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Three essays on food and humanitarian aid

Nathalie Ferrière

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ÉCOLE DES HAUTES ÉTUDES EN SCIENCES SOCIALES



THÈSE POUR L'OBTENTION DU TITRE DE DOCTEUR EN SCIENCES ÉCONOMIQUES

Aide alimentaire et humanitaire : analyses économiques des donateurs aux bénéficiaires
Three essays on food and humanitarian aid

Thèse présentée et soutenue publiquement le 14 Décembre 2016 par

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General Introduction

82.5 million of people among 37 countries depended on humanitarian aid to ensure their lives in 2015 according to the Office of Coordination of Humanitarian Affairs (OCHA) United Nations Office for the Coordination of Humanitarian Affairs (2016a). 20.1 billion of dollars have been allocated the same year to respond to these needs partly through the OCHA. However numerous crises were under-funded: all needs were not covered.¹ Other countries who were not targeted by an UN appeal also received humanitarian aid from other type of donors. Partly in collaboration with the OCHA, 76.7 million of people, with a special focus to women and children, among 81 different countries received food aid from the World Food Program (WFP) and other donors.² Food and humanitarian aid amounts are still small compared to amounts allocated to development aid (about 132 billion of dollars). Nevertheless the share of humanitarian aid is increasing (Figure 1).

Humanitarian aid represented about 5 percent of total aid in 1995 and 10 percent in 2014.³ On the contrary the share of food aid is decreasing but food aid still remains important in some countries. This trend is partly explained by the almost end of program food aid. In addition emergency aid which used to be food aid is more diverse now: school meal, cash, demining action, livestock care, water sanitation, immunization, clothes, and schooling for refugees... (United Nations Office for the Coordination of Humanitarian Affairs, 2016b).

Despite the fact humanitarian and food aid aim to save lives, they have been criticized over the last years. On the one hand, aid is too scarce and badly allocated to be effective and relevant (United Nations Office for the Coordination of Humanitarian Affairs, 2015). Indeed the amounts devoted seem to be small given the accuracy and the increasing number of crises. This trend of criticism also points out important and recurrent delays on the delivery. For instance in 2011 three months after the emergency statement in the Horn of Africa because of severe drought and hungry, the amounts of delivered aid were small and commitments of future aid also compared to the estimated needs.⁴ About the allocation, criticism focus on the fact some

1. Source : Financial Tracking System database, OCHA.

2. Women and children represent 82 percent of beneficiaries according to World Food Programme (2015).

3. It is the share focusing on DAC donors, which are not the only donors but traditional donors. It excludes private sector and NGOs that are more active in humanitarian sector.

4. Newspaper publicized extensively the delay on the international community reaction as show these French examples: *Jeune Afrique*, 08/02/2011, *Libération*, 09/29/2011, *La Croix*, 09/07/2011. Some NGOs, such as OXFAM or Groupe URD, also point out the lack of reaction of the UN system.

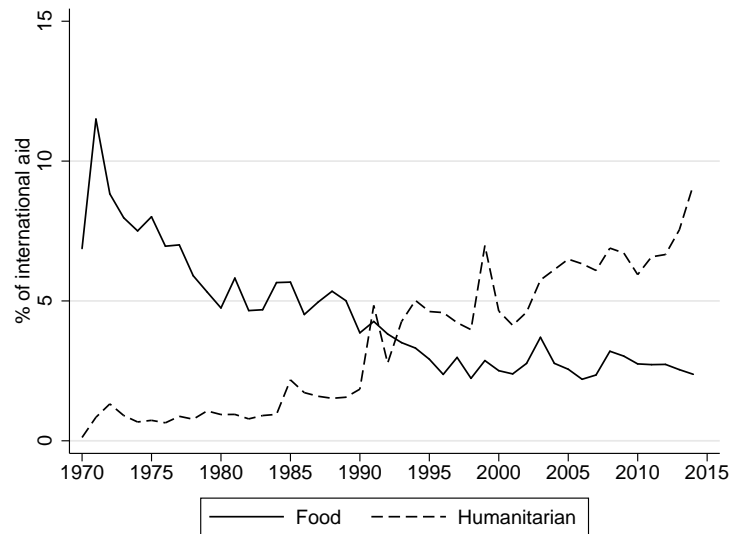


Figure 1 – Share of humanitarian and food aid on international aid
Source: author's calculation from OECD data.

well publicized crises concentrate large amounts of humanitarian and/or food aid while other crises are almost forgiven.⁵

On the other hand, some criticized aid to create humanitarian trap in which beneficiaries are stuck. Receiving aid would decrease incentives to improve their situation and thus increase the probability of future crisis. Hence aid would create dependency (Devereux, 2004). This type of criticism has been well-developed for food aid but can be applied for humanitarian aid. Relief aid decreases the needs of prevention and preparedness of disasters. The criticism can go a step further: humanitarian aid system has incentives to self-maintain (De Waal *et al.*, 1997): relief is a business. It leads to some situations in which countries received every year humanitarian and/or food aid. The second problem underlined is about the crowd-out effect. Indeed aid would deter (or even substitute) to local coping system. Third aid would not be suited to local contexts. A survey by the UN in 2015 on refugees draws a concerning picture. Aid does not fit their needs, information and communication are low, and projects are accused to be developed to fund-raising purposes rather than to help beneficiaries, etc.

In this context, academic research in economics can make a contribution. Indeed, an objective analysis of the effectiveness of aid both at the micro level and macro is crucial given the needs and resources available. At the micro level, it can help to highlight the direct but also indirect effects of assistance on the beneficiaries and the local economy. Indeed the beneficiaries can change the behavior and thus affect the actual effectiveness of aid. For example food aid is often given to rural households, where economic theory shows that consumption and production are not separable. Further aid is part of a specific economic system often undermined because of a crisis. This assistance may affect the functioning of the system. Understand the full implications

5. Advocacy NGOs do a lot to un-forgive forgiven crises. For instance in March 2016, a group of international NGOs launched an alert about the humanitarian crisis in Yemen ([link](#))

of the provision of aid at the micro level can therefore afford to implement projects that will minimize the disincentive effects that can theoretically generate help.

An analysis at the macro level is complementary to the first type of analysis. It allows us to understand the overall effect for a country with a multitude of local and sometimes disparate projects for which the secondary consequences and general equilibrium effects are sometimes neglected. Moreover, macroeconomic analysis does not focus more on beneficiaries but often on the behavior of donor and recipient governments. These two types of actors, their behavior and interests, may also affect the effectiveness of aid must be understood. Indeed literature has extensively documented that institutional donors allocate aid not only to the needs of recipient countries but also according to their own interests which could reduce the effectiveness of aid. It also showed that the context - the characteristics of the recipient country - had a great impact on its effectiveness, at least for development aid (Burnside & Dollar, 2000).

In this rich literature on aid effectiveness and the different channels that can influence it, relatively little empirical work mentions the existence of the third major player: the agency in charge of implementing projects. Many theoretical work shows that they also have personal and strategic interests (Annen & Knack, 2015). Two papers (Dietrich, 2013; Acht *et al.*, 2015) differ, however, by taking account of these intermediaries. Nevertheless they implicitly assume that the choice of implementing agencies depends only on the donor and that these intermediaries are ultimately neutral apart by their relative effectiveness and vis-à-vis independence of recipient governments. Hence analyzing these three players is critical to better understand the system and be able to reform if necessary to improve the effectiveness of aid. This thesis contributes to this general understanding and is mainly based on empirical work. The third chapter also introduces a framework to classify donors as to their vis-à-vis reaction allocation of food aid from the European Union. Nevertheless it remains essentially empirical work and mobilizes data types and different methodologies, to address three important obstacles inherent in the empirical analysis of aid.

The first of these obstacles is the scarcity of data especially for humanitarian and food aid that is often allocated in a context of fragile states. Each chapter uses a specific database. The first chapter takes advantage of a panel of Ethiopian rural households. This investigation set up after the great famine of the 1980s in Ethiopia is unique. Indeed few investigations include a detailed questionnaire on aid and more specifically food aid while many countries are still regular recipients. It follows on over fifteen years a thousand households throughout Ethiopia. The panel dimension was crucial to take into account the effects of endogenous selection and allocation of aid. The second chapter is based on international data flows of aid collected by OCHA through the Financial Tracking System since 2000. The wealth of information collected both on donors than on the agencies responsible for the implementation and beneficiaries is amazing. Finally, the third chapter is based on data collected by WFP in INTERFAIS base. The data is reliable only for institutional donors (countries, UN bodies). The advantage of these data is to focus specifically on one type of aid over a long period: 1988-2016 (as part of this thesis the years after 2012 are not processed).

The second obstacle is the empirical difficulty of establishing causal links both at micro and macro levels. Indeed there is a selection phenomenon both in terms of beneficiary households and recipient countries. Beneficiary households are on average poorer, cultivate less land, etc. So it is empirically challenging to distinguish what in the effect of aid on the choice of production and marketing, reports and what is due to these original differences. Likewise countries receiving humanitarian or food aid have special characteristics. Another problem is due to a risk of reverse causality. For the allocation of aid at the household level, it can also be explained by the subsequent choice or anticipated households. At the country level, the allocation can be strategic on the part of donors. Will they allocate humanitarian aid based on the potential recovery of the country whatever the level of aid - to communicate on its effectiveness - or to countries for which the prospects of recovery are low - the risk that humanitarian aid seems not very efficient? Finally if donors take into account the allocation of other donors, the classic problem of reflection appears.

To address these two common pitfalls, three empirical chapters of the thesis are based on rich data, and pay special attention to the development of specific strategies to consider, to the extent that data permit, the risk of endogeneity. This thesis has three original contributions to the empirical literature on aid, focusing specifically on humanitarian and food aid. Specifically, she is interested in the role of each actor involved in the process of assistance: recipients (chapter 1) donors (Chapters 2 and 3) and the agencies responsible for project implementation (Chapter 2). Each of the three sections described highlights how each actor can have an impact on the effectiveness of aid.

Chapter 1

The first chapter deals with beneficiaries' behavior. Co-authored with Akiko Suwa-Eisenman it is entitled "Does Food Aid Disrupt Local Food Market? Evidence from Rural Ethiopia". Food aid may induce changes in beneficiaries' behavior that could affect its efficiency and thus maintain high level of food insecurity. This chapter tests this existence of these changes focusing on production but also sales and purchases decisions. Indeed food security does not depend only on production (because of auto-consumption) but also on what a household can afford (through purchases and sales). To do, so we look at both the extensive margin (the 0/1 choice) and the intensive margin (quantities). The chapter also investigates whether changes on allocation's criteria and programs have consequences on beneficiaries' behavior. It has policy implications on the way food aid programs have to be implemented.

We analyze it in the context of rural households in Ethiopia. The reason is twofold in that choice. First Ethiopia is the country receiving the most food aid from the international community and is characterized by chronic food insecurity. Second, we have the ability to use a next panel database of households from 1994 to 2009. The use of panel data allows us to take into account the endogeneity problem associated with the non-random allocation of food aid to households.

The contribution of this chapter is twofold. First we show that food aid has an impact on the behavior of beneficiaries in terms of production, purchasing and sales but only at the extensive margin. This will provide an explanation to the apparent paradox between the results previously obtained at the macro level and the micro level. Then we show that the conditions of allocation are critical and influence the reactions of the beneficiaries. The new program implemented by Ethiopia in 2004 appears to reduce the disincentive effects of food aid and allows the inclusion of beneficiaries in the marketing chain, which should reduce food insecurity.

Chapter 2

The second chapter extends the analysis and focuses in part on the previous link in the humanitarian aid system, that is to say, the agencies responsible for the implementation of projects. How they manage projects, interact with beneficiaries and donors but also between them may affect aid efficiency. Entitled “Donors versus implementing agencies. Who fragments humanitarian aid?” this chapter contributes to the debate on aid effectiveness and fragmentation in two ways. First, it is to my knowledge the first study that documents humanitarian aid fragmentation not only at the donor level but also at the implementing agency. Disparities exist between the two types of fragmentation which shows that the two types of actors need to be differentiated. Donor fragmentation is mitigated at the implementing agency level. Fragmentation is less a concern than expected as in 13 percent of the case only one donor and implementing agency are involved within a country. In addition high level of fragmentation – more than 50 donors and 50 implementing agencies – is not frequent: only one percent of the cases.

The second contribution of this chapter is about the debate on aid fragmentation and its effects on efficiency. Indeed there is a broad consensus on the fact that fragmentation is bad for the effectiveness of aid.⁶ Nevertheless only fragmentation at the donor is analyzed. But in most cases donors are only donors and there are other agencies that implement humanitarian aid projects in recipient countries. Using three case studies, I illustrates that fragmentation is not necessary a burden. The way aid is delegated and the strength of the recipient country are important to avoid negative consequences of aid fragmentation.

This chapter contributes to highlight the importance of agencies in charge of implementing projects that are almost systematically excluded from the analysis concerning aid allocation and effectiveness. They add an additional layer on the aid system.

Chapter 3

The third chapter, whose title is “To Give or Not to Give? How Do Donors React to European Food Aid ”, is interested in the third major player: the donor. Indeed the slightest aid effectiveness may also stem from donor behavior. The literature has shown that donors were

6. This consensus is beginning to be questioned by some studies (Gehring *et al.* , 2015; Han & Koenig-Archibugi, 2015).

allocating their assistance not only to the needs of recipient countries but also according to their own strategic interests. However literature implicitly assumes that these interests are linked to recipient countries: bias linked to trade concerns, historical links between the donor and the recipient. However donors can also act strategically in relation to other donors.

To take into account the endogeneity problem, the identification strategy is based on the differential impact of a reform of the EU in 1996 of its food aid program on the probability of receiving food aid from the European Union. The reform aims to move from a system of allocation related to agricultural surplus of the Union to a system governed by the needs of recipient countries. Consequently the number of European food aid recipient countries has been halved in the space of five years. The reform first hit small countries (particularly small islands) and next other countries. The more often a country received aid before the reform the more affected the country is. The reform and its differential effect allow me to instrument the EU allocation.

Using the INTERFAIS database, I find that other donors do take account of the EU allocation choices to determine their own allocations. Thus not only the allocation of food aid is skewed by the own interests of donors, but this bias is reinforced by a set of interactions between donors. In fact on average if the EU allocates aid to a country it increases by one the number of other donors. I then studied the heterogeneity of responses by donors. There is a wide variety of response among donors. Large donors and Nordic countries complement the EU while the WFP substitutes.

I then developed a framework in order to classify donors that offers two main reasons why donors react to the allocation of the European Union. They react indirectly for reasons related to the recipient (altruism, geopolitical concerns) or directly because they compare their allocation with the European Union. This allows me to propose a typology of donors based on their behavior towards the allocation of aid. For small countries, donors tend to react to the allocation of the European Union by directly comparing their allocation to that of the European Union. Large donors within and outside the EU and Nordic countries react directly to the EU while the WFP is recipient-driven.

This chapter is one of the first studies showing empirically that donors are responding to the allocation of other donors. This has important consequences in terms of potential reform to implement in order to improve donor coordination in order to improve the effectiveness of aid ; especially as the reactions of reasons are twofold and vary among donors.

Chapitre 1

Does Food Aid Disrupt Local Food Market? Evidence from Rural Ethiopia

Abstract¹

The paper examines the impact of food aid on households' marketing behavior, based on a panel of households followed between 1994 and 2009 in 15 villages of Ethiopia. The impact of aid is examined at the intensive margin (on quantities produced, sold or bought by the households) and at the extensive margin (on the number of producers, sellers and buyers). Food aid reduces the probability of being a producer. It also increases the probability of being a seller after a reform of aid policy in 2004 from 'repeated emergency distributions' towards a multi-year program aiming at agricultural development.

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The ERHS data have been made available by the Economics Department, Addis Ababa University, the Centre for the Study of African Economies, University of Oxford and the International Food Policy Research Institute. Funding for data collection was provided by the Economic and Social Research Council (ESRC), the Swedish International Development Agency (SIDA) and the United States Agency for International Development (USAID); the preparation of the public release version of these data was supported in part by the World Bank. AAU, CSAE, IFPRI, ESRC, SIDA, USAID and the World Bank are not responsible for any errors in these data or for their use or interpretation.

1.1 Introduction

Food aid has evolved in recent years from a one-size-fits-all food transfer to a variety of interventions, tailored to the context and needs of recipient households: food can be distributed for free or in exchange of work (Bezu & Holden, 2008); it can be transferred in cash or in-kind (Hoddinott *et al.*, 2014; Sabates-Wheeler & Devereux, 2010); in the latter case, it can be procured locally (or regionally) or shipped from overseas (Lentz *et al.*, 2013; Garg *et al.*, 2013; Violette *et al.*, 2013). Free food can be distributed to specific groups such as meals for schoolchildren; food-for-work may be coupled with agricultural investments. The efficacy of this wide array of interventions is attracting attention as ever (Lentz & Barrett, 2008).

This paper re-examines an important question on the efficiency of aid, namely if food aid could have a negative impact on production, sales and purchases by recipient households, thus disturbing crop marketing. This question has been already largely debated. We take advantage of a panel dataset stretching over 1994-2009, in a country that was one of the world top aid recipients, Ethiopia.² This long period allows us to assess whether there is "aid dependency" in the long run; moreover, as Ethiopia has overhauled its aid policy in the mid 2000s, we can see if the shift in aid philosophy in the recent years, from simple commodity transfers to holistic developmental interventions, can be felt on local markets. Using a panel of households followed over fifteen years allows controlling for the endogenous allocation of aid in an innovative way.

In a poor country where most aid recipients are farmers, food aid can have a negative impact on production if aid is non additional (meaning that food aid transfers do not increase food consumption by an equal amount) and partly monetized, thus depressing the prices received by agricultural producers (Schultz, 1960). On the other hand, food aid also raises income, hence the demand for food bought on the local market, mitigating the negative price effect. In the case of food-for-work, there is also the risk that the program might displace normal employment. In the long run, repeated aid could also create dependency and lack of agricultural investments by farmers themselves or by the government. It could also shift consumers' preferences away from indigenous food (Maxwell & Singer, 1979; Maxwell, 1991; Barrett & Maxwell, 2007).

A variety of papers have put these assumptions to the data, and among them, many on Ethiopia. Four lessons emerge from this rich literature. First, there is a discrepancy between micro and macro approaches. While some (but not all) macro studies have found a small disincentive impact of aid at the country or at the regional level (Mann, 1967; Isenman & Singer, 1977; Barrett *et al.*, 1999; Gelan, 2006; Tadesse & Shively, 2009), micro studies have failed to find any significant and negative impact of aid at the household level (Abdulai *et al.*, 2005).

2. According to INTERFAIS, the Food Aid Information System created by the World Food Programme (WFP), Ethiopia was the second largest recipient of food aid in the world in 2004 and the first one from 2008 to 2011. About 5 million Ethiopians live in food insecurity, especially in rural zones.

Second, the dynamic impact of aid is worth studying, as short-term effects may differ from long-term ones. Abdulai *et al.* (2005) find a slight negative impact of aid received in 1994 in Ethiopia on labor supply for permanent and semi-permanent crops one year later, while they see no significant impact of current aid.

Third, a major difficulty in assessing the impact of aid comes from the endogeneity of aid allocation, namely, that aid is not distributed at random but is the result of targeting. Without controlling for targeting, Abdulai *et al.* (2005) find a negative impact of aid on households' labor supply and use of agricultural inputs. But this negative impact vanishes once controlled for household characteristics that might explain aid allocation. Hence, aid must be considered as an endogenous variable and the problem becomes one of finding a credible instrument that might explain aid allocation but not the outcome. Abdulai *et al.* (2005) instrument aid by households' observable characteristics and whether they have received aid in the past (thus assuming a kind of "aid inertia"). Gilligan *et al.* (2009) use a propensity score matching method. The propensity score is based on observable household characteristics; moreover, as the matching compares treated and non-treated households in the same village, the method implicitly takes into account unobservable characteristics at the community level. However, they are not controlling for unobservable characteristics at the household level that might also explain aid allocation.

Fourth, the impact of aid on households is heterogeneous, because of the varying degrees of households' reliance on local markets. Levinsohn & McMillan (2007) show that the effect of aid on poverty depends on whether the household is a net buyer or a net seller. In the case of Ethiopia, poor households who are mostly net buyers will benefit from the low prices induced by aid. Yamano *et al.* (2000) look at the impact of food aid on local markets and suggest that purchases and sales must be examined separately. Based on a 1996 survey in Ethiopia, they find that food-for-work decreases local purchases of wheat, while free food transfers slightly decrease wheat sales. However, they do not take into account the endogeneity of aid allocation.

In this paper, we try to go further on these four points. First, we take into account heterogeneity of impact. We consider as Yamano *et al.* (2000) that the impact of aid depends on households being buyers or sellers of the crop they receive. We add two more groups: households that might grow a crop without selling or purchasing it on the local market (they are in autarky, producing for their own consumption only); and households that neither produce nor buy the crop that they receive as a food transfer. These four categories define what we call the "type" of households' participation to markets.

The data shows that households do indeed switch their type of market participation from one year to another. Wouldn't be likely that receiving food aid in non negligible quantity has influenced their decision to do so? Hence, we look at the impact of aid at the intensive margin (on quantities, controlling for a given type of market participation), and at the extensive margin

(on the type of market participation itself). We focus on wheat, which is the most distributed crop in food transfers in Ethiopia.

Second, we refine the estimation method in order to take into account the endogenous allocation of aid. Our strategy is based on the panel dimension of the dataset we are using, five rounds of the Ethiopian Rural Household Survey (ERHS) between 1994 and 2009. As the dependent variables are a mix of continuous variables (for instance, the quantities produced) and discrete variables (such as the decision to produce), we cannot simply include household fixed effects. We estimate a panel tobit which allows for selection and endogeneity, a method presented by Semykina & Wooldridge (2010). Households fixed effects are included as the average over time of households characteristics. This method allows taking into account time-invariant unobservable household characteristics that might explain the allocation of aid.

On the dynamic impact of aid, we take advantage of the fact that aid is included twice in our estimations: first, as the current quantity of aid received by the household and as the average quantity received over fifteen years. The coefficient of the latter variable may be interpreted as an indicator of aid dependency in the long-run and will be contrasted with the short-term impact. Moreover, the impact of these two variables will be followed over fifteen years, a period during which Ethiopia has overhauled its aid policy. We will also distinguish between the impact of free food transfers and food-for-work.

The main findings of the paper are the following. On production, food aid has an impact at the extensive margin: it decreases the probability of being a wheat producer. Once controlled for selection, there is no evidence of any impact at the intensive margin, on quantities produced. This finding might help reconcile macro studies that find a slight negative impact of aid on production and micro studies that fail to do so: even though there is no significant impact on average individual productivity aid reduces the number of producers, thus decreasing aggregate (nationwide) production. Based on reasonable assumptions, our results suggest that aid in wheat has decreased wheat output by 114'000 tons in Ethiopia in 2009 compared to a total production of 3 million tons, a negative but small impact, which does not undermine the utility of aid in general.

Food aid has also an impact on sales after 2004. Here too, the channel goes through the extensive margin: after 2004, aid increases the probability of a household to be selling wheat, especially in the case of food-for-work. On the other hand, food aid (mostly free food distribution) had a positive impact on the probability of buying wheat before 2004; the effect is no longer significant and switches sign after 2004. The impact at the intensive margin, on quantities of wheat sold or purchased by households, is not significant. The change in 2004 coincides with the introduction of innovative aid policies in Ethiopia, aimed at building agricultural assets. Our results suggest that aid reform did make a difference in households' marketing behavior.

Moreover, our results show the importance of factors that relate to the frequency and closeness of local markets within the district.

The remainder of the paper is structured as follows: section 1.2 sets the context of food aid in Ethiopia and recalls related literature; section 1.3 describes the data and households' heterogeneity with respect to market participation. In section 1.4, we present the empirical framework and the way we deal with selection and reverse causality. Section 1.5 discusses the empirical results and the robustness checks before we conclude in section 1.6.

1.2 Context

1.2.1 Food aid in Ethiopia

Ethiopia has been one of the world's major recipients of international food aid for decades. As a result, over the last twenty years, food aid has amounted to one-tenth of domestic production in Ethiopia (Planel, 2005). For wheat, a major staple in the country, food aid has even reached 40 percent of domestic production.³

Ethiopia has faced a major shift in food aid policy in the mid 2000s. Before that date, food aid was basically repeated emergency interventions. While those interventions were successful in terms of alleviating starvation, they did not prevent asset depletion and were not integrated in agricultural development activities (Berhane *et al.*, 2014).

Against this background, a number of policy changes have occurred. First allocation criteria of free food aid were reformed (DRMFSS, 1995, 2003). Before 2003 those who used to be eligible for free food delivery were the elderly, disabled persons, lactating or pregnant women, and household members attending to young children. In 2003, the Disaster Risk Management and Food Security Sector revised the official guidelines and introduced the Household Economic Approach. This method is based on a survey that assesses hazard probability and coping strategies at the household level. For instance, it takes into account resources available to the household, such as assets (livestock) or relatives who could give transfers. While the Household Economic Approach is based on sound economic theory, it is hard to apply on the ground, partly because the institutional channels through which aid is actually allocated have hardly changed (Shoham, 2005).

Secondly starting 2004-2005, Ethiopia, with the help of donors, implemented the Productive Safety Net Program (PSNP). This multi-year program seeks to prevent asset depletion at the household level and build assets at the community level; it also ensures timely and predictable

3. Data from the UN's World Food Programme for aid in wheat and from the Food and Agriculture Organization for wheat production.

cash and/or food transfers to chronically food-insecure people.⁴ The program covers now more than 50 percent of the communities (*woredas*) in the country.⁵ The shift from “annual emergency aid” to an integrated safety net approach is likely to have influenced households’ marketing behavior and is worth studying over time.

1.2.2 Related studies on Ethiopia

As one of the countries most dependent on food aid, Ethiopia has been the focus of numerous studies.

A first stream of work focuses on targeting and dependency. Aid allocation in Ethiopia results from a three-step process where the government decides the geographical allocation of aid at the regional level, regional leaders decide the allocation of aid by *woreda*, and local leaders at the Peasant Association (PA) level select households within each community. All steps are subject to inefficiency and potential political capture. According to Clay *et al.* (1999), Jayne *et al.* (2001) and Enten (2008), allocation at the *woreda* level results from negotiations between the government, the administrative staff and local communities and, as a result, is not (entirely) related to effective needs. These three papers, although written ten years apart, show that the Tigray region has been favored because of its close ties to the government.⁶ At the local level, recipient households with political connections and involved in village organizations receive more food aid than recipient households without connections (Broussard *et al.* , 2014). The system perpetuates itself, as PA leaders who are elected are reportedly manipulating the election, by threatening voters that they will be excluded from federal support (Human Rights Watch, 2010).

Two consequences emerge from these papers on allocation process in Ethiopia. First, targeting is likely to be imperfect. Only 22 percent of food-insecure people received some aid; this comes either because their district was not targeted or because their household was not selected (Planel, 2005). As allocation under the new Household Economic Approach relies less than before on easily households’ observable characteristics such as age and gender, it may be subject to political capture.

4. The first year of implementation of the PSNP has coincided with a large increase in both the number of households receiving food-for-work and those receiving free food transfers. The PNSP was to be complemented by improvements in access to credit and seeds that were included in the Other Food Security Programme (OFSP). The latter lacked sufficient agricultural extension agents and the coverage was limited. Hence, the OFSP was redesigned in 2009 and a new program was introduced, called the Household Asset Building Program (HABP).

5. A *woreda* is an administrative unit, defined below region and zone, and roughly equivalent to a district elsewhere. *Woredas* are composed by *kebeles* (group of villages) and peasant associations (PA). In order to obtain land, households have to register with the PA which keeps the list of recipient households. A peasant association can cover many villages. For instance, the Adele Keke PA consists of 28 villages.

6. Politically motivated aid allocation is of course not restricted to Ethiopia. For instance, in Madagascar, regions with close ties to the government receive more aid (Francken *et al.* , 2012) .

Second, because of political stability in Ethiopia, with a national coalition staying in power for many years, it is likely that the same politically-connected households have received aid over time. Hence, the part of the selection that is based on unobservable households characteristics such as political connections may be considered as time-invariant.

Political capture is not the only culprit of poor targeting. The fixed costs of setting operations and identifying needs also account for the inertia of food aid allocation. Jayne *et al.* (2002) show, based on a nationally representative rural dataset of 1996, that the spatial allocation of aid in 1996 is highly correlated with the spatial pattern of vulnerability in 1984 during the famine and is concentrated in areas that are not the poorest. The inertia is particularly prevalent for food-for-work, possibly because the latter is often a multi-year program.

Asfaw *et al.* (2011) investigate the determinants of participation in food aid programs and the impact of such programs on poverty reduction, based on the ERHS surveys from 1999 and 2004. They show that households' size and asset endowments determine the extent of poverty alleviation and food aid dependency. Based on quantitative and qualitative data from 1999-2000 and 2002-2003, Little (2008) finds that food aid plays a significant role in households' recovery strategies, without creating dependency. This is due to the fact that aid deliveries are poorly timed and come with uncertainty. Bevan & Pankhurst (2006) have conducted interviews in 20 villages, including the villages surveyed in the ERHS. Their study gives a sense of attitudes towards aid. Respondents mention that aid in the long-term can make "people lazy". They also claim that food aid may come too late, is insufficient and distributed in centers that are too far away.

A second stream of literature investigates the impact of food aid on food prices and food production. Levinsohn & McMillan (2007) argue that the impact of aid on poverty depends on its effect on prices and on the household being a net seller or a net buyer. Based on two nationally representative household surveys in 1999-2000, they estimate the welfare impact of a change in prices and infer the impact of food aid on prices using a partial equilibrium model. They find that aid is alleviating poverty in the short term, as net buyers are more numerous than net sellers and poorer. Kirwan & McMillan (2007) extend the time span of the previous analysis to the period 1970-2003 and use indirect evidence based on aggregate data on production and prices. They find no correlation between food aid and producer prices, the latter declining steadily after 1984 while food aid, mostly driven by variations in the US price of wheat, has been volatile. As a consequence, food aid might have an impact on long-run production, not through prices but because of uncertainty about shipments that might have deterred investment in the wheat sector. Re-examining the relationship between aid and prices, Assefa Arega & Shively (2014), using monthly data over 2007-2010, do not find an impact of food aid on local producer prices of wheat, teff and maize in Ethiopia.

Using a computable general equilibrium model calibrated to Ethiopia in 2000, Gelan (2006)

finds a disincentive impact of food aid on domestic food production. Removing food aid stimulates demand and generates an expansion of the food producing sector with a slight increase in producer prices. In general equilibrium, consumers would substitute between grains ; as households receive wheat for free, they would shift away from maize or teff, hurting not only wheat growers but also the producers of other cereals.

Abdulai *et al.* (2005) re-examines the impact of aid on food production both at the micro level on Ethiopia and at the macro level with a VAR model estimated on 42 Sub-Saharan African countries. They do not find evidence of a disincentive impact with either method. If any, the macro analysis tends even to find a positive impact of food aid on production one or two years later. The micro analysis is based on two rounds of the ERHS in 1994 and one in 1995. They estimate the impact of receiving food aid on various outcomes: labor supply (of various sorts: on- and off-farm, wage work and own business, male and female), agricultural investment and use of inputs, and informal labor sharing. Some of these outcomes are of a 0/1 type. Others are continuous with zero values, and are estimated with a tobit. A naive estimation finds that aid has a strong disincentive impact. However, once controlled for household characteristics that might explain aid allocation (location, age, gender and education of household head, household size and holdings of land and oxen), only one impact remain significant (and positive), on off-farm female wage work. Then they estimate a model where aid is endogenous and is instrumented by past aid, reflecting an inertia effect as in Jayne *et al.* (2002). Aid received one year before, in early 1994, has a small disincentive effect on family labor supply for permanent and semi-permanent crops. On the contrary, contemporaneous aid (that received in 1995) has a positive impact on the same type of labor supply. Both past and current aid increase male labor supply of off-farm work. Overall, these findings make a very convincing case on the convergence of macro and micro analysis and the non existence of disincentive effects of aid in Ethiopia, at least in the short run.

Recent papers focus on the PNSP (Gilligan *et al.* , 2009; Hoddinott *et al.* , 2012; Berhane *et al.* , 2014) using propensity score matching and difference-in-difference estimations. The propensity score matching is based on observable households' characteristics. It also accounts for unobservable characteristics at the village level, as it compares treated and control households from the same woreda. The first paper finds a weak impact of PNSP in its first year of implementation in 2006 because of delays and under-payment of transfers. Aid recipients tend to increase their livestock suggesting a positive impact of aid on production. The second paper finds a positive impact of the PSNP on agricultural inputs use, especially when it is coupled with the OFSP extension program. The third paper considers treatment as continuous: it is the number of years of PNSP transfers. The paper compares the outcome between one and five years of PNSP. The propensity score is based on the demographic characteristics of the households before the program. Aid has a positive effect on food security and livestock holdings.

A third direction in the literature compares the different types of aid (Yamano *et al.* , 2000;

Gilligan & Hoddinott, 2007; Bezu & Holden, 2008). For instance, food-for-work (FFW) target household members that are able to work and provide them a job with payments usually in-kind. If work requirements are harsh, not all eligible households enroll in the program, thus, there is self-selection on top of eligibility criteria. By contrast, free distribution is aiming at those that cannot work, children or elderly people. Bezu & Holden (2008) finds that food-for-work has encouraged the adoption of fertilizer in Tigray in 2001. They estimate a Heckman two-step model where first the household decides whether to adopt fertilizers, before deciding the actual quantity, conditional on selection. Gilligan & Hoddinott (2007) compares two programs that were expanded after the 2002 drought, free food distribution (FFD) of the "Gratuitous Relief", and food-for-work (the "Employment Generation Scheme" or EGS). They use the 1999 and 2004 waves of the ERHS and estimate a propensity score. They find that EGS participants had significantly lower growth of livestock holdings; the effect is partly driven by outliers (some households with large livestock in the control group). Households could also have decreased their precautionary saving as they felt protected and insured by aid. On the other hand, free food distribution was better targeted and smaller in size and had no significant impact on livestock.

Yamano *et al.* (2000) also distinguish between FFW and free distribution and examine their impact on purchases and sales separately. They argue that looking at net sales is not sufficient in order to assess the impact on local markets. They find that FFW decreases the purchase of wheat, while free distribution decreases the level of sales albeit the effect is small and not statistically significant.⁷

To push their argument one step further, one would like to examine other types of market participation, such as households that grow wheat for their own consumption. Moreover, aid might not only influence the quantities sold or bought, but also the 0/1 decision of the type of market participation, for instance, determining producers who were growing wheat for their own consumption, to sell on the local market. Moreover, Yamano *et al.* (2000) were not controlling for the endogeneity of aid allocation. Last, we would like to take advantage of a panel stretching over 1994 and 2009 and contrast the short-run and the long-run impact of aid as well as look for any change in households' behavior following the reform of aid policy in Ethiopia in the mid 2000s.

7. Another differentiating characteristic of food aid is whether it is sourced from local or regional procurement (LRP) or shipped from overseas. Lentz *et al.* (2013) show that LRP aid reduces delay and improves the adequacy between needs and shipments; thus, it should reduce the risk of disincentive effect. Violette *et al.* (2013) show that LRP is more culturally accepted. This may reduce the negative impact on markets, as households are more likely to consume LRP aid instead of selling it, a consequence that is not investigated in their paper. Garg *et al.* (2013) examines the potential price effect of LRP aid and do not find any statistically significant impact. Unfortunately the EHRS does not provide information on the type of procurement. At the country level, one quarter of aid in wheat comes from local purchases (INTERFAIS-WFP).

1.3 Data and descriptive statistics

Our data comes from the Ethiopian Rural Household Survey Dataset (EHRS), a longitudinal survey which covers some villages between 1989 and 2009. The survey results from a joint project between Addis Ababa University, the CSAE at the University of Oxford and IFPRI. The data are not nationally representative but account for the diversity of non-pastoral farming systems in the country (see Dercon & Hoddinott (2009) for more details). The survey gives information on household characteristics, agriculture and livestock, food consumption, transfers and remittances, health, women's activities, and information at the village level on electricity and water, health services and education, wages, production and marketing.

Most of the results of this paper are based on a balanced panel of 1215 households in 15 villages, followed over 5 rounds (in 1994, 1995, 1999, 2004 and 2009).⁸ In the robustness checks, we also run the estimations on the whole (unbalanced) sample.

Table 1.1 provides descriptive statistics of the sample. The poverty rate was 48.2 percent in 1994, decreased in the late 1990s and early 2000s, but has returned to its previous level in 2009. Households are cultivating 1.5 hectares on average. The worst harvest took place in 1995 with only 533 kgs of wheat produced by the average household, and the best in 2009 with a production three times higher. The size of livestock holdings has increased continually since 1994 and reaches an average of 5 tropical livestock units in 2009 (one tropical livestock unit - TLU - equals 1 cow or 10 goats or 11 sheep or 100 chickens).

[Table 1.1 here]

The variables of interest are whether a household has received free food aid or food-for-work, and the quantities received. We focus on one crop, wheat, which is one of the major cereals in Ethiopia. From the mid-1990s, wheat consumption has increased steadily in both urban and rural areas and wheat has become one of the top priority crops deemed to solve food security challenges in the country (Tefera, 2012). Thus, a large share of food aid is provided in wheat (74 percent in our sample).⁹

The share of recipients is highly variable: only seven percent of households received free food aid in 1995 whereas almost 30 percent did so in 2009.¹⁰ Hence, on average, only one third of

8. We drop the second round of EHRS (December 1994-January 1995), as its reference period was six months instead of one year, and the fourth round (1997), which surveyed additional villages. However we include production, sales and food aid of the second round in order to compute the annual quantities in 1995.

9. At the national level, aid in wheat represents about 72 percent of total food aid from 1988 to 2011 (INTERFAIS-WFP).

10. In 1995, total food aid distributed across the world dropped as the US reduced its shipments because of a spike in food prices.

beneficiaries receives a transfer again in the next round (Table 1.2).

The share varies between villages as well, from zero to almost 80 percent. Quantities of wheat received per household vary from 30 kilograms in 1995 to 100 kilograms in 1999. The share of household benefiting from food-for-work programs was stable during the 1990s at around 10–11 percent. It has doubled after 2004.¹¹

[Table 1.2 here]

Looking at targeting criteria (Table 1.3), recipient households have fewer and older members. They have fewer children on average, though we would have expected the opposite, given the official allocation guidelines before 2004. Food-for-work and free food aid recipients seem to differ in terms of agricultural assets and household composition. Households receiving free food are smaller than those receiving food-for-work but have more old-age members. Food-for-work households, as expected, cultivate less land than other households and have less livestock.

[Table 1.3 here]

Regarding households market participation, we define four groups. First, households can be wheat buyers or sellers (these categories are defined in gross terms). They can grow wheat for their own consumption, without selling or buying it: these households are called "autarkic". Finally, they can be "non-involved" (in any wheat-related activity), meaning that they neither produce nor buy wheat. Household are considered as producers if they sow wheat, even if they get no harvest.

All four types of market participation are present in Ethiopia.¹² The share of households cultivating wheat (for their own use or to sell) increases over time, going from 24 percent in 1994 to 32 percent in 2009. 11 percent of households were sellers and 18 percent buyers in 2009; 20 percent were in autarky and 55 percent were "non-involved". As buyers and sellers are defined in gross terms, they might overlap (as some households are doing both) but these are in very small number, making up less than four percent of the sample.

Households' market participation status is not stable across rounds (Table 1.4). Transition happens mostly between buyers and non-involved households, and to a lesser extent between sellers and autarkic households. In addition, only three-quarter of households that have grown wheat at time t cultivate it again at time $t + 1$ (not reported in the Table).

11. 2004-2005 marks the end of a long drought and the first implementation year of the PSNP.

12. The exception is 1995, when the data shows no autarkic households and a large increase of the number of sellers. One reason might be a policy shift that has enhanced incentives to sell: "In the 1995/96 season, the Ethiopian Grain Trading Enterprise was explicitly mandated to support producers' maize and wheat prices at the stated support price" (Negassa & Jayne, 1997). In the robustness check, we present the estimations without 1995.

[Table 1.4 here]

In the descriptive statistics, food aid recipients differ from other households in terms of their market participation status. Beneficiaries are more likely to be non-involved in wheat-related activity and less likely to be autarkic households or sellers (Table 1.5). They are as likely to buy wheat. Regarding quantities, aid recipients produce less (the difference being significant at 1 percent level of confidence for autarkic households); they also buy more wheat. However, they sell as much as non-recipient households. How much of these differences come from selection and endogenous aid allocation and how much could be triggered by aid itself?

[Table 1.5 here]

1.4 Empirical specification

1.4.1 On production

We model simultaneously the production decision and the quantity produced. We allow food aid to affect both stages differently. We run a panel Tobit type II with selection and endogeneity (Semykina & Wooldridge, 2010). The model is defined as:

$$\begin{aligned}
 y_{it} &= y_{it}^* * s_{it} \\
 s_{it} &= \mathbb{1}_{s_{it}^* > 0} \\
 y_{it}^* &= x_{it}\beta + \gamma_1 FA_{it} + c_{i1} + u_{it1} \\
 s_{it}^* &= x_{it}\beta_{2t} + z_{1it}\delta_t + \gamma_{2t}FA_{it} + c_{i2} + u_{it2}
 \end{aligned} \tag{1.1}$$

where y_{it} is the quantity of wheat produced in year t by household i , and s_{it} is the household's 0/1 decision to produce. Both are observed if s_{it}^* , the latent variable that drives production decision, is higher than 0. y_{it}^* is the latent variable that drives the level of production. FA_{it} is the quantity of wheat aid received in the last 12 months by each household (through free food distribution and/or food-for-work programs). If food aid is well targeted, we should expect that it affects neither the decision to produce nor the quantities. c_{i1} and c_{i2} are households fixed effects.

x_{it} are control variables, meant to capture market conditions and transactions costs: whether there is a daily market within the Peasant Association, the distance to the nearest market and regional dummies. We also add consumption and production shifters such as household size (per adult equivalent), the age of the household's head, whether the household is poor, the amount of non-food consumption, livestock size (in tropical livestock units) and the size of the cultivated plot (in hectares). The household size takes into account the fact that larger families can allocate more labor on their plots. The size of livestock holdings matters in two ways for cereals production: first, part of the harvest is used to feed the livestock; second, manure is used

as a fertilizer and may improve harvest. Poor households may invest less in agriculture because they are cash-constrained; they may also grow less risky crops (hence, often less productive) in order to reduce risk.

We also include observable household characteristics that explain food-aid allocation and affect both productivity and the demand for food, such as the share of women, children and elderly within the household.

We control for climatic shocks by including the monthly average level of rainfall during the planting and growing season, measured in nearby meteorological stations and interpolated in a 50 km² grid around each village.¹³ Last, we take into account health shocks, namely, whether a household member was sick during the previous month. We cannot control for all health shocks that could have occurred during the growing season, but we assume that recent illness is a proxy for previous bad health.

The estimation procedure is as follows:

- For each round, we estimate $\mathbb{P}(s_{it} = 1|z_i) = \Phi\left(z_{it}\delta_t^a + \gamma_{2t}FA_{it} + \bar{z}_i\xi_t^a + \overline{FA}_i\xi_{2t}^a\right)$ where z_{it} includes x_{it} and z_{1it} , the excluding variable (see below). \bar{z}_i is the individual mean over time of z_{it} and \overline{FA}_i the average quantity of food aid received by household i over time.
- Next, we compute the inverse Mills ratio, $\hat{\lambda}_{it}$.
- For $s_{it} = 1$ we estimate a pooled two-stage least square with $y_{it}^* = x_{it}\beta + \bar{z}_i\nu + \gamma\hat{\lambda}_{it} + e_{it}$ using z_{it1} , $\hat{\lambda}_{it}$ and \bar{z}_i as instruments of x_{it} and the endogenous variable FA_{it} .
- Finally, we estimate the variance, applying a panel bootstrap.

Three issues arise with this type of estimation: endogeneity of food aid allocation, reverse causality, and the need to have an exclusion variable that differentiates between the decision to produce and the level of production.

First, on the issue of selection, the distribution of food aid is not random, because of targeting. We first control for time-varying observable characteristics that drive aid allocation as stated in the official guidelines (such as poverty status or household composition). Selection is also driven by unobservable characteristics such as political connections. We assume that selection on these unobservable characteristics is time-invariant. This is a reasonable assumption because the institutional setting of food aid allocation in Ethiopia has been stable over time,

13. Data come from the Global Historical Climatology Network, that compiles station data and by satellites on monthly precipitations (in mm). Station values are interpolated to a 0.5 degree by 0.5 degree latitude/longitude grid, where the grid nodes are centered on the 0.25 degree, using a Climatologically aided interpolation (CAI). Each grid size is approximately 50 km². The 15 villages of our sample are further apart than 50 km. For more information on extrapolation models, see Willmott & Matsuura (2001). In a preliminary version, we have also used information on droughts reported by the household; results were similar.

as well as the political affiliation of PA leaders who ultimately allocate aid to a given household within a village. Hence, we assume that PA leaders favor the same households and do not switch aid recipients before and after an election. If the assumption holds, we can exploit the panel nature of the data in order to control for individual time-invariant unobservable heterogeneity in the distribution of aid. More precisely, we assume that endogeneity is conditional on the unobserved fixed household effect, c_{i2} , only through the time averages of households' variables.¹⁴

The equations above estimate the impact of food aid received by a household in year t on its production later that year. Could it be the case instead, that food aid reacts to agricultural output of the same year, raising the concern of reverse causality?

Actually, the nation-wide amount of aid in a given year is based on previous year's total production. The government estimates in the last quarter the number of households by *woreda* that are likely to be in need during the upcoming year and calls for pledges by international donors. Then, at the local level, aid is mostly distributed to households during the lean season, between April and September. It is also during these months that households decide what to produce during the main harvest (*meher*), which starts in October and goes through December. Normally, there is no aid distributed during the *meher* harvest.¹⁵ There is also a minor harvest in May and June (*belg*), during which wheat is not grown.

Rain in June and July is a good predictor of the *meher* harvest to come, and food aid could be adjusted accordingly. In practice, however, the amount of aid is not revised before August and due to regular delays (DRMFSS, 2012), actual quantities given to households start to be affected only in September and more often after January (see Figure A1.1 in 1.8 for an illustration of the calendar in 2004). Hence, because of this timing, it seems that the concern of reverse causality can be ruled out.

Moreover, most results will present the impact of current aid on current production, but we will also look at the impact of aid received over all rounds between 1994 and 2009 (a kind of dependency effect), as well as the impact on the outcome in 2009 of aid received in all years but the last (a lagged effect of aid).

For our estimation strategy to hold, we need an excluding variable z_{1it} that explains the decision to produce but not the level of production. We choose for that purpose the share of religious holidays during the planting season as agricultural activity is banned during these

14. Due to the "curse of dimensionality" (Greene, 2004) that does not allow us to compute unbiased estimates, we cannot just include household fixed effects in order to capture all time-invariant characteristics; we need to specify a functional form of the household fixed effects. The approach taken here rules out the case of unobservables that would be time-varying.

15. In case of distribution delays, there could be some marginal shipments. We have no clue whether these actually take place.

days. According to farmers' interviews it seems the prohibition is actually binding (Bevan & Pankhurst, 1996):

People have the strict belief that if they go to the field on these religious holidays, they will be punished by God. If they see someone working on these days, he will be admonished by elders of the community. If he insists on working on these days, he will be condemned and ostracized by the community. – Debre Birhan PA (p.24).

People go to church on [holy] days to pray and attend religious ceremonies. If anyone is found working (ploughing, harvesting or weeding) on these religious holidays he is criticized by the community and must pay a fine to the church. In some cases this situation may be a fundamental obstacle in the production process. For example this year the belg rain [...] came on April 14th. The following days [...] were the usual holidays [...]. Then followed the week-long holiday of Himamat [...]. Then came [...] a holiday of four consecutive days making the total number of holidays 16 consecutive days. That means that if the rain only lasted two weeks the Shumsheha peasants could not plough, and therefore would not get any belg harvest. Peasants referred to this year's belg as yeslam belg (Muslim's belg) indicating that only the Muslims could plough. – Shumsheha PA (p.22).

Muslims fast for a month during Ramadan. Since they stay awake during the nights they do not work effectively on most of the days. – Imbidir PA (p.22).

As not all religious holidays are on a fixed calendar day, their number varies by year¹⁶; moreover, the planting season also varies across years and regions. Hence the excluding variable is differentiated across households, years and regions.

We also include household's religion directly in the estimations, as it could affect production decisions and productivity through difference in preferences, ritual fasting or prohibitions. We assume that once controlled for the direct impact of religion, the share of religious holidays only affects the planting decisions. This is in line with Kijima & Gonzalez (2013) who find that in Madagascar, religion does not affect agricultural productivity but determines the choice of crops.¹⁷ Table 1.6 shows the expected probability of being a wheat producer, depending on the household's religious group and the share of days-off during the planting season (controlling for other household characteristics). The probability is lower for Muslims than for other religious groups, and decreases with the share of holidays.

[Table 1.6 here]

16. Religious days-off are for instance, Easter, Pentecost, Good Friday, Saints' day and Ascension Day for Catholics; Ramadan for Muslims. We add civil holidays for all groups.

17. As a robustness check, we do not use this instrument and rely only on the non-linearity of Mills ratio (see Table B1.1).

1.4.2 On sales and purchases

For sales and purchases, we use the same Tobit specification as for production.¹⁸ However, it is harder to find a variable that might explain the decision to sell or buy and not the quantities involved. Hence, for identification, we just rely on the non-linearity of the inverse Mills ratio. We will also present a robustness check using the same excluding variable as in the production equations.

Selling and buying decisions may be driven by other factors than food aid, namely determinants related to production and market conditions. Pender & Alemu (2007) find that a rise in the production of maize and teff results in a rise in sales. Hence, we control for the quantity of cereals produced. As some households may be self-sufficient in food even though they do not grow wheat (because they rely on other crops), we control for the size of land cultivated by the household. As a proxy for market opportunities, we take distance to the nearest market and the number of days per week the local market is open. We expect these latter variables to have a smaller impact on buyers than on sellers, as buyers are likely to be more constrained. We include price level with a food price index computed at the village level. The index is not subject to reverse causality because it is not exclusively the price of wheat. We also add household characteristics such as household size and composition, poverty status (as wheat is more expensive than other crops), and non-food expenditures as a proxy for wealth. Household size may actually have two contrasting effects: having a large family may facilitate sales but it also increases the demand for food and the need to buy. We also control for climatic and health shocks, using the same indicators as for production.

1.5 Results and analysis

1.5.1 On production

The production system of equation (1) is estimated for each round of the survey. Results are summarized in Tables 1.7 to 1.9. Table 1.7 reports how many times a variable has a positive or a negative impact on the probability of producing wheat, and how many times the estimate is statistically significant at a five percent level.

Before turning to aid, we present the results of other determinants. First, the excluding variable, the share of religious holidays during the planting season, has a significant impact on the decision to produce wheat, albeit with varying signs.¹⁹ Market conditions affect production decisions: having a market close by or opened many days a week increases the probability of

18. We estimate separately on buyers and on sellers, although ideally one would prefer to run a simultaneous system (Bellemare & Barrett, 2006).

19. It could be due to the fact that in 2004 and 2009 when the effect is positive, there is no difference in the share of religious holidays between Muslim and other religious groups.

growing wheat.

Aid appears twice in Table 1.7, as the quantity received by the household in the current year and the average quantity of food aid received between 1994 and 2009. Average aid over time has a negative impact on the production decision and is statistically significant during 3 rounds out of 5. Current aid has also a negative impact during 3 rounds, which is statistically significant once in 1994. Two rounds show also a positive impact of current aid, which is however never statistically significant. These results suggest that food aid, once controlled for its endogenous allocation, tends to reduce the number of producers.

[Table 1.7 here]

Table 1.8 gives some order of magnitude of the effect. If a household receives an additional 10 kg of food aid every year between 1994 and 2009 (compared to a total amount of 150 kg on average), its probability of producing wheat decreases by one percentage point on average in each round.²⁰ The impact of average aid over all rounds could be seen as a proxy for long-term dependency: it catches how households would behave if they were expecting a given amount of aid each year.

By contrast, we also compute the impact of current aid. In the framework of equation (1), the overall impact of current aid is due to two factors: first, the direct impact of current aid and the indirect impact through the average aid over all years. Table 1.8 presents the order of magnitude: in 1994, a 10 kg increase in food aid reduces the probability of being a producer by 21 percent. The impact of current aid drops afterwards and is equal to -1.9 percent in 2009.

[Table 1.8 here]

Turning now to the quantity produced, food aid has no significant impact, even if the sign is negative as expected (Table 1.9). By contrast, market-related variables have a statistically significant impact on production. Having a market that is open one day more per week within the peasant association increases wheat production by 76 kg (compared to an average output of 350 kg, a significant impact).²¹ There are also differences in the quantities produced between religious groups, with Protestant and Orthodox Christians producing the most.

The fact that food aid has different effects on the decision to produce and on the level of production could help explain why some macro papers that have looked at the impact of aid have found a temporary decrease in production while no impact have shown up in micro studies. One explanation could be that micro papers focus on the level of production, hence on

20. Except in 1994 where the negative effect is ten times higher than in other years.

21. We do not deal here with the fact that the variable on market openness is bounded.

the intensive margin, while macro papers take into account the extensive margin (the number of producers in the country) as well as the intensive margin. Our results suggest that food aid in wheat has contributed to reduce the number of wheat producers in Ethiopia while having no significant impact on the amount harvested by each producer.

[Table 1.9 here]

We can go one step further and distinguish between free food transfer and food-for-work. Results remain the same for food-for-work. However current free transfer has a positive impact on the probability of production in 2004 and 2009 and a negative one in 1994. Moreover, free transfer has also a negative and significant impact of the quantity produced, albeit small (Table B1.2 in appendix 1.8).

Based on these estimations, we have run some policy simulations and computed the impact of food aid on the number of producers in 2009 (Table 1.10). A first scenario assumes 1994 as it is observed (some households receiving aid, others not) and constrains aid to be zero in later years throughout 2009. Thus, the difference between the baseline (the observed outcome) and scenario 1 tells about the cumulative impact of aid received between 1994 and 2009. A second scenario assumes that households get aid as observed during 1994-2004 and constrains them to receive no aid in 2009. By comparing the baseline and scenario 2, we can infer the short-term impact of current aid (received in 2009).

Next, we compute the level of total production, based on the simulated number of producers, with the following assumption: households that are observed as wheat growers in the data are attributed their actual production; households that are not observed as producers in the data are given their estimated production given their characteristics.²²

[Table 1.10 here]

Table 1.10 suggests that food aid has reduced the number of wheat producer households in 2009 by 3 percent in 2009, that is, about one percent of the total number of households in the balanced panel. As a consequence, aid decreases wheat production by 3.4 percent (in the short-run) or 3.8 percent (in the long-run). If our sample were representative of wheat producers in Ethiopia, these figures would mean that aid in 2009 has contributed to lower wheat production by less than four percent of total production (114,000 tons out of a total production of 3 million tons), or 14 percent of total aid in wheat received by Ethiopia in 2009. In any case, the order of magnitude of the impact is small. As a comparison, a similar computation (not reported in the Table) can be done with market-related variables. If the market within the P.A. was open one additional day starting 1994, there would be 9 percent more producers in 2009 and wheat production would have been 7 percent higher.

22. We select the households with the highest estimated probability of being wheat producers.

1.5.2 On sales and purchases

Being a seller and the level of sales

Selling decisions are estimated on wheat producers only.²³ The impact of food aid shifts in 2004, when aid policy is reformed in Ethiopia (Tables 1.8 and 1.11).

[Table 1.11 here]

Before 2004, aid has a negative and statistically non-significant impact on households' 0/1 decision to sell wheat; starting 2004, the impact is positive and significant. Receiving ten additional kilograms of food aid in 2009 increases the probability of selling wheat the same year by 2.5 percentage points (Table 1.8); receiving ten additional kilograms every year since 1994 increases the probability of selling wheat in 2009 by 6 percentage points. The magnitude of the effect of aid is lower than if one cultivates one more hectare – that increases the probability of selling wheat by 8.3 percentage points (not reported in the Table).

If we disentangle food aid between food-for-work and free transfer, it is free distribution that explains most of the action, while food-for-work has no significant impact on selling decisions (see Table B1.3 in appendix 1.8). Hence, in 2004, some households, for whom aid was not additional, presumably received free food transfer and sold part of it on local markets. Other factors also matter on the decision to sell, in line with intuition, such as a higher level of production and better market conditions.

Once controlled for the impact on the decision to sell, we find no significant impact of aid on the level of sales (Table 1.12). As for other determinants, cereal production has a statistically significant impact on the level of wheat sales: when cereal production increases by 100 kilograms, households sell 16 additional kilograms of wheat; this ratio should be higher if we focus on wheat production. Distance to the nearest market has a negative effect on the quantities sold, suggesting that transportation costs matter. The size of livestock holdings has a negative impact on the quantities sold; one explanation could be that households use part of their production to feed their livestock.

[Table 1.12 here]

Being a buyer and the level of purchases

We now turn to households' decision to buy wheat (Table 1.13). The impact of food aid on the decision to buy is positive before 2004 and negative afterwards. However, the impact is statistically significant only once, in 1994. In that year, receiving 10 kgs more increases the

23. Hence, the sample reduces to 350 observations in each round, with the exception of 2009 when the number of observations is 629. The smaller size of the sample could affect the precision of the estimates.

probability of buying wheat by 2.2 percentage points (Table 1.8).

When disaggregated by types of aid (Table B1.5 in appendix 1.8), both food-for-work and free food transfer exhibit the same pattern. Moreover, free food transferred in 2004 has a negative (and significant) impact on the probability to buy wheat. One explanation is that under the new guidelines following the reform, the allocation of free food aid was more easily manipulated. The PNSP was also not perfectly implemented at the beginning (Hoddinott *et al.*, 2012): households received excessive quantities of food aid or with delay. Hence free food aid was less additional for recipient households in the sense that some of them did not really need it. As a result, food aid has affected local markets.

As for other determinants, being poor reduces the probability of buying. Market conditions matter also, but in a somewhat non-intuitive way: the buying decision is positively correlated with distance and negatively correlated with the frequency of the local market.

[Tables 1.13 and 1.14 here]

Food aid does not affect significantly the quantity of wheat purchased by the household (Table 1.14). What matters is household composition – having more women in the household increases the purchases – as well as regional differences such as living in Tigray, a food-insecure region with low and volatile agricultural production.

1.5.3 Robustness checks

We run several regressions to test the robustness of our results. Concerning households' production, we do not restrict to food aid in wheat but include all aid received whatever the crop (column (3) in Tables B1.1 and B1.2 in appendix 1.8). We leave out the requirement for the panel to be balanced (column (4)). We drop each round one by one in order to check whether our results are driven by a specific year (columns (5)-(9)). We add the household's religious group as an additional excluding variable that explains the 0/1 decision to produce but not the level of production - and we take out this variable from the second stage equation on quantity (column (10)). We also drop all instruments and rely for identification on the non linearity of the Mills ratio (column (11)). Last, we use monthly rainfalls over the whole year and not only during the growing season, in order to get a complete picture of climatic conditions (column (12)). Results remain similar. The negative effect of food aid on the quantity of wheat produced by the household becomes significant at a 10% level of confidence, once 1999 has been dropped.

For selling and buying decisions, we also consider food aid in all crops (column (3) in Tables B1.3-B1.6 in appendix 1.8). Next, we take unit values of wheat as an alternative food price index (column (4)). For that purpose, we compute separately unit values for sales and for purchases, as

the ratio between the nominal level and the quantity in kilograms. Households' unit values are averaged at the village level ; if an observation is missing (this happens most often for sales), we impute the regional mean. Taking unit values instead of the food price index matters: between 2004 and 2009, the price index tripled while households' unit values remained at the same level. One explanation might be that households facing higher prices turned to lower quality wheat in 2009.

We also estimate the model on the unbalanced panel (column (5)). Then, we use as possible instruments, the stock of livestock and religion (column (6)). These variables are assumed to explain the decision to buy (or sell) but not the quantities. Households with livestock may prefer selling some chicken rather than wheat. Also, some religious groups, because they have access to a larger network, may rely on markets more easily, irrespective of the value of their trade flows (Helpman *et al.* , 2008). Finally, we include monthly rainfalls over the whole year (column (7)) and we drop each round one by one (columns (8)-(12)). Results remain broadly similar.

Overall, the results are robust to the specifications. Food aid reduces the probability of producing wheat. After 2004, it also increases the probability of selling wheat, without significant impact on quantities.

1.6 Conclusion

This paper examines the impact of aid on households' marketing behavior, in Ethiopia, over 1994-2009. It allows for heterogeneity of impact, depending on households' type of market participation. It distinguishes between the impact at the intensive margin, on quantities, and at the extensive margin, on the type of market participation itself. We take into account with the endogeneity of aid allocation with an innovative method, that uses the panel dimension of the data in order to account for time-invariant unobservable households characteristics.

Aid in wheat is shown to impact the decision to produce wheat, a negative, albeit small effect. Aid (mostly food-for-work) also increases the number of sellers after 2004, when Ethiopia has overhauled its aid policy towards a multi-year program aimed at agricultural development. In addition, before the reform, aid (mostly free food distribution) used to increase the number of buyers ; the effect is no longer significant after the reform. In any case, food aid has no significant impact at the intensive margin. As a consequence, in the case of Ethiopia, concerns of a disincentive impact of food aid on local production and markets are probably not relevant.

These results could be extended in two directions : other outcomes, such as labor supply on and off farm could be studied ; other dimensions of households heterogeneity could be explored.

The small negative impact on the number of wheat producers may conceal a substitution effect, as farmers might have switched to other crops. The impact of aid after 2004 could be due not to the distribution of aid per se but to concomitant investments in agricultural assets made at the village level (that could be collective assets built in the food-for-work programs) or to the parallel development of agricultural extension programs and improved access to fertilizers.

Improving market access (such as the distance to the nearest market and its frequency) is important in order to promote market participation.

Overall, these findings support the new approach to aid implemented by the Ethiopian government, that promotes agricultural development and market infrastructure.

1.7 Figures and tables

Table 1.1 – Descriptive Statistics

	1994		1995		1999		2004		2009	
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
Poor (%)	48.23	49.98	55.19	49.75	36.24	48.09	34.87	47.67	52.14	49.97
Household Size	6.06	2.95	6.13	3.03	5.31	2.55	5.74	2.5	5.67	2.55
Total Food Consumption (kg)	260.26	331.68	233.74	376.36	284.64	1188.15	224.88	239.32	223.75	470.13
Non Food Consumption (Birr)	101.46	132.56	83.07	154.51	69.8	78.08	111.98	158.19	192.16	367.09
Food Price Index	100.74	11.83	120.29	12.00	113.51	13.14	115.68	8.48	354.49	18.81
Livestock	2.61	3.38	2.52	3.38	2.91	2.78	3.04	3.24	5.11	5.6
Cultivated Area (ha)	1.56	1.46	1.83	7.73	1.29	1.1	1.7	1.8	1.56	1.37
Total Cereal Production (kg)	723.34	1200.92	533.19	940.59	1177.8	1432.12	1375.02	1311.46	1499.22	1772.06
Wheat Producers (%)	24.11	42.79	24.85	43.23	28.8	45.3	31.9	46.62	31.76	46.57
Wheat Production (kg)	362.78	423.08	311.73	415.75	431.73	418.07	388.71	405.79	479.74	542.12
Wheat Sellers (%)	7.57	26.46	24.85	43.23	13.00	33.64	17.44	37.96	10.04	30.06
Wheat Buyers (%)	16.21	36.87	15.50	36.49	20.16	40.13	21.06	40.79	15.96	36.64
Autarkic Households (%)	14.49	35.21	0	0	10.94	31.23	11.85	32.33	19.83	39.89
Non involved Households (%)	62.13	48.52	61.72	48.62	57.61	49.43	51.52	49.99	55.14	49.75
Wheat Sales (kg)	202.91	154.59	216.46	273.50	230.08	218.75	294.63	363.53	285.99	328.81
Wheat Purchases (kg)	43.57	84.43	59.94	272.51	70.70	151.21	50.91	80.75	71.20	389.84
All Food Aid Recipients (%)	15.22	35.94	7.57	24.46	27.65	44.74	26.09	43.93	28.23	45.03
All Food Aid (kg)	69.84	84.95	33.14	28.44	102.51	103.81	85.11	92.17	105.70	152.41
Recipients of FFW in wheat (%)	10.12	30.17	10.99	31.29	10.86	31.13	22.66	41.88	19.50	39.64
Wheat Received in FFW (kg)	87.51	79.19	37.72	56.19	188.94	199.29	18.33	46.4	96.03	102.65
Recipients of FFD in wheat (%)	9.46	29.28	6.5	24.66	0.74	8.57	19.42	39.57	16.54	37.71
FFD in Wheat (kg)	80.07	54.15	29.31	19.08	114.88	81.32	85.91	80.02	58.14	55.44
Number of Respondent Households	1215									

Note: ERHS data, balanced panel. The average quantities of aid (resp. production) are computed only on beneficiaries (resp. producers). Total production excludes chat, coffee and ensete (Ethiopian banana). Producers are households that have sown wheat even if they do not harvest. Autarkic and Non-involved households are defined with respect to wheat (see text). Non food consumption is in nominal Birr, the Ethiopian currency. Livestock is computed in tropical livestock units. FFD: free food distribution. FFW: food-for-work

Table 1.2 – Probability of receiving aid over two rounds

		Round $t + 1$	
		Non Recipient	Recipient
Round t	Non Recipient	86.81	13.19
	Recipient	68.45	31.55

Note: Balanced panel (1 215 households). The probability is computed pooling all rounds. Row total is 100.

Table 1.3 – Household Characteristics and Food Aid

	(1)	(2)	(3)	(4)	(5)	(6)
	No Food Aid	Food-for-Work	Free Food Aid	1-2	1-3	2-3
Poor (%)	44.45	50.20	45.41	***		**
Household size	5.75	5.66	5.02		***	***
Children (<14)	2.41	2.47	2.25		***	**
Elderly (>60)	0.36	0.29	0.37	***		***
Livestock (TLU)	3.33	2.44	2.05	***	***	***
Cultivated Area (ha)	1.61	1.24	1.37	***	**	***
Total Production (kg)	1123.73	751.52	574.71	***	***	***

Note: All rounds are pooled. Column (4) tests if the mean is equal between non recipients and food-for-work recipients. Column (5) tests equality of means between non recipients and free food aid recipients; column (6) tests equality of means between food-for-work and free food recipients. We exclude households that receive both types of aid during a round. Significance levels: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 1.4 – Transition matrix of types of market participation

		Time $t + 1$			
		Non involved households	Autarkic households	Seller	Buyer
Time t	Non involved	71.89	6.27	4.93	16.91
	Autarkic households	23.75	37.92	23.33	15.00
	Seller households	15.52	30.60	43.32	10.56
	Buyer	51.52	11.05	9.25	28.18

Note: Balanced panel. We drop round 3 when there is no autarkic households. Buyers and sellers are defined here in net terms. The probability of being a seller at round $t + 1$ if a household was non involved at time t is 4.93 percent (first row, column 3). Row total is 100.

Table 1.5 – Market Participation and Aid

	Non Recipient	Recipient	Difference
Seller			
Proportion	15.13%	5.29%	***
Production (in kg)	528.88 (566.19)	406.97 (428.46)	**
Sales (in kg)	252.26 (297.30)	214.52 (209.29)	
Buyer			
Proportion	16.64%	15.73%	
Production (in kg)	45.80 (150.43)	27.32 (97.61)	*
Purchases (in kg)	32.98 (36.21)	48.97 (51.40)	**
Autarkic household			
Proportion	11.93%	5.67%	***
Production (in kg)	310.84 (302.84)	158.11 (161.09)	***
Non-involved household			
Participation	56.29%	73.29%	***

Note: All rounds are pooled. Standard deviations in parentheses. The type of market participation is defined in gross terms. For each type of market participation, the proportion is the share of non-recipients (resp. recipients) households; we test whether the means are equal between non-recipients and recipients. Significance levels: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 1.6 – Probability of being a wheat producer and the share of religious holidays during the growing season

	(1) Less than 1%	(2) Between 1 and 5%	(3) More than 5%	(1) - (2) = 0	(2) - (3) = 0
Orthodox	0.536 (584)	0.242 (1 867)	0.329 (1 340)	***	***
Muslim	0.193 (477)	0.103 (521)	0.096 (474)	***	
Protestant	0.682 (38)	0.007 (485)	0.009 (542)	***	*
Other religions	0.571 (58)	0.05 (373)	No obs	***	N. A

Note: The expected probability of being a wheat producer is estimated in a probit that controls for the survey's round, regional effects, household characteristics (except religion) and market conditions. The share of religious holidays varies by year and region. Number of observations in parenthesis. Significance levels: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 1.7 – Being a Wheat Producer

Dependent Variable =	Household produces wheat +/-
Aid received in wheat (in kg)	0(2) / 1(3)
Average wheat aid over all rounds (kg)	0(0) / 3(5)
Share of days-off during planting season	2(2) / 2(3)
Religion (ref. Orthodox Christian)	
Other religions	4(5) / 0(0)
Muslim	0(0) / 4(5)
Protestant	5(5) / 0(0)
Cultivated area	3(4) / 0(1)
Rainfall during planting season	0(1) / 2(4)
Livestock size (TLU)	2(3) / 1(2)
Illness in past 4 weeks	0(1) / 0(4)
Household size	0(4) / 0(1)
Proportion of women	0(0) / 2(5)
Proportion of children	0(3) / 0(2)
Proportion of elderly	0(1) / 1(4)
Log(age of household head)	0(3) / 1(2)
Non food expenditure	2(5) / 0(0)
Household is poor	0(4) / 0(1)
Log(Distance to the nearest market)	0(0) / 5(5)
Market days per week within the PA	5(5) / 0(0)
Region (ref. Tigray)	
Amhara	3(5) / 0(0)
Oromia	4(5) / 0(0)
SNNP	0(1) / 3(4)
Average characteristics	Yes

Note: The average quantity of aid received in wheat by a household over all rounds of the survey (second line) decreases the probability of being a wheat producer in five rounds and is significant in three rounds. Significance level at 5%. Panel Tobit type 2 model, 1st stage.

Table 1.8 – Impact of receiving ten additional kilograms of wheat on the type of market participation

Receiving 10 kilograms more wheat	1994	1995	1999	2004	2009
On average every year					
being a wheat producer	-18.6***%	0.8%	-0.4%	-1.2%**	-0.4%**
being a wheat seller	-6.0%	X	-4.1%	1.7%	6.2%**
being a wheat buyer	2.8%	1.1%*	0.2%	-1,0%	-0.02%
In current year					
being a wheat producer	-21**%	0%	-2.1%*	-2.3%**	-1.9%*
being a wheat seller	-49.4%	X	-1.3%	-0.2%	2.5%*
being a wheat buyer	2.2%**	2.5%	0.3%	-0.6%	0.09%

Note: Receiving 10 kgs more wheat every year (in 1994, 1995, 1999, 2004 and 2009) reduces the probability of being a producer in 2009 by 0.4 percent (first line). Receiving 10 kgs more wheat only in 2009 reduces the probability of being a producer in 2009 by 1.9 percent (fourth line). Panel Tobit type 2 model. Significance levels: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 1.9 – Wheat Production

	Wheat Production (kg)	Standard Errors
Wheat aid (in kg)	-0.348	(0.284)
Cultivated area	21.334	(17.565)
Rainfall during planting season	-2.480	(0.551)***
Livestock size (TLU)	14.035	(5.332)***
Illness in past 4 weeks	17.095	(59.322)
Household size	24.211	(10.121)**
Log(age of household head)	-137.703	(56.001)**
Proportion of women	-34.141	(79.736)
Proportion of children	-291.511	(129.001)**
Proportion of elderly	-53.381	(115.361)
Non food expenditure	0.519	(0.144)***
Household is poor	-62.881	(55.722)
Region (ref.Tigray)		
Amhara	228.764	(77.356)***
Oromia	660.011	(91.439)***
SNNP	98.414	(116.168)
Log(distance to the closest market)	-314.475	(41.429)***
Market - No. of days per week within the PA	76.306	(19.556)***
Religion (ref. Orthodox Christian)		
Protestant	-137.015	(90.544)
Muslim	-127.296	(56.272)**
Other	-127.750	(57.572)**
Constant	1045.576	(217.737)***
Round Fixed effects		Yes
Number of obs. (all rounds)		1 693
Pseudo R-squared		0.27
Number of bootstrap replications		999

Note: Panel Tobit type 2 model, 2nd stage. Significance levels: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Instruments: share of religious holidays, average household variables, inverse Mills ratio. All rounds are pooled.

Table 1.10 – Simulated impact of food aid on the number of wheat producer and on total wheat production

	Baseline	Scenario 1 Aid only in 1994	Scenario 2 No aid in 2009
Total Wheat Production (kgs)	197 771	205 365	204 628
Ratio to baseline	-	3.84%	3.47%
Number of producers in 2009	385	397	396
Ratio to baseline	-	3.12%	2.86%

Note: Scenario 1: 1994 as observed, then aid is constrained to be zero in later years throughout 2009. Scenario 2: 1994-2004 as observed and no aid 2009. The simulated production is computed as follows: households that are observed as wheat growers in the data are attributed their actual production; households that are not observed as producers in the data are given their estimated production given their characteristics.

Table 1.11 – Being a Wheat Seller

Dependent Variable =	Household sells wheat +/-
Wheat aid (kg) ^a	2(3) / 0(1)
Average wheat aid over all rounds (kg) ^a	0(0) / 1(4)
Household size	0(2) / 1(3)
Log(age of household head)	0(1) / 0(4)
Household is poor	1(3) / 0(2)
Proportion of women	0(3) / 1(2)
Proportion of children	0(2) / 0(3)
Proportion of elderly	0(1) / 0(4)
Religion (ref.Orthodox Christian)	
Muslim ^b	0(1) / 0(3)
Protestant ^b	0(1) / 0(3)
Other religions ^b	0(3) / 0(1)
Non Food expenditure	0(3) / 1(2)
Cereal production	3(4) / 0(1)
Cultivated area	0(1) / 0(4)
Livestock (TLU)	0(2) / 0(3)
Illness in past 4 weeks	0(1) / 0(4)
Rainfall during planting season	0(2) / 1(3)
Market - No. of Days per week within the PA	3(4) / 0(0)
Log(distance to the nearest market)	0(0) / 1(4)
Food price index	0(1) / 0(3)
Region (ref.Tigray)	
Amhara	1(3) / 0(0)
Oromia	1(3) / 0(0)
SNNP	1(3) / 0(0)
Average characteristics	Yes

Note: The average quantity of wheat aid received by a household over all rounds (second line) decreases the probability of being a wheat seller in four rounds and is significant in one round. Significance level at 5%. Panel Tobit type 2 model, 1st stage.

^a : the variable predicts success perfectly for one or two rounds. ^b : due to convergence failure, this variable was dropped in 1995.

Table 1.12 – Wheat Sales

	Wheat Sales (kg)	Standard Errors
Wheat aid	-0.107	(0.574)
Household size	6.736	(6.954)
Log(age of household head)	-18.100	(43.685)
Household is poor	-9.801	(40.688)
Proportion of women	15.066	(56.823)
Proportion of children	15.910	(77.368)
Proportion of elderly	51.150	(100.264)
Religion (ref.Orthodox Christian)		
Muslim	-7.299	(34.889)
Protestant	0.167	(93.462)
Other religions	-85.281	(108.438)
Non Food expenditure	-0.001	(0.141)
Illness in past 4 weeks	23.609	(44.846)
Rain during planting season	-3.650	(2.894)
Cereal production	0.157	(0.023)***
Cultivated area	-8.434	(15.145)
Livestock (TLU)	-12.628	(5.264)**
Market - No. of Days per week within the PA	5.091	(63.616)
Log(distance to the closest market)	-90.478	(54.176)*
Food price index	-9.833	(5.199)*
Region (ref.Tigray)		
Amhara	230.951	(255.552)
Oromia	387.054	(294.534)
SNNP	224.222	(270.292)
Constant	1131.072	(485.180)**
Round effects		Yes
Number of obs		755
R-squared		0.26
Number of bootstrap rep.		999

Note: Significance levels: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Panel Tobit type 2 model, 2nd stage. Instruments: average individual variables, inverse Mills ratio.

1.8 Appendix

Appendix A: Timing of food aid allocation

Figure A1.1 illustrates the timing between production, harvest, food aid and the survey in 2004. Households were surveyed between April and July 2004. *Meher* harvest, between November and January, is the main harvest season, accounting for almost 90 percent of total annual production. The lean season is between July to September. Food aid distribution occurs mainly between January and September.

Appendix B: Robustness checks

Table 1.13 – Being a Wheat Buyer

Dependent Variable =	Household buys wheat + / -
Wheat aid (kg)	1(3) / 0(2)
Average wheat over all rounds (kg)	1(3) / 0(2)
Log(age of household head)	0(3) / 0(2)
Household is poor	0(0) / 4(5)
Proportion of women	0(1) / 0(4)
Proportion of children	1(5) / 0(0)
Proportion of elderly	0(3) / 1(2)
Religion (ref.Orthodox Christian)	
Muslim	0(4) / 0(1)
Protestant	0(2) / 1(3)
Other religions	0(2) / 1(3)
Non Food expenditure	0(3) / 0(2)
Illness in past 4 weeks	1(3) / 0(2)
Rain during growing season	3(3) / 1(2)
Cultivated area	0(0) / 3(5)
Livestock (TLU)	1(1) / 0(4)
Market - No. of Days per week within the PA	1(1) / 4(4)
Log(distance to the nearest market)	2(3) / 1(2)
Food price index	2(3) / 1(2)
Region (ref.Tigray)	
Amhara	1(4) / 1(1)
Oromia	2(4) / 0(1)
SNNP	2(4) / 0(1)
Average characteristics	Yes

Note: The current wheat aid (first line) increases the probability of being a wheat buyer in three rounds and is significant once; it decreases the probability twice but is never significant. Significance level at 5%. Panel Tobit type 2 model, 1st stage.

Table 1.14 – Wheat Purchases

	Wheat Purchases (kg)	Standard Errors
Wheat aid	-0.043	(0.115)
Household Size	3.080	(5.537)
Log(age of household head)	-24.700	(24.324)
Household is poor	-25.246	(33.706)
Proportion of women	121.306	(58.920)**
Proportion of children	84.270	(69.343)
Proportion of elderly	59.711	(55.027)
Religion (ref.Orthodox Christian)		
Protestant	-20.830	(27.651)
Muslim	-21.917	(57.128)
Other	-10.964	(24.129)
Non Food expenditure	0.014	(0.073)
Illness in past 4 weeks	18.817	(27.528)
Rainfall during planting season	-0.252	(0.353)
Cultivated area	22.373	(26.044)
Livestock (TLU)	4.739	(5.143)
Market - No.of Days per week within the PA	22.822	(17.866)
Log(distance to the closest market)	-25.682	(24.233)
Food price index	-0.108	(0.561)
Region (ref.Tigray)		
Amhara	-126.988	(32.631)***
Oromia	-61.320	(38.589)
SNNP	-121.060	(27.647)***
Constant	126.093	(141.770)
Round effects		Yes
Number of obs.		1 069
R-squared		0.03
Number of bootstrap replications		999

Note: Significance levels: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Panel Tobit type 2 model, 2nd stage. Instruments: average individual variables, inverse Mills ratio.

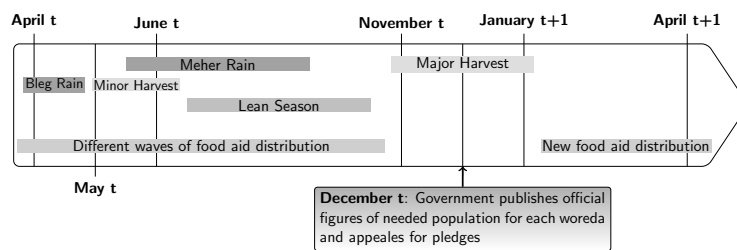


Figure A1.1 – Timing of Food Aid Allocation and of the Survey

Table B1.1 – Being a Producer: Alternative Specifications

	(1) Free Wheat Aid	(2) Wheat-For-Work	(3) All food aid +/-	(4) Unbalanced panel	(5) W/o 1994	(6) W/o 1995
Wheat aid (kg)				0(2) / 1(3)	0(2) / 0(2)	0(1) / 1(3)
Average wheat aid (kg)				0(0) / 2(5)	0(0) / 3(4)	0(0) / 2(4)
Total Food Aid (kg)			0(2) / 0(3)			
Average total food aid			0(1) / 2(4)			
Free Wheat aid (kg)	2(2) / 1(3)					
Average Free wheat aid	0(0) / 2(5)					
Wheat-For-Work (kg)		0(2) / 0(3)				
Average Wheat-For-Work		0(0) / 2(5)				
	(7) W/o 1999	(8) W/o 2004	(9) W/o 2009	(10) Instrument	(11) Only IMR	(12) Rainfall
Wheat Aid (kg)	0(2) / 1(2)	0(2) / 1(2)	0(1) / 1(2)	0(2) / 1(3)	0(3) / 2(2)	0(3) / 1(2)
Average wheat aid (kg)	0(0) / 3(4)	0(0) / 3(4)	0(0) / 2(4)	0(0) / 3(5)	0(0) / 2(5)	0(3) / 0(2)

Note: (3) : total food aid (and not only wheat). (10) : religion and share of religious holidays in the growing season as instruments. (11) no other instrument than the inverse Mills ratio. (12) monthly rainfall over the whole year (and not only during the growing season). Significance level at 5%. Other controls are added.

Table B1.2 – Wheat Production (kg): Alternative Specifications

	(1) Free Wheat Aid	(2) Wheat-For-Work	(3) All food aid	(4) Unbalanced panel	(5) W/o 1994	(6) W/o 1995
Wheat aid (kg)				-0.243 (0.212)	-0.260 (0.215)	-0.159 (0.239)
Total food aid (kg)			-5.302 (4.928)			
Free wheat aid (kg)	-2.303** (0.948)					
Wheat-For-Work (kg)		-0.057 (0.215)				
Number of obs.	1841	1841	1841	1893	1401	1400
R-squared	0.25	0.27	0.21	0.18	0.26	0.26
Number of bootstrap rep.			999			

	(7) W/o 1999	(8) W/o 2004	(9) W/o 2009	(10) Instrument	(11) Only IMR	(12) Rainfall
Wheat aid (kg)	-0.419* (0.234)	-0.220 (0.189)	-0.153 (0.542)	-0.382 (0.302)	-0.410 (0.312)	-0.204 (0.384)
Number of obs	1352	1341	1325	1841	1841	1841
R-squared	0.31	0.30	0.30	0.24	0.12	0.19
Number of bootstrap rep			999			

Note: Significance levels; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. (3) : total food aid (and not only wheat). (10) : religion and share of religious holidays in the growing season as instruments. (11) no other instrument than the inverse Mills ratio. (12) monthly rainfall over the whole year (and not only during the growing season). Other controls and round effects are added.

Table B1.3 – Being a Wheat Seller: Alternative Specifications

	(1) Free Wheat Aid	(2) Wheat-For-Work	(3) All food aid +/-	(4) Unit Value	(5) Unbalanced	(6) Instrument
Wheat aid (kg) ^a				1(3) / 0(1)	1(3) / 0(1)	1(3) / 0(1)
Average wheat aid (kg) ^a				0(0) / 1(4)	0(0) / 1(4)	0(0) / 1(4)
Food aid - all crops - (kg)			0(4) / 0(0)			
Average food aid			0(1) / 2(3)			
Free wheat aid (kg)	2(3) / 0(1)					
Average Free wheat	0(0) / 2(4)					
Wheat-For-Work (kg)		0(1) / 0(2)				
Average Wheat-For-Work		0(0) / 0(4)				
<hr/>						
	(7) W/o 1994	(8) W/o 1995	(9) W/o 1999 +/-	(10) W/o 2004	(11) W/o 2009	
Wheat Aid (kg) ^a	1(2) / 0(1)	1(3) / 0(1)	1(3) / 0(0)	0(2) / 0(1)	0(2) / 0(1)	
Average wheat aid (kg) ^a	0(0) / 1(3)	0(0) / 1(4)	0(0) / 1(3)	0(0) / 1(2)	0(0) / 1(2)	

Note: (3): food aid received in all crops (not only wheat). (4): households' unit values averaged at the village level (and not the food price index). (5): unbalanced panel. (6): instruments are livestock and religion.

^a: Drop in 1995 due to convergence problems or because it determines totally allocation. Significance level at 5%. Other controls are added.

Table B1.4 – Wheat sales (kg): Alternative Specifications

	(1)	(2)	(3)	(4)	(5)	(6)
	Wheat-For-Work	Unbalanced	All food aid	Unit Value	Free Wheat Aid	Instrument
Wheat aid (kg)		-0.103 (0.565)		-0.240 (0.277)		-0.078 (0.177)
Total food aid (kg)			0.732 (0.941)			
Free wheat aid (kg)					-1.725 (6.856)	
Wheat-For-Work (kg)	-0.064 (0.452)					
Number of obs	814	794	817	691	815	561
R-squared	0.24	0.26	0.26	0.24	0.26	0.18
Number of bootstrap rep			999			
	(7)	(8)	(9)	(10)	(11)	
	W/o 1994	W/o 1995	W/o 1999	W/o 2004	W/o 2009	
Aid in Wheat (kg)	-0.166 (0.559)	0.016 (0.106)	-0.127 (2.083)	-0.196 (0.307)	-0.221 (1.580)	
Number of obs	627	460	514	469	464	
R-squared	0.29	0.17	0.34	0.32	0.12	
Number of bootstrap rep			999			

Note: Significance levels: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. (3): total food aid (not only wheat). (4) households' unit values averaged at the village level (instead of food price index). (5) unbalanced panel. (6) Instruments: livestock and religion. Other controls and round effects are added.

Table B1.5 – Being a Wheat Buyer: Alternative Specifications

	(1) Free Wheat Aid	(2) Wheat-For-Work	(3) All food aid + / -	(4) Unit Value	(5) Balanced panel	(6) Instrument
Wheat aid (kg)				1(3) / 0(2)	1(3) / 0(2)	0(3) / 0(2)
Average wheat aid				1(4) / 0(1)	1(4) / 0(1)	1(4) / 0(1)
Food aid - all crops - (kg)			1(1) / 0(4)			
Average food aid			0(3) / 0(2)			
Free wheat aid (kg)	1(3) / 1(2)					
Average free wheat aid	0(3) / 0(2)					
Wheat-For-Work (kg) in Wheat		0(3) / 0(2)				
Average of Wheat-For-Work		1(4) / 0(1)				
	(7)	(8)	(9)	(10)	(11)	(12)
	Rainfall	W/o 1994	W/o 1995	W/o 1999	W/o 2004	W/o 2009
			+ / -			
Aid in Wheat (kg)	0(3) / 0(2)	0(2) / 0(2)	1(2) / 0(2)	1(2) / 0(2)	0(3) / 0(1)	1(3) / 0(1)
Average aid in Wheat	1(2) / 0(3)	1(3) / 0(1)	0(2) / 0(2)	1(2) / 0(2)	1(2) / 0(2)	0(3) / 0(1)

Note: (3): food aid received in all crops (not only wheat). (4): households' unit values averaged at the village level (and not the food price index). (5): unbalanced panel. (6): instruments are livestock and religion. (7): monthly rainfalls over the whole year. Significance level at 5%.

Table B1.6 – Wheat Purchases (kg): Alternative Specifications

	(1) Free Wheat Aid	(2) Wheat-For-Work	(3) All food aid	(4) Unit Value	(5) Unbalanced panel	(6) Instrument
Wheat aid (kg)				-0.044 (0.123)	-0.027 (0.105)	-0.045 (0.140)
Total Food Aid (kg)			-0.021 (0.540)			
Free wheat aid (kg)	-0.328					
Wheat-For-Work (kg)	-0.021	-0.033 (0.129)				
Number of obs	1068	1069	1069	1069	1073	1073
R-squared	0.02	0.04	0.04	0.03	0.04	0.01
Number of bootstrap rep			999			
	(7) Rainfall	(8) W/o 1994	(9) W/o 1995	(10) W/o 1999	(11) W/o 2004	(12) W/o 2009
Wheat aid (kg)	-0.013 (0.255)	-0.015 (0.141)	0.016 (0.106)	0.011 (0.183)	-0.061 (0.116)	-0.175 (0.170)
Number of obs	1174	883	881	830	839	906
R-squared	0.03	0.03	0.05	0.04	0.01	0.15
Number of bootstrap rep			999			

Note: Significance levels: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. (3): total food aid (not only wheat). (4) households' unit values averaged at the village level (instead of food price index). (5) unbalanced panel. (6) Instruments: livestock and religion. (7): monthly rainfalls over the whole year (and not only during the growing season). Other controls and round effects are added.

Chapitre 2

Donors Versus Implementing Agencies: Who Fragments Humanitarian Aid?

Each time a major disaster takes place, the humanitarian machinery is set in motion [...]. However, the arrival of large quantities of donations [...] can result in relevant aid of great value, or in an additional burden.

Pan American Health Organization
(2009)

Abstract Little is known about humanitarian aid and the actors involved. In the case of humanitarian aid, in addition of donors and recipients, a third actor is essential: the implementing agency which is in charge of the implementation of the project in the field. This actor has a key role on the efficiency of aid. In this paper I first document who they are. I show that fragmentation is less a concern that expected and that donor fragmentation is often mitigated at the implementing agency level. I develop next the pro and cons of using multiple implementing agencies. Finally I document three case studies that show that a similar level of fragmentation could lead to very different situations in term of aid efficiency.

2.1 Introduction

“Every time a natural disaster hits any part of the world, the newspaper headlines ten days later can be written in advance: ‘Why isn’t the response more coordinated? Still no food or water for some areas’”. This quotation taken from Clarke & Dercon (2016) highlights one of the main criticism addressed to humanitarian aid: a lack of coordination, due to the intervention of too many agents, that deters aid effectiveness.¹

The lack of coordination is not specific to humanitarian aid and has also been addressed to development aid (Frot & Santiso, 2009). However the problem is doubled in the case of humanitarian aid, as most aid projects (85 percent) are not implemented by the donor or the recipient country’s government, but by a third party: an implementing agency, that could be an international organization, a private enterprise or a NGO. Implementing agencies can also be fragmented, adding another layer of potential non-coordination. By contrast, only half of development aid goes through a third-party.²

For development aid, the consensus in the international community that fragmentation is “bad” is taken for granted even if it has been questioned recently. Han & Koenig-Archibugi (2015) find a U-shaped relationship between health outcomes and the number of donors - that measures fragmentation. However Gehring *et al.* (2015) do not find systematically a significant and negative relation between growth and the level of fragmentation of development aid. In the case of humanitarian aid, the idea of fragmentation as “bad” is also taken for granted. Recent reforms of the humanitarian architecture (United Nations Office for the Coordination of Humanitarian Affairs, 2006) have the objective to increase coordination based on the assumption that humanitarian aid is too fragmented given the actual level of coordination among agents.

In this paper I document fragmentation at the donor and at the implementing agency (IA) level in the case of humanitarian aid. I use the Financial Tracking Service (FTS) database between 2000 and 2014, that reports humanitarian aid flows sent by all types of donors (not only countries and multilateral institutions but also NGOs and private donations) and the identity of implementing agencies. I first describe the extent of humanitarian aid fragmentation. I first find that there is a non-negligible share of cases (13 percent) for which fragmentation is not a concern, as only one donor and one implementing agency are involved with the country. This is mainly the case for small recipient countries. There is even less fragmentation if the type of activities (providing shelters, food, access to clean water) is considered: donors and implementing agencies tend to perform some divisions of labors.

1. These criticisms do not claim that humanitarian aid is not beneficial for recipients but argue that humanitarian aid could be more efficient with some changes, especially if it deals with fragmentation.

2. Author’s calculations from OECD Creditor Reporting System.

I also investigate whether there is a tendency, at the implementing agency level, to re-concentrate aid received from donors. I distinguish two definitions of fragmentation. The first one considers the lower tail of the distribution of players and is measured by the number of donors (or IAs). It deals with the fact that some donors and/or implementing agencies are involved in a project merely as a signal rather than doing a real job. Those marginal donors provide only little financial support while adding to the overall number of humanitarian partners and, arguably, to the needs of coordination, deterring global efficiency of humanitarian aid.³

The other definition of fragmentation stresses what happens at the upper tail of the distribution and is measured by a concentration ratio. The concentration ratio does not consider the addition of small donors at the tail of the distribution. The number of actors could not matter so much if humanitarian aid is highly concentrated among a few specialized and experienced actors. The second indicator focuses on the lack of leading donors/IAs – one or a few dominant donors/IAs who may take over the responsibility for the bulk of the coordination activities. It would be appropriate if, for instance, small donors/IAs tend to align themselves with existing procedures, thus adding little to existing transaction costs.

The initial fragmentation at the donor level is mitigated in 62 percent of the cases by concentration at the implementing agency level. The UN and the Red Cross take a key role in this phenomenon. Even if fragmentation remains high at the implementing agency level, the UN has still a key role in coordinating aid actors through the consolidated UN process which calls for donors' funding.

Next I document the potential advantages and disadvantages of delegating humanitarian aid to an implementing agency, and the consequences on aid efficiency. I also discuss the implications of fragmentation of IAs. Using three case studies where fragmentation was particularly high –Haiti, Pakistan and Sudan in 2010 – I provide anecdotal evidence that donor and implementing agency fragmentation are different and that fragmentation of implementing agencies is not necessary detrimental.

In Haiti, fragmentation at the implementing agency level was lower than at the donor level; however it remains a burden. In Pakistan, fragmentation was similar at the donor and implementing agency level. The number of actors involved was smaller than in Haiti but humanitarian aid was less concentrated among few actors. In Pakistan, coordination was high both between donors and implementing agencies and thus the fragmentation of humanitarian actors was a plus. Finally in Sudan, fragmentation at the implementing agency level was higher but

3. For instance China was highly criticized after her first donation to Philippines in 2013 which was very low (100 000 dollars) compared to her capacity. In reaction to those criticisms China increased her contribution to 1.6 millions of dollars. The initial low level of humanitarian aid was driven by diplomatic tensions about some islands.

only donor fragmentation was criticized while fragmentation at the implementing agency level received little attention. It seems that the experience of implementing agencies in Sudan led to effective coordination in the field.

The structure of the paper is as follows: Section 2.2 describes the data. In section 2.3 I present fragmentation indicators and provide detailed descriptive statistics of humanitarian aid fragmentation at the donor and implementing agency level. Section 2.4 discuss the expected consequences of delegating humanitarian aid and of its fragmentation. Three cases studies on the potential consequences of such delegation and fragmentation are presented in section 2.5. Section 2.6 concludes.

2.2 Humanitarian aid: data and descriptive statistics

2.2.1 Data

The Financial Tracking Service (FTS) database is a global database managed by the UN Office for the Coordination of Humanitarian Affairs (OCHA). FTS reports global humanitarian aid flows to emergencies and natural disasters. It records all reported international humanitarian aid contributions including bilateral and multilateral aid, NGOs, the Red Cross/Red Crescent Movement, private (personal or from a private entity) or confessional donations. Humanitarian aid is often seen as an intervention to help people who are victims of a natural disaster or conflict. However humanitarian aid is also sent to a country for which international assistance is needed to save lives even in the absence of disasters or conflict, during a lasting crisis. The Humanitarian aid must meet according to UN OCHA the following criteria:

- “1. Demonstrated relationship to survival requirements of identified group(s) of severely affected people including refugees and internal displaced people ;
2. Demonstrated delivery and implementation capacity by the concerned agency to procure and deliver inputs.”

Part of reconstruction projects can be included in humanitarian aid rather than in development aid. FTS focuses on humanitarian funding flows. Data does not include government's expenditure on crises within its own borders, government's expenditure on refugees within its own borders, concessional finance and soft loans. This definition of humanitarian aid is precise and differs slightly from the OECD definition of emergency and humanitarian aid which is less precise: humanitarian action are actions saving lives, alleviating suffering and maintaining human dignity during and in the aftermath of crises.

Nevertheless there is no major difference in the magnitude of aid and its evolution between FTS and OECD when focusing on donors that are in both databases and aid devoted to disaster response. Comparing FTS data with Development Assistance Committee (DAC) data, Fink & Redaelli (2011) find only minor differences between both databases, which show that FTS has

relatively good data coverage on those donors.⁴

The FTS data includes humanitarian aid from 2000 to 2014.⁵ FTS covers humanitarian response plans (HRPs) and refugee response plans (RRPs), developed by the UN, after major humanitarian crises whose funding requirements are well defined. Response plans represent half of total humanitarian aid. FTS also includes humanitarian aid which is not linked to response plans and is provided by different type of donors.

FTS differentiates three types of flows: paid contribution (54 percent), committed funding (45 percent) and uncommitted pledges (1 percent). A pledge is a non-binding announcement of an intended contribution by the donor. A pledge could lead to zero formal contracts if it does not turn in commitments. A paid contribution is the payment or transfer of funds or in-kind goods from the donor to an implementing agency: it would correspond to a disbursement in the case of official development aid. A commitment is the creation of a contractual obligation regarding funding between the donor and the implementing agency. Once a commitment is made implementing agencies can begin spending. Thus commitments result on actual projects before showing up as a paid contribution.

It is important to know whether there could be double-counting of implementation of commitment and paid contribution. As each humanitarian project is uniquely defined in the FTS database, I can check whether a commitment is followed one year or after by a paid contribution. It is not the case. Hence it corresponds to two distinct flows of humanitarian aid and both should be taken into account.⁶ In this paper I focus on paid contributions and commitments.

Another argument goes in favor to include both paid contribution and commitments. There is no statistical difference on the start date of projects or on the length of the project.⁷ The only difference is on who reports the flow. Donors are more likely to reports paid contribution while implementing agencies are more likely to report commitments.⁸

The FTS data has many advantages compared to the OECD data on emergency and humanitarian aid. First the FTS database provides information on more donors than DAC donors.

4. DAC data collects aid data on member donors (29) but also some non-members.

5. In fact the FTS data started in 1992 focusing on disaster funding but data are an open, online database only since 2000 because data are not reliable before. Data for 2015 is already available but large modifications are still on-going.

6. Fink & Redaelli (2011) and Fuchs & Klann (2013) also pool together paid contribution and commitments.

7. For pluri-annual flows, the UN OCHA annualizes the amounts. It concerns mostly pledge rather than paid contribution or commitments (information given by a EU civil servant from DG ECHO in charge of humanitarian aid in the EU).

8. Thus it seems that implementing agencies do not change the status of the flow after receiving actual funds from the donor.

It tracks aid from 1 764 different donors and 183 recipient countries (over the whole period).⁹ These figures pool together all national agencies of international NGOs separately. For instance Action against Hunger France, UK, Spain or USA are coded as an unique donor. If I consider national offices of international NGOs, the FTS database covers 2 270 donors. On average, 73.21 percent of humanitarian aid comes from countries, 19.56 from multilateral agencies and 5.61 from NGOs and private sector.¹⁰

The FTS records quite well the implementing agency at a very detailed level of information. An implementing agency is the agency on charge of the implementation of the project. It could be a governmental agency of the donor or recipient country, a UN institution (such as the High Commissioner for Refugees), another multilateral agency, a NGO, a foundation, a private organization of other type of agency (such as a research center). The FTS database covers 2 722 different implementing agencies. If I count national offices of international NGOs separately, the FTS database covers 3 426 implementing agencies. On average over the period 2000-2014, only about 10 percent of humanitarian aid has been implemented directly by the donor or recipient country. 60 percent has been implemented by multilateral agencies and 31 percent by NGOs or the private sector. The implementing agency is not well defined or identified in 4.4 percent of the cases.¹¹

Looking at implementing agency is important in the case of humanitarian aid because a large share of aid is not allocated by either the donor or the recipient's government. Implementing agencies by their characteristics and their interactions with the donor and with other implementing agencies may have a great impact on humanitarian aid efficiency.

The FTS also records the sector of activities in which the humanitarian project is implemented. Humanitarian activities are classified in 12 different sectors: agriculture, coordination support, economy recovery, education, food, health, mine action, protection, safety and security of staff, shelter and non-food items, water and sanitation and multi-sector activities. These sectors give a hint of the expertise of each donor or implementing agency. It allows looking at not only the fragmentation at the recipient level but also at the sector level. A given number of implementing agencies/donors may reflect different situations if they are all in one sector or if they are in different sectors.

A potential drawback of the FTS database is that it is based on voluntary reports by donors, recipient organizations and beneficiary country. However as already said the evolution

9. The FTS includes every emergency situation whatever the level of development of the country such as Japan in 2011.

10. FTS ensures that there is no double-counting in the sense that an annual core (often obligatory) contribution from a donor to a UN office that leads to a contract between the UN office and an implementing agency is not recorded twice for instance. Only the flow between the UN and the implementing agency is recorded.

11. Those cases were dropped later in descriptive statistics.

of humanitarian aid by DAC donors based on FTS is similar to the one recorded by the OECD. Although data coverage may be worse for non-DAC donors, FTS is still the best database available for my analysis.

2.2.2 Descriptive statistics

Amounts devoted to humanitarian aid are increasing but are sensitive to economic cycles (see figure 2.1): the Great Depression stopped the increasing trend observed before 2010. There is a catch-up in 2014 with more than 15 billion dollars devoted to humanitarian aid. This catch-up is partly driven by the Syrian crisis.¹²

[Figure 2.1 here]

About half of humanitarian aid is allocated to Africa, 40 percent to Asia and the remainder to Europe, America and Pacific region. Humanitarian aid is concentrated in a small number of countries: the top three recipients receive on average 40 percent of annual humanitarian aid and the top ten get 80 percent (Figure 2.2) while at the other end, 107 countries receive 20 percent. Except for specific crisis (Iraq war in 2003, Haiti earthquake and Pakistani floods in 2010), the share of humanitarian allocated to the top recipients is quite stable over time – about 20 percent.

[Figure 2.2 here]

Despite its increasing trend, humanitarian aid remains generally small compared to recipient's GDP: on average 0.94 percent of recipient GDP - which is lower than development aid (on average 7 percent of recipient GDP). The share is lower than 0.01 percent of GDP in 38 percent of the cases. It is higher than 1 percent in 14 percent of the cases and than 10 percent for 1 percent of the observations.

Those amounts are funded on average by 161 donors to 116 recipient countries through 402 implementing agencies. Figure 2.3 shows the evolution on the number of donors, recipients and implementing agencies at the global level. The number of donors and implementing agencies is increasing from 2000 to 2010, donors being almost multiplied by five from 121 to 556, before a large decrease between 2011 to 2013 - the number of donors being divided by two, at a similar level as in 2000. The number increases again in 2014 (by 50 percent). The 2011-2013 drop can be due to the economic crisis: those who stopped giving were mostly private sector donors, foundations (such as the Bill Clinton foundation) and NGOs. The huge peak in 2010 is mostly due to the Haitian earthquake and in smaller proportion to floods in Pakistan.

12. It was 20.2 billion in 2015 ; 21.6 billion are required in 2016 according to the UN OCHA to meet all identified requirements at the beginning of the year and may change in case of new events. However requirements expressed by the UN OCHA are not always totally funded at the end of the year.

[Figure 2.3 here]

The number of donors or implementing agencies involved in one country is very heterogeneous (Figure 2.4). Interestingly the distributions are quite constant over time. However it does not mean that for a specific recipient country, the number of donors and/or implementing agencies has not changed over time. Figure 2.5 illustrates this point in the case of Pakistan. After every large natural disaster – earthquake in 2005, floods in 2010 – there is a sudden increase in the number of both donors and implementing agencies but even in “normal” year the number of donors and implementing agencies varies.

[Figures 2.4 and 2.5 here]

Table 2.1 shows that humanitarian donors are mostly countries, as in the case of development aid, both in terms of projects funded and on allocated amounts. However multilateral agencies are also large contributors of humanitarian aid. NGOs provide a non negligible part of humanitarian projects but represent a very small share of total amount allocated (2 percent) while the private sector remains a small contributor. NGOs and the private sector as donors include more than 700 different actors suggesting that each donor taken separately has little influence on the total amount of humanitarian aid allocated. Private donors are mostly located in developed countries (80 percent). NGOs are half-half located in developed (47 percent) and developing countries.

[Table 2.1 here]

Table 2.1 provides similar descriptive statistics on implementing agencies. Countries are almost never the implementing agency: countries delegate the implementation of the project to other type of agencies. It is similar for the private sector that fund more projects than it implements. An implementing agency is more likely to be a multilateral institution or a NGO. The multilateral institutions are the main implementer of humanitarian projects both in absolute number and on the size of project. Within multilateral agencies, the UN offices are the main actors (about 90% of the cases).¹³ The most heterogeneous group is the group of NGOs with 1 852 different NGOs acting as an implementing agency. While they represent 68 percent of implementing agencies, they implement 37 percent of humanitarian aid projects which represent 29.5 percent of total amount of humanitarian aid. Among NGOs, 55 percent of them are located in developed countries. Hence donors and implementing agencies seems to be different types of actors.

In order to assess the efficiency of humanitarian aid, the experience within humanitarian aid system could be an important characteristic to look at. Experience could be measured

13. Multilateral agencies include different offices of the UN, European Union as well as development bank or regional council such as the Arab League or the African Union.

by the number of years a donor (or a IA) is present in at least one recipient country. Figure 2.6 provides the distribution of the number of years a donor is active - meaning she funds at least one project per year. Countries are regular donors compared to others. Half of them have allocated humanitarian aid more than six years between 2000 and 2014 while 50 percent of NGOs or private donors have allocated only one year humanitarian aid. It is interesting to see that multilateral institutions are not always experienced. The lack of persistence of multilateral agencies could be explained by some giving humanitarian aid despite this is not their main mandate such as NATO, development banks or regional unions.

[Figures 2.6 and 2.7 here]

Implementing agencies are on average less persistent (figure 2.7). The average number of years of activity is about 3 and the median is one year.¹⁴

The efficiency of humanitarian aid may also depend on the combination of a donor with the implementing agency. First a donor can implement himself its project and not use an intermediate but this occurs only in 1 case out of 10. This proportion is stable over time. Nevertheless there are large differences between donors. Countries almost never implement themselves projects while the multilateral agencies do it regularly (see table 2.2). Finally only 5.9 percent of projects are directly implemented by the recipient country. It means that in total in 85 percent of the case it is never the donor neither the recipient country that is in charge of the implementation of the humanitarian project but a third actor, which is mostly neglected in the literature on aid.

[Table 2.2 here]

The size and number of projects depend on the type of both donors and implementing agencies (see tables 2.3 and 2.4). Projects funded by countries are on average the largest, especially when implemented by a multilateral agency. The average size of projects implement by NGOs is relatively large – about 1 million dollar – when the donor is a multilateral agency or a country. NGOs also implement on average large projects funded by private donors however it remains less frequent. Projects NGOs funded and implement themselves are on average smaller and not so frequent. NGOs thus really depend on institutional donors to implement humanitarian projects. Hence a large share of humanitarian is allocated by persistent donors and mostly implemented by the most persistent implementing agencies.

[Tables 2.3 and 2.4 here]

14. Among experienced NGOs, I find well-known and historical international NGOs such as the Red Cross and Crescent movement, CARE, OXFAM...

To conclude implementing agency adds another layer of potential inefficiency of humanitarian aid as using intermediaries can increase costs and as those actors need to coordinate in the field, with recipient authorities and with other donors. It is thus important to also look at fragmentation at this level as fragmentation is seen by the international community as a potential driver of inefficiency.

2.3 Fragmentation of humanitarian aid

2.3.1 Indicators of aid fragmentation

In this section I describe the two different measures of fragmentation used in the literature. For simplicity I will always refer to donors but the indicator could be computed for implementing agencies.

The simplest indicator is the number of donors (N). It refers quite directly to the OECD definition of aid fragmentation: "Fragmentation occurs when there are too many donors giving too little aid to too many countries." The underlying assumption is that a high number of donors will make donor coordination more difficult and thus aid less effective, irrespective to the distribution of aid among donors. For instance a recipient with a donor allocating 90 percent of total aid and nine donors allocating the remaining amount is perceived as fragmented as a recipient with 10 donors each allocating 10 percent of total aid. This indicator does not take into account the possible existence of a leading donor that allocates the main share of aid to a recipient. It focuses on marginal donors that provide only little financial support while adding to the overall number of humanitarian partners and, arguably, to the needs of coordination.¹⁵

The second indicator is based on an indicator used to measure the degree of competition in an industry: the concentration ratio CRm . It is the percentage of aid share provided by the largest m donors to a recipient country

$$CRm = \sum_{i=1}^m s_i^{ord}$$

with s_i^{ord} the share of the i est largest donor. Concentration indicators focus on the existence of few dominant donors. In this paper I will look at $CR3$ which is the share of aid provided by the three largest donors (IAs). In order to compare this indicator with the first one, I define my second fragmentation indicator as $1 - CR3$. Hence an increase in the value of the indicator

15. The OECD refines this indicators by focusing on significant actors. However both indicators were highly correlated – about 0.99 – and thus it does not provide additional information on fragmentation to look at both indicators.

means an increase in fragmentation.¹⁶

The two indicators reflect different dimensions of fragmentation by putting emphasis on the high or the low end of the distribution: $1 - CR3$ value the existence of top donors. It is relevant if the transaction costs of a marginal donor are small. In that case, the multiplication of donors does not lead to large increases in transactions costs and thus what really matters is the presence (or absence) of leading donors able to coordinate humanitarian aid. N values the existence of small donors at the low tail of the distribution. They are relevant if there are (increasing) and large transaction costs of dealing with a new donor in that case the multiplication of donors induces large costs compared to the benefit of having a new donor bringing humanitarian aid.

2.3.2 Donor and implementing agency fragmentation

On average 12.33 donors allocates humanitarian aid to a recipient country (table 2.5). In the case of a disaster as could be expected the average number of donors is increasing with the severity of the disaster – measured by the number of people affected. Indeed needs are higher and disaster are publicized. Fragmentation is higher when the UN launches a humanitarian appeal attracting 24.39 donors instead of 5.9 on average in the other case. However in that case, the UN is in charge of the coordination of donors (and implementing agencies). Hence an increase in the number of actors in this situation does not necessarily imply negative outcomes.

[Table 2.5 here]

The structure of aid players, seen with the concentration ratio, seems less fragmented. 36.73 percent of humanitarian aid on average is given by three donors and thus does not appear to be fragmented at all given the indicator (table 2.5). The lower level of fragmentation in the structure of aid is explained by the United States and the European Union who allocate large share of total humanitarian aid but also by Switzerland – who is often the only donor in recipient countries. The average fragmentation is about 0.17 which is a moderate level of fragmentation – it increases to 0.25 when I exclude recipients with less than three donors. Hence it seems that humanitarian aid is mostly funded by some large donors but that there are multiple donors allocating marginal amounts of humanitarian aid.

Table 2.5 also shows different patterns across regions. Donor fragmentation seems to be larger in Asia and Africa and lowest in the Pacific region. The table presents the results for America with and without Haiti in 2010: it affects the average number of donors while the concentration ratio remains similar. Indeed the earthquake leads to an unprecedented number

16. Other indicators could have been studied: concentration ratio at another level and Herfindahl index. A change within the top m donors does not alter the concentration ratio m as opposed to the Herfindahl index. However again both indicators are quite correlated and seem to be redundant.

of donors, especially American private donors.

However there is a large heterogeneity among recipient countries (table 2.6). 17 percent of recipient country-year has received humanitarian aid from only one donor. Those countries are mostly small islands and intermediate income-level countries. In that case, United States (13 percent), the European Union (18 percent) and Switzerland (18 percent) are the most likely donors. 41 percent of recipient countries have less than 5 donors which is quite low. Only 1.4 percent of countries have more than 50 donors.

[Table 2.6 here]

The sector of activity in which donors are involved is also interesting to look at. Fragmentation is not necessarily detrimental if it results in donors allocating humanitarian aid in different (and complement) sectors of activities.¹⁷ Diversification could be on the contrary beneficial. There are on average 5.12 donors by sector within a recipient country (see table 2.5). However in 36 percent of the cases only one donor is involved in a given activity within a recipient country while in 14 percent of the cases there are more than 10 donors for a given activity within a recipient country. Some sectors are more fragmented than others: food and health have on average more than six donors.

Implementing agency fragmentation is slightly larger than donor fragmentation measured by the number of actors – about 13.59 for the mean and 6 for the median (table 2.7). Interestingly fragmentation increases fast with natural disaster severity. Implementing agencies are more numerous in the case of severe disasters than donors. However again humanitarian aid is more concentrated to few large implementing agencies (see concentration ratio). It is due to the leading role of the UN and the Red Cross and Crescent Movement. Those two implementing agencies are more likely to be one of the top three implementing agencies. In addition when there is only one implementing agency, the UN is the implementing agency in 26 percent of the case; it is about the same for the Red Cross (22 percent). The case of only one implementing agency (16 percent) is less frequent than for donors (table 2.6) and the one with more than 50 implementing agencies more frequent (4 percent).

[Table 2.7 here]

There is no clear difference between donor and implementing agency fragmentation at the continent level. However it seems that a lower number of implementing agencies are involved by sectors within a recipient country. It can suggest a better specialization of implementing agencies within sectors.

¹⁷. In line with this argument geographical specialization within a country would also reduce the problem of fragmentation however I do not have information on this level.

Fragmentation could also be seen by the number of countries in which donors and implementing agencies are involved. Fragmentation in that sense seems to be higher at the donor level: on average a donor is involved in 8.72 countries while an implementing agency is active in 4.03 countries.¹⁸

A donor can decide to implement its project through multiple implementing agencies within a recipient country and an implementing agency can receive funds from different recipients. Fragmentation at the implementing agency level can be lower, equal or higher than at the donor level. It first translates on the correlation among fragmentation indicators (see table 2.8). Correlations are positive but remains at a moderate level. The number of donors and implementing agencies is positively correlated (0.74) however correlation of concentration ratio is lower. Having leading donors does not necessarily translate on having leading implementing agencies within a recipient country. It is also interesting to see that the correlation between the number of actors and the concentration ratio is not very high – 0.55 for donors and 0.41 for implementing agencies. It reinforces the idea that both indicators reflect two aspects of fragmentation.

[Table 2.8 here]

Figure 2.8 illustrates how IA fragmentation can differ from donor fragmentation using four donors, four implementing agencies and three recipients. Recipient 1 receives humanitarian aid from four donors but projects are implemented by only two implementing agencies. Hence for this recipient, aid is less fragmented at the implementing agency than at the donor level. On the contrary for recipient 3 there are three implementing agencies and 2 donors: fragmentation is higher at the implementing agency level. Finally for recipient 2, the level of fragmentation is the same at both levels. These differences are mostly explained by two phenomena: some donors (here donors 1 and 4) allocate their aid to recipient through many implementing agencies and some implementing agencies (here agency 1 and 4) collect aid from many donors for a given recipient country. An implementing agency may also work in more countries than the number of donors from which she receives funds (as agency 2). This example illustrates directly the change in the level of fragmentation measured by N .¹⁹

[Figure 2.8 here]

Table 2.6 shows first that there is a non-negligible share (13.3 percent) of cases for which fragmentation is not a concern as only one implementing and one donor are involved. Those countries are more likely small countries and intermediate income-level countries who can face

18. The difference is more accurate when focusing on donors and implementing agencies active in at least two countries. In that cases donors allocates aid on average to 18.86 countries while agencies implement projects in 10.73 countries.

19. It is more difficult to illustrate graphically the pattern for concentration ratio.

by themselves the consequences of a crisis. Among those cases, 27 percent are funded by either the US (14) or the EU (13) and 66 percent implemented by the UN (21), the Red Cross (21) or the recipient government (25). On the other side, less than 1 percent of the cases face more than 50 donors and implementing agencies. It only occurs for large crisis which have been publicized and for which fragmentation is often criticized (but not always).²⁰

Table 2.9 look at the proportion of each scenario in the FTS database for both fragmentation indicators.²¹ 38 percent of recipient country-year observation experience strictly more fragmentation at the implementing level in term of number of actors and 24 percent where looking at the concentration ratio. This share is increasing with the severity of a disaster. On the contrary a UN appeal does not affect the ratio of the number of donor/implementing agency. It means that the increase in the number of donors and implementing agencies induced by the UN appeal (seen in tables 2.5 and 2.7) is similar. However humanitarian aid is more concentrated among a few implementing agency, underlying the role of UN institutions in the appeals. Indeed based on the concentration ratio, 85 percent of the cases see a reconcentration at the IA level.

[Tables 2.9 and 2.10 here]

To investigate this phenomenon, I look at the average number of implementing agencies by donors and the average number of donors by implementing agencies within a country. On average a donor gives to a recipient country through 2.5 implementing agencies but 60 percent of them choose it only one implementing agency (see table 2.10). However, the share of donors who fragment its aid within a country has increased since 2000 (see figure 2.9).

[Figure 2.9 here]

The use of different implementing agencies is not fully explained by the sector in which the implementing agency is involved. Indeed even within a sector of aid activity, donors on average use more than one implementing agency (1.55) in a given recipient country. Again 75 percent of donors delegate through a unique implementing agency by sector in a given recipient country but the share is also decreasing over time: it was more than 80 percent in 2000 and is about 70 percent in 2014.

This fragmentation driver is mitigated by implementing agencies that receive on average aid from 2.23 donors even if 67 percent of them receive within a recipient country from only one donor. The similar increasing trend is observed: the share of implementing agencies within a country receiving funds from more than one donor is increasing over time. Hence the situation

20. It is the case for Afghanistan (2002), Haiti (2010), Indonesia (2005), Iraq (2003), Jordan (2013), Lebanon (2006), Myanmar (2008), Pakistan (2005 and 2010), Palestine (2009 and 2014), Philippines (2014), Somalia (2011), Sri Lanka (2005), Sudan (2007), Syrian Arab Republic (2014).

21. I do not look at the magnitude of the concentration/dilution.

is more complex over time. The one donor - one implementing case is less frequent nowadays.

Including implementing agencies in the analysis when looking at the efficiency of aid is useful because implementing agencies are different agents than donor. In addition fragmentation is also different at both level of analysis. In a majority of cases fragmentation is lower at the implementing agency level but there are cases for which the fragmentation is increasing. The next section details potential positive and negative consequences of having a third actor in the aid system on aid efficiency in the specific context of humanitarian aid.

2.4 Delegating aid and its fragmentation: potential consequences

A donor has the choice to delegate her humanitarian project to an implementing agency, to implement herself the project or to ask the recipient country to do so. As already mentioned the delegation to an implementing agency is the common choice in humanitarian aid.²² The question is why delegating takes place.

Another question relates to the number of agencies through which humanitarian aid projects are delegated. Costs induced by fragmentation are often highlighted. Does the potential negative consequences of fragmentation offset the expected positive impact of delegation? Indeed while it is intuitively plausible that a growing number of intervening partners raises transaction costs and represents a burden on developing countries' administrative capacities, it is theoretically much less clear whether these effects must necessarily outweigh potentially positive effects of delegation on aid effectiveness.

2.4.1 Positive impacts of delegation and fragmentation on aid efficiency

Delegations relies upon the division of labor and gains from specialization. Rather than performing the humanitarian project, the donor (the principal) delegates to a specialized implementing agency (the agent) with the expertise, time, ability and resources to perform the project.

Humanitarian aid requires specific expertise and knowledge that favors delegation. Implementing agencies have plausible comparative advantages in specific sectors, countries or to reach some sub-groups of the population. For instance de-mining activities require expertise that donors often do not have. They may also be involved in the country for a long time and thus have a specific expertise of the recipient context: 13 percent of projects are implemented by domestic IAs and 22 percent by IAs with more than 10 years of experience in the given country. A catholic-oriented implementing agency and a Muslim-oriented agency are more likely not to

22. It is not totally true for some private donors such as in the case of Haiti (2010) for which for instance international tennis players contribute. We do not expect those donors to implement themselves humanitarian projects

reach the same beneficiaries. It is particularly important in conflict crisis to insure that both sides of the conflict receive equal treatment. Hence implementing agencies are not necessary substitutes but could be complement.

Second implementing agencies can have the resources to perform the project because they pool together aid from different donors. In addition it allows some economy of scale that could be beneficial for humanitarian aid efficiency: entry fixed costs are for instance paid only once. Annen & Knack (2015) proposes a model that explains why it could be optimal for donors with very different motives to delegate development aid implementation to the same (multilateral) agency even if the agency is not specialized. They show that the multilateral agency is more able to increase aid selectivity (which is more likely to be efficient) than donors.

The second related reason to delegate is an informational one. Donors are very good at specifying goals and what they hope to achieve with the aid, but they may not know where aid is required, who needs it, where and in what quantities. Similarly, the poor in the recipient countries know what they need and in what quantities, but they may not know who has the aid or how to get it. The use of an intermediary – the implementing agency – may solve part of the problem. Implementing agencies have usually more local knowledge and thus know where and how to spend money. At the same time, they know who are the donors and are able to obtain funds.

Donors, implementing agencies and recipients aim to solve a common problem – how to mitigate the impact of the humanitarian crisis and recover. However they are likely to pursue a wide range of other goals such as maintaining their professional and political position, advancing their careers, maximizing the budget of their own agency, maintaining or increasing the international influence of their agency. Even if donors and implementing agencies share the same goal, there is significant diversity among them with respect to their beliefs on the best ways to achieve it. The use of an implementing agency could be motivated by the problem of moral hazard in a principal - agent model and to solve the problem of Samaritan's dilemma (Lindbeck & Weibull, 1988). Recipients have no incentive to produce any efforts – such as prevention or humanitarian intervention within the country – to be sure to obtain humanitarian aid in case of crisis. Hence aid from an altruistic donor might have counterproductive effects due to moral hazard from the recipient who has incentives stopping its own related policy. The delegation may solve this problem if the implementing agency has specific characteristics.

Delegating aid project is the opportunity to bypass corrupt recipient government (Dietrich, 2013). It reduces the risk of aid capture. Recent experimental evaluations by Bold *et al.* (2013) and Dufflo *et al.* (2015) suggest that NGO-administered school programs perform better than government-administered programs in improving education. Not all implementing agencies are equally virtuous and capable, however. For instance in poorly governed countries, the quality

of service delivery of local NGOs may be compromised by a lack of expertise and organization as well as corruption (see for example Barr *et al.* (2005)).

2.4.2 Negative impacts of delegation and fragmentation on aid efficiency

Central to the principal-agent theory, delegation induces costs and losses for the principal (donor). The relationship between donors and implementing agencies also induces costs: (i) matching costs between a donor and an IA ; (ii) monitoring costs for the donor and (iii) administrative costs for the IA which has to deal with specific donor's requirements. A donor has to find an implementing agency to implement the project in a given sector and a given destination country. The multiplicity of donors and implementing agencies increases the likelihood to find a match but entails searching costs. Werker & Ahmed (2008) estimate in the case of NGOs that about 15 percent of the proposed total project amount used to covers costs of fund-raising, administration, monitoring and evaluation. They suggest this figure is a lower bound as the number of delegation could be higher: the UN can also delegate the project to a local NGO.

The problem of principal-agent is already in place between the donor and the recipient organization but introducing implementing agencies adds a second level of principal/agent. The agents (implementing agencies) pursue their own interest rather than donors' interests. Hence delegation induces monitoring costs to insure that the implementing agency does its mandate.

Delegation also dilutes the accountability of donors and implementing agency on humanitarian aid efficiency. Implementing agencies may have no incentive to be efficient. In addition, in case of multiple donors, accountability on the monitoring of the implementing agency is also diluted among donors. It weakens the incentives to achieve results: if implementing agencies are numerous, each providing only a small fraction of a country's total aid, responsibility for the country's success gets diffused.

The theory of public choice can also be relevant and complement the argument in the case of humanitarian implementing agencies. The main objective of implementing agencies could not be to be efficient and alleviate suffering from beneficiaries. The literature on NGOs – which are the second largest type of implementing agencies – provides some insights. Barr *et al.* (2005) show for instance that the survival rate of NGOs does not depend on its efficiency but on its ability to obtain large grants. NGOs have more incentive to manage donor satisfaction than beneficiary welfare as donors are the ones who fund them while beneficiaries have weak ability to penalize or reward NGOs that provide a free service (Werker & Ahmed, 2008).

The multiplication of implementing agencies may also alter aid efficiency. The fragmentation issue is not particular to implementing agencies but also hold at the donor level. However as

implementing agencies are the one in the field, the negative consequences of its fragmentation are more relevant to look at. Fragmentation is a problem if there is no coordination among implementing agencies.²³ It increases the likelihood of duplication. In addition it could induce congestion effect as it had been the case in Nepal in 2015 after the earthquake. A large number of small actors is detrimental because their individual benefit is small relative to the cost of having them involved, because of fixed costs associated with an aid project (Acharya *et al.* , 2006; Anderson, 2012).

Fragmentation may also have a crowding-effect on the skilled labor market: Knack & Rahman (2007) show that aid fragmentation deters the quality of governmental agencies, as wages offered by international organizations or foreign NGOs are often higher than the local mean wage. The underlying mechanism is as follows: “if each donor in its hiring decisions treats the government bureaucracy as a common-pool resource, the collective donor community may end up hiring an excessive number of highly qualified public managers away from government. A donor is more likely to ignore the potential “negative externalities” on recipient country systems where it is funding only a small fraction of all projects, and as a result the hiring problem worsens as the number of donors increases. The hiring problem is less acute when a single donor has a large share of aid projects in a particular country. A single donor with a large share of aid projects has an interest in maintaining the quality of the government administration, thus reducing the collective impact of its projects by hiring fewer high-quality managers away from the public sector to run them.”²⁴ The mechanism also holds at the implementing agency level. For instance in Sudan, about 80 percent of NGOs staff (including international NGOs) is local.

It also has been shown that the multiplication of implementing agencies has negative externalities. In the case of the 2005 tsunami the proliferation of implementing agencies has also resulted in other negative externalities such as inflation (Tsunami Evaluation Coalition, 2006) and transport congestion. It has been shown that the inflation is driven by the sudden influx of international implementing agencies and staff with higher purchase power (Jayasuriya & McCawley, 2008)

Finally the delegation of aid projects and the multiplication of implementing agencies could be more or less effective/detrimental depending on the level of administrative and management capacity of recipient country. A high-capacity country might be able to handle both a large number of donors and implementing agencies relatively easily. The following three case studies illustrate first that large crises (that happened the same year) can lead to very different level of fragmentation at both levels and that negative consequences of delegation and fragmentation do not necessarily offset the positive ones.

23. This point also holds for donors.

24. Extract of research brief in Knack, 2006.

2.5 Three case studies of implementing agency fragmentation

The three case studies do not allow me to detail all possible positive and negative effects of delegation and of the fragmentation of delegation. For instance it is difficult to obtain accurate information on the way donors monitor implementing agencies and thus to illustrate the principal-agent problem faced by donors and implementing agencies. However I provide anecdotal evidence and descriptive statistics on the specialization and experience of implementing agencies and on the coordination between implementing agencies. The case studies also detail the key role of local authorities on humanitarian efficiency especially in coordinating the response.

2.5.1 Haiti 2010: the burden of fragmentation

On January 12th 2010, an earthquake of magnitude 7.0 on the Richter scale struck Haiti's capital Port-au-Prince and its surrounding areas. The earthquake had devastating effects: about 220 000 people were killed, with many left injured and homeless. Material loss is reported to be equivalent to more than 100% of Haiti's national income. More than 2 million displaced persons sought refuge in spontaneous settlements in and around the capital, with host families, and in rural areas. The humanitarian situation in Port-au-Prince and the provinces was compounded by the high level of chronic poverty in Haiti. The scale of the disaster was comparable to the Indian Ocean Tsunami in 2004, but in a much more limited area. However the urban characteristics of the disaster were quite new for humanitarians.

Pre-crisis conditions were also bad: Haiti is one of the poorest countries in the Caribbean; over the past decades, natural disasters of all kinds have regularly struck Haiti and Haiti was politically troubled. After the earthquake, the already weak Haitian state found itself with an even further reduced capacity to take charge of the disaster response.

Despite the quick mobilization, the management of this humanitarian crisis is seen a failure. The multiplication of implementing agencies was a burden. However it should be noted that without any delegation, the situation would have been worse as the number of donors was even higher, that is due to unprecedented flows of private donations. On average an implementing agency receives funds from three different donors. However the number of implementing agencies involved in a quite restricted area was tremendous: 213. It represents one implementing agency every 100 squared-kilometer within the country!²⁵

One of the main criticisms addressed by the humanitarian community is the massive entry of international implementing agencies (often NGOs) with varying capacity, level of professionalism

25. In reality the geographical concentration is much more higher as only part of the country was affected by the earthquake.

and resources : “20 percent of the NGOs did 80 percent of the work and the remaining 80 percent clogged the system” (Grunewald & Binder, 2010). Figure 2.10 illustrates the sudden influx of implementing agencies in 2010 which is still limited compared to the influx of donors. After only one year, two third of the agencies had already no new projects.²⁶ Figure 2.11 shows that humanitarian aid is spread over a large number of implementing agencies. Indeed the three largest implementing agencies only channeled 40 percent of total aid. Interestingly here the fragmentation is higher at the implementing agency level.

[Figures 2.10 and 2.11 here]

Table 2.11 provides some insights on the experience of implementing agencies. Two types of experience matter: field experience measured as the fact that the implementing agency has already be active in Haiti before 2010 and sector experience as the fact the implementing agency has already implemented a project in the sector of activity in Haiti or anywhere else. 31 percent of implementing agencies involved in 2010 in Haiti were never recorded before in the data, among them 95 percent were not Haitian. Hence they have no experience in humanitarian aid and no experience of the specific context of Haiti. Among implementing agencies that have some experience in humanitarian aid – in the sense they had implemented at least one project anywhere between 2000 and 2009 – 44.7 percent were new in Haiti and thus have no specific experience on the context and among them 21.8 percent have implemented a project in a new sector. On the contrary, only 21.2 percent of implementing agencies have both experiences in the country and in the sector. Hence donors did not delegate in Haiti the implementation of their projects to experienced agents.

[Table 2.11 here]

However experienced implementing agencies, even if they are a minority, implemented a large share of total aid. 91 percent of humanitarian aid was delegated to implementing agencies who had experience to Haiti and 96 percent to implementing agencies had experience in the sector of activity. Among them, the UN implemented almost a quarter of total aid and the Red Cross movement almost 10 percent. Local implementing agencies had a small share of total aid – 5.5 percent. Thus non experienced implementing agencies took care of very small projects (see table 2.12). This raises questions on the utility of these projects, given the fixed entry costs faced by new implementing agencies: develop new structure in the country, assessing needs, understanding local context...

[Table 2.12 here]

26. For 36 percent of the projects initiated in 2010 I can also compute the duration. 95 percent of them last less than one year. Hence it is likely that a majority of the agencies who had no new projects in 2011 have left the country.

The second criticism was about coordination of the implementing agencies. Given their number, coordination was necessary to avoid project duplication. Coordination was low mainly for two reasons. First there was a lack of state-capacity to insure a minimum level of coordination. State capacity which was already weak before the earthquake was even reduced. For instance the building of the National Disaster Risk Management was totally destroyed by the earthquake, the UN coordinator of humanitarian affairs was killed and thus replaced by a (less) experienced person.²⁷ The absence of state capacity and the reduction of the UN capacity were detrimental to provide a framework for coordination. Structures parallel to state were developed, local governance was by-passed and thus their knowledge and experience totally neglected. In addition, the use of English as main language in coordination meetings between implementing agencies and the local government was an important barrier (Grunewald & Renaudin, 2012). Only 35 percent of implementing agencies came from francophone countries.

In addition the cluster approach developed by the UN after 2005 tsunami to avoid the negative consequences of fragmentation was not totally efficient. The idea of a cluster is to provide coordination by sector of activities to increase the speed of decision-making. Coordination is done by some lead agencies – often a UN office – who are in charge of allocating each implementing agency to a specific project. All implementing agencies should be in relation with the lead agency. Nevertheless the lack of leadership was underlined in some clusters (Grunewald & Renaudin, 2012) – some performed well. A more drastic criticism of clusters was developed by some NGOs: “clusters legitimize all actors that aim to take part, regardless of their real capacity or impact” (Médecins Sans Frontières). In any cases, the cluster approach would have not resolved all the problems as they were used for projects within the UN appeal. Humanitarian aid channel outside UN appeal was not necessary in clusters: almost 70 percent of total aid was outside the UN appeal in 2010.

2.5.2 Pakistan 2010: a useful fragmentation

The same year in July Pakistan faced one of the worst floods in his history. A third of the country area was affected and a tenth of the population (18 millions) was directly affected by flood. Few people were killed but a lot of housings and schools were destroyed. The receding water period was long: six months after, some areas were still flooded. However despite the magnitude of the disaster and the number of actors involved, the crisis was well-managed and the multiplication of actors was perceived as plus. Figure 2.5 shows that the disaster attracted a unprecedented number of donors and implementing agencies in Pakistan in 2010 while figure 2.12 shows that fragmentation of the structure of aid (computed by the 1 - CR3 indicator) is similar

27. “It took four weeks before a Deputy Humanitarian Coordinator arrived in Port-au-Prince and the Humanitarian Coordinator then resigned. The nomination of the new Humanitarian Coordinator (who also has the functions of Deputy Special Representative of the Secretary General and Resident Coordinator) took place three months later.” (Grunewald & Renaudin, 2012)

to Haitian fragmentation. Some facts can explain why, opposite to Haiti, the multiplication of implementing agencies was not a problem.

[Figure 2.12 here]

First the affected area was large. Thus it induced some specific constraints but also allowed geographical specialization among implementing agencies. However it could have been the case that all implementing agencies implement projects in the most accessible villages/districts. However it does not seem to be the case. This is partly due to the strength of Pakistan authorities.

Indeed Pakistan authorities at the federal, regional or district levels played a key role on the collection of information about needs, affected areas. This information was gathered by humanitarian actors in order to improve the response to the crisis. In addition authorities played an active role in coordinating both of the donors and implementing agencies. The ministry of finance was in charge of the coordination of donors while the National Disaster Management Authority coordinated disaster response efforts and thus implementing agencies. It avoids donors to allocate funds where it is not necessary and it allows implementing agencies to apply to funds for needed projects. Pakistani authorities insure efficient matches between donors and implementing agencies.

A large share of humanitarian aid was channeled through the UN appeal (53.5 percent). The mechanism of clusters was more efficient than in Haiti. It is mainly due to a more experienced staff. The UN and local authorities developed together a website where humanitarian information was posted and gathered.²⁸ Hence all implementing agencies had real-time information on all closed roads (due to floods), baseline surveys on beneficiaries, need assessments done by all implementing agencies, coordination meeting date, . . . There are economies of scale on information collection which reduced costs for each implementing agency. In addition the UN clusters developed the 3W approach: Who, What, Where. Cluster leaders were in charge of collecting information on which implementing agencies are involved in which area to do what. Next the information is gathered on the previously cited website and thus limits the risk of project duplication.

[Tables 2.13 and 2.14 here]

Implementing agencies involved in the crisis were more experienced than in the Haitian context (see table 2.13). 42 percent of them were already active in Pakistan in the sector of activity. 31.9 percent of implementing agencies were without experience of Pakistan and without experience in the sector of activity. However among these implementing agencies new in the humanitarian system, 55.4 percent were domestic, hence with specific knowledge of the context

28. www.pakresponse.info

and in the field. In addition coordination is facilitated by the fact that these implementing agencies are more likely to already work together. A UN report underlines the fact that most implementing agencies were already involved in the 2005 earthquake and have already worked together. The more experienced implementing agencies obtained larger amounts of humanitarian aid (see table 2.14) that should improve the efficiency of humanitarian aid. Local implementing agencies were in charge of a non negligible share of humanitarian aid – about 15.8 percent.

2.5.3 Sudan 2010: the leading role of the UN

The humanitarian crisis faced by Sudan is not related to a sudden natural disaster but rather to a complex and long-lasting crisis, civil conflict and instability. 2010 corresponds to the end of the transitional period. It particularly weakened Sudan as general elections were held in a context of increasing tensions. The referendum on South-Sudan auto-determination occurred at the very beginning of 2011. As a consequence fighting between rebels and government forces intensified leading to more population movements. One of the main challenges faced by the humanitarian community is the pervasive violence that affects both local population and aid workers. In that context a coordinated response is essential. In addition the relationships between the government and aid workers were tense. For instance the president decided to expelled some international NGOs and to restrict access to some geographical area to aid workers.

The humanitarian crisis results in a large number of internally displaced people (4.8 millions of people) and chronic-vulnerable population, particularly in Darfur, in South Sudan, and in the eastern part of the country.²⁹ As a consequence since 2006 and except in 2010, Sudan was the largest recipient of humanitarian in the world receiving almost 20 percent of total humanitarian aid. Nevertheless this crisis is sometimes seen as "forgotten" in the sense that the crisis remains invisible to the public and politicians alike. Hence the effectiveness of humanitarian aid and its fragmentation are not well documented contrary to Haiti or Pakistan.³⁰

[Figure 2.13 and 2.14 here]

Given the amount of humanitarian aid devoted to Sudan, a large number of humanitarian actors was active (figure 2.13). This number is slowly increasing over time while the number of donors remains almost stable. Conversely to the two other examples, Sudan did not face a sudden increase neither in the number of implementing agencies nor in the number of donors. On average a donor allocates its aid to three different implementing agencies. Donors tend to reinforce the fragmentation at the implementing level in term of number. Nevertheless a high share of this aid was channeled through UN humanitarian response appeal (87 percent) that insures partly coordination among implementing agencies. In addition 44 percent of aid is directly

29. Some refugee camps host more than 80 000 people. Those camps rely extensively on humanitarian aid.

30. Kristalina Georgieva, the European Commissioner for International Cooperation, Humanitarian Aid and Crisis Response, states that Sudan humanitarian crisis is forgotten in Brussels, 30 June 2010.

implemented by the UN. As a consequence, when looking at the concentration ratio, humanitarian aid appears to be less fragmented at the implementing agency level than at the donor level: as about 70 percent of humanitarian aid is allocated by the three largest implementing agencies (figure 2.14).

However the UN OCHA which is in charge of the coordination of humanitarian aid noted that “insecurity, poor infrastructure, heavy rains and incomplete information all impeding effective humanitarian programming, leading to potentially duplicate or poorly targeted efforts”.

Implementing agencies – at least the UN offices and NGOs – tried to provide some coordination framework to avoid duplication in a context where needs are much more important than available aid. Hence in 1996 NGOs working in Sudan created the NGO Forum which regroups both humanitarian and development aid workers.³¹ Information sharing should reduce administrative costs to conduct efficient humanitarian projects. The Forum provides information on security but also training sessions to NGO staff that should improve their security and thus the efficiency of project by reducing risks. On coordination, the NGO forum supports the networking among members, and share critical information on operational and strategic decisions of members. This aspect is critical as in some districts where refugee camps are located all NGOs are active. The forum is seen as efficient and useful by implementing agencies involved in (Taylor *et al.*, 2012). In parallel Taylor *et al.* (2012) also shows that UN clusters are efficient in coordinating the action of implementing agencies. The UN also plays a key role concerning the security of aid workers partly through the two peacekeeping missions involved in Sudan.

[Tables 2.15 and 2.16 here]

The other aspect that would suggest that delegation to implementing agencies despite its high fragmentation is beneficial is the specialization and experience of implementing agencies. Implementing agencies involved in Sudan are experienced: 77 percent of them were already involved in their sector of activity in Sudan in the previous years and only 13 percent of them were new implementing agencies in humanitarian aid and among them only 56 percent were not Sudanese agencies (table 2.15). About 16 percent of implementing agencies are local agencies.

The most experienced implementing agencies provided 99 percent of humanitarian aid. The average amount channeled through agencies already involved in Sudan and in the sector is between ten times – when I exclude projects implemented by the UN – and 40 times higher – when the UN is included – than the average amount channeled by less experienced agencies (table 2.16).

31. In 2016 it coordinates the action of 101 local institutions and 127 international NGOs.

2.6 Conclusion

While many studies look at the effectiveness of development aid and the impact of fragmentation, this paper discusses the consequences of fragmentation on this specific context that has been mostly neglected before. It also introduces a new level of analysis for the fragmentation which is related to the implementing agencies that are in charge of the implementation of the program in the field.

I first document who are the donors and the implementing agencies. Implementing agencies are more likely to be a NGO or a UN structure. More importantly implementing agencies tend to be more specialized within a sector of activities or geographically. However they tend to be less experienced in the humanitarian sector as a large share of implementing are active only one or two years while a large share of donors are countries active every year.

Second I document humanitarian aid fragmentation. Humanitarian aid is fragmented at both levels however the level of analysis matters. Nevertheless fragmentation is lower than expected. In 13 percent of the cases only one donor and one implementing agency is involved. It happens particularly to small recipient countries. Only 1 percent of the cases show more than 50 donors and 50 implementing agencies. In addition donor fragmentation is often mitigated at the implementing agency level. Fragmentation is strictly higher at the implementing agency level in 38 percent of the case. The UN and the Red Cross and Crescent Movement play an important role on this re-concentration movement. However for some situation, especially chronic and/or forgotten crisis fragmentation is higher in the field.

Third I discuss the benefits and drawbacks of delegation and its fragmentation. Delegation to specialized and experienced agencies should increase aid efficiency ; however it introduces a new level of principal-agent problem that can deter aid efficiency. Fragmentation can imply both positive diversity or on the contrary risk of duplication. I underline the importance of the context especially whether the government is enough strong to regulate implementing agencies and donors. The potential negative effects of fragmentation may be offset by the potential positive effects of delegation.

Those points are illustrated by three case studies: Haiti, Pakistan and Sudan in 2010. In Haiti, the sudden entry of donors and implementing agencies was not regulated and lead to inefficiency. On the contrary in Pakistan, the government with the help of the UN succeeded in regulating humanitarian aid. A formal framework for coordination was developed and operational. Finally in Sudan, the UN was the principal agent involved as 80 percent of humanitarian aid passed through a UN appeal. In parallel implementing agencies were experienced and have structured themselves to improve their efficiency.

This paper only provides a first attempt to better understand humanitarian aid, its fragmentation and its efficiency. More should be done. First, understand why some donors (or IAs) fragment more their aid than other could be useful. Second, it is necessary to formally test humanitarian aid efficiency using micro-data. The development of the 3W approach by the UN is an opportunity. For some countries we thus know where projects are implemented locally by whom and for what. Hence it will be possible to match this information with household survey to investigate the impact of humanitarian aid.

2.7 Figures and tables

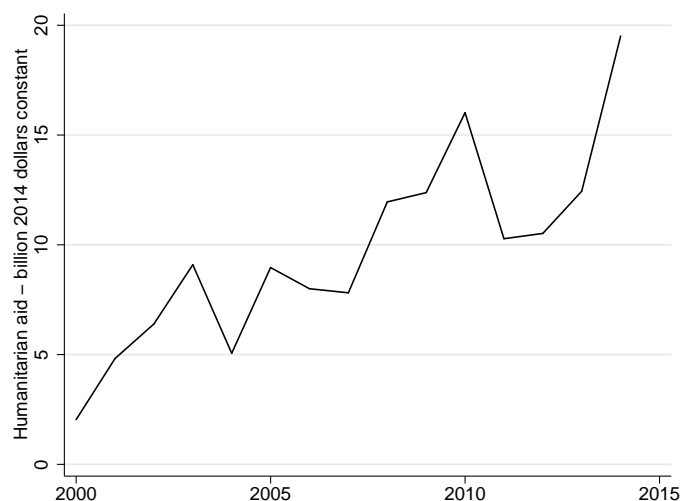


Figure 2.1 – Humanitarian aid over time, billion of current US dollars

Notes: Own calculations from FTS database.

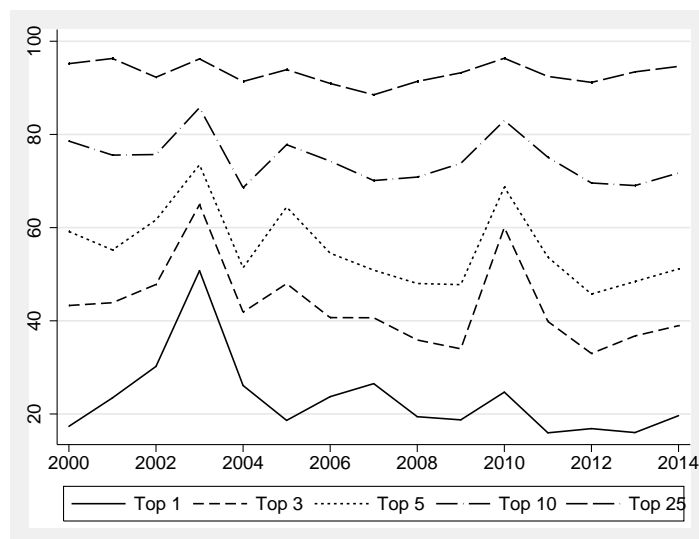


Figure 2.2 – Percentage of world humanitarian aid allocated to top recipients

Notes: Own calculations from FTS database. Top 1 recipients were: North Korea (2000), Palestine (2001), Afghanistan (2002), Iraq (2003), Sudan (2004 to 2009, 2011 to 2012, 2014), Haiti (2010), Syrian Arab Republic (2013).

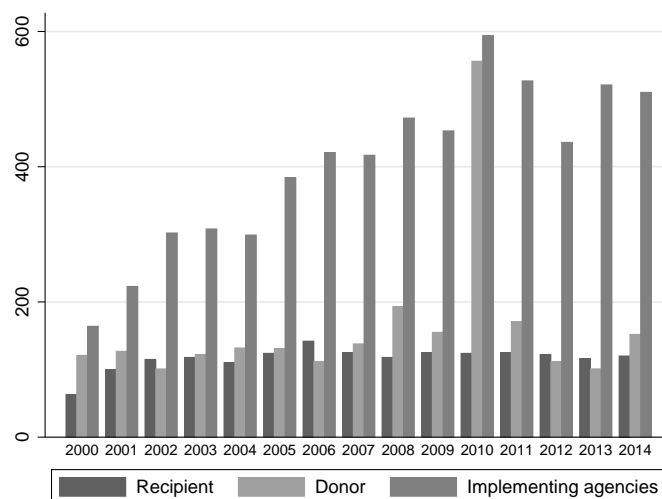


Figure 2.3 – Number of actors in humanitarian aid from 2000 to 2014

Notes: Own calculations from FTS database.

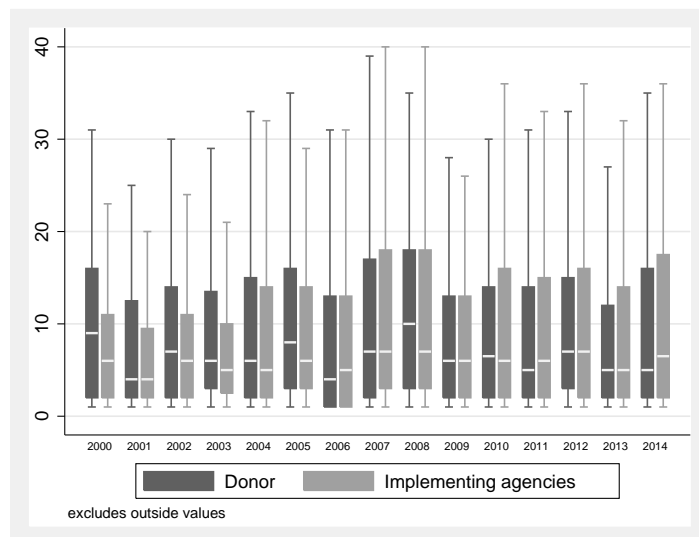


Figure 2.4 – Distribution of the number of donors and implementing agencies over time
Notes: Own calculations from FTS database. For every year the graph plots the 10th percentile, the first quartile, the median, the third quartile and the 90th percentile. It excludes observations from the 1st and 99th percentile.

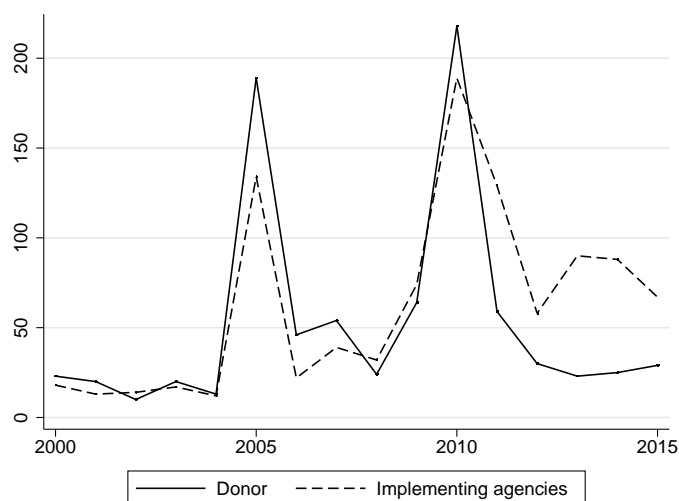


Figure 2.5 – Number of implementing agency and donor in Pakistan over time
Notes: Own calculations from FTS database.

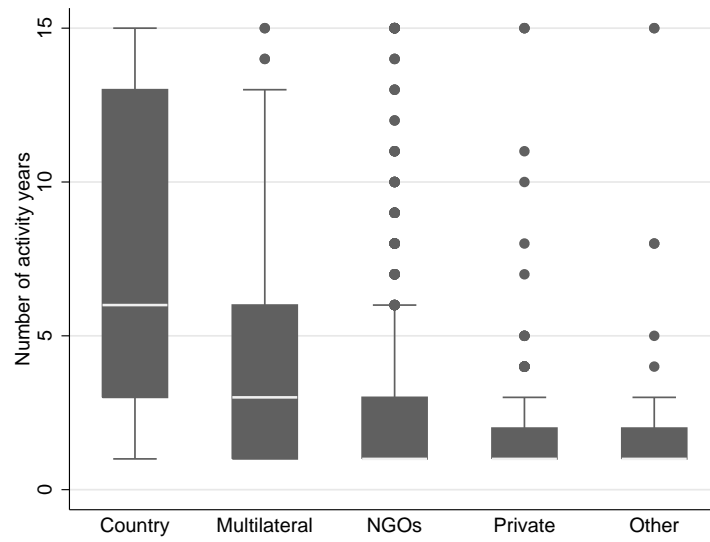


Figure 2.6 – Persistence of donor over time

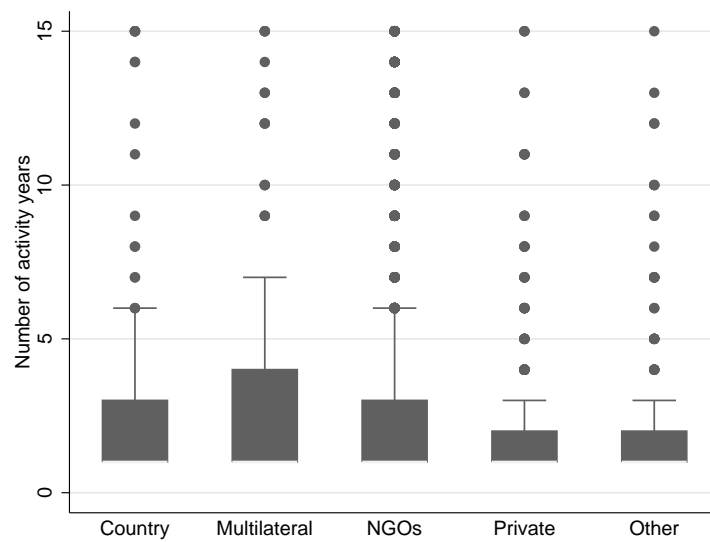


Figure 2.7 – Persistence of implementing agency over time

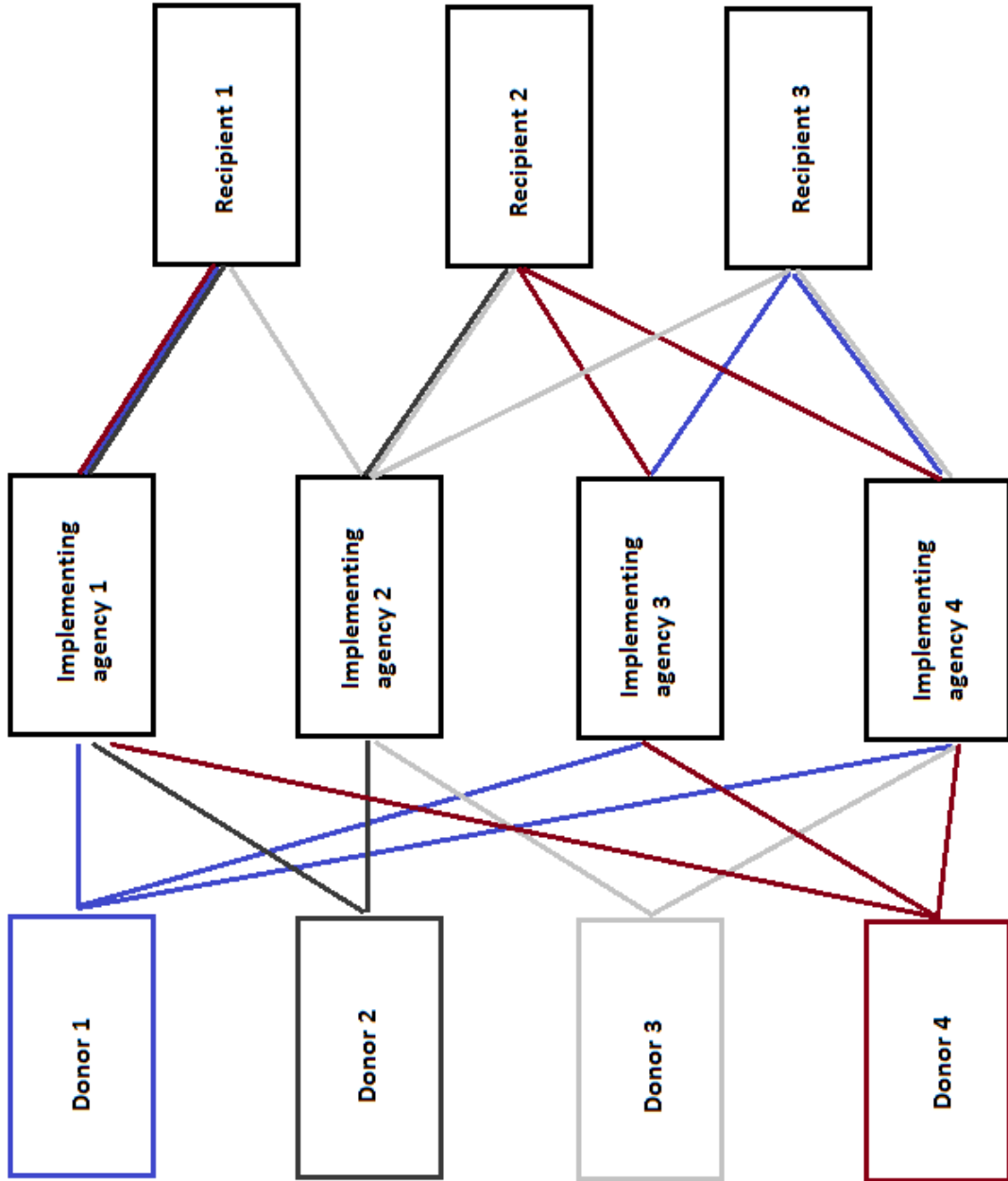


Figure 2.8 – Link between implementing and donor fragmentation



Figure 2.9 – Proportion of donors using only one implementing country in a given country
Notes: Own calculations from FTS database.

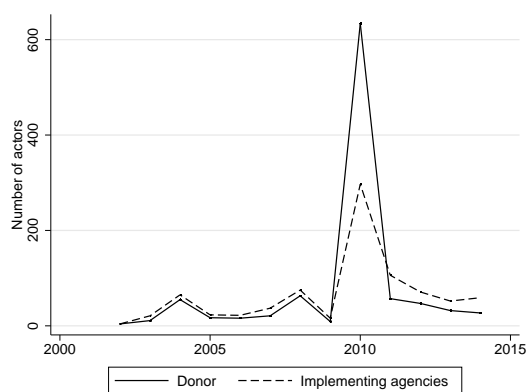


Figure 2.10 – Number of donors and implementing agencies in Haiti

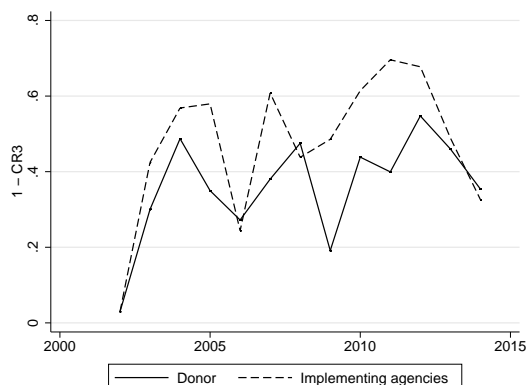


Figure 2.11 – Donor and implementing agency fragmentation – 1 - CR3 – in Haiti

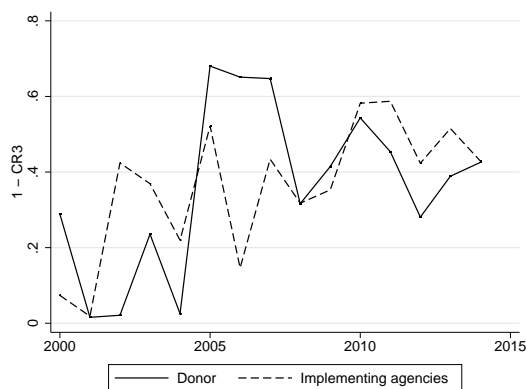


Figure 2.12 – Donor and implementing agency fragmentation – 1 - CR3 – in Pakistan

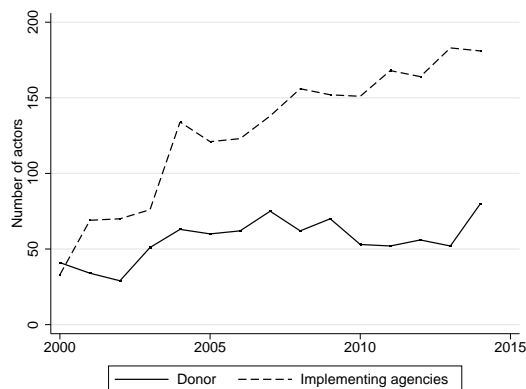


Figure 2.13 – Number of donors and implementing agencies in Sudan

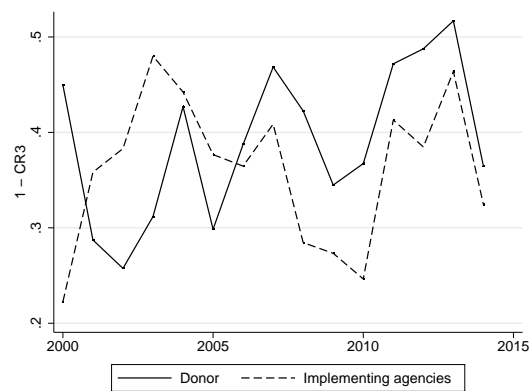


Figure 2.14 – Donor and implementing agency fragmentation – 1 - CR3 – in Sudan

Type of donors	Number	Share of project funded by	Share of amount funded by
Countries	202	58.9	73.3
Multilateral agencies	45	28.7	19.5
NGOs	770	7.9	1.8
Private sector	700	3.7	4.3
Other	47	0.7	0.9

Type of IAs	Number	Share of project funded by	Share of amount funded by
Countries	111	0.5	4.5
Multilateral agencies	131	52.5	60.5
NGOs	1852	37.4	29.5
Private sector	366	1.2	1.2
Other	262	3.9	4.2

Table 2.1 – Type and importance of donors and implementing agencies

Notes: IAs refers to implementing agencies. Own calculations from FTS database excluding humanitarian aid to developed countries. Share computed in 2014 constant dollars. All years (2000-2014) pooled together. A confessional NGO is recorded as a NGO.

Type of donor	Direct implementation
All donors	10.07
Countries	0.03
Multilateral agencies	32.34
NGOs	9.04
Private sector	1.52
Other	0.69
Implementation by recipient country	5.94

Table 2.2 – Share of projects directly implemented by types of donor or implemented by recipient country

Notes: Direct implementation means that the donor does not use an implementing agency to implement the project. Hence the implementing agency is the donor. Implementation by recipient country is humanitarian projects for which the implementing agency is a governmental agency from the recipient country.

	Donors					Total
	Country	Multilateral	ONGs	Private	Other	
IAs						
Country	6 593	137	129	92	9	696
Multilateral	37 063	25 215	7 210	1 910	456	71 854
ONGs	31 894	13 337	3 177	2 290	431	51 129
Private	977	218	6	396	14	1 611
Other	4 142	325	357	368	107	5 299
Total	80 669	39 232	10 879	5 056	1 017	136 853

Table 2.3 – Distribution of projects depending on donors and implementing agencies

	Donors				
	Country	Multilateral	ONGs	Private	Other
IAs	<i>N=6 593</i>	<i>N=137</i>	<i>N=129</i>	<i>N=92</i>	<i>N=9</i>
Country	1 126 952	908 011.7	690 334.8	310 866.7	962 593.3
	7 714 621	3 494 677	2 430 640	788 766.2	1 654 850
	<i>N=37 063</i>	<i>N=25 215</i>	<i>N=7 210</i>	<i>N=1 910</i>	<i>N=456</i>
Multilateral	2 132 337	879 431.9	80 045.15	542 782.2	214 1275
	8 244 684	1.49e+07	3 887 383	440 6239	994 8354
	<i>N=31 894</i>	<i>N=13 337</i>	<i>N=3 177</i>	<i>N=2 290</i>	<i>N=431</i>
ONGs	999 824.4	803 558.6	591 527.3	2 521 596	1 073 540
	3 735 173	1 411 757	5 935 425	2.12e+07	3 052 507
	<i>N=977</i>	<i>N=218</i>	<i>N=6</i>	<i>N=396</i>	<i>N=14</i>
Private	1 731 187	938 748.8	52 376.95	461 519.7	2 280 969
	2.92e+07	2 572 637	42 881.3	2 095 698	3 672 622
	<i>N=4 142</i>	<i>N=325</i>	<i>N=357</i>	<i>N=368</i>	<i>N=107</i>
Other	1 391 288	1 299 977	1 704 469	961 379.8	1 401 641
	1.33e+07	3 625 097	1.05e+07	7 165 538	6 564 634

Table 2.4 – Average size of projects depending on donors and implementing agencies
Notes: Standard deviation in parenthesis.

	Number	1 – CR3
Mean	12.33 (21.07)	0.17 (0.18)
Median	6	0.10
Max	606	0.67
By disaster severity		
No natural disaster	8.49 (14.27)	0.11 (0.17)
Small	9.17 (9.92)	0.14 (0.17)
Medium	13.77 (12.25)	0.21 (0.18)
Severe	24.99 (46.22)	0.27 (0.18)
Whether the UN launches an appeal		
No	5.95 (7.30)	0.08 (0.13)
Yes	24.39 (30.54)	0.32 (0.16)
By continent		
Africa	12.86 (11.52)	0.20 (0.18)
Asia	14.87 (17.93)	0.19 (0.19)
America	8.86 (35.64)	0.09 (0.14)
America (w o Haiti)	6.90 (9.70)	0.09 (0.15)
Europe	4.71 (6.65)	0.06 (0.13)
Pacific	3.60 (4.25)	0.05 (0.11)
By sector of activity in a given country		
Mean	5.12 (8.71)	0.08 (0.14)
Median	2	0

Table 2.5 – Donor fragmentation in a given recipient country
Notes: Fragmentation indicators are computed at the recipient level from FTS database. Standard deviations in parenthesis. For instance there are on average 5.12 donors in a humanitarian sector in a given country.

Number of donors	Number of IAs					Total
	1	2 to 5	6 to 10	11 to 50	More than 50	
1	13,34	3,41	0,29			17,04
2 to 5	2,29	17,04	4,58	0,47		24,38
6 to 10	0,12	5,64	9,52	4,82		20,09
11 to 50		1,12	7,17	25,56	3,23	37,07
More than 50				0,47	0,94	1,41
Total	15,75	27,20	21,56	31,32	4,17	

Table 2.6 – Share of recipient country-year by number of implementing agencies and donors

	Number	1 - CR3
Mean	13.59 (21.26)	0.13 (0.15)
Median	6	0.07
Max	213	0.66
By disaster severity		
No disaster	8.72 (14.89)	0.08 (0.12)
Small	10.41 (14.80)	0.11 (0.14)
Medium	15.25 (19.09)	0.16 (0.14)
Severe	27.18 (28.71)	0.24 (0.16)
Whether the UN launches an appeal		
No	6.52 (7.87)	0.11 (0.15)
Yes	26.59 (26.60)	0.16 (0.13)
By continent		
Africa	15.33 (20.95)	0.11 (0.12)
Asia	16.19 (19.42)	0.17 (0.17)
America	8.06 (14.88)	0.13 (0.15)
America (wøHaiti)	7.39 (9.12)	0.12 (0.15)
Europe	4.84 (6.01)	0.08 (0.14)
Pacific	2.91 (2.65)	0.04 (0.09)
By sector of activity in a given country		
Mean	4.23 (5.96)	0.05 (0.11)
Median	2	0

Table 2.7 – Implementing agency fragmentation in a given recipient country

Notes: Fragmentation indicators are computed at the recipient level from FTS database. Standard deviations in parenthesis. For instance there are on average 4.23 donors in a humanitarian sector in a given country.

	N_d	N_{ia}	$1 - CR3_d$	$1 - CR3_{ia}$
N_d	1.00			
N_{ia}	0.74	1.00		
$1 - CR3_d$	0.55	0.59	1.00	
$1 - CR3_{ia}$	0.29	0.41	0.54	1.00

Table 2.8 – Correlation between fragmentation indicators

Notes: d refers to donor level while ia refers to implementing agency level. Indicators computed at the recipient country level.

	More fragmentation	Less fragmentation	Status Quo
	Number		
All	38	35	27
	By disaster severity		
No disaster	29	29	42
Extreme	58	34	08
	By UN appeal		
No	37	26	36
Yes	42	50	08
	1- CR3		
All	24	45	35
	By disaster severity		
No disaster	33	16	51
Extreme	37	57	5
	By UN appeal		
No	31	45	35
Yes	09	85	5

Table 2.9 – Share of concentration, dilution or status quo on fragmentation of IAs over fragmentation of donors

Notes: Indicators computed at the recipient country level. More fragmentation means that there is more fragmentation at the implementing agency level than at the donor level; status quo that fragmentation are the same at the donor and implementing agency level. Less concentration means that there is less fragmentation at the implementing agency level than at the donor level.

	Mean	Std Dev.	Min	Median	Max	Share > 1
Donors give to						
Implementing agencies	2.50	3.97	1	1	106	0.40
Implementing agencies by sector	1.57	1.69	1	1	46	0.25
Implementing agencies receive from						
Donors	2.23	3.95	1	1	210	0.23
Donors by sector	1.87	2.80	1	1	203	0.27

Table 2.10 – Average number of IAs by donors and of donors by IAs

Notes: Descriptive statistics are computed at the recipient level from FTS database.

	New in humanitarian aid		Old in humanitarian aid	
	New in Haiti		New in Haiti	Old in Haiti
New in the sector	31.0 (95.1)		9.7	3.1
Old in the sector			35.0	21.2

Table 2.11 – Haiti: experience of implementing agencies in percentage of cases

Notes: Own calculations from FTS database. There are 213 unique implementing agencies in Haiti in 2010, however some are involved in different sectors. Hence an implementing agency can be counted more than once if she is involved in more than one sector. An implementing agency can be new in one sector and old in another. 67 implementing agencies have already implemented projects in Haiti before 2010 and 46 have already implement a project in the sector of activity in the world before 2010. In total there are 389 possible sector-implementing agency cases. For new agency in humanitarian aid, the number in parenthesis refers to the share of non-Haitian implementing agencies among new IAs.

	New in humanitarian aid		Old in humanitarian aid	
	New in Haiti		Old in Haiti	
New in the sector	710 000 (30.9)	1 200 000 (9.7)	3 200 000 (3.1)	
Old in the sector			3 000 000 (34.9)	68 000 000 (21.2)

Table 2.12 – Haiti: average project size depending on the experience of the implementing agency

*Notes:*Own calculations from FTS database. In parenthesis the share of projects it represents. Averages are rounded.

	New in humanitarian aid		Old in humanitarian aid	
	New in Pakistan		Old in Pakistan	
New in the sector	31.9 (45.6)		5.1	5.8
Old in the sector			15.2	42.0

Table 2.13 – Pakistan: experience of implementing agencies in percentage of cases

*Notes:*Own calculations from FTS database. There are 133 unique implementing agencies in Pakistan in 2010, however some are involved in different sectors. Hence an implementing agency can be counted more than once if she is involved in more than one sector. An implementing agency can be new in one sector and old in another. 47 implementing agencies have already implement projects in Pakistan in previous years and 39 have already implement a project in the sector of activity in the world in previous years. In total there are 279 possible combinations of implementing agencies and sector of activity. For new implementing agency in humanitarian aid, the number in parenthesis refers to the share of non-Pakistani implementing agencies among new IAs.

	New in humanitarian aid		Old in humanitarian aid	
	New in Pakistan		Old in Pakistan	
New in the sector	1 200 000 (31.9)	700 000 (5.1)	3 800 000 (5.8)	
Old in the sector			13 000 000 (15.2)	25 000 000 (42.0)

Table 2.14 – Pakistan: average project size depending on the experience of the implementing agency

*Notes:*Own calculations from FTS database. In parenthesis the share of projects it represents. Averages are rounded.

	New in humanitarian aid		Old in humanitarian aid	
	New in Sudan		Old in Sudan	
New in the sector	13.2 (56.3)		4.4	4.4
Old in the sector			0.9	77.2

Table 2.15 – Sudan: experience of implementing agencies in percentage of cases

*Notes:*Own calculations from FTS database. There are 151 unique implementing agencies in Sudan in 2010, however some are involved in different sectors. Hence an implementing agency can be counted more than once if she is involved in more than one sector. An implementing agency can be new in one sector and old in another. 91 implementing agencies have already implement projects in Sudan in previous years and 90 have already implement a project in the sector of activity in the world in previous years. In total there are 222 possible combinations of implementing agencies and sector of activity. For new implementing agency in humanitarian aid, the number in parenthesis refers to the number of non-Sudanese implementing agencies.

	New in humanitarian aid		Old in humanitarian aid	
	New in Sudan	New in Sudan	Old in Sudan	Old in Sudan
New in the sector	250 000 (13.2)	300 000 (4.4)	250 000 (4.4)	
Old in the sector		390 000 (0.9)	16 000 000 (77.2)	

Table 2.16 – Sudan: average project size depending on the experience of the implementing agency

Notes: Own calculations from FTS database. In parenthesis the share of projects it represents. Averages are rounded. The average amount channeled through agencies with both Sudan and sector experience is about 3 700 000 if the UN is excluded.

Chapitre 3

To Give or Not to Give? How Do Donors React to European Food Aid Allocation?

Abstract¹

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.

1. This chapter is my job market paper.

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3.1 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.² 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.³ Kuhlitz *et al.* (2010), 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.

2. "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)

3. On aid allocation, papers look at whether allocation is driven by donor interests but also on differences between donors (Berthélemy, 2006a; Nunnenkamp & Öhler, 2011; Fuchs & Klann, 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 & Heisey, 2002; Young & Abbott, 2008).

The literature on donor interactions in the case of development aid (ODA) in general is larger even if it remains small. Frot & 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.⁴ 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 & 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 & Overman (2012) for instance). Davies & 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 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 concessional 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.

4. They 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.

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).⁵ 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 documented 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.⁶

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.⁷ 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 & Maxwell, 2005). Second it has been a leading component of the reforms of the Food Aid

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

6. In the Indian context, Besley & 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.

7. It is also in 70 percent of the cases one of the three largest donors in a recipient countries, see figure A3.1 in appendix 3.8.

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 promoting 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 & Qian (2014).⁸ 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. First, donors could react directly to the EU allocation. Annen & 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

8. This type of instrument has a growing importance on the aid literature (Ahmed *et al.* , 2015; Dreher & Langlotz, 2015; Dietrich & Wright, 2015).

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 3.2. Section 3.3 describes the data. Section 3.4 discusses the results and their robustness. Section 3.5 describes the framework and the typology of donors. Finally section 3.6 summarizes the findings and discuss the implications.

3.2 Empirical strategy

3.2.1 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:

$$FA_{drt} = \beta FA_{EUrt} + X_{dr,t-1}\Gamma_1 + X_{r,t-1}\Gamma_2 + \phi_{dt} + \phi_{dr} + \epsilon_{drt} \quad (3.1)$$

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.⁹ 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.

9. Controls are detailed in section 3.3.2. They also include some contemporaneous controls to take into account fast response in case of emergency for instance.

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 3.2.2). Nevertheless in appendix 3.8 (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.

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} .

3.2.2 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 unpredictability 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.¹⁰

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 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 A3.2a in appendix 3.8).

The reform resulted in three major changes in aid allocation. First, the EU reduced the number of recipient countries (see figure 3.1). The decrease is mainly due to program and project food aid (see figure A3.2b in appendix 3.8) 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 3.1 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 sca-

10. "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.)

led 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).¹¹ The amounts of food aid allocated to small countries were on average smaller (see table A3.1 in appendix 3.8), 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 A3.3 in appendix 3.8). 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 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 A3.4a in appendix 3.8). 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 A3.4b in appendix 3.8 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 3.2a 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 3.2 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

11. See table D3.1 in appendix 3.8 for the list of small countries.

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 A3.2 in appendix 3.8 that provides descriptive statistics). Figure 3.2b 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 3.2c). 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 3.1 as follows:

$$FA_{EUrt} = \lambda Reform_t * P_r + X_{EUr,t-1}\Gamma_3 + X_{r,t-1}\Gamma_4 + \phi_t + \phi_r + \epsilon_{rt} \quad (3.2)$$

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 3.2, 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.

3.2.3 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.¹² The only thing I find is about France who has done some evaluation of their own programs (Thirion, 1996).¹³ I am thus aware that even in the absence of formal reform it could have shaped bilateral food aid policies.

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.¹⁴ 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,

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

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

14. Since 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

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 assumptions 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 3.8. 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_7 . 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 3.8. More precisely I observe divergences for small countries after 2001 only on democratic indicators and the number of neighbor countries in conflict.¹⁵ 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 3.3 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

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

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 3.3 here]

Other events during the period may have affected the allocation of the EU and 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 & 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 $Reform_t * (P_r < a_1)$, $Reform_t * (a_1 \leq P_r < a_2)$... with a_1, \dots, a_n to be defined.

3.3 Data and descriptive statistics

3.3.1 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.¹⁶ 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.¹⁷ 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.¹⁸ 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 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 A3.1 in appendix 3.8).

Table 3.1 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

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

17. The 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.

18. Moreover, data exhaustiveness is doubtful in the case of occasional donors, especially non governmental organizations, see appendix 3.8 for more details.

the food aid reform already presented section 3.2.2. The decrease in the number of recipients from the EU concerned mostly small states.¹⁹ 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 A3.3 in appendix 3.8). 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.²⁰

[Table 3.1 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.

Table 3.1 underlines a positive correlation across donors' allocation.²¹ 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.

3.3.2 Controls

$X_{r,t-1}$, in equation 3.1, 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.

19. Small states are defined following the World Bank definition. The list is provided in Appendix 3.8.

20. The pattern is similar when looking at the average quantity allocated to recipient countries (see table A3.1 in appendix 3.8).

21. I 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.

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 same country. Hence I introduce the share of refugees and internally displaced populations in recipient countries and its square.²²

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.²³

$X_{dr,t-1}$ 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 & 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

22. Data on refugees are provided by the UNHCR. Cereal production data come from FAOSTAT. Data are provided by the CRED of UCL for disasters (Guha-Sapir *et al.*, n.d.) and by the Center for Systemic Peace for conflicts. GDP data, population and wheat price are taken from the WDI (World Bank).

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

substitute.²⁴ Thus I use the current amount of ODA (Official Development Aid) allocated by donor d to recipient r rather.²⁵ Finally I include the number of other donors allocating food aid (excluding the EU) at time t to recipient r . Table A3.4 in appendix 3.8 provides descriptive statistics of controls variables for small countries.

3.4 Empirical results

3.4.1 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 3.1 for the donor allocation are reported in the first lines of Table 3.2.²⁶ 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 3.2 here]

Table 3.2 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 the reform. The effect is significant for all specifications. According to Chernozhukov & 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

24. I will not interpret the sign or the magnitude of the estimates given the endogeneity problem if both types of aid are substitute or complement.

25. Data are provided by the OECD.

26. Estimates for controls are provided in table B3.4 in appendix 3.8.

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 & 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 3.3). 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 3.3 here]

3.4.2 Bilateral reactions

It is unlikely that all donors react to EU food aid in the same way. Thus, I estimate equations 3.1 and 3.2 for each donor d allowing for a differentiated response, β_d to the EU allocation.

$$FA_{EURt} = \lambda Reform_t * P_r + X_{EUR,t-1}\Gamma_3 + X_{r,t-1}\Gamma_4 + \phi_t + \phi_r + \epsilon_{rt} \quad (3.3)$$

$$FA_{drt} = \beta_d FA_{EURt} + X_{dr,t-1}\Gamma_{d1} + X_{r,t-1}\Gamma_{d2} + \phi_{dt} + \phi_{dr} + \epsilon_{drt} \quad (3.4)$$

I focus on small recipients countries as the identification strategy suits more small recipient countries. Table 3.4 reports the bilateral estimates including controls as in column (2) of table 3.2.²⁷ I observe three possible reactions: $\beta_d < 0$ and significant, $\beta_d > 0$ and significant, and β_d non statistically different from zero.

[Table 3.4 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.²⁸

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

27. Table B3.5 in appendix 3.8 shows bilateral reactions when all recipients – large and small – are included.

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

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 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.

3.4.3 Placebo tests and robustness checks

Placebo tests

In table 3.5 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 3.5 or including EU food aid in table B3.4).

[Table 3.5 here]

Robustness checks

I test the sensitivity of baseline estimates to the sample definition (table 3.6). 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 & 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.²⁹ 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

29. First-stage result is provided in table B3.6 in appendix 3.8.

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 3.1, 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, $FA_{EU,t-1}$, (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 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 3.8.

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 3.6 here]

3.5 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.³⁰ The framework only helps interpreting the bilateral estimates. The framework does not test any causal mechanisms.

3.5.1 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.³¹ 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

30. Berthélemy (2006b) 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.

31. Given 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.

account EU allocation 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 & 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.³² 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.

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:

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

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

32. More 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.

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.

3.5.2 Reaction function

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

$$A_{drt} = \frac{\mu_{dt}}{\lambda_d + \gamma_d} + \frac{\gamma_d}{\lambda_d + \gamma_d} G_{dr} + \frac{\gamma_d}{\lambda_d + \gamma_d} G_{drt} + \frac{\gamma_d}{\lambda_d + \gamma_d} F_{rt} + \frac{1 - \frac{\gamma}{\lambda_d}}{1 + \frac{\gamma}{\lambda_d}} A_{EUrt} \quad (3.5)$$

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.

$$A_{drt}^* = \frac{1}{2} F_{rt} + \frac{(\lambda_{EU} + \gamma_{EU})(\mu_{dt} + \gamma_d(G_{dr} + G_{drt}))}{2(\gamma_d \lambda_{EU} + \lambda_d \gamma_{EU})} + \frac{(\lambda_d + \gamma_d)(\mu_{EUt} + \gamma_{EU}(G_{EUR} + G_{EURt}))}{2(\gamma_d \lambda_{EU} + \lambda_d \gamma_{EU})} \quad (3.6)$$

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".

3.5.3 Typology

Adding an error term to equation (3.5) and interpreting the allocation not in quantities but on the probability of giving food aid, I obtain the equation (3.4) I have estimated in section 3.4.2, 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 3.7.

[Table 3.7 here]

Table 3.8 shows the donor typology for small countries.³³ 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 3.8 here]

3.6 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

33. Point estimates of $\frac{\gamma}{\lambda_d}$ are provided in table B3.7 in appendix 3.8.

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 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.

3.7 Figures and tables

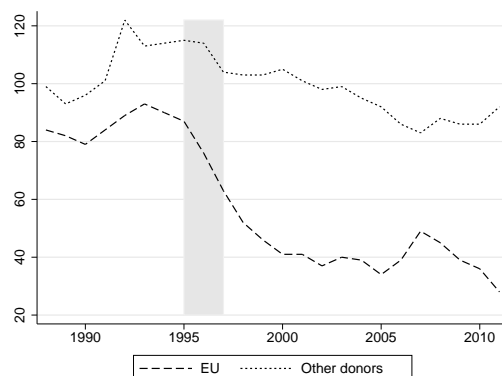


Figure 3.1 – Number of recipient countries

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.

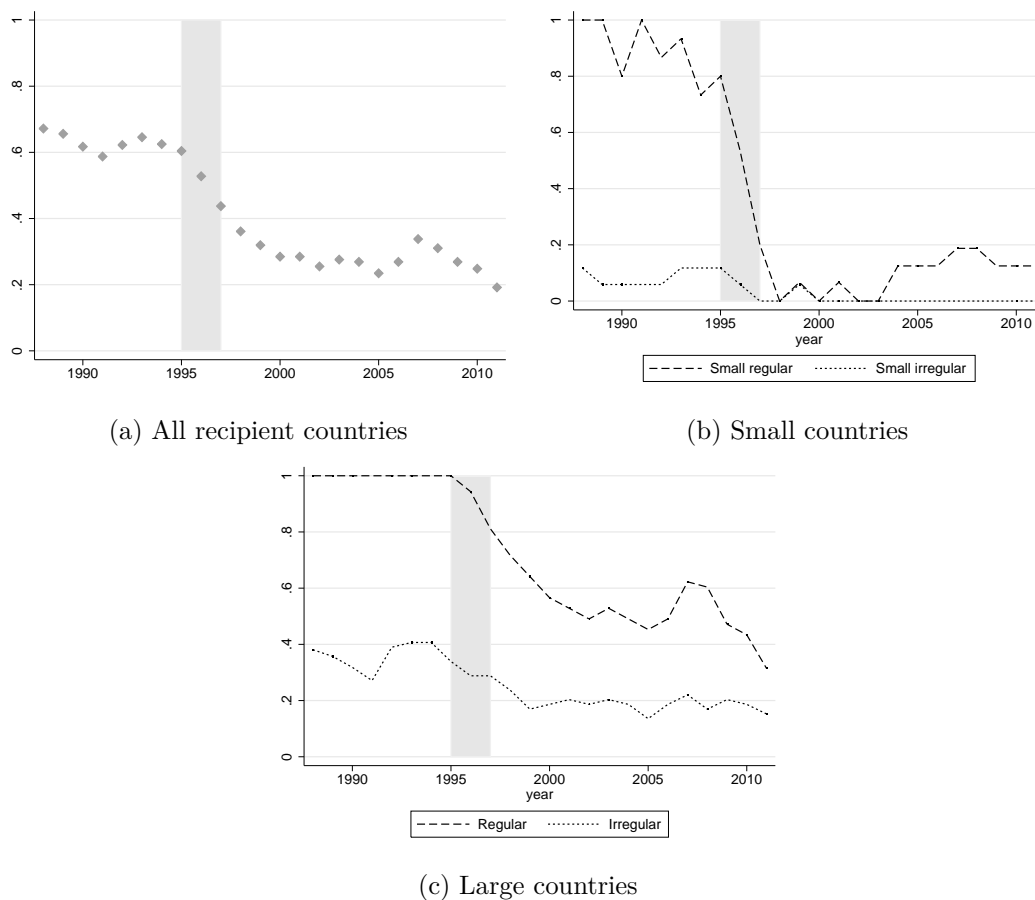


Figure 3.2 – Average probability of receiving food aid from the EU

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 3.8 for the precise list of recipients).

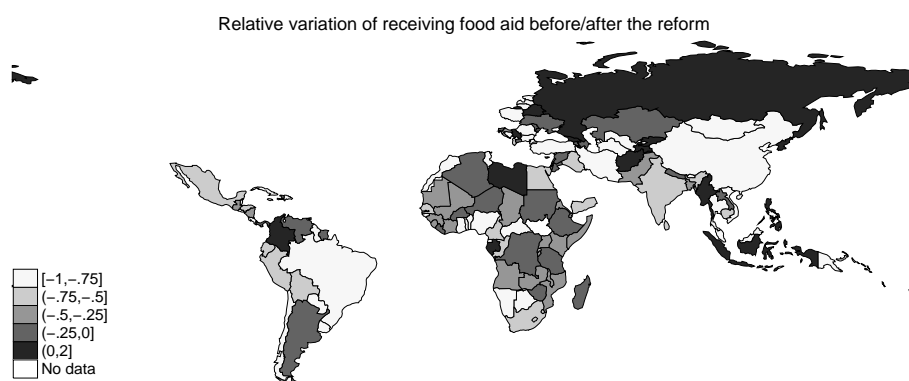


Figure 3.3 – Relative variation of the probability of receiving food aid from the EU
Notes: Ratio of the average probability of receiving from the EU after the reform minus the average probability of receiving before the reform over the average probability of receiving before 1996. The increase observed 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 3.1 – 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*** (0.023)	0.086*** (0.027)	0.089*** (0.031)	0.088** (0.033)
R^2	0.435	0.422	0.401	0.393
Reduced Form Estimates				
Reform $_t$ * P_r	-0.099** (0.035)	-0.123*** (0.035)	-0.126** (0.044)	-0.134** (0.061)
R^2	0.435	0.422	0.400	0.392
2SLS Estimates				
Has received EU food aid	0.113*** (0.021)	0.141*** (0.028)	0.152*** (0.043)	0.162*** (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			
First-Stage Estimates				
Reform $_t$ * P_r	-0.870*** (0.047)	-0.872*** (0.075)	-0.830*** (0.068)	-0.825*** (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 3.2 – 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 3.8 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	
	Non EU	All	Non EU	All
Recipients				
Donors				
	<i>Controls as in column (2) of table 3.2</i>			
Has received	0.141***	0.153***	0.021	0.065***
EU food aid	(0.028)	(0.023)	(0.023)	(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 3.2</i>			
Has received	0.162***	0.148***	-0.016	0.040*
EU food aid	(0.043)	(0.032)	(0.027)	(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 3.3 – 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 3.2. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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 3.4 – 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 3.2). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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)	-0.005	(.0003)	5 301	
(4) Dependent variable: EU agricultural imports (millions of \$)	-0.002	(.0003)	5 301	

Table 3.5 – Placebo Tests

Notes: All regressions include the same set of controls as column (2) in table 3.2. 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) $P_r = \text{EU food aid in 1995}$	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) $\text{Reform}_{t-1} * P_r$	0.147***	(0.031)	5 301	199.6

Table 3.6 – Robustness checks - Small recipients

Notes: Row (1) refers to estimates obtained in column (2) in table 3.2. All regressions include the same set of controls than column (2) in table 3.2. 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 3.7 – Donor typology

Complement			Substitute		
EU-driven	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 3.8 – A Donor Typology for small recipients

3.8 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 A3.1 gives descriptive statistics on the average quantities allocated by donors and the correlation across donors. Table A3.2 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 A3.3 shows the average number of recipient countries by regular donor before and after 1996. Table A3.4 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 A3.1 – 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 A3.2 – 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 A3.3 – 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 A3.4 – Descriptive statistics

Figure A3.1 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 A3.2a and A3.2b 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.

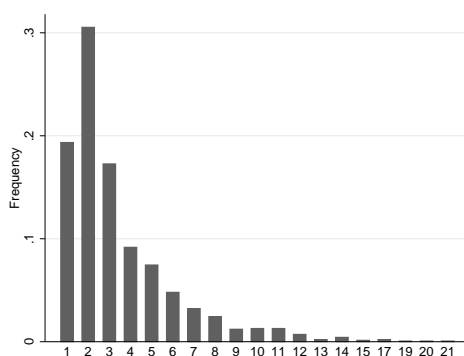


Figure A3.1 – EU donor ranking

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

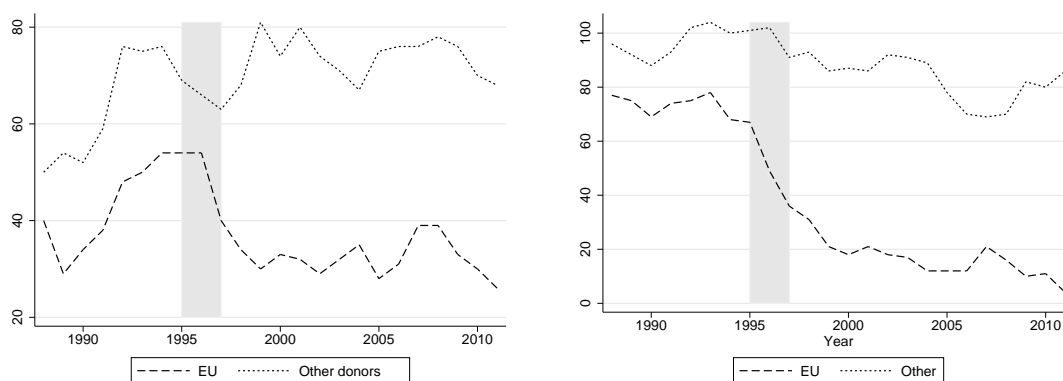
Figure A3.3 plots the share of local or triangular purchases for the three groups of donors. Figure A3.4a plots the average quantity of food aid received by recipient countries of EU food aid. It shows that the reform in 1996 does not affect significantly the quantities received on average by EU recipients. Figure A3.4b 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 $\frac{\gamma}{\lambda_d}$.

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



(a) Emergency food aid

(b) Project or program food aid

Figure A3.2 – 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.

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 3.2. Reference year 1988. Year 1989 interacted with P_r is dropped due to collinearity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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
<i>P_r</i> 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 3.8. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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
<i>P_t</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 3.8. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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 3.2). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

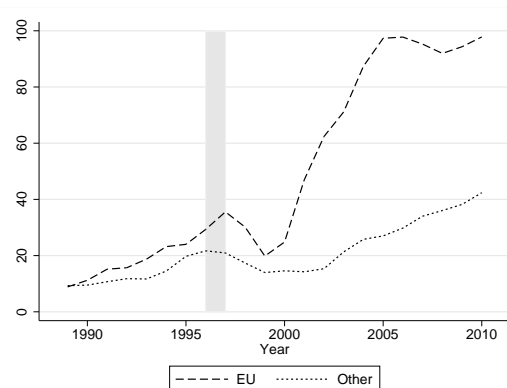
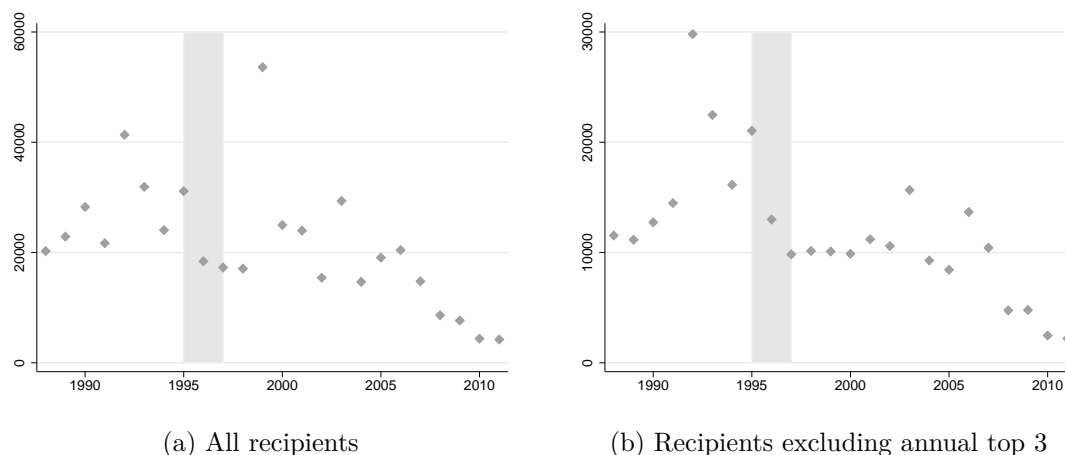


Figure A3.3 – Share of local or triangular purchases

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 A3.4 – Average quantity received from the EU by EU recipient countries (in metric tons)

according to the nutritional standards of the WFP.³⁴

For the first stage, I allow the EU to allocate zero food aid.³⁵ 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:

$$\overline{FA_{drt}} = \beta \overline{FA_{EUrt}} + X_{drt-1}\Gamma_1 + X_{rt-1}\Gamma_2 + \phi_{dt} + \phi_{1dr} + \epsilon_{drt} \text{ if } FA_{drt} > 0 \quad (3.7)$$

$$\overline{FA_{EUrt}} = \lambda Reform_t * P_r^q + X_{drt-1}\Gamma_3 + X_{rt-1}\Gamma_4 + \phi_t + \phi_r + \epsilon_{rt}$$

34. Nutritional 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.

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

Dependent Variable	Has received EU food aid		
	1994-1997	Polynomial power 2	Piecewise quartile
Reform _t * P _r	-0.555* (0.176)	-0.829** (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 3.2 column (2)). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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.

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 3.4 in section 3.4.2.

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)			
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	
Recipients				
Donors	Non EU	All	Non EU	All
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 3.2. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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} .

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	
Egypt	1	0.3125	
El Salvador	1	0.25	

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Recipient countries	P_r	P_r^{1996}	Small country
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	
Malaysia	0.25	0	
Maldives	0	0	Yes
Mali	1	0.5625	
Mauritania	1	0.5625	
Mauritius	0.625	0	Yes

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Recipient countries	P_r	P_r^{1996}	Small country
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	
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	

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Recipient countries	P_r	P_r^{1996}	Small country
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

General Conclusion

Main results

This thesis has investigated the behavior of each aid player - recipients, donors and implementing agencies - based on statistical and micro-econometric techniques.

First this study has explored the change of household's behaviors on production but also sales and purchases. Beneficiaries do adapt their decisions, mostly at the extensive margin. Their reaction depends on the implementing framework. The identification relies on the longitudinal dimension of the ERHS database. The first chapter can reconcile previous puzzling findings on the impact of food aid on production. At the macro level, a decrease in production is generally found (quite small) while no decrease on quantities is found at the micro-level. It could be explained by the absence of reactions conditional on producing but reactions on the decision of producing. Results provided on the chapter show that households also adjust their market participation which is important to insure food security. It has implications in terms of policy to insure food aid is efficient. Beneficiaries adapt their behavior. It must be taken into account when designing aid program to insure no disincentive effects (or at least reduce it): the timing of the allocation, the type of commodities allocated have implications on recipients' behavior.

Second it has shown that implementing agencies must be included when look at aid. In the case of humanitarian aid, I first illustrate that donors and implementing agencies are not the same actors. In addition part of donor fragmentation is mitigated by implementing agencies who concentrate aid from different donors. The second chapter of this thesis also tackles that two types of fragmentation exist: the number of donors (or implementing agencies) and the structure of aid - meaning the presence or absence of lead donor or implementing agencies. Both type of fragmentation may matter and affect humanitarian aid efficiency. Delegating humanitarian aid have pros and cons I develop in a context of relative high fragmentation. Through three case studies, this thesis suggests that, conversely to the international consensus, fragmentation is not always detrimental. These findings have policy implications. First donor fragmentation is not as important as expected. The benefits of coordinating donors could be off set by the drop in humanitarian aid amounts that it could induced. It could be more important to focus on implementing agencies. Donors choose to delegate to implementing agencies: this delegation

may induce efficiency benefits however it introduce a new level that also implies inefficiency.

Finally the third chapter of this thesis show that donors react strategically to each other. Their allocation, at least for food aid, is partly driven by the allocation of the EU. It induces an additional bias on the allocation of food aid that could deter aid efficiency. I investigate the heterogeneity among donors and depending on the type of recipients. European member states tend to step in the EU allocation as well as non European member states for small countries. On the contrary the World Food Program substitutes to the EU in line with her mandate. Developing a simple framework, I am able to develop a typology of donors. Large donors and EU member states react directly because they compare their allocation to the EU allocation. Given these strategic interactions among donors which are driven by two different channels, implement a coordinated system to ensure a better allocation of aid appears even more difficult that expected. However multilateral delegation can partly offset the problem in the case of direct reaction. This chapter also has implications at the European level and question the utility of two levels of food aid programs: national and European as members states tend to step in European allocation.

Further research

This work is the starting point of a rich research agenda that I have developed. The first project is about the efficiency of humanitarian aid. Using details data on the location of humanitarian projects and the identity of the implementing agencies combined with micro-data on households, I would be able to look at humanitarian aid efficiency. Those types of data exists for some countries, including Pakistan.

The second project I would like to develop is about the complementarity or substitutability of different types of aid: humanitarian, development and food. For now I consider implicitly that each type of aid - development, humanitarian and food aid - are independently allocated by donors. Decisions of allocating one type of aid may depend on the past and present allocation of others. Using the case of the European Union reform I would like to investigate whether the reform on food aid allocation also affects the allocation of development and humanitarian aid projects. The EU has reduced the allocation of food aid but may have increased the allocation of humanitarian or development aid.

In the line with the second chapter of my thesis, I intend to investigate in more details who are the fragmenters and concentraters both at the donor and implementing agencies level. Indeed I consider that recipient's characteristics affect the level of fragmentation at both levels but it could be because it attracts specific types of donors and/or implementing agencies. In addition I intend to investigate which donors dilute their aid through numerous implementing agencies and why. I am particularly interested in studying whether fragmenters are related to specific countries or whether within a country some specific donors - government agencies,

NGOs, private firms - are fragmenters. Understanding who fragment aid to different implementing agencies will help to reduce aid fragmentation.

The OECD plans to collect more detailed data on the implementing channel of development aid. It will be interesting to see whether conclusion drawn for humanitarian aid state to development aid. For now I could not investigate this research question because data on the channel are aggregated too broadly to allow enough variations.

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Aide alimentaire et humanitaire : analyses économiques des donateurs aux bénéficiaires

Résumé : Partant du constat que l'aide humanitaire et alimentaire est souvent critiquée pour son efficacité relative, cette thèse étudie les comportements des différents acteurs impliqués pour comprendre par quel biais l'efficacité de l'aide pourrait être réduite. Le premier chapitre se demande comment les ménages bénéficiaires d'aide alimentaire adaptent leur choix de production mais aussi de vente et achat. Il étudie les changements de comportement tant à la marge intensive qu'à la marge extensive. Le second chapitre s'intéresse aux donateurs et aux agences en charge de la mise en œuvre de l'aide humanitaire. Après avoir documenté l'allocation de l'aide humanitaire et sa fragmentation, il étudie les conséquences de la délégation et de fragmentation de l'aide sur son efficacité. A partir de trois cas d'étude, il montre que le niveau de fragmentation en soi ne semble pas déterminer l'efficacité de l'aide. Le dernier chapitre se focalise sur les donateurs d'aide alimentaire. Il analyse les interactions stratégiques des donateurs qui peuvent être source de mauvaises allocations d'aide alimentaire. Pour cela il utilise une réforme de la politique d'aide de l'Union Européenne comme expérience naturelle.

Mots clés : Economie Appliquée, Economie du développement, Aide, Fragmentation, Donneurs, Receveur, ONGs

Three essays on humanitarian and food aid

Abstract: Humanitarian and food aid have been widely criticized because of a lack of efficacy. This thesis investigates the behavior of each different actors involved in the process that could explained the relative efficacy of aid. The first part of the work investigates changes in decisions of production, sales and purchases induced by food aid. It looks at the extensive and intensive margin. The second chapter focuses on donors and implementing agencies. It documents humanitarian aid allocation and fragmentation at both levels. It investigates the potential consequences of delegation and fragmentation on humanitarian aid efficacy. Based on three case studies, the chapter shows that fragmentation is not necessary negative. The last chapter looks at strategic interactions between food aid donors using a reform implementing by the EU as a natural experiment.

Keywords: Applied Economics, Development Economics, Aid, Fragmentation, Donors, Recipients, NGOs.