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PARIS-JOURDAN SCIENCES ÉCONOMIQUES

48, Bd JOURDAN – E.N.S. – 75014 PARIS
TÉL. : 33(0) 1 43 13 63 00 – FAX : 33 (0) 1 43 13 63 10
www.pse.ens.fr

To give or not to give? How do donors react to European food aid allocation?

NATHALIE FERRIÈRE*

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Using a change in the rules of EU food aid policy in 1996, I investigate how donor countries react to EU's food aid allocation. On average if the EU stops allocating food aid to a small country, this reduces by 1.4 the average number of other donors. Donors reactions are heterogeneous. Next, I develop a simple framework in which donors react to EU's action either indirectly because it changes the recipient's needs or directly because they are motivated by comparing their allocation with the one of EU. I derive a donor typology from this framework. Large donors and Nordic countries are motivated by direct comparison with the EU allocation while the WFP is driven by recipient-related motives.

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* Paris School of Economics – EHESS (ferriere.nathalie@gmail.com). I am grateful to Gani Aldashev, Lisa Chauvet, Andreas Fuchs, Erasmus Kersting, Karen Macours, Marc Raffinot and Akiko Suwa-Eisenmann for their advice and careful reading of the paper and their numerous suggestions. This paper benefits from discussions with Pamina Koenig and Toman Barsbai. For their helpful comments I also thank participants to the Doctorissimes 2015, to the Journées de Microéconomie Appliquées 2015, to Political Economy of International Organization 2016, to the AFSE Congress 2016 and to seminars at PSE. I thank the World Food Programme for the data and their help on the data. The research leading to these results has received funding from the European Union's Seventh Framework Programme FP7/2007-2011 under Grant Agreement n290693 FOODSECURE. The author only is responsible for any omissions or deficiencies. Neither the FOODSECURE project and any of its partner organizations, nor any organization of the European Union or European Commission are accountable for the content of papers.

I. Introduction

Food aid allocation has created orphan and darling countries. Darling countries, who are favored by most donors, receive relatively too much aid, while orphan countries, who are neglected, do not receive enough [Utz, 2011]. For instance in December 2014, the World Food Programme (WFP) partially suspended food aid to countries hosting Syrian refugees due to a funding crisis, while in March 2010, the Haiti's president asked to "stop sending food aid". The existence and consequences of darling and orphan recipients have been widely discussed since the Paris Declaration on Aid Effectiveness (2005). This problem is related to the existence of multiple donors who do not coordinate despite scarce resources.

Recognizing the potential damage of the absence of coordination, the 2005 Paris Declaration on Aid Effectiveness and the 2008 Accra Plan of Action called on donors to better coordinate their aid. To facilitate this process, donors were encouraged to specialize by concentrating their aid on fewer countries, and fewer sectors within countries, in line with their comparative advantage. Hence in that case coordination reflects geographic specialization by donors. This could be particularly efficient for small recipient countries for which absolute needs are relatively low. Nevertheless most observers find that these goals are not reached [Aldasoro et al., 2010]. However for large countries another kind of coordination could be effective: joint response.¹ Indeed in those countries needs could be very high and multiple donors may be necessary to completely fill the needs.

The question of whether and to what extent aid from a given donor depends on the allocation decisions of other donors is a critical but little researched question. The way donors interact in their aid allocation decision will, however, critically affect aid allocation as well as the interest of donors to take donor coordination. While a large set of studies examine aid and food aid allocation in general, few papers focus specifically on interactions between donors.² Kuhlitz et al. [2010],

¹"Practical explanations for joint response include the efficiency gains attainable from jointly using existent aid resources such as aid workers' expertise, transport vehicles, storage facilities, and shared international perspectives on the likely cooperativeness of local authorities in facilitating timely commodity deliveries." [Kuhlitz et al., 2010]

²On aid allocation, papers look at whether allocation is driven by donor interests but also on differences between donors [Berthélemy, 2006b, Nunnenkamp and Öhler, 2011, Fuchs and Vadlamannati,

which is, to my knowledge, the only paper looking specifically at interactions between food aid donors, 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 strategic interaction and coordination and interpret the significance and value of correlation terms directly as indicators of whether donors coordinate and the way they do. They find positive correlation and interpret it as a sign of donors acting jointly within a recipient country.

The literature on donor interactions in the case of development aid (ODA) in general is larger even if it remains small. Frot and Santiso [2011], using methods from finance, show small but significant and positive interactions – that they call “herding behavior”: if a donor increases its aid, this results in a more than 1-for-1 increase for the recipient, as other donors step in. Fuchs et al. [2015] look at overlapping aid allocation that they interpret as a lack of coordination, given the risk of duplication.³ They find that export competition between donors is a major impediment to aid coordination.

Using panel data from 1988 to 2007 and tackling endogeneity of other donors’ aid with a spatial econometric approach, Davies and Klasen [2015] 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 exclusion restriction and the use of spatial econometrics (see Gibbons and Overman [2012] for instance). Davies and Klasen [2015] assume, for instance, that the fact that a recipient country r shares the same language with a donor d_1 (for instance Ivory Coast and France) does not directly affect the probability of receiving aid from another donor d_2 (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

2013], on the evolution of aid drivers [Clist, 2011]. On food aid, papers look at whether allocation is driven by needs [Zahariadis et al., 2000, Barrett and Heisey, 2002, Young and Abbott, 2008].

³They define it as the number of countries receiving aid from both donor d_1 and d_2 over the number of countries receiving from at least one of the two donors.

costs between them, such as translation costs. Finally Knack et al. [2014] relies on an exogenously determined eligibility threshold based on the level of income for concessionary International Development Association (IDA) loans. They find that bilateral aid is significantly reduced when a country crosses the IDA income cutoff. They also find large 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 thus, on specific recipient countries. In addition, these studies neglect the fact that depending on the type of recipients, donors may have different strategies and react differently to one another.

This paper contributes to the small existing literature on interactions among donors by providing new causal evidence. Focusing on one specific type of aid – food aid – I estimate the causal effect of EU food aid allocation on other donors’ allocation. I focus on regular donors, those countries who send food aid every year to at least one recipient. In this paper, EU food aid refers to food aid allocated through the European Union institutions. Food aid sent through bilateral programs of EU member states is considered separately. Even if this study restricts the analysis to the reactions of donors to a change in EU food aid, it is still interesting.

Food aid is likely to be seen by the general public as more humanitarian in nature and more oriented towards recipient need than general ODA. However it has already been shown that the misallocation of food aid is partly explained by the fact that food aid is not only a mean to save life and help needy people but also a diplomatic weapon and depends on donors’ interests [Neumayer, 2005].⁴ The role of US food aid on the containment strategy has been largely discussed [Wallenstein, 1976, Maddock, 1978, Coffey, 1981] but even after the Cold War food aid has been used as a diplomatic tool. For instance food aid delivery to North Korea was delayed to incite the regime to keep in peace negotiations. Food aid can be used to put pressure on recipients but it could also be a way to react to other donors. At least one case of strategic interaction has already been doc-

⁴“Food is a weapon much more than other type of aid because you can starve people” (Butz (US Foreign Secretary), 1967).

umented by political scientists. Kim [2011] investigates how China and the US allocate food aid to North Korea and show that they strategically react to each other because they compete for leadership in this geographical area.

Two factors suggest that strategic interactions among donors are likely to occur in the case of food aid. First the allocation of food aid is publicized: “when a state gives emergency food aid to starving people in another state, it rarely happens without notice and fanfare. [...] The ceremonies of this status demonstration include having as many witnesses as possible.” [Aaltola, 1999]. Labels and emblems are clearly specified on food to enhance the identity of the donor – its flag on the rice bag for instance. The visibility of food aid donors increases the likelihood of having such strategic interaction among donors.⁵

Second, the issue of coordination has emerged long before than for development aid and the Paris Declaration of 2005. The Food Aid Convention (1967) provided “a framework for cooperation, coordination and information-sharing among members to achieve greater efficiency”. Hence given the historical background and the specificity of food aid relative to other types of aid, it seems more likely to observe strategic interactions between food aid donors than in other types of aid.

Focusing on how donors react to the EU is relevant as the EU is the second largest donor of food aid (and the largest multilateral donor) providing about 10 percent of total food aid.⁶ EU member states add a further 10 percent through their bilateral program and are obviously influenced by the EU allocation, a point I will document below. More importantly the EU is a key player on development and humanitarian assistance. It is reflected by the major role the EU played in the WFP since its creation even if it is not the largest contributor [Barrett and Maxwell, 2005]. Second it has been a leading component of the reforms of the Food Aid Convention in 1999 and 2011 that promote a shift from *food aid* – driven by donors’ surplus – to *food assistance* – driven by recipients’ needs and based on more structural programs. In addition the EU was one of the first donor pro-

⁵In the Indian context, Besley and Burgess [2002] show that public food provision is more politicized than calamity relief and its provision depends more on political cycle because of the visibility factor.

⁶It is also in 70 percent of the cases one of the three largest donors in a recipient countries, see figure A.1 in appendix VII.

moting innovative delivery systems such as local or triangular purchases. Finally the EU provides an example that it is possible to reform in order to disentangle agricultural policies and food aid policy conversely to the US.

My identification strategy is close to Werker et al. [2009] and Nunn and Qian [2014].⁷ I exploit exogenous variation in the timing of the EU reform of food aid policy in 1996 and interact this variable with a country's probability of receiving food aid from the EU before the reform, thereby introducing variation across countries. When controlling for the levels of the interacted variables, this interaction term is excludable to country specific variables such as food needs, because the timing of the reform is not related with recipient's needs and thus, allows determining the causal effects of EU food aid allocation on the allocation by other donors. This reform linked with previous reform of the CAP (Common Agricultural Policy) changed drastically the EU food aid policy. It shifted from a supply-driven policy to a demand-driven policy. The main consequence was a sudden and sharp decrease in the number of EU recipients. In three years, it was divided by two. The reform first affected small countries and next large recipient countries.

I find that if the EU stops allocating food aid to a small recipient country that has always received food aid from the EU before the reform, the number of other donors decreases by almost 1.5 on average. I find heterogeneity among donors, with some donors complementing the EU allocation, others substituting it, and others not reacting significantly to the EU allocation. Large donors (outside and within the EU) and Nordic countries tend to complement the EU allocation while the WFP substitutes herself to the EU. Smaller donors tend not to react significantly to the EU allocation.

Next I provide a donor typology depending on how they react to the EU that helps me interpreting the empirical results. The framework I develop allows me to classify donors' interaction but is not a mean to formal testing of causal mechanisms. I allow two types of reactions that have been discussed in the literature.

⁷This type of instrument has a growing importance on the aid literature [Ahmed et al., 2015, Dreher and Langlotz, 2015, Dietrich and Wright, 2015].

First, donors could react directly to the EU allocation. Annen and Moers [2016] claim that citizens may not care on the absolute impact of aid, which is quite difficult to evaluate, but on its impact relative to aid allocated by other donors and thus compare donors with each other. Alternatively donors may expect that the EU has better information on recipients' needs and will follow the EU allocation. Vesterlund [2003] and Andreoni [2006] develop theoretical frameworks and provide evidence of such mechanism in the case of charitable fund-raising.

Second, a donor may react indirectly to the EU allocation if the donor is altruistic or because the EU allocation affects its relationship with the recipient. For instance she could compete with the EU on trade partnership [Fuchs et al., 2015]. The two types of drivers are not excludable and both may play a role on how donors react to the EU.

According to the typology, for small countries, for which bilateral donor-recipient ties are probably weaker, relations between the EU and the other donors matter more than recipient's characteristics for large donors such as the US or Canada. Nordic countries also react directly to the EU allocation. On the contrary the WFP is the only institution clearly recipient-driven. Donors for which I do not find empirically a significant reaction to the EU are classified as giving the same weight to their ties with the EU and with the recipient.

The remainder of the paper is organized as follows. The empirical strategy and the EU reform are presented in section II. Section III describes the data. Section IV discusses the results and their robustness. Section V describes the framework and the typology of donors. Finally section VI summarizes the findings and discuss the implications.

II. Empirical strategy

A. Specification

In this paper, I investigate how donors react to EU food aid allocation controlling for other determinants such as recipient's needs and geopolitical bilateral

effects between the donor and the recipient. I consider the following specification:

$$(1) \quad FA_{drt} = \beta FA_{EUrt} + X_{dr,t-1}\Gamma_1 + X_{r,t-1}\Gamma_2 + \phi_{dt} + \phi_{dr} + \epsilon_{drt}$$

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

Controls $X_{r,t-1}$ and $X_{dr,t-1}$ are lagged to take into account the time needed to deliver aid.⁸ For instance, US food aid takes on average six months to be delivered [US Government Accountability Office, 2007]. Hence the decision is more likely based on past needs rather than on current needs, except in the case of natural disasters.

I allow the time effect to differ across donors thus I control for donor-year fixed-effects, ϕ_{dt} : it accounts for donor specific trend in food aid budget or for electoral cycles that can affect the allocation of aid [Tingley, 2010]. ϕ_{dr} is the donor-recipient pair fixed effects that catch time-invariant specificity such as colonial links, distance or sharing a common language.

In the core part of the paper I focus on the 0/1 decision choice to give rather than on quantities, because it is easier for a donor to anticipate whether the EU allocates any food aid to a recipient, rather than the exact amount that was sent. In addition, for a similar budget, depending on the type of commodities and the type of delivery, the quantity of food aid (in caloric equivalent) that eventually reaches the recipient country can be actually different. Hence the dependent variable, FA_{drt} , is a dummy equal to one if donor d allocates aid to recipient r at time t . FA_{EUrt} is a dummy equal to one if the EU allocates aid to recipient r at time t . The choice of focusing on the extensive margin - the 0/1 decision - is also partly driven by the instrumental strategy applied in this paper (see below section II.B). Nevertheless in appendix VII (tables C3.1 and C3.2), I also look at quantities (in caloric equivalent). More precisely, I estimate the reaction of a donor conditional on her giving to the recipient, in order to avoid the problem of the truncated nature of the outcome. Results go in the same direction but are not statistically significant.

⁸Controls are detailed in section III.B. They also include some contemporaneous controls to take into account fast response in case of emergency for instance.

Allocation decisions are often announced before food aid actually reaches the recipient country. Donors are more likely to react immediately to this type of announcement rather than once food aid has been actually distributed. Thus I use contemporaneous EU allocation rather than the one one year before. In addition, given the increasing share of food aid devoted to emergency, donors are more likely to react to current EU allocation than to the previous one.

Concerning the estimation strategy, I estimate the equation with a probability linear model with fixed effects. I am not aware of a non-linear procedure that identifies parameters in case of a binary outcome coupled with a binary endogenous variable, as well as an individual and time fixed effects. Nevertheless, I acknowledge that this choice has some drawbacks. First, the fitted probability both for the instrumented variable and the outcome variable can go below zero and above one. In addition, it assumes that the marginal effect of the allocation of food aid from the EU is constant and that the effect of the reform is linear on the probability of receiving food aid from the EU. I relax this assumption by allowing heterogeneous reactions, depending on the type of recipients and the type of donors. Finally standard errors are clustered at the recipient and year level.

The coefficient of interest, β , is the estimated effect of the food aid allocation by the EU in country r on the probability of participation of donor d in country r . A positive coefficient indicates that, on average, if the EU stops allocating food aid to a specific country r , it also decreases the probability that a donor d gives food aid to the recipient country. By contrast, a negative coefficient suggests that if the EU stops allocating food aid to a recipient, other donors compensate and step in. A non significant estimate indicates that I cannot reject the hypothesis that on average, other donors do not react to the EU allocation.

FA_{EUrt} is endogenous because of two problems: omitted variables and reverse causality. First, donors may react in the same way to shocks for which I do not have reliable data or I do not observe at all. For instance in 1984, the BBC launched a global media campaign to inform people about the large famine in

Ethiopia. This campaign led to an unexpected and massive civil mobilization. In reaction, governments increased their food aid to Ethiopia. As I do not have reliable data on all media campaigns I cannot control for these recipient-related common shocks. In that case, the OLS estimate will be upward biased.

Second, there is a problem of reverse causality. The EU itself reacts strategically to the allocation of other donors. One could argue that using previous allocation by the EU (FA_{EUrt-1}) solves the problem of endogeneity. However FA_{EUrt-1} could be still endogenous in case of “dynamics among the unobservables” as pointed by Bellemare et al. [2015], meaning that if FA_{EUrt-1} is correlated with the error term ϵ_{drt-1} and that shocks are auto-correlated, FA_{EUrt-1} is still correlated with ϵ_{drt} .

B. Instrumental strategy

In order to provide causal evidence of donors’ interactions, I develop an instrument of the EU allocation based on a natural experiment, which is a large reform of the EU food aid policy ratified in 1996.

EU FOOD AID POLICY AND ITS REFORM

Before 1996, EU food aid was mainly supply-driven. Project and program food aid of the EU, administrated by the EU Regulation n°3972/86 of Council of December, 22 1986, are non emergency food aid and more oriented towards development. Since 1967, EU food aid has been closely linked with the Common Agricultural Policy (CAP) and until 1986, both policies have been explicitly related in European regulation. Even if it was no more explicitly written in the 1986 regulation, the main purpose of food aid was to run down agricultural surplus until 1996. Thus EU reaction to recipients’ needs was slow [Clay et al., 1996] and food aid was allocated to many different countries.

At the beginning of the 1990s, agricultural surplus decreased due to reforms of the CAP and so did, food aid quantities. The EU progressively abandoned target prices and purchases leading to a decrease in EU stocks. In parallel the EU was criticized within the development assistance community for slowness and unre-

dictability of delivery. Hence, after the European parliament election in 1994, the EU decided to launch an external evaluation of its food aid program [Clay et al., 1996] in order to prepare a necessary reform.

The evaluation was the main source of recommendations for the reform finally adopted in June, 27 1996. The report pointed that the EU reached its minimal requirements under the Food Aid Convention. It also stressed that 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 amounts and on a one time basis. The report suggested concentrating food aid on a limited number (around 15 instead of an actual number of 90) of low-income countries, chronically in food deficit. In addition, the EU should be able to respond to specific circumstances such as a temporary food aid gap.

The new regulation n°1292/96 of the Council of 27 June 1996 on program and project food aid [COUNCIL REGULATION (EC), 1996] adopted a large number of the report's recommendations. Under the new regulation, a list of eligible countries was established for project and program food aid corresponding to countries with per capita GDP below 695 USD in 1992. Food aid principles were clearly expressed: aid should promote food security related to poverty, increase the nutritional status of recipient households, reduce food aid dependency and coordinate food aid among EU member states. Food aid meant to alleviate chronic food insecurity should be provided only to countries involved in a coherent national food strategy oriented towards the poor. Food aid should take into account local dietary customs and favor local (within a country) or triangular (in a third country) purchases of food aid. In addition, EU should evaluate needs based on food deficit and food security through specific indicators such as the HDI, income per capita, index of well-being or balance of payment.⁹

Emergency food aid is not anymore regulated with program and project food aid but with humanitarian aid and by the regulation n°1257/96 of the Council

⁹“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.” [COUNCIL REGULATION (EC), 1996, Chapter 1, Article 1 2.]

of 20 June 1996. Emergency food recipients were not concerned by the eligibility cut-off. Moreover emergency food aid was totally untied from program and project food aid. As a consequence it could be the case that emergency food aid was used as a substitute of program and project food aid. However I observe that the number of emergency food aid recipients also decreased after 1996 (see figure A.2a in appendix VII).

The reform resulted in three major changes in aid allocation. First, the EU reduced the number of recipient countries (see figure 1). The decrease is mainly due to program and project food aid (see figure A.2b in appendix VII) but emergency food aid was also affected. Before 1996, the trend of the number of recipients was parallel for other donors as well, but it did not follow the sharp EU drop in 1996.

[Figure 1 here]

Given the size of EU food aid and the number of recipients involved, the reform could not be completely implemented in one year. Moreover project and program food aid are often scaled over two or three years; the EU may have decided not to renew them rather than stop an on-going project. The EU decided which countries were to be first affected by the reform and first stopped allocating food aid to small countries (as defined by the World Bank).¹⁰ The amounts of food aid allocated to small countries were on average smaller (see table A.1 in appendix VII), administrative constraints and bureaucratic ties may also be weaker and these countries may have offered less opportunities in terms of economic and geopolitical development for the EU. As a result, small countries almost stopped receiving food aid from the EU after 1996 and only received emergency food aid from time to time afterwards. For larger countries, the implementation of the reform took longer.

Triangular and local purchases became more frequent (see figure A.3 in appendix VII). Fourth, the new regulation should affect 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

¹⁰See table D3.1 in appendix VII for the list of small countries.

six months”. It was four months in the 1986 regulation [COUNCIL REGULATION (EC), 1986]. However the total budget for food aid (including emergency food aid) decreased. Thus, just after the reform, the quantities received by recipient countries did not increase despite the concentration on a smaller number of recipients (see figure A.4a in appendix VII). However one could expect that the reform may have increased the quantities allocated to recipients that used to receive relatively low amounts of food aid. Figure A.4b in appendix VII plots the average quantity of food aid received by recipients excluding the three largest recipients who represent on average between one third and half of total food aid allocated by the EU. The pattern is similar.

Hence the reform mainly affects the first level of allocation that means to whom the EU allocates aid. I will use this exogenous time variation – from the point of view of other donors – in the EU allocation as an instrument of 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 was slowly decreasing; in 1996, there is a sudden drop. Afterwards, the probability is again decreasing on a slower trend.

[Figure 2 here]

HETEROGENEOUS EFFECT OF THE REFORM ON RECIPIENTS

The reform does not affect all recipient countries uniformly. More exactly the reform affects more, in absolute terms, countries that have received food aid regularly before 1996 than countries that have received it irregularly. To illustrate this point, I divide the countries in my sample in two groups, based on the frequency they have received food aid from the EU before 1996. I also look at small and large recipients countries separately as the reform has first affected small countries.

Countries that received food aid more often than the median (over the 1988-1995 period) are called “regular countries” and the others “irregular countries”. Regular recipients are on average poorer and more populous; they are also more

likely to be affected by a natural disaster or a conflict, than irregular recipients (see table A.2 in appendix VII that provides descriptive statistics). Figure 2b focuses on small countries and shows that there is a clear drop in the probability of receiving food aid from the EU, among regular recipients before 1996. Irregular recipients are also affected by the reform, but the impact is smaller. I do observe an heterogeneous effect of the reform between regular and irregular recipients for large countries (see figure 2c). The decrease is less sudden and takes some years to stabilize suggesting a larger phase-in of the reform.

Given the timing of the reform and its heterogeneous impact, I instrument the EU allocation in equation 1 as follows:

$$(2) \quad FA_{EUrt} = \lambda Reform_t * P_r + X_{EUr,t-1}\Gamma_3 + X_{r,t-1}\Gamma_4 + \phi_t + \phi_r + \epsilon_{rt}$$

with $Reform_t$ a dummy equal to one if the reform has been implemented (i.e. $t > 1996$) and P_r 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 received food aid from the EU.

The instrument uses variations induced by the reform across recipients as the reform does not affect them uniformly. I expect λ to be negative: the more often a country received food aid before the reform, the larger the drop in the probability of receiving food aid after the reform. In addition, the interaction term allows me to include year fixed effect in the first stage equation 2, so as to control for changes over time that could be spuriously correlated with EU food aid allocation pattern. ϕ_t also captures the direct and uniform impact of the reform on recipients. ϕ_r controls for the direct time-invariant impact of P_r on FA_{EUrt} and for specific relationships between the EU and the recipient. To summarize, the first stage compares the probability of receiving food aid from the EU before and after the reform in countries that were regular recipients and countries that were irregular recipients.

C. Potential concerns

Causal inference using the interacted variable, $Reform_t * P_r$, relies on the assumption that, conditional on the controls, the interaction between the reform dummy and the recipient's propensity of receiving EU food aid before the reform only affects food aid allocation from other donors through EU food aid allocation pattern. Different concerns could arise when making such assumptions.

One of the main concerns with this assumption is that the reform is a consequence of the CAP reform on EU agricultural policy. Hence the timing of the reform could affect other donors' allocation through EU agricultural exports to recipients. I find that EU agricultural exports to regular recipient countries are significantly lower than EU agricultural exports to irregular recipients after the reform. Hence EU agricultural exports were not substitute to food aid as both tend to decrease more in regular recipient countries. Thus if anything it should increase the probability of receiving food aid from other donors while I find the opposite (see later). However, to be cautious, the analysis addresses this possibility by controlling by the EU agricultural exports to the recipient country.

A second possibility is that the reform affects the allocation of other types of aid from the EU (development and humanitarian). I find no significant relationship between the timing of the reform interacted with the propensity of receiving food aid from the EU and the probability of receiving other types of aid (or the amount received).

A specific concern arises for EU member states. The reform may have induced bilateral reforms that are in line with the EU one. I do not find any written evidence of reforms of food aid policy at the national level by any large member states – UK, Germany and France – in the years around the EU reform.¹¹ The only thing I find is about France who has done some evaluation of their own programs [Thirion, 1996].¹² I am thus aware that even in the absence of formal reform it could have shaped bilateral food aid policies.

¹¹France reformed its policy in 2005 to focus mostly on Sub-Saharan African countries.

¹²I have not obtained a copy of this document but I will interview the author.

In addition EU members could have influenced the allocation of EU food aid before and after the reform, especially the largest member countries. The way the EU Commission decides on the allocation and the exchanges with EU representatives seems to avoid manipulation from large member states. Depending on recipient's requests, the EU Commission first establishes proposals of food aid allocation. Then, the Food Aid Committee, which includes civil servants from the Commission and EU representatives, agrees or disagrees with the proposals made by the Commission. In practice, the Committee has never rejected any proposal [Clay et al., 1996]. The role of the Food Aid Committee has decreased over the years and is now negligible. The Commission has been much more independent.¹³ It has been shown that holding the presidency of the Council of the European Union may affect foreign aid allocation [Aronow et al., 2016]. During the reform period (1995-1997) only small donor countries held the presidency – Spain, Italy, Ireland, Netherlands and Luxembourg. In addition the Commissioner for Development and Humanitarian Aid and Civil Protection were Spanish (1989-1995) and Portuguese (1995-1999).

Second, the International Food Aid convention (1986) implies minimum requirements at the EU level. The EU developed the "1+12" system in which these requirements are split between EU contribution and 12 state members contributions. It reinforces the idea that bilateral contributions are distinct to multilateral contributions done by the EU.

Another concern is about Sweden that enters the EU in 1995 and participates in EU food aid programs. However I do not observe a sudden drop on the quantities allocated by Sweden that would have indicate a substitution from bilateral to multilateral food aid. Nevertheless given those specific concerns on EU member states I first focus the analysis on non-EU regular donors. I include them afterwards and see how results are affected. I will also pool together EU and bilateral food aid of members states as non-EU donors may see European food aid as a whole.

The first stage is similar to a difference-in-difference. One of the key assump-

¹³Since the ratification of the Lisbon treaty (2009) the Commission does not need anymore approval from EU member states on the allocation of food and humanitarian aid

tions is thus the parallel trend before the reform. I test it as I have a large historical period of analysis. I test whether the changes on the allocation of the EU before the reform were similar for regular and non regular countries. I look at separately small and large recipient countries. Table B3.1 provides the results in appendix VII. It seems that the parallel trend assumption holds both for large and small countries.

Even if I include years fixed effects, recipient's needs may have evolved differently and could be spuriously correlated with EU food aid allocation pattern before the reform and thus with P_r . Changes in the recipient's needs could also be correlated with the timing of the reform. However, I do not observe any different trend of recipient's needs proxied by the variables I include. I test it formally for small and large recipients separately. Results are provided in tables B3.2 and B3.3 in appendix VII. More precisely I observe divergences for small countries after 2001 only on democratic indicators and the number of neighbor countries in conflict.¹⁴ For large countries, I observe divergence after 1996 for the growth of population. Regular large countries have experienced larger increase in population. However it goes against our results as a fast increase in population should increase the probability of receiving food aid from the EU and other countries while I find that the EU and other countries in reaction to the EU tend to reduce their allocation.

Next, one could worry that regular recipients affected by the reform are concentrated in some specific regions (for instance former USSR countries). Figure 3 shows for each country, the relative change in the average probability of receiving food aid from the EU after the reform. Recipients who are affected by the reform are not concentrated in one specific region. The only concern is about the size of the recipients that's why I first focus on small country for which the identification strategy holds well and next I extend the analysis to large countries for which the reform took some years to be totally implemented.

[Figure 3 here]

Other events during the period may have affected the allocation of the EU and

¹⁴In a robustness check I show that if I exclude years after 2001 results hold.

of other donors. One could think of the end of the Cold War, the 9/11/2001 attacks or the Paris Declaration on Aid Effectiveness (2005). In order to test the robustness of my result to the choice of the period of analysis, I exclude the Cold War period (until 1990). I also stop the sample in 2005 and in 2001. Results stay within a standard error of the baseline results.

Specifically in 1996, the US has ratified a new Farm Bill. As a consequence, theoretically food aid should have to make a final transition from a government surplus-based to a budget-based regime. In that case, the effect I find could be due to a reaction to the US changes rather than to the EU changes. However [Barrett and Maxwell, 2005] note that “this potential for reform has gone untapped. Indeed, and perhaps ironically, food aid now tracks domestic food stocks more closely than ever because fluctuations in food aid volumes arise primarily from “emergency” supplemental appropriations by the Congress that direct the CCC to purchase commodities for shipment overseas in an effort to prop up a weak commercial market.” Finally it is interesting to see that the amount of food aid allocated by the US increased substantially from 1995 and 1996. However I find that the US reacts positively to the EU allocation meaning that the reduced the probability of allocating food aid to those recipient countries despite the increase in the total quantities allocated.

Finally one may expect that the effect of the reform on the probability of receiving food aid from the EU is not linear. By construction, the only possible effect for countries that have received food aid every year before the reform is downward or status quo. On the contrary, the probability of receiving food aid for countries that have not received food aid from the EU before the reform is upward or status quo. In order to take into account this non-linearity problem, I specify the effect of the reform in a more flexible way. First, I use a polynomial function of the reform impact. Thus, instead of FA_{EUdrt} depending only on $Reform_t * P_r$ I allow it to depend on a higher polynomial degree, $Reform_t * P_r^2$, $Reform_t * P_r^3$ and $Reform_t * P_r^4$. A second possibility is to use a piece-wise function of the instrument. It allows the effect to be different for different values of the instrument. In such a case, FA_{EUdrt} will be a function of $Reform_t * (P_r < a_1)$,

$Reform_t * (a_1 \leq P_r < a_2) \dots$ with a_1, \dots, a_n to be defined.

III. Data and descriptive statistics

A. Food aid statistics

The data comes from the INTERFAIS database and has been provided by the WFP [World Food Programme, 2011]. This paper looks at total food aid, whatever the delivery mode, including emergency food aid. Emergency food aid may be very different from program/project food aid. However the frontier between both types of aid is sometimes fuzzy, for instance Ethiopia has received emergency food aid every year since 1988 from almost all donor countries. A food aid flow is defined by a donor d , a recipient r and a year t . The year corresponds to the moment food aid is reaching the recipient country.¹⁵ The initial sample is a panel of 144 recipient countries between 1988 and 2011.

I focus on 21 regular donors define as countries or institutions who have given food to at least one recipient every year since 1988. Donors are Australia, Austria, Belgium, Canada, Denmark, the European Union, Finland, France, Germany, Italy, Japan, the Netherlands, Norway, Saudi Arabia, Spain, Sweden, Switzerland, UN offices except the WFP, the United Kingdom, the United States and the WFP.¹⁶ Together they represent about 96 percent of total food aid recorded in the data. Regular donors are more likely to react to EU food aid allocation as food aid is a permanent program of their foreign policy.¹⁷ In this paper the “EU” refers to the European institutions and administration. EU food aid allocation is the one decided by the EU administration, more precisely the European Commission. It is the multilateral part of EU food aid and does not include bilateral programs of EU member states.

The EU is the second largest donor in the world after the US until 2008. In 1988, EU food aid represented almost 18 percent of global food aid and reached

¹⁵Food aid could be food being delivered or financial assistance that is tied to the purchase of food by the recipient (aid for food).

¹⁶The UN offices include the UN OCHA, the HCR, the UNDP, the UNICEF and other similar institutions that depend on the UN. Note that the World Bank does not provide food aid.

¹⁷Moreover, data exhaustiveness is doubtful in the case of occasional donors, especially non governmental organizations, see appendix VII for more details.

more than 80% of recipient countries at that time. This share has declined to 10 percent in 2000 and only 3 percent in 2011. The 2008 crisis has dramatically affected the EU food aid budget. The EU remains an important actor as she still allocates food to 30% of recipient countries in 2011. In addition, the EU is one of the two largest donors for almost half of the recipient countries and is one of the top four in 75 percent of cases (see figure A.1 in appendix VII).

Table 1 provides the annual average number of recipients by group of donors for two sub-periods: 1988-1995 and 1996-2011. The number of recipients of EU food aid is divided by two after 1996. The EU is the only donor with such a large decrease, a consequence of the food aid reform already presented section II.B. The decrease in the number of recipients from the EU concerned mostly small states.¹⁸ The EU divided by seven the average number of small countries that receive food aid after the reform, whereas it cut by less than two the number of large recipients countries. Other donors also reduced the number of recipients but the magnitude of the drop is smaller. Among European member states, the UK is the only country which increased the number of recipients after 1996 (see table A.3 in appendix VII). Outside the EU, the largest decrease is seen for Canada, partly because of large budget cuts during the 1990s. On the contrary, Japan and the UN institutions have increased the number of recipients. For the UN institutions, the increase is mainly explained by the role of the WFP.¹⁹

[Table 1 here]

I define the set of potential recipients as follows. In a given year t potential recipient countries are all the countries that have received some food aid from at least one regular donor between 1988 and 2011. Thus, the set includes countries that actually receive no food aid in a given year t . For instance, in 1988, Afghanistan did not receive food aid from regular donors but is still included as a potential recipient in the sample. Hence the data are perfectly balanced by recipient-donor pairs. The only caveat is state partitions such as East Timor in 2002.

¹⁸Small states are defined following the World Bank definition. The list is provided in Appendix VII.

¹⁹The pattern is similar when looking at the average quantity allocated to recipient countries (see table A.1 in appendix VII).

Table 1 underlines a positive correlation across donors' allocation.²⁰ Obviously this correlation is partly due to similar responses to negative shocks on recipient countries. For instance all donors allocate food aid after large natural disasters such as Haiti earthquake in 2010. However, even if I exclude emergency food aid, I still find a positive correlation in the allocation. I observe some variations in the correlation as it is higher for EU members than for extra-EU countries or UN institutions. The correlation between aid allocations is higher for large countries than for small countries.

B. Controls

$X_{r,t-1}$, in equation 1, includes control variables specific to recipient countries that proxy recipient's needs and thus partly determines food aid allocation. Precisely it controls for recipient's needs proxied by population size, domestic cereal production per capita and GDP per capita. The literature on aid determinants stresses the potential "population bias". That is to say that if, *ceteris paribus*, the population doubles, aid receipts would increase by less than two. It could also affect the decision of giving food aid. Hence, I control by the level and square of the logarithm of population.

For cereal production, I take the logarithm and its square so as to allow flexibility because I am more interested in the variation than in the level of production. I do not include total food imports but only agricultural imports from the EU, so as to avoid endogeneity [Barthel et al., 2014] even if two recipients with the same level of cereal production per capita may still have different needs, because of their different capacity to import food. A recipient may adjust its import, depending on the amount of food aid received.

Logarithm and squared of GDP per capita (in 2005 US dollar) are added to control for food insecurity linked with poverty and entitlement [Sen, 1981]. Food aid is also often allocated to refugees from another country or region within the

²⁰I do not adjust these correlations with the overall budget of food aid. Indeed the US and the EU are more likely to overlap than the EU and Italy, because the budget devoted by the US to food aid is larger. However if I look at the share of recipient r in each donor's total food aid instead – that adjust for budget size – correlation results are similar.

same country. Hence I introduce the share of refugees and internally displaced populations in recipient countries and its square.²¹

I also control for the occurrence of a disaster or a conflict, two phenomena that largely explain food aid allocation (especially emergency food aid): I include a dummy equal to one, whether the recipient country suffers from a disaster, such as drought, fire, flood or earthquake, at time t and another dummy if the disaster occurred at time $t - 1$. In case of a large disaster, food aid delivery could be fast. I introduce a dummy equal to one if the country is involved in an internal or external conflict at time $t - 1$ and control for the number of contiguous countries that are in conflict, as being near a conflict zone may have negative externalities on food security.

Many papers suggest that the effectiveness of aid depends on the quality of the recipient country. Thus donors are more likely to allocate aid to countries with better institutions. Hence, I include a democracy index (Polity IV) and two indicators on civil liberties and political rights. Polity IV ranges from -10 to 10. 10 denotes full democracy while -10 denotes autocracy. Civil liberties and political rights indicators range from 1 to 7. 1 refers to free countries while 7 refers to not free countries. The less autocratic the country, the more likely it is that food aid reaches the neediest households.²²

$X_{dr,t-1}$ is a vector of time-variant variables specific to the donor-recipient pair, that captures changes in the bilateral relationship which can affect the donor's willingness to give. The most important factor is the type and quality of diplomatic relationships, proxied by the UN vote similarity index constructed by Strezhnev and Voeten [2012]. The allocation of food aid may also depend on whether a donor gives other types of aid such as development aid, because the donor may have better information on the recipient. In addition, the two types of aid could be substitute.²³ Thus I use the current amount of ODA (Official

²¹Data 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 taken from the WDI (World Bank).

²²Both indicators are constructed by the Freedom House. These variables reduce the sample size, hence I only introduce them in a third specification.

²³I will not interpret the sign or the magnitude of the estimates given the endogeneity problem if both

Development Aid) allocated by donor d to recipient r rather.²⁴ Finally I include the number of other donors allocating food aid (excluding the EU) at time t to recipient r . Table A.4 in appendix VII provides descriptive statistics of controls variables for small countries.

IV. Empirical results

A. Baseline results

Given the timing of the reform and the potential concerns for EU members donors I first focus on the reaction of non EU donors in small recipients countries. In sensitivity analysis I will extend the sample to EU member states and large recipient countries.

The OLS estimates of equation 1 for the donor allocation are reported in the first lines of Table 2.²⁵ Column (1) controls for recipient-donor and donor-year fixed effects. The correlation between the EU allocation and the allocation by other donors is positive and significant at the one percent level. In column (2), I include a range of time-variant variables, X_{rt-1} to control for factors that capture recipient needs. In column (3), additional controls are related to the quality of recipient government: a democracy index (Polity IV) and two indicators on civil liberties and political rights. These variables reduce significantly the sample size. In column (4), I include a time-variant donor-recipient variable X_{drt-1} : the UN vote similarity index. I also control whether donor d allocates other types of aid simultaneously to recipient r and by the number of other food aid donors. Given the large drop on the number of observations my baseline estimates are the ones in column (2).

[Table 2 here]

Table 2 also provides the estimate of the reduced form and the first stage of the 2SLS estimation. The reduced-form effects show that the probability of receiving food aid from another donor is correlated negatively for regular recipients after

types of aid are substitute or complement.

²⁴Data are provided by the OECD.

²⁵Estimates for controls are provided in table B3.4 in appendix VII.

the reform. The effect is significant for all specifications. According to Chernozhukov and Hansen [2008] it provides evidence of the fact that the instrument does affect the endogenous variable.

The first stage estimates show a strong negative correlation between the instrument and the EU choice of giving food aid. According to estimates in column (2) for a small country that had received food from the EU every year before 1996, the reform induced a decrease in its probability of receiving EU food aid by 87.2 percentage points. Given the average probability of receiving food aid from the EU before 1996, I can estimate the predicted average number of EU food aid recipient countries after the reform: about zero if all other variables remain constant (compared to 15 before the reform). The estimated number is less than the actual average number of EU food aid recipients after the reform – about 2. Estimates decrease slightly as I include controls. The Kleibergen-Paap F-statistic is large, suggesting that the instrument is not weak. I also look at the share of fitted probabilities outside the interval. About 25 percent of observations are below 0 or above 1. Among fitted probabilities outside the range [0-1], 95 percent is below 0 and 5 percent above 1.

Without any controls, the 2SLS estimate is significant and higher than the OLS estimates. In column (2), where I control for time-variant determinants of recipients' needs, the estimate is larger and significant at the one percent level. The effect remains significant when I control for the quality of recipient government and for bilateral determinants, even if the estimates is less precise and the number of observations drops. Results suggest that if the EU allocates aid to a recipient country, it increases by 14.1 percentage points the probability of receiving food aid from another donor. The results are in line with other studies [Knack et al., 2014, Davies and Klasen, 2015] that look at the causal estimates of the interaction among donors and also find positive interactions on average, meaning that donors complement each other.

The sample mean of the probability of receiving food aid from a non EU member donor is 15.88 percent for a small country before the reform and the average

probability of receiving food aid from the EU is 43 percent. Therefore, for a small recipient country at the mean level of EU probability, the estimate implies that a decrease by 10 percentage point of the probability of receiving food aid from the EU causes a 1.40 percentage point decrease in the average probability of receiving food aid from other donors, that is 9.5 percent of the sample mean. As the EU reform is equivalent to a 38.6 percentage point decrease of the probability of receiving EU food aid, this leads to a reduction by 0.5 of the number of other donors on average. For a recipient who had always received food aid from the EU before the reform and does not receive it anymore, it induces a decrease of the number of other donors by 1.5 which is important.

Next I extend the analysis to EU member states still focusing on small countries (table 3). Results stay within a standard error of the baseline results. EU members behave on average as non EU donors. Then I include large countries which are affected later by the reform. In that case given the phase-in of the reform it is possible than other donors learned from the first phase of the reform and thus adapted their reaction. It could also be the case that donors do not react similarly for small and large recipient countries. Hence the estimate should be interpreted with more cautions. First I focus on non EU donors and second I include EU member states. I find a positive but not significant reaction of non EU donors to the EU allocation and a positive and significant reaction when I also include EU member states.

[Table 3 here]

B. Bilateral reactions

It is unlikely that all donors react to EU food aid in the same way. Thus, I estimate equations 1 and 2 for each donor d allowing for a differentiated response, β_d to the EU allocation.

$$(3) \quad FA_{EUrt} = \lambda Reform_t * P_r + X_{EUr,t-1}\Gamma_3 + X_{r,t-1}\Gamma_4 + \phi_t + \phi_r + \epsilon_{rt}$$

$$(4) \quad FA_{drt} = \beta_d FA_{EUrt} + X_{dr,t-1}\Gamma_{d1} + X_{r,t-1}\Gamma_{d2} + \phi_{dt} + \phi_{dr} + \epsilon_{drt}$$

I focus on small recipients countries as the identification strategy suits more small recipient countries. Table 4 reports the bilateral estimates including controls as in column (2) of table 2.²⁶ I observe three possible reactions: $\beta_d < 0$ and significant, $\beta_d > 0$ and significant, and β_d non statistically different from zero.

[Table 4 here]

Bilateral reactions are very heterogeneous across donors but the estimates are always between -1 and 1. It suggests that alone, a donor cannot entirely compensate the fact that the EU stops giving to a recipient country and the response is not systematic. Among non-EU countries, three donors react significantly to the EU allocation: the two largest donors – Canada and the US – and the WFP. The US and Canada react positively and significantly to the EU allocation. Hence they decrease their probability of allocating food aid to small countries in response to the EU decision. On the contrary the WFP substitutes to the EU and starts allocating food aid to former EU recipient countries. This finding is expected in the sense that the WFP has a double role: it is a donor who allocates food aid based on its own funding as well as an implementing agency that is dedicated to implement food aid programs decided by other donors. Actually, the WFP always tries first to obtain food aid from other donors through special appeal or core contributions, before spending on its own. Thus, the WFP appears as a donor of last resort, if he does not succeed to obtain food aid from other donors.²⁷

Among EU members, it seems that Nordic countries, such as Denmark, Finland, Netherlands and Sweden, are the ones who react the most to the EU allocation and follow EU's lead. The two largest EU donors – France and Germany – also react to the EU by following the EU decision. For the recipients, the loss in terms of food aid can be quite substantial. Except Japan, who does not react significantly to the EU allocation, the top donors behave the same way as the EU, regarding small recipients. Hence, the EU reform may have induced a larger decrease on food aid received than the effect of the sole EU withdrawal. Given the average quantities allocated by those donors to small countries, it does not

²⁶Table B3.5 in appendix VII shows bilateral reactions when all recipients – large and small – are included.

²⁷In the data, the WFP does not appear as a donor when the WFP is only the implementing agency.

seem possible that the WFP and the UK has succeeded in compensating the loss.

The problem of subsidiarity between EU institutions and EU members is salient. It questions the efficiency of having two levels of food aid allocations, at the country and at the EU level, if both target the same recipients. A solution that could preserve bilateral allocation by EU member states while reducing costs is to increase the number of food aid projects co-financed by the EU and a EU member state. It is already partly the case but it is not systematic.

These estimates do not provide information on why donors react or not to the EU. In the next section, I present a typology in which I distinguish a donor's reaction to the EU depending on whether she reacts indirectly to the EU because EU's decision affects the way she estimates recipient's needs, or directly because she wants to keep up with the EU. Before presenting the typology, I check the robustness of the 2SLS estimates.

C. Placebo tests and robustness checks

PLACEBO TESTS

In table 5 I run different placebo tests to provide additional evidence on the validity of the identification strategy. First I estimate alternative first-stage equations where the reform is assumed to occur in 1992, which is the mid-point of the pre-treatment period, or in 2003, which is the mid-point of the post-treatment period. The estimate is not significant for a fake reform in 1992 – which corresponds to the year of the CAP reform – nor in 2003. As a consequence the second stage estimates are not significant and the K-P F-Stat very low.

The reform should only affect the allocation of food aid from the EU. However it could be the case that the EU substitutes to food other types of aid (development or humanitarian aid). In that case, the other donors may react to the EU not only because of the change in EU food aid but also because of the changes in other aid allocation. I find no impact of the reform on the amount of development and humanitarian aid allocated to recipient countries by the EU. The reduced form also shows no significant relationship between the amount of EU

aid and the allocation of food aid by a donor d .

As the aid reform is an indirect consequence of the CAP reform, it could have affected (and increased) EU agricultural exports, resulting in another channel for other donors' reaction. In that case, the exclusion assumption does not hold. Hence I look at the first-stage estimates to investigate whether the CAP reform has affected differentially EU agricultural exports to recipient countries after 1996. I find that it has decreased EU agricultural exports to small regular recipients. Agricultural exports are not a substitute to food aid. If anything the decrease in EU agricultural exports should increase the probability of other donors to allocate food aid rather than decrease it. Moreover I do not find any significant relationship between EU agricultural exports to a country and donor d allocation of food aid (excluding EU food aid in table 5 or including EU food aid in table B3.4).

[Table 5 here]

ROBUSTNESS CHECKS

I test the sensitivity of baseline estimates to the sample definition (table 6). First, I change the set of donors. In row (2), I include all donors (except NGOs because of incomplete data) even if they only allocate food aid to few recipients during few years. In row (3) and (4), I restrict the sample to donors who give food aid often, respectively at least 10 or 20 years (out of 24 years). The estimates are significant and positive. More interestingly the estimate is increasing when the number of donors sets smaller. It seems that the more regular a donor is, the more likely it is that she is react significantly to the EU food aid allocation.

In row (5) I change the definition of EU food aid by pooling together multilateral and bilateral EU aid. Non European donors may not distinguish both types of aid. In addition it is possible than even if the reform only applies to the multilateral EU food aid programs, it indirectly affects the policy of bilateral members as already mentioned. In addition the reform is partly due to previous reform of the CAP that affects bilateral agricultural surplus. The estimate is twice higher than when I only include multilateral EU food aid. It suggests that

non EU countries react at both multilateral EU and bilateral EU food aid allocation. However the K.-P. F-Stat is low, reinforcing the idea that the reform only affects the multilateral EU allocation rather than both multilateral and bilateral European food aid policy.

Third, I change the period of analysis in order to exclude events that could affect (food) aid allocation. In row (6), I stop the analysis in 2005 as the Paris Declaration on the Effectiveness of Aid, that same year, stressed the importance of coordination among donors and may have had some influence. In row (7), I restrict the period to 1988-2001 as Fleck and Kilby [2010] show that the US have altered their allocation pattern after the 2001 attacks. In row (8), I also exclude the Cold War period and thus restrict the period to 1991-2001. The reported coefficients stay within a standard-error of the baseline results. In row (9), I narrow the analysis to one year before and after the reform.²⁸ The estimate is slightly lower than the baseline estimate but more importantly is no more significant at a ten percent level. I could be partly explain by a loss in power due to the large reduction of the number of observations, given the number of fixed effects (donor-recipient and recipient-time).

Next, I change the first-stage specification. In row (10), in order to investigate whether the European Commission started changing its rules of allocation before the ratification of the regulation, I redefine the dummy Reform_t to be equal to one after 1995 instead of 1996. Actually, the evaluation was launched in 1994 just after the European Parliament election and the establishment of a new European Commission while the need of a reform was agreed in 1994/1995. Hence the main lines of the report were known before 1996. In Figure 1, it seems that indeed the decrease in the number of recipients actually starts in 1995. The estimate remains the same. Rather than interacting the reform timing with the propensity of receiving food aid from the EU before the reform, I interact it with last year's allocation, FA_{EUt-1} , (row (11)) or recent past allocation, by computing the propensity of receiving food aid from the EU between 1993-1995 (row (12)). In that case, donors would not react to the long-term allocation of the EU but

²⁸First-stage result is provided in table B3.6 in appendix VII.

to short-term allocation of the EU. I also compute the propensity of receiving project or program food aid excluding emergency food aid, in row (13) as the former were the main targets of the reform. Results stay within a standard-error of the baseline results. The K.-P. F-Stat evolves in the expected direction: it is higher when I focus on program and project food aid and lower when I define P_r only with last year's EU allocation.

In row (14) and (15), I allow the impact of the reform to be non-linear on the probability of receiving food aid from the EU. In rows (14), I use a polynomial function of $Reform_t * P_r$. I add a squared term $Reform_t * P_r^2$. In rows (15), instead of using a polynomial function, I use a piecewise function of P_r and interact each term with $Reform_t$. Instruments are thus $Reform_t * (P_r < a_1)$, $Reform_t * (a_1 \leq P_r < a_2)$, $Reform_t * (a_2 \leq P_r < a_3)$ and $Reform_t * (a_3 \leq P_r)$. I use quartiles. Results stay within a standard error of the baseline results. First stages results are provided in table B3.6 in appendix VII.

Finally in row (16) I allow the reform to have an impact on the allocation of food aid only one year after. Indeed the year of allocation corresponds to the year food aid reaches the recipient country. In that case it could be the case that food aid decided in 1995 reaches the country only in 1996, thus after the ratification of the reform. Results stay within a standard error of the baseline results.

[Table 6 here]

V. A donor typology

In the previous section, I show that some donors react significantly to EU food aid allocation. I argue that these interactions may be classified in from two broad categories of behaviors. First, a donor reacts to the EU decision, because he cares about the extent of recipient's needs (which partly depends on EU's action). It could be for altruism [Younas, 2008] or for strategic reasons (related to the recipient). Because the donor reacts to the EU through the impact on the recipient, I call this channel *indirect* or *recipient-driven* interactions. Alternatively, a donor can also react to the EU allocation per se. It could be for coordination purpose or due to a signaling effect. I call this channel *direct* or *EU-driven* interaction.

I found in the previous section that donors tend to complement the allocation of the EU. This could lead to a concentration towards some recipients at the expense of others. However, the policy implications are not the same, depending on whether the donor's reaction is recipient or EU driven. If it is recipient-driven, coordination could be achieved by specializing donors geographically or by delegation to a multilateral agency. If it is EU-driven, coordination could take the form of a joint program, so as to limit transaction costs and projects duplication.

I provide a simple typology from a framework in which a donor reacts directly and indirectly to the allocation of the EU. The typology classifies donors according to the importance of interactions driven by recipients' characteristics vis-à-vis interactions driven by the EU.²⁹ The framework only helps interpreting the bilateral estimates. The framework does not test any causal mechanisms.

A. Setting

For simplicity, the framework is based on two donors, donor d and the EU. Each donor can allocate food aid to R potential recipients. Allocation's decisions are made simultaneously and for tractability, there is no uncertainty and information is perfect.³⁰ A donor maximizes its current utility.

At each period t , donor d has a fixed budget A_{dt} for food aid and faces R recipients with specific needs, F_{rt} . The donor's allocation A_{drt} is determined by two competing drivers: recipient's characteristics and allocation by the EU.

Donor d allocates food aid depending on recipient's needs, F_{rt} but also depending on geopolitical concerns. Geopolitical bias is driven by time-invariant links, G_{dr} , such as colonial history. G_{dr} can be seen as a positive premium. Geopolitical bias can also vary over time, G_{drt} , because of diplomatic changes or specific interests at a given period of time. The donor also takes into account EU allocation

²⁹Berthélemy [2006a] derives a typology of donors distinguishing altruist and strategic donors. This typology is in line with this idea. However in my case, the fact a donor reacts because of the recipient does not necessarily implies altruism.

³⁰Given the history of food aid allocation, it is quite believable that each donor anticipates well how other donors allocate their aid on average. In addition, the Food Aid convention and the WFP helps to spread information among donors.

in his evaluation of needs because of his limited budget: he wants to avoid giving too much or not giving enough.

To summarize, donor d allocates food aid depending on evaluated needs equal to $F_{rt} + G_{dr} + G_{drt} - A_{EUrt}$ with A_{EUrt} the amount of food aid allocated by the EU to recipient r . A donor wants to minimize the gap between the estimated needs and the quantity of food aid he allocates. Hence, his first objective is to minimize $((F_{rt} + G_{dr} + G_{drt} - A_{EUrt}) - A_{drt})^2$.

On the other side, donor d compares directly its own allocation with the allocation done by the EU. It could be so because of competition effects and he wants to appear as more important (see the concept of lead donor developed by Steinwand [2015]). It could also be for domestic reasons. Annen and Moers [2016] rationalize the idea that it is easier for donors to communicate on the relative effectiveness of their aid compared to one another rather than on the absolute effectiveness of their aid. Moreover, they argue that an increasing number of advocacy NGOs provide donor rankings; in that context, the objective is no more to increase the absolute aid effectiveness but to be close to another donor's behavior. It could also be that as the EU is a large donor, the EU has better information on recipients' needs. In that case, smaller donors may follow the informed donor – the EU – because they infer information about the recipient. Vesterlund [2003] develops such a model showing that the order of fund-raising matters. My framework and the data do not perfectly fit this possibility as donations are simultaneous and are not sequential.³¹ However donors often announce commitments before disbursing aid actually. Small donors can rely on the announcement rather than on the current disbursements. Hence donor d is interested in $A_{drt} - A_{EUrt}$.

Alternatively, it could also be the case that donor d wants to specialize compared to the EU. In that latter case of specialization, I treat symmetrically the fact of giving more than the EU or giving less. This is a simplifying assumption, which neglects the idea that a donor could want to appear as leading by giving more than the EU. Hence a donor wants to minimize $\lambda_d (A_{drt} - A_{EUrt})^2$ with $\lambda_d (\in \mathbb{R})$ the way a donor value the direct comparison with the EU allocation.

³¹More precisely I do not have any information on the timing of the decision by each donor. I only observe flows when they reach the country on a one-year basis.

The objective function of donor d is a weighted sum of both components given its annually predetermined budget, A_{dt} . Each period t , a donor chooses A_{drt} that minimizes:

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

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

λ_d captures the weight a donor gives to the direct comparison with the EU allocation. Its sign also captures the way the donor compares itself relative to the EU. $\lambda_d > 0$ means that donor d wants to allocate its aid the same way as the EU. On the contrary $\lambda_d < 0$ suggests that donor d wants to specialize compared to the EU.

$\gamma_d > 0$ captures the weight a donor gives to the recipient and how much recipient's characteristics are taken into account in the allocation process. It captures the indirect interactions between donors. It is defined at the donor level and does not depend on the recipient. $G_{dr} + G_{drt}$ already captures the fact that donors may give more importance to some recipients. Therefore, the ratio $\frac{\gamma}{\lambda_d}$ measures the relative importance of interactions driven by the recipient's needs (estimated by the donor) over interaction driven by a direct comparison with the EU allocation.

B. Reaction function

The first order condition gives a reaction function of A_{drt} to A_{EUrt}

$$(5) \quad A_{drt} = \frac{\mu_{dt}}{\lambda_d + \gamma_d} + \frac{\gamma_d}{\lambda_d + \gamma_d} G_{dr} + \frac{\gamma_d}{\lambda_d + \gamma_d} G_{drt} + \frac{\gamma_d}{\lambda_d + \gamma_d} F_{rt} + \frac{1 - \frac{\gamma}{\lambda_d}}{1 + \frac{\gamma}{\lambda_d}} A_{EUrt}$$

where μ_{dt} is the Lagrangian multiplier associated to donor d at time t . The reaction function implies some constraints on the parameters. First $\lambda_d \neq 0$ which means that donor d always weights the EU allocation. Second $\frac{\gamma}{\lambda_d} \neq -1$: a donor cannot value the same way the direct comparison with the EU and the recipient's characteristics ($\lambda = \gamma$) and at the same time, specialize relative to the EU ($\lambda < 0$).

The equilibrium allocation exists and induces restriction on λ_d and γ_d but does not affect the reaction function. First, donors partly allocate their food aid on recipient's needs and characteristics - i.e. $\lambda \neq 0$. Second $\gamma_d \lambda_{EU} + \lambda_d \gamma_{EU} \neq 0$. It means that on average the EU and donor d take into account the allocation driven by direct comparison done by each other.

$$(6) \quad A_{drt}^* = \frac{1}{2} F_{rt} + \frac{(\lambda_{EU} + \gamma_{EU})(\mu_{dt} + \gamma_d(G_{dr} + G_{drt}))}{2(\gamma_d \lambda_{EU} + \lambda_d \gamma_{EU})} + \frac{(\lambda_d + \gamma_d)(\mu_{EUt} + \gamma_{EU}(G_{EUR} + G_{EURt}))}{2(\gamma_d \lambda_{EU} + \lambda_d \gamma_{EU})}$$

Based on this framework and the reaction function, I can derive a typology of donors. First, the sign of the ratio provides information on how a donor values its allocation compared to the EU allocation. If $\frac{\gamma}{\lambda_d} > 0$ then $\lambda_d > 0$, meaning that donor d wants to complement and copy EU food aid allocation. Alternatively, if $\frac{\gamma}{\lambda_d} < 0$ it means that donor d tends to substitute to the EU and specialize compared to the EU.

Second, the magnitude of the ratio $\frac{\gamma}{\lambda_d}$ indicates whether the allocation by donor d in reaction of the allocation of the EU is driven by the recipient's estimated needs or rather by the EU itself. Donors whose allocation is more driven by recipient's characteristics ($|\frac{\gamma}{\lambda_d}| > 1$) will be called "Recipient driven". Donors whom allocation is driven by the EU allocation ($|\frac{\gamma}{\lambda_d}| < 1$) will be "EU driven". If the donors value similarly both outcomes, they will be "Neutral".

C. Typology

Adding an error term to equation (5) and interpreting the allocation not in quantities but on the probability of giving food aid, I obtain the equation (4) I have estimated in section IV.B, with $\beta_d = \frac{1 - \gamma_d}{1 + \frac{\gamma_d}{\lambda_d}}$, $\Gamma_{d1} = \frac{\gamma_d}{\lambda_d + \gamma_d}$, $\Gamma_{d2} = \frac{\gamma_d}{\lambda_d + \gamma_d}$, $\phi_{dt} = \frac{\mu_{dt}}{\lambda_d + \gamma_d}$ and $\phi_{1dr} = \frac{\gamma_d G_{dr}}{\lambda_d + \gamma_d}$. Hence, I can interpret the coefficient β_d as $\frac{\gamma_d}{\lambda_d} = \frac{1 - \beta_d}{1 + \beta_d}$. It provides me an equivalence between β_d and $\frac{\gamma}{\lambda_d}$ and a typology presented in table 7.

[Table 7 here]

Table 8 shows the donor typology for small countries.³² Large donors (outside the EU and within the EU) and Nordic donors are EU-driven. Small countries' needs can be normally fulfilled by a few number of donors. Allocating food aid to these small countries can be a strategy to signal that the donor cares about food aid in general by following the EU, which is seen a leading donor. This could be the case for Nordic countries. It could also be the case that bilateral ties with the recipient are weaker than concerns regarding donors' interactions in the case of France, Germany, Canada and the US. One donor stands out as recipient-driven: the WFP. It suggests that the WFP does allocate food aid depending on the needs of recipient countries, in line with its international mandate.

[Table 8 here]

VI. Conclusion

Even in the absence of an international framework that improves coordination and interactions between donors, donors do react to each other. In this study, I show that the change in the EU rules of food aid allocation in 1996, which resulted in many countries, mostly small countries, receiving no longer from the EU, has affected food aid allocation by other donors. On average, donors complement the allocation of the EU: they stop giving to recipients following EU's withdrawal. I find a large heterogeneity on donor's reactions: Nordic countries, France, Germany, Canada and the US complement the EU food aid allocation and are likely to aggravate the drop experienced by the recipient country. On the contrary, the WFP substitutes to the EU and mitigates the decrease in food aid received. These findings are largely robust to the use of different sample definitions of donors and time period. They are also mostly robust to alternative specifications.

This study focuses principally on the reaction to food aid allocation to small countries. On average, if the EU stops allocating food aid to a small country, it reduces by 1.5 the average number of other donors. This direct reaction could

³²Point estimates of $\frac{\gamma}{\lambda_d}$ are provided in table B3.7 in appendix VII.

be explained by coordination between donors: they specialize so as to limit the number of donors in small countries whose needs are relatively low. I cannot formally test this mechanism. For large recipient countries the conclusions are not robust to the exclusion of EU member states. In addition the reform affects them later which has implications on my identification strategy.

I develop a simple framework where donors react to the EU through two channels: indirect reaction to the EU, based on recipients' characteristics, and direct reaction to the EU, based on a comparison of their allocation to the EU's one. I derive a typology that helps me interpreting the empirical results. Large donors such as Canada and the US outside the EU but also Nordic donors and large EU member states such as France and Germany react directly to the EU allocation. On the opposite, the WFP is recipient-driven. For the WFP, this finding is in line with its mandate.

These results have implications for global food aid allocation and in an European perspective. First the fact that donors complement the EU allocation could lead to the problem of darling and orphan countries even if the WFP seems to mitigate part of the phenomena. Indeed it means that some recipients will receive from a large number of donors if the EU decides to deliver food aid to them. At the European level, it raises the problem of subsidiarity between the EU and its member states, and the efficiency of having two levels of food aid allocations.

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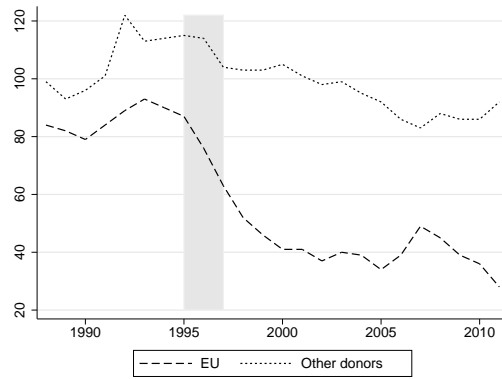
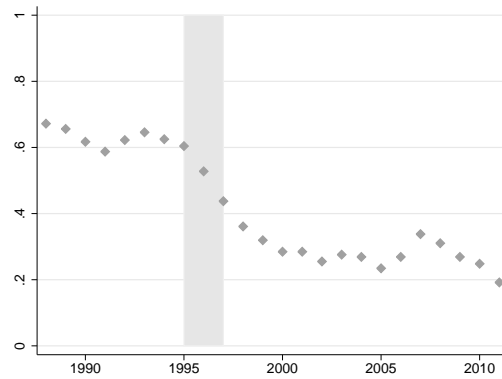
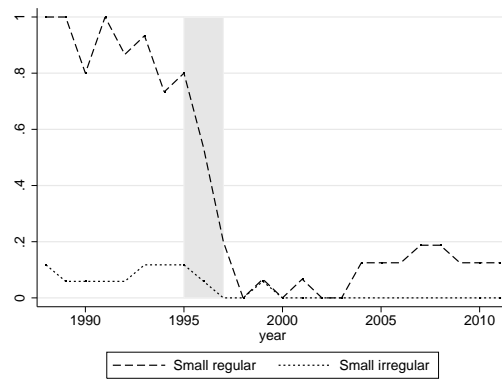


Figure 1. : Number of recipient countries

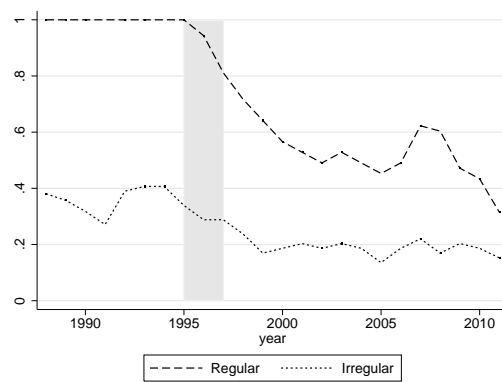
Notes: Other donors include regular donors. For this figure a country is a recipient of other donors if at least one regular donor allocates food aid to the country.. Pattern is similar if all non regular donors are included.



(a) All recipient countries



(b) Small countries



(c) Large countries

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

Notes: Regular recipients are countries whose probability of receiving food aid from the EU before 1996 is above 0.78 – the sample median value. Irregular recipients are countries whose probability of receiving is below 0.78 (see table D3.1 in appendix VII for the precise list of recipients).

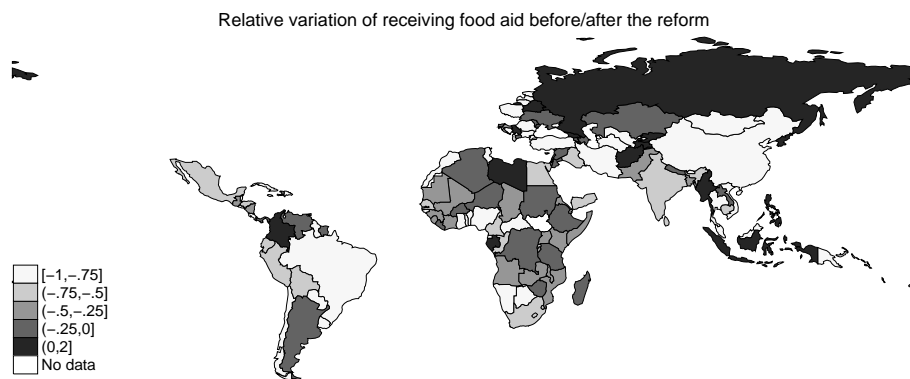


Figure 3. : Relative variation of the probability of receiving food aid from the EU

Notes: Ratio of the average probability of receiving from the EU after the reform minus the average probability of receiving before the reform over the average probability of receiving before 1996. The increase observed for Russia is due to the Tchetchenia war.

	Number of recipient countries		Correlation with the EU	
	<i>Before 1996</i>	<i>After 1996</i>	<i>All food aid</i>	<i>Excl. emergency</i>
EU	86	44.1	1	1
EU Members	88.3	79.8	0.56	0.47
Non EU countries	102.6	91.1	0.51	0.41
UN institutions	17.4	33.8	0.22	0.04
	Number of small recipients		Correlation with the EU	
	<i>Before 1996</i>	<i>After 1996</i>	<i>All food aid</i>	<i>Excl. emergency</i>
EU	14.6	2.7	1	1
EU Members	15.8	10.0	0.49	0.49
Non EU countries	18.1	11.9	0.41	0.43
UN institutions	3.2	3.9	0.20	0.29
	Number of large recipients		Correlation with the EU	
	<i>Before 1996</i>	<i>After 1996</i>	<i>All food aid</i>	<i>Excl. emergency</i>
EU	71.3	42.0	1	1
EU Members	72.6	69.8	0.55	0.53
Non EU countries	84.5	79.1	0.50	0.53
UN institutions	15.5	30.8	0.19	0.30

Table 1—: Number of recipients and correlation among donors

Notes: INTERFAIS database. Author's calculation. A country is a recipient if he receives food aid – emergency, program or project. For EU members, I count a country as a recipient if the country receives food aid from at least one EU member. Similarly a country is a recipient from non EU countries if the country receives food aid from at least one non EU country donor. The third column gives the correlation of food aid allocation by type of donors with EU food aid allocation for all types of food aid. The fourth column excludes emergency food aid. EU members are Austria, Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Spain, Sweden and the United Kingdom. Non EU members are Australia, Canada, Japan, Norway, Saudi Arabia, Switzerland and the United States.

Dependent Variable	Has received food aid from d			
	(1)	(2)	(3)	(4)
OLS Estimates				
Has received EU food aid	0.078***	0.086***	0.089***	0.088**
	(0.023)	(0.027)	(0.031)	(0.033)
R^2	0.435	0.422	0.401	0.393
Reduced Form Estimates				
Reform $_t$ * P_r	-0.099**	-0.123***	-0.126**	-0.134**
	(0.035)	(0.035)	(0.044)	(0.061)
R^2	0.435	0.422	0.400	0.392
2SLS Estimates				
Has received EU food aid	0.113***	0.141***	0.152***	0.162***
	(0.021)	(0.028)	(0.043)	(0.043)
R^2	0.435	0.422	0.400	0.392
Observations	7326	5301	3636	3366
Donor-recipient pairs	306	252	162	162
Dependent Variable	Has received EU food aid			
	(1)	(2)	(3)	(4)
First-Stage Estimates				
Reform $_t$ * P_r	-0.870***	-0.872***	-0.830***	-0.825***
	(0.047)	(0.075)	(0.068)	(0.066)
R^2	0.662	0.664	0.665	0.662
KP F-Stat	345.470	177.570	178.604	213.683
Observations	814	589	404	401
Recipients	34	28	18	18
Donor-Recipient FE	Yes	Yes	Yes	Yes
Donor-Year FE	Yes	Yes	Yes	Yes
Any Conflict $_{rt-1}$	No	Yes	Yes	Yes
Any Neighbor Conflict $_{rt-1}$	No	Yes	Yes	Yes
Any Natural Disaster $_{rt}$	No	Yes	Yes	Yes
Any Natural Disaster $_{rt-1}$	No	Yes	Yes	Yes
Log(Cereal Production per capita (MT)) $_{rt-1}$	No	Yes	Yes	Yes
Log(Cereal Production per capita (MT)) $^2_{rt-1}$	No	Yes	Yes	Yes
Log(Population (million)) $_{rt-1}$	No	Yes	Yes	Yes
Log(Population (million)) $^2_{rt-1}$	No	Yes	Yes	Yes
Log(GDP per capita \$2005) $_{rt-1}$	No	Yes	Yes	Yes
Log(GDP per capita \$2005) $^2_{rt-1}$	No	Yes	Yes	Yes
Share of refugees in recipient country $_{rt-1}$	No	Yes	Yes	Yes
Share of refugees in recipient country $^2_{rt-1}$	No	Yes	Yes	Yes
Log(EU agricultural exports +1) $_{rt-1}$	No	Yes	Yes	Yes
Democratic Index $_{rt-1}$	No	No	Yes	Yes
Political Rights and Civil Liberties $_{rt-1}$	No	No	Yes	Yes
UN Vote Similarity Index $_{drt-1}$	No	No	No	Yes
Any other aid from donor d_{drt}	No	No	No	Yes
Number of other food aid donors $_{drt}$	No	No	No	Yes

Table 2—: Donors' reaction to the allocation of EU food aid on the decision stage - Small countries and extra-EU members

Notes: An observation is a donor-recipient pair and a year for OLS, 2SLS and reduced form. For the first stage equation it is a recipient and year. The sample is small recipient countries, regular donors outside the EU from 1988 to 2011. Coefficients are reported with standard errors bootstrapped and clustered at the recipient and year level in parenthesis. The first stage equation includes recipient and year fixed effects. P_r is the average probability of receiving food aid from the EU before 1996. Table B3.4 in appendix VII provides the 2SLS estimates for control variables. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Dependent Variable	Has received food aid from d			
	Small		All	
Recipients				
Donors	Non EU	All	Non EU	All
<i>Controls as in column (2) of table 2</i>				
Has received EU food aid	0.141*** (0.028)	0.153*** (0.023)	0.021 (0.023)	0.065*** (0.042)
R^2	0.422	0.397	0.494	0.443
KP F-Stat	163.260	177.810	58.087	58.104
Observations	5 301	11 780	26 063	57 918
Recipient-Donor Pair	252	588	1 224	2 856
<i>Controls as in column (4) of table 2</i>				
Has received EU food aid	0.162*** (0.043)	0.148*** (0.032)	-0.016 (0.027)	0.040* (0.022)
R^2	0.392	0.382	0.488	0.437
KP F-Stat	213.683	210.252	51.048	51.395
Observations	3 366	7 777	21 770	50 233
Recipient-Donor Pair	162	378	1 097	2 561

Table 3—: Strategic interactions depending on the type of recipients and the sample of donors

Notes: One observation is a pair donor-recipient and a year. The sample includes 136 recipient countries and 21 regular donors (except the EU) from 1988 to 2011. Coefficients are reported with standard errors in parenthesis, bootstrapped and clustered at the recipient and year level. I include controls from columns (2) or (4) of table 2. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Non EU members		
	2LS Estimates	Sd.Err.
Australia	0.265***	(0.084)
Canada	0.420***	(0.075)
Japan	0.088	(0.077)
Norway	0.201**	(0.087)
Saudi Arabia	-0.042	(0.034)
Switzerland	0.104*	(0.059)
UN Institutions	0.006	(0.038)
United States	0.369***	(0.081)
WFP	-0.145***	(0.046)
EU members		
	2LS Estimates	Sd.Err.
Austria	0.115*	(0.061)
Belgium	-0.006	(0.043)
Denmark	0.252**	(0.085)
Finland	0.312***	(0.074)
France	0.241***	(0.085)
Germany	0.255***	(0.084)
Italy	-0.023	(0.076)
Luxembourg	-0.006	(0.043)
Netherlands	0.300***	(0.090)
Spain	-0.065	(0.043)
Sweden	0.436***	(0.070)
United Kingdom	-0.029	(0.041)

Table 4—: Bilateral response to EU food aid allocation

Notes: An observation is a recipient and a year. For each donor d the sample includes a maximum of 27 small countries. Coefficients are reported with standard errors bootstrapped and clustered at the recipient and year level. All regressions control for the set of baseline controls (see column (2) of table 2). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Specification	2SLS Estimates	Sd.Err.	Observation	K-P F-Stat.
1st stage				
(1) Reform in 1992 (period 1988-1995)	-0.054	(0.073)	172	
(2) Reform in 2003 (period 1996-2011)	0.038	(0.043)	392	
(3) Dependent variable: All EU aid (excluding food aid)	2.476	(3.115)	589	
(4) Dependent variable: EU agricultural imports (millions of \$)	-7.616*	(4.221)	589	
2nd stage				
(1) Reform in 1992 (period 1988-1995)	1.292	(6.788)	1 548	0.943
(2) Reform in 2003 (period 1996-2011)	0.242	(1.876)	3 528	0.897
Reduced Form				
(3) Dependent variable: All EU aid (excluding food aid)	-.0005	(.0003)	5 301	
(4) Dependent variable: EU agricultural imports (millions of \$)	-.0002	(.0003)	5 301	

Table 5—: Placebo Tests

Notes: All regressions include the same set of controls as column (2) in table 2. The sample is regular non EU member donors and small states recipients. Coefficients are reported with standard errors bootstrapped and clustered at the recipient and year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Specification	2SLS Estimates	Sd.Err.	Observation	K-P F-Stat.
(1) Baseline estimates	0.141***	(0.028)	5 301	163.260
Changes in sample definition				
On the donor side				
(2) All donors	0.024***	(0.004)	73 036	178.7
(3) Donors giving at least 10 years	0.061***	(0.012)	27 683	178.7
(4) Donors giving at least 20 years	0.112***	(0.019)	16 492	178.6
(5) EU and EU donors pooled together	0.276***	(0.062)	5 301	8.939
Period				
(6) 1988-2005	0.133***	(0.032)	3 870	84.70
(7) 1988-2001	0.145***	(0.037)	2 898	49.64
(8) 1991-2001	0.119***	(0.044)	2 475	37.64
(9) 1994-1997	0.088	(0.312)	900	13.10
Changes in the first-stage specification (instrument)				
(10) Reform in 1995	0.141***	(0.029)	5 301	178.3
(11) P_r =EU food aid in 1995	0.137***	(0.031)	5 301	82.83
(12) EU food aid between 1993-1995	0.147***	(0.030)	5 301	203.7
(13) Only program and project aid	0.148***	(0.031)	5 301	219.6
Non linear effect of the reform (instrument)				
(14) Polynomial function (order 2)	0.141***	(0.029)	5 301	180.256
(15) Piecewise function (quartile)	0.147***	(0.031)	5 301	224.373
(16) $Reform_{t-1} * P_r$	0.147***	(0.031)	5 301	199.6

Table 6—: Robustness checks - Small recipients

Notes: Row (1) refers to estimates obtained in column (2) in table 2. All regressions include the same set of controls than column (2) in table 2. Recipients are small countries. Except for rows (2) to (4) donors are regular non EU members donors. Coefficients are reported with standard errors bootstrapped and clustered at the recipient and year level in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

	$\frac{\gamma}{\lambda_d} < 0$ or $ \beta_d > 1$	$\frac{\gamma}{\lambda_d} > 0$ or $ \beta_d < 1$
$ \frac{\gamma}{\lambda_d} < 1$ or $\beta_d > 0$	Substitute / EU driven	Complement / EU driven
$ \frac{\gamma}{\lambda_d} = 1$ or $\beta_d = 0$	Ruled out	Complement / Neutral
$ \frac{\gamma}{\lambda_d} > 1$ or $\beta_d < 0$	Substitute / Recipient driven	Complement / Recipient driven

Table 7—: Donor typology

EU-driven	Complement		Substitute		
	Neutral	Recipient-driven	EU-driven	Neutral	Recipient-driven
Australia	Japan	WFP			
Canada	Saudi Arabia				
Norway	UN institutions				
Switzerland	Belgium				
USA	Italy				
Austria	Luxembourg				
Denmark	Spain				
Finland	UK				
France					
Germany					
Netherlands					
Sweden					

Table 8—: A Donor Typology for small recipients

VII. Appendix

A. Descriptive statistics

ADDITIONAL INFORMATION ON INTERFAIS DATA

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. Data are available for all practitioners and should reflect all food aid flows. Governmental donors data are exhaustive. On the contrary, the data are incomplete for NGOs and private sector. I interviewed in January 2015 a staff member of Action Contre la Faim - France who said that either all observations (allocations by ACF) for a given year are included either the whole year is missing. In addition there was no referent person at the ACF that provides information to the WFP. He told me that the WFP obtains contact names depending on meeting attendance without consistency over time. Hence it seems that the way the WFP collects reliable information of food aid from NGOs is not systematic.

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 a consequence of state partition is often a sudden increase in humanitarian and food aid. In consequence the panel is almost balanced except for these countries.

ADDITIONAL DESCRIPTIVE STATISTICS

Table A.1 gives descriptive statistics on the average quantities allocated by donors and the correlation across donors. Table A.2 provides some descriptive statistics on recipients. EU regular recipients before the reform are on average

poorer, more likely to be affected by a natural disaster or a conflict. They are also more populous. They are more likely to receive food aid from at least another donor and received on average more food aid from other donors than irregular recipients. Table A.3 shows the average number of recipient countries by regular donor before and after 1996. Table A.4 provides descriptive statistics on control variables.

	Quantity allocated to recipients (tons)		Correlation with the EU	
	<i>Before 1996</i>	<i>After 1996</i>	<i>All food aid</i>	<i>Excl. emergency</i>
EU	2 394 670	831 311	1	1
EU Members	1 305 302	897 245	0.47	0.28
Non EU countries	8 954 894	5 274 221	0.54	0.50
UN institutions	28 170	152 990	0.06	0.02
	Quantity allocated to small recipients		Correlation with the EU	
	<i>Before 1996</i>	<i>After 1996</i>	<i>All food aid</i>	<i>Excl. emergency</i>
EU	29 720	7 369	1	1
EU Members	62 078	35 791	0.36	0.33
Non EU countries	383 536	101 064	0.06	0.29
UN institutions	1 225	4 252	0.03	0.15
	Quantity allocated to large recipients		Correlation with the EU	
	<i>Before 1996</i>	<i>After 1996</i>	<i>All food aid</i>	<i>Excl. emergency</i>
EU	2 364 949	825 783	1	1
EU Members	1 243 224	861 386	0.47	0.72
Non EU members	8 571 357	5 173 156	0.54	0.63
UN institutions	27 557	149 285	0.05	0.09

Table A.1—: Descriptive statistics on food aid quantities and correlation among donors

Notes: INTERFAIS database. Author's calculation. A country is a recipient if he receives any kind of food aid. The quantity is the average annual 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 EU food aid allocation for all type of food aid. The fourth column excludes emergency food aid. EU members are Austria, Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Spain, Sweden and the United Kingdom. Non EU countries are Australia, Canada, Japan, Norway, Saudi Arabia, Switzerland and the United States.

	Irregular recipients		Regular recipients	
	Before 1996	After 1996	Before 1996	After 1996
Receiving EU food aid	0.25 (0.44)	0.13 (0.34)	0.98 (0.14)	0.47 (0.50)
Receiving food aid from at least another donor	0.56 (0.50)	0.42 (0.49)	0.98 (0.14)	0.90 (0.31)
Quantity received from the EU	52 624 (123 499)	17 139 (29 354)	21 851 (47 594)	19 345 (73 556)
Quantity received from other donors	64 820 (105 531)	47 129 (103 287)	113 921 (235 299)	75 257 (168 026)
Population (millions)	19.49 (35.91)	21.10 (40.15)	44.35 (170.93)	52.97 (195.44)
GDP per capita (\$2005)	4 056.02 (4 140.19)	5 113.34 (5 303.3)	1171.65 (1182.00)	1491.63 (1637.38)
Cereal production (millions of MT)	7.33 (19.12)	7.30 (13.80)	11.68 (52.50)	14.28 (59.64)
Disaster	0.43 (0.50)	0.56 (0.50)	0.52 (0.50)	0.69 (0.46)
Conflict	0.28 (0.45)	0.16 (0.36)	0.31 (0.46)	0.21 (0.41)
Governance index	1.73 (6.83)	3.40 (6.62)	-1.16 (6.31)	1.74 (5.62)

Table A.2—: Descriptive statistics on regular and irregular recipients

Notes: Regular recipients are recipients whom probability of receiving food aid from the EU before 1996 is above 0.78. Irregular recipients are recipients whom probability of receiving food aid from the EU before 1996 is below 0.78. Statistics on quantities are conditional on receiving food aid. Standard deviations are in parenthesis.

	Number of recipient countries			
	Small		Large	
	Before 1996	After 1996	Before 1996	After 1996
EU	14.6	2.8	71.4	41.9
	Inside the EU			
Austria	2.4	1.6	12.4	6.6
Belgium	2.0	1.7	10.9	13.8
Denmark	8.0	4.4	37.4	35.4
Finland	5.5	2.5	28.3	24.7
France	4.3	1.7	26.8	22.8
Germany	8.4	4.8	50.4	48.8
Italy	5	4.3	34.4	33.3
Luxembourg	2.0	1.7	10.9	13.8
Netherlands	8	3.8	41.4	40.6
Spain	1.3	2.2	7.1	14.75
Sweden	9.3	3.6	42	34.4
United Kingdom	1.8	1.6	14.4	17
	Outside the EU			
Australia	6.1	2.5	26.4	20.3
Canada	8.8	2.6	54.3	39.8
Japan	7.9	6.9	38.4	44.3
Norway	6.3	3.6	31.8	33.6
Saudi Arabia	2	1.9	4.9	12.1
Switzerland	4.1	2.8	48.3	46.3
UN Institutions	2.3	3.3	5.8	14.1
United States	12.9	7.1	66.9	64.4
WFP	2.3	2.6	11.1	24.5

Table A.3—: Average number of recipient countries by donor and period

Notes: INTERFAIS database. Author's calculation. A country is a recipient if she receives any kind of food aid. The first column shows the annual average number of recipient countries by donor from 1988 to 1995. The second column shows the same average but over the period 1996-2011.

Variable	Obs	Mean	Std. Dev.	Min	Max
Small countries					
Any disaster	824	.35	.477	0	1
Any conflict	789	.035	.185	0	1
Any neighbor conflict	789	.208	.406	0	1
Cereal production per capita (MT)	728	.075	.142	0	.785
Population (millions)	800	1.026	1.403	.041	7.072
Share of refugees in recipient country	800	.004	.016	0	.168
GDP per capita \$2005	743	4763.943	5103.177	386.533	32636.03
EU agricultural exports - millions of \$	824	66870.41	325466.5	0	4867998
Democratic index: -10 (autocracy) to 10 (democracy)	466	2.53	6.567	-10	10
Political right index: 1 (free) to 7 (not free)	743	3.005	1.99	1	7
Civil liberties index: 1 (free) to 7 (not free)	743	3.055	1.581	1	7
UN vote similarity	746	.857	.037	.644	1
Any other aid from donor	824	.871	.335	0	1
Large countries					
Any disaster	2587	.651	.477	0	1
Any conflict	2475	.286	.452	0	1
Any neighbor conflict	2475	.642	.48	0	1
Cereal production per capita (MT)	2583	.24	.233	0	1.804
Population (millions)	2586	46.405	155.962	0	1344.13
Share of refugees in recipient country	2584	.005	.014	0	.134
GDP per capita \$2005	2428	2473.993	3429.217	50.042	24312.9
EU agricultural exports - millions of \$	2587	225162.4	528246.4	0	1.03e+07
Democratic index: -10 (autocracy) to 10 (democracy)	2397	1.495	6.418	-10	10
Political right index: 1 (free) to 7 (not free)	2452	4.361	1.985	1	7
Civil liberties index: 1 (free) to 7 (not free)	2452	4.315	1.615	1	7
UN vote similarity	2355	.84	.053	.346	.994
Any other aid from donor	2587	.862	.345	0	1

Table A.4—: Descriptive statistics

Figure A.1 details how many times the EU is the first or second largest donor at the recipient level. Half of the time the EU is among the two largest donors and ranks below the third position only in 20 percent of the cases. Figures A.2a and A.2b 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.

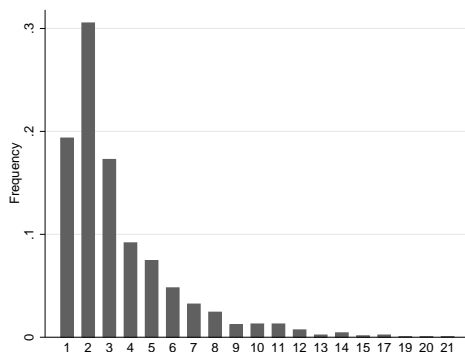


Figure A.1. : EU donor ranking

Notes: 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.

IMPACT OF THE REFORM: GRAPHICAL ILLUSTRATIONS

Figure A.3 plots the share of local or triangular purchases for the three groups of donors. Figure A.4a 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 A.4b excluding the annual top three recipients.

B. Empirical results: additional tables

Table B3.1 tests the parallel assumption trend. Tables B3.2 and B3.3 test the assumption of no divergence in needs after the reform for regular and irregular recipients. Table B3.4 provides the 2SLS estimates of control variables. Table B3.5 provides bilateral estimates when all recipients are included. Table B3.6

gives the first stage estimates in the case of a non-linear effect of the reform. Finally table B3.7 provides the point estimates of $\frac{\gamma}{\lambda d}$.

Dependent variable	Has received food aid from the EU							
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Recipients	Small	Small	Small	Small	Large	Large	Large	Large
P_r interacted with								
Year 1990	-0.159 (0.101)	-0.172 (0.152)	-0.261 (0.191)	-0.267 (0.199)	0.019 (0.078)	0.107 (0.117)	0.130 (0.119)	0.060 (0.104)
Year 1991	-0.048 (0.040)	-0.042 (0.050)	-0.047 (0.100)	-0.131 (0.120)	-0.063 (0.091)	-0.092 (0.157)	-0.055 (0.153)	-0.120 (0.143)
Year 1992	-0.109 (0.084)	-0.074 (0.124)	-0.028 (0.129)	0.001 (0.116)	-0.039 (0.076)	-0.008 (0.135)	0.003 (0.133)	-0.061 (0.123)
Year 1993	-0.109 (0.080)	-0.108 (0.135)	-0.151 (0.181)	-0.186 (0.185)	-0.025 (0.074)	0.087 (0.124)	0.101 (0.121)	0.016 (0.105)
Year 1994	-0.233* (0.119)	-0.281** (0.128)	-0.153 (0.167)	-0.100 (0.168)	-0.086 (0.079)	0.010 (0.132)	0.013 (0.131)	-0.036 (0.113)
Year 1995	-0.189* (0.108)	-0.060 (0.103)	0.018 (0.133)	0.064 (0.134)	-0.076 (0.072)	0.080 (0.121)	0.070 (0.120)	-0.013 (0.104)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Recipient FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	270	172	120	119	826	619	613	596
R-squared	0.046	0.149	0.225	0.290	0.011	0.052	0.065	0.073
Number of recipients	34	26	18	18	111	103	102	101

Table B3.1—: Pre-trend analysis for EU food aid allocation - small and large countries - depending on their type

Notes: One observation is a recipient and year. Coefficients are reported with standard errors clustered at the recipient and year level. P_r is the average probability of receiving food aid from the EU before 1996. For small and large countries, (1) (2) (3) (4) include respectively controls from column (1) (2) (3) (4) of table 2. Reference year 1988. Year 1989 interacted with P_r is dropped due to collinearity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

C. Reaction on quantities

I provide results on the reaction on quantities once a donor d decides to allocate food aid to a recipient r (table C3.1). Coefficients should be carefully interpreted conditional on giving food aid. In order to pool together all commodities, quantities are converted in equivalent calories according to the nutritional standards

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Disaster	Conflict	Neighbor countries	Agricultural production	Population	Refugees	GDP per capita	Polity Index	Political Index	Liberties Index
P_r interacted with										
Year 1989	0.404 (0.418)		0.242 (0.163)	-0.286 (0.176)	0.011 (0.009)	4,072.808 (3,738.265)	-0.034 (0.027)		0.040 (0.388)	-0.768* (0.372)
Year 1990	0.002 (0.506)	0.262 (0.209)	-0.042 (0.152)	0.374 (0.555)	0.053 (0.041)	9,415.589 (9,118.950)	0.187 (0.153)	-0.984 (1.940)	-0.554 (0.885)	-0.991 (0.674)
Year 1991	0.445 (0.382)	0.351 (0.234)	-0.118 (0.170)	0.173 (0.621)	0.059 (0.045)	12,426.065 (11,302.967)	0.163 (0.147)	-0.609 (2.287)	-0.608 (0.716)	-1.367 (0.870)
Year 1992	-0.021 (0.424)	0.351 (0.234)	-0.002 (0.288)	-0.031 (0.591)	0.063 (0.048)	6,150.384 (3,795.539)	0.169 (0.143)	1.015 (2.506)	-0.430 (0.664)	-1.422* (0.726)
Year 1993	-0.224 (0.431)	0.351 (0.234)	-0.281 (0.361)	0.327 (0.594)	0.065 (0.051)	7,204.442 (4,533.319)	0.180 (0.141)	2.830 (2.682)	-0.901 (0.649)	-1.378* (0.729)
Year 1994	0.302 (0.313)	0.315 (0.230)	-0.035 (0.307)	0.362 (0.600)	0.068 (0.054)	3,708.878 (5,514.204)	0.155 (0.148)	2.366 (3.749)	-0.554 (0.932)	-1.233 (0.984)
Year 1995	0.568* (0.322)	0.199 (0.197)	-0.035 (0.307)	0.326 (0.565)	0.070 (0.058)	2,044.308 (4,612.954)	0.144 (0.145)	1.902 (3.691)	-0.670 (0.920)	-1.310 (0.975)
Year 1996	0.397 (0.416)	0.199 (0.197)	-0.035 (0.307)	0.489 (0.633)	0.074 (0.062)	1,820.818 (4,446.806)	0.146 (0.155)	2.598 (3.642)	-0.670 (0.920)	-1.310 (0.975)
Year 1997	-0.416 (0.397)	0.199 (0.197)	-0.612 (0.418)	0.405 (0.555)	0.077 (0.066)	2,099.287 (4,363.715)	0.170 (0.155)	2.587 (3.495)	-0.554 (0.914)	-1.310 (0.975)
Year 1998	0.082 (0.395)	0.155 (0.342)	-0.380 (0.431)	0.458 (0.618)	0.081 (0.071)	1,655.734 (4,096.907)	0.123 (0.164)	1.080 (3.162)	-0.554 (0.914)	-1.378 (0.867)
Year 1999	0.202 (0.431)	0.155 (0.342)	-0.416 (0.438)	0.676* (0.344)	0.085 (0.076)	207.743 (5,403.703)	0.151 (0.186)	1.688 (3.273)	-0.148 (1.054)	-1.302 (0.867)
Year 2000	0.242 (0.412)	0.039 (0.318)	-0.329 (0.356)	0.518 (0.350)	0.088 (0.080)	235.762 (5,619.738)	0.207 (0.215)	4.095 (3.974)	-1.250 (1.130)	-1.621 (0.935)
Year 2001	0.245 (0.470)	0.039 (0.318)	-0.561 (0.327)	0.741* (0.380)	0.091 (0.085)	510.325 (5,308.045)	0.235 (0.237)	4.675 (4.060)	-1.279 (1.078)	-1.824* (1.004)
Year 2002	0.473 (0.383)	0.039 (0.318)	-0.880** (0.336)	0.423 (0.428)	0.093 (0.089)	617.928 (4,941.400)	0.235 (0.261)	5.371 (4.142)	-1.576 (0.980)	-1.889** (0.885)
Year 2003	0.274 (0.453)	0.039 (0.318)	-0.880** (0.336)	0.566 (0.414)	0.095 (0.094)	355.920 (5,195.477)	0.200 (0.277)	3.880 (3.710)	-1.195 (1.027)	-2.121** (0.942)
Year 2004	0.270 (0.502)	0.242 (0.204)	-0.677** (0.269)	0.550 (0.408)	0.097 (0.098)	-1,105.354 (4,560.047)	0.177 (0.295)	3.079 (3.539)	-1.543 (1.013)	-2.117** (0.937)
Year 2005	0.171 (0.465)	0.242 (0.204)	-0.677** (0.269)	0.342 (0.432)	0.098 (0.103)	-1,457.997 (3,606.977)	0.162 (0.302)	4.072 (3.600)	-1.833* (0.961)	-1.861** (0.843)
Year 2006	0.274 (0.485)	0.242 (0.204)	-0.696** (0.277)	0.436 (0.416)	0.099 (0.107)	-800.859 (3,827.710)	0.146 (0.323)	6.247* (3.539)	-2.355** (0.929)	-2.068** (0.823)
Year 2007	0.154 (0.403)	0.242 (0.204)	-0.580* (0.281)	0.158 (0.492)	0.100 (0.111)	-1,026.143 (3,867.158)	0.138 (0.324)	6.450* (3.578)	-2.240** (0.914)	-2.068** (0.823)
Year 2008	0.187 (0.429)	0.242 (0.204)	-0.580* (0.281)	0.479 (0.423)	0.101 (0.115)	-711.068 (3,934.913)	0.120 (0.341)	6.740* (3.551)	-2.471** (0.927)	-2.068** (0.823)
Year 2009	0.107 (0.315)	0.242 (0.204)	-0.580* (0.281)	0.408 (0.421)	0.102 (0.120)	-856.666 (3,800.672)	0.151 (0.348)	5.318 (4.049)	-2.279** (0.912)	-2.155** (0.795)
Year 2010	-0.165 (0.325)	0.242 (0.204)	-0.580* (0.281)	0.640 (0.423)	0.104 (0.124)	-765.480 (3,890.178)	0.162 (0.351)	5.318 (4.049)	-2.163** (0.929)	-2.155** (0.795)
Year 2011	0.078 (0.197)	0.242 (0.204)	-0.580* (0.281)	0.438 (0.429)	0.106 (0.128)	1,427.040 (3,829.754)	0.149 (0.351)	5.318 (4.049)	-2.048* (0.995)	-2.155** (0.795)
Recipient FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	430	430	430	428	430	430	422	429	430	430
R-squared	0.076	0.095	0.215	0.009	0.048	0.088	0.317	0.103	0.063	0.133

Table B3.2—: Evolution of recipient's characteristics in small countries depending on the propensity of receiving from the EU

Notes: Standard errors clustered at the recipient and year level. List of small countries is provided in table D3.1 in appendix VII. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Disaster	Conflict	Neighbor countries	Agricultural production	Population	Refugees	GDP per capita	Polity Index	Political Index	Liberties Index
<i>P_r</i> interacted with										
Year 1989	0.321** (0.159)	-0.042 (0.085)	-0.127 (0.117)	-0.028 (0.059)	0.007** (0.003)	4,918.465 (4,955.162)	0.035 (0.078)	-1.674 (1.226)	-0.019 (0.188)	-0.044 (0.232)
Year 1990	0.087 (0.165)	0.051 (0.067)	0.160 (0.147)	-0.113 (0.071)	0.125 (0.136)	-7,057.284 (42,731.940)	-0.374 (0.278)	-2.814* (1.569)	0.350 (0.377)	0.393 (0.388)
Year 1991	0.172 (0.172)	0.177* (0.098)	0.239 (0.205)	0.054 (0.097)	0.234 (0.196)	25,027.418 (23,998.067)	-0.330 (0.353)	-0.933 (1.793)	0.267 (0.477)	0.308 (0.456)
Year 1992	0.055 (0.162)	0.169 (0.113)	0.303 (0.246)	-0.223 (0.182)	0.341 (0.222)	-16,745.946 (47,397.873)	-0.357 (0.345)	-0.180 (1.948)	0.137 (0.526)	0.298 (0.485)
Year 1993	-0.081 (0.163)	0.131 (0.118)	0.313 (0.268)	-0.244 (0.167)	0.323 (0.224)	35,035.815 (70,853.704)	-0.353 (0.349)	0.280 (1.938)	0.099 (0.588)	0.194 (0.515)
Year 1994	0.211 (0.139)	0.243* (0.143)	-0.005 (0.259)	-0.205 (0.146)	0.337 (0.225)	54,244.793 (86,685.658)	-0.338 (0.355)	0.884 (1.991)	0.181 (0.613)	0.276 (0.529)
Year 1995	-0.030 (0.186)	0.207 (0.143)	-0.035 (0.237)	-0.170 (0.153)	0.351 (0.225)	37,558.528 (86,053.482)	-0.415 (0.371)	1.520 (2.011)	0.167 (0.624)	-0.006 (0.548)
Year 1996	0.198 (0.144)	0.212 (0.138)	-0.037 (0.233)	-0.001 (0.162)	0.367 (0.226)	14,097.970 (83,159.976)	-0.421 (0.377)	1.924 (2.030)	0.092 (0.610)	-0.023 (0.521)
Year 1997	0.036 (0.162)	0.129 (0.134)	0.179 (0.257)	-0.179 (0.165)	0.383* (0.227)	9,170.494 (83,575.903)	-0.434 (0.377)	1.294 (2.058)	0.160 (0.609)	-0.033 (0.522)
Year 1998	0.124 (0.166)	0.173 (0.125)	0.166 (0.265)	-0.026 (0.153)	0.400* (0.227)	5,107.173 (84,500.677)	-0.449 (0.374)	1.003 (2.077)	0.122 (0.608)	-0.140 (0.520)
Year 1999	0.237 (0.146)	0.219 (0.133)	-0.026 (0.265)	-0.079 (0.166)	0.555* (0.285)	4,770.370 (85,011.071)	-0.736 (0.488)	0.179 (2.213)	0.405 (0.662)	0.077 (0.536)
Year 2000	-0.168 (0.154)	0.228* (0.133)	0.390 (0.279)	-0.122 (0.174)	0.572** (0.286)	24,936.420 (76,556.102)	-0.787 (0.488)	0.144 (2.228)	0.451 (0.641)	-0.039 (0.549)
Year 2001	0.162 (0.157)	0.166 (0.128)	0.372 (0.282)	-0.156 (0.170)	0.447* (0.229)	28,889.466 (77,428.868)	-0.610 (0.384)	0.399 (2.242)	0.451 (0.651)	-0.014 (0.560)
Year 2002	0.278* (0.153)	0.161 (0.127)	0.325 (0.270)	-0.290 (0.177)	0.464** (0.230)	28,991.304 (99,054.110)	-0.626 (0.385)	0.441 (2.287)	0.582 (0.653)	0.111 (0.585)
Year 2003	0.135 (0.147)	0.161 (0.127)	0.213 (0.264)	-0.076 (0.172)	0.479** (0.230)	35,215.461 (108,031.036)	-0.682* (0.388)	0.377 (2.290)	0.538 (0.657)	0.099 (0.580)
Year 2004	-0.036 (0.152)	0.136 (0.125)	-0.013 (0.243)	-0.272 (0.177)	0.495** (0.231)	29,289.836 (108,197.050)	-0.736* (0.388)	0.887 (2.317)	0.498 (0.659)	0.144 (0.577)
Year 2005	-0.086 (0.126)	0.158 (0.123)	0.017 (0.238)	-0.140 (0.186)	0.510** (0.232)	32,737.826 (108,604.070)	-0.773** (0.389)	1.020 (2.313)	0.463 (0.695)	0.217 (0.586)
Year 2006	0.138 (0.152)	0.161 (0.136)	-0.059 (0.235)	-0.043 (0.182)	0.525** (0.232)	59,179.949 (111,036.262)	-0.814** (0.390)	1.029 (2.350)	0.409 (0.695)	0.157 (0.585)
Year 2007	0.214 (0.158)	0.141 (0.135)	0.101 (0.258)	-0.044 (0.193)	0.539** (0.233)	91,663.566 (108,690.990)	-0.916** (0.392)	1.110 (2.327)	0.340 (0.702)	0.193 (0.581)
Year 2008	0.376*** (0.142)	0.122 (0.133)	-0.210 (0.236)	-0.124 (0.249)	0.553** (0.233)	69,533.783 (107,531.671)	-0.951** (0.393)	1.045 (2.309)	0.211 (0.679)	0.190 (0.580)
Year 2009	0.356*** (0.133)	0.085 (0.132)	-0.255 (0.236)	-0.096 (0.192)	0.566** (0.234)	65,778.969 (105,407.293)	-0.921** (0.393)	1.539 (2.408)	0.350 (0.703)	0.257 (0.583)
Year 2010	0.256* (0.151)	0.062 (0.133)	-0.325 (0.245)	-0.055 (0.167)	0.580** (0.235)	68,392.591 (104,147.473)	-0.947** (0.398)	1.639 (2.396)	0.485 (0.696)	0.210 (0.596)
Year 2011	0.309** (0.128)	0.077 (0.153)	-0.130 (0.260)	-0.103 (0.184)	0.597** (0.236)	72,171.623 (109,468.923)	-1.057** (0.404)	1.553 (2.417)	0.271 (0.695)	0.298 (0.593)
Recipient FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2 444	2 444	2 444	2 417	2 443	2 444	2 386	2 415	2 444	2 444
R-squared	0.071	0.036	0.077	0.130	0.016	0.013	0.165	0.109	0.081	0.101

Table B3.3—: Evolution of recipient's characteristics in large countries depending on the propensity of receiving from the EU

Notes: Standard errors clustered at the recipient and year level. List of large countries is provided in table D3.1 in appendix VII. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

of the WFP.³³

For the first stage, I allow the EU to allocate zero food aid.³⁴ In addition I slightly change the definition of P_r . I do define it as the average quantities of food aid received before the reform. Hence P_r^q is now equal to $\frac{1}{8} \sum_{t=1988}^{1995} FA_{EUrt}$ with $FA_{EUrt} \geq 0$. Thus I estimate the following equations:

$$(7) \quad \begin{aligned} \overline{FA_{drt}} &= \beta \overline{FA_{EUrt}} + X_{drt-1}\Gamma_1 + X_{rt-1}\Gamma_2 + \phi_{dt} + \phi_{1dr} + \epsilon_{drt} \text{ if } FA_{drt} > 0 \\ \overline{FA_{EUrt}} &= \lambda Reform_t * P_r^q + X_{drt-1}\Gamma_3 + X_{rt-1}\Gamma_4 + \phi_t + \phi_r + \epsilon_{rt} \end{aligned}$$

with $\overline{FA_{drt}} = \ln \left(FA_{drt} + \sqrt{1 + FA_{drt}^2} \right)$ and the same for $\overline{FA_{EUrt}}$.

Results must be interpreted conditional on the fact the donor d decides to allocate food aid to recipient r . In that case $\overline{FA_{EUrt}}$ is the inverse hyperbolic sine transformation (IHST) of the amount of food aid allocated by the EU (or donor d) to recipient r . The transformation is similar to log transformation, as it reduces the influence of outliers, and it is also defined at zero [Burbidge et al., 1988] which is necessary for the EU food aid. IHST of x is defined as $\log \left(x + (x^2 + 1)^{\frac{1}{2}} \right)$. I do not use the logarithm transformation for $\overline{FA_{drt}}$, in order to be consistent with the definition of $\overline{FA_{EUrt}}$. In such a case, β measures how much donor d increases (or decreases) the quantities allocated to recipient r , when the EU decides to allocate $\overline{FA_{EUrt}}$, conditional on giving.

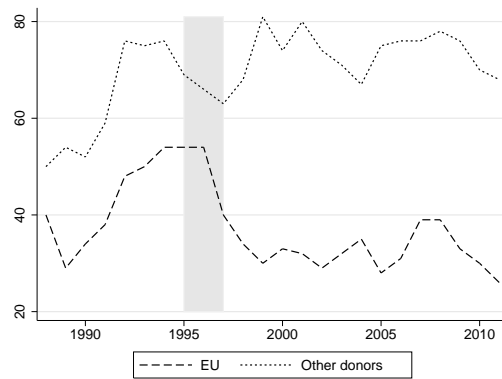
Results presented in table C3.1 suggests that conditional on allocating food aid, a donor increases on average the quantity of food aid he allocates to a recipient. However the estimates are not significant but goes in the same direction than for the 0/1 choice of giving food aid. Table C3.2 shows the results to different sets of donors and recipients. Results are similar and not significant except in one case.

³³Nutritional standards of the WFP are quite high and food aid which is not channeled by the WFP may have lower nutritional standards. Hence it could induce some measurement errors.

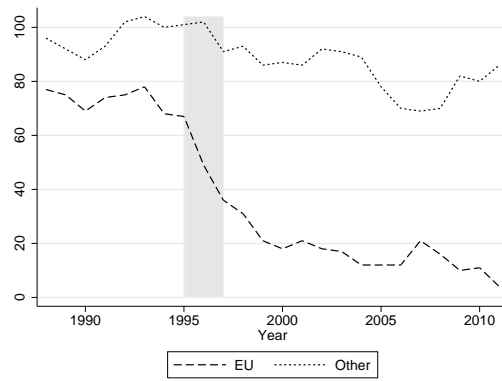
³⁴I am aware that the truncated nature of EU food aid may induce some bias. However the first-stage is estimated linearly.

D. Recipient list

Table D3.1 provides the list of recipient countries. It also gives the propensity of receiving EU food aid before 1996 P_r and the average probability of receiving food aid from the EU after the reform P_r^{1996} .



(a) Emergency food aid



(b) Project or program food aid

Figure A.2. : Number of recipient countries

Notes: Other donors refer to regular donors. A country is counted as a recipient for other donor if at least one regular donor allocates food aid to the country. Pattern is similar if all donors are included.

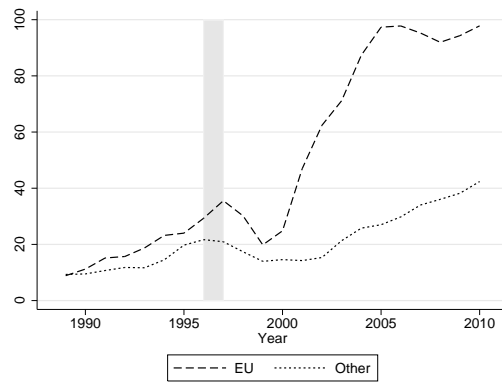


Figure A.3. : Share of local or triangular purchases

Notes: Other donors refer to regular donors. Pattern is similar if irregular governmental donors are included. Data are smoothed using moving average order 3.



(a) All recipients



(b) Recipients excluding annual top 3

Figure A.4. : Average quantity received from the EU by EU recipient countries (in metric tons)

Dependent Variable	Has received food aid from d		
	(2)	(3)	(4)
Any Conflict $_{rt-1}$	-0.067*** (0.023)	-0.075** (0.031)	-0.072** (0.028)
Any Neighbor Conflict $_{rt-1}$	-0.054*** (0.015)	-0.061*** (0.019)	-0.059*** (0.019)
Any Natural Disaster $_{rt-1}$	0.021** (0.011)	0.026* (0.015)	0.021 (0.015)
Any Natural Disaster $_{rt}$	0.014 (0.010)	0.015 (0.014)	0.014 (0.014)
Log(Cereal Production per capita (MT)) $_{rt-1}$	-0.006 (0.037)	-0.003 (0.034)	0.000 (0.037)
Log(Cereal Production per capita (MT)) $^2_{rt-1}$	-0.001 (0.003)	-0.000 (0.003)	-0.001 (0.004)
Log(Population (million)) $_{rt-1}$	0.221 (0.442)	-0.286 (0.987)	-0.287 (1.017)
Log(Population (million)) $^2_{rt-1}$	-0.016 (0.016)	0.008 (0.035)	0.012 (0.037)
Log(GDP per capita \$2005) $_{rt-1}$	-0.097 (0.110)	-0.243 (0.185)	-0.204 (0.196)
Log(GDP per capita \$2005) $^2_{rt-1}$	-0.006 (0.009)	-0.019 (0.015)	-0.019 (0.017)
Share of refugees in recipient country $_{rt-1}$	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Share of refugees in recipient country $^2_{rt-1}$	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Log(EU agricultural exports - Millions of \$) $_{rt-1}$	-0.002 (0.007)	-0.000 (0.010)	0.000 (0.010)
Democratic Index $_{rt-1}$		-0.000 (0.003)	-0.000 (0.003)
Political Rights $_{rt-1}$		-0.007 (0.010)	-0.005 (0.010)
Civil Liberties $_{rt-1}$		0.004 (0.013)	-0.001 (0.016)
UN Vote Similarity Index $_{drt-1}$			0.000 (0.000)
Any other aid from donor drt			0.000 (0.000)
Number of other food aid donors drt			0.000 (0.000)
Observations	5301	3636	3366
Adjusted R^2	0.422	0.400	0.392

Table B3.4—: Control Variables: 2SLS estimates - Small recipients and extra EU members donors.

Notes: One observation is a pair donor-recipient and a year. The sample includes 48 recipient countries, regular donors outside the EU from 1988 to 2011. Coefficients are reported with standard errors clustered at the recipient and year level in parenthesis. Standard errors are bootstrapped. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Non EU members		
	2LS Estimates	Sd.Err.
Australia	0.140***	(0.054)
Canada	0.363***	(0.067)
Japan	-0.010	(0.063)
Norway	0.034	(0.061)
Saudi Arabia	-0.029	(0.032)
Switzerland	0.083	(0.067)
UN Institutions	-0.058	(0.039)
United States	-0.051	(0.065)
WFP	-0.281***	(0.057)
EU members		
	2LS Estimates	Sd.Err.
Austria	0.142***	(0.039)
Belgium	0.010	(0.045)
Denmark	0.090	(0.071)
Finland	0.115**	(0.053)
France	0.198***	(0.059)
Germany	0.089	(0.070)
Italy	0.070	(0.064)
Luxembourg	0.010	(0.045)
Netherlands	0.192***	(0.072)
Spain	-0.043	(0.043)
Sweden	0.306***	(0.061)
United Kingdom	-0.068	(0.051)

Table B3.5—: Bilateral response to EU food aid allocation – All recipients

Notes: An observation is a recipient and a year. The sample includes all recipient countries (large and small). Coefficients are reported with standard errors bootstrapped and clustered at the recipient and year level. All regressions control for the set of baseline controls (see column (2) of table 2). ***

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

Dependent Variable	Has received EU food aid		
	1994-1997	Polynomial power 2	Piecewise quartile
Reform _t * P _r	-0.555*	-0.829**	
	(0.176)	(0.328)	
Reform _t * P _r ²		-0.043	
		(0.273)	
Reform _t * P _r ³			
Reform _t * (0 < P _r < 0.25)			
Reform _t * (0.25 ≤ P _r < 0.625)			
Reform _t * (0.625 ≤ P _r < 1)			
Reform _t * (0.25 ≤ P _r < 0.875)			-0.253***
			(0.082)
Reform _t * (0.875 ≤ P _r < 1)			-0.495***
			(0.118)
Reform _t * (P _r = 1)			-0.867***
			(0.066)
R ²	0.679	0.663	0.650
KP F-Stat	13.104	180.256	224.373
Baseline controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Recipient FE	Yes	Yes	Yes

Table B3.6—: Robustness checks - first stage estimates

Notes: One observation is a recipient and year for the first stage equation. Coefficients are reported with standard errors clustered at the recipient and year level in parenthesis. For piecewise specification, reference group is the first quintile/quartile – i.e. $P_r < 0.125$. Fourth and fifth quintiles are the same. All regressions control for the full set of baseline controls (see table 2 column (2)). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Donor	$\frac{\gamma_d}{\lambda_d}$ estimated
Australia	0.58 [0.76 ; 0.82]
Canada	0.41 [0.56 ; 0.57]
Japan	0.84 [0.99 ; 1.13]
Norway	0.67 [0.85 ; 0.94]
Saudi Arabia	1.09 [1.08 ; 1.24]
Switzerland	0.81 [0.95 ; 1.04]
UN Institutions	0.99 [1.04 ; 1.15]
United States	0.46 [0.62 ; 0.65]
WFP	1.34 [1.22 ; 1.61]
Austria	0.79 [0.93 ; 1.01]
Belgium	1.01 [1.06 ; 1.20]
Denmark	0.60 [0.78 ; 0.84]
Finland	0.52 [0.70 ; 0.71]
France	0.61 [0.79 ; 0.86]
Germany	0.59 [0.77 ; 0.83]
Italy	1.05 [1.13 ; 1.42]
Luxembourg	1.01 [1.06 ; 1.20]
Netherlands	0.54 [0.71 ; 0.78]
Spain	1.14 [1.12 ; 1.35]
Sweden	0.39 [0.54 ; 0.54]
United Kingdom	1.06 [1.08 ; 1.25]

Table B3.7—: Estimates of donors' type

Notes: $\frac{\gamma_d}{\lambda_d} = \frac{1-\beta_d}{1+\beta_d}$. In brackets, the confidence interval at a 10 percent level. Estimates are derived from results obtained in table 4 in section IV.B.

Dependent Variable	Food aid from d (IHST)			
	(1)	(2)	(3)	(4)
OLS Estimates				
EU food aid quantities (IHST)	0.015 (0.016)	-0.004 (0.024)	-0.005 (0.025)	-0.023 (0.016)
R^2	0.525	0.510	0.497	0.516
2SLS Estimates				
EU food aid quantities (IHST)	-0.001 (0.033)	0.043 (4.962)	0.082 (0.134)	0.073 (0.121)
R^2	0.523	0.494	0.443	0.435
Reduced Form Estimates				
Reform $_t$ * P_r^q	0.001 (0.020)	-0.021 (0.035)	-0.053 (0.050)	-0.053 (0.047)
R^2	0.523	0.510	0.498	0.512
Observations	755	547	519	475
Dependent Variable	EU food aid quantities (IHST)			
	(1)	(2)	(3)	(4)
First-Stage Estimates				
Reform $_t$ * P_r^q	-0.869*** (0.048)	-0.868*** (0.084)	-0.838*** (0.072)	-0.833*** (0.077)
R^2	0.673	0.675	0.673	0.670
KP F-Stat	61.066	3.741	9.769	11.977
Observations	814	589	404	401
Donor-Recipient FE	Yes	Yes	Yes	Yes
Donor-Year FE	Yes	Yes	Yes	Yes
Any Conflict $_{t-1}$	No	Yes	Yes	Yes
Any Neighbor Conflict $_{t-1}$	No	Yes	Yes	Yes
Any Natural Disaster $_{t-1}$	No	Yes	Yes	Yes
Any Natural Disaster $_t$	No	Yes	Yes	Yes
Log(Cereal Production per capita (MT)) $_{t-1}$	No	Yes	Yes	Yes
Log(Cereal Production per capita (MT)) $^2_{t-1}$	No	Yes	Yes	Yes
Log(Population (million)) $_{t-1}$	No	Yes	Yes	Yes
Log(Population (million)) $^2_{t-1}$	No	Yes	Yes	Yes
Log(GDP per capita \$2005) $_{t-1}$	No	Yes	Yes	Yes
Log(GDP per capita \$2005) $^2_{t-1}$	No	Yes	Yes	Yes
Log(EU agricultural exports +1) $_{rt-1}$	No	Yes	Yes	Yes
Share of refugees in recipient country $_{t-1}$	No	Yes	Yes	Yes
Share of refugees in recipient country $^2_{t-1}$	No	Yes	Yes	Yes
Democratic Index $_{t-1}$	No	No	Yes	Yes
Political Rights and Civil Liberties $_{t-1}$	No	No	Yes	Yes
UN Vote Similarity Index $_{t-1}$	No	No	No	Yes
Any other aid $_t$	No	No	No	Yes

Table C3.1—: Reaction to the allocation of EU food aid on quantities - small recipients and non-EU donors

Notes: an observation is a donor-recipient pair and a year for OLS, 2SLS and reduced form,. For first stage it is a recipient and yea. The sample includes 136 recipient countries, 21 regular donors (except EU) from 1988 to 2011. Coefficients are reported with standard errors bootstrapped and clustered at the recipient and year level. The first stage equation includes recipient and year fixed effects. P_r is the average quantity of food aid received from the EU before 1996. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Dependent Variable	Food aid from d (IHST)			
	Small		All	
	Non EU	All	Non EU	All
Recipients				
Donors				
EU food aid quantities (IHST)	0.043 (4.962)	0.089 (0.555)	0.052* (0.030)	0.051 (0.038)
R^2	0.494	0.246	0.550	0.387
KP F-Stat	3.741	3.283	6.640	5.393
Observations	547	1 160	6 811	13 728
Recipient-Donor Pair	147	168	685	1 489

Table C3.2—: Strategic interactions depending on the type of recipients and the sample of donors – quantities

Notes: One observation is a pair donor-recipient and a year. The sample includes 136 recipient countries and 21 regular donors (except the EU) from 1988 to 2011. Coefficients are reported with standard errors in parenthesis, bootstrapped and clustered at the recipient and year level. I include controls from columns (2) of table 2. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Recipient countries	P_r	P_r^{1996}	Small country
Afghanistan	0.625	0.75	
Albania	0.375	0.125	
Algeria	1	0.9375	
Angola	1	0.6875	
Antigua and Barbuda	0	0	Yes
Argentina	0	0	
Armenia	0.6	0.5	
Azerbaijan	0.6	0.5	
Bangladesh	1	0.75	
Belarus	0	0.0625	
Belize	0.125	0	Yes
Benin	1	0.25	
Bhutan	0.75	0	Yes
Bolivia	1	0.4375	
Bosnia and Herzegovina	0.25	0.0625	
Botswana	0.875	0	Yes
Brazil	0.75	0	
Bulgaria	0.125	0	
Burkina Faso	1	0.8125	
Burundi	1	0.625	
Cambodia	0.625	0.1875	
Cameroon	0.875	0.25	
Cape Verde	1	0.125	Yes
Central African Rep.	1	0.1875	
Chad	1	0.75	
Chile	1	0	
China	0.875	0.0625	
Colombia	0.625	0.75	
Comoros	1	0.0625	Yes
Congo	0.875	0.4375	
Costa Rica	0.125	0	
Côte d'Ivoire	1	0.625	
Croatia	0.167	0.125	
Cuba	1	0.125	
Cyprus	0	0	
Democ.Rep.Congo	1	0.9375	
Djibouti	1	0.375	Yes
Dominica	0.875	0	Yes
Dominican Republic	1	0.25	
East Timor		0.5	Yes
Ecuador	1	0.3125	

Continuing next page. . .

Recipient countries	P_r	P_r^{1996}	Small country
Egypt	1	0.3125	
El Salvador	1	0.25	
Equatorial Guinea	0.625	0	Yes
Eritrea	1	0.5625	
Estonia	0.6	0	
Ethiopia	1	1	
Fiji	0	0	Yes
French Guiana	0	0.0625	
Gabon	0	0.0625	Yes
Gambia	1	0.25	Yes
Georgia	0.6	0.75	
Ghana	1	0.25	
Grenada	0.5	0	Yes
Guatemala	1	0.6875	
Guinea	0.625	0.375	
Guinea-Bissau	1	0.125	Yes
Guyana	1	0	Yes
Haiti	1	0.8125	
Honduras	1	0.375	
Hong Kong	0	0	
India	1	0.5	
Indonesia	0	0.375	
Iran	0.25	0	
Iraq	0.625	0.25	
Israel	0	0	
Jamaica	0.125	0	Yes
Jordan	1	0.8125	
Kazakhstan	0	0	
Kenya	1	0.75	
Korea, Democ	0	0.6875	
Kyrgyzstan	0.4	0.4375	
Laos	0.5	0.4375	
Latvia	0.4	0	
Lebanon	1	0.6875	
Lesotho	1	0.25	Yes
Liberia	1	0.8125	
Libya	0	0.0625	
Lithuania	0.4	0	
Macedonia	0	0	
Madagascar	1	0.875	
Malawi	1	0.75	

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Recipient countries	P_r	P_r^{1996}	Small country
Malaysia	0.25	0	
Maldives	0	0	Yes
Mali	1	0.5625	
Mauritania	1	0.5625	
Mauritius	0.625	0	Yes
Mexico	0.375	0.125	
Moldova	0.2	0.1875	
Mongolia	0.25	0	
Morocco	0.875	0	
Mozambique	1	0.625	
Myanmar	0.25	0.5625	
Namibia	0.833	0.0625	Yes
Nepal	0.875	0.8125	
Nicaragua	1	0.75	
Niger	1	0.8125	
Nigeria	0.125	0	
Pakistan	1	0.625	
Palestine	1	1	
Panama	0	0	
Papua New Guinea	0.5	0.0625	Yes
Paraguay	0.75	0	
Peru	1	0.375	
Philippines	0	0.25	
Poland	0.25	0	
Romania	0.5	0	
Russian Federation	1	0.8125	
Rwanda	1	0.4375	
Saint Kitts and Nevis	0	0	Yes
Saint Lucia	0	0	Yes
St. Vincent & Grenadines	0	0	Yes
Sao Tome and Principe	0.875	0.125	Yes
Senegal	1	0.3125	
Serbia&Montenegro	0.5	0.5625	
Seychelles	0.25	0	Yes
Sierra Leone	1	0.5625	
Slovenia	0	0	
Solomon Islands	0	0	Yes
Somalia	1	0.625	
South Africa	0.125	0.0625	
South Sudan		0	
Sri Lanka	0.75	0.375	

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Recipient countries	P_r	P_r^{1996}	Small country
Sudan	1	0.9375	
Suriname	0	0	Yes
Swaziland	0.875	0.25	Yes
Syria	1	0.875	
Tajikistan	0.6	0.75	
Tanzania	1	0.875	
Thailand	1	0.0625	
Togo	1	0.125	
Trinidad and Tobago	0	0	Yes
Tunisia	1	0.125	
Turkey	0.5	0.0625	
Turkmenistan	0.2	0	
Uganda	1	0.75	
Ukraine	0	0	
Uruguay	0.875	0	
Uzbekistan	0.2	0	
Vanuatu	0	0	Yes
Venezuela	0	0	
Viet Nam	1	0	
Yemen	1	0.4375	
Zambia	1	0.75	
Zimbabwe	1	0.875	

Table D3.1—: List of recipient countries