Security Council.*

What the results also indicate is still a clear pattern of oil competition in the aid allocated by the G7 donors. The spatial coefficient remains positive and statistically significant for both the parsimonious spatial lag model and the spatial lag augmented model (Table 6). Turning finally to country-by-country results (Table 7), our previous findings hold: except for Japan and the United Kingdom, all individual donors seem to compete for aid allocation to the recipients from which they import oil.

6. Conclusion

In this paper we investigated the influence of oil on the aid policy of the seven major OECD donors. Our empirical analysis covers 82 recipient countries over the 1980-2010 period. Several important insights emerge from this analysis. Our results show that recipient countries with abundant oil endowment receive larger aid commitments of the G7 donors, after controlling for other important determinants of aid. Our second contribution relates to the importance of energy security motives for the aid allocation. Major OECD donors that are highly dependent of oil commit more bilateral aid. We also find that aid provision increases with instability in the oil market, including political instability in major oil exporters, especially those in the Middle East. We attribute those findings to the importance of foreign aid as a way to ensure the security of oil supply. Finally, we demonstrated the existence of competition for oil among the G7 donors, by estimating the degree to which donors compete within a same recipient country, according to their share of oil imports in the recipient country's total oil exports. By using the cross-country dimension, we find that the role and share of oil in the economies of the G7 donors is important for understanding aid allocation driven by oil competition, the magnitude of this effect being more important for donors that are more exposed to oil security risks. These key results are robust to several checks, including additional tests run with another aid database and with other estimators.

All in all our paper contributes to the literature on the role of self-interest of the donors, by adding an energy security dimension to the conventional geopolitical or commercial motives. The paper also makes a significant contribution to the literature by linking energy security policy in the G7 donors with the formation of their foreign aid policies. We evidence that among the different energy policies implemented by industrialized countries to address energy security concerns, aid allocation can be considered as a way to expand and ensure access to energy resources. Furthermore, as aid is, at least partly, given for these strategic reasons, there is some evidence of competition in aid allocation across industrialized countries, which is motivated by the quest of energy security.

Table 7: *The importance of oil competition: cross-country differences, 1980-2010, AidData database*

	Canada	France	Germany	Italy	Japan	United Kingdom	United States
W oil competition	9.77***	10.20***	40.24***	55.90***	1.61	4.55	9.62***
	(2.308)	(3.192)	(7.222)	(12.2)	(17.87)	(4.722)	(2.907)
OilR	0.298**	0.164	0.131	1.091***	1.383***	0.038	0.024
	(0.122)	(0.105)	(0.185)	(0.197)	(0.435)	(0.0853)	(0.0461)
Aid_{-1}	−5.275	7.372***	2.615	−0.390	−0.206	−5.118	10.600***
	(6.852)	(2.648)	(2.875)	(0.696)	(1.809)	(3.762)	(2.037)
Multilateral aid$^{(a)}$	0.678**	0.404**	−0.0651	0.828***	0.379	0.903*	0.935***
	(0.271)	(0.189)	(0.321)	(0.177)	(0.427)	(0.505)	(0.129)
Trade	0.0973	1.236***	−0.141	1.528***	0.974	1.337***	0.263
	(0.196)	(0.397)	(0.246)	(0.529)	(0.757)	(0.446)	(0.208)
Inf	$52.5e^{-05*}$	$16.3e^{-05}$	$-17.2e^{-05}$	$-49.5e^{-05*}$	$13.9e^{-05}$	−0.0723***	$-23.0e^{-05*}$
	$(31.9e^{-05})$	$(13.7e^{-05})$	$(30.5e^{-05})$	$(28.3e^{-05})$	$(36.1e^{-05})$	(0.0244)	$(13.1e^{-05})$
HAI	−0.0492	−0.0191*	−0.0446**	−0.0026	−0.0681***	0.0241	−0.0258**
	(0.0358)	(0.00989)	(0.0174)	(0.0120)	(0.0245)	(0.0277)	(0.0115)
GDP$^{(a)}$	0.590	−1.708***	−1.198**	−3.679***	−0.733	−3.061	−0.226
	(1.030)	(0.438)	(0.508)	(0.964)	(0.589)	(2.313)	(0.625)
Pop	0.920	−0.881***	−0.115	−2.236***	−0.890	−0.432	0.692***
	(0.575)	(0.257)	(0.441)	(0.649)	(1.087)	(0.534)	(0.240)
UNSC	−1.506***	0.029	0.921	−0.198	−0.329	−1.006**	−0.547**
	(0.542)	(0.347)	(0.688)	(0.626)	(0.497)	(0.508)	(0.261)
Democracy	0.953*	−0.509	−2.204***	−0.900**	−0.725*	1.976**	−0.264
	(0.514)	(0.349)	(0.504)	(0.430)	(0.421)	(0.906)	(0.358)
Constant	−25.41	4.33	10.44	37.42***	−17.05**	9.01	−18.11**
	(18.04)	(5.823)	(8.388)	(10.01)	(7.800)	(22.45)	(8.244)
Observations	135	204	187	162	100	109	220
R-squared	0.55	0.61	0.70	0.69	0.85	0.45	0.68

Notes: This table presents the coefficients estimates of W, the spatial component that captures donors competition for oil in our individual spatial lag model using maximum likelihood estimators. $^{(a)}$ *Variables per capita. The dependent variable is the share each recipient country j receives from a donor i. Robust standard errors are in parentheses. Independent variables are lagged to reflect aid allocation process and avoid simultaneity bias. ***, **, and * indicate 1%, 5%, and 10% significance levels. UNSC: United Nations Security Council.*

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Appendix A. Data Source and Description

Our samples of countries included in our analysis are as follows:

1. **Donor countries:** Canada, Germany, France, Italy, Japan, the United Kingdom, and the United States.
2. **Recipient countries:** Afghanistan, Angola, Bangladesh, Belize, Benin, Bhutan, Bolivia, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Rep., Chad, Comoros, Congo Rep., Cte d'Ivoire, Djibouti, Egypt, El Salvador, Equatorial Guinea, Eritrea, Ethiopia, Fiji, Gambia, Ghana, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Iraq, Kenya, Kiribati, Korea, Dem. Rep., Kosovo, Laos, Lesotho, Liberia, Madagascar, Malawi, Mali, Marshall Islands, Mauritania, Moldova, Mongolia, Morocco, Mozambique, Myanmar (Burma), Nepal, Nicaragua, Niger, Nigeria, Pakistan, Papua New Guinea, Paraguay, Philippines, Rwanda, Samoa, Sao Tome & Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, Sri Lanka, Sudan, Swaziland, Syria, Tanzania, Togo, Tonga, Tuvalu, Uganda, Ukraine, Vanuatu, Vietnam, Yemen, Zambia, and Zimbabwe.

Table A.1: *Data Description*

Variable	Definition	Source
Aid_{ijt}	Bilateral ODA commitments from donor i to recipient j in year t in constant 2010 US$.	OECD-CRS
Project Aid	Project level aid commitments from donor i to recipient j in year t in constant 2010 US$	AidData
Multilateral aid	Multilateral aid received by recipient j in year t in constant 2010 US$.	OECD-CRS
HAI	100-Human asset index	United Nations
Democracy	Dummy variable coded 1 if the regime qualifies as democratic following the definition used in Cheibub et al. (2010).	Cheibub et al. (2010)
GDP per capita	Gross Domestic Product per capita, in constant 2005 US$.	World Bank, WDI
Pop	Recipients total population.	World Bank, WDI
$Trade$	Bilateral trade between a donor and a recipient country (current prices).	World Bank
$OilR$	Recipients oil reserves (in thousands million barrels).	Cotet and Tsui (2013)
$OilM$	Donors net oil imports, expressed relative to oil consumption.	IEA database
$OilP$	Oil price volatility.	IEA database
Rivalries in MENA	Number of rivalries in MENA. Based on Major Episodes of Political Violence ($MEPV$) database and Klein et al. (2006) International rivalries dataset.	Authors calculation
$MEPV$	Major Episodes of Political Violence, coded on a scale of one to ten according to an assessment of the full impact of their violence on the societies that directly experience their effect.	Center for Systemic Peace
$UNSC$	Dummy variable coded 1 if a country is temporarily serving on the United Nations Security Council, and 0 otherwise.	United Nations

Notes: WDI: World Development Indicators. IEA : International Energy Agency

Table A.2: *Summary statistics*

	Obs.	Mean	Std. Dev.	Min	Max
Year	17,794	1995	8.945	1980	2010
Aid share (allocated by donor)	15,459	0.011	0.028	5.83^{-07}	0.561
Oil reserves (barrels)	15,400	216,238	2.865^{+06}	0	5.750^{+07}
Import crude oil (K barrels/per day)	13,940	2,896	2,758	354.9	11,564
UNSC	17,010	0.0424	0.201	0	1
Multilateral aid per capita (log)	16,261	1.797	1.339	-2.394	7.170
Human Asset Index (HAI)	16,100	50.25	22.79	1.10	95.77
GDP per capita (2005 prices, US$)	15,575	978.9	1,055	50.04	14,901
Inflation (CPI)	13,524	29.05	314.3	-17.64	11,750
Population	16,261	3.227^{+07}	1.114^{+08}	144,416	1.225^{+09}
Bilateral trade (log)	14,715	10.07	2.418	0.465	17.01
Rivalries in MENA	17,794	16.65	11.96	0	32
Net oil imports ratio on consumption	13,940	0.684	0.215	0.234	1.129
Democracy	16,100	0.322	0.467	0	1

Appendix B. Fixed Effects models

Table B.1: *Oil and aid allocation, G7 countries, 1980-2010*

	(1)	(2)	(3)	(4)	(5)	(6)$^{(a)}$
OilR	0.0207***	0.0208***	0.0208***	0.0208***	0.0216***	0.0258***
	(0.00595)	(0.00625)	(0.00625)	(0.00625)	(0.00657)	(0.0087)
Rivalries in MENA			0.0500***			
			(0.0108)			
OilP				0.0247**	0.0228*	0.0043
				(0.0123)	(0.0122)	(0.0109)
OilM					−0.127	−0.172
					(0.254)	(0.523)
Aid_{-1}	0.541***	0.424***	0.424***	0.424***	0.393***	0.365***
	(0.0221)	(0.0276)	(0.0276)	(0.0276)	(0.0297)	(0.0371)
Multilateral aid$^{(b)}$		0.0703***	0.0703***	0.0703***	0.0582***	0.0697***
		(0.0175)	(0.0175)	(0.0175)	(0.0184)	(0.0221)
Trade		0.135***	0.135***	0.135***	0.125***	0.155***
		((0.0203)	(0.0203)	(0.0203)	(0.0211)	(0.0287)
Inf		-1.43^{-05}	-1.43^{-05}	-1.43^{-05}	2.37^{-05}	-2.58^{-05}
		(1.33^{-05})	(1.33^{-05})	(1.33^{-05})	(4.39^{-05})	(5.21^{-05})
HAI		−0.00218	−0.00218	−0.00218	0.000742	0.00630
		(0.00384)	(0.00384)	(0.00384)	(0.00433)	(0.00531)
GDP$^{(b)}$		−0.164*	−0.164*	−0.164*	−0.137	−0.088
		(0.0969)	(0.0969)	(0.0969)	(0.107)	(0.138)
Pop		0.0674	0.0674	0.0674	0.0729	0.0233
		(0.274)	(0.274)	(0.274)	(0.300)	(0.346)
UNSC		0.0138	0.0138	0.0138	0.0073	0.0386
		(0.0372)	(0.0372)	(0.0372)	(0.0411)	(0.0596)
Democracy		0.0558	0.0558	0.0558	0.0551	0.0614
		(0.0363)	(0.0363)	(0.0363)	(0.0400)	(0.0511)
Constant	−2.754***	−5.066	−5.066	−5.227	−5.538	−4.540
	(0.136)	(4.989)	(4.989)	(4.996)	(5.465)	6.351)
Observations	12,530	8,554	8,554	8,554	7,620	5,361
R-squared	0.77	0.75	0.704	0.752	0.745	0.66
Number of dyads	540	476	476	476	476	340
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Dyadic FE	Yes	Yes	Yes	Yes	Yes	Yes

*Note: This table presents the Fixed Effects estimates of the log-linearized model of bilateral aid allocation. (a) Canada and the United Kingdom excluded from the estimation. (b) Variables per capita. Standard errors are in parentheses. Independent variables are lagged to reflect aid allocation process and avoid simultaneity bias. ***, **, and * indicate 1%, 5%, and 10% significance levels. UNSC: United Nations Security Council.*

Table B.2: *Oil and aid allocation, G7 countries, 1980-2010, AidData database*

	(1)	(2)	(3)	(4)	(5)	(6)[(a)]
OilR	0.0145^{**}	0.0152^{**}	0.0152^{**}	0.0152^{**}	0.0155^{**}	0.0164^{**}
	(0.00580)	(0.00627)	(0.00627)	(0.00627)	(0.00641)	(0.00777)
Rivalries in MENA			0.0430^{***}			
			(0.0101)			
OilP				0.00405	0.00213	0.00323
				(0.00764)	(0.00766)	(0.00847)
OilM					0.590^{**}	0.668^{*}
					(0.251)	(0.342)
Aid_{-1}	0.245^{***}	0.177^{***}	0.177^{***}	0.177^{***}	0.170^{***}	0.161^{***}
	(0.0228)	(0.0228)	(0.0228)	(0.0228)	(0.0240)	(0.0306)
Multilateral aid[(b)]		0.0710^{***}	0.0710^{***}	0.0710^{***}	0.0507^{***}	0.0623^{***}
		(0.0180)	(0.0180)	(0.0180)	(0.0182)	(0.0201)
Trade		0.0666^{***}	0.0666^{***}	0.0666^{***}	0.0678^{***}	0.0820^{***}
		(0.0184)	(0.0184)	(0.0184)	(0.0183)	(0.0235)
Inf		-4.48^{-05**}	-4.48^{-05**}	-4.48^{-05**}	-4.86^{-05**}	-4.86^{-05**}
		$(2.07e^{-05})$	$(2.07e^{-05})$	$(2.07e^{-05})$	$(2.22e^{-05})$	(1.96^{-05})
HAI		−0.00374	−0.00374	−0.00374	−0.00229	0.00505
		(0.00407)	(0.00407)	(0.00407)	(0.00423)	(0.00510)
GDP[(b)]		−0.0725	−0.0725	−0.0725	−0.0461	−0.0515
		(0.0985)	(0.0985)	(0.0985)	(0.0992)	(0.110)
Pop		0.433^{*}	0.433^{*}	0.433^{*}	0.315	0.0288
		(0.252)	(0.252)	(0.252)	(0.269)	(0.296)
UNSC		-0.0096	-0.0096	-0.0096	-0.0238	-0.0341
		(0.0427)	(0.0427)	(0.0427)	(0.0407)	(0.0443)
Democracy		0.103^{**}	0.103^{**}	0.103^{**}	0.127^{***}	0.153^{***}
		(0.0411)	(0.0411)	(0.0411)	(0.0443)	(0.0501)
Constant	-4.15^{***}	-12.29^{***}	-12.29^{***}	-12.34^{***}	-10.99^{**}	−6.75
	(0.135)	(4.614)	(4.614)	(4.601)	(4.836)	(5.400)
Observations	10,052	7,406	7,406	7,406	6,898	4,965
R-squared	0.504	0.441	0.441	0.441	0.438	0.447
Number of dyads	527	454	454	454	454	326
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Dyadic FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table presents the Fixed Effects estimates of the log-linearized model of bilateral aid allocation. [(a)] *Canada and the United Kingdom excluded from the estimation.* [(b)] *Variables per capita. Standard errors are in parentheses. Independent variables are lagged to reflect aid allocation process and avoid simultaneity bias. ***, **, and * indicate 1%, 5%, and 10% significance levels. UNSC: United Nations Security Council.*