To give or no give? How do other donors react to the EU food aid allocation?

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Abstract

I study interactions among aid donors. More specifically I investigate how other donors react to the European Union (EU) aid. Focusing on one type of aid (food), I am able to develop an instrumental strategy to estimate the causal effect of EU food aid allocation on allocation from other donors. I combine two sources of variation for the identification. First I exploit an exogenous source of time-variation associated with the EU reform of food aid allocation in 1996. The reform leads to an increase in selectivity; in consequence the number of recipients is deeply decreasing. Secondly I exploit cross-sectional variation in the country's propensity to receive aid from the EU before the reform. The probability of receiving aid from the EU decreases more for regular recipients before 1996. I use the interaction that represents the intensity of the reform for each recipient as an instrument for the probability of receiving food aid from the EU.

Using data provided by the World Food Programme (WFP), I show that the EU crowds in significantly food aid from other. I also find large heterogeneity among donors. European countries react mainly significantly and positively to the EU food aid allocation. By contrast the US and the WFP react negatively to EU food aid allocation. Newt I develop a model in which donors may react to other donors because of competition, altruism, specialization and geopolitical interest. I derive a typology of donors. Donors tends to want to mimic EU food aid allocation but some are altruism, others are strategic.

JEL: C26, F35, F42, H84

Keywords: Food Aid, European Union, Allocation, Donors, Interaction

I. Introduction

Since the Paris Declaration (March 2005) and the Accra Agenda for Action (September 2006), aid coordination has been a recurrent theme in international discussions and has been pointed as one cause of aid inefficiency. However the need for coordination, in the case of food aid, has been encouraged long before through the Food Aid convention created in 1967.[1] The gains for coordination are multiple and well-known: transaction costs savings [Brown et al., 2000], expected increase in food aid efficiency (through better targeting for instance [Disch, 1999])...[2] But coordination also induces some costs [Easterly, 2002]. Bourguignon and Platteau [2015] show that (food) aid coordination involves incentive problems leading to free riding problems. Moreover, each donor faces a trade-off between costs (political independence) and benefits (lower transaction costs) that impedes to reach the optimal level of coordination. In addition Torsvik [2005] shows that under some conditions aid coordination could be harmful because it crowds out domestic support. Currently coordination among donors is far from reality, especially in a context of an increasing number of donors – new bilateral donors, NGOs, regional development bank [Aldasoro et al., 2010]. This lack of food aid coordination leads to fragmentation and non efficient allocation where some recipients – darling countries – are favored by most donors while others – orphan countries – are largely neglected keeping people suffering from hunger [Utz, 2011]. For instance, in December 2014, the World Food Programme (WFP) partially suspended food aid to Syrian refugees due to a funding crisis while in March 2010 the Haiti's president asked the United States to "stop sending food aid".

Nevertheless, no coordination does not mean that there are no interactions among donors or that donors do not react to aid allocation from other donors. On the contrary donors worry about the impact of their actions relative to other donors because it's hard to measure absolute impact of each food aid donor [An-

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[1] The objectives of the FAC are "to contribute to world food security and [...] respond to emergency food situations". To do so, donors pledge to provide annually specified minimum amounts, or values of food aid to developing countries. The FAC also provides "a framework for cooperation, co-ordination and information-sharing among members [...] to achieve greater efficiency". In 2013 the FAC was renamed the Food Assistance Convention whose main objective was "facilitating information-sharing, cooperation, and coordination, and providing a forum for discussion in order to improve the effective, efficient, and coherent use of the parties' resources to respond to needs".

[2] For a review of the expected gains and the empirical literature on it see Bigsten [2006].

nen and Moers, 2012]. In addition some organisms rank donors depending on their commitment and the relative effectiveness of their aid, for instance HANCI in the case of tackling hunger and under-nutrition. Ignoring such interactions is implicitly assuming that an exogenous change in one donor's allocations will be totally additional for recipients, meaning an increase of one for one. It also assumes that food aid allocation is free from some donor interests that could be affected by the allocation of other donors (such as bilateral trade). The purpose of this paper is to investigate empirically whether donors interact with each other. More precisely I provide causal estimates of the effect of the European Union (EU) allocation of food aid on food aid allocation by other donors. This paper is not about what kind of coordination should be implemented.[3] Understand actual allocation determinants and current interactions among donors is necessary to implement, in a second step, a coordination framework in which donors have incentive to join it and not to deviate.

There is a large (and mostly empirical) literature that looks at the determinants of (food) aid allocation. For food aid one major research question is to know whether donors are responding to recipient needs that correspond to the main concern address by the FAC [Barrett and Heisey, 2002, Neumayer, 2005, Young and Abbott, 2008]. The FAC states "Food aid, only to be provided when it is the most effective and appropriate means of assistance, should be based on the *evaluation of needs* by the recipient and the members. In responding to those needs, members shall pay attention to meeting the particular nutritional needs of women and children." Whatever the way they proxy recipient needs – agricultural production, child mortality, deviation from long term production, GDP – most of the literature finds little responsiveness of food aid flows to needs. On the other hand they do find that food aid flows depend on donor's interests [Zahariadis et al., 2000]. It's also the case for humanitarian aid in general [Fink and Redaelli, 2011]. Donors allocate more aid to countries that have similar vote to the UN Assembly [Alesina and Weder, 2002], to former colonies [Dollar and Levin, 2006], to some preserve or allies [Berthélemy, a] or to countries with trade links [Barthel et al., 2014]. Foreign aid allocation also depends on governance indicators [Neumayer, 2003]. Another part of the literature looks at heterogeneity among donors. Some countries such as the United States, France or Japan react more on their

[3]Coordination could be a joint response as well as a geographical specialization or both depending on the type of aid or emergency situation.

own interests than on recipient needs where Scandinavian countries are less selfish [Berthélemy, b, Nunnenkamp and Öhler, 2011].

By contrast the empirical literature has devoted little attention to (strategic) interaction among donors. For instance Alesina and Dollar [2000] does not address this concern, assuming that aid from one donor cannot crowd out or crowd in aid by other donors. Some papers provide indirect evidence of interactions among donors. Berthélemy and Tichit [2004] find some signaling effect – meaning a positive correlation – between total aid and aid from one donor. They include total aid from other bilateral donors as a control variable but they do not attempt to correct for simultaneity bias. More recently Aldasoro et al. [2010] study the impact of the Paris Declaration considering aid fragmentation as an evidence of a lack of coordination. They find that donor coordination has not improved. Nunnenkamp et al. [2013] using a different approach but the same proxy for coordination concludes that coordination among donors has even weakened after 2005. Frot and Santiso [2011] using methods from finance show little but significant and positive interactions – they call "herding behavior": an increase from one donor induces an increase in total aid to a recipient by more than 1-for-1 increase. More specifically on food aid, only one paper looks at interactions among donors. Kuhlgatz et al. [2010] estimate simultaneously food aid allocation for different donors and allows for correlation among donors with respect to a given recipient country in a specific year. They do not distinguish between simple interaction and coordination and directly interpret the significance and value of correlation terms as indicators of whether donors coordinate and the way they do. They find positive correlation and interpret it as a joint action. On the contrary they state that a negative coefficient would have suggested coordination by geographical specialization. However a positive correlation could also result in competition among donors in which a donor reacts to another by increasing its own aid. In addition this study does not estimate the magnitude of other donors' reaction to a change in food aid allocation of one specific donor.

Only two papers studying interactions among donors (to my knowledge) claim to take into account the endogeneity problem due to simultaneity on donors' allocation and reverse causality. Using panel data from 1988 to 2007 and trying to correct for endogeneity of other donors' aid with a spatial econometric approach Davies and Klasen [2013] find a small but significant positive effect of other donors'

aid on the amount of aid provided by a particular donor to a recipient. They carefully do not interpret their results as coordination but only as interactions among donors. They also provide some rationale on what could generate positive or negative dependencies in donor allocations. However there are concerns on the excluding restriction and the use of spatial econometrics [Gibbons and Overman, 2012]. It needs, for instance, that the fact a recipient country j shares the same language that a donor k (for instance Ivory Coast and France) does not directly affect the probability of receiving aid from a donor j (for instance the USA). It is unlikely to be the case because the fact that the USA and Ivory Coast do not share the same language may increase administrative costs relative to food aid – by inducing translation costs for instance. The identification in the second paper by Knack et al. [2014] relies on an exogenous World-Bank determined threshold for eligibility for concessionary International Development Association (IDA) loans. They find that bilateral aid is significantly reduced after countries cross the IDA income cutoff and heterogeneity across donors, especially between EU member countries and non EU countries. However in order to provide a clean empirical analysis they have to focus on a local effect and on one specific type of aid.

This paper contributes to the small existing literature on interactions among donors by providing new causal evidence. Focusing on one type of aid – food aid – I estimate the causal effect of EU food aid allocation on other donors' allocation. The EU food aid only refers to food aid allocated through the European Union and not directly by EU member states. Food aid directly sends by EU member countries is considered as bilateral aid from other donors. Even if this study restricts the analysis to the reactions of a change in EU food aid, it is still interesting for policy implications: the EU is the second largest donor of food aid. In addition the EU wants to be the leader in promoting food assistance programs. The European Union was at the forefront during the Paris summit on aid effectiveness and during the negotiation of the Food Assistance Convention. The EU was one of the first institution ratifying the FAC. This study allows investigating whether this leadership leads to crowd in food aid from other donors. Finally I also provide indirect evidence on whether these interactions reflect competition or coordination among donors.

I combine two sources of variation adapting to this study the empirical strat-

egy used by Nunn and Qian [2014]. First I exploit an exogenous source of time-variation associated to the EU reform of food aid allocation in 1996. Before 1996, food aid policies were driven by supply (European surplus) and not by demand (needs). In practice, it leads to few selectivity thus to a large number of recipients. After 1996 the EU shifted to a demand-driven allocation.[4] In consequence selectivity is increasing and the number of food aid recipients is deeply decreasing. Hence the probability of receiving EU food aid sharply decreases after 1996. Secondly I exploit cross-sectional variation in the country's tendency to receive aid from the EU before the reform. For all potential recipients the probability of receiving aid from the EU is decreasing but this decrease is larger for regular recipients before 1996. I interact both types of variation and use it as an instrument for the probability of receiving food aid from the EU. The interaction term measures the intensity of the reform on the probability of receiving aid from the EU for each recipient.

The excludability of the instrument relies on different assumptions. First the reform should not have not anticipated by other donors or another donor should not have simultaneously implemented a reform of food aid policy. I provide evidence that other donors (outside the European Union) did not know the exact timing of the reform and its actual consequences and no other donors had reformed their food aid program at the exact same time and affecting the exact same recipient countries. Second the reform did not affect the allocation of food aid from the EU members. Members were not obliged to conduct such reform for bilateral aid and I find no evidence of such reform at the national level for member states. Reform should induce change in how the EU members react because the reform enhanced the importance of coordination but in practice no mechanisms were implemented to increase cooperation.

Next I derive a simple theoretical model on donors' interactions to explain why donors interact and for which purposes. Donors react to other donors because of three main mechanisms: altruism, direct competition and comparison. Allocation also depends on geopolitical bias. I derive a typology of donors. All donors tends to mimic the EU allocation but some donors are altruistic (especially the WFP), others weight more the competition effects.

[4]Food aid policy explicitly states that EU food aid has to promote food security related to poverty, to reduce food aid dependency. In addition food aid programs have to be integrated into larger development policies implemented by recipient governments.

Data on food aid flows are provided by the World Food Programme. It is a panel of 144 recipient countries from 1988 to 2011.[5] I find that aid flows from other donors are significantly influenced by EU food aid policies. On average if the EU gives aid to a specific recipient it increases by one the number of other donors. I also find evidence of heterogeneity across donors and recipients. In disaggregating aid from bilateral donors, European countries except the United Kingdom and Luxembourg are countries that react positively and mainly significantly to the EU allocation. Japan does not react significantly to European food aid. By contrast EU food aid crowds out food aid from the US and the WFP.

The remainder of the paper is organized as follows. Section II provides an overview of the data and descriptive statistics, describes food aid allocation from the European Union and the 1996 reform of food aid policies. Section III describes the empirical strategy. Section IV presents results for the baseline specification, for various robustness tests and falsification tests. Section V presents the theoretical framework and provides a donor typology. Section VI summarizes the findings and discuss the implications.

II. Food Aid Allocations and the 1996 EU Reform

This section describes the data and provides some descriptive statistics on food aid allocation. It also documents the effect of the reform on the recipient's propensity to receive food aid from the EU.

A. The INTERFAIS-WFP database

Data are generously provided by the WFP and come from the INTERFAIS database. It registers all food aid shipments (in the recipient country) for the period 1988 to 2011. In this study I'm interesting about whether a donor gives food aid and on the amount allocated. On the contrary I do not investigate through which types of aid – program, project or emergency – delivery modes – direct, triangular or local – or commodities a donor react. Hence I look at the total amount of food aid provided by a donor to a recipient. The sample is a panel of 144 recipient countries (defined in 2011) between 1988 and 2011. In a given year t potential recipient countries are all the countries that have received at least any food aid from one donor over the period of interest. Thus it includes countries that receive

[5] Panel is not perfectly balanced due to state partitions.

no food aid in year t – for instance in 1988 Afghanistan does not receive any food aid from one of the donors I'm interested in but is included in the sample in 1988.[6]

I restrict the analysis to regular donors that represents about 96 percent of total food aid. Regular donors give food aid to at least one recipient country every year. These donors are the one who are more likely to react to European food aid allocation. Occasional donors allocate food aid to other motives. In addition for occasional donors, especially non governmental organizations the exhaustiveness of the data is not sure, see appendix A.A for more details. European food aid can be decomposed into two principal parts: food aid from the European Union (EU food aid) and food aid from member countries (member food aid). In this paper EU food aid always refers to food aid from the European Union excluding aid from members that are considered as bilateral aid.

B. Some descriptive statistics on donors' allocation

At the beginning of the period the EU food aid represented almost 20 percent of global food aid. This share has declined to 10 percent of global food aid in the 2000s. However the EU remains one of the main actors in food aid. For instance the EU was a major actor in the negotiations of the FAC in the 2000s. In addition when looking at the recipient level, for almost 50 percent of recipient countries, the EU is one of the two largest donors and one of the four largest in 75 percent of cases (see figure 4 in appendix A.B).

Table 1 provides the average number of recipients by donors for two sub-periods: 1988 to 1995 and 1996 to 2011.[7] The number of EU food aid recipients is divided by two after 1996. The EU is the only donor with such type of large decrease. European members also decrease globally the number of recipients but in smaller proportions. It is also the case for non European members.[8] On the contrary the number of recipients from the UN institutions has doubled. For the UN institutions the increase is mainly explained by the increasing role of the WFP on food aid and food assistance programs. The pattern is similar for the average quantity allocated to recipient countries.

[6] In robustness check I define recipient countries in a given year t as countries that have received food aid from at least one donor at time t. In this specification, Afghanistan is not included in 1988.

[7] I will use these two periods in the empirical strategy.

[8] If I look at the donor level, among European member countries only the UK has slightly increased its number of recipient countries after 1996. The largest decrease is Canada which is partly due to large budget cuts during the 1990s. Only Japan has increased its number of recipients.

It also underlines a positive correlation across donors' allocation.[9] Obviously this correlation is partly due to similar responses to negative shocks on recipient countries – all donors allocate aid after dramatic natural disasters such as Haiti earthquake in 2011. However I observe some variations on the correlation suggesting that donors may not only react to similar shocks but also react to the EU food aid allocation. For instance the correlation on the choice is higher for EU state members than for non EU member donors or the UN institutions. It could indicate that the EU members react positively to the EU food aid allocation due to some signaling effects.[10]

	Until 1995	After 1996	Correlation
	Number of recipient countries		
EU	86	44	1
EU Members	88	79	0.56
Non EU members	103	91	0.51
UN institutions	17	34	0.22
	Average quantity allocated to recipients		
EU	2 394 670	831 311	1
EU Members	1 305 302	897 245	0.47
Non EU members	8 954 894	5 274 221	0.54
UN institutions	28 170	152 990	0.06

Table 1—: Desciptive statistics on recipient numbers, food aid quantities and corrlation among donors

INTERFAIS database. Author's calculation. A country is a recipient if she receives any kind of food aid. For grouping donors such as EU members, a recipient is a country receiving food aid from at least one EU member. The quantity is the average total amount of food aid (in metric tons) received from the group of donors by recipient countries. The third column provides the correlation of food aid allocation by type of donors with the EU food aid allocation.

C. The EU food aid policy reform: background

EU food aid policy before 1996:

Before 1996 project and program food aid were administrated by Regulation n°3972/86 of Council of December, 22 1986. The EU food aid was mainly supplied-driven. Since 1967 EU food aid has been closely linked with the common agricultural policy (CAP) and until 1986 both policies have been explicitly

[9] I do not adjust correlation with the overall budget of food aid. Indeed a recipient is more likely to receive food aid from the US and the EU than from the EU and Italy because the budget devoted by the US to food aid is larger. However if I look at the share of donor's food aid received by each recipient – that adjust for budget size – results are similar.

[10] A government may justify its allocation by comparison to the allocation of the EU.

related. Even if it was not anymore explicitly mentioned after 1986, the main purpose of food aid was still to run down agricultural surplus.

In consequence the EU reaction was slow to recipients' needs and food aid was allocated to many different countries. At the beginning of the 1990s, agricultural surplus decreased due to reforms of the CAP: food aid was more and more scarce. In parallel criticisms increased and the EU program acquired a reputation of slowness and unpredictability in delivery within the development assistance community. Hence after the European election in 1994 the EU decided to launch an external evaluation of its food aid program.

The evaluation [Clay et al., 1996] was the main source of recommendations for the reform adopted in June, 27 1996. The report pointed that the EU reached its minimal requirements for the FAC and reacted positively to the largest food crises. However the EU targeting was poor. Countries with chronic food insecurity were not more targeted than countries with low levels of needs. In addition these countries often received small and one time allocations representing only a small part of the overall food supply that raises questions about the effectiveness of EU food aid. The evaluation shows also that EU food aid has generally been tied by source and commodity to EU food markets leading to large transaction costs. The evaluation suggests to concentrate food aid on a limited number (around 15) of low-income, seriously food deficit countries. In addition the authors recommend being involved in two specific circumstances: in case of temporary food aid gap and in case of chronic food insecurity or endemic poverty. Finally the report stresses the lack of coordination with any other donors even with member countries mainly due to a lack of consistent and regular sharing of information.

EU food aid policy after 1996:

The new regulation n°1292/96 of the Council ratified in June 1996 adopts a large number of recommendations done by the report [EC, 1996]. First a list of eligible countries is established for project and program food aid corresponding to the countries that per capita GDP was below 695 USD in 1992; it does not concern emergency food aid. Second food aid principles are clearly expressed: to promote food aid security related to poverty, to increase the nutritional status of recipient households, to reduce food aid dependency and to coordinate food aid among EU member states. Food aid combating chronic food insecurity should be provided only to countries involved in a coherent national food strategy oriented

to the poor. Third food aid should take into account local dietary customs that results to favor local (within a country) or triangular (in a third country) purchases of food aid. In addition EU should evaluate needs. This assessment should take into account food deficit, food security through specific indicators such as HDI, income per capita, index of well-being, payment balance, ... All these new criteria result in four major changes in project/program food aid allocation.

First the new regulation underlines that "food aid shall primarily be allocated on the basis of an objective evaluation of the real needs justifying such aid, as this is the only way to improve the food security of groups which do not have the means or the possibility of plugging their food shortage themselves. To that end, consideration shall be given to the following criteria, without excluding other relevant considerations: food shortages, food situation measures, per capita income and the existence of particularly poor population groups, social indicators of the welfare of the population, the recipient country's balance-of-payments situation, the existence in the recipient country of a long-term policy on food security". In consequence the EU has reduced the number of recipient countries (see figure 1).[11] Interestingly before 1996 the trend of the number of recipients was parallel for other donors but it does not follow the same sharp drop from 1996.

Second the higher selectivity and the decrease in budget for program and project food aid result on an increasing share of EU food aid devoted to emergency situation (see figure 6 in appendix A.B).[12]

Third the EU has adopted that "the products supplied, along with another operation in the framework of food aid, must reflect as closely as possible the dietary habits of the recipient population and shall not adversely affect the recipient country". In consequence triangular and local purchases are more frequent (see figure 7 in appendix A.B).

Fourth the new regulation regulates quantities. The volume of aid "granted in a given case shall be limited to the quantities needed by the population affected to cope with the situation for a period not normally exceeding six months".[13] In parallel the total budget for food aid has decreased. In consequence quantities

[11]The decrease is mainly due to program and project food aid (see figure 5a in appendix A.B). Even if the reform does not concern emergency food aid, a similar pattern has occurred for emergency food aid in lower proportions (see figure 5b in append).

[12]"Operations under this Regulation shall be appraised after analysis of the desirability and effectiveness of this instrument as compared with other means of intervention available under Community aid which could have an impact on food security and food aid." [EC, 1996, Chapter 1, Article 1 2.]

[13]It was four months in the 1986 regulation [EEC, 1986].

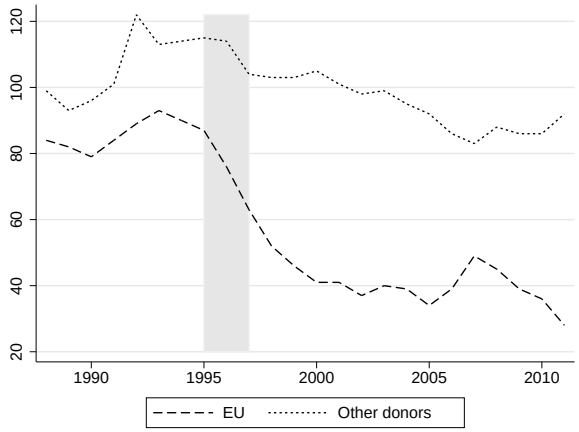


Figure 1. : Number of recipient countries

Note: Pattern is similar if all non regular donors are included.

received by recipient countries have not decreased just after the implementation of the reform at least (see figure 8a in appendix A.B).[14]

Consequences on food aid allocation by the EU:

Hence the reform mainly affects the first level of allocation that means to whom the EU allocates aid and but also affects the second stage of allocation – how much the EU gives food aid. It also suggests two main phases in the implementation of the reform: from 1996 to 2000 that corresponds to the take-off of the reform – reduction of the number of recipients – and after 2000 that corresponds to the final adjustment – change in delivery mode, reduction in quantities allocated to recipients because of the decreasing budget. I will use this exogenous time variation – from the point of view of other donors – in the EU allocation at the first stage of decisions as an instrument to the probability of receiving food aid from the EU.

Figure 2a plots the average probability of receiving food aid from the EU by year. The gray area represents the period between 1995 and 1997. Before 1996 the probability has slowly decreased; in 1996 there is a sudden drop in the probability

[14]However one could expect that the reform may affect the quantities allocated to recipient that received relatively low amounts of food aid and excluding countries receiving large amounts of food aid due to a specific disaster. Figure 8b in appendix A.B plots the average quantity of food aid received by recipients excluding the three largest recipients – representing on average between one third and half of total food aid allocated by the EU. The pattern is similar.

of receiving food aid from the EU. Then the probability is still decreasing. Secondly, the reform does not affect uniformly all recipient countries. More exactly the reform affects more countries that have received regularly food aid before 1996 than countries that have received irregularly. To illustrate this point I divide the countries in my sample into two groups based on the frequency they receive food aid from the EU before 1996.The sample median value is equal to 0.78. Countries that received the most often food aid are called "regular countries" and the others "irregular countries". Next I compute for each group the average probability of receiving any type of food aid from the EU every year and plot it. Figure 2b shows that there is a clear drop in the probability of receiving any food aid from the EU among regular recipients before 1996. Irregular recipients are also affected by the reform but the impact is smaller.[15]

Next for each group I compute the probability of receiving any food aid from at least one donor except the EU.[16] I plot it against year highlighting the period of the reform. There is a change in the probability of receiving any food aid from at least one other donor for EU regular countries but the effect seems to be quite low (see figure 3). For EU irregular countries, the effect seems to be larger and seems that the decreasing trend in the probability of receiving food aid is increasing after 1996. These figures do not control for variables that could drive food aid allocations commonly but suggest that on average EU food aid does not crowd out food aid from other donors and even may crowd in. I also could expect heterogeneous reactions of donors to the impact on EU food aid allocation of EU food aid reform. For instance one could expect that EU member countries are more likely to react in the same direction than the EU. Next section provides the empirical analysis that allows me to control for many variables that also drive food aid allocation.

III. Empirical Strategy

A. Specification

Let's consider the following specification:

$$FA_{drt} = \beta FA_{EUrt} + X_{drt}\Gamma_1 + X_{rt}\Gamma_2 + \phi_{dt} + \phi_{1dr} + \epsilon_{drt} \tag{1}$$

The index d refers to donors, r to recipient countries and t denotes years. The

[15] Patterns are similar for quantities.
[16] Hence all other donors are pooled together as if it was a unique donor.

dependent variable, FA_{drt}, is either a dummy equal to one if donor d allocates aid to recipient r at time t either the inverse hyperbolic sine transformation of the amount of food aid allocated by the EU to recipient r.[17] X_{drt} is a vector of control time-variant variable specific to the pair donor-recipient; X_{rt} also includes control variables specific to recipient countries. I allow the time effect to differ across donors and control for donor-year fixed-effect, ϕ_{dt}. It captures for instance donor specific trend in food aid budget. ϕ_{1dr} denotes pair donor-recipient fixed effects and captures all time-invariant pair specificity. X_{rt} and X_{drt} control for all time-variant characteristics that explain food aid allocation by donor and thus that explain the part of correlation between allocation only due to similar response to shocks.

More specifically X_{rt} controls for recipient's needs that depend on population size, domestic cereal production per capita, GDP per capita and the number of refugees hosted by the recipient country. I also control for the occurrence of a disaster or a conflict, two phenomena that explain largely food aid allocations: I include a dummy equals to one whether the recipient country suffers from a disaster – drought, fire, flood, earthquake... – and a dummy equals to one if the country is involved in an internal or external conflict. Food aid allocation is also driven by agricultural surplus (especially for wheat in the US and the EU before 1996). International price is a good proxy of such surplus. Hence I control for international wheat price as food aid is mainly wheat aid. Many papers suggest that the effectiveness of aid depends on the quality of the recipient country. Thus donors may allocate more likely aid to more democratic countries. In order to capture this determinant I control for a democracy index (Polity IV) and two indices on civil liberties and political rights. Fixed effects capture all time-invariant pair characteristics such as colonial link, common language and distance but there are also time-variant determinants of food aid allocation. The most important is diplomatic relationships: good relationship may increase the probability of receiving food aid. I proxy it by the UN vote similarity index constructed by Strezhnev and Voeten [2012]. These controls and fixed effects will capture all determinants of food aid allocations that are not related to the reaction to the allocation by other donors.

[17] Inverse hyperbolic sine transformation (IHST) is similar to log transformation in helping reduce influence of outliers, but is defined at zero [**?**]. IHST of x is $log\left(x + (x^2+1)^{\frac{1}{2}}\right)$.

FA_{EUrt} the variable of interest is either a dummy equal to one if the EU allocates aid to recipient r at time t either the inverse hyperbolic sine transformation of the amount of food aid allocated by the EU to recipient r. The coefficient of interest, β, is the estimated effect of the food aid participation of the EU in country r on the probability of participation of donor d in country r (or the amount). A positive coefficient indicates that, on average, if the EU allocates food aid to a specific country r it increases the probability that donor d gives also food aid to the recipient country. By contrast a negative coefficient suggests crowding out of the EU food aid. Finally a coefficient non significant estimate indicates that I cannot reject the hypothesis that the allocation of donor d is independent to allocation of the EU.

However FA_{EUrt} is clearly endogenous because of two problems: omitted variables and reverse causality. First donors may react in the same way to an unobservable shock. For instance in 1984 a global media campaign launched by the BBC contributed to aware people about the large famine in Ethiopia. It leaded to an unexpected and massive civil mobilization. In reaction governments also increased their food aid to Ethiopia. In this example the unobservable shock is the global media campaign – I cannot include all advocacy campaigns about food crisis in my model (because of a lack of data). In such a case the OLS estimate is up-ward biased. In addition there is a problem of reverse causality. The EU also reacts strategically to the allocation of other donors. Food aid is still a weapon for diplomatic and economic concerns. Donors do not know exactly the allocation of other countries because decisions are made simultaneously but they can infer it based on previous allocations. Previous papers show that food aid is quite persistent [Kuhlgatz et al., 2010]. The only thing I observe is the equilibrium allocation based on donors' reactions to expected allocation from other donors. However I decide not to model FA_{drt} depending on FA_{EUrt-1} because the lag variable is still endogenous – correlated with FA_{drt-1} – and adds auto-correlated residuals. In a robustness check I will estimate this model. It does not change the main results. To my knowledge there is no non-linear procedure that correctly estimates parameters in case of both binary outcome and binary endogenous variable with individual fixed effects, that's why I estimate a linear specification for the 0/1 choice. In addition I'm not interested in any forecasting but on the average effect.

B. Instrumental Strategy

I instrument FA_{EUrt} by an interaction term between the timing of the reform $Reform_t$ and the cross-sectional recipient variation induced by the propensity of receiving food aid from the EU before the reform, P_r. $Reform_t$ is dummy equal to one if the reform has been implemented (i.e. $t > 1995$). P_r is the country's propensity to receive food aid from the EU before 1996. P_r is equal to $\frac{1}{8}\sum_{t=1988}^{1995} FA_{EUrt}$, it is the share of years before the reform a country r receives food aid from the EU. Hence the first stage is:

$$FA_{EUrt} = \lambda Reform_t * P_r + X_{rt}\Gamma_2 + \phi_{2t} + \phi_{2r} + \nu_{rt} \tag{2}$$

The instrument uses variations induced by the reform across recipients. Indeed the reform does not affect uniformly all recipient countries. In previous section I document that the decrease in the probability of receiving aid and in the quantities of aid received from the EU is larger for countries that received regularly food aid before the reform. Hence I expect λ to be negative. It allows me to include year fixed effect in the first stage equation 2 that controls for changes over time that could be spuriously correlated with EU food aid allocation pattern. ϕ_{2t} also captures the direct and uniform impact of the reform on recipients. ϕ_{2r} controls for the direct impact of P_r on FA_{UErt} which is time-invariant and for specific relationship between the EU and the recipient. Hence the first stage looks like to a Diff-in-Diff analysis. It compares before and after the probability of receiving food aid from the EU (or the quantities received) in countries that receives frequently food aid from the EU before the reform to countries that receives rarely food aid from the EU. However the treatment is not dichotomous but continuous. The reduced form makes a similar comparison but with food aid from donor d as the dependent variable.

Causal inference using the interacted variable relies on the assumption that, conditional on the controls, the interaction between the reform dummy and the recipient's propensity of receiving the EU project or program food aid before the reform only affects food aid allocation from other donors through EU food aid allocation pattern. Different concerns arise.

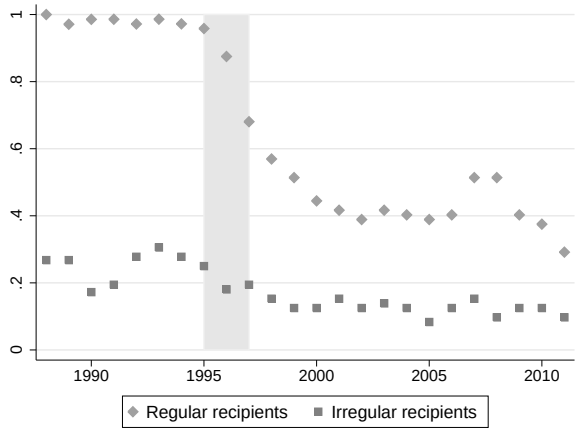
A first concern is that another donor also implements a reform of food aid policy that affects in the same way the same recipient countries. In such a case

I cannot interpret the coefficient β as the effect of EU food aid allocation on other donors' allocation. I find no evidence of any reform in countries outside Europe. For EU member states there is no national reform of food aid policy. Second the EU reform does not apply to bilateral food aid but only to EU food aid; members still allocate bilateral food aid as they want. In addition it does not change the way the budget is voted for EU food aid. Thus it has no impact on the bilateral food aid budget. One concern is about coordination. Indeed the new regulation stresses the importance of increasing coordination between the EU and state members. However the European Court of Auditors [2003] pointed that there is no effective coordination between the EU and state members on food aid allocation. There was no communication across both parts especially from state members to the EU. Sometimes the EU delivered information on its allocation. Thus if something is at stake it's a better knowledge of the EU food aid allocation by state members. If anything it gives more information to EU members on EU food aid allocation that just reinforces the capacity of EU donors to adjust their allocation to EU allocation. Thus in my baseline specification, I will consider no coordination on aid allocation between the EU and EU state members. However in a robustness I will also consider the opposite extreme case in which bilateral EU and multilateral EU food aid are determined jointly and only the rest of the world reacts to European food aid.

A second concern is about anticipation of the reform by other donors. Other donors should not have anticipated the reform and have adapted their allocation in consequence. Since the beginning of the 1990s criticisms about EU food aid have been important. It was known that the EU has decided to evaluate its programs. However official conclusions and suggestions to improve food aid programs were published after the adoption of the new regulation. In addition the exact timing for the adoption of the new regulation cannot be anticipated by the countries outside the EU. Moreover the EU has no incentive to implement the new policies before its ratification because it was a way to run down agricultural surplus. Countries inside the EU have more information on the reform and thus may have anticipated the reform and its consequences. In addition figure 5a seems to show that the EU starts to implement the reform before its ratification, that's why in robustness check I use the year 1994 as the year of the reform. This date should not have been anticipated by EU member states. Results remain similar.

In conclusion my 2SLS estimates reflect the average effect for observations that comply with the instrument, i.e. countries for which the probability of receiving project of program food aid from the EU has changed after 1996. The estimate is not driven by countries whose probability of receiving project of program food aid from the EU is unaffected by the reform.

(a) All recipient countries



(b) Heterogeneous effects

Figure 2. : Average probability of receiving food aid from the EU

Note: Regular recipients are countries whose probability of receiving food aid from the EU before 1996 is above 0.78 – the sample median value. Irregular countries are countries whose probability is below 0.78 (see table 7 in appendix A.C for the list of regular and irregular recipients).

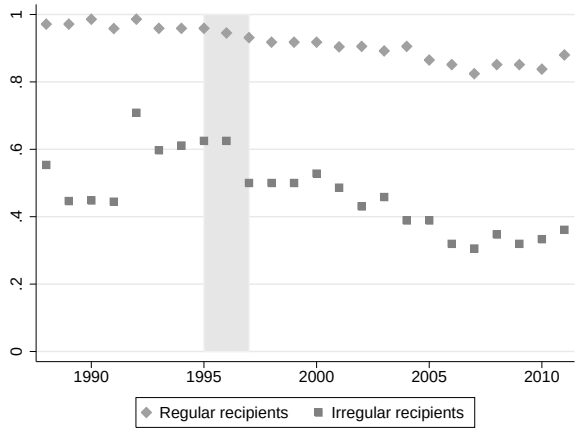


Figure 3. : Average probability of receiving food aid from at least one donor except the EU

Note: Regular countries are countries whose probability of receiving food aid from the EU before 1996 is above 0.77 – the sample median value. Irregular countries are countries whose probability is below 0.77 (see table 7 in appendix A.C for the list of regular and irregular recipients).

IV. To give or not to give? Empirical results

A. OLS Estimates

The OLS estimates of equation 2 for the 0/1 choice are reported in first lines of table 2.[18] Column (1) only controls for pair recipient-donor and donor-year fixed effects. The estimate is positive and highly significant. The correlation between the EU allocation and the allocation by other donors is positive and significant at a one percent level.

In column (2) I include a range of variables, X_{rt} to control for factors that may be correlated with donor's allocation. I control first for variables that capture recipient needs. For cereal production I take the logarithm because I am more interested in the variations than on the level of production and its square to be more flexible. I do not include food imports so as avoid endogeneity [Barthel et al., 2014] even if two recipients may have the same level of cereal production per capita but still different needs because of their distinct capacity to import food. GDP per capita and squared GDP per capita (in log 2005 US dollar) are added to control for food insecurity linked with poverty and entitlement [Sen, 1981]. The literature on aid determinant stresses the potential "population bias". That is to say that if, ceteris paribus, the population doubles aid receipts would increase but not by two. Hence I control by the level and square of the logarithm of population. Wheat price is an important determinant for the quantity of food aid allocated by some donors such as the US [Maxwell and Barrett, 2005, Nunn and Qian, 2014] but it is captured by year fixed effects. Food aid is also often allocated to refugees or internal displaced population. Hence I introduce the share of refugees and internal displaced populations in recipient countries and its square.

In column (3) additional controls are time-variant recipient variables, X_{rt}: a democracy index (Polity IV)and two indices on civil liberties and political rights.[19] A part of the literature suggests that aid efficiency depends on the level of governance and liberties of the recipient countries. Thus donors may adjust their allocation to these variables.

In column (4) I include a time-variant donor-recipient variable X_{drt}. I proxy

[18] Results for quantities are really similar and available upon request. The order of magnitude and the significance of the estimates (OLS, 2SLS, reduced form) is the same. Only the order of magnitude changes for the first stage.

[19] Both index are constructed and provided by the Freedom House. These variables reduce the sample size that's why I introduce them in a third specification.

diplomatic relationships by the UN vote similarity index constructed by Strezhnev and Voeten [2012]. This variable reduces quite significantly the sample size. I include these variables for both level of allocation decisions.[20] Results in column (3) are my baseline results.

B. 2SLS estimates and reduced form

Table 2 also provides the estimate of the reduced form and the first stage of the 2SLS estimation. The first stage estimates show a strong negative correlation between the instrument and the choice to give food aid from the EU. The Kleibergen-Paap F-statistic is higher than 2 000 (except in column (2)) suggesting that the instrument is not weak and thus that the estimates are not biased by a weak instrument. For a country that had received every year program or project food from the EU before 1996, the reform induced a decrease in its probability of receiving EU food aid by 53 percentage points. Given the average probability of receiving any food aid from the EU before 1996, I can estimate the predicted average number of EU food aid recipient countries after the reform: about 42 if all other variables remain constant. It is really close to the actual average number of EU food aid recipients even if it does not take into account the decreasing budget allocated to food aid by the EU that may also affect the number of food aid recipients. Estimates are quite stable across the different specifications once I include some controls. The reduced-form effects show that the probability of receiving any food aid from another donors decreases for the EU darling recipients after the reform. The effect is significant at the one percent level. Again the estimates are stable across the different specifications.

Finally table 2 reports the 2SLS estimates. Without any controls, the estimates is quite low and is not significant. However once I control for time-variant determinants of recipients' needs and bilateral effect, the estimate is larger and significant at the five percent level. Compared to the OLS estimates the effect is divided by two. Results suggest that if the EU allocates aid to a recipient country it increases by five or six percentage points the probability of receiving food aid from another donor. The results are in line of other studies [Knack et al., 2014, Davies and Klasen, 2013] that looks at the causal estimates on the interaction

[20]Data on refugees are provided by the UNHCR. Cereal production data come from FAOSTAT. Data are provided by the CRED of UCL for disasters [Guha-Sapir et al.] and by the Center for Systemic Peace for conflicts. GDP data, population and wheat price are provided by the World Bank.

Dependent Variable	Any food aid			
	(1)	(2)	(3)	(4)
OLS Estimates				
Any EU food aid	0.09582***	0.08821***	0.08885***	0.08339***
	(0.00545)	(0.00539)	(0.00560)	(0.00571)
R^2	0.472	0.476	0.470	0.473
2SLS Estimates				
Any EU food aid	0.02849	0.06837**	0.04254**	0.04759**
	(0.01937)	(0.02753)	(0.02044)	(0.02100)
R^2	0.469	0.476	0.469	0.472
Reduced Form Estimates				
Reform * P_r	-0.50066***	-0.56283***	-0.55025***	-0.54952***
	(0.01027)	(0.01049)	(0.01090)	(0.01146)
R^2	0.579	0.592	0.580	0.587
Observations	63 503	63 503	58 106	55 258
Donor-recipient pairs	2 992	2 992	2 422	2 303
Dependent Variable	Any EU food aid			
First-Stage Estimates				
Reform * P_r	-0.50139***	-0.52595***	-0.52597***	-0.53221***
	(0.01391)	(0.01414)	(0.01413)	(0.01548)
R^2	0.293	0.307	0.308	0.310
KP F-Stat	2376	91.95	2550	2301
Observations	2 918	2 918	2 918	2 706
Recipients	126	126	134	125
Donor-Recipient FE	Yes	Yes	Yes	Yes
Donor-Year FE	Yes	Yes	Yes	Yes
Any Conflict	No	Yes	Yes	Yes
Any Natural Disaster	No	Yes	Yes	Yes
Log(Cereal Production per capita (MT))	No	Yes	Yes	Yes
Log(Cereal Production per capita (MT))^2	No	Yes	Yes	Yes
Log(Population (million))	No	Yes	Yes	Yes
Log(Population (million))^2	No	Yes	Yes	Yes
Log(GDP per capita \$2005)	No	Yes	Yes	Yes
Log(GDP per capita \$2005)^2	No	Yes	Yes	Yes
Share of refugees in recipient country	No	Yes	Yes	Yes
Share of refugees in recipient country^2	No	Yes	Yes	Yes
Democratic Index	No	No	Yes	Yes
Political Rights and Civil Liberties	No	No	Yes	Yes
UN Vote Similarity Index	No	No	No	Yes

Table 2—: The effect of EU food aid allocation on allocation by other donors: 0/1 choice

Notes: One observation is a pair donor-recipient and a year for OLS, 2SLS and reduced form, it's a recipient and year for the first stage equation. The sample includes 144 recipient countries, 12 donors (except UE) from 1988 to 2011. Coefficients are reported with standard errors clustered at the pair level in parenthesis. For the first stage equation, donor-recipient fixed effects and donor-year are recipient and year fixed effects. P_r is the average probability of receiving food aid from the EU before 1996. $***\ p < 0.01$, $**\ p < 0.05$, $*\ p < 0.1$

among donors that also find positive interaction on average.[21]

To assess the magnitude of the effect, one can note that the sample mean of the probability of receiving food aid by another donor is 22 percent and the average probability of receiving food aid from the EU is 41 percent. Therefore for a recipient country at the mean level of EU probability the estimates imply that a decrease by 10 percent point of the probability of receiving food aid from the EU causes a 1.2 percentage point decrease in the average probability of receiving food aid from other donors, it represents 5.6 percent of the sample mean. Hence the decrease by 30 percent point of the probability of receiving food aid from the EU after 1996 leads to decrease by 1.28 the number of other donors on average.

C. Falsification tests

In this section, I provide additional evidence for the validity of our identification strategy by undertaking different falsification test. Table 3 provides results of different falsification tests. In the first type of test I use lag values of the EU food aid allocation. If the identification strategy is fine I should find no effect of EU food aid allocation on current donor's allocation from a given number of lag. It could be possible that the EU allocation with one or two lags is still significant because the EU administration seems to have started changing its allocation policy since 1994 (the decrease in the number of recipients starts in 1994).

The last column provides the results of the second type of falsification test. I restrict the sample of countries that had received food aid before 1996 only from the EU. Even if the reform affects their probability of receiving food aid from the EU after 1996 other donors should not react at all because they do not react before to the aid allocated by the EU. If the instrumental strategy is valid then aid allocated by the EU to countries that do not received food aid to other donors before 1996 should not have any impact on the probability of receiving food aid from other donors. The 2SLS estimate is non significant and close to the OLS estimate, suggesting no bias.

Finally the estimation strategy holds on the reform of program and project food aid allocation. If I restrict the analysis to emergency food aid the first stage

[21] Knack et al. [2014] find a larger estimate that could be due to the fact that it is easier to react in value and because the identify a local effect on specific recipients countries (whos just below or above the IDA threshold).

should be less well identified.

	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Only EU recipient	Emergency
Any EU food aid	0.05664***	0.05872***	0.05327**	0.03666	0.02754		-2.38394
	(0.01996)	(0.02114)	(0.02399)	(0.02629)	(0.02930)		(5.29214)
Observations	64 261	61 643	58 915	56 209	53 437		66 526
R^2	0.48	0.48	0.48	0.49	0.49		-3.25
KP F Stat	2 542	2 157	1 761	1 428	1 217		0.23

Table 3—: Falsification tests

Note: One observation is a recipient-donor pair and a year. The sample includes 132 countries for the years 1988-1995. Coefficients are reported with standard errors clustered at the pair level in parenthesis. All regressions control for the full set of baseline controls (see table 2 column (2)). $***$ $p < 0.01$, $**$ $p < 0.05$, $*$ $p < 0.1$

D. Robustness checks

I check the robustness check of the IV estimates. First I test the sensitivity of the estimate of the baseline specification: results are given in table 4. I recall baseline results in row (1).

Rather than using only the probability of receiving any type of EU food aid before 1996 I use the probability of receiving program and project EU food aid as instrument interacted with the reform dummy (row (2)). Indeed these two types of food aid are the main target of the reform even if emergency food aid allocation is also affected by the reform by some spillover effects. Results remain significant and the estimate is stable. The reform could have been anticipated by some donors, especially by EU member states. Indeed the idea of reforming EU food aid policy emerged in 1994 and in figure 1 it seems that the number of EU recipients is slowly decreasing in 1994-1995. Thus in row (3) I define the dummy reform equal to one after 1994. The estimate is larger and significant that suggests the allocation of food aid from the EU institution has begun to change since the start of the evaluation.

Rather than interacting the reform timing with the average propensity of receiving EU food aid before 1996, I interact it with a country's propensity of receiving EU food aid during the recent past. In row (4) I interact the dummy reform with the probability of receiving EU food aid between 1993 and 1995 because program and project food aid are often defined in a multi-annual basis; other donors may react only to recent allocations done by the EU and not to historic allocations. Results still hold.

In row (5) I interact the dummy reform with lagged value of EU food aid choice and correct standard errors to auto-correlation. The estimate is still positive but no longer significant. It could be due to the high volatility of food aid allocation from one year to another. Donors may react to more structural allocations (based on past allocation over a larger period) than to the past year allocation.

Food aid allocation is highly volatile. Thus in rows (6) and (7) I smooth food aid allocation at a three-year or five-year horizon. FA_{drt} is equal to one if donor d allocate at least one food aid to recipient r, respectively, between $t-1$ to $t-1$ and between $t-2$ to $t+2$. The estimates is larger and still significant.

In row (8) I use lag of variables that proxy needs of the recipient countries (disaster dummy, cereal production, conflict dummy...). It could take time for donors to adjust their allocation to changes in needs.

I next check the robustness of the estimate to the use of alternative samples. In row (9) I restrict the sample period from 1988 to 2005. Indeed the Paris Declaration on the Effectiveness of Aid, that stressed the importance of coordination among donors, may have affected the way donors react to each other. Hence I estimate donor's reactions to EU food aid before any potential change in the way all donors react to aid from the EU (or other donors). In rows (10) to (16), I use alternative sample definitions of recipient countries. In row (10) I exclude China and India that could drive results due to their size. In row (11) I exclude countries that were formerly part of the Soviet Union and do not enter the sample until 1991.[22] In row (12) I exclude countries that were formerly part of Yugoslavia and do not enter the sample until 1992.[23] In row (13) I exclude all small islands countries or very small countries.[24] In row (14) I exclude countries that have never received food aid from the EU, in row (15) I drop countries that have always received food aid from the EU during 1988-2011. In row (16) I drop the four annual largest recipient countries of EU food aid. Indeed these countries are generally countries in which extreme disaster take place. Almost all donors allocate food aid to these countries because needs are very large and the disaster is often largely publicized. The results seems to be partly driven by small islands. Indeed when small islands are excluded from the sample the effect is no longer

[22]Countries are Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

[23]Countries are Croatia, Slovenia, Macedonia, Bosnia and Herzegovina and Serbia and Montenegro. Serbia and Montenegro were pooled together during the whole period even if Montenegro begun independent in 2006.

[24]Islands are Antigua and Barbuda, Belize, Cape Verde, Fiji, French Guiana, Grenada, Guyana, Hong Kong, Mauritius, Papua New Guinea, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Saint Lucia, Vanuatu and Solomon Islands.

significant whereas it is always significant and positive for all other changes in the sample definition.

In row (17) I change the definition of donor. In a given year I restrict the donor sample to be composed by countries having given food aid to at least one recipient. In row (18) I include all donors (except the NGOs) and define a zero flow even if the donor does not allocate aid at any recipient in a given year t. The estimate is smaller suggesting that the average global effect is larger when focusing on the main large donors than when I include donors giving food aid more sporadically.

In row (19) I exclude the year 1996. In row (20) I exclude the years 1996-2000 that correspond to the phase-in of the reform. Results remains positive and significant. Finally in row (21) I consider food aid from the EU members as part of the EU food aid and thus pooled together EU food aid and bilateral EU food aid. The estimate is no longer positive and is not statistically different from zero. In addition the K-P F stat reduced dramatically even if it is larger than 10. It could suggest that donors outside the EU react differently to the EU allocation and allocation by the EU members.

E. Bilateral Responses

There are vast differences in size and in institutional links with the EU among donors represented in the data. It is unlikely that all donors react to the EU food aid in the same way. Thus I estimate the following equation for each donor d:

$$FA_{drt} = \beta_d FA_{EUrt} + X_{rt}\Gamma_{d1} + \phi_{dt} + \phi_{1dr} + \epsilon_{drt} \tag{3}$$

$$FA_{EUrt} = \lambda Reform_t * P_r + X_{rt}\Gamma_2 + \phi_{2t} + \phi_{2r} + \nu_{rt}. \tag{4}$$

Table 5 reports the estimates. For each donor, column (1) refer to OLS estimates and column (2) to 2SLS estimates. Three different types of behaviors appear: crowded in ($\beta > 0$ and significant), independent (β non significant) and crowded out ($\beta < 0$ and significant).

Among crowded in donors there are mainly the EU member countries such as Germany or France but also Canada. For the EU members the results can be explained by the fact that food aid policies have been relatively close and demand-oriented (at least since the beginning of the XXI century). The EU food

	Dependent Variable	Any food aid	Sd. Err.	R^2	KP F-Stat	Observations	Pairs
(1)	**Baseline Specification**	**0.06110*** **	**(0.01799)**	**0.47**	**3 016**	**66 527**	**2 918**
Changes in the first stage specification (instrument)							
(2)	Project and program EU food aid	0.05336**	(0.02215)	0.47	1 768	66 527	2 918
(3)	Reform in 1994	0.08269***	(0.02121)	0.47	2 493	66 527	2 918
(4)	EU food aid between 1993-1995	0.05468***	(0.02043)	0.47	1 952	66 461	2 918
(5)	EU food aid in 1995	0.01545	(0.02864)	0.47	622	66 460	2 918
Changes in the second stage specification							
(6)	Smoothing food aid over 3 years	0.07423***	(0.01860)	0.65	2 995	20 480	2 918
(7)	Smoothing food aid over 5 years	0.09268***	(0.01817)	0.73	2 662	13 040	2 918
(8)	Controls in lag						
Changes in sample definition							
(9)	1988-2005	0.04054**	(0.02010)	0.50	2 551	46 354	2 918
(10)	W/o India and China	0.06683***	(0.01821)	0.47	2 865	65 471	2870
(11)	W/o former Soviet Union	0.06718***	(0.01848)	0.47	3 021	60 433	2518
(12)	W/o former Yugoslavian countries	0.05666***	(0.01837)	0.47	2 933	64 437	2688
(13)	W/o small islands	0.02664	(0.02144)	0.46	2 195	60 697	2 530
(14)	W/o never recipients of EU food aid	0.04525*	(0.02651)	0.46	1 456	57 749	2408
(15)	W/o always recipients of EU food aid	0.06067***	(0.01792)	0.47	3 027	65 735	2740
(16)	W/o annual top four recipients						
(17)	Zero flows definition	0.03435***	(0.01079)	0.50	3 016	144 996	6 042
(18)	All donors	0.00825**	(0.00338)	0.53	3 016	381 023	15 875
(19)	W/o 1996	0.05514***	(0.01719)	0.47	3 333	63 689	2 918
(20)	W/o 1996-2000	0.04953***	(0.01738)	0.48	3 525	57 925	2918
Changes in the EU definition							
(21)	EU + member states	-0.01125	(0.14644)	0.51	41.26	30 240	1260

Note: One observation is a recipient-donor pair and a year. The sample includes 144 recipient countries from 1988 to 2011. Coefficient are reported with standard errors clustered at the pair level in parenthesis. Only 2SLS estimates are reported. Controls included all controls of Column (3) in Table 2.
$*** p < 0.01$, $** p < 0.05$, $* p < 0.1$

Table 4—: Food Aid Allocation: Alternative Specifications

aid policy and food aid policies from EU member countries seem to converge to the same recipients. It could suggest that the EU food aid policy reflects the view of the EU members. For Canada results are more striking with an estimate that is larger than the estimates for EU member state. Canada seems to be the country that reacts more positively to EU food aid allocation. A part of the result can be explained by a food aid policy which is also demand-oriented. It could suggest that Canada interprets EU food aid allocation as a signal of needs for some recipients.[25] Among countries for whose the estimate is not significantly different from zero there are countries outside the EU such as the US, Australia or Saudi Arabia but also some European countries such as Denmark or Finland. Finally donors are also crowded out: Luxembourg, the United Kingdom and the WFP. It could be the case that the WFP dedicates its own resources only in the last resort, if the WFP do not find any donors to allocate food aid.

These results suggest that is not only the EU membership that matters because among EU member states that should suggest some bandwagon effect but that bilateral food aid allocation is determined by other mechanisms such as altruism (the WFP).

V. Altruism, signaling or competition effect? A conceptual framework

In the previous section, I showed that actually some donors react significantly to the EU food aid allocation. However those interactions may result of different behavior. The literature suggests mainly three different causes of interaction between donors: altruism [Younas, 2008], competition with other donor for some recipient countries [Barthel et al., 2014] and signaling effect for global food aid allocation [Annen and Moers, 2012]. I provide a simple theoretical framework in which the three mechanisms enter simultaneously in the objective function of the donor and derive some testable hypothesis to identify which component explain the estimated reaction. What really matters is the relative importance of altruism over the signaling component. Second it is not possible to separate the effect of pure competition and some geopolitical bias that alters the perception of recipient's needs. Next based on previous estimates I provide a typology of donors relative to the EU allocation.

[25]The result may also reflect that despite donor-year fixed effects the estimate captures part of the impact of the decreasing Canadian budget for food aid at the very end of the 1990s. It takes part of the austerity and reform plan introduced in the 1990s by the Canadian government.

	(1): OLS		(2): 2SLS	
	Any EU food aid	Sd. Err.	Any EU food aid	Sd. Err.
EU members				
Austria	0.05049***	(0.01583)	0.12963**	(0.06437)
Belgium	0.06461***	(0.01671)	0.14225**	(0.06700)
Denmark	0.07088***	(0.02570)	0.09441	(0.10589)
Finland	0.05458*	(0.02768)	0.09851	(0.08484)
France	0.09890***	(0.02051)	0.21327***	(0.07402)
Germany	0.11341***	(0.03074)	0.16594	(0.10853)
Italy	0.12938***	(0.02932)	0.05862	(0.08123)
Luxembourg	0.03770**	(0.01690)	-0.08269*	(0.04742)
Netherlands	0.13458***	(0.02863)	0.21450**	(0.09229)
Spain	0.04362**	(0.02082)	-0.05744	(0.05422)
Sweden	0.16598***	(0.02733)	0.28935***	(0.08882)
United Kingdom	0.09686***	(0.02180)	-0.08461*	(0.04863)
Non EU members				
Australia	0.10344***	(0.02224)	0.11241	(0.07586)
Canada	0.21973***	(0.02773)	0.34674***	(0.10918)
Japan	0.09267***	(0.02582)	-0.02305	(0.08315)
Norway	0.07489***	(0.02612)	0.04618	(0.08171)
Saudi Arabia	0.01800	(0.02035)	-0.00372	(0.05122)
Switzerland	0.10445***	(0.02742)	0.09925	(0.10356)
UN Institutions	0.04461**	(0.02034)	-0.06198	(0.06337)
United States	0.11014***	(0.02753)	-0.04273	(0.13074)
WFP	0.02353	(0.01789)	-0.21917***	(0.07515)

Table 5—: Bilateral response to EU food aid allocation

Note: One observation is a recipient and a year. For each donor d the sample includes 135 countries, 3 024 observations for the years 1988-2011. Coefficients are reported with standard errors clustered at the recipient level in parenthesis. All regressions control for the full set of baseline controls (see table 2 column (2)). Colums (1) refer to the OLS estimates; columns (2) to the 2SLS estimates. $***$ $p < 0.01$, $**$ $p < 0.05$, $*$ $p < 0.1$ The K-P F Stat is between 135.6 and 135.8 depending on the donor.

A. The setting

The model is composed by two donors and R recipients. Allocation's decisions are made simultaneously and for tractability there is no uncertainty and information is perfect.[26] A donor maximizes only its current utility; there is no intertemporal maximization.[27]

At each period t the donor d has a fixed budget A_{dt} for food aid and faces R recipients with specific needs, F_{rt}. A donor allocation A_{drt} is determined by three main drivers: altruism, competition and signaling. First the altruism effect is about the fact that donors want to allocate food aid to the neediest recipients and the scarcity of food aid. An altruist donor should react to the allocation of food aid from other donors to a recipient country by reducing its own quantities. Indeed once a donor gives food aid to a recipient, needs are reduced. Thus it is the remaining needs that are important for an altruistic donor. A donor incurs a cost not to respond perfectly to recipients' needs by giving not enough aid or too much aid. However donor d evaluates with a additive geopolitical bias, G_{drt}, the recipient needs. Geopolitical bias is driven by time-invariant links, G_{dr}, such as colonial history, preserve, distance and time-variant links, G_{drt}, such as bilateral tensions, diplomatic alliance... Hence a donor allocates food aid not depending on $F_{rt} - A_{lrt}$ but on $(F_{rt} + F_{drt}) - A_{lrt}$. Thus in this setting the altruism component is not pure altruism but altruism nuanced by geopolitical links because a donor cannot evaluate perfectly recipients' needs.

Second the competition effect deals about the potential outcomes of food aid on donor-recipient relationship such as trade – food aid may cause agricultural trade – and geopolitics – vote at the UN assembly for instance.[28] In this framework a competitive donor wants to be the only donor or at least wants to be the largest donor. Thus a donor cares about the current difference between allocation and its sign, $A_{lrt} - A_{drt}$. The competition effect should depends on the recipient because some countries are more important than other for the donor.

Finally the signaling effect is more about comparison between donors due to

[26] Given the history of food aid allocation it is quite believable that each donor knows how other donors allocate their aid on average. In addition the Food Aid convention and the the WFP allow the spread of information among donors.

[27] The setting is calibrated to my case study in the sense that donor d only cares about the EU and neglects in its objective function other donors. Except for the USA it is believable because of the relative importance (in food aid volume) of the EU compared to other donors.

[28] Causal link between (food) aid and trade is not established because of a lack of good identification strategy however but the literature provides suggestive evidence of effects of aid on trade [Suwa-Eisenmann and Verdier, 2007].

domestic objectives such as elections or warm glow. Hence it does not depend on the recipient. Indeed an increasing number of NGOs provides donors ranking that are often used by the donors to justify their aid budget and their aid allocation. In such framework a signaling donor would like to behave similarly to other donors as a signal of "good allocation" or instead specialize to show that its aid is complement to other donor's aid.

A donor wants to maximize the sum of these three components given its aid budget which is predetermined, I_{dt}. Formally at each period t a donor chooses A_{dt} maximizing:

$$(5) \quad U_d(A_{drt}) = \frac{1}{2}\sum_{r=1}^{R} \gamma_d \left(((F_{rt} + F_{drt}) - A_{EUrt}) - A_{drt}\right)^2 + \frac{1}{2}\sum_{r=1}^{R} \gamma_{dr} \left(A_{EUrt} - A_{drt}\right) + \frac{1}{2}\sum_{r=1}^{R} \lambda_d \left(A_{EUrt} - A_{drt}\right)^2$$

subject to $\sum_{r=1}^{R} A_{drt} = I_{dt}$.

$\gamma_d < 0$ captures the intensity of altruism.[29] Altruism is defined at the donor level and does not depend on the type of recipients. F_{dr} already captures the fact that donors may value differently recipient's needs because of geopolitical bias. λ_d captures the intensity of direct interaction behavior and the way a donor is interacting. If there is a sort of bandwagon effect from donor d to aid allocated by the EU then $\lambda_d < 0$. On the contrary if a donor wants to specialize relative to the EU, λ_d should be positive. Finally for each recipient γ_{dr} captures the competition effect. I restrict $\gamma_{dr} \leq 0$ for all recipients.

[29] It is unrealistic to allow γ_d to be positive.

The first order condition gives a reaction function of A_{dr} to A_{lr}:[30]

$$(6) \quad A_{drt} = \frac{\mu_{dt}}{\lambda_d + \gamma_d} + \frac{\lambda_{dr} + \gamma_d G_{dr}}{\lambda_d + \gamma_d} + \frac{\gamma_d}{\lambda_d + \gamma_d} F_{rt} + \frac{\gamma_d}{\lambda_d + \gamma_d} G_{drt} + \frac{1 - \frac{\gamma_d}{\lambda_d}}{1 + \frac{\gamma_d}{\lambda_d}} A_{lrd}$$

with μ_{dt} is the Lagrangian multiplier associated to donor d at time t.

$\frac{\gamma_d}{\lambda_d}$ captures the relative importance of altruism over signaling effect. I derive a donor typology from $\frac{\gamma_d}{\lambda_d}$. First the magnitude of the ratio shows how a donor weights altruism relatively to signaling behavior. Donors giving more weight to the altruism component ($|\ \frac{\gamma}{\lambda}\ | > 1$) are named "Altruist".[31] On the contrary, if $|\ \frac{\gamma}{\lambda}\ | < 1$ donors are "Signaling". It also could be the case that $|\ \frac{\gamma}{\lambda}\ | = 1$. I label these donors as "Balanced". Second the sign of the ratio provides information of the signaling type. If $\frac{\gamma}{\lambda} > 0$ then it implies that $\lambda < 0$. It means that a donor mimics the EU allocation. On the contrary if the ratio is negative it implies that a donor specializes. Thus it leads to five types of donors: altruist and mimic, altruist and specialist, signaling and mimic, signaling and specialist and finally balanced and mimic.[32]

In parallel equation 6 shows that it is not possible to disentangle the competition effect and the geopolitical bias. However I can infer some recipient ranking for each donor through $\alpha_{dr} = \frac{\frac{\lambda_{dr}}{\lambda_d} + \frac{\gamma_d G_{dr}}{\lambda_d}}{1 + \frac{\gamma_d}{\lambda_d}}$. Let's examine the case in which $\frac{\gamma_d}{\lambda_d} > 0$. It implies that the denominator is positive and that $\gamma_d < 0$. The sign of α_{dr} depends only on $\frac{\lambda_{dr}}{\lambda_d} + \frac{\gamma_d}{\lambda_d} G_{dr}$. Given the hypothesis on the sign of λ_{dr} I obtain $\frac{\lambda_{dr}}{\lambda_d} \geq 0$. If α_{dr} is negative it implies the geopolitical bias G_{dr} is negative and large enough to offset the competition effect. On the contrary if α_{dr} is positive G_{dr} can be positive or negative. If G_{dr} is positive it means that the competition effect is reinforced by a positive geopolitical bias. On the other hand if G_{dr} is negative it suggests that the competition effect is larger than the geopolitical bias. However it is reasonable to think that if $G_{dr} < 0$ then $\lambda_{dr} = 0$. Donors will not compete for recipient countries for whom they have negative geopolitical bias.[33]

[30] The equilibrium allocation exists and is defined by

$$A^*_{drt} = \frac{1}{2} F_{rt} + \frac{(\lambda_l + \gamma_l)(\mu_{dt} + \lambda_{dr} + \gamma_d (G_{dr} + G_{drt}))}{2(\gamma_d \lambda_l + \gamma_l \lambda_d)} + \frac{(\lambda_d - \gamma_d)(\mu_{lt} + \lambda_{lr} + \gamma_l (G_{lr} + G_{lrt}))}{2(\gamma_d \lambda_l + \gamma_l \lambda_d)}.$$

It implies some restrictions on parameters. First donors should be partly altruist – i.e. $\lambda \neq 0$. Second $\gamma_d \lambda_l + \gamma_l \lambda_d \neq 0$ that can be written as $\sum_d \frac{\gamma_d}{\lambda_d} \neq 0$. On average donors should have some signaling effects.

[31] It does not mean that they do not signal through the EU allocation neither they do not compete.

[32] Given the parameters' restriction, a donor can not be balanced and specialist.

[33] Given this restriction I obtain a dichotomy for recipients: recipients with negative bilateral bias

B. *Identifiable parameters*

Adding an error term to equation 6 I obtain the equation 3 described in section IV.E with $\beta_d = \frac{1-\frac{\gamma_d}{\lambda_d}}{1+\frac{\gamma_d}{\lambda_d}}$, $\Gamma_{d1} = \frac{\gamma_d}{\lambda_d+\gamma_d}$, $\phi_{dt} = \frac{\mu_{dt}}{\lambda_d+\gamma_d}$ and $\phi_{1dr} = \frac{\lambda_{dr}+\gamma_d G_{dr}}{\lambda_d+\gamma_d}$. Hence I can estimate $\frac{\gamma_d}{\lambda_d}$. Indeed $\frac{\gamma_d}{\lambda_d} = \frac{1-\beta_d}{1+\beta_d}$.

Table 6 provides the typology of donors obtained through the bilateral estimation. All donors seem to mimic the EU food aid allocation - $\gamma_d < 0$. On the contrary some donors weight more the altruistic component and other the signaling component. Donors are in majority "signaling" but it seems that on average donors outside Europe tend to weight more likely altruist than the signaling effect and European donors care more about the signaling effect of their allocation than on altruism.

Donor	$\frac{\gamma_d}{\lambda_d}$	Type
WFP	1,75	Altruist/Mimic
Luxembourg	1,29	Altruist/Mimic
UN	1,23	Altruist/Mimic
USA	1,22	Altruist/Mimic
Spain	1,20	Altruist/Mimic
United Kingdom	1,15	Altruist/Mimic
Saudi Arabia	1,09	Altruist/Mimic
Japan	1,09	Altruist/Mimic
Norway	0,97	Signaling/Mimic
Italy	0,92	Signaling/Mimic
Finland	0,89	Signaling/Mimic
Denmark	0,84	Signaling/Mimic
Australia	0,81	Signaling/Mimic
Switzerland	0,79	Signaling/Mimic
Germany	0,76	Signaling/Mimic
Austria	0,75	Signaling/Mimic
Belgium	0,73	Signaling/Mimic
France	0,66	Signaling/Mimic
Netherlands	0,64	Signaling/Mimic
Sweden	0,57	Signaling/Mimic
Canada	0,51	Signaling/Mimic

Table 6—: Donor typology of donor reaction to the EU food aid allocation derived from the conceptual framework and bilateral estimates

Note: In bold, donors for which I can exclude the ratio to be equal to one at a 10 percent level. Estimates are obtained with the estimates of column (2) in table 5.

Given the standard errors of the estimates, I cannot reject the hypothesis that some donors weight equally the altruistic part and the comparison effect. On the

($\alpha_{dr} < 0$) and recipients for which competition and positive geopolitical bias reinforces each other ($\alpha_{dr} > 0$).

contrary I can exclude the hypothesis that donors wants to specialize relatively to the EU.

VI. Conclusion

Donors do not need any international framework to already react to each other food aid allocation. In this study I show that EU food aid allocation affects food aid allocation from other donors in ways that reinforce the EU allocation on average. Controlling for needs, proximity between donors and recipients, I argue that the reform on food aid policy implemented by the EU in 1996 that does not affect uniformly all potential recipients provides an exogenous variation to estimate a causal effect of EU food aid allocation on allocation by other donors. The fact that the EU stops allocating aid to a recipient country decreases on average by one the number of other donors. It also affects the quantities allocated by donors. This effect is largely due to the EU member states and Canada. By contrast if the EU stops allocating aid to a country it increases significantly the probability of receiving food aid from the US or the WFP. These findings are robust to the use of different sample definition of recipients, time period, and "control" and "treatment" groups.

I propose a model from which I derive a donor typology. Donors react to the EU allocation due to three main components: altruism, competition for some recipients and mimetism (due to domestic electoral objectives). No donors are specialist relatively to the EU. On the contrary all donors tends to mimic the EU allocation. However some donors weight more the signaling component than the altruism part. These countries are mostly European countries. Countries outside the EU tends to weight more the altruistic part than the signaling effect relatively to the EU.

These results have some implications for global food aid allocations and for a European perspective. First the fact that on average the EU crowds in food aid from other donors may lead to darling countries and orphan countries – receiving more or less food aid that needed. However this effect could be mitigated by one donor. One role of the WFP could be to allocate aid in last resort – after all donors – to the orphan countries. Results may also suggest sort of world division between the EU and the US as the US reacts negatively (even if I cannot reject the hypothesis the effect is equal to zero) to EU food aid allocation.

Finally at the European level, results suggest positive (and mainly significant) interactions between the EU and EU members. These findings suggest some convergence between members' allocation and EU allocation. It raises the question of subsidiarity between the EU and EU members and the efficiency of two levels of aid allocations: communal and bilateral, especially if both food aid programs target similar recipient country.

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A. Some Additional Descriptive Statistics

A. More information on data

According to the WFP "data on global food aid deliveries in metric tons are from the database of the International Food Aid Information System (INTERFAIS), which was developed by WFP as a contribution to a coordinated international response to food aid shortages. INTERFAIS is a dynamic system, which involves the interaction of all users, represented by donor governments, international organizations, non-governmental organizations, recipient countries and WFP field offices. They are sharing information and data on food aid transactions." There is no doubt that for governmental donor data are exhaustive.

At the beginning of the period the set of recipient countries was smaller and increased due to the partition of the USSR, Yugoslavia and the independence of Timor-Leste and South Sudan. I do introduce these new countries in the sample because country partition is often related to food aid allocation. In consequence the panel is almost balanced except for these countries.

Concerning donors, the exhaustiveness of the data is not reached for NGOs and private sector. I interviewed in January 2015 a staff member of Action Contre

la Faim - France. It appears from this interview that either all observations for a given year are included either the whole year is missing. Hence it seems that the way the WFP collects reliable information of food aid from NGOs is not systematic.

B. Descriptive statistics

Figure 4 provides the frequency of the EU ranking. Figure 5a and 1 show respectively the number of recipient of project/program food aid and emergency food aid for the EU, the EU member states and donors outside the EU.

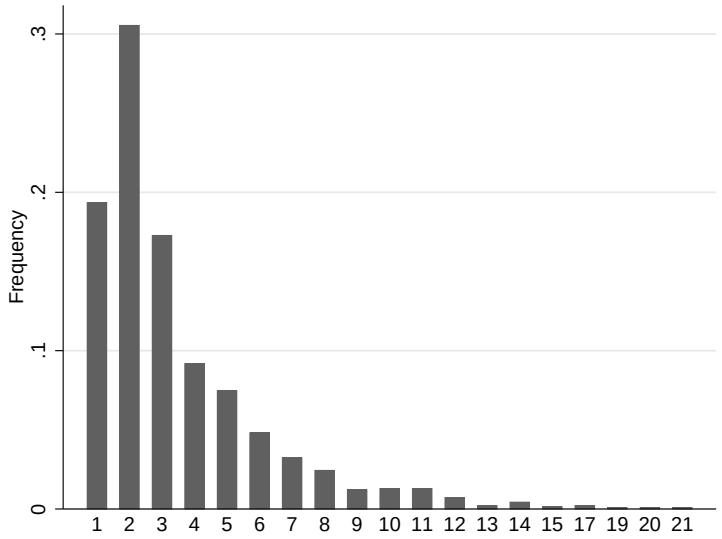

Figure 4. : EU donor ranking

Lecture: In almost 20 percent of case, the EU is the largest donor. Source: WFP-INTERFAIS database from 1988 to 2011. Ranking is established depending on the quantity allocated to each recipient.

Figure 6 plots the share of emergency food aid by groups of donors and its evolution from 1988 to 2011. Figure 7 plots the share of local or triangular purchases for the three groups of donors. Figure 8a plots the average quantity of food aid received by recipient countries of EU food aid. It shows that the reform in 1996 does not affect significantly the quantities received on average by EU recipients. Figure 8b plots the same thing but excluding each year the top three recipients.

C. List of countries

Table 7 provides the list of all recipient countries. It also gives the propensitiv of receiving EU food aid before 1996 and how they are classified for each type of heterogeneity analysis.

Recipient countries	P_r	**Sub-Saharan**	**Poorest countries**	**High distance**	**Smallest countries**	**Badly governed**
Afghanistan	0,625					
Albania	0,375				X	X
Algeria	1		X			X
Angola	1	X		X		X
Antigua and Barbuda	0			X	X	
Argentina	0		X	X		
Armenia	0,6					
Azerbaijan	0,6					
Bangladesh	1		X	X		
Belarus	0					
Belize	0,125			X	X	
Benin	1	X	X		X	X
Bhutan	0,75			X	X	X
Bolivia	1		X	X	X	
Bosnia and Herzegovina	0,25					
Botswana	0,875	X		X	X	
Brazil	0,75		X	X		
Bulgaria	0,125					X
Burkina Faso	1	X	X			X
Burundi	1	X	X		X	X
Cambodia	0,625			X		
Cameroon	0,875	X	X			X
Cape Verde	1	X			X	
Central African Rep.	1	X	X		X	X
Chad	1	X	X		X	X
Chile	1			X		
China	0,875		X	X		X
Colombia	0,625		X	X		
Comoros	1	X		X	X	X
Congo	0,875	X			X	X
Costa Rica	0,125			X	X	
Côte d'Ivoire	1	X	X			X
Croatia	0,167					
Cuba	1			X		X

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Recipient countries	P_r	**Sub-Saharan**	**Poorest countries**	**High distance**	**Smallest countries**	**Badly governed**
Cyprus	0				X	
Democ.Rep.Congo	1	X	X			X
Djibouti	1	X			X	X
Dominica	0,875			X	X	
Dominican Republic	1			X		
East Timor				X		
Ecuador	1			X		
Egypt	1		X			
El Salvador	1			X	X	
Equatorial Guinea	0,625	X			X	X
Eritrea	1	X				
Estonia	0,6					
Ethiopia	1	X	X			X
Fiji	0			X	X	
French Guiana	0			X		
Gabon	0	X			X	X
Gambia	1	X			X	
Georgia	0,6					
Ghana	1	X	X			X
Grenada	0,5			X	X	
Guatemala	1			X		
Guinea	0,625	X	X		X	X
Guinea-Bissau	1	X			X	X
Guyana	1			X	X	X
Haiti	1			X		X
Honduras	1			X	X	
Hong Kong	0			X	X	
India	1		X			
Indonesia	0		X	X		X
Iran	0,25		X			
Iraq	0,625					X
Israel	0				X	
Jamaica	0,125			X	X	
Jordan	1				X	X
Kazakhstan	0					
Kenya	1	X	X	X		X
Korea, Democ	0			X		X
Kyrgyzstan	0,4					
Laos	0,5		X	X	X	X
Latvia	0,4					

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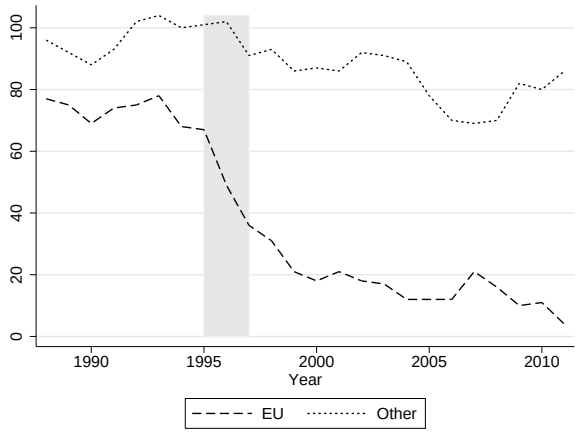
Recipient countries	P_r	**Sub-Saharan**	**Poorest countries**	**High distance**	**Smallest countries**	**Badly governed**
Lebanon	1				X	
Lesotho	1	X		X	X	X
Liberia	1	X			X	
Libya	0				X	X
Lithuania	0,4					
Macedonia	0				X	
Madagascar	1	X	X	X		
Malawi	1	X	X	X		X
Malaysia	0,25		X	X		
Maldives	0			X	X	
Mali	1	X	X			X
Mauritania	1	X			X	X
Mauritius	0,625	X		X	X	
Mexico	0,375		X	X		
Moldova	0,2					
Mongolia	0,25			X	X	X
Morocco	0,875		X			X
Mozambique	1	X	X	X		X
Myanmar	0,25			X		
Namibia	0,833	X		X		
Nepal	0,875		X	X		
Nicaragua	1			X	X	
Niger	1	X	X			X
Nigeria	0,125	X	X			X
Pakistan	1		X			
Palestine	1				X	
Panama	0			X	X	X
Papua New Guinea	0,5			X	X	
Paraguay	0,75			X	X	X
Peru	1		X	X		
Philippines	0		X	X		
Poland	0,25					
Romania	0,5					X
Russian Federation	1					
Rwanda	1	X	X			X
Saint Kitts and Nevis	0			X	X	
Saint Lucia	0			X	X	
St. Vincent & Grenadines	0			X	X	
Sao Tome and Principe	0,875	X			X	
Senegal	1	X	X			

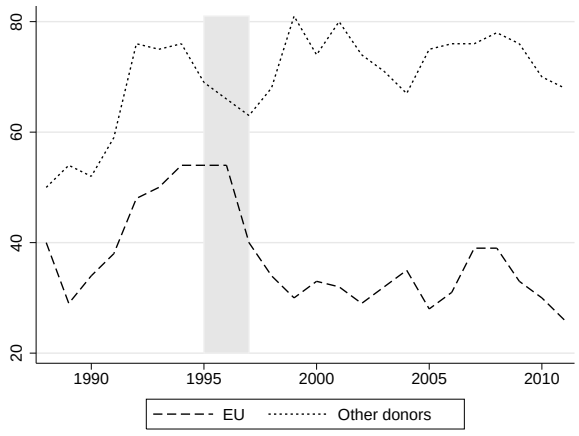
Be continued next page...

Recipient countries	P_r	**Sub-Saharan**	**Poorest countries**	**High distance**	**Smallest countries**	**Badly governed**
Serbia&Montenegro	0,5				X	
Seychelles	0,25	X		X	X	
Sierra Leone	1	X	X		X	X
Slovenia	0					
Solomon Islands	0			X	X	
Somalia	1	X		X	X	X
South Africa	0,125	X	X	X		
South Sudan						
Sri Lanka	0,75		X	X		
Sudan	1		X			
Suriname	0			X	X	
Swaziland	0,875	X		X	X	X
Syria	1		X			X
Tajikistan	0,6					
Tanzania	1	X	X	X		
Thailand	1		X	X		
Togo	1	X	X		X	X
Trinidad and Tobago	0			X	X	
Tunisia	1					
Turkey	0,5		X			
Turkmenistan	0,2					
Uganda	1	X	X			X
Ukraine	0					
Uruguay	0,875			X	X	
Uzbekistan	0,2					
Vanuatu	0			X	X	
Venezuela	0			X		
Viet Nam	1		X	X		X
Yemen	1					
Zambia	1	X	X	X		X
Zimbabwe	1	X	X	X		

Table 7—: List of recipient countries



(a) Project or program food aid



(b) Emergency food aid

Figure 5. : Number of recipient countries

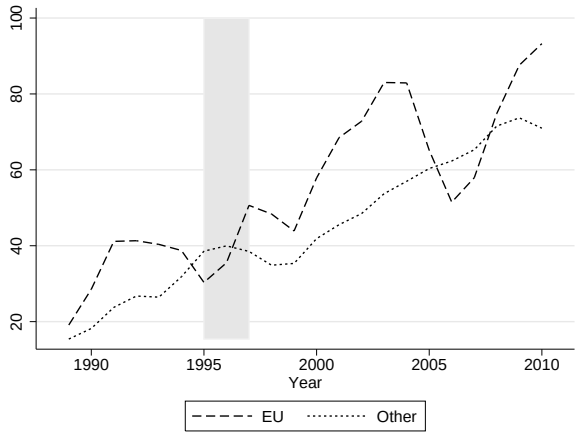


Figure 6. : Share of emergency food aid

Note: Other donors include donors cited in table **??**. Pattern is similar if all donors without any restrictions are included. Data are smoothed using moving average order 3.

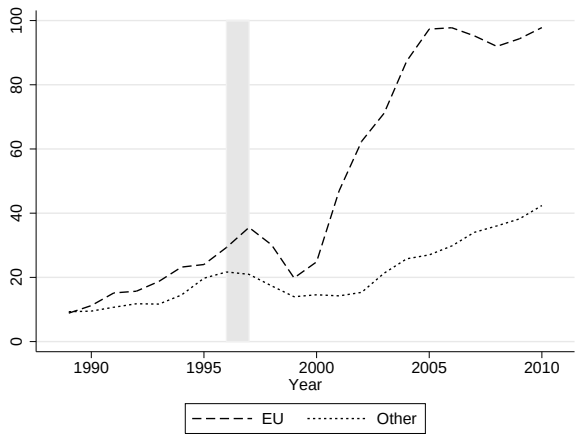
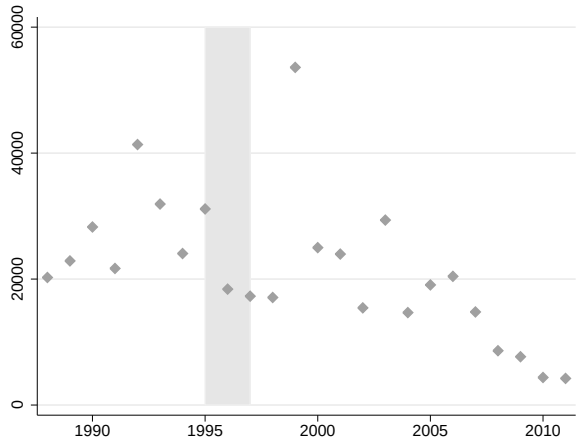
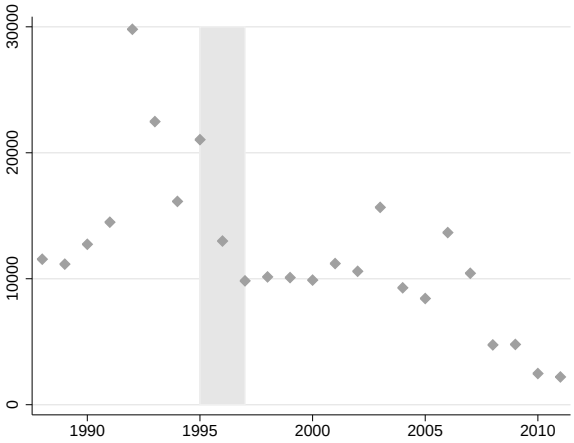


Figure 7. : Share of local or triangular purchases

Note: Other donors include donors cited in table **??**. Pattern is similar if all donors without any restriction are included. Data are smoothed using moving average order 3.



(a) All recipients



(b) Recipients excluding annual top 3

Figure 8. : Average quantity received by recipient countries (in metric tons)