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**What Explains EU Food Aid?  
An Econometric Analysis**

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## **Abstract**

This study investigates the determinants of EU food aid allocation among recipients for the period 1993-2003 from a political economy perspective. Thereby the analysis differentiates between emergency and non-emergency food aid which is, to the author's best knowledge, not covered by preceding studies.

In a first step, following previous studies investigating the political economy of aid allocation, a hypothetical market for food aid supply and demand is constructed. In order to explain the allocation of food aid among recipients several factors that may determine food aid supply and demand are considered. Beside humanitarian and development objectives, the examination includes commercial and external interests as well as bureaucratic factors in order to account for the fact that the EU has often been criticized to use food aid for commercial and political rather than for humanitarian purposes.

In a second step, empirical evidence concerning the validity of the theoretically derived factors is provided. Using two different econometric approaches commonly applied in the foreign aid literature – the two-part and the Tobit model – the analysis finds that EU food aid is, to a large extent, determined by humanitarian objectives. Most importantly, both emergency and non-emergency food aid allocation of the EU strongly respond to the recipient's average calorie supply per capita. Additionally, the results show that non-emergency food aid is targeted towards countries with low economic and non-economic well-being.

In spite of the clear humanitarian orientation, EU food aid is also determined by external interests and bureaucratic inertia. As concerns the former a positive relationship between food aid donations of other donors and those of the EU suggests that the EU competes with other donors for political influence in the recipient countries. No evidence is found that EU food aid is allocated with a view to reward countries with sound policies and institutions as the widespread discussion about the role of good governance in aid allocation suggests. Instead, EU emergency food aid allocation is biased towards non-democratic countries meaning that the EU, regardless of the recipient's ideological view, responds to the needs of countries which may have a lower capacity to effectively help its people in case of food shortages. Finally, neither the common belief that emergency food aid is particularly responsive to recipients' needs nor the hypothesis that emergency food aid is intrinsically political as compared to non-emergency food aid is confirmed by the analysis.

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## List of Abbreviations

ACP	Countries from Africa, Caribbean, and Pacific (Lomé member states)
Bn	Billion
CAP	Common Agricultural Policy
CIS	Commonwealth of Independent States
DG	Directorate General
EC	European Commission
ECHO	European Community Humanitarian Office
EM-DAT	Emergency Event Database
EU	European Union
FAC	Food Aid Convention
FAO	Food and Agriculture Organisation of the United Nations
FE	Fixed Effects (Panel Model)
GEE	Generalized Estimation Equations
GM	Genetically Modified
HDI	Human Development Index
i.i.d.	independently and identically distributed
IMF	International Monetary Fund
INTERFAIS	International Food Aid Information System
kg	kilograms
LDC	Least Developed Country
LDV	Lagged Dependent Variable
LIFDC	Low Income, Food Deficient Country
LPM	Linear Probability Model
MDG	Millennium Development Goals
Mio	Million
ML	Maximum Likelihood
NGO	Nongovernmental Organization
ODA	Official Development Assistance
OECD/DAC	Development Assistance Committee of the Organisation for Economic Cooperation and Development
OLS	Ordinary Least Squares
PL 480	Public Law 480
PQLI	Physical Quality of Life Index
RE	Random Effects (Panel Model)
SIPRI	Stockholm International Peace Research Institute
t	tons
Tsd	Thousand
UK	United Kingdom

UN	United Nations
UNDP	United Nations Development Programme
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
US	United States
USD	US Dollar
WFP	World Food Programme
WTO	World Trade Organisation



# What Determines EU Food Aid? An Econometric Analysis

## 1 Introduction

### 1.1 Purpose of the Study

Over one decade after the World Food Summit in 1996 and the establishment of the United Nations Millennium Development Goals (MDGs) virtually no progress in reducing hunger has been made, even though the sources of hunger are widely known today. The main problem of hunger is not a capacity for food production insufficient to provide everyone an adequate diet but instead an unequal distribution of resources, i.e. a lack of purchasing power of the poor. In order to solve this disparity problem, resources in form of food aid are redistributed from industrialized towards developing countries. However, even the considerable amount of food aid allocated to developing countries during the past four decades did not help to alleviate hunger in these countries. The consequences are shrinking food aid levels as well as losses in public and political attention devoted to food aid during the past decade.

Today, the development of world food markets poses a new challenge to the fight against hunger. Increasing food demand in developing and transition countries, especially in China and India, the redirection of staple crops, such as maize and wheat, from food uses to biofuel production in the European Union (EU) and United States (US) and increasingly frequent occurrence of droughts, floods and storms as an outcome of climate change have led to a strong rise of world food prices in the recent past. As soaring world prices for agricultural commodities (occasionally called “agflation”) limit the purchasing power, many people in developing countries are exposed to an increasing risk of food insecurity, causing riots such as the so-called Tortilla-Crisis in Mexico in December 2007. The following excerpt illustrates the consequences of these developments for the poorest.

*“A wave of food price inflation is moving through the world, leaving riots and shaken governments in its wake. For the first time in 30 years, food protests are erupting in many places at once. [...] The measures of today’s crisis are misery and malnutrition. [...] Those on \$1 a day are cutting back on meat, vegetables and one or two meals, so they can afford one bowl. The desperate – those on 50 cents a day – face disaster.”*

THE ECONOMIST (2008)

In view of this development, the topic of food aid is once again attracting the attention of not only academics and practitioners of international development, but also governments of donor countries are increasingly under pressure. As concerns the latter, in recognition of the burden

the rise of world market prices poses on developing countries the European Commission (EC) and the US raised the food aid budget by €117 Mio and US\$770 Mio, respectively (EC 2008a, FAO 2008a). This increase in financial support certainly is essential, but is it enough to provide the most vulnerable and food insecure people adequate access to food?

An effective provision of food aid is an essential precondition to reduce hunger and food insecurity in developing countries. However, even though industrialized countries have considerable capacity to help those in need, there is widespread belief that food aid is not efficiently targeted at the poorest and most food-insecure countries as donors follow objectives other than humanitarian concerns, such as trade and geopolitical interests. Especially the US and the EU as the largest bilateral donors have been criticized by scientists as well as practitioners for their mostly self-serving food aid systems.

With a view to future challenges to food security and scarce resources, inefficient food aid systems will be even less tolerated in the future than they were in the past. As the second largest food aid donor the EU has the moral obligation and the capability to contribute to the reduction of hunger and poverty in developing countries, but only if most vulnerable and food insecure people are addressed. In this context, this study investigates the effectiveness and efficiency of EU food aid, or in other words whether EU food aid targets those countries most in need of food aid. Thus, this study aims at finding out whether the EU actually allocates food aid with respect to postulated – humanitarian – allocation criteria necessary to meet the nutritional needs of the very poor, or whether self-interests as for instance commercial and external objectives are at the center of EU food aid allocation.

The thesis has been stimulated by the study of PRINZ (1994), but extends that study in several aspects. First, additional economic and political factors that might determine the allocation of food aid are considered in the analysis. Second, PRINZ neglects the panel structure of the data and merely estimates pooled regression models. This shortcoming is corrected by the econometric analysis at hand which employs Ordinary Least Squares and Limited Dependent Variable models explicitly taking into account the panel data structure. Moreover, a larger coverage of countries is possible due to improved data availability for former Soviet states in the time period considered in this study (1993-2003). Finally, the analysis is augmented by disaggregating total food aid flows into emergency and non-emergency (i.e. project and program) food aid as the objectives of these types of food aid clearly differ from one another. This proceeding further aims at testing the widespread hypothesis that emergency food aid is more responsive to recipients' needs and to a lesser extent motivated by donors' interests than project and program food aid. As it is rather assumed on theoretical considerations than based

on empirical evidence this hypothesis is important to examine, especially in view of the rising importance of emergency food aid vis-à-vis project and program food aid.

## **1.2 Organization of the Study**

The thesis is organized as follows. Chapter 2 gives detailed information about the role and importance of food aid in total development aid as well as major food aid donors and recipient regions. Further, main characteristics of different types of food aid – i.e. emergency, project, and program food aid – are reviewed, including a discussion of its virtues and limitations in reducing poverty and food insecurity.

Chapter 3 illustrates the particular food aid system of the EU. First, the development of food aid supply, again separated into emergency, project, and program food aid, during the past 20 years is presented. Afterwards, the development of EU food aid policy and the regulative system are reviewed and put into the context of the development of world agricultural markets and agricultural policy.

In Chapter 4, EU food aid is subject to a theoretical examination. More precisely, a political market for EU food aid is constructed by means of Public Choice Theory. Similar to economic theory, it is postulated that food aid allocation can be explained by food aid supply and demand. Thus, several determinants of food aid supply of donor countries and food aid demand of recipients are established. The chapter concludes with an application of the theory in order to explain the impacts of the recent food price rise on the food aid market equilibrium.

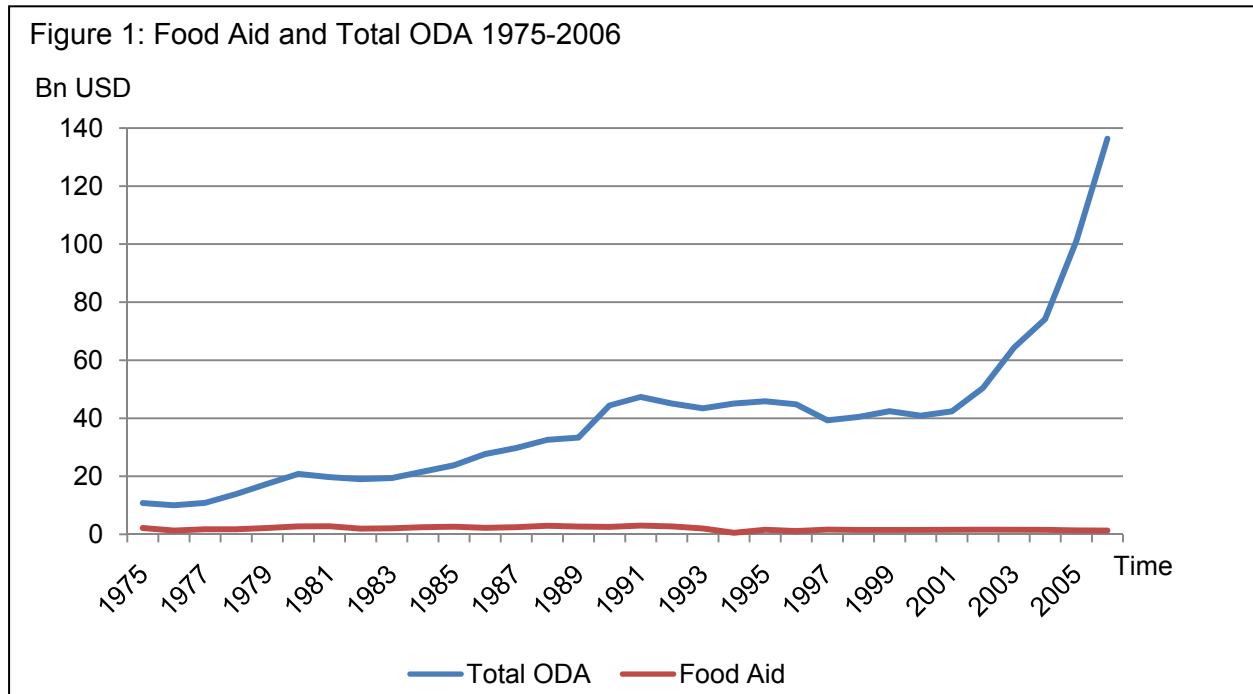
Based on these theoretical considerations, Chapter 5 empirically investigates which factors determine EU food aid allocation by applying econometric techniques. To this end, the econometric methods used in the analysis are first briefly introduced. After providing detailed information about the model specification and data used in the analysis the estimation results are presented. This is followed by a synthesis and a profound discussion of the estimation results as well as an evaluation of the virtues and limitations of the analysis. The thesis concludes with a summary of the main findings and implications.

## **2 Food Aid as an Aid Instrument**

Today as in the past, economic well-being dramatically differs across countries. On one side of the scale, the rich countries' populations live in abundance of resources – although certainly not entirely free from poverty – whereas, on the other side of the scale, a large share of the population in poor countries suffers from hunger and malnutrition. Helping poor countries in alleviating hunger and poverty is thus a moral obligation for rich countries. For this reason a considerable amount of food aid is distributed from industrialized to developing countries. However, as food aid is only a fraction of total foreign aid this chapter sets food aid in the perspective of Official Development Assistance (ODA) and gives an introduction to basic characteristics and principles of the food aid system on the global level. First, the importance and effectiveness of food aid as an instrument of ODA is discussed followed by a brief presentation of major food aid donors and destinations. Going into more depth, the different food aid types – emergency, project, and program food aid – and food aid procurement are then illustrated, including their major virtues and shortcomings in reducing hunger and poverty.

### **2.1 Food Aid in Official Development Aid**

It is well known that enough food is produced globally to provide each person an adequate diet for a healthy life. Aggregate figures of food availability, however, hide the fact that many people lack the access to food sources to meet their nutritional needs. Recent estimates of the Food and Agriculture Organization of the United Nations (FAO) find that 852 Million (Mio) people – corresponding to one-eighth of the world population – suffer from hunger (FAO 2006a). The FAO established the goal of a per capita intake of 2 350 calories per day which is currently not met in approximately 60 countries (MAXWELL and BARRETT 2005 p. 8). Although food insecurity is often visible at the country level, more often it is not. More precisely, even if the calorie supply in a country as a whole is in principle sufficient to provide everyone an adequate diet, particular groups of the population still may suffer from hunger. This is for example the case in the Democratic Republic of Congo, Somalia, Afghanistan, and Burundi where more than two-thirds of the population were undernourished during the period 1988-2000 (FAO 2002). Basically, the reason for this problem is an unequal distribution of resources both between and within countries. If poor people lack the purchasing power to compensate chronically insufficient production and short-term production shortfalls by food purchases on local and international markets the consequence is hunger. Since developing countries often do not have the means, and sometimes not the will, to help their food insecure population, rich countries are obliged to support poor countries in overcoming this problem. In order to alleviate poverty and hunger,



Source: OECD/DAC (2008).

considerable efforts in form of ODA are made – with a sharply increasing volume in the past decade as shown in Figure 1.

Food aid is a subcategory of ODA which is defined by BARRETT and MAXWELL (2005 p. 254) as the “provision of food commodities for free or on highly concessional terms to individuals or institutions within one country by foreign donors”. As such food aid is characterized by the (1) international sourcing of (2) resources allocated on concessional terms (3) in form of or for the provision of food. This definition unambiguously distinguishes food aid from other assistance programs, intra-national food transfers and commercial international food trade (BARRETT and MAXWELL 2005 p. 5).

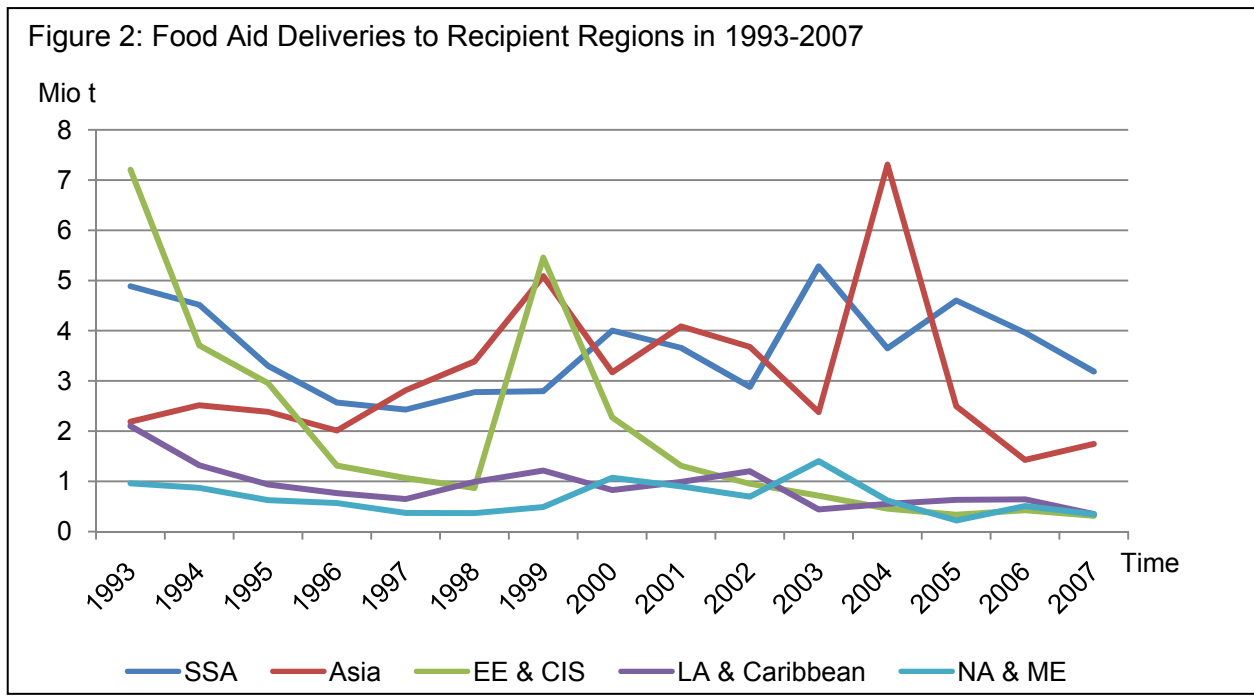
One important aspect of the above definition of food aid is that a considerable grant element is required to qualify food deliveries as food aid. To provide “considerable grant element” does not necessarily and against conventional wisdom mean that food aid is allocated for free. Food aid may also be provided as loans, as for instance parts of US food aid, meaning that food aid is a transfer of resources on at least concessional terms from high income countries to developing countries. Thus, food aid fundamentally is an entry into the recipients’ balance of payments in order to stimulate its development and economic growth (BARRETT 1998, WFP 2008).

In spite of the high public awareness of food aid as compared to other forms of foreign aid which is merely due to its visibility and public interest in emergency situations, the share of food aid in total ODA is very small. Figure 1 shows that – contrarily to the dramatic rising trend in ODA

since 2000 – the amount of food aid deliveries decreased since the early 1990s. That is, after averaging 6.6% of total ODA in the period 1975-2000 food aid deliveries worldwide declined to only 1.8% in 2001-2006.

Also the share of food aid in world food production and commercial food trade is of minor importance accounting for only 0.2% of cereal production and 2% of cereal trade in 2007 (WFP 2008, note that the share refers to cereal not food production and imports). As food aid is an instrument of development aid with special focus on relieving food insecurity and hunger 90% of food aid goes to low income food deficient countries (LIFDCs) and 61.5% to Least Developed Countries (LDCs). However, even in the group of LIFDCs food aid deliveries only amount to 0.4% of total cereal production, but to 5.5% of LIFDCs cereal imports in 2007 (WFP 2008). On average, the share of food aid products in total food consumption equaled 2.5% in developing countries in 2001-2003. However, this share may be much larger for selected economies. In Eritrea, for instance, the share of food aid in total food consumption reached 45.7% in 2001-2003 implying that food security in selected LIFDCs depends to a substantial degree on food aid (FAO 2006b).

At the regional level Asia was historically the largest recipient of food aid.<sup>1</sup> With its rapid



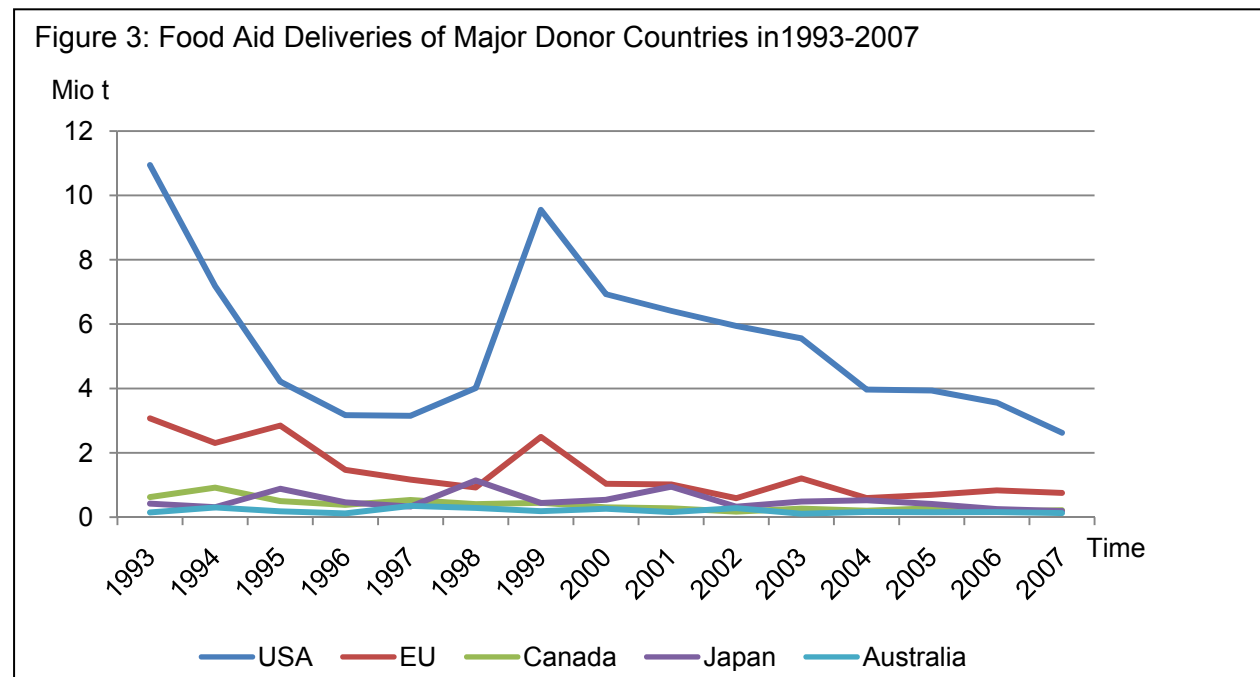
SSA=Sub-Saharan Africa, LA & Caribbean=Latin America and the Caribbean, EE & CIS= Eastern Europe and the CIS, NA & ME=North Africa and Middle East. Source: WFP/INTERFAIS (several years).

<sup>1</sup> Please note that food aid data used throughout this study are obtained by the International Food Aid Information System (INTERFAIS) database and has been provided courtesy of the World Food Programme (WFP). Cereals are specified in grain equivalents, other commodities in actual quantities.

economic growth in the 1960s and 1970s, Asia was replaced as the largest food aid recipient by Sub-Saharan Africa in the mid-1970s which suffered from economic stagnation and civil strife (BARRETT and MAXWELL 2005 pp. 10). As illustrated in Figure 2, this constellation remained in principle unchanged until today although the share of food aid delivered to Sub-Saharan Africa increased in recent years from 28% in 1993 to its all time high of 60% in 2006 (with 4.1 Mio tons) this is not the highest amount absolute terms). This increase, however, comes at other regions' expense, most notably Asia whose share in total food aid decreased from 40% in 1998 to merely 18% in 2006, corresponding to 1.2 Mio t.

The end of the Cold War in the early 1990s led to a sharp increase of food aid deliveries to the former Soviet Union, thereby temporarily cutting down food aid flows to Africa and Asia. However, in the following years the amount of food aid to Eastern Europe and the Commonwealth of Independent States (CIS) fell rapidly, with a sole exception in 1999 when the Russian ruble crisis again triggered large food aid deliveries to Eastern Europe.

While the regions of destination varied considerably over time, the donors of food aid remained largely unchanged. Figure 3 presents major bilateral food aid donors in 1993-2006. Although food aid is given by many industrialized countries, the major share is concentrated on few donors. The US is historically the largest donor of food aid with food aid shipments accounting for 95% of total food aid in the mid-1960s. The US share in total food aid declined to one-half to two-thirds in the 1980s, averaging 72% in the period 1996-2006. Even though US food aid flows in total terms declined steadily since 1999, its share in total food aid reached 75% in 2006. This



Source: WFP/INTERFAIS (several years).

means that US food aid decreased at a slower pace than other donors' food aid contributions. Food aid donations of the EU as the second largest donor averaged 15.5% in 1996-2006. However, since the mid-1990s EU food aid donations were considerably reduced as a result of major reforms of its food aid policy, which will be reviewed in greater detail in Chapter 3. Other important bilateral food aid donors are Canada and Australia, averaging 4.7% and 3.1% of total food aid flows in the period 1996-2006. Further, Japan delivers 7.9% of total food aid which is primarily headed towards its Asian neighbor countries (WFP/INTERFAIS several years, COLDING and PINSTRUP-ANDERSEN 2002 p. 198).

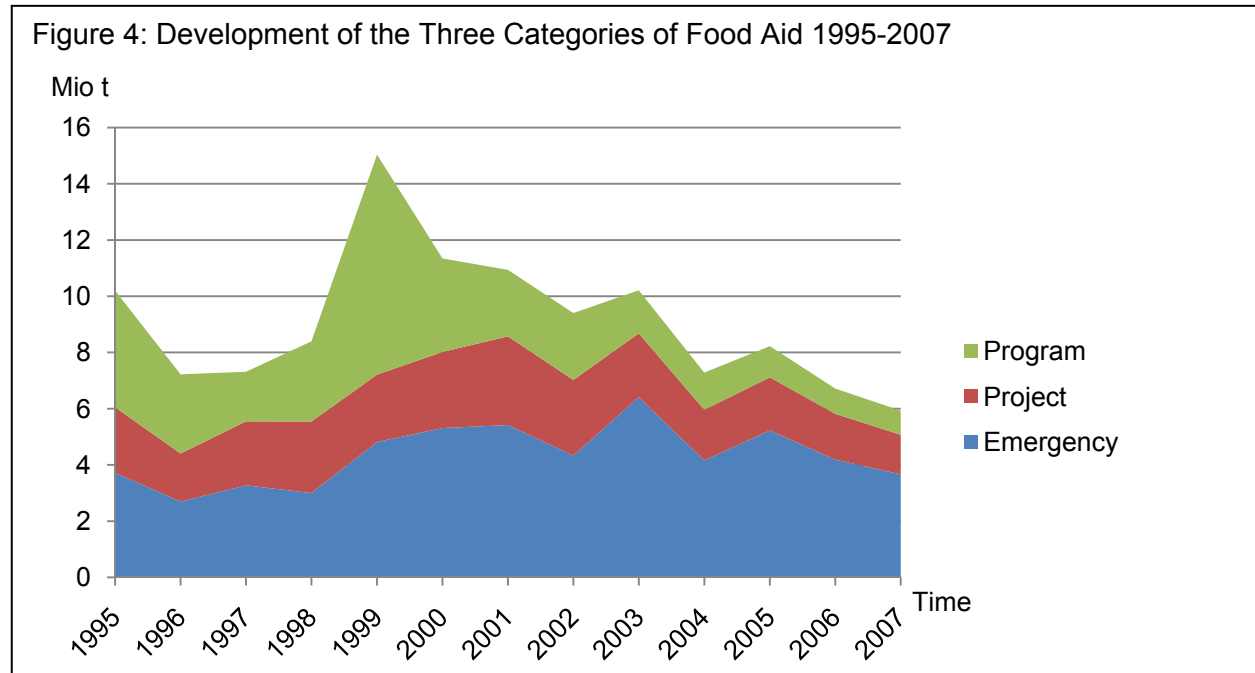
Even though food aid may in principle enhance food security – given that it is targeted to vulnerable and food insecure households, supports agricultural infrastructure and is allocated to avoid adverse price effects – during the past two decades food aid faced sharp criticism which finally led to the decline of food aid in total development aid. As compared to private, well-functioning markets, food aid is considered as an inefficient and unsustainable instrument for both reducing poverty and food insecurity and addressing shortfalls in food availability in developing countries (CLAY et al. 1998, CLAY 2000, DEL NINNO et al. 2007). Moreover, COLDING and PINSTRUP-ANDERSEN (2002) point out that hunger is a problem of mutually interactive factors which cannot be solved by food aid alone due to its limited capacity in combating the causes of hunger, i.e. poverty. However, even though the ability of food aid to reduce structural food insecurity caused by poverty is questionable, the importance of food aid in brief periods of localized food shortages which cannot be corrected by local markets should not be undervalued (GILLIGAN and HODDINOTT 2007). Regardless of its minor share in total development aid, BARRETT and MAXWELL (2005 p. 6) emphasize that food aid is an important instrument to “make a big difference at the margin by relieving shortfalls in food availability that contribute directly to widespread, often acute hunger, malnutrition and undernutrition [...]”. Thus, the virtue of food aid is short-term relief for highly vulnerable and food insecure people in poorly functioning markets. Obviously, there is a common understanding in the literature that food aid effectiveness largely depends on the purpose of food aid which is strongly associated with the type of food aid. In order to evaluate EU food aid allocation it is thus important to be aware of the basic concepts, virtues and limitations of the different types of food aid – emergency, project, and program food aid – which will be discussed in the following sections.

## **2.2 Types of Food Aid**

So far food aid has been treated as a homogenous instrument of development aid. In fact, food aid is commonly differentiated in emergency, project, and program food aid. Project and program



food aid (also called development or non-emergency food aid) target at long-term development and poverty reduction in the recipient country. In contrast, emergency food aid (also called humanitarian or relief food aid) is seen as an instrument of relief in humanitarian catastrophes caused by natural or man-made disasters (GABBERT 2000 p. 29, BARRETT and MAXWELL 2005 p. 13).



Source: WFP/INTERFAIS (2008).

Traditionally, program food aid was by far the most important type of food aid until about 1990. In the 1990s, however, substantial criticism of program food aid led to a sharp decline in program food aid associated with an increasing importance of emergency food aid. As a consequence, emergency food aid replaced program food aid as the major type of food aid in 1996, with the exception of 1999 where the ruble crisis led to massive program food aid deliveries to Russia. In fact, Figure 4 reveals that even project food aid, which historically made up the smallest fraction of food aid, overtook program food aid in 2001. Due to its continuing downward trend the share of program food aid in total food aid merely equaled 14% in 2007, while emergency and project food aid accounted for 62% and 24%, respectively (WFP 2008). In order to understand these dramatic changes it is necessary to have a closer look at major virtues and shortcomings of emergency, project, and program food aid.<sup>2</sup>

<sup>2</sup> The following treatment is restricted to the most commonly mentioned aspects of food aid and is thus far from being exhaustive. For a more detailed treatment see for instance COLDING and PINSTRUP-ANDERSEN (2002).

### 2.2.1 Program Food Aid

Program food aid, which was first introduced by the US in 1954 under Public Law (PL) 480, constituted the first type of official food aid. Program food aid primarily aims at reducing poverty in developing countries. It is directly given to the recipient's government on a bilateral basis (government-to-government) either as a grant or on concessional terms. The share of food aid on concessional terms is, however, almost negligible as the share of program food aid given as grants increased from 61.7% in 1972 to 98% in 2006. Only the US continues to supply program food aid as loans while the EU and other donors deliver program food aid exclusively as grants (COLDING and PINSTRUP-ANDERSEN 2002, WFP 2007).

Program food aid may be provided as food aid in kind or in form of cash transfers. If the former is the case, the recipient's government has the possibility to directly transfer commodities as gifts in kind to poor and food insecure households or to monetize food aid, which means that the commodities are sold on the market with the revenue usually going to the government. In the case of monetization, food aid in kind is essentially the same as cash transfers which are budgetary resources used to generate revenues in domestic currency in form of counterpart funds. These serve as a source of public revenue and may reduce balance-of-payment deficits of the recipient country. The recipient's government can use these additional resources either to provide public goods, for instance physical infrastructure, agricultural research or health and education services, or to redistribute income to poor population groups (HERRMANN and PRINZ 1993, BARRETT 1998, GABBERT and WEIKARD 2000, COLDING and PINSTRUP-ANDERSEN 2002).

Program food aid typically includes formal agreements which oblige the recipient to channel resources into uses approved by the donor ("conditionality"). These agreements, however, are unlikely to impose any restriction on the use of food aid. In fact, in the case of cash transfers and monetization of food aid in kind recipients are free to use program food aid donations without significant restrictions due to the fungibility of budgetary resources. That is, resources can be re-directed from the intended and agreed purpose to other purposes (BARRETT and MAXWELL 2005 p. 15, HAGEN 2006). Consequently, BARRETT and MAXWELL (2005 p. 13) argue that program food aid essentially is "nothing else than foreign aid provided in the form of food".

Unfortunately, program food aid is characterized by several shortcomings, which made it a frequent object of criticism and finally led to the sharp decline of program food aid since the 1990s. First, on the microeconomic level program food aid may cause adverse producer incentives, the so-called disincentive effects. By adding to the domestic food supply, food aid deliveries in kind push local food prices down thereby reducing the returns and competitiveness of agricultural production. This consequently leads to a decreasing food production in recipient

countries and lower farm incomes. If one additionally takes into account that the poorest parts of the population often live in rural areas and crucially depend on agricultural production, program food aid may rather hurt than support the poorest, most vulnerable and food insecure groups (SCHULTZ 1960, MAXWELL and SINGER 1979, MAXWELL 1991 pp. 66, CLAY et al. 1998). Recent studies, however, question the existence of disincentive effects arguing that program food aid has no or only minor impacts on local production (BARRETT 2002a, LOWDER 2004, ABDULAI et al. 2005).

Second, program food aid is considered a cost-ineffective transfer of resources as the transaction cost of food aid in kind, which include transport, handling, storage and administration, are likely to be higher than transaction cost of aid donated in cash. Generally speaking, the cost-effectiveness of program food aid is determined by the source of food aid, which will be discussed in greater detail in Section 2.3. CLAY et al. (1996) finds that EU program food aid is most cost-effective when the sources of food are either commercial imports arranged by the recipient or purchased nearby the affected region (i.e. triangular transactions or local purchases). Conversely, food aid procured on EU markets is less likely to be cost-effective. Therefore, if more flexibility in sourcing or budget support instead of in kind deliveries are allowed, a substantial reduction in costs, or an increase in food aid contributions at equal expenses is possible (COLDING and PINSTRUP-ANDERSEN 2002).

Third, it is argued that recipients' governments often use the financial resources given as food aid for activities other than distributing food to food insecure people. In this case program food aid fails to meet its target to increase the food security of the most vulnerable groups of the recipients' population while at the same time benefiting the political powerful (BARRETT and MAXWELL 2005).

Despite the strong criticism of program food aid in general, the role of program food aid in alleviating poverty and food insecurity depend on several factors, most importantly on the demand and supply situation of food staples, economic policies in the recipient country, the targeting, and on the source of food aid commodities (HERRMANN and PRINZ 1993, JAYNE et al. 2001, BARRETT 2002b). A conclusive evaluation of program food aid thus requires a more detailed assessment of the particular arrangement of food aid and the specific conditions in each recipient country.

### 2.2.2 Project Food Aid

The major objective of project food aid is to support particular projects related to poverty-reduction and disaster-prevention activities, thereby improving the nutritional situation of

vulnerable, often remote, parts of the population. Most commonly known projects supported by project food aid are food for work programs, school feeding initiatives, and supplemental feeding programs for mothers and children (GABBERT 2000 p. 30).

As project and program food aid aim at long-term reduction of poverty and food insecurity both types of food aid share several characteristics. Similar to program food aid, project food aid may be donated as cash transfers or as food aid in kind which is either freely distributed to vulnerable and food insecure groups or sold on the market (WFP 2007). Thus, project food aid supports local interventions rather than governments and is therefore more frequently distributed in kind than monetized. Due to its use in local interventions project food aid is usually provided multilaterally through international organizations and nongovernmental organizations (NGOs), most importantly the World Food Programme (WFP) (COLDING and PINSTRUP-ANDERSEN 2002). However, since program food aid today is also channeled through international organizations and NGOs and project food aid is also given to recipients' governments, it is increasingly difficult to differentiate between both types of food aid (BARRETT and MAXWELL 2005 p. 13).

Despite its strong similarities, the stable amount of project food aid, as opposed to the sharp decline in program food aid, in recent years implies that project food aid has some desirable properties when compared to program food aid. Most importantly, project food aid is often distributed in kind and thus particularly suitable in situations where food is more valuable than cash transfers, that is, in acute or chronic food insecurity due to insufficient supply and poorly functioning markets. But even in efficient markets it is possible that food aid in kind is preferable to cash transfers as project food aid has proved to be more appropriate in targeting vulnerable groups. Also, if properly targeted direct distribution of food aid commodities to households particularly benefit rural households and has less adverse effects on those who are excluded from food aid which is due to the fact that in kind deliveries have weaker effects on the demand side than cash transfers (BASU 1996, ARNDT and TARP 2001). Finally, given that women usually control food whereas cash is more likely to be managed by men COLDING and PINSTRUP-ANDERSEN (2002) argue that food aid in kind strengthens the power of women over household resources. This is expected to have a positive impact on food security and child nutrition as evidence suggests that women distribute household resources more equitable between household members than men.

Regardless of its merits, project food aid is also subject to criticism. First, similar to program food aid, project food aid may have disincentive effects by adversely affecting food prices and farmers' income. Second, food transfers are expensive, logistically difficult to handle and thus often ill-timed. Finally, no improvement in food security can be expected if the composition of food products do not meet the (micro-)nutritional needs of the target group or if supplementary

factors, such as hygiene, nutrition knowledge and adequate health care, are required but not provided (COLDING and PINSTRUP-ANDERSEN 2002). The effectiveness and efficiency of project food aid in reducing poverty and improving food security is thus largely determined by the particular design and implementation of each project.

### 2.2.3 Emergency Food Aid

The general intention of emergency food aid is to support people affected by some kind of acute emergency such as floods, droughts, hurricanes, economic shocks, or civil war and conflicts, and who are not able to meet their nutritional needs for a limited period of time. Food aid increases food security among those affected by natural or man-made disasters, including refugees and internally displaced persons, and serves as an important instrument of emergency relief and post-crisis rehabilitation. In the case of natural disasters, well-targeted food aid may also help to prevent emergency-induced migration and political instability (BARRETT 1998, GABBERT and WEIKKARD 2000, COLDING and PINSTRUP-ANDERSEN 2002, BARRETT and MAXWELL 2005 p. 14). Emergency food aid is clearly distinct from project and program food aid as it is exclusively provided as gift and generally aims at short-term relief.

The share of emergency food aid in total food aid experienced a sharp increase at the end of the 1990s. Basically, this expansion reflects two developments. Besides the sharp reduction of program food aid, an increasing frequency of man-made and natural disasters, with the latter usually being accredited to climate change, more often requires short-term food aid deliveries in order to reduce the burden of affected people (CHRISTENSEN 1999, GABBERT 2000 p. 32, ADDISON 2002, BARRETT and MAXWELL 2006).

In contrast to program and project food aid, which may have serious negative impacts on the economy of the recipients, most importantly disincentive effects, emergency food aid is usually exempted from this criticism. This is due to the fact that food aid is essential in natural and man-made emergencies when people do not have access to food neither by own production nor by purchasing food on the market. Even though it is commonly acknowledged that emergency food aid has no or only minor adverse effects on the recipient's economy and agricultural sector, it nevertheless shares some shortcomings of project and program food aid. Emergency food aid is rather costly, often ill-timed and does not take into account the needs of the recipient countries in an adequate manner, especially with a view to the provision of micronutrients. Additionally, even though well-intended, humanitarian food aid during war may prolong and intensify conflict if the relief falls in the hands of belligerents. However, only 2% of food aid channeled through the WFP is lost this way (STEWART 1998, ADDISON 2002). Also, the impacts of emergency food aid

on the recipient countries are controversially discussed lately. Recent case studies of GELAN (2007) and CHABOT and DOROSH (2007) find disincentive effects of food aid on domestic agricultural production in countries receiving a large share of food aid for emergency relief, e.g. Ethiopia. Nonetheless, it is commonly agreed upon that emergency food aid is more demand-driven and responsive to the needs of the targeted groups than program and project food aid (NEUMAYER 2005).

Altogether, as already mentioned, the effectiveness of food aid on the recipient's economy crucially depends on the sourcing of food aid commodities. As an assessment of food aid is not possible without taking into account its procurement, the following section will briefly address the major types of procurement and its development.

### **2.3 Sources of Food Aid**

Commodities used as food aid may be procured in three different ways. The largest share of food aid is procured as direct transfers, meaning that food commodities originating from donor countries are shipped to the recipients. Commodities may also be purchased in surplus regions of the recipient country itself – so-called local purchases – or sourced in third countries, which are mostly developing countries other than the recipient – known as triangular transactions (CLAY and BENSON 1991 pp. 143).

The dominance of direct transfers is due to its role as a convenient opportunity to dispose agricultural surpluses of donor countries which was the main purpose of the US and the EU food aid as the largest bilateral donors prior to the early 1990s. However, with major modifications in both agricultural and food aid policy of the EU in the mid-1990s the structure of food aid procurement slowly began to change (BARRETT and MAXWELL 2005 pp. 55). Moreover, the increase in procurement outside the donor country is further supported by the shift from program towards emergency food aid. That is to say, triangular transaction and local purchases are more likely to be linked to emergency and relief responses because of problems and shortages associated with the ad-hoc sourcing of appropriate commodities (CLAY 1994 p. 20).

Although direct transfers still made up for 59% of total food aid (3.5 Mio t) in 2007, its share in total food aid recently declined. While the EU almost eliminated direct transfers with only 1% in 2007, virtually all of US food aid is still procured in the US (99.3% in 2007). As the amount of direct transfers declined, local purchases and triangular transactions gained in importance and most recently accounted for, respectively, 17% and 24% of total food aid (1.0 and 1.4 Mio t in 2007) (WFP 2008).

From the donors' as well as the recipients' point of view this is a welcomed development since commodities purchased from inside or nearby the affected, food insecure region may benefit for the recipient country – or other developing countries in the case of triangular transactions – as well as the donor in several ways. First, delivery lags are reduced as commodities are not shipped from the donor country to the recipient but purchased locally. Second, transportation costs are reduced leading to higher cost efficiency in procurement and delivery and, third, locally bought food usually suits the tastes and nutritional habits of the local population. Finally, local purchases and triangular transactions stimulate demand thereby supporting farmers and the agricultural sector in the region where the purchases are made. This minimizes or even eliminates the potentially disincentive and devastating effects of food aid in the recipient region or country (CLAY and BENSON 1991 p. 143, PRINZ 1994 p. 21, ZERBE 2004, BARRETT and MAXWELL 2005 p. 59).

To sum up, food aid is a complex and dynamic system. The effects and effectiveness of food aid depend on myriad factors, most importantly the type and procurement of food aid. In recent years major changes in food aid donations highlights two basic concerns. On the one hand, the rise in emergency food aid mirrors the inappropriateness of food aid as a single means of long-term poverty reduction, which may even have adverse effects on the recipient's agricultural sector, whereas the importance of food aid as short-term relief was underscored in the past. On the other hand, the increasing share of triangular transactions and local purchases in times of shrinking agricultural surpluses implies that donor interests other than development assistance may play a significant role in food aid allocation, as for example agricultural sector and geopolitical interests. This is supported by the fact that major food aid donors represent the world's leading food exporters and geopolitical influential and powerful democracies (BARRETT and MAXWELL 2005 p. 12).

### 3 Food Aid in the EU

The previous chapter already indicates that food aid allocation generally does not only serve recipients' needs but also multiple donor interests. As this chapter will show, the EU is no exemption from this. However, in order to make inferences about the determinants of EU food aid it is inevitable to understand its genesis and its structure as well as how it has evolved over time. Therefore, based on the previous introduction to the global food aid system and its basic concepts, virtues, and limitations, this chapter reviews the particular food aid regime of the EU. First, the development of EU food aid flows is illustrated, followed by a discussion of EU food aid policy and regulation. Thereby, the objectives of the EU in form of stated and non-stated intentions of food aid are highlighted.

One remark is appropriate at this point. There are basically two forms of European food aid. The first form refers to the collective allocation of food aid of all EU members and is officially granted by the EC. As for the second form, single EU member states independently provide food aid to developing countries which is, however, not covered in this study as food aid of individual member states is not subject to the EU regulation but to the sovereignty of the member states. Instead, focus is given to the first form which is usually labeled EC food aid. However, throughout this study it will be referred to as EU food aid.

#### 3.1 Trends in EU Food Aid

Due to sharp criticism of food aid, in particular food aid delivered by the US and the EU, and falling agricultural surpluses during the past two decades, EU food aid was subject to major changes in both the total amount of food aid provided and its structure. Even though food aid deliveries during the period 1976-2006 averaged 15.5% of total EU foreign aid, Table 1 shows

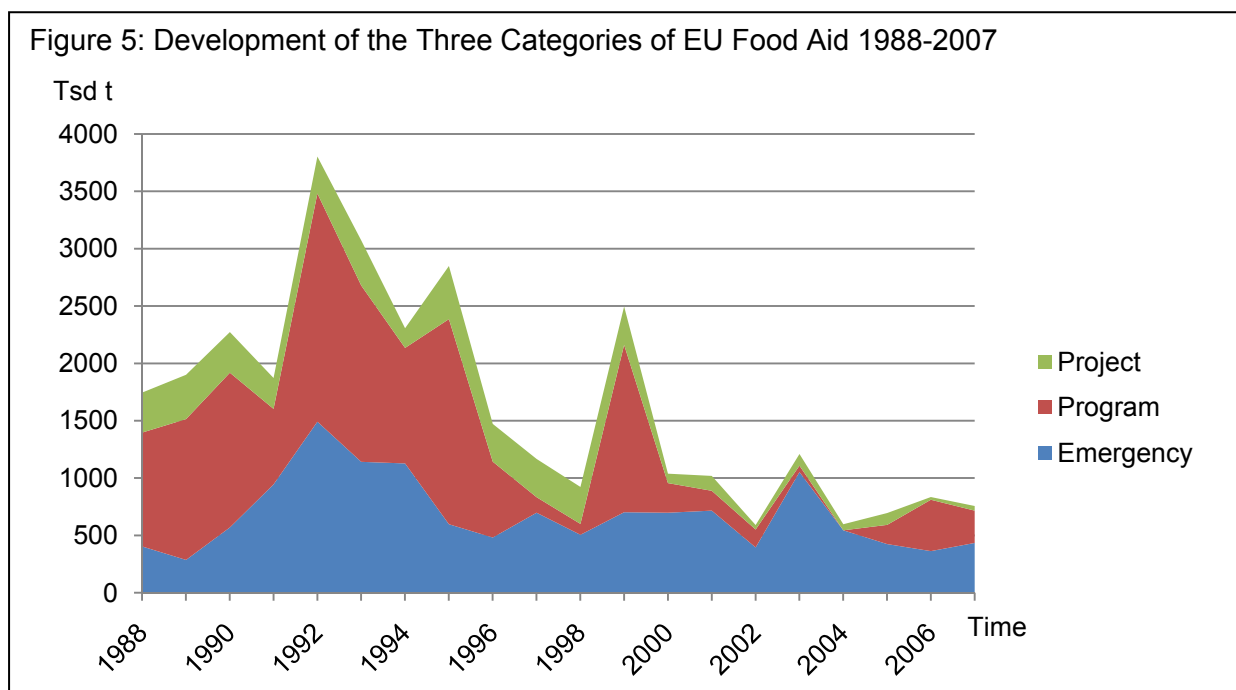
Table 1: Share of Food Aid in EU Development Aid

Year	Total ODA (Mio USD)	Food aid (Mio USD)	Share of food aid in ODA (%)
1978	716.33	219.35	30.62
1982	862.11	326.65	37.89
1986	1 413.41	182.69	12.93
1990	2 495.68	399.88	16.02
1994	4 396.37	n.a.	n.a.
1998	4 461.55	363.54	8.15
2002	5 101.89	317.20	6.22
2006	9 366.68	275.67	2.94
Ø 1976-2006	3 337.29	297.20	15.50
Ø 1976-1990	1 270.54	276.88	25.05
Ø 1991-2006	5 274.86	361.44	7.49

n.a. = not available. Source: OECD/DAC (2008).



that the share of EU food aid actually fell from almost 40% of EU foreign aid in 1982 to merely 3% in 2006. The development of EU food aid in total EU development aid is thus consistent with the development of food aid at the global level.



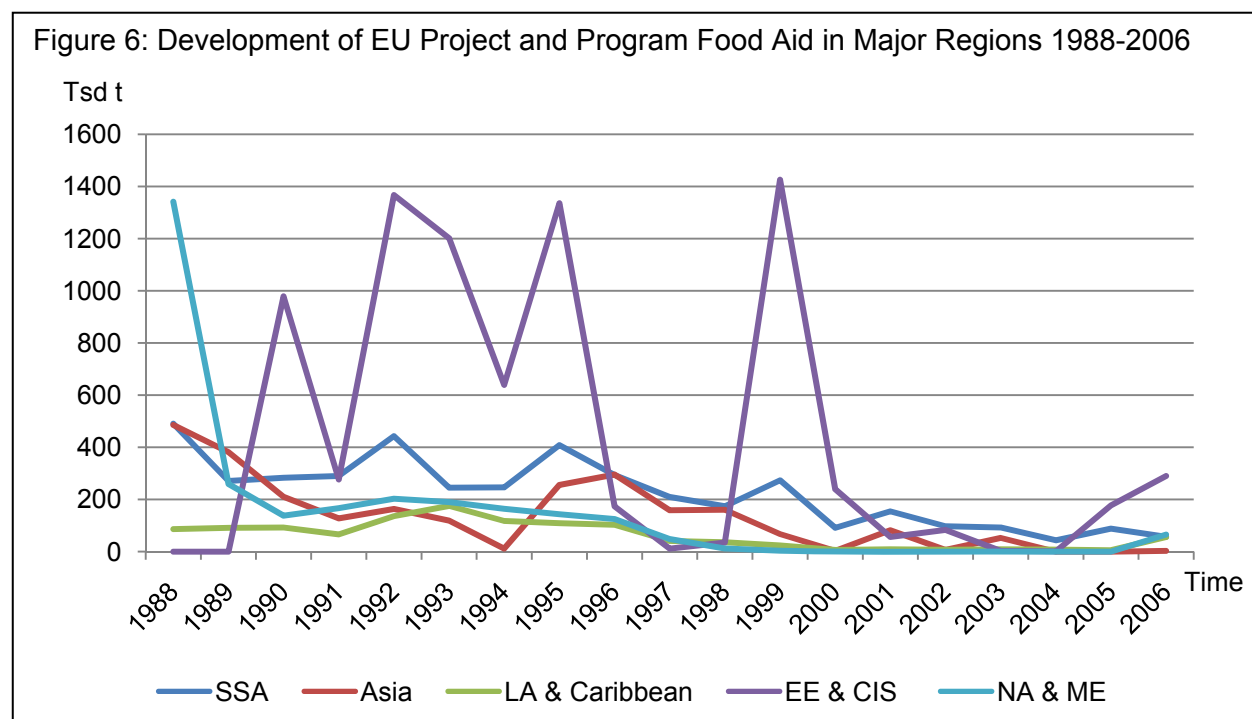
Source: WFP/INTERFAIS (2008).

After reaching its peak with 3.8 Mio t in 1992 the total amount of EU food aid declined to only 0.6 Mio t in 2002. Figure 5 presents the development of food aid over the past 19 years decomposed into emergency, project, and program food aid. Over the whole period considered emergency food aid was the most important type of food aid with a share of 48.6% of total food aid, followed by program food aid with 36.9% and project food aid with 14.5%. However, the importance of each type of food aid was subject to major changes over the period, which is largely owed to a sharp decrease of the amount of program food aid (not at least triggered by the criticism of program food aid) whereas the amount of emergency and project food aid remained rather stable. Consequently, the share of program food aid fell behind that of emergency food aid in mid-1990s with the exception of 1999 where, again, a huge amount of program food aid was shipped to Russia in view of the ruble crisis. In order to analyze the patterns and determinants of EU food aid allocation a more comprehensive understanding of the structure of EU food aid is essential. With a view to the upcoming econometric analysis the

remainder of this section will present the development of EU food aid separated into two groups – emergency as well as project plus program food aid.<sup>3</sup>

The total amount of project and program food aid together shows large variations with the highest amount of 2.3 Mio t supplied in 1992. The high degree of volatility of project and program food aid is surprising since both types of food aid aim at long-term poverty reduction which would imply rather constant food aid flows. If the high degree of variability also is present at the country level, the unpredictability of aid flows may lead to losses in effectiveness (CELASUN and WALLISER 2008). Since 2000 the amount of project and program food aid was drastically reduced reaching 0.05 Mio t in 2004. Only recently, program food aid began to increase again, which is, however, solely caused by deliveries to the CIS. Coincidentally, the revitalization of program food aid to the CIS came along with the accession of the ten Central and Eastern European Countries to the EU.

Figure 6 shows that important recipient regions of project and program food aid are Sub-Saharan Africa with 32% and Asia with 15% of total project and program food aid deliveries. However, with 36% of project and program food aid on average the CIS and Eastern Europe is the most important recipient region. An interesting relationship is to be mentioned with respect to



SSA=Sub-Saharan Africa, LA & Caribbean=Latin America and the Caribbean, EE & CIS= Eastern Europe and the CIS, NA & ME=North Africa and Middle East. Source: WFP/INTERFAIS (2008).

<sup>3</sup> In the following project and program food aid are not treated separately but as one group as the econometric analysis in Chapter 5 examines project and program food aid jointly. Please note that in the following the expression project and program food aid actually refers to project plus program food aid.

the dominance of the CIS as program and project recipient. In the aftermath of the Cold War the EU faced international criticism accusing the EU to divert a considerable part of development aid to the former communist states and thus, to withdraw important resources from other regions in need, such as Sub-Saharan Africa. The leading position of the CIS in Figure 6 seems to confirm this criticism as the amount of program food aid sharply increased after the fall of the Berlin Wall, whereas no food aid at all was delivered to the communist Soviet states during the Cold War. This relationship suggests that political interests strongly influence the allocation of food aid to particular countries (for a separate illustration of project and program food aid see Figures A.13 and A.14 in the appendix).

However, the regional approach hides the fact that single countries within one region receive a much higher quantity of food aid than other countries of the same region. Therefore, a detailed record of project and program food aid deliveries to recipients in total as well as in per-capita terms in the period 1988-2006 is given in Table 2. For brevity, table 2 only includes the 15 most important recipients in terms of total food aid. An extension of this table including all recipients can be found in table A.16 in the appendix. Table 2 shows that CIS countries, most prominently the Russian Federation (rank 1), Poland (3), Albania (5), and Georgia (8), received huge amounts of food aid (summed over all years 1988 to 2006). Even though the EU provided food aid to the CIS in only a few years, these deliveries exceeded shipments to other countries that received food aid for a much larger part of the period. In the most extreme case Poland amounts to the third largest recipient of project and program food aid in total terms by receiving

Table 2: Allocation of EU Project and Program Food Aid across Major Recipients in 1988-2006

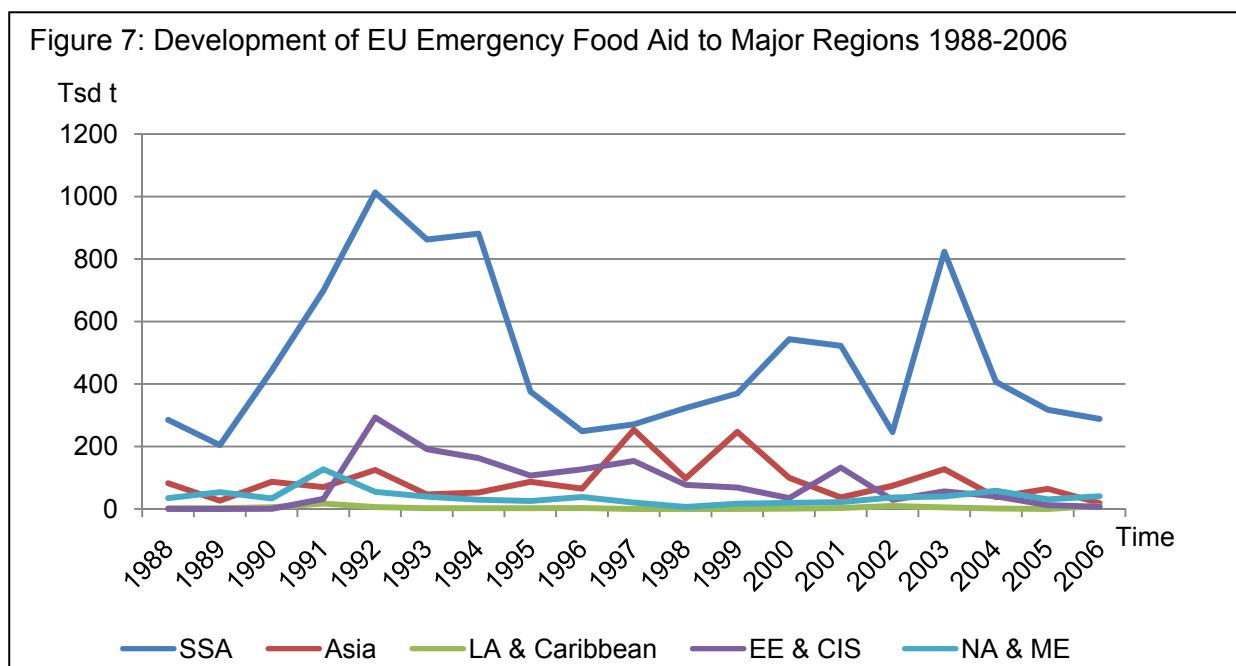
Recipient country	Total food aid		Per-capita food aid		Nb. of years receiving food aid
	Total	Average p.a.	Total	Average p.a.	
	(Tsd t)		(kg)		
Russian Federation	1 836.16	96.64	12.53	0.66	6
Bangladesh	1 719.13	90.48	13.06	0.69	14
Poland	1 434.46	75.50	37.42	1.97	2
Egypt	1 135.56	59.77	17.97	0.95	11
Albania	1 076.23	56.64	340.23	17.91	3
Ethiopia	1 046.53	55.08	17.07	0.90	16
Mozambique	880.64	46.35	52.26	2.75	16
Georgia	853.59	44.93	172.65	9.09	4
Azerbaijan	622.15	32.74	79.91	4.21	5
Romania	523.91	27.57	23.33	1.23	4
Lithuania	509.04	26.79	142.57	7.50	2
Armenia	475.97	25.05	147.57	7.77	8
Latvia	466.70	24.56	188.66	9.93	2
Kyrgyzstan	364.42	19.18	76.84	4.04	6
Malawi	361.48	19.03	33.05	1.74	17

Source: Own calculation using data from WFP/INTERFAIS (2008).

huge amounts of food aid in only two years. This bias towards CIS countries does not change significantly when considering per-capita food aid. Most notably, Albania received 17.91 kilograms (kg) per capita p.a., followed by Latvia and Georgia with 9.93 kg and 9.09 kg per capita p.a., respectively. Further, the findings by, among others, PRINZ (1994 p. 40) and NEUMAYER (2003a p. 32, 2005) that countries with small population tend to receive more food aid in per capita terms than populous countries seems to be supported by Table 2.

Similar to the case of project and program food aid, the total amount of emergency aid varied considerably during the past two decades with the largest supply of 1.5 Mio t in 1992 and the lowest supply of 0.4 Mio t in 1989 and 0.7 Mio t in 1996. The volatility of emergency food aid is anticipated as emergency food aid is designed as a local and short-term response to disasters. With respect to the regions and countries of destination, however, emergency food aid is clearly distinct from project and program food aid, suggesting that emergency food aid follows different allocation criteria than project and program food aid. As shown in Figure 7, the major recipient region is Sub-Saharan Africa which accounts on average for 69% of total emergency food aid during the period 1988-2006. The total amount of emergency food aid delivered to Sub-Saharan Africa varies strongly with the highest amount of 1 Mio t delivered in 1991.

Further important destinations are the CIS and Asia which on average receive 14% and 10% of EU emergency food aid, respectively. Consistent with the general pattern of food aid distribution, a considerable amount of EU emergency food aid was provided to the CIS following the breakup



SSA=Sub-Saharan Africa, LA & Caribbean=Latin America and the Caribbean, EE & CIS= Eastern Europe and the CIS, NA & ME=North Africa and Middle East. Source: WFP/INTERFAIS (2008).

Table 3: Allocation of EU Emergency Food Aid across Major Recipients in 1988-2006

Recipient country	Total food aid		Per-capita food aid		Nb. of years receiving food aid
	Total	Average p.a.	Total	Average p.a.	
	(Tsd t)		(kg)		
Ethiopia	3 487.42	183.55	56.88	2.99	19
Sudan	1 125.40	59.23	36.23	1.91	19
Serbia and Montenegro	700.28	36.86	94.62	4.98	13
Rwanda	596.16	31.38	79.83	4.20	13
Korea, Dem. Rep.	512.22	26.96	23.27	1.22	9
Eritrea	485.68	25.56	135.46	7.13	12
Malawi	470.67	24.77	43.03	2.26	13
Angola	419.21	22.06	32.17	1.69	19
Mozambique	362.91	19.10	21.54	1.13	11
Somalia	336.05	17.69	48.20	2.54	16
Zimbabwe	329.71	17.35	27.63	1.45	14
Afghanistan	298.88	15.73	24.85	1.31	13
Russian Federation	278.84	14.68	1.90	0.10	13
Occupied Palest. Territory	273.08	14.37	n.a.	n.a.	19
Bangladesh	268.88	14.15	2.04	0.11	10

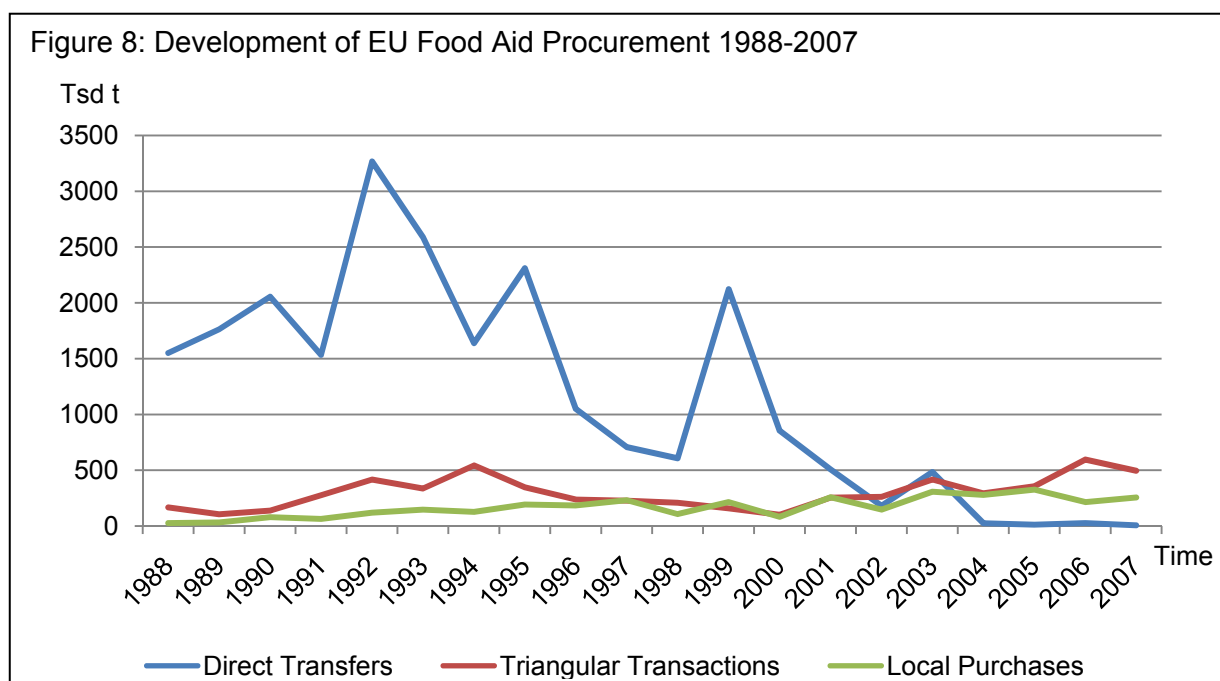
n.a. = not available. Source: Own calculation using data from WFP/INTERFAIS (2008).

of the Soviet Union. However, after the peak in 1992 with 293 Thousand (Tsd) t (19.6%), emergency food aid delivered to CIS countries declined to 6.9 Tsd t in 2006, which corresponds to merely 1.9% of EU emergency food aid. The remaining regions – Latin America and the Caribbean as well as North Africa and the Middle East – receive a much smaller amount of emergency food aid.

Table 3 illustrates that at the country level total emergency food aid deliveries differ enormously across countries with Ethiopia and Sudan receiving by far the largest amount. Due to the large variation in population size across countries the amount a country receives in total terms apparently does not allow any predictions about food aid available in per capita terms. In per capita terms Eritrea and Liberia receive the largest amount of emergency food aid with 7.13 and 5.21 kg, respectively. Again, an extended version of Table 3 can be found in the appendix (Table A.17).

Finally, another subject to examine in greater depth is the development of EU food aid procurement. As already mentioned in Section 2.3 the sources of food aid changed considerably in the past decade as a result of major reforms of the EU's food aid and agricultural policy. Figure 8 shows that the share of direct transfers started to decrease in 1992 which can be attributed to both a reduction in agricultural surpluses in the EU and the recognition of potential benefits of other forms of procurement (CLAY et al. 1994 p. 19). The decline of direct transfers was associated with an increasing share of local purchases and triangular transactions. Nowadays, EU food aid is mostly purchased from inside or nearby the affected, food insecure

region with local purchases and triangular transactions accounting for 34% and 65% of EU food aid in 2007, respectively. This is in sharp contrast to the US which sources only negligible parts of food aid in the recipient country and third countries (less than 0.5%) (WFP 2008).



Source: WFP/INTERFAIS (2008).

### 3.2 Historical Development of EU Food Aid Policy

To understand the dynamic development of EU food aid outlined in the previous section it is essential to have a closer look on the evolvement of EU food aid policy during the past four decades. Starting in the mid-1960s, the EU advanced to the second largest bilateral food aid donor after the US. However, budget constraints in industrialized countries, reforms of the agricultural policy and the enclosure of agricultural issues in the trade negotiations of the World Trade Organisation (WTO) led to considerable changes of EU food aid policy in 1996. In order to make inferences about potential determinants of EU food aid allocation, the following sections give an overview of the development of EU food aid policy including major changes of the 1996 reform.

#### 3.2.1 EU Food Aid Policy until 1996

EU food aid policy started in the 1960s when the US, which was the first to implement the concept of food aid under PL 480 in 1954, imposed pressure upon the then-European Community to share the “food aid burden”. The EC followed the request of the US in 1967 by

establishing EU food aid under the Wheat Trade Agreement and the Food Aid Convention (FAC) specifying annual minimum levels of food aid. The incentive to approve the US claim was, however, not solely driven by humanitarian concerns. Instead, it is commonly acknowledged that EU food aid policy of the early years was primarily motivated by the domestic agricultural sector and therefore strongly linked to the Common Agricultural Policy (CAP) (CATHIE 1981 p. 25, BARRETT and MAXWELL 2005 pp. 55).

The EU's CAP aimed at increasing farmers' incomes by a complex support system including, inter alia, import protection and export subsidies. Thereby the CAP constituted the most expensive EU policy accounting for half of its budget in the 1960s. By giving the prospect of higher world market prices, a contribution to the food aid system was seen as an opportunity to reduce farmers' payments and thus to relax the CAP's burden on the EU budget (BARRETT and MAXWELL 2005 pp. 55). Further, the fact that the EU for the first time experienced nonmarketable cereal intervention stocks in 1967 surely contributed to the establishment of EU food aid (PRINZ 1994 p. 32).

In the 1970s and 1980s, EU market intervention and farm support programs led to the production of large food surpluses thereby further depressing world market prices. This development had a strong impact on EU expenditures under CAP due to increasing payments required to guarantee farmers a high and stable income and to keep ever larger intervention stocks (CHRISTENSEN 1999, MAAS and SCHMITZ 2007). To dispose food surpluses in developing countries constrained by food shortages was thus a possibility to get the CAP expenditures under control by reducing costly intervention stocks and relieving the surplus situation on domestic food markets. The tight surplus situation on the EU market thus led to increasing amounts of food aid donations in the 1980s and resulted in the advancement of the EU to the second largest food aid donor. Unfortunately, with the disposal of agricultural surpluses being a primary motivation of EU food aid, the amount of food aid shipments depended on the world market situation. In times of strong demand and high food prices on international markets more food was sold and less provided as food aid. This had adverse effects on food insecure people in developing countries since food aid supply declined exactly when poor household could least afford to purchase food on the market and therefore food aid demand was high (COLDING and PINSTRUP-ANDERSEN 2002).

In the late 1980s and the 1990s two major concerns led to a rethinking in the EU concerning its agricultural policy, with major consequences for EU food aid. On the one hand, expenditures for European farmers under CAP steadily increased and made up 70% of the EU's budget in the 1980s, despite a shrinking importance of agriculture in the Gross Domestic Product (GDP) and employment. On the other hand, agricultural policy continued to negatively affect world market

price level and stability. This was a significant burden to food exporting developing countries by raising the risk of agricultural production and lowering farmers' competitiveness, thereby increasing poverty in rural areas. The combination of internal budgetary concerns and external criticism, most strongly expressed in the WTO negotiations initiated several reforms of the CAP starting with the MacSharry reform in 1992. By reducing price support and introducing direct payments and land set-aside programs the reform was a first step towards an increasing market orientation of agricultural production. The result was a cutback of agricultural surpluses manifesting in shrinking intervention stocks in the 1990s, which considerably contributed to the reduction in food aid donations (BARRETT 1998, COLDING and PINSTRUP-ANDERSEN 2002, TANGERMANN 2006, MAAS and SCHMITZ 2007).

Yet, the CAP was not the only policy under strain. Also the food aid system itself faced public criticism because of its mainly supply-driven character. Particularly the incorporation of food aid in the Doha-Round of the WTO trade negotiations set the policy under pressure. In 1996, EU food aid policy was finally subject to significant changes which will be discussed below.

### 3.2.2 EU Food Aid Policy Reform of 1996

In the mid-1990s, EU food aid policy moved from a supply-driven towards a more demand-based approach of food aid which more strongly takes into account recipients' needs. In recognition that the causes of poverty are complex and to enhance coherence with EC development strategies, program and project food aid were integrated in the conceptual framework of an overall poverty reduction strategy, thus responding to the widespread criticism that food aid cannot solve the problem of hunger and poverty on its own (EC 2001, YOUNG and ABBOTT 2008). Moreover, with respect to its different objectives and to assure a prompt reaction to disasters, emergency food aid was fully separated from non-emergency food aid.

One important change in EU food aid policy was the decreasing amount of food aid procured within the EU. This is to be seen with a view to the permanently lower grain stocks as a result of the ongoing CAP reform which was started by the MacSharry reform and continued with the Agenda 2000 and the Mid-Term Review in 2003. As the EU no longer needed to hold large cereal reserves, food aid commodities had to be purchased on domestic and international markets (COLDING and PINSTRUP-ANDERSEN 2002). This resulted in an increase in local purchases and triangular transactions which accounted for 99% of EU food aid in 2007, to the benefit of both the EU and recipient countries (ZERBE 2004, WFP 2008).

The major change of EU food aid policy, however, was the transformation from food aid in kind shipments to cash transfers for the following reason. If food aid does not serve the aim of



surplus disposal but is purchased on the international market, it clearly competes with other, perhaps more cost-effective aid instruments. In cases where an improvement in food security does not necessarily depend on deliveries of commodities in kind, for instance in non-emergency situations and well-functioning markets, it is thus reasonable to reconsider the use of food aid as development instrument (CHRISTENSEN 1999, COLDING and PINSTRUP-ANDERSEN 2002). Consequently, if possible program food aid is provided in form of financial assistance which gradually replaces food aid in kind due to desirable impacts of cash transfers on cost-efficiency, local food markets, regional trade relations and economic development, and its flexibility to address country-specific dimensions of food insecurity. Food aid in kind is mainly used in emergency situations and in cases where it is best to target particularly vulnerable groups (EC 2001 pp. 10, EC 2004 p. 18). As a consequence, food aid donations in kind declined from 89% of total EU food aid in 1993 to 39% in 2000 (EC 2001 p. 19).

Yet, the change from food aid in kind to cash transfers is not a panacea. Several problems remain. One important problem still unsolved is the strong variation in food aid supply. The supply of food aid is dependent on the budget situation of the donor countries on the one hand and on world market prices on the other hand. As EU food aid was transformed from a surplus-based into a budget-based program, food aid tends to decline in times of soaring world food prices due to increasing cost of providing food aid. With respect to budget constraints high world market prices of food aid commodities therefore translate into lower tonnage of food aid donations (COLDING and PINSTRUP-ANDERSEN 2002). Also, food aid is subject to the price volatility on world markets causing a greater variability of food aid donations. As a consequence, food aid deliveries are procyclical rather than countercyclical which is in sharp contrast to the fact that a declining food availability and security in recipient countries could be prevented by countercyclical food aid deliveries (BARRETT and HEISEY 2002).

In order to make inferences about the determinants of EU food aid allocation it is not sufficient to account for observable allocation decisions and the development of food aid policy. Also, stated intentions of EU food aid as well as legislative and institutional requirements need to be considered. Therefore, the complex regulatory system of EU food aid is briefly reviewed in the next section.

### **3.3 Institutional Framework of EU Food Aid Policy**

Based on the Common Market Organization of Cereals, the early EU food aid policy was characterized by a strong link to agricultural trade arrangements through the FAC, stressing that surplus disposal was a major purpose of EU food aid. This is emphasized by Council

Regulation 67/120 which explicitly forbids the purchase of cereals in third countries if the intervention stocks contain sufficient inventory for food aid deliveries. In fact, the Regulation states that food aid commodities should originate from surplus regions to assure relief and should be purchased either on the market or directly from intervention stocks (PRINZ 1994 pp. 45, BARRETT and MAXWELL 2005 pp. 55).

When EU food aid policy was increasingly confronted with criticism in the early 1980s, food aid policy was modified by several regulations with the aim to guarantee a better adaptation of EU food aid to recipients' needs. To enhance the cooperation and coordination of the EU and NGOs with respect to emergency food aid allocation a network of European NGOs for food aid, EuronAid, was founded in 1981 (PRINZ 1994 pp. 51). Moreover, Council Regulation 3331/82 issued in 1982 was the first Regulation to define the, mostly humanitarian, objectives of EU food aid. These include the improvement of food security of target groups, the intervention in emergencies and disasters, the support of recipients' progress in food production and the contribution to a balanced economic and social development in recipient countries. The regulation explicitly specified three allocation criteria, i.e. basic food requirements, income per capita and the current account balance (CLAY et al. 1994 p. 35, PRINZ 1994 p. 47). Subsequent regulations, inter alia, define conditions to meet transport costs, the choice of commodities (besides cereals, skim milk powder and oilseeds are delivered to a measurable extent) and the implementation of early warning systems. Finally, a complex system consisting of international agreements and EU regulations determined annual food aid contributions with the competence being split between the Directorate General (DG) Agriculture and the DG Development. Unfortunately, the complexity of the food aid system and the division of competences resulted in conflict between both DGs and finally led to time-delayed reaction to emergencies and disasters (PRINZ 1994 pp. 51).

In order to assure a more timely and effective distribution of food aid and to improve poor control mechanisms of the generation and use of counterpart funds the procedure of food aid provision was significantly simplified in 1987. These changes, however, did not solve the problem of inefficient distribution of competences within the EC, so that the reform process was continued. EU emergency aid was reorganized and fully separated from project and program food aid in 1992. More precisely, the EC initiated the European Community Humanitarian Office (ECHO) which was henceforward responsible for the entire organizational and financial execution of EU emergency food aid in order to guarantee a timely response to emergencies by accelerating the process of food aid giving (PRINZ 1990, PRINZ 1994 p. 57, CLAY et al. 1996). According to the EC emergency food aid is distributed with a view to provide short-term food security in countries facing food crises. This includes the distribution of food to refugees and internally displaced

persons, assist nutritional recovery, support initial rehabilitation and recovery efforts as well as restore basic livelihoods and improve resilience to future shocks of vulnerable groups (EC 2008b). As concerns program and project food aid the responsibility for development operations was completely shifted from DG Agriculture to DG Development, stressing the increasing humanitarian orientation of EU food aid policy (EC 2004).

The reform of EU food aid policy was finally completed in 1996 with the adoption of the Council Regulation 1292/96, replacing seven previous regulations. Basically, EU project and program food aid moved towards a holistic approach with the major objective being “to overcome problems of temporary food shortages, to manage post-crisis situations for food recovery and finally to address structural food security problems” (EC 2004 p. 6). The new regulation extends the list of allocation criteria, so that EU food aid is intended to be delivered with regard to:

- the food situation and food shortages in the recipient country using human development and nutritional indicators;
- per-capita income and the existence of particularly poor population groups;
- social indicators of the welfare of the population;
- the recipient’s balance-of-payments situation;
- the economic and social impact and financial cost of the proposed operation;
- the existence of a long-term policy on food security in the recipient country (EC 1996).

To conclude, the food aid system of the EU has changed drastically since its establishment in 1967. While EU food aid was strongly influenced by agricultural sector interests first, with the primary intention to dispose surpluses, humanitarian objectives gained importance in subsequent years. This development was accompanied by major changes in the type and procurement of food aid, most importantly a sharp increase in emergency food aid, local purchases and triangular transactions. With major modifications in 1996, food aid policy intends to support long-term reduction of poverty and food insecurity as well as to respond effectively and coherently to recipients’ needs. However, with regard to the observed allocation of food aid illustrated in Section 3.1 – for instance the considerable amount of food aid flows to the CIS – doubts on a purely humanitarian oriented food aid supply remain. It is thus worthwhile to explore whether or not EU food aid actually succeeds in realizing well-intended statements and objectives.

## **4 Political Economy of EU Food Aid**

The EU provides food aid exclusively on a grant basis without receiving any monetary reward for its food aid contributions. This raises the question what motivation is behind the EU providing food aid to less wealthy countries at all? Why does the EU provide food aid to some countries every year in large amounts while others seldom receive food aid? Food aid allocation most likely is not a one-dimensional decision but serves many different objectives. Although the EC specified humanitarian criteria for food aid allocation, the previous chapter has cast doubt on whether these stated intentions are actually followed or whether there are other criteria which determine food aid allocation but are not stated by the EC. In fact, there is a widespread belief that, besides humanitarian and development concerns, donors also pursue economic as well as political and strategic interests in food aid allocation.

Unfortunately, according to the TINBERGEN rule (1967) an effective policy requires one policy instrument for each objective. If food aid as a policy instrument serves several objectives – including others than humanitarian concerns – this will have a negative impact on its effectiveness as not those countries most in need receive food aid but countries that are economically and politically important for the EU. Thus, the multidimensional decision-making process fundamentally determines the effectiveness of EU food aid in reducing poverty and food insecurity abroad.

In order to examine the determinants of EU food aid allocation an analytical framework of institutions and incentive structures is required and will be presented in the following section. To this end, potential determinants of food aid from the supply side, i.e. the donor's point of view, as well as from the demand side, i.e. the recipient's point of view, will be explored theoretically. Finally, the theoretical considerations will be illustrated on the basis of the recent price rise of food products on the world market.

### **4.1 Public Choice Theory – A Political Market of Food Aid**

In order to explain EU food aid allocation and the preceding decision-making process a Political Economy approach is chosen. In general, Political Economy is a theoretical construct to analyze the behavior of political institutions using Public Choice Theory, which is the application of economic theory to nonmarket decision-making, or in other words the application of economics to political science (MUELLER 1976). As such Public Choice Theory combines political and economic elements in order to analyze the behavior of political institutions, such as governments, political parties, voters or particular interest groups, in the presence of economic incentives. Well known applications of Public Choice Theory are, for instance, the median voter

theorem and the “political business cycle” (MUELLER 2001). The Public Choice approach postulates that political decisions of individuals and institutions are determined by the underlying incentive structure implying that rational, self-interested decision-makers decide as to maximize their own utility. Changes in the decision-makers’ behavior are thus induced by changes in expected cost and expected benefit of a particular action, or between competing actions. The choice finally made by the decision-maker reveals his or her preferences (PRINZ 1994 p. 62).

In leaving the realm of traditional rational actor models basically three subcategories of public choice models are relevant to analyze the allocation of food aid – the theory of interest groups, the theory of political voter systems, and the theory of bureaucracies. First, the theory of interest groups based on the work of OLSON (1965), which was later enhanced by BECKER (1983), postulates that the action of (organized) interest groups, as for instance the farm lobby, has a measurable impact on policy outcomes (MUELLER 2005 pp. 475). An application of this theory to foreign aid allocation is given by LAHIRI and RAIMONDOS-MØLLER (2000) approving the importance of lobbying of ethnic groups in ODA allocation.

Furthermore, the theory of political voter systems first examined by BUCHANAN and TULLOCK (1962) deals with rational based constitutions as individuals and groups are able to determine the rules laid down in the constitution. This theory is appropriate to the examination of EU food aid allocation as the “rules of the game”, that is to say, the particular voting rules applied within the EU (e.g. majority or unanimity rule) determines the policy outcome to a considerable extent (PRINZ 1994 p. 62, MUELLER 2005 pp. 615).

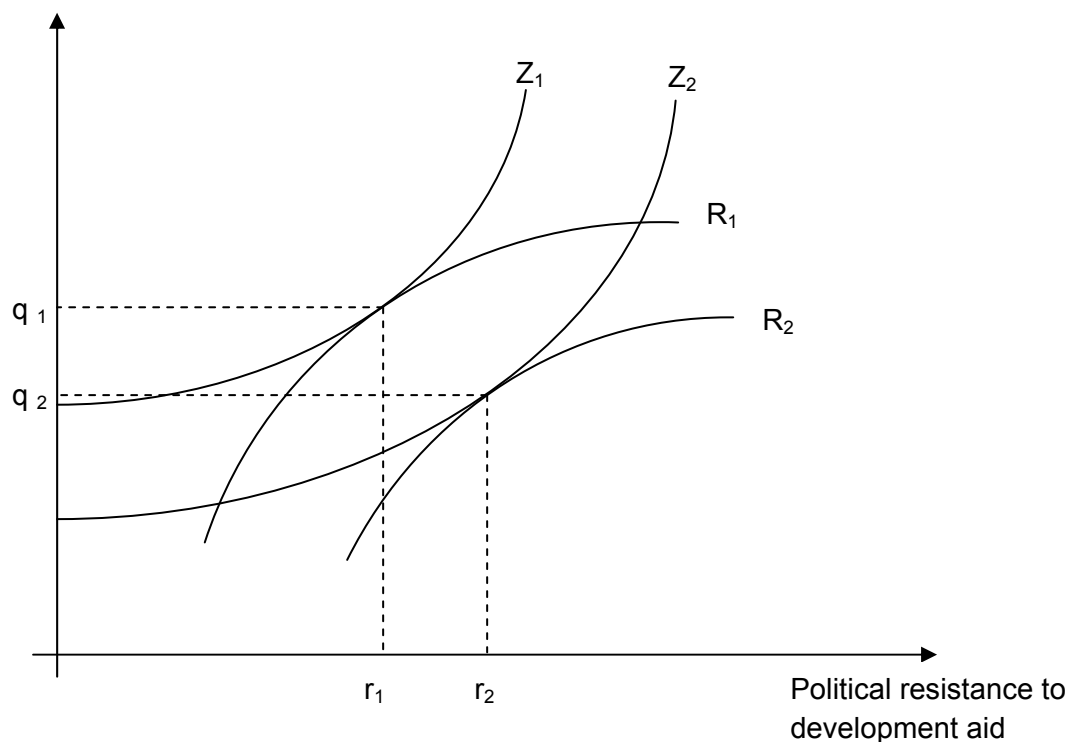
Finally, the political economy of bureaucracies based on NISKANEN (1971) offers important insights with respect to the allocation of food aid. NISKANEN argues that bureaucracies and public administrative bodies act to the benefit of its decision-makers (the so-called rational actor models). This egoistic behavior is in sharp contrast to the traditional point of view that administrative bodies act and decide in a selfless manner with regard to maximize public welfare (MUELLER 2005 p. 359). However, delving deeper into the causes of human motivation, recent work of FREY and STUTZER (2000a, 2000b) derived approaches to explain behavior which is inconsistent with rational actor models, such as intrinsic motivation and happiness. Therefore, both egoistic, purely self-interested motivation of political actors and altruistic interests, as for example the ideological orientation of EU decision-makers, may influence aid allocation (ROUND and ODEDOKUN 2003).

As already mentioned, the EU provides food aid entirely on a grant basis and does not receive any monetary reward for its food aid contributions. Therefore, the very fact that food aid actually is provided indicates that there has to be some non-monetary benefit for the EU. But since the amount of aid given is limited, there also has to be some cost.

On the one side, the EU benefits by achieving specific objectives, which may be based on self-interest of the EU, such as external interests, or purely altruistic as aid per se is seen as a desirable objective and is thus approved by the voter. On the other side, food aid is a transfer of resources from the EU to the recipient. If food aid is provided in form of financial transfers the cost merely confine to the amount of cash donations. If food aid is donated in kind the EU agrees to bear additional cost for transport, procurement and distribution. These budgetary costs are strongly associated with the political cost of food aid or, following BEENSTOCK (1980) the “political rancor”. Since budgetary resources are limited food aid competes with other expenditures. Especially in times of tight budgets within the donor country, such as high unemployment or large net budget deficits, voters may resent high expenditures abroad which are also needed at home. Governments are less willing in this situation to use relatively scarce budgetary resources to donate food aid (BEENSTOCK 1980).

Figure 9: Determination of the Optimal Development Aid Budget for Donor Countries

Development aid

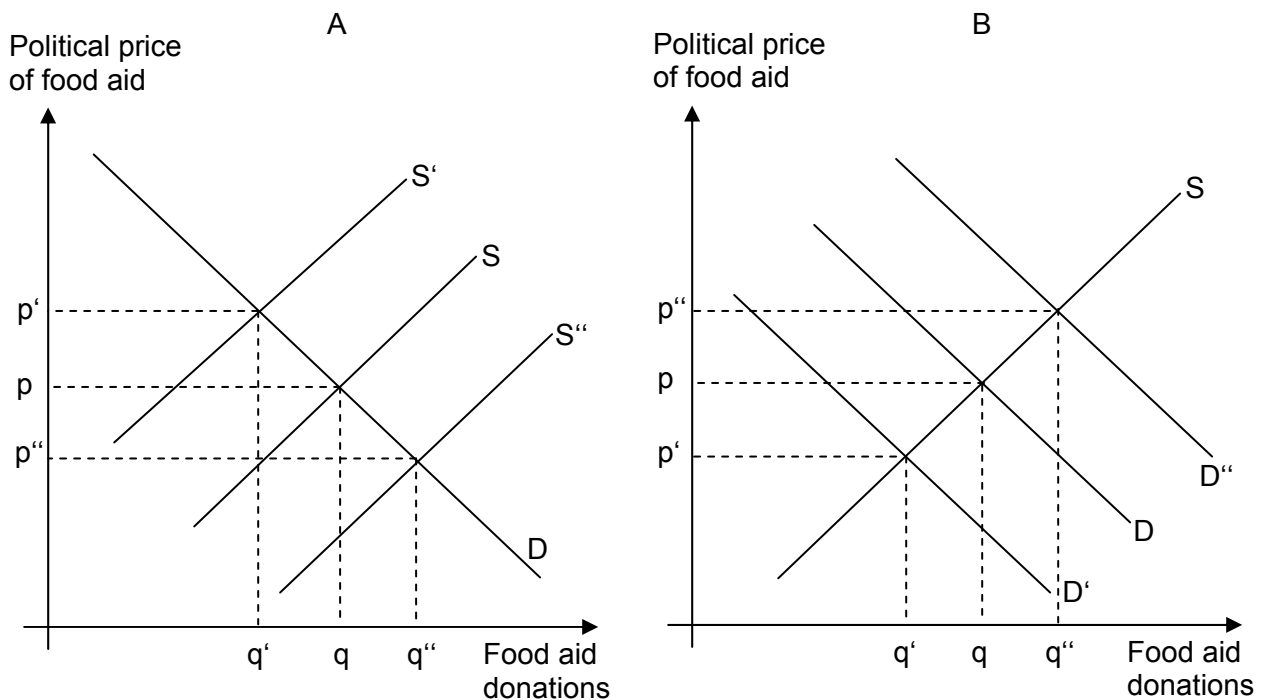


Source: PRINZ (1994 p. 95) following BEENSTOCK (1980 p. 140).

This relationship is illustrated in Figure 9 where  $Z$  represents the political preference function and  $R$  the restriction function with respect to the budget assigned to food aid. The concave progression of  $Z$  indicates that decision-makers are willing to accept additional political opposition only if the associated increase in food aid is disproportionately high. The political

restriction function  $R$  gives the government's trade-off between food aid as a desirable objective and political resentments.  $R$  is convex suggesting that, given a fixed total budget, the marginal opposition increases with a rise of development aid. The optimal allocation of food aid is found at the osculation point of the preference and the restriction function which corresponds to the total amount  $q_1$  of development aid provided in the initial situation. If the budgetary situation in the donor country tightens, resistance of opponents of development aid will increase from  $R_1$  to  $R_2$ . As a result, merely the preference function  $Z_2$  can be reached, so that the amount of food aid agreed upon in budget negotiations shrinks from  $q_1$  to  $q_2$  (BEENSTOCK 1980, PRINZ 1994 pp. 95). Similar to classical economic theory, public choice theory postulates that the actual amount of food aid provided depends on both the supply and the demand side. The decision over EU food aid allocation is thus subject to a set of economic incentives within a particular institutional framework in the recipient and donor country. Following PRINZ (1994), a political market for EU food aid where the EU supplies and the recipient countries demand food aid can be postulated in order to address the question why food aid contributions strongly vary over time and across countries. Figure 10 shows such a political market for food aid where the political price of food aid on the supply side is equivalent to the marginal cost of food aid. On the demand side the political price of food aid refers to the marginal benefit of an increase in food aid provided.

Figure 10: Effect of Shifts of the Supply and Demand Curve on the Food Aid Market Equilibrium



Source: Own illustration following PRINZ (1994 pp. 70, 98).

As shown in Figure 10A, the supply curve of food aid has an upward slope indicating that a higher amount of food aid provided is associated with increasing marginal cost. If the supply curve shifts to the left the political cost increase from  $p$  to  $p'$ , leading to a reduction of the amount of food aid contributions from  $q$  to  $q'$ . In contrast, if the supply curve shifts to the right the political cost of food aid decline from  $p$  to  $p''$  and the amount of food aid provided increases from  $q$  to  $q''$ . Thereby, different shapes of the supply curve may either reflect the change of marginal political cost of food aid to one particular recipient over time, or may refer to different marginal cost across recipient countries. As concerns food aid allocation across countries, the positive slope of the supply curve implies that a higher amount of food aid delivered to a particular recipient is associated with an increase in marginal cost. This is due to the fact that an increasing amount of food aid provided to one recipient is associated with declining deliveries to other countries. This probably results in a loss of goodwill of these countries which may negatively affect the achievement of the donor's objectives (PRINZ 1994 p. 69).

On the demand side illustrated in Figure 10B, food aid benefits the recipients due to an increase of the resource stock. However, the negative slope of the demand curve indicates that the benefit of food aid declines with increasing amounts of food aid. First, the capacity of existing infrastructure in developing countries to discharge, store and transport food aid may be limited. Second, an increasing amount of food aid leads to higher dependency on donor countries and is thus accompanied by a loss of autonomy as the capability of donors to influence the recipients' decisions increases. If the demand curve shifts to the right the political benefit increases from  $p$  to  $p''$ , leading to a rise of the amount of food aid receipts from  $q$  to  $q''$ . If the demand curve shifts to the left the political benefit decreases from  $p$  to  $p'$ , leading to a decline of the amount of food aid receipts from  $q$  to  $q'$ . Similar to the supply side, different demand curves may either reflect the change of marginal political cost of accepting food aid of one donor over time or different marginal costs of accepting food aid from different donors. Differences in demand for food aid across recipients may, for instance, depend on whether the ideological view of the recipient and the donor matches (PRINZ 1994 p. 71).

#### **4.2 Determinants of Food Aid Supply**

As outlined in the previous section the quantity of food aid provided is determined by both food aid supply and food aid demand. Different objectives and interests of donors and recipients shaping the curves are reviewed in the next sections, starting with the supply side. Each factor considered leads to a shift of the supply curve as illustrated in Figure 10A. If the factor increases the marginal political cost of food aid contributions, the supply curve shifts to the left, thus



reducing the amount of food aid delivered, whereas a reduction of marginal political cost leads to a shift of the supply curve to the right, associated with an increasing amount of food aid. The following sections discuss humanitarian and development, economic and commercial, external, and bureaucratic objectives as well as surplus disposal as determinants of food aid supply.

#### 4.2.1 Humanitarian and Development Interests

One motivation of food aid may be altruistic objectives and moral obligation of rich countries to ease the burden of hunger and malnutrition in food deficient developing countries which may also be accompanied by a gain in individual and international prestige (HERRMANN et al. 1990, PRINZ 1994 p. 72).

If food aid is determined by altruistic motivations it is expected to increase with a higher need of the recipient country which may be caused by either structural or acute food insecurity. Structural food insecurity arises from the inability to produce or purchase a sufficient amount of food for an adequate diet. Therefore, the main causes of structural food insecurity are limited economic resources as both low per capita income and shortage of foreign currency constrain food imports. Given altruistic motivation, a higher amount of food aid has thus to be directed towards countries with low per-capita income, short foreign currency resources, and high indebtedness (PRINZ 1994 pp. 73, ABBOTT and YOUNG 2008).

Food aid, i.e. emergency food aid, is supposed to respond to acute food insecurity caused by both natural disasters and man-made conflicts. As concerns the former, floods, droughts and storms destroy agricultural production and hence reduce food security in the affected region, given that the loss of agricultural production cannot be fully compensated by imports as it is usually the case in developing countries. Also epidemic diseases reduce food security by increasing the average daily calorie requirements. With respect to man-made disasters, violent conflicts and war increase the need for food aid as the affected population is detained from agricultural production and usually all other income sources (YOUNG and ABBOTT 2008). Altogether, postulating that donors' motivations are purely altruistic, a deterioration of food security shifts the supply curve to the left and increases the marginal benefit of emergency food aid deliveries, resulting in a rise in the amount of food aid provided.

Further, extreme variability of world market prices for agricultural commodities affect food security in developing countries. On the one hand, a rise of the world market price limits the ability of net food-importing developing countries to purchase agricultural products necessary for food security. On the other hand, falling world market prices of agricultural products lead to a shortfall in foreign exchange proceeds in food exporting countries, thereby exposing groups of

the population at risk of food insecurity. Following humanitarian objectives, food aid is expected to be countercyclical to non-concessional food availability of recipient countries. However, for the case of the US food aid under PL 480 BARRETT (2001) and DIVEN (2001) provide empirical evidence that food aid is procyclical since it is budgeted in monetary rather than in volume terms. That is, rising world market prices lead to a decrease of commercial food imports of low-income countries due to a lack of foreign exchange. Contemporarily, food aid contributions decline because of the diminishing purchasing power of the constrained budget and thus fail to stabilize per-capita food availability in developing countries. However, for EU food aid PRINZ (1994) does not find evidence to support this hypothesis. In contrast, PRINZ shows that the EU raises its food aid budget in times of rising food prices which may be triggered by increasing pressure from recipient countries on the EC to boost its food aid donations.

Development oriented objectives take a similar stance as altruistic objectives but with quite different implications. From the development point of view, food aid serves to encourage growth and economic development. In contrast to the purely humanitarian motivation, development oriented allocation of food aid does not prefer the neediest countries but those with best development prospects. If development motivations alone are considered, high economic growth shifts the supply curve to the right associated with an increase in food aid provided, whereas the supply curve of purely altruistic motivated donors would shift to the left. According to PRINZ (1994 p. 75), the comparison of humanitarian and development objectives clarifies the dilemma donors are confronted with. If a donor follows altruistic objectives, the deterioration of a recipient's situation in terms of food security and poverty leads to an increase of food aid shipments. This is, however, equivalent to rewarding a country for its poor performance whereas countries with sound economic development are penalized by donor countries. Governments of recipient countries may thus increase food insecurity by applying counterproductive actions.

#### 4.2.2 Surplus Disposal as Driving Factor

In general, high agricultural surpluses and intervention stocks are expected to have a positive impact on EU food aid. That is, food surpluses at home reduce the political cost of food aid leading to a shift of the supply curve to the right and an increase of food aid supply. This relationship is supported by the fact that the EU utilized food aid as a means to dispose agricultural surpluses in developing countries in the 1970s and 1980s, as outlined previously in Chapter 3.

Since the EU provides food aid as grant, rising world market prices increase the opportunity cost of food aid as compared to selling agricultural products on the world market. The EC will thus be

more willing to use agricultural products as food aid when world market prices are low. The budgetary and political cost of food aid increase with rising world market prices, thus, leading to a shift of the supply curve to the left (PRINZ 1994 p. 76).

Although the motivation of surplus disposal is still of central importance in US food aid, this does not seem to be valid for the EU (BARRETT and MAXWELL 2005 p. 59). As concerns the EU the decline of intervention stocks lead to a shift in food aid procurement from almost entirely domestic sources to the purchase of food aid commodities in developing countries. Thus, it is reasonable to argue that surplus disposal as a motivation of EU food aid provision lost importance in recent years.

Regardless of whether the EU procures food aid at home or abroad, food aid donations in kind additionally incur transport costs which are partly covered by the EU. In order to maximize the amount of food aid totally provided, the supply curve is expected to shift to the left for countries with above-average transport cost and to the right for countries with below-average transport cost. As the EC states to allocate food aid with respect to the financial cost of the operation (see Section 3.3), countries with low transport cost are likely to receive a higher amount of EU food aid than to countries with high transport cost (PRINZ 1994 p. 77, EC 1996).

#### 4.2.3 Commercial Interests

By changing local tastes and habits in recipient countries in favor of the composition of food commodities contained in food aid deliveries, EU food aid may aim at promoting EU exports and the development of new markets. This may include the protection as well as expansion of established market shares in both emerging and saturated markets.

If export promotion is the motivation of food aid, one might expect that a higher amount of food aid is delivered to countries with a higher market potential. Recipient countries which already are an important destination of total EU food exports are therefore in a more favorable position than countries with only minor imports of the EU agricultural products. Consequently, the supply curve shifts to the right for countries with high commercial food imports originating from the EU (PRINZ 1994 p. 78, NEUMAYER 2005). This hypothesis is supported by the study of PRINZ (1994) who finds that the larger the recipient's cereal imports, the higher the amount of EU food aid receipts. In contrast, a more recent study of NEUMAYER (2005) provides evidence that neither emergency nor total food aid of the EU is affected by commercial interests.

#### 4.2.4 External Interests

As another important and widely discussed motivation of food aid, donors may allocate food aid with a view to strategic foreign policy objectives. In doing so, donor countries aim to assure the goodwill of recipients in order to influence the recipients' behavior. This implies that food aid flows depend on the external importance of the recipient which is determined by its political, economic and military power which may be based on, for instance, the population size, resource stocks and the geographical position. To assure their friendship and direct their decisions towards the donor's interest, recipients with high external importance are expected to receive a larger amount of food aid than less relevant countries (PRINZ 1994 pp. 79). Basically, donors may intend to influence recipients' behavior out of four reasons, i.e. geopolitical concerns, to influence the voting behavior of recipients in international institutions, to support traditional "allies" such as former colonies or member states of the Lomé agreement and to reward countries for sound internal institutions and policies.

With respect to international negotiations donor countries may have in mind to direct recipients' voting behavior towards the donor's interests. In this context it is interesting to explore whether food aid donors aim to exert influence on a maximum number of countries or to concentrate the impact on few recipients with exceptionally high external importance. In the first case, given constrained budgetary resources and approximately uniform food aid contributions per capita, donors would primarily provide food aid to relatively small and less populous countries as this allows allocating food aid to a higher number of recipients. The decision between maximizing the number of recipients or supporting particularly important countries depends on the voting rule employed in the organization the donor wants to benefit from. In order to influence the voting behavior in organizations employing the "one country, one vote" rule, as for example in the WTO, the United Nations (UN) and its sub-organizations, it is rather rational to maximize the number of countries receiving food aid. In organizations giving higher weight to the voting of specific countries, such as the World Bank or the International Monetary Fund (IMF), the concentration on countries with higher authority is advantageous (Prinz 1994 p. 83, NEUMAYER 2003a pp. 51). However, although there is some empirical evidence that vote similarity plays a role in foreign aid, this seems not to be the case for food aid allocation (ALESINA and DOLLAR 2000, NEUMAYER 2005).

Moreover, multiple donor countries compete at the international level for political influence in recipient countries. As a result of this peer pressure, donors may respond positively to other donors' food aid donations. That is, in order to maintain their political influence, donors have to react to rising food aid contributions of other donors by also increasing own food aid donations.

This behavior may be particularly pronounced in cases which draw public attention as these give donors credit for their effort and promise a gain in international prestige (ROUND and ODEDOKUN 2003). As natural and man-made catastrophes generally draw more public attention than chronic food insecurity, emergency food aid may be driven by political motivations in the first place, or as CLAY (2002) puts it “intrinsically political”. Further, BARRETT and MAXWELL (2005 pp. 45) judge with reference to food aid intervention of the US in Afghanistan in 2001-2002 that donors may favor “high-profile” efforts in geopolitically strategic situations as compared to acute and chronic emergencies at politically less advantageous places.

On the other side BARRETT and MAXWELL (2005 p. 65) argue that single countries may wait to deliver food aid in order to let other donors bear the cost of emergency response. Donors following free-rider behavior cut down food aid contributions if other donors increase the amount of food aid delivered. The free-rider problem of bilateral food aid may occur if the benefits in terms of domestic or foreign policy objectives, such as gaining international prestige by publicity, are relatively low or do not depend on who actually provides food aid (PRINZ 1994 pp. 84, BARRETT and MAXWELL 2005 p. 65). However, if donors respond adversely to other donors’ food aid distribution across recipients, this may also indicate that donors cooperate by defining separate regions of responsibility.

Altogether, EU food aid could be both positively and negatively affected by the amount of food aid delivered by other donors, so that the direction of a shift of the supply curve is not a priori known. For the case of overall foreign aid ROUND and ODEDOKUN (2003) and MCGILLIVRAY (2006) find that foreign aid contribution of one donor is a positive function of the aid contributions of other donors. Due to the evidence of poor coordination among donors, in September 2008 a High Level Forum on Aid Effectiveness held in Accra, Ghana, asks donors to improve the coordination of aid deliveries amongst themselves (OECD 2008).

Moreover, food aid may serve donors’ geopolitical interests. That is, food aid is utilized as an instrument to support particular regimes or systems, which may explain the enormous amount of program food aid donated to Poland and other CIS countries in the aftermath of the Cold War (see Table 2). The transition from a centrally planned to a market economy was accompanied by difficulties in food supply, so that, besides humanitarian concerns, food aid donations to the CIS were intended to support the newly adopted economic system and to increase political stability in this region (PRINZ 1994 p. 80). Even though GABBERT and WEIKARD (2000) argue that several benefits of food aid, such as decreasing migration and political stability, do not go to the donor alone but to all countries, it is reasonable to argue that political and economic stability in the former Soviet Union was particularly important to the EU since potential migrants of these countries are prone to be attracted by EU countries due to its wealth and geographical proximity.

Therefore, the closer the country facing food insecurity, poverty, or political and economic instability, the higher the marginal benefit of food aid and thus the amount of food aid provided. This hypothesis is in line with NEUMAYER (2005) who argues that donors “tend to give more aid to geographically close countries in order to maintain a regional sphere of influence”.

Furthermore, donors may intend to assure their traditional external influence by favorable treatment of specific countries. In the case of the EU, these countries may be either former colonies or member states of the Lomé agreement. Whether or not a former colony receives a more than proportional amount of food aid depends on the assertiveness of the former colonial power within EU negotiations. More precisely, the allocation of food aid is the result of a coordination process between EU member states, raising the question whether the outcome of this process reflects a compromise of all members or whether single EU member states are able to use food aid for their own interests. In the latter case single countries may use their influence to support former colonies meaning that those recipients whose former colonial power succeeds in pursuing its own interests the supply curve in Figure 10A shifts to the right (PRINZ 1994 p. 81).

As concerns empirical evidence ALESINA and DOLLAR (2000) analyzed foreign aid contributions of individual countries (no collective EU aid). The authors provide evidence that donors, most notably France, tend to donate a higher amount of aid to former colonies than to developing countries that are not former colonies, even if the former are mismanaged and non-democratic. This finding indicates that former colonial powers may provide additional support for former colonies in individual food aid programs, so that they do not need to pursue this goal in collective aid allocation of the EU. For the particular case of food aid, this is supported by the study of PRINZ (1994) and NEUMAYER (2005) who do not find a general relationship between the colonial status of a recipient and food aid allocation.

Another group of countries the EU may aim to support are the member states of the Lomé agreement from Africa, Caribbean and the Pacific (ACP). According to PRINZ (1994 p. 81), an a priori statement about the direction of the shift of the supply curve for ACP countries is not possible. On the one hand, the EC may intend to preserve its influence in ACP countries, thus, shifting the supply curve to the right. On the other hand, the EC may use food aid to compensate states which do not benefit from the Lomé Agreement, leading to a shift of the supply curve for ACP countries to the left. This is in line with CLAY (1994 pp. 21) who argues that DG Development may use program food aid as a means to counterbalance the focus on ACP countries which fall in the responsibility of DG Agriculture. However, no impact of the Lomé membership is found so far at the empirical level (PRINZ 1994 pp. 148).

The ambition of donors to influence the behavior of food aid recipients is, however, not likely to be restricted to the international level. In fact, donors may also aim to affect the behavior of the

recipients' government with respect to its regime and internal affairs, thus using food aid as to strengthen sound policies and institutions at home. This hypothesis is supported by the fact that multilateral aid donors, as for example the IMF and World Bank, increasingly condition aid transfers on reforms ensuring good governance (DOLLAR and LEVIN 2006). In spite of the frequent use of the term no conclusive, all-encompassing definition of good governance exists. Basically, good governance describes the process of decision-making and the implementation of policies in a country with respect to public institutions, management of public resources, and the acceptance and realization of human rights (ALESINA and DOLLAR 2000, NEUMAYER 2003a pp. 30).

In the context of EU food aid the Federal Ministry for Economic Cooperation declares explicitly that the recognition of human rights, the participation of the population in political decision-making, the provision of legal security and a market-oriented economic system are to be considered in the allocation of food aid. The EU thus intends to support recipients with a pluralistic social order and market-oriented economic system in EU food aid allocation (PRINZ 1994 p. 80). As a consequence, food aid supply to countries with sound institutions and policies will be higher than food aid donated to countries with "bad" institutions.

In the foreign aid literature the motivation of donors to influence internal affairs of recipient countries is often referred to as "selectivity". That is, donors may be selective in the choice of which country is eligible for food aid with regard to democracy, property rights and rule of law, human rights, and corruption (WORLD BANK 1998 pp. 34, DOLLAR and LEVIN 2006). First, selectivity avoids that foreign aid goes to non-deserving countries but rather to those which, according to the intended criteria of good governance, deserves it (HOUT 2002). As such aid is intended to reward countries for sound policies. Second, good policies in recipient countries are key determinants of the effectiveness of aid. As the Monterrey Consensus (UN 2002) points out, the impact of aid on growth and poverty reduction is higher in countries with sound policies than in countries with "bad" policies implying that foreign aid is more effective when given to countries with sound policy regimes. The relationship between aid effectiveness and good governance is supported by BURNSIDE and DOLLAR (2000, 2004), SVENSSON (2000), and DOLLAR and LEVIN (2006) who find that foreign aid effectiveness is negatively influenced by political instability and a low degree of democracy. In countries with high levels of corruption foreign aid leads to windfall gains due to rent-seeking behavior of bureaucrats and politicians (BOONE 1996, SVENSSON 2000). While food insecurity remains the same, the political powerful are likely to benefit. Food aid is thus more likely to actually reach the poor and needy in countries with low corruption

thereby increasing the efficiency of food aid.<sup>4</sup> Given the constrained budget available for food aid deliveries, it is reasonable for donor countries to allocate a higher amount of food aid to recipients with sound institutions as to maximize its effect in reducing poverty and hunger.

However, seen from another angle, if all donors allocate aid solely based on selectivity this leads to “under-aiding” of fragile states which primarily and adversely affects poor and needy population groups (MCGILLIVRAY 2006). The provision of food aid as a reward for sound institutions and policies is associated with the denial of food aid to countries with “bad” policies. This may contrast humanitarian objectives if people with little political rights are more vulnerable to food shortages than people which are able to avouch for their own interests. Additionally, HANSEN and TARP (2000) point out that “it may well be that many of those countries where aid works best are, at the same time, among those that need foreign aid the least” while countries with less good policies may need aid “badly to help bring them on track”.

Altogether, empirical evidence does not find consistent evidence that donors reward countries for the recognition of civil and political rights and for a low degree of corruption (GUILLAUMONT and CHAUVET 2001, MCGILLIVRAY 2003b, 2006), even though ALESINA and DOLLAR (2000) and ALESINA and WEDER (2002) find that the Scandinavian countries are particularly prone to respond to “correct” incentives in the recipient country.

#### 4.2.5 Bureaucratic Interests

The importance of political processes in economic decision-making and the interactions between various actors involved, such as desk managers, aid agencies and, in the case of food aid deliveries in kind, suppliers, packagers and shippers are widely recognized. At the government level, both the total amount and the allocation of food aid across recipients are to a considerable extent determined by bureaucratic interests. At the country level, donors gain international prestige by providing food aid if the economic effects of food aid are positive, thereby benefiting (successful) political leaders and representatives of donor countries at the individual level. In the case of the EU food aid allocation the desk officer representing the recipient country determines to a large extent the success or failure of a request for food aid. That is, the more a desk officer lobbies for the country he is representing, the higher the probability that “his country” receives

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<sup>4</sup> In fact, it is often argued that corrupt governments are not only discriminated against in aid flows, but that foreign aid stimulates corruption. That is, aid donations enlarge the resource base to gain which has a positive impact on rent-seeking behavior, an effect TORNELL and LANE (1999) call the “voracity effect” (SVENSSON 2000, ALESINA and WEDER 2002). However, since it is unlikely that food aid increases corruption due to its low magnitude in total development aid, this issue of “corruption dynamics” is not further explored here.



the submitted amount of food aid. A successful proposal is a reference of the competence and motivation of the desk officer and is therefore expected to have a positive effect on the desk officer's career prospects. As such the strategic use of food aid offers the opportunity of advocating the representatives' individual objectives by improving their own position and promoting the professional career. This implies that food aid allocation is often determined by short-term interests of politicians. Consequently, the higher the motivation of the responsible desk officer is, the further the supply curve is shifted to the right (PRINZ 1994 pp. 86, for foreign aid see LAHIRI and RAIMONDOS-MØLLER 2000, ROUND and ODEDOKUN 2003).

Moreover, food aid has to compete with other uses of budgetary resources at basically two levels. As concerns total development aid, DG Development has to compete with 26 other DGs for financial resources. Successful lobbying of the DG Development vis-à-vis other DGs leads to a shift of the supply curve of development aid to the right. Whether an increasing amount of development aid is in turn translated into an increasing amount of food aid, however, depends on the strengths of the food aid lobby within DG Development as resources devoted to food aid compete with other forms of development assistance. This relationship has two interesting implications. First, the shrinking share of food aid in total development aid represents a shift of priorities of DG Development towards other instruments of development assistance. Second, the strong variability of food aid reflects the fact that food aid is particularly prone to financial cuts, especially in times of tight budgetary resources, as the share of long-term commitments is rather small as compared to other uses of budgetary expenditures, such as social welfare programs (PRINZ 1994 pp. 88).

Finally, in the foreign aid and food aid literature it is commonly argued that aid allocation is based on last year's budget with only a narrow range of increases and decreases from one year to another. This hypothesis of incremental budgeting was first established by WILDAVSKY (1974) for the general case of development aid. By following the approach of WILDAVSKY many authors such as PRINZ (1994), BARRETT (1998), BARRETT et al. (1999), DIVEN (2001), and BARRETT and HEISEY (2002) find significant persistence in food aid flows of the EU, the US, and the WFP which, as the authors argue, may be caused by either administrative inertia in the donor country or chronic need in the recipient country.

#### **4.3 Determinants of Food Aid Demand**

Similar to the supply side, major determinants of food aid demand of recipient countries can be established. Again, all determinants considered affect the recipients' food aid demand leading to a shift of the demand curve in Figure 10B. If the demand curve shifts to the left the political

benefit of food aid declines from  $p$  to  $p'$ , which is associated with a reduction of food aid demand from  $q$  to  $q'$ . In contrast, shifts of the demand curve to the right increases in the political benefit of food aid from  $p$  to  $p''$  leading to a rise in food aid demand from  $q$  to  $q''$ . The following sections will discuss humanitarian, economic, external, and bureaucratic determinants of food aid demand.

#### 4.3.1 Humanitarian Determinants

As concerns humanitarian determinants of food aid demand the marginal benefit of food aid increases with rising needs of a recipient country caused by a shortfall in food availability. Thus, a decline in food availability – either due to natural or man-made disaster, the deterioration of the basis of agricultural production or large influxes of refugees – leads to an increase in food aid demand by shifting the demand curve to the right (PRINZ 1994 p. 90, NEUMAYER 2005, YOUNG and ABBOTT 2008).

#### 4.3.2 Economic Determinants

Food availability is determined by agricultural production and by commercial food imports with the latter basically depending on the following two aspects. First, assuming that no government intervention such as import subsidies or subsidizing staples for target groups exists, the ability to import food commodities depends on the population's purchasing power. The marginal benefit of food aid is thereby determined by both the average income measured as GDP per capita as well as the income distribution between particular subgroups of the population. For a fixed level of agricultural production, the lower the average income per capita and the higher the share of poor population groups, the higher the marginal benefit of food aid, and thus food aid demand will be (PRINZ 1994 p. 90, NEUMAYER 2005).

Second, the ability to purchase food commodities on the international market is determined by a country's availability of foreign currency. In case of a negative balance on current account and an associated shortage of foreign currency, food imports depend on the country's access to credits and bonds, which is in turn determined by the country's degree of creditworthiness. Especially countries with high foreign debts and low or even negative economic growth face poor access to credits. Whether or not a potential recipient applies for food aid therefore depends to a considerable extent on its possibilities to raise foreign currency. Consequently, food aid demand is adversely affected by the availability of foreign currency and economic growth of the recipient (PRINZ 1994 p. 91).

Moreover, a potential recipient's decision to apply for food aid is linked to the level of food prices. At the macro level, rising prices of imported food products lead to economic constraints in the form of a deterioration of the recipient's balance-of-payments situation. At the micro level, particularly poor population groups heavily depend on low food prices so that rising prices of staples may lead to riots and put rulers' power at risk, as recently demonstrated in various countries such as Mexico, Indonesia and Burkina Faso. Additionally, the urbanization rate affects the responsiveness of food security to changes in food prices. In general, the rural population is less affected by rising food prices than the urban population due to the possibility of subsistence farming. The pressure imposed on the government to keep prices low will therefore increase with a rising share of urban population. All in all, shortages of the government's own funds to mitigate the effects of rising food prices lead to an increase in food aid demand by shifting the demand curve rightwards (PRINZ 1994 pp. 91).

Food aid demand is also influenced by restrictions imposed by donor countries. As outlined in Chapter 2, food aid is often conditioned on a particular use of food aid commodities specified by the donor. The recipient country may see these agreements as too much an interference by donors with the recipient's decision. By reducing the marginal benefit due to the loss of the recipient's independence, conditionality shifts the demand curve to the left leading to a fall in food aid demand (PRINZ 1994 p. 29). However, non-compliance with the agreements usually does not lead to sanctions as conditionality is seldom monitored and reinforced by donors (HAGEN 2006). Since recipients may ignore conditionality it is unlikely that restrictions on the use of food aid have any significant effects on food aid demand.

Finally, a recently emerged problem related to recipients' commercial interest, which was most impressively demonstrated during the severe food crisis in Southern Africa in 2002, is the use of Genetically Modified (GM) food as food aid commodities. Even though the famine in Southern Africa exposed 15 Mio people to hunger, Lesotho, Malawi, Mozambique, Swaziland, Zambia, and Zimbabwe rejected food aid containing GM maize provided by the US (HERRICK 2008). Besides the potential health risk of GM food on recipients and its impact on domestic agricultural biodiversity by cross-pollination, the rejection was based on the impact of GM food on the recipients' long-term prospects to export agricultural commodities to the EU. Since the EU does not allow the import of plants containing GM organisms the recipient countries fear to lose the EU as an important export market (ZERBE 2004, CLAPP 2005). As long as the EU imposes import bans on GM food, the demand curve for food aid from donors delivering GM food will shift to the left, reducing food aid demand from these donors as compared to donors providing non-GM food. In the most extreme case Zambia's demand for non-milled GM food aid equaled zero in 2002.

#### 4.3.3 External Determinants

Similar to the supply side, foreign policy concerns may also play a role in food aid demand. From the recipients' point of view, the benefit of food aid depends on the ideological orientation of the donor countries. If donor and recipient have similar ideological views the application for food aid requires less convincing within the recipient country so that food aid demand will be higher as compared to countries with opposed ideological views (PRINZ 1994 pp. 92). Consequently, democratic countries, such as Botswana or Namibia, may bear less political cost in accepting food aid from the EU and thus show a higher food aid demand than socialist countries, as for example North Korea or Cuba. Food aid demand may also be determined by the relationship of the recipient to its former colonial power. That is, food aid demand will be higher if the former colony gained independence in a non-violent and friendly manner (PRINZ 1994 p. 98).

Recipients may also consider possible adverse effects of food aid on the degree of self-sufficiency which may lead to dependence on food aid and commercial food imports in the long-term perspective. In this sense food aid may result in a loss of autonomy. If the recipient prefers to be independent from abroad food aid demand will be lower as if the recipient favors to maximize food availability (PRINZ 1994 p. 93). Empirical and theoretical evidence, however, does not unambiguously support the hypothesis that food aid leads to an increasing dependence on food imports. HERRMANN et al. (1990) show both theoretically and empirically that food aid may have an increasing or decreasing impact on food imports, depending on the specific use of counterpart funds, i.e. whether counterpart funds are spent for demand or supply subsidization. Moreover, BARRETT (1998, 2002a) finds a J-curve relationship between food aid and commercial food imports of the recipient, meaning that food aid displaces food imports in the short-term, but in the long-term stimulates food imports.<sup>5</sup>

#### 4.3.4 Bureaucratic Determinants

The delivery of EU food aid is associated with an extensive administrative procedure which requires a considerable amount of effort of the recipient, as for instance the application for food aid, acceptance of food aid deliveries and the generation of counterpart funds. The process of food aid allocation thus requires specific and detailed knowledge about the administrative procedure. As a consequence, recipients who already gained experience with the operation methods of the Commission are likely to face fewer problems with the administrative procedure than countries that receive food aid for the first time. Having long working experience with the

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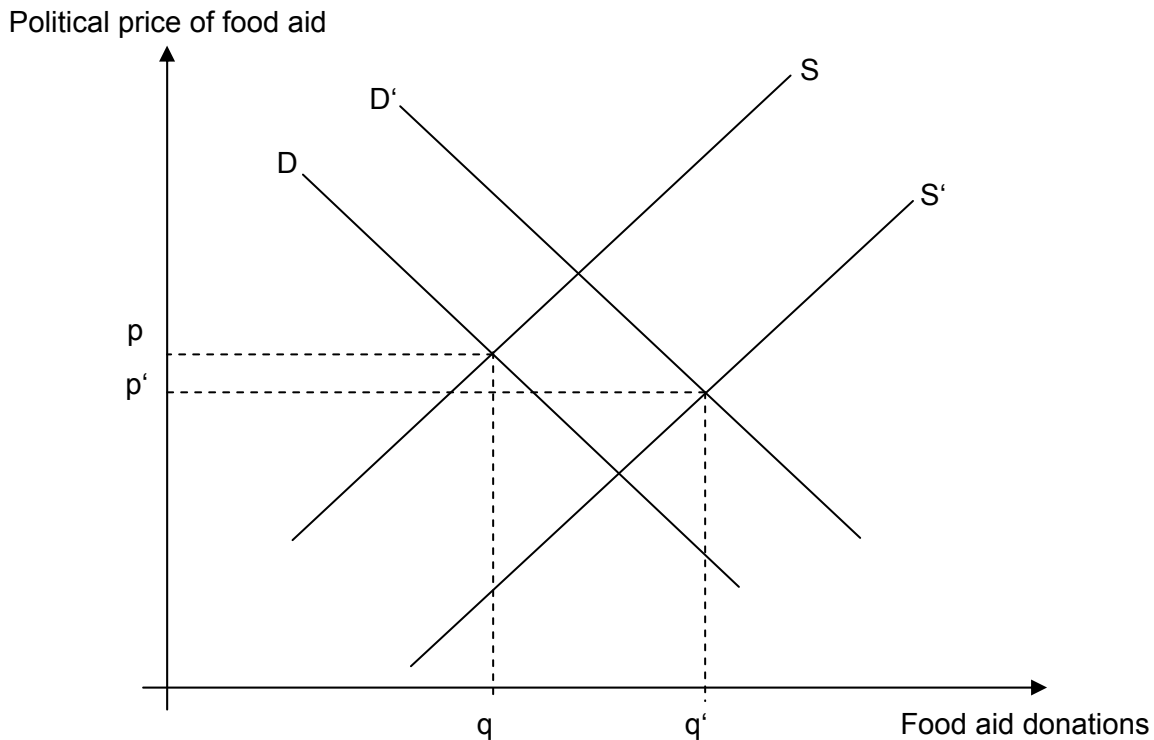
<sup>5</sup> This relationship contradicts the assumption of additionality as it implies that food aid does not simply add to imports in the short run (BARRETT 2002a).

EC, member states of the Lomé agreement are therefore likely to show a higher food aid demand than non-Lomé countries. Finally, the working language of the Commission – English and French – favors anglo- and francophone countries as these face fewer linguistic barriers than countries with other official languages (PRINZ 1994 p. 93).

#### 4.4 Impact of the Recent Rise in World Food Prices on EU Food Aid Market Equilibrium

In this section the concept of a political market for food aid is used to explore the impact of the current development of world food markets on EU food aid deliveries. In light of the extreme price rise in 2007 many people face hunger and food insecurity, thereby affecting food aid demand and supply (VON BRAUN 2008). In general, the demand side is affected by (humanitarian and) economic factors whereas the supply side responds to price rises on the basis of humanitarian concerns. Figure 11 illustrates the impact of rising international food prices on food aid supply and demand where the initial situation (without prime) is characterized by low world market prices and the final situation (with prime) by high world market prices.

Figure 11: Effects of Rising World Food Prices on the Food Aid Market Equilibrium



Source: Own illustration following PRINZ (1994 pp. 98).

On the demand side the rise in world market prices is associated with an increase of the political benefit of food aid due to an increasing need as inflating food prices limit the purchasing power.

The demand curve thus shifts to the right leading to an increase in food aid demand. In contrast to other emergencies and crises, such as floods or civil strife which are usually localized, rising world market prices lead to an increase in food aid demand in many countries simultaneously. This, however, should not hide the fact that developing countries will be affected to a different degree. Food-importing countries are likely to suffer most from rising food prices leading to an increase in food insecurity. In food-exporting countries particular population groups, e.g. exporting farmers, may benefit from rising food prices due to increasing revenue while food security of other population groups may deteriorate, most likely urban population groups which depend on food purchases.

The supply side effects are less clear-cut. On the one hand, humanitarian concerns about rising hunger and food insecurity in developing countries lead to a decrease in the marginal political cost of food aid, thus shifting the supply curve to the right which is *ceteris paribus* associated with an increase in food aid supply. On the other hand, food aid deliveries decline with rising world market prices for agricultural commodities since rising prices are associated with higher expenditures for food aid commodities and thus inflate food aid cost. However, due to the public attention rising food prices and its effects on food security receive within the EU, an increase in the food aid budget may be easier to legitimate by politicians. In the end, whether food aid supply increases or decreases as a reaction to rising world market prices depends on the magnitude of both effects. Thus, a prediction of food aid supply is a priori not possible. However, both the EC and the US already reacted to the increasing pressure on donor countries due to rising prices by raising the food aid budget by €117 Mio and US\$ 770 Mio, respectively. This reaction provides evidence that economic interests are outbalanced by humanitarian concerns. The shift of both demand and supply curve leads to a new equilibrium where  $S'$  and  $D'$  intersect. The additional amount of food aid provided to developing countries thus equals  $(q'-q)$ .

Given a fixed EU budget, food aid resources have to be allocated across all potential recipients. Rising world market prices for agricultural commodities affect all food-importing countries – although to a different degree – thus leading to a rise in food aid demand in many countries simultaneously. Due to rising cost of food aid it is unlikely that the increase of the EU food aid budget is sufficient to maintain its food aid deliveries per capita to each recipient which renders the allocation of food aid across countries more difficult. Possibly, maximizing the number of countries eligible for food aid will lead to negligible amounts of food aid provided to each recipient. Thus, it can reasonably be assumed that the EU aims at providing an effective amount of food aid to only a limited number of countries. In this case, some countries are considered as “important” recipients who will receive an increasing amount of food aid as neediness increases.

In return, countries belonging to the group of “unimportant” recipients face the problem that food aid supply depends on the requirements of important recipients (PRINZ 1994 p. 102).

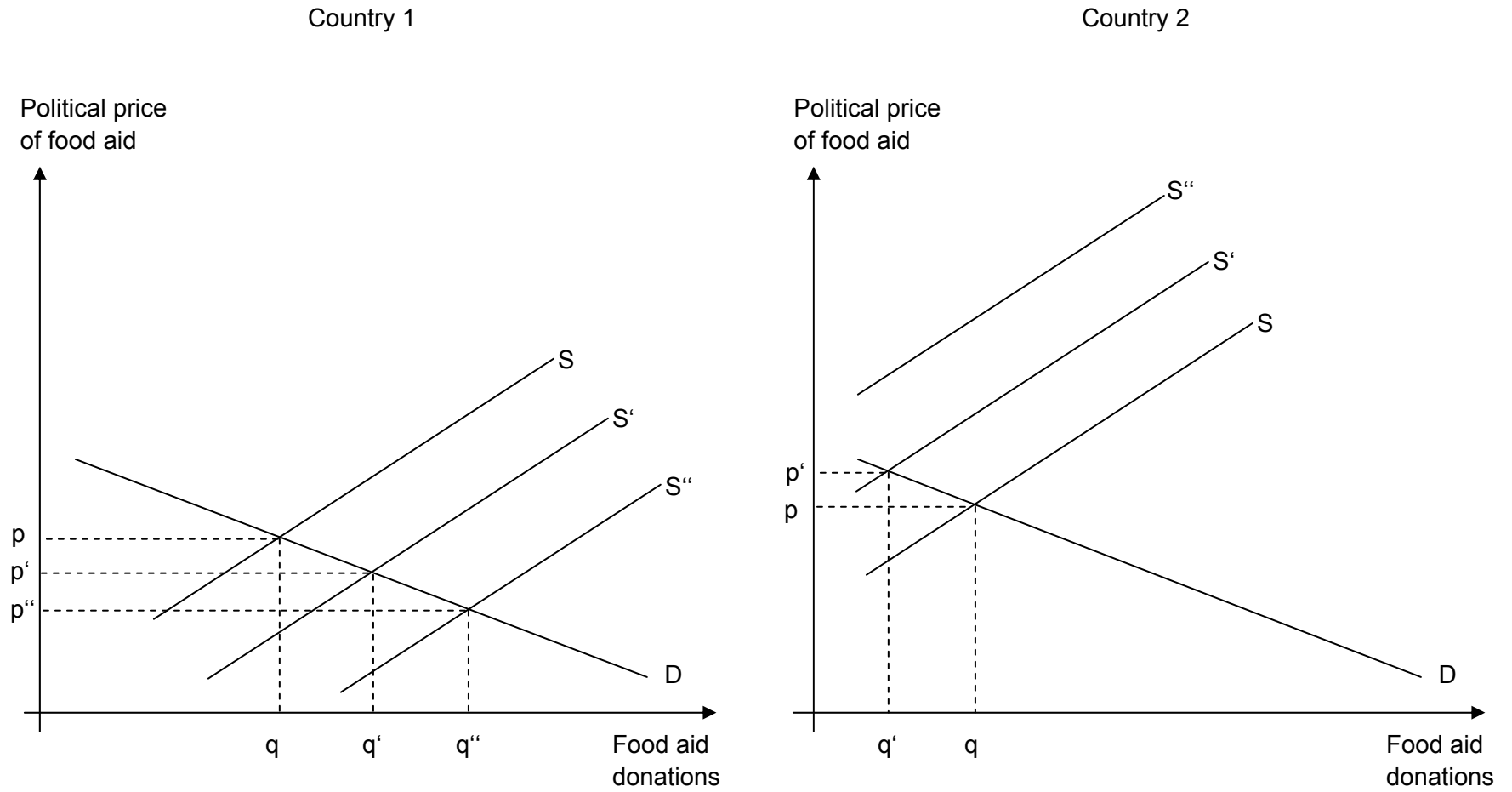
This relationship between recipient countries is illustrated in Figure 12 for the simplified case of two countries with country 1 presented in the diagram on the left hand side and country 2 on the right hand side. For simplicity both countries are assumed to have the same demand curve which does not change with rising food prices. It is assumed that the EU prefers to allocate food aid to country 1 over country 2 out of reasons explained in Section 4.2. In the initial situation S represents food aid supply to country 1 and 2 in the case of low world market prices. Both countries receive food aid but country 1 receives a larger amount than country 2 as it is preferred by the EU.

Now introducing the price rise of agricultural commodities could affect the supply curve in basically three ways. First, both countries receive a larger amount of food aid but the share delivered to each recipient remains constant. However, given the preference towards country 1 it is more likely that higher food prices lead to a more than proportional increase of food aid contributions to country 1, so that the share of EU food aid going to country 2 will decline. In other words the political cost of food aid to country 1 decreases whereas the political cost of providing food aid to country 2 increases. The supply curve shifts from S to S', resulting in an increase (reduction) of food aid deliveries from q to q' in country 1 (country 2).

If additional to the price rise an event, for example a natural disaster, occurs in country 1 the supply curve will shift further to the right from S' to S''. In this case it is possible that country 2 does not receive any food aid. In an extreme case situation 3 may also result from a very high preference towards country 1. Thus, given maintaining high food prices and limited budgetary resources available for food aid, ever more countries are likely to face S'' while contemporarily food aid demand increases. This relationship stresses the importance that food aid goes to the poorest people, most vulnerable to food insecurity.

Theoretically, the factors that may determine food aid supply and demand are manifold. Basically, both the demand and supply may be affected by humanitarian, commercial, external and bureaucratic determinants which lead to a varying distribution of food aid to one recipient over time as well as across recipients. However, which of the several factors actually determine food aid is an empirical matter and will be explored in the following chapter.

Figure 12: Interdependencies in Food Aid Allocation between Recipient Countries



Source: Own illustration following PRINZ (1994 p. 103).



## **5 Empirical Analysis of EU Food Aid**

Based on theoretical considerations discussed in the previous chapter, this part of the study deals with the empirical test of hypotheses on the determinants of EU food aid. Two separate models will be estimated for non-emergency, i.e. project plus program food aid and for emergency food aid in order to take into account the different objectives and allocation structure of these two groups. First, the econometric methods appropriate to analyze the determinants of food aid allocation are reviewed including a discussion of the specific assumptions, advantages and disadvantages of each method. Subsequently, detailed information about the model specification and indicators are given. Finally, the estimation results are presented followed by a substantive interpretation of the parameter estimates. The chapter concludes with a synthesis of the results and a brief discussion of the virtues and limitations of the analysis.

### **5.1 Estimation Methods**

The choice of an adequate estimation method to examine EU food aid crucially depends on the assumptions about the decision-making process of food aid allocation. Basically, food aid allocation may either be assumed a one-stage or a two-stage decision-making process. In the two-stage process, those countries which are deemed eligible for food aid are first to be selected among a “pool” of potential recipients (selection decision). In the second step the amount of food provided to each previously selected recipient is determined (allocation decision). Conversely, the one-stage process assumes that the selection of countries and the definition of the amount of food aid allocated to each country take place simultaneously.

From the econometric point of view, to model the food aid allocation process properly, the one- and the two-stage approach require different estimation procedures. The appropriate approach to analyze the two-stage process is the two-part model which separates the selection and the allocation decision by applying two different estimation methods. In the first step the selection (of a limited number) of countries among all potential recipients is considered as a yes-or-no-decision - or in other words a 0/1 choice - which is modeled by a binary choice approach. For the subsequent allocation decision an Ordinary Least Squares (OLS) model is used. In order to allow for OLS estimation the dependent variable is transformed from an originally censored to a continuous variable by ignoring all zero observations. That is, the OLS model takes only countries into account that actually receive food aid whereas countries that are not selected in the first step in a given year are deleted.

The one-stage process is modeled using the Tobit approach which explicitly accounts for the censored structure of the dependent variable.<sup>6</sup> In the following subsections the estimation methods and test statistics are briefly illustrated along with major virtues and drawbacks of each method. In either case the analysis is augmented by the use of panel data which will also be addressed in the following.

### 5.1.1 Ordinary Least Squares

Food aid donors generally provide food aid to only a fraction of all potential recipients in a given year whereas other countries are excluded. Food aid data are thus characterized by a censored dependent variable which is only partly continuous, strictly nonnegative, and equals zero for a large part of observations. That is, the dependent variable is censored from below with the limit zero. Above the limit the dependent variable behaves like a continuous variable because of the varying amount of food aid provided to each recipient. The general framework of the panel OLS model is

$$(5.1) \quad FA_{it} = \mathbf{x}_{it}\beta + \delta_{it} \quad i = 1, 2, \dots, N; t = 1, 2, \dots, T$$

where  $FA_{it}$  refers to the quantity of food aid deliveries to the recipient  $i$  at time  $t$ ,  $\beta$  is a vector of parameter estimates and  $\mathbf{x}_{it}$  is a vector of  $k$  explanatory variables including a constant. The term  $\delta_{it}$  is the composite error consisting of the country specific effects  $\alpha_i$  and the idiosyncratic error term  $\varepsilon_{it}$ , which are both assumed to be independently and identically distributed (i.i.d.),  $N(0, \sigma_\alpha^2)$ . The time-invariant country specific effects capture unobserved factors specific to each cross-sectional unit that affect  $FA_i$ . These factors render a country more or less likely to receive food aid but cannot explicitly be included in the analysis due to their unobservable (latent) nature. Thus, the use of panel data has the advantage of accounting for heterogeneity between countries that is not captured by the explanatory variables (WOOLDRIDGE 2006 pp. 461, GREENE 2008 p. 182). The literature on panel data models essentially suggests two approaches to model individual specific effects, the fixed effects (FE) and the random effects (RE) approach. Both methods differ in the estimation procedure and assumptions needed to derive consistent estimates. In the present analysis, the RE model is considered more appropriate as it, in contrast to the FE approach, allows estimating parameters of time-invariant explanatory variables. This is clearly an advantage given that the effects of time-constant variables, such as

<sup>6</sup> Another method to estimate the selection and allocation decision simultaneously is the Heckman model which was first proposed by Heckman (1979). However, the analysis at hand will be restricted to the two-step and the Tobit model.

membership of the Lomé agreement and distance, on food aid allocation are of central importance in this study. Unfortunately, the possibility of estimating time-constant variables is associated with introducing strong assumptions as compared to the FE model. More specifically, in the RE model consistency is only given if the unobserved heterogeneity (the random effects) follows a normal distribution and is uncorrelated with each explanatory variable. This orthogonality condition requires strict exogeneity of the explanatory variables and the unobserved effects, which is not shared by the FE model where estimation coefficients are unbiased and consistent even if the individual specific effects are correlated with the explanatory variables (GREENE 2008 pp. 193).

Unfortunately, due to the censored dependent variable OLS estimation is only in parts appropriate to analyze the determinants of food aid. Simply applying OLS estimation may result in negative predicted values for the dependent variable which is not feasible given that food aid deliveries are strictly nonnegative (NEUMAYER 2003a p. 34). Moreover, the regression of food aid including all zero observations on the independent variables yields biased estimates. The bias will be larger the higher the share of zero observations in the dataset. In the present analysis the share of zero observations amounts to 70% and 66% of total observations for emergency and non-emergency food aid, respectively. As a result, it is not possible to get reliable estimates of the determinants of the overall food aid allocation process using OLS (RONNING 1991 p. 128, PRINZ 1994 p. 112).

To avoid this problem, all zero observations of food aid are excluded in the OLS regression which is equivalent to modeling only the allocation decision. Unfortunately, simply avoiding this issue is not an unproblematic solution either because this proceeding leads to a loss of information contained in the (deleted) zero observations. Even more serious, AMEMIYA (1984) shows that using only positive values of food aid also yield biased and inconsistent estimates. The bias is caused by the nonrandom sample selection of the endogenous variable which leads to a violation of basic assumptions of OLS. To illustrate the problem the expected value of food aid conditional on positive observations is calculated as

$$(5.2) \quad E(FA_{it} | FA_{it}^* > 0) = x'_{it}\beta + E(\varepsilon_{it} | FA_{it}^* > 0)$$

where  $FA_{it}^*$  is the unobserved latent variable and  $FA_{it}$  represents the observed outcomes (PRINZ 1994 p. 113). Only if the expected value of the error term - the second term on the right-hand side of equation (5.2) - is zero OLS estimates are unbiased. Unfortunately, the expected value of the error term will generally not equal zero. In this case nonrandom sample selection will lead to biased OLS estimates (CAMERON and TRIVEDI 2006 p. 44, WOOLDRIDGE 2006 pp. 616). However,

by use of Monte Carlo simulations MANNING et al. (1987) show that the bias of OLS estimates is typically small in foreign aid applications.

A frequently occurring misspecification problem in econometric analysis of cross-section data is heteroscedasticity. Although parameter estimates will still be consistent under heteroscedasticity, it has serious consequences for the estimation results as it leads to inefficient estimates. Statistical inference is therefore not reliable in the presence of heteroscedasticity. In order to identify heteroscedasticity the White and the Breusch-Pagan test are performed (WOOLDRIDGE 2006 pp. 280, GREENE 2008 p.167). In case heteroscedasticity is present the problem is corrected by calculating heteroscedasticity-robust standard errors.

In order to draw conclusions about the overall fit of the model no easy measure, as for instance the  $R^2$  for standard OLS models, is available for panel data models. Therefore, the fit of the model is measured by comparing the predicted and observed outcomes of the dependent variable. Moreover, the joint and single significance of the parameters is tested using the Wald-test, which is equivalent to the F-test in the linear OLS model, with  $H_0 : \beta_1 = \beta_2, \dots, \beta_k = 0$  and the t-test with  $H_0 : \beta_k = 0$ , respectively.

### 5.1.2 Binary Choice Models

Many economic studies deal with discrete dependent variables, as for example the selection (choice) of food aid recipients among a pool of potential recipients. In principle, discrete dependent variable models can be estimated with the standard OLS procedure, such as the Linear Probability Model (LPM). The LPM is, however, characterized by severe shortfalls. Most importantly, the dependent variable is not restricted to lie between 0 and 1, so that fitted values may take on negative probabilities and probabilities above unity. The LPM also suffers from heteroscedasticity and non-normality of the error term (JOHNSTON and DINARDO 2007 pp. 417, GREENE 2008 p. 772). In fact, in the presence of panel data the LPM is even less attractive since it fails to incorporate the individual specific effects and therefore imposes unnatural restrictions on this effect (i.e. to be zero) (WOOLDRIDGE 2002 p. 482).

As a result of the shortcomings of the LPM, models more appropriate for limited dependent variables were developed, namely Probit and Logit models. The dependent variable of these models measures the probability  $p_i$  that a particular event occurs, e.g. a recipient country receives food aid, where  $p_i$  is constrained to lie between one and zero. Probit and Logit models are nonlinear approaches which require Maximum Likelihood (ML) estimation that renders the estimation more difficult than OLS models. Although both models differ in their distributional assumptions – the Probit model assumes a normal distribution whereas the Logit model

postulates a logistic distribution – this difference plays only a minor role in practice. In fact, it is possible to obtain a good approximation of the Logit estimator by multiplying the Probit coefficients by 1.6 (WOOLDRIDGE 2006 p. 592). Therefore, the decision which model to use is often simply a matter of personal preference. With regard to the subsequent analysis, food and foreign aid applications commonly use the Probit model, which will also be used here.

In the case of food aid allocation the dependent variable is a binary choice variable where  $FA_i = 1$  if a country receives food aid and  $FA_i = 0$  if not. Obviously, this approach is useful to analyze the determinants of the selection of countries eligible for food aid shipments whereas it is not possible to draw any conclusions about factors that determine the amount of food aid allocated to a given country. To illustrate the general panel framework of Probit estimation consider the following model

$$(5.3) \quad \begin{aligned} FA_{it}^* &= x'_{it}\beta + \delta_i && i = 1, 2, \dots, N; t = 1, 2, \dots, T \\ FA_{it} &= 1 && \text{if } FA_{it}^* > 0 \\ FA_{it} &= 0 && \text{otherwise} \end{aligned}$$

where the subscripts again refer to country  $i$  at time  $t$ . The unobserved latent variable  $FA_{it}^*$  represents the difference between the marginal cost and the marginal benefit of food aid. For positive values of the latent variable – the marginal benefit exceeds marginal cost – the observed outcome  $FA_{it}$  equals one. That is to say, food aid is only provided if the marginal benefit outweighs the marginal cost. In contrast, if marginal cost of food aid is higher than marginal benefit, i.e. the latent variable takes on negative values, food aid equals zero (PRINZ 1994 p. 115).

As for OLS estimation, the literature on limited dependent variable models using panel data essentially suggests two estimation procedures, the FE and RE approach. Unfortunately, the presence of country specific effects  $\alpha_i$  complicates the estimation of Probit models. More precisely, in the presence of individual specific effects coefficient estimates of the FE Probit model are biased due to the “incidental parameters problem”.<sup>7</sup> In contrast, RE Probit models do not suffer from the incidental parameters problem and thus provide consistent parameter estimates. However, avoiding the incidental parameters problem comes at a cost of introducing a complicated estimation procedure.<sup>8</sup> Nonetheless, for two reasons the RE Probit model is

<sup>7</sup> For details about the incidental parameters problem the reader may refer to NEYMAN and SCOTT (1948), who were the first to mention this problem, MADDALA (1987), and, more recently, LANCASTER (2000), and GREENE (2004a, 2004b).

<sup>8</sup> Coefficient estimates of the explanatory variables are obtained by maximizing the log-likelihood function of the RE Probit model which is complex and therefore omitted here. RE Probit estimates are calculated

considered more appropriate to analyze the determinants of food aid. First, the RE Probit model allows estimating time-constant variables and, second, it yields consistent coefficients, given that the orthogonality assumption holds true (WOOLDRIDGE 2002 p. 485).

Despite the difficulties raised by individual effects, it is not a feasible option simply to ignore these. For the RE case, Monte Carlo simulations by GUILKEY and MURPHEY (1993) show that ignoring the random effects and performing a standard Probit model leads to severely biased standard errors of the coefficients and thus to misleading inference. Moreover, with respect to the considerations about the incrementalism of food aid allocation in Section 4.2.5 a country that already received food aid in the previous year is also more likely to receive food aid in the current year. To model this relationship a lagged dependent variable (LDV) is included as an explanatory variable thereby creating a dynamic limited dependent variable model. The probability that country  $i$  receives food aid in time  $t$  depends on a vector of explanatory variables, the unobserved heterogeneity  $\alpha_i$  and whether the country received food aid in the previous period  $t - 1$  (WOOLDRIDGE 2002 pp. 493). In this case, neglecting individual effects has further unfavorable consequences by overstating the effect of the LDV (BALTAGI 2005 p. 217). Due to the complicated structure of the RE Probit model, the estimation is quite sensitive to misspecification. Therefore, an alternative estimator which allows calculating robust standard errors, the Generalized Estimation Equations (GEE), is used for estimation (WOOLDRIDGE 2002 p. 486).<sup>9</sup>

The nonlinearity of the Probit model does not only complicate the estimation but also the interpretation of estimation coefficients. The parameter estimates of the Probit model indicate whether or not an explanatory variable significantly influences the probability that an event occurs. In contrast to the OLS coefficients, Probit coefficients cannot be interpreted as the constant marginal effect of an explanatory variable on the dependent variable. Instead, Probit estimates give information about the sign and the significance of the marginal effect of an explanatory variable, but no conclusion about the magnitude of the marginal effect can be drawn. This is due to the fact that the marginal effect of one explanatory variable depends on the value of all explanatory variables in a nonlinear manner. In order to draw reliable conclusions, Probit coefficients have to be transformed by inserting particularly interesting values for all

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using the Gaussian quadrature procedure proposed by BUTLER and MOFFITT (1982) which is also employed by econometric computer programs that provide routines for the RE Probit model, such as LIMDEP and STATA. For more details see for example WOOLDRIDGE (2002 pp. 486), BALTAGI (2005 p. 213), and GREENE (2008 pp. 797).

<sup>9</sup> The GEE approach is also called the population-averaged model, which is not used here as it is a somewhat ambiguous expression (see WOOLDRIDGE 2002 p. 486).

explanatory variables as for example the mean, except for dummy variables which can only take on the value 0 and 1 (JOHNSTON and DINARDO 2007 p. 424).

Finally, to evaluate the goodness-of-fit of the model the predicted and observed outcomes of the dependent variable are again compared. Moreover, to test for the joint significance of the explanatory variables the Wald test is employed whereas the t-test tests for the significance of single parameters.

### 5.1.3 Tobit Model

The Tobit model, also called censored regression model, was first mentioned by Tobin (1958). TOBIN analyzed the purchasing behavior of durable consumer goods but faced the problem that the data were characterized by zero purchases by any individual in many years. Driven by this problem, Tobin proposed a model which allows estimating the probability of occurrence as well as the marginal effect of an explanatory variable at the same time. This approach is adequate to the context of food aid allocation which offers the possibility to estimate the selection and the allocation decision simultaneously. Moreover, as it allows using censored observations the Tobit model permits to make use of all available data (MADDALA 1983, AMEMIYA 1984, CAMERON and TRIVEDI 2006 pp. 529).

Just as the Probit model, the Tobit model belongs to the class of nonlinear models and as such makes use of ML estimation. Although both models belong to the limited dependent variable models, the Probit (qualitative dependent variable) and the Tobit model (censored dependent variable) differ in the structure of the dependent variable.<sup>10</sup> The difference is illustrated by following the analytical framework of TOBIN. The general framework of the RE Tobit model is

$$(5.4) \quad \begin{aligned} FA_i^* &= x_i' \beta + \varepsilon_i & i &= 1, 2, \dots, N \\ FA_i &= FA_i^* & \text{if } FA_i^* &> 0 \\ FA_i &= 0 & \text{otherwise.} \end{aligned}$$

Again, let  $FA_i^*$  be the latent variable. More specifically,  $FA_i^*$  is an underlying continuous response variable which is unobserved in practice for the censored values. For zero and negative values of the latent variable food aid equals zero, for positive values of the latent variable food aid equals the value of  $FA_i^*$ .

For the case of panel data, the coefficient estimates of the RE Tobit model can only be approximated by maximizing the log-likelihood function using the Gauss-Hermite quadrature,

<sup>10</sup> The dependent variable of the Tobit model may also be truncated but as this is not the case in the analysis at hand, this issue will be neglected. For a discussion of truncated models see MADDALA (1983), AMEMIYA (1984), and, more recently, GREENE (2008 pp. 863).

which is also employed by econometric computer programs. A detailed demonstration of this complicated procedure can be found in GREENE (2008 pp. 552). In large datasets the results of this approximation are, however, not robust to the number of quadratures calculated. Due to the poor performance of RE Tobit models (see NEUMAYER 2003a p. 40) only the results of the standard Tobit model will be reported.

Similar to the Probit models, the interpretation of Tobit coefficients is not as straightforward as the interpretation of OLS coefficients. The nonlinearity of the estimation procedure complicates the interpretation of Tobit coefficients since the marginal effect of a given variable depends on the parameter value of each explanatory variable included in the model. Two possibilities of interpreting Tobit coefficients are common in the literature. The first possibility, which is followed here, is to calculate the value of the coefficient by inserting interesting values for the explanatory variables, such as the mean, the maximum or the minimum. Another possibility is to estimate the coefficient for each observation and then to average over all observations (PRINZ 1994 p. 124).

The coefficients of the Tobit model represent the marginal effect of an explanatory variable on the latent (unobserved) variable and must not be confused with the regression coefficients for observations above the censoring threshold as it is frequently done in the literature (LECLERE 1994). That is, the regression coefficient for each explanatory variable does not yet take into account the censored structure of the data but refers to the latent variable. In order to improve the interpretation of Tobit estimates MCDONALD and MOFFITT (1980) propose the decomposition of Tobit coefficients. Basically, MCDONALD and MOFFITT distinguish between three concepts: (1) the expected value of all observations, (2) the expected value conditional on being above the threshold which refers to the allocation decision (allocation elasticity), and (3) the probability of being above the threshold which refers to the selection decision (participation elasticity). For the present case of food aid PRINZ (1994 p. 124) calculates the marginal effect of a change in the explanatory variable  $x_i$  on food aid deliveries as

$$(5.5) \quad \frac{\partial E(FA_i)}{\partial x_{i,k}} = \Phi(FA_i/\sigma) \frac{\partial E(FA_i^*)}{\partial x_{i,k}} + E(FA_i^*) \frac{\partial \Phi(FA_i/\sigma)}{\partial x_{i,k}}.$$

Equation (5.5) gives the marginal change of food aid averaged over all potential recipients without distinguishing whether or not a country receives food aid. It is therefore not possible to derive whether a change in food aid provided is caused by a change in the amount of food aid allocated to previous food aid recipients or by a change in the probability to be eligible for food aid. In order to overcome this limitation, MCDONALD and MOFFITT suggest to disaggregate the effect of the explanatory variables on the total change in  $y$  into two parts. This is done by decomposing equation (5.5) into the first and the second term which yields two different estimators. The first estimator gives the marginal effect of the explanatory variable  $x_i$  on the



expected value of  $FA_i$  for all observations above the limit, that is, countries that already receive food aid. The second estimator gives the marginal effect of the explanatory variable  $x_i$  on the probability of being above the threshold, which corresponds to the probability that a country receives food aid. The decomposition hence allows separating the total effect of an explanatory variable on food aid allocation whether it is caused by a change in the amount of food aid provided to recipients or by a change in food aid eligibility. A recent study of KANG (2007) emphasizes that this technique was often applied erroneously in the past as the usefulness of the decomposition is questionable if one is only interested in the latent variable (recall that the Tobit coefficients directly give the effect of  $x_i$  on the latent variable). However, in the present context it is reasonable to decompose the Tobit coefficients since the latent variable of food aid is not a particularly interesting subject to analyze.

With respect to misspecification problems, ROBINSON (1982) shows that Tobit estimates are inefficient but still consistent in the presence of first-order autocorrelation. Unfortunately, things are more complicated in the presence of heteroscedasticity. Compared to OLS where heteroscedasticity causes the estimator to be inefficient but nevertheless consistent, the estimates of the Tobit model are not even consistent. ARABMAZAR and SCHMIDT (1981) argue that the inconsistency in censored regression models increases the stronger the heteroscedasticity and the larger the number of censored observations. Also JOHNSTON and DINARDO (2007 p. 441) note that “heteroscedasticity in the Tobit is likely to be a much more serious problem than in the logit or probit. In particular, the problem is that the misspecification of  $\sigma$  has profound consequences for  $\beta$  [...]”. In order to obtain reliable results heteroscedasticity-robust standard errors are calculated for the standard Tobit model.

Again, the accuracy of the model is by performing the same tests for both the general fit of the model and the significance of parameter estimates as in the RE Probit model (see Section 5.1.2).

One final remark is warranted. As compared to the two-part model the Tobit model is associated with two major restrictions. First, by definition the Tobit model assumes that both the selection of recipients and the allocation of food aid across recipients is determined by the same explanatory variables. This is not shared by the two-part approach which is more flexible and allows differentiating between determinants of the first and the second stage of the decision-making process (PRINZ 1994 p. 111). However, the consequences may not be too serious since it is plausible to assume that most determinants are the same for the selection decision as for the allocation decision. This is stressed by the fact that most studies (including this one) choose the same explanatory variables to model the selection of recipients and the amount of food aid

allocated. Second, the Tobit model constrains the signs of the determinants of both stages to be the same, that is, variables that positively affect the eligibility of recipients are also assumed to have a positive impact on the amount of food aid allocated. As NEUMAYER (2003a p. 35) emphasizes, although this is also a reasonable assumption it should rather be tested than simply assumed.

## **5.2 Data and Specification of the EU Food Aid Model**

After reviewing major features of the estimation techniques, the following subsections present the model specification used to examine EU food aid allocation. Thereby, detailed information about the indicators chosen to model the determinants of food aid allocation discussed in Chapter 4 is given.

### **5.2.1 Dependent Variable**

Throughout the empirical analysis emergency food aid will be examined independently from project and program food aid. The reason for this proceeding is that the determinants of emergency versus project and program food aid allocation are likely to differ due to different objectives and motivations. Project and program food aid, however, will be analyzed jointly since the difference between both forms of food aid is diminishing and only of minor importance for the aim of this study. To the best knowledge of the author, such disaggregation of food aid flows has not yet been estimated in previous studies, even though NEUMAYER (2005) analyzed the allocation of emergency food aid and total EU food aid, but did not separate project and program food aid.

In this analysis food aid is specified as the delivery of food measured in tons, with cereals being expressed in grain equivalents. Food aid data are obtained from WFP/INTERFAIS. Even though food aid can also be delivered as financial assistance tied to the purchase of food commodities, unfortunately this form of food aid allocation cannot be analyzed in a comprehensive manner due to lack of data (NEUMAYER 2005).

In the foreign and food aid literature the issue of the accurate specification of the dependent variable is intensively discussed, as for example in MCGILLIVRAY and OCZKOWSKI (1991), NEUMAYER (2003a pp. 42, 2005), BERTHÉLEMY and TICHIT (2004) and BERTHÉLEMY (2006). Basically, aid allocation may be modeled in total or in per-capita terms. In this study the former approach is chosen for the following reason. Previously to the decision about food aid allocation between recipients the total budget eligible for food aid is fixed by the EC. Given this constraint, MCGILLIVRAY and OCZKOWSKI (1991) point out that it is difficult to allocate food aid in per-capita

terms since decision-makers have to be careful neither to exceed nor to fall short of the fixed budget. Thus, per capita aid distribution is an outcome of the aid allocation process rather than a primary consideration. It is therefore refrained from specifying the dependent variable in per capita term.<sup>11</sup> Instead, food aid allocation is specified in absolute terms while including the population size as control variable. The specification of the dependent variable as total food aid allocated to each recipient offers the advantage of a simple and straightforward interpretation of the regression coefficients. Finally, to reduce the impact of outliers the dependent variable is logged which is an approach widely used in foreign aid literature. Thereby, the dependent variable is calculated as  $\log(1+FA)$  to ensure that zero observations are not deleted by taking the logarithm (DOLLAR and LEVIN 2006).

### 5.2.2 Explanatory Variables

Besides the specification of the dependent variable, the choice of explanatory variables and data sources need further explanation, which will be given in the following. Starting with recipient need, a clear distinction whether a given variable serves as an indicator for recipient need, donor interest or good governance will be made.

#### 5.2.2.1 Recipients' Needs

The EC claims that humanitarian objectives are at the center of EU food aid. To test for the responsiveness of EU food aid to recipients' needs several measures are considered in the model including indicators of objectives directly stated by the EC (see Section 3.3).

One intention of EU food aid is to improve the *food situation and to respond to food shortages in the recipient country using human development and nutritional indicators*. Chronic hunger measured as the recipient's average calorie supply per capita and self-sufficiency in cereal production serves as an indicator for the food situation. Unfortunately, data of the per-capita calorie supply obtained from the Food Balance Sheets of the FAO are only available until 2003. Due to the central importance of the calorie supply and the lack of alternative measures the estimation period has to be restricted to the period 1993-2003 (although food aid data up to 2006 are provided by the WFP/INTERFAIS).<sup>12</sup>

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<sup>11</sup> However, a non-reported regression of the model in per-capita terms indicates that the estimation results are robust to the specification of the dependent variable.

<sup>12</sup> An alternative "food availability" variable was computed as (own cereal production + cereal imports – cereal exports)/population. Since this variable performed poorly in the estimation it did not constitute a proper substitute for per capita calorie supply which also takes into account non-cereal food and the calorie content of different foodstuffs.

Further, a shock variable is calculated as the percentage change of calorie supply from one year to another. This variable aims to test whether the EU responds to sudden changes in food availability in recipient countries. With respect to theoretical considerations presented in Chapter 4 all coefficients of the above variables are expected to be negative. Unfortunately, in case of self-sufficiency a negative coefficient may represent either humanitarian objectives, as insufficient food production – which cannot be properly supplemented by commercial imports – indicate higher need, or commercial objectives, as countries with a low self-sufficiency might represent promising export markets for donor countries in the long run.

Moreover, three variables specific to emergency food aid are included in the model. First, a dummy variable for conflicts and war in a given country enters the regression. In conformity with YOUNG and ABBOTT (2008), the dummy variable was set to one in the case of intermediate conflict or war with the first being defined as at least 25 battle-related deaths and the latter as at least 1,000 battle-related deaths per year (SIPRI 2007). Data are obtained from the Stockholm International Peace Research Institute (SIPRI). Second, the occurrence of natural disasters is captured by a dummy variable which equals one if at least one disaster affecting at minimum 1 Mio people takes place in a given country and year. The threshold is rather arbitrary and is therefore tested for 50 Thousand and 500 Thousand people, too. Finally, the number of refugees residing in the recipient country is included in the model. In contrast, internally displaced persons are excluded in order to avoid any source of multicollinearity with a view to the variables for war and natural disaster. The coefficient estimates of the above indicators are expected to be positive in the case of emergency food aid whereas no effect is anticipated for project and program food aid.

According to the EC, food aid is directed towards countries with lower *per-capita income and the existence of particularly poor population groups*. As these are long-term indicators of poverty the following variables are rather anticipated to affect project and program than emergency food aid. Low per-capita income is measured as GDP per capita which is in fact the most common indicator for recipients' needs in the foreign aid literature. Nonetheless, GDP as an indicator for wealth is often criticized as it solely focuses on the economic part of wealth, thereby neglecting other factors that influence well-being. It is reasonable to argue that decision-makers also account for non-economic well-being in the recipient countries, such as infant mortality, when deciding over the distribution of food aid (NEUMAYER 2003a p. 45, BERTHÉLEMY and TICHIT 2004). In fact, the reduction of infant mortality is one of the International Development Targets (IDTs) associated with the adopted integrated approach towards EU food aid in 1996 (EC 2001, EC 2004). Thus, the infant mortality rate as an indicator for recipient needs is introduced in the

model.<sup>13</sup> The coefficient of infant mortality (per-capita income) is expected to have a positive (negative) sign. However, both the GDP per capita and calorie supply per capita are limited in the sense that the distribution of income and calorie availability across different groups of the population is not captured. Although there are indicators covering income inequality at the household level, such as the GINI coefficient, these are not used in the analysis at hand due to the infrequent collection of these data.

In order to account for the *balance-of-payment situation* in the recipient country as a further selection criterion of the EC, the current account balance is introduced in the model. As a poor balance of payments situation is associated with a low ability to import food and thus adversely affects non-concessional food availability the coefficient of this variable is expected to be negative.

Finally, the population size of the recipient country is included in order to test the well-known hypothesis of population bias in the sense that less populous countries receive more food aid in per capita terms than more populous countries. The foreign aid literature proposes the following explanations. First, donors may be unwilling to give huge amounts of food aid to very populous countries. As this behavior is attended by neglecting smaller countries and thus a decline of good will of smaller countries towards the EU, this could have adverse effects on the EU's objectives concerning international negotiations applying the "one country, one vote" rule. Also, the capacity of large countries to absorb additional amounts of food aid may be limited (PRINZ 1994 p. 172, NEUMAYER 2003a p. 32). The prediction of the coefficient of the population size is rather complicated. For the selection decision the parameter estimates are expected to be insignificant as the population size per se does not allow to make any prediction about the population's neediness. However, once eligible for food aid, countries with larger populations are expected to receive a higher amount of food aid in total terms (positive coefficient), where a coefficient below one would confirm the hypothesis of population bias.

#### 5.2.2.2 Good Governance

In order to capture the complex concept of good governance two indicators, i.e. the degree of corruption and democracy, enter the regression model. These variables serve as indicators for

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<sup>13</sup> Also life expectancy is a non-economic indicator for well-being but highly correlated with child mortality and thus not included in the model. Further, the Human Development Index (HDI) was tested as a more comprehensive indicator of well-being (UNDP several years). The HDI, however, includes per-capita income which is already part of the model and thus induces multicollinearity. To avoid this problem the Physical Quality of Life Index (PQLI) which includes infant mortality, life expectancy, and literacy was calculated from HDI data, but also performed poorly in the estimation.

the importance of human rights and the population's opportunities to participate in the decision-making process of the recipient country. The level of corruption in the recipient country is measured by the Kaufmann-Kraay-Mastruzzi Worldwide Governance Indicators of the World Bank (KAUFMANN et al. 2003). Since these indicators are only collected intermittently since 1996 and on an annual basis since 2002 years with no data available are replaced by the latest available observation, making use of the reasonable assumption that the level of corruption does not vary considerably from year to year. Note that the variable is defined from -2.5 to 2.5 with the lowest value corresponding to the highest degree and 2.5 to the lowest degree of corruption. To maximize the effectiveness of food aid donations donors are anticipated to preferably allocate food aid to countries with low corruption so that the coefficient is expected to be positive.

Data for the degree of democracy in the recipient country are obtained from Freedom House due to better data availability as compared to the Kaufmann-Kraay-Mastruzzi Worldwide Governance Indicators. Freedom House classifies a country as free, partly free or not free with respect to political rights and civil liberty of the population. With a view to the stated intention to reward countries with sound policies at home the coefficient is expected to be positive.

#### 5.2.2.3 Donor Interests

Food aid donors are often blamed to provide food aid with a view to commercial interests. Countries which are important trading partners or promising export markets are thus expected to receive a higher amount of food aid. In order to measure the impact of commercial interests on EU food aid allocation bilateral cereal exports from the EU to the recipient country as a share of total cereal exports of the EU is included in the model. Other authors, as for instance PRINZ (1994) used the total, as against bilateral, cereal imports of the recipient as a proxy for EU trade prospects. This is a rather imprecise measure as, say, Asian countries may import large quantities of cereals which mostly origin from Australia and thus overstate the commercial importance and opportunities of the EU in these countries. A high share of EU cereal exports is expected to be positively associated with food aid contributions to a particular recipient. However, a positive coefficient does not necessarily mean that the EU pursues commercial interests but may also hint to an increasing orientation towards cost-efficiency. According to the food aid policy of 1996 the EC gives priority to countries where the "EC has experience and a comparative advantage to intervene" in order to increase the cost-efficiency of food aid allocation (EC 2004 p. 13). This is certainly true for important trading partners as transport and distribution cost are reduced by the existence of marketing channels as well as economic and physical infrastructure in the recipient country.

Furthermore, geographical distance measured as distance (airway) between Brussels, Belgium, and the capital of the recipient enters the model. In the case of direct transfers the geographical distance between the donors' and recipients' capital serves as a proxy for the difference in transport cost across recipients. However, as mentioned in Section 3.1, food aid is increasingly purchased in developing countries while the amount of food aid procured within the EU is diminishing. This development is expected to lead to a declining importance of transport cost from the EU (or, admittedly simplified, Brussels) to the recipient. Consequently, geographical proximity may rather serve as a proxy for geopolitical interests of the donor (NEUMAYER 2005). In either case a negative sign of the parameter estimate is expected. A related variable is a dummy for Eastern Europe and states of the CIS which is only used in the analysis of project and program food aid in order to account for the huge amount of program food aid delivered to these countries since the end of the Cold War. With a view to Figure 6 the coefficient is expected to be positive. As both variables are strongly correlated the distance variable is excluded from the project and program food aid model.

To account for further geopolitical considerations of food aid allocation, a dummy variable for a recipient's membership in the Lomé agreement is included in the model. Two more dummies indicate whether or not a recipient is a former colony of the United Kingdom (UK) and France, respectively, whereas former colonial status of Portugal, Spain and Italy is neglected. The rationale behind is the important position of both UK and France with respect to population size and economic power suggesting a strong influence of both countries on decision-making in the EU. This implies that these two countries are more likely than other member states to have the power to exploit food aid negotiations for their own interests.

Moreover, food aid donations of other donors enter the model. The coefficient of this variable cannot be anticipated a priori. On the one side, EU food aid allocation may be influenced by peer pressure implying a positive coefficient. On the other side, the EU may either effectively coordinate food aid allocation with other donors or free ride on other donors' food aid donations which implies a negative coefficient.

Finally, to test the hypothesis of incrementalism the lagged value of food aid is included in the model. The coefficient is expected to be positive. As a desirable side effect this autoregressive specification reduces potential autocorrelation.

Summarizing all indicators of recipient need, good governance and donor interest, the general specification of the model to be estimated is

$$(5.6) \quad FA_{i,t} = f(GDP_{i,t}, POP_{i,t}, IMORT_{i,t}, CAL_i, SS_i, CAB_{i,t}, SHOCK_{i,t}, WAR_{i,t}, NATDIS_{i,t}, REFUGEE_{i,t}, EXP_{i,t}, DEM_{i,t}, DIST_i, LOME_i, COLUK_i, COLF_i, ODON_{i,t}, FA_{i,t-1}).$$

An overview of all abbreviations and definitions of the variables is given in Table 4.

Table 4: List of Variables<sup>14</sup>

Variable	Definition
FA	Food aid (in t, with cereals specified in grain equivalents, other commodities in actual quantities) <sup>15</sup>
ODON	Food aid deliveries from other donors to the recipient (see above) <sup>15</sup>
SS	Self-sufficiency in cereal production (%)
CAL	Per capita calorie supply per day
SHOCK	Year-to-year change in calorie supply (%)
GDP	GDP per-capita in Purchasing Power Parity (PPP) (Tsd international Dollar)
CAB	Current-account balance (USD)
POP	Population data (Mio)
IMORT	Infant mortality rate, under-5 (per 1,000)
CORR	Index of corruption in the recipients country (2.5 lowest level, -2.5 highest level of corruption)
WAR	Dummy variable for countries with violent conflicts
NATDIS	Dummy variable for natural disasters with at least 1 Mio affected people
REFUGEES	Number of refugees residing in the recipient country
DEM	Freedom of the population in the recipient country separated into free, partly free, and not free (proxy for democracy)
EXP	Share of bilateral cereal exports of EU to recipient country (%) <sup>15</sup>
DIST	Distance between Brussels and the capital of the recipient (Tsd kilometers)
COLUK	Dummy variable for former colonies of the United Kingdom
COLF	Dummy variable for former colonies of France
LOME	Dummy variable for member states of the Lomé-Agreement
CIS	Dummy variable for countries of Eastern Europe and the Commonwealth of Independent States

Dummy variables equal one if the event takes place. Data sources and descriptive statistics can be found in Table A.18 and A.19 in the appendix. Source: Own illustration.

Potential influences on EU food aid allocation which cannot be included in the estimation due to lack of adequate proxies or data availability will not remain unmentioned. First, as outlined in

<sup>14</sup> In the following the dependent variable will be referred to as either PFA for project and program food aid or EFA for emergency food aid. The same proceeding holds for the variable ODON where PODON (EODON) refers to other donors' project and program (emergency) food aid contributions.

<sup>15</sup> The author gratefully thanks WFP/INTERFAIS for providing bilateral food aid data broken down into emergency, project and program food aid, and Janine Pelikan from the von Thünen-Institute (vTI) for providing bilateral export data obtained from the Comtrade database.



Chapter 4, the motivation and competence of the responsible representative, e.g. the desk officer, crucially determines whether or not a request for food aid of a developing country is successful and thus determines food aid allocation to a considerable extent. Unfortunately, since no measurement for the motivation of desk officers is available no variable covering this effect can be included in the model.

Second, in order to capture political similarity between the recipient and the EU the voting behavior in the UN General Assembly is an often included explanatory variable in studies investigating the determinants of food aid allocation. Though meaningful, the voting behavior cannot be included in the present analysis since the EC does not have one collective vote but each member state votes independently (PRINZ 1994 p. 137). However, the indicator discussed above for the “state of freedom” in a country also serves as an indicator for political similarity as the methodology of Freedom House considers political rights and civil liberties which are both important preconditions of a democratic and thus like-minded system.

Finally, the world market prices for cereals and agricultural stocks as an indicator for surplus disposal are not included. The rationale is that these factors may influence the total food aid budget but do not explain the allocation of food aid across recipients which is the focus of the present analysis.

Based on theoretical considerations presented in Chapter 4, the expected impacts of the explanatory variables on emergency as well as project and program food aid are summarized in Table 5.

Table 5: Expected Signs of the Explanatory Variables of EU Food Aid

Variable	Emergency food aid		Project and program food aid	
	Selection Decision	Allocation Decision	Selection Decision	Allocation Decision
<i>Humanitarian motivation</i>				
GDP per capita	-	-	-	-
Population size	0	0	0	+
Infant mortality	0	0	+	+
Calorie supply per capita	-	-	-	-
Shock	-	-	0	0
Current account balance	-/0	-/0	-	-
Natural disasters	+	+	0	0
War	+	+	0	0
Number of refugees	+	+	0	0

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<i>Commercial motivation</i>				
Cereal exports to recipient	+	+	+	+
<i>External motivation</i>				
Democracy	+/-	+/-	+/-	+/-
Corruption	+/0	+/0	+	+
Food aid from other donors	+/-	+/-	+/-	+/-
Lomé member state	+/-	+/-	+/-	+/-
Former colony of UK	+/-	+/-	+/-	+/-
Former colony of France	+/-	+/-	+/-	+/-
CIS			+	+
Distance	-	-		
<i>Bureaucratic inertia</i>				
Food aid ( $t - 1$ )	+	+	+	+

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+ = positive impact, - = negative impact, 0 = no impact. Source: Own illustration.

### 5.2.3 General Remarks on the Model Specification

Before presenting the results some remarks on the estimation procedure are warranted. Unfortunately, data availability of the independent variables is often insufficient for very poor, undemocratic countries and countries at war or civil strife. As this could introduce sample selection bias, explanatory variables are chosen to avoid a systematic exclusion of countries. That is, the dataset was constructed with a view to maximizing the number of countries in the dataset rather than the number of years. As a consequence, the sample covers the period 1993-2003 and 106 countries (a list of all countries can be found in appendix Table A.15). Nonetheless, due to lack of data in the independent variables, Afghanistan, Bosnia and Herzegovina, Cuba, Djibouti, Equatorial Guinea, Eritrea, Palestine Occupied Territory, Papua New Guinea, North Korea, Serbia and Montenegro, Somalia, and Timor Leste have to be excluded from the analysis. The loss of countries is not expected to have a significant impact on the estimation as they represent a heterogeneous group with respect to the explanatory variables. Therefore, the remaining sample is still representative.

With respect to the model specification only the information available at the time of decision-making is relevant for the allocation of food aid. Thus, most non-constant explanatory variables, i.e. the recipients' per-capita income and population size, child mortality, the current account balance, corruption, and democracy, enter the regression lagged by one year in order to imitate the decision-making process. Moreover, it is also useful to lag per-capita calorie supply in order to avoid potential simultaneity bias given the impact of food aid receipts on calorie supply

(NEUMAYER 2005). For the case of emergency aid it is reasonable to argue that food aid deliveries immediately respond to changes in calorie supply and self-sufficiency, so that these variables are not lagged in the emergency food aid regression.<sup>16</sup> Finally, natural disasters, violent conflicts, and the number of refugees residing in a country are assumed to have an immediate impact on aid allocation.

Further, some non-constant explanatory variables, i.e. lagged food aid donations of the EU, the recipients' income and population size, the number of refugees hosted by the recipient and food aid contributions of other donors, enter the model in logarithmic form. This proceeding has the advantage that the coefficients can be directly interpreted as elasticity in the second stage estimations (recall that the dependent variable is also logged).

The previous chapter has shown that the analysis is sensitive to misspecification so that explanatory variables are selected with a view to avoid endogeneity bias. In general, it is reasonable that the strong assumption of strict exogeneity holds true as food aid deliveries are unlikely to influence the explanatory variables, particularly when considering the rather small quantities delivered to single recipient countries. For instance, neither GDP per capita nor the population size will depend on the quantity of food aid provided. It is, however, possible that the variable ODON introduces endogeneity bias if countries allocate food aid with a view to food aid allocation of the EU. In order to avoid any possible source of simultaneity food aid contributions of other donors enter the model with a one-year lag. This also applies to other explanatory variables as the probability of endogeneity is further reduced by specifying non-constant variables as one-year lag. It is thus plausible to assume exogeneity of the explanatory variables. Moreover,  $T - 1$  time dummies are included in the standard Tobit model which does not make use of panel data techniques in order to permit each year its own intercept. These allow for time effects that do not differ across countries in a given year such as shifts in the total amount of EU food aid (NEUMAYER 2003a p. 50).

For the OLS model, both the Breusch-Pagan and the White test strongly indicate the presence of heteroscedasticity which necessitates the calculation of heteroscedasticity-robust standard errors. Unfortunately, in the RE Probit and Tobit model it is not possible to test for heteroscedasticity. In order to assure that efficient estimates yield reliable inference, robust standard errors are calculated for these models as well. For the RE Probit model the GEE approach is used (WOOLDRIDGE 2002 p. 486). With respect to multicollinearity no strong partial

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<sup>16</sup> Both the lagged and non-lagged specification was tested. The results are robust to the specification of the calorie and self-sufficiency variable which indicates that the estimates do not suffer from endogeneity.

correlation between the explanatory variables can be found. However, the data suggest that cumulative correlation between several explanatory variables might be a problem. Therefore, each equation is first estimated using all explanatory variables. In a second step, insignificant variables that might cause multicollinearity are excluded from the model. The results, reported in Section 5.4, are robust to the exclusion of insignificant variables.

### **5.3 Overview of Empirical Results of Precedent Studies on EU Food Aid**

Only few studies among the literature investigating the political economy of food aid analyze the determinants of EU food aid allocation. The first analysis of EU food aid was conducted by SHAPOURI and MISSIAEN (1990). Besides recipient need, the authors find that both humanitarian concerns and donor interests, in particular trade interests, have a significant impact on EU food aid allocation. The study, however, suffers from three major shortcomings. First, SHAPOURI and MISSIAEN do not differentiate between the selection of eligible countries and the determination of how much food aid is delivered to eligible countries. Second, no time lags in order to imitate the decision-making process most realistically were introduced in the regression model. Finally, instead of employing an estimation technique appropriate for the large share of zero observations in the dataset, as for instance the Tobit model, SHAPOURI and MISSIAEN estimated an OLS model based using the full dataset, which most likely yields biased estimates.

A study of HERRMANN et al. (1990) stresses the importance of recipient need in EU food aid distribution. However, the authors do not control for donor interests. In overcoming this shortcoming the finding of HERRMANN et al. is generally confirmed by PRINZ (1994). More specifically, PRINZ concludes that per-capita food aid allocation of the EU in the period 1982-1989 is determined by humanitarian and altruistic motives, i.e. low per-capita income and calorie supply. The author nonetheless finds that commercial interests and bureaucratic inertia also influence EU food aid allocation.

CLAY et al. (1996) examined the responsiveness of EU program food aid to recipient needs for the period 1989-1991. The authors' conclusions are clearly less optimistic as compared to HERRMANN et al. and PRINZ. In fact, CLAY et al. find only a weak relationship between the allocation of program food aid and indicators of stated intentions of EU food aid. It is, however, possible that the differences between the studies are due to the fact that CLAY et al. examine program food aid alone whereas HERRMANN et al. and PRINZ investigate total food aid.

However, most of the above studies analyze food aid as one homogenous group without differentiating between emergency as well as project and program food aid. The results are thus not directly comparable to the analysis at hand. The only study which differentiates between

total food aid and emergency food aid is conducted by NEUMAYER (2005) who aims at testing whether or not emergency food aid has a stronger link to recipient's need than overall food aid. NEUMAYER finds a negative impact of the recipients' GDP per capita and a positive impact of the population size on both emergency and total food aid. Further, the results indicate that the EU prefers geographically close countries in both emergency and total food aid allocation. As concerns possible self-interested behavior the results indicate that EU food aid allocation is neither intended to pursue commercial interests nor biased towards former colonies. Nonetheless, EU food aid is not motivated by humanitarian concerns and altruism alone as NEUMAYER also finds that countries with similar UN voting behavior are more likely to be eligible to receive food aid (emergency and total). Altogether, NEUMAYER draws the conclusion that, out of all donors considered in the analysis (EU, US, WFP and NGOs), the EU food aid seems to be most comprehensively oriented towards recipients' needs. The author does not find a clear difference between both groups which indicates that EU emergency food aid is not generally "better" than total food aid. However, NEUMAYER investigates the determinants of emergency food aid versus food aid in general but does not separate project and program food aid from emergency food aid. That is to say, the group of total food aid still contains emergency food aid which may strongly influence the results and would thus explain the similarity of both groups. Moreover, NEUMAYER does not include a one-year lag of EU food aid even though the autoregressive specification of aid models is well-accepted and commonly applied in the foreign aid and food aid literature. The author further does neither test for potential impacts of other donors' food aid contributions nor for good governance which is gaining in importance during the recent past (World Bank 1998 pp. 34).

Finally, a recent study by YOUNG and ABBOTT (2008) provides evidence that food aid allocation of the EU is increasingly responsive to the needs of the recipients. Additionally, the authors find that the EU addresses acute food shortages due to violent conflict as well as long-term malnutrition and chronic hunger caused by poverty. However, the study is characterized by major shortcomings. As MCGILLIVRAY (2003a) emphasizes, including both recipient need and donor interest in aid allocation models is of central importance in order to avoid biased estimates due to omitted variable. Unfortunately this proceeding is not followed by YOUNG and ABBOTT who do not include donor interests other than humanitarian objectives, such as trade and geopolitical interests. The analysis of YOUNG and ABBOTT hence most likely suffers from omitted variable bias.

## 5.4 Empirical Results of Own Estimation<sup>17</sup>

Based on the theoretical and methodological considerations in the previous sections, the estimation results are presented in the following. In view of potential presence of multicollinearity several estimations are performed for each case where insignificant variables which may cause multicollinearity are dropped, so that at least two regressions of each model are presented. First the estimation results for project and program food aid are shown and discussed including a comparison of the Tobit and two-part approach as well as the major implications of the results. Thereafter the results for emergency food aid will be presented in Section 5.4.2.

### 5.4.1 Empirical Results for Project and Program Food Aid

The analysis of EU project and program food aid reveals interesting insights. In general, the analysis shows that project and program food aid is largely determined by recipient needs. However, also external interests seem to influence the decision of food aid allocation to a considerable extent. The following two sections will present and discuss the major results and implications of the Tobit and the two-part model in more detail.

#### 5.4.1.1 Project and Program Food Aid: Estimation Results of the Tobit Model

In order to find out by which factors EU project and program food aid allocation is determined the standard Tobit is estimated. The overall fit of the Tobit model is quite good with a predicted probability of the selection decision 0.32 to 0.33 compared to the observed probability of 0.34. As concerns the allocation decision the predicted value of the amount of emergency food aid of 3.9 overshoots the expected value of 2.8.

According to the Tobit model EU project and program food aid deliveries are higher

- the lower GDP per capita in the recipient country;
- the higher child mortality in the recipient country;
- the lower the calorie supply per capita in the recipient country;
- if the recipient is not a member state of the CIS;
- the higher the amount of project and program food aid provided from other donors;
- the higher project and program food aid deliveries in the previous period (incrementalism).

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<sup>17</sup> The estimations in this section are performed with the statistical software package STATA version 9.

Table 6: Tobit Model Estimation Results for EU Project and Program Food Aid Allocation

Explanatory variable	(1)	(2)	(3)	(4)
Constant	3.763 (3.280)	3.653 (2.668)	3.711 (2.373)	3.608 (2.599)
ln PFA(t-1)	2.103*** (.188)	2.105*** (.188)	2.112*** (.169)	2.123*** (.179)
ln GDP(t-1)	-1.368 (.710)	-1.302* (.569)	-1.289 (.679)	-1.323 (.688)
ln POP(t-1)	.329 (.376)	.153 (.229)	.151 (.226)	.287 (.222)
IMORT(t-1)	.010 (.006)	.012* (.005)	.012* (.005)	.009* (.005)
SS(t-1)	-1.225 (1.102)	-1.110 (1.117)	-1.091 (1.143)	-1.167 (1.195)
CAL(t-1)	-.003** (.001)	-.003*** (.001)	-.003*** (0.001)	-0.003*** (0.001)
SHOCK	.019 (.063)	.021 (.060)		
CAB(t-1)	-.005 (.054)	.001 (.052)		
NATDIS	.485 (1.084)			
WAR	.474 (.747)			
ln REFUGEES	-.132 (.123)			
EXP	1.380 (.926)	1.532 (.947)	1.538* (.748)	1.357 (1.002)
DEM(t-1)	.497 (.370)	.486 (.347)	.483 (.342)	.543 (.416)
CORR(t-1)	.193 (.595)	.156 (.475)	.173 (.533)	.164 (.415)
ln PODON(t-1)	.574*** (.077)	.579*** (.086)	.579*** (.082)	.577*** (.090)
LOMÉ	.658 (.598)			.503 (.650)
COLUK	-.549 (.527)			-.609 (.598)
COLF	.375 (.637)			.338 (.598)
CIS	-1.369 (1.133)	-1.695 (.991)	-1.682 (1.142)	-1.591 (1.288)
Wald test	2964.69***	2038.19***	3299.57***	2014.63***

Pr(Y>0)	.34	0.34	0.34	0.34
Pr(Y*>0)	.32	0.33	0.33	0.32
E(ln Y)	2.78	2.78	2.78	2.78
E(ln Y*)	3.85	3.87	3.87	3.86
N	1166	1166	1166	1166
n	106	106	106	106

Values in parenthesis are robust standard errors of the regression coefficients, \*\*\* (\*\*, \*) statistically significant at the 99.9% (99%, 95%) level. Robust standard errors are calculated by bootstrapping procedure. Pr = Probability, E = expected value, Y\* = predicted value, Y = observed value, N = number of observations, n = number of countries, further abbreviations are explained in Table 4. Year-specific dummy variable coefficients are not reported. Source: Own calculations.

With respect to long term indicators the results indicate that EU project and program food aid is largely motivated by humanitarian and altruistic concerns. More precisely, project and program food aid deliveries are higher the lower the GDP per capita in the recipient country is. According to Table 7 which presents the marginal effects of significant explanatory variables decomposed into the total elasticity, the participation elasticity, and the allocation elasticity, a 1% decrease of GDP per capita leads to a 0.4% increase in project and program food aid. The estimation results further indicate that a high child mortality rate triggers project and program food aid deliveries. Thus, in addition to economic poverty, the distribution of EU project and program food aid also seems to be responsive to non-economic indicators of well-being.

The strong humanitarian orientation of EU project and program food aid is further supported by the results of the variables for calorie supply and self-sufficiency. That is, both a low calorie supply per capita and a low degree of self sufficiency in the recipient country increase food aid contributions. More precisely, Table 7 shows that if the average calorie availability declines by one calorie per capita the delivery of project and program food aid increases by 1.2 kg (recall that the coefficient of the calorie variable refers to food aid deliveries expressed in tons).

Moreover, a shock in calorie availability as well as humanitarian emergencies indicated by natural disasters, refugees, and war do not affect the allocation of EU non-emergency food aid, a result that was previously expected. Also the recipient's balance of payments situation and the population size do not play a role in project and program food aid allocation.

As concerns external motives, the amount of project and program food aid donations provided by other donors positively affects food aid allocation of the EU thereby exacerbating the variability of food aid deliveries to the recipient. Instead of pursuing an effective coordination of food aid contributions and sharing of responsibilities among donors (which would imply a negative coefficient), the EU seems to compete against other donors for political influence in



recipient countries. The EU thus seems to intend to enlarge or at least preserve its political influence in the recipient countries.

Moreover, no consistent influence of trade interests on EU project and program food aid can be verified. The same is true for good governance as both the variable for corruption and for democracy in the recipient country are not significant. Especially the failure to distribute program food aid towards less corrupt governments may lead to efficiency losses of food aid as it is less likely that people in need are targeted at the micro level.

Also, no bias towards political allies, such as Lomé member states and former colonies, can be found. This result indicates that neither France nor the UK is able to use their status to direct the outcomes of decision-making within the EU to the benefit of their “allies”.

Finally, the incrementalism variable has a positive and highly significant coefficient meaning that food aid deliveries to countries which already received food aid in the previous year are higher than food aid donations to countries that were not among the food aid recipients in the previous year. The decomposition of the effect presented in Table 7 shows that this effect is dominated by the allocation decision which accounts for about 80% of the effect. However, this is not

Table 7: Marginal Effects of Significant Variables of the Tobit Model on EU Project and Program Food Aid Allocation (based on equation 2)

Explanatory variable	Total elasticity	Participation elasticity	Allocation elasticity
ln PFA(t-1)	.684	.128	.581
ln GDP(t-1)	-.423	-.079	-.360
IMORT(t-1)	.004	$7.44 \cdot 10^{-4}$	$3.38 \cdot 10^{-3}$
CAL(t-1)	-.001	$-1.83 \cdot 10^{-4}$	$-8.30 \cdot 10^{-4}$
ln PODON(t-1)	.188	.035	.160

Marginal effects calculated after bootstrap. Coefficients represent change in probability at the mean of continuous independent variables and 0-1 change in binary independent variables due to a marginal increase in the variable. Abbreviations are explained in Table 4. Source: Own calculations.

necessarily a bad result in the context of project and program food aid if incrementalism does not hint to bureaucratic inertia but rather to the long-term orientation and continuity of food aid intervention.

#### 5.4.1.2 Project and Program Food Aid: Estimation Results of the Two-Part Model

By relaxing the assumption of the one-step decision associated with the Tobit approach, the two-part model allows both the significance and the sign of the explanatory variables to differ

between the selection and allocation decision. In this section the results of the two-part model, presented in Table 8, will be discussed and compared to those of the Tobit model. In order to avoid multicollinearity two separate regressions containing either DIST or CIS are performed as both variables are strongly correlated. The results of the model do not differ significantly whether DIST or CIS is included in the model. Since the coefficient of the distance variable is not significant only the results of the regression including CIS are reported.

With respect to the fit of the model the two-part approach performs slightly better than the Tobit model. For the selection decision, the predicted probability of 0.35 almost matches the observed value. Also the prediction of the allocation decision is accurate as the predicted value of the amount of food aid provided (8.05) is close to the observed value of 8.06.

Table 8: Two-Part Model Estimation Results for EU Project and Program Food Aid Allocation

Explanatory variable	Selection decision		Allocation decision	
	GEE (RE) (5)	GEE (RE) (6)	OLS (RE) (7)	OLS (RE) (8)
Constant	1.135 (.824)	.868 (.784)	6.463*** (1.138)	5.800*** (.838)
ln PFA(t-1)	.458*** (.061)	.460*** (.061)	.480*** (.072)	.503*** (0.070)
ln GDP(t-1)	-.423** (.155)	-.393* (.156)	-.556 (.296)	-.259 (.229)
ln POP(t-1)	-.034 (.081)	-.033 (.069)	.329* (.126)	.265** (.084)
IMORT(t-1)	.003 (.002)	.002 (.002)	.001 (.002)	
SS(t-1)	-.333 (.280)	-.286 (.290)	-.196 (.431)	
CAL(t-1)	-.001** (.000)	.001** (.000)	$2.42 \cdot 10^{-5}$ ( $3.26 \cdot 10^{-4}$ )	$7.91 \cdot 10^{-5}$ ( $3.08 \cdot 10^{-4}$ )
SHOCK	-.009 (.012)		.006 (.029)	
CAB(t-1)	-.007 (.011)	-.008 (.010)	-.040 (.029)	-.046 (.024)
NATDIS	-.044 (.233)		-.164 (.428)	
WAR	.064 (.186)		.341 (.290)	
ln REFUGEES	-.010 (.047)		-.126 (0.080)	

EXP	.527*	.544*	.336	.320
	(.222)	(.206)	(.456)	(.431)
DEM(t-1)	.098	.106	-.235	-.133
	(.111)	(.107)	(.166)	(.169)
CORR(t-1)	.239	.200	.371	.280
	(.168)	(.162)	(.228)	(.052)
ln PODON(t-1)	.076***	.078**	.099	.115*
	(.018)	(.018)	(.053)	(0.080)
LOMÉ	-.115		-.115	
	(.215)		(.337)	
COLUK	-.124		-.116	
	(.179)		(.290)	
COLF	-.042		-.493	
	(.198)		(.284)	
CIS	-.611*	-.541*	2.200***	2.289***
	(.275)	(.262)	(.500)	(.429)
Wald test	229.98***	196.86***	309.14***	279.93***
Pr(Y>0)	0.34	0.34		
Pr(Y*>0)	0.35	0.35		
E(ln Y)			8.06	8.06
E(ln Y*)			8.05	8.05
N	1166	1166	402	402
n	106	106	85	85

Values in parenthesis are robust standard errors of the regression coefficients, \*\*\* (\*\*, \*) statistically significant at the 99.9% (99%, 95%) level. Pr = Probability, E = expected value, Y\* = predicted value, Y = observed value, N = number of observations, n = number of countries, further abbreviations are explained in Table 4. Source: Own calculations.

The results of the two-part model mostly confirm the results of the Tobit model, indicating that biases from neglecting country-specific effects in the standard Tobit model are only of minor concern. Therefore, the following discussion is restricted to results that differ from those of the Tobit model. In general, differences between both approaches merely occur when distinguishing whether an explanatory variable influences the selection, the allocation, or both decisions. More precisely, the probability to be considered as eligible for project and program food aid is higher

- the lower the recipients' GDP per capita;
- the lower the calorie supply per capita of the recipient country;
- the higher the share of cereal exports to the recipient country;
- if the recipient is not a member state of the CIS;
- the higher the amount of project and program food aid from other donors to the recipient;
- the higher project and program food aid deliveries in the previous year.

As concerns the allocation decision the amount of project and program food aid provided is higher

- the larger the population size of the recipient;
- if the recipient is a member state of the CIS;
- the higher the amount of project and program food aid from other donors to the recipient;
- the higher project and program food aid deliveries in the previous year.

While most results of the Probit model are consistent with the Tobit estimates, the OLS model differs from the Tobit estimates in several aspects which implies that the allocation and selection decision are not generally determined by the same factors. With respect to humanitarian objectives, the coefficients of GDP and calorie supply per capita are not significant in the OLS model, although they are highly significant in the Tobit and Probit model. Thus, countries with low GDP and calorie supply per capita are more likely to be selected as recipients of project and program food aid, but once selected both indicators do not affect the amount of project and program food aid allocated to the recipient. Overall, the two-part model supports the strong orientation of EU project and program food aid towards humanitarian motives.

Consistent with theory the results of the two-part model further indicate that the recipients' population size matters, but only at the allocation stage. That is, the population size per se has no connection to the neediness of recipients, or as NEUMAYER (2005) puts it "there is no reason to presume that less populous countries are any less in need of food aid than more populous ones". However, once considered as eligible to receive food aid it is plausible that more populous countries receive a larger amount of food aid in total terms. More precisely, the OLS estimates suggest that a 1% rise in the population size leads to a 0.3% increase in the amount of food aid provided. With the coefficient being smaller than one the increase in food aid deliveries is less than proportional to the increase in population size. This result is consistent with the well-known population bias of foreign aid found, inter alia, by ISENMAN (1976), ALESINA and DOLLAR (2000), and NEUMAYER (2003a) and, in the context of food aid, by PRINZ (1994 pp. 172), and NEUMAYER (2005) according to which less populous countries receive larger amounts of food aid per capita than more populous countries.

As concerns EU trade interests, the Probit model indicates that the selection of recipients is positively affected by the share of EU cereal exports to the recipient country. Countries importing a higher share of cereal exports of the EU are thus more likely to be considered as eligible to receive project and program food aid than countries which purchase a lower share of EU cereal exports. This result contrasts the finding of NEUMAYER (2005) according to which the share of EU

exports to the recipient country has no effect on EU food aid allocation. The difference in the results, however, may be caused by the fact that NEUMAYER does not estimate a separate model for project and program food aid but analyzes total food aid. The effect of trade interests may thus be blurred by the presence of emergency food aid which is not influenced by commercial interests, as will be demonstrated in Section 5.4.2.

Another interesting result is obtained for CIS members. While the coefficient of this variable is negative in the Probit model, the OLS coefficient is positive. According to Table 9, CIS members are less likely to be selected as a recipient by about 18% but once considered as eligible the amount of project and program food aid provided is about twice the amount received by non-CIS countries. With regard to the discussion of project and program food aid to the CIS in Chapter 3 this finding seems to be more feasible than the result of the Tobit model.

Finally, the Tobit results of self-sufficiency, good governance indicators, incrementalism and food aid deliveries of other donors are confirmed whereas the significant coefficient of child mortality is not verified.

While the OLS estimates directly refer to the marginal effects of the explanatory variables on food aid allocation, the Probit coefficients do not directly give these marginal effects due to its nonlinear nature, as already discussed in Section 5.1. To give an impression of the effect of a marginal change in explanatory variables on food aid allocation, elasticities of significant factors determining the selection of project and program food aid recipients are presented in Table 9. Altogether, the magnitude of the marginal effects calculated by the Probit model are consistent with the participation elasticity of the Tobit coefficients presented in Table 7 and will therefore not be interpreted here.

Table 9: Marginal Effects of Significant Variables of the RE Probit Model on EU Project and Program Food Aid Allocation

Explanatory variable	Elasticity (5)	Elasticity (6)
ln PFA(t-1)	.154	.155
ln GDP(t-1)	-.142	-.132
CAL(t-1)	$-2.57 \cdot 10^{-4}$	$-2.48 \cdot 10^{-4}$
EXP	.177	.183
ln PODON(t-1)	.026	.026
CIS	-.177	-.160

Marginal effects calculated after bootstrap. Coefficients represent change in probability at the mean of continuous independent variables and 0-1 change in binary independent variables due to a marginal increase in the variable. Abbreviations are explained in Table 4. Source: Own calculations.

### 5.4.2 Empirical Results for Emergency Food Aid Allocation

The analysis shows that emergency food aid responds to a substantial degree to recipients' needs on the one hand, but is also determined by external motivations and bureaucratic inertia on the other hand. As such the results of emergency food aid seem to mirror those of non-emergency food aid at first sight. However, at closer examination, the results for emergency food aid, as expected, differ from those for project and program food aid. The following two sections present and discuss the results of the Tobit and two-part model.

#### 5.4.2.1 Emergency Food Aid: Estimation Results of the Tobit Model

Similar to the case of project and program food aid the overall fit of the Tobit model is very good. For the selection decision the predicted value of 0.29 matches the observable value of 0.30, as demonstrated in Table 10. In the allocation stage the predicted value of the logged food aid deliveries of 3.6 is higher than the observed value of 2.4.

Table 10: Tobit Model Estimation Results for EU Emergency Food Aid Allocation

Explanatory variable	(9)	(10)	(11)	(12)
Constant	8.539* (3.999)	7.207 (3.906)	7.582* (3.491)	7.796* (3.231)
ln EFA(t-1)	2.047*** (.236)	2.066*** (.231)	2.055*** (.211)	2.058*** (.272)
ln GDP(t-1)	.495 (.544)			
ln POP(t-1)	.033 (.310)			
IMORT(t-1)	-.006 (.005)			
SS(t-1)	-2.326* (1.187)	-2.861*** (.886)	-2.836** (.942)	-2.792*** (.781)
CAL(t-1)	-.004*** (.001)	-.004*** (.001)	-.004*** (.001)	-.004*** (.001)
SHOCK	-.106 (.060)	-.095 (.064)		-.100 (.058)
CAB(t-1)	-.022 (.082)	-.023 (.102)		
NATDIS	-3.715*** (.982)	-3.611*** (1.070)	-3.584*** (.888)	-3.644*** (1.054)
WAR	1.051 (.580)	.961 (.694)	.986 (.584)	.972 (.676)

In REFUGEES	.221 (.160)	.229 (.117)	.236 (.146)	.233* (.118)
EXP	-.484 (1.016)			
DIST	-.422* (.174)	-.374* (.146)	-.370* (.135)	-.375* (.136)
DEM(t-1)	-1.178** (.404)	-1.105** (.384)	-1.244*** (.377)	-1.196** (.340)
CORR(t-1)	-.409 (.610)	-.328 (.619)		
In EODON(t-1)	.690*** (.084)	.667*** (.077)	.670*** (.078)	.672*** (.091)
LOMÉ	-.781 (.684)	-1.214* (.559)	-1.800 (0.636)	-1.230* (.558)
COLUK	1.312* (.571)	1.199* (.522)	1.135* (.577)	1.143 (.529)
COLF	1.745* (.704)	1.487*** (.665)	1.397 (.778)	1.448* (.662)
Wald test	2449.61***	2012.48***	2957.84***	1546.97***
Pr(Y>0)	.30	0.30	0.30	0.30
Pr(Y*>0)	.29	0.29	0.29	0.29
E(ln Y)	2.41	2.41	2.41	2.41
E(ln Y*)	3.58	3.59	3.60	3.60
N	1166	1166	1166	1166
n	106	106	106	106

Values in parenthesis are robust standard errors of the regression coefficients, \*\*\* (\*\*, \*) statistically significant at the 99.9% (99%, 95%) level. Robust standard errors are calculated by bootstrapping procedure. Pr = Probability, E = expected value, Y\* = predicted value, Y = observed value, N = number of observations, n = number of countries, further abbreviations are explained in Table 4. Year-specific dummy variable coefficients are not reported. Source: Own calculations.

In general, the results of the Tobit model as presented in Table 10 show that emergency food aid is higher

- the lower calorie supply per capita and the recipients' self-sufficiency in cereal production;
- if the recipient country was *not* hit by a natural disaster;
- the higher the number of refugees being hosted by the recipient country;
- the higher the geographical proximity of the recipient to the EU;
- the lower the degree of democracy in the recipient country;
- if the recipient is not a member of the Lomé Agreement;
- if the recipient is a former colony of France and the UK;

- the higher emergency food aid contributions of other donors;
- the higher emergency food aid deliveries in the previous period.

As expected neither of the indicators which are oriented towards the long-term development of a given recipient, i.e. GDP per capita, population size, child mortality, and the current account balance affect EU emergency food aid at any reasonable significance.

The results nonetheless strongly indicate that EU emergency food aid is responsive to recipients' needs. Both a low calorie supply per capita and a low degree of self-sufficiency trigger emergency food aid deliveries with the magnitude of the effect being comparable to the effect of project and program food aid. Moreover, countries hosting higher numbers of refugees receive more EU emergency food aid donations than countries with fewer refugees. Concerning the negative effect of self-sufficiency on project and program food aid, it is not possible to draw a conclusive statement whether this effect is resulting from humanitarian or commercial motivation. With respect to the latter, countries with a low degree of self-sufficiency are more dependent on food imports and thus might represent a promising export market for the EU and other donor countries in the long run. However, since no other variable indicates that EU emergency food aid could be motivated by trade interests, higher emergency food aid deliveries towards less self-sufficient countries are more likely to be determined by humanitarian concerns than by commercial interests.

Surprisingly, the occurrence of a natural disaster with more than 1 Mio affected people has a negative impact on emergency food aid deliveries. According to Table 11 emergency food aid is reduced by 75% if a country is hit by a natural disaster. In order to ensure that this result does not depend on the somewhat arbitrarily chosen threshold of 1 Mio affected people other thresholds, i.e. 50,000 and 500,000 affected people, were also tested. In these cases no significant effect of natural disasters on EU emergency food aid can be verified. In order to interpret this result it should be noted that food aid delivered in situations of natural disasters is to a significant degree channeled multilaterally, most importantly by the WFP, the United Nations Children's Fund (UNICEF) or the Red Cross/Crescent which are in turn funded by bilateral donors. However, EU funding is mostly provided in form of financial assistance which is not covered by the data. The negative coefficient may thus signal an efficient division of responsibilities between international organizations and the EU. That is to say, international organizations are likely to have a higher capacity than bilateral donors to respond to natural disasters of this magnitude because of their specialization in humanitarian relief and representation facilities in developing countries. Moreover, food aid deliveries in cases of natural emergencies may be less appealing to the EU than emergency food aid to countries with large



influxes of refugees or in situations of violent conflict as these promise political influence in the recipient country. However, as concerns the latter, the results of the Tobit model do not indicate that countries at war or violent conflict receive a larger amount of EU food aid than countries without man-made emergencies – although this result is to be seen in the context that several countries at war had to be deleted from the dataset due to a lack of data availability, such as Afghanistan, Somalia, Eritrea, Palestine Occupied Territory, and Iraq.

In accordance with the estimates for project and program food aid, a positive relationship between emergency food aid of the EU and emergency food aid of other donors can be observed. As Table 11 shows, EU emergency food aid provided to a given recipient will increase by roughly 2% if other donors' emergency food aid contributions increase by 10%. Obviously, as in the case of non-emergency food aid no coordination and division of responsibility among donors takes place. The fact that EU food aid to a recipient country increases when other donors raise their food aid contributions rather indicates that the EU competes against other donors for international prestige and political influence in the recipient country.

As concerns further external motivations, the results show that EU emergency food aid is biased towards geographically close countries. The EU thus seems to assign a higher value to humanitarian relief and political stability in neighboring countries than in more distant countries. The Tobit estimates also suggest that emergency food aid is biased towards former colonies of France and the UK, which means that both countries are more successful in advocating the interests of its "allies" than other EU member states. This is in line with NEUMAYER (2003b) who provides evidence that, in the context of foreign aid, France is more successful in promoting its own interests than other EU member states, indicating that bargaining power within the EU is not equally distributed among member states. Contrarily, Lomé member states receive less emergency food aid than non-Lomé countries.

With respect to good governance, the results are rather heterogeneous. More precisely, the degree of corruption in the recipient country has no effect on emergency food aid whereas democracy is negatively associated with emergency food aid deliveries. Thus, non-democratic countries (i.e. countries with a low level of political rights and civil liberties) receive more emergency food aid than democratic countries. On the one hand, this may indicate that the EU aims at directing the recipient's political regime towards democracy. On the other hand, this result implies that the EU does not discriminate against non-democratic countries which may have fewer resources and institutional capacities to respond effectively to emergency situations and, thus, rely to a larger extent on aid from abroad than democratic countries.

Table 11: Marginal Effects of Significant Variables of the Tobit Model on EU Emergency Food Aid Allocation (based on equation 12)

Explanatory variable	Total elasticity	Participation elasticity	Allocation elasticity
ln EFA(t-1)	.589	.121	.531
SS(t-1)	-.798	-.165	-.721
CAL(t-1)	-.001	$-2.19 \cdot 10^{-4}$	$-9.59 \cdot 10^{-4}$
NATDIS	-.747	-.177	-.804
ln REFUGEES	.067	.014	.060
DIST	-.107	-.022	-.097
DEM(t-1)	-.342	-.071	-.309
ln EODON(t-1)	.192	.040	.173
LOMÉ	-.349	-.072	-.316
COLF	.449	.088	.390

Marginal effects calculated after bootstrap. Coefficients represent change in probability at the mean of continuous independent variables and 0-1 change in binary independent variables due to a marginal increase in the variable. Abbreviations are explained in Table 4. Source: Own calculations.

Finally, a country that received emergency food aid in the previous year is more likely to be eligible to receive emergency food aid in the following year. In the case of emergency food aid this finding either hints to a chronic state of emergency or to bureaucratic inertia which does not respond to changing needs. Unfortunately, bureaucratic inertia would limit the effectiveness of emergency food aid since a rapid reaction to humanitarian crises is a major virtue of emergency food aid as an instrument of humanitarian relief.

#### 5.4.2.2 Emergency Food Aid: Estimation Results of the Two-Part Model

Similar to the case of project and program food aid, the fit of the two-part model is higher as compared to the Tobit approach (see Table 12). With respect to the selection decision the predicted probability of being eligible for emergency food aid of 0.30 matches the observed probability of 0.30. This is also true for the allocation decision as the predicted value of the amount of emergency food aid of 7.5 to 7.8 almost matches the observed value of 7.9.

Even though the results of the Tobit model are to a large extent confirmed by the two-part approach, again differences between the factors determining the selection decision and those determining the allocation decision are found. Starting with the selection decision, the probability that a potential recipient is considered as eligible to receive EU emergency food aid is higher

- the lower the recipients' calorie supply per capita and degree of self-sufficiency;
- the recipient is affected by sudden shortfalls in food availability (shock variable);

- if the recipient country was *not* hit by a natural disaster;
- the nearer the recipient country is to the EU in geographical terms;
- the lower the degree of democracy in the recipient country;
- the higher emergency food aid contributions from other donors;
- the higher emergency food aid deliveries in the previous year.

These determinants of the selection decision are, however, clearly distinct from the determinants of the allocation stage of emergency food aid. That is to say, the amount of food aid provided to a recipient is higher

- the higher the recipients' current account balance;
- the higher the number of refugees residing in the recipient country;
- the lower the degree of democracy in the recipient country;
- the higher emergency food aid in the previous year;
- the higher emergency food aid donations by other donors.

Table 12: Two-Part Model Estimation Results for EU Emergency Food Aid Allocation

Explanatory variable	Selection decision		Allocation decision	
	GEE (RE)		OLS (RE)	
	(13)	(14)	(15)	(16)
Constant	2.391* (1.104)	1.884* (.926)	7.835*** (1.576)	7.686*** (1.029)
ln EFA(t-1)	.480*** (.073)	.475*** (.076)	.289** (.095)	.278** (.093)
ln GDP(t-1)	-.069 (.178)	.014 (.136)	-.508 (.403)	
ln POP(t-1)	.007 (.086)	.036 (.069)	.041 (.221)	
IMORT(t-1)	-.002 (.002)		-.001 (.004)	
SS(t-1)	-.593* (.291)	-.690* (.299)	-.616 (.594)	-.397 (.485)
CAL(t-1)	-.001** (.000)	-.001** (.000)	1.26·10 <sup>-4</sup> (4.42·10 <sup>-4</sup> )	4.36·10 <sup>-4</sup> (3.56·10 <sup>-4</sup> )
SHOCK	-.026* (.012)	-.024* (.011)	.013 (.018)	
CAB(t-1)	-.011 (.040)		.052* (.020)	.055** (.019)
NATDIS	-.713*** (.204)	-.667*** (.201)	-.353 (.391)	-.381 (.387)

WAR	.240 (.174)	0.241 (.185)	.145 (.241)	.199 (.235)
ln REFUGEES	.062 (.040)	.048 (.040)	.155* (.076)	.178* (.068)
EXP	-.042 (.252)		.001 (.354)	
DIST	-.080* (.037)	-.078* (.033)	-.038 (.097)	
DEM(t-1)	-.244* (.108)	-.278* (.110)	-.436* (.220)	-.512* (.203)
CORR(t-1)	.029 (.156)	.044 (.147)	-.226 (.338)	
ln EODON(t-1)	.084*** (.017)	.084*** (.017)	.102* (.040)	.113** (.040)
LOMÉ	-.214 (.172)		-.101 (.498)	-.059 (.421)
COLUK	.172 (.188)		-.315 (.487)	-.272 (.465)
COLF	.258 (.205)		-.979 (.474)	-.888* (.451)
Wald test	371.45***	317.22***	127.40***	119.26***
Pr(Y>0)	.30	.30		
Pr(Y*>0)	.30	.30		
E(ln Y)			7.92	7.92
E(ln Y*)			7.78	7.50
N	1166	1166	355	355
n	106	106	74	74

Values in parenthesis are robust standard errors of the regression coefficients, \*\*\* (\*\*, \*) statistically significant at the 99.9% (99%, 95%) level. Pr = Probability, E = expected value, Y\* = predicted value, Y = observed value, N = number of observations, n = number of countries, further abbreviations are explained in Table 4. Source: Own calculations.

The occurrence of natural disasters in a recipient country again has a significant negative effect on emergency food aid, thus confirming the unexpected result of the Tobit model. However, the two-part model indicates that the allocation stage is not affected by natural disasters. In contrast, only the probability to be eligible for emergency food aid declines with the occurrence of natural disasters in a given country which supports the hypothesis of divided responsibilities between international organizations and the EU.

In contrast to the Tobit estimation results, the shock variable is significant in the two-part model. The negative sign of the shock variable suggests that sudden shortfalls of calorie supply trigger deliveries of EU emergency food aid at the selectivity stage. This result contrasts Prinz (1994) who does not find any reaction to acute deficits in calorie availability which may be due to the fact that Prinz does not distinguish between different types of EU food aid. Similar to the allocation of non-emergency food aid, the results further provide evidence that countries with a low calorie supply per capita and self-sufficiency are more likely to be selected as recipient. However, once eligible, the calorie supply and self-sufficiency do not affect emergency food aid distribution at the allocation stage. Moreover, the two-stage estimates provide evidence that the positive effect of the number of refugees residing in the recipient country is solely determined by the allocation decision. That is, countries hosting a large number of refugees are equally likely to be eligible for food aid as countries with no or only low numbers of refugees, but once selected as recipient these countries receive a larger amount of food aid.

Unexpectedly, the current account balance has a positive impact on emergency food aid donations. The higher the current account balance of a country the higher is the amount of emergency food aid provided by the EU. This result may hint to commercial interests of the EU as a positive balance of payments situation is associated with a high purchasing power, which renders these countries more attractive future export markets than countries with a poor balance of payments situation.

Finally, the two-part model strongly supports the results of the Tobit model that EU emergency food aid is incremental and positively affected by food aid deliveries of other donors, both on the

Table 13: Marginal Effects of Significant Variables of the RE Probit Model on EU Emergency Food Aid Allocation

Explanatory variable	Marginal effects based on equation (13)	Marginal effects based on equation (14)
ln EFA(t-1)	.150	.150
SS(t-1)	-.186	-.218
CAL(t-1)	$-3.18 \cdot 10^{-4}$	$-2.81 \cdot 10^{-4}$
SHOCK	-.008	-.008
NATDIS	-.172	-.167
DIST	-.025	-.025
DEM(t-1)	-.076	-.088
ln EODON(t-1)	.026	.027

Marginal effects are calculated after bootstrap. Coefficients represent change in probability at the mean of continuous independent variables and 0-1 change in binary independent variables due to a marginal

selection and the allocation stage. The results found in the Tobit model that former colonies of France receive a larger amount whereas member states of the Lomé Agreement receive a smaller amount of emergency food aid are not confirmed by the two-part model.

The marginal effects of significant explanatory variables determining the selection of food aid recipients are presented in Table 13. As in the case of project and program food aid, the marginal effects are of similar magnitude as compared to the participation elasticity of the Tobit model and will thus not be further explored here.

## **5.5 Discussion and Synthesis of the Results**

In this chapter major results of the analysis, summarized in Table 14 for emergency as well as project and program food aid, and its implications will be discussed and compared to findings of preceding studies.

The present analysis clearly shows that the stated motivations of the different kinds of food aid to a large extent also hold true in practice. That is to say, EU food aid is targeted towards poor and food insecure countries – even though, due to its different targets, the determinants of emergency food aid allocation as expected differ from those explaining project and program food aid. Project and program food aid is determined by the GDP per capita and child mortality in the recipient country (although the latter is not confirmed by the two-part approach), providing evidence that besides economic also non-economic factors of well-being are important in the allocation of project and program food aid. Moreover, both emergency and non-emergency food aid strongly respond to low calorie supply per capita. The result for the calorie variable is robust to the model specification and highly significant in each model, except for the OLS model. All of the above results confirm the findings of PRINZ (1994), NEUMAYER (2005), and YOUNG and ABBOTT (2008) that EU food aid is to a substantial degree determined by humanitarian objectives.

Besides the calorie supply, emergency food aid is responsive to a low degree of self-sufficiency and sudden shortfalls in food availability in the recipient country as the coefficient of the shock variable indicates. With respect to its primary intention of humanitarian relief, emergency food aid positively responds to the number of refugees hosted by the recipient, thus supporting countries charged with the burden of large influxes of refugees who add to the regular population and are usually not able to look after themselves.

Surprisingly, emergency food aid negatively responds to the occurrence of natural disasters. This may indicate that the management of huge humanitarian emergencies falls into the responsibility of multilateral donors, such as the WFP, UNICEF, and the Red Cross/Crescent.

This hypothesis is supported by the fact that international organizations have a comparative advantage over bilateral donors to respond to huge disasters because of their specialization in humanitarian relief and representation facilities in each developing country. This would also enable the EU to focus on recipients affected by disasters of a lesser magnitude in order to

Table 14: Summary of Results: Significant Impacts of the Explanatory Variables on EU Food Aid

Explanatory variable	Emergency food aid			Project and program food aid		
	Two-part model		Tobit	Two-part model		Tobit
	RE Probit	RE OLS		RE Probit	RE OLS	
<i>Humanitarian motivation</i>						
In GDP				-		-
In POP					+	
IMORT						+
SS	-		-			-
CAL	-		-	-		-
SHOCK						
CAB		+			-	
NATDIS	-		-			
WAR						
In REFUGEES		+	+			
<i>Commercial motivation</i>						
EXP				+		
<i>External motivation</i>						
DIST	-		-			
DEM	-	-	-			
CORR						
In ODON	+	+	+	+	+	+
LOMÉ			-			
COLUK						
COLF			+			
CIS				-	+	-
<i>Bureaucratic inertia</i>						
In FA(lagged)	+	+	+	+	+	+

+ = positive sign of the coefficient, - = negative sign of the coefficient. Abbreviations are explained in table 4. Source: Own illustration.

ensure a more equal distribution of food aid across recipients. However, it may also be the case that the EU is less inclined to deliver food aid to natural emergencies than to large influxes of refugees or situations of violent conflict as these promise political influence in the recipient country. This is in line with HODDINOTT et al. (2003) who find that emergency food aid flows to people affected by natural disasters are of minor importance in bilateral emergency food aid allocation and have actually fallen since 1990.

Conversely, HODDINOTT et al. (2003) point out that emergency food aid allocated towards people affected by conflicts has risen slightly which is not confirmed for EU emergency food aid. However, also the finding of PRINZ (1994 p. 181) that countries at war receive even less EU food aid than peaceful countries is not confirmed. In fact, the present analysis suggests that war and civil strife have no effect on emergency food aid which may be due to the fact that several countries at war could not be included in the analysis due to lack of data availability.

In spite of the strong humanitarian orientation of EU food aid, one major result of the analysis is that factors other than those stated by the EC, especially external interests, systematically influence the allocation of emergency as well as project and program food aid. More specifically, the results strongly suggest that the coordination problem of foreign aid found by ROUND and ODEDOKUN (2003) and MCGILLIVRAY (2006) also holds true for EU food aid. This is in support of BARRETT and MAXWELL (2005 p. 59) who argue that food aid is characterized by a lack of coordination among donors. Instead, the analysis shows for both emergency and non-emergency food aid that donors compete for political influence in the recipient country thereby exacerbating the variability of food aid deliveries.

Further, emergency as well as project and program food aid is preferably allocated towards geographically near countries as the positive and significant estimates of the distance and the CIS variable show. This indicates that emergency relief and the combat of food insecurity in the “neighborhood” receives a higher weight than in more distant countries, which is consistent with NEUMAYER (2005). On the one side this behavior may be an attempt to maintain the EU’s regional political influence, on the other side public perception and the feeling of responsibility of policy-makers towards neighboring countries may be higher than for geographically distant countries (NEUMAYER 2005). In contrast, no consistent impact of former colonies of the UK and France as well as member states of the Lomé Agreement can be verified, neither for emergency nor project and program food aid.

As concerns good governance, the analysis does not find any bias of EU food aid allocation towards countries with sound policies and institutions. More precisely, the degree of corruption in the recipient country has no influence on food aid. In the case of emergency food aid this is a plausible result as emergency food aid – usually distributed by international organizations and



NGOs – is directly targeted to the people in need, and therefore mostly unaffected by corrupt governments. In the case of project and program food aid which is to a large extent given to governments the ignorance of corruption may lead to a considerable reduction of the effectiveness of EU food aid if governments fail to distribute the resources to the people in need. Altogether, the results are in line with NEUMAYER (2003b, 2003c) who finds for the case of foreign aid that the EU does not reward countries with sound policies in a consistent manner. Instead, a negative relationship between emergency food aid and democracy is found, meaning that, contrary to the concept of rewarding good governance, EU emergency food aid is actually biased towards countries with “bad” policies. Given that non-democratic countries may have a lower capacity to effectively respond to humanitarian crises than democratic countries, this result suggests that the EU emergency food aid is responsive to those more in need of food aid.

Finally, EU food aid is characterized by bureaucratic inertia as the incrementalism variable indicates. It should, however, be mentioned that this result is not a contradiction to other allocation criteria per se. In fact, while incrementalism in the context of emergency food aid is likely to be a sign of bureaucratic inertia which implies an ill-timed reaction to disasters, incrementalism in the context of project and program food aid may hint to positive experiences of food aid allocation in the previous year and is consistent with long-term poverty reduction goals (PRINZ 1994 p. 180).

Altogether, neither the hypothesis of CLAY (2002) that emergency food aid is “intrinsically political” and might thus be particularly responsive to donor interests nor the widespread belief that emergency food aid is particularly responsive to recipient needs are consistently supported for the case of the EU. In support of NEUMAYER (2005), emergency food aid does not seem to be to a higher extent determined by humanitarian concerns as compared to project and program food aid, providing evidence that at the country level emergency food aid is not targeted better to recipients’ needs than project and program food aid.

From a methodological point of view, Table 14 demonstrates that the results of both the Tobit and the two-part model lead to, in most cases, consistent results for emergency and also project and program food aid. Differences in the estimates may be due to neglecting country specific effects in the standard Tobit model. However, the two-part model estimates reveal severe shortcomings of the Tobit approach which are consistent with the criticism of NEUMAYER (2003a p. 35). First, the two-part model shows that factors determining the selection of recipients in the first step do not necessarily have to be the same factors that determine the amount of food aid provided to eligible countries. Second, the case of CIS indicates that important determinants of food aid allocation do not need to be of the same sign in the selection and allocation decision.

As both are basic assumptions of the Tobit model, the use of this approach to analyze food aid allocation only allows drawing imprecise conclusions and implications.

The two-part model indicates that the selection of recipients and the allocation of food aid resources between the selected recipients seem to be well-thought through by decision makers. In general the results show that fewer variables are significant in the second stage than in the eligibility stage which supports the finding of ZAHARIADIS et al. (2000) that "donor motives and recipient need are most influential in determining whether, rather than how much, a state will receive food aid". This finding should, however, not be overvalued as it may be attributed to selectivity bias of the OLS model.

Finally, two important limitations of the study should be mentioned. First, the analysis does not address the question of how well food aid is targeted to the most vulnerable and needy people within each recipient country. Consequently, due to its macro-level perspective, this study does not allow a final statement about the effectiveness and efficiency of food aid. Even if macro-level analysis concludes that donors address the most food insecure countries according to humanitarian objectives and recipients' need (and those with a low degree of corruption), it is still possible that at the micro level the needs of the most food insecure individuals are not met (BARRETT and HEISEY 2002, YOUNG and ABBOTT 2008). Whether food aid benefits the political powerful or the poor in need can only be answered in a comprehensive manner by a micro-level analysis, although the insignificant corruption variable suggests that there is still room for improvement in targeting needy population groups. However, this should not limit the importance of this study as the crucial precondition of effective and efficient food aid is to target the neediest countries.

Second, it is not possible to explicitly account for the procurement of food aid in the econometric analysis. In this context the EU clearly strengthens the humanitarian intention of EU food aid as the shift from direct transfers to local purchases and triangular transactions is likely to have a positive impact on the recipients' (and neighbors) agricultural sector and economic development. Even though these aspects of food aid cannot be accounted for in the econometric estimation, they are an important part of the evaluation of EU food aid. In this respect, EU food aid clearly improved in the recent past and consequently the analysis is likely to undervalue the humanitarian motivation of EU food aid.

## 6 Conclusion

The objective of this study is to explain the allocation of EU food aid among recipient countries from a political economy perspective. In contrast to the vast literature concerning the allocation of foreign aid the particular case of food aid receives far less attention by scholars. Among those which actually deal with the political economy of food aid the majority of studies focus on the US as the largest donor country, whereas only few studies deal with the EU as the second largest donor.

Today's dilemma of food security and food aid is the following. While resources devoted to food aid decline the need of the poor increased in face of rising world food prices, which are expected to remain high in the coming decade. That is, as less people can afford to purchase food in order to mitigate sudden and chronic food shortages the amount of food aid donations is limited. This stresses the fact that food aid has to be conducted with the highest efficiency possible. At the country level, food aid has thus to be consequently targeted towards the poorest countries most vulnerable to food insecurity.

Unfortunately, there have not been humanitarian and altruistic motives alone to determined food aid allocation. Instead, food aid was strongly influenced by various mutually inconsistent objectives including both recipient needs and donor interests. Especially surplus disposal, trade and geopolitical interests are commonly mentioned as important determinants of food aid allocation. Furthermore, a recently emerged allocation criteria of food aid is that of good governance meaning that donors aim to reward "deserving" countries for sound policies and institutions at home. Evidently, to follow various donor interests besides altruistic motives adversely affects the effectiveness and efficiency of food aid as it is not the poorest and most food insecure countries that are targeted but countries which are of particular geopolitical or commercial importance for the donor country.

The EU is no exemption from this criticism. The early years of EU food aid policy were characterized by the disposal of large agricultural surpluses which were an outcome of the Common Agricultural Policy. With the reformation of both agricultural and food aid policy in the 1990s, EU food aid – it is claimed – evolved from a system dominated by donor interests towards an approach oriented to recipients' needs. In order to explore whether EU food aid is in fact efficiently targeted towards recipients' needs it is subject to both theoretical and empirical examination.

Following previous studies investigating the political economy of aid allocation, a hypothetical market of food aid is established by means of Public Choice Theory. Similar to economic theory it is postulated that food aid is determined by supply and demand which in turn are determined

by altruistic and development objectives, commercial and external interests, and bureaucratic factors. The potential determinants are derived from stated intentions of the EC which specifies precise – mostly humanitarian – allocation criteria within the regulatory framework of food aid. Additionally, several indicators of commercial and external interests including the importance of good governance in EU food aid allocation are considered.

Empirical evidence of the validity of the theoretically derived determinants is provided by use of two econometric models commonly applied in the foreign aid literature – the two-part and the Tobit model. Altogether, the analysis finds that EU food aid allocation is to a considerable extent driven by humanitarian objectives. Most importantly, a low per-capita calorie supply in the recipient country determines EU food aid. However, by distinguishing between emergency and non-emergency food aid throughout the analysis, the results show that, in many cases, factors determining emergency food aid differ from those determining project and program food aid. That is, project and program food aid on the one hand is targeted towards countries with low per-capita income and high child mortality indicating that non-emergency food aid responds to economic and non-economic well-being within the recipient country. Emergency food aid on the other hand responds to a low degree of self-sufficiency, sudden shortfalls in food availability as well as large influxes of refugees in recipient countries. In contrast, countries affected by huge natural disasters are less likely to receive EU emergency food aid which may be due to a division of responsibilities between the EU and international organizations, such as the WFP and UNICEF. Overall, the humanitarian orientation of EU food aid is welcomed from both a normative and an efficiency point of view.

Nonetheless, the analysis finds that there is still room for improvement of EU food aid allocation. That is, EU food aid is likely to suffer from efficiency losses as also external objectives and bureaucratic inertia play an important role in food aid allocation. As this is the case for both emergency and non-emergency food aid, neither the belief that the allocation of emergency food aid is particularly responsive to recipients' needs nor the hypothesis that emergency food aid is intrinsically political as compared to project and program food aid is supported by the analysis.

Most notably, EU emergency and non-emergency food aid is positively associated with other donors' food aid contributions indicating that donors compete for international prestige and political influence in the recipient countries. Thereby, the lack of coordination among donors exacerbates food aid variability which may lower aid effectiveness.

As concerns good governance the results do not provide consistent evidence that food aid is allocated to reward countries with sound policies and institutions. The resulting implications are heterogeneous. On the one hand, the lack of connection between EU food aid and the degree of corruption of the recipients' governments may adversely affect food aid efficiency. Thus, one

possibility to ensure that food aid, in particular program food aid which is usually directly given to the recipients' governments, is effectively directed towards the poorest and most vulnerable parts of the recipients' population is to systematically target program food aid to less corrupt countries. On the other hand, the results show that emergency food aid allocation is biased towards countries with a low degree of democracy meaning that the EU, regardless of the recipient's ideological view, responds to the needs of those countries which may have a low capacity, and often also willingness, to effectively help its people in case of sudden or chronic food shortages.

To conclude, EU food aid certainly improved in the past decade. While EU food aid during the 1970s and 1980s was used as an instrument for the disposal of agricultural surpluses and thus primarily served the donor's interests, this study provides evidence that, today, both EU emergency and non-emergency food aid are to a considerable extent determined by recipients' needs. As a consequence, EU food aid is allocated towards (most) needy and food insecure countries. For the future, it is, however, still possible to improve the effectiveness and efficiency of EU food aid transfers by coordinating own food aid contributions with those of other donors' and, in the case of program food aid, by targeting food aid towards countries with a low level of corruption.

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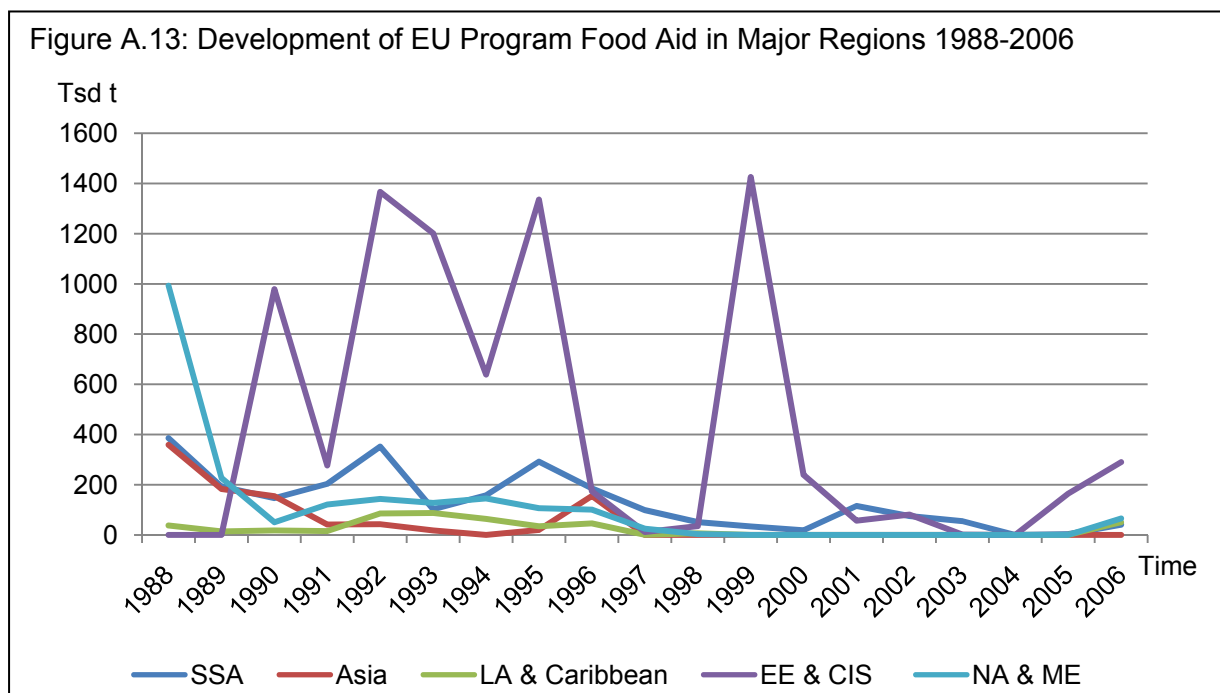
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## Appendix

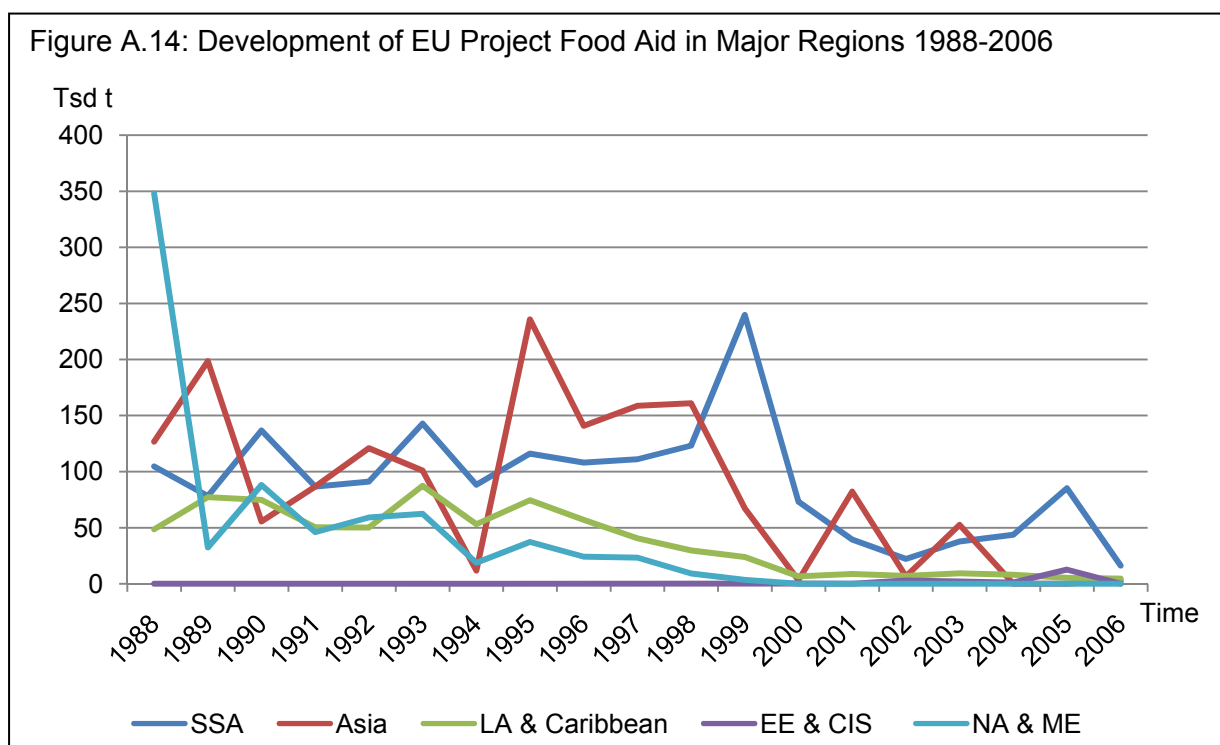
Table A.15: List of Countries

<b>Sub-Saharan Africa</b>	Senegal	Bolivia	Moldova
Angola	Seychelles	Chile	Poland
Benin	Sierra Leone	Colombia	Romania
Botswana	South Africa	Costa Rica	Russia
Burkina Faso	Sao Tome and Principe	Dominica	Tajikistan
Burundi	Sudan	Dominican Rep.	Turkmenistan
Cameroon	Swaziland	Ecuador	Uzbekistan
Cape Verde	Tanzania	El Salvador	
Central African Republic	Togo	Grenada	<b>NA &amp; ME</b>
Chad	Uganda	Guatemala	Algeria
Comoros	Zambia	Guyana	Egypt
Congo, Rep.	Zimbabwe	Haiti	Iran
Congo, Dem. Rep.		Honduras	Jordan
Côte d'Ivoire	<b>Asia</b>	Jamaica	Lebanon
Ethiopia	Bangladesh	Mexico	Morocco
Gabon	Cambodia	Nicaragua	Syria
Gambia	China	Paraguay	Tunisia
Ghana	India	Peru	Turkey
Guinea	Indonesia	Uruguay	Yemen
Guinea-Bissau	Laos		
Kenya	Malaysia	<b>EE &amp; CIS</b>	
Lesotho	Mongolia	Albania	
Madagascar	Myanmar	Armenia	
Malawi	Nepal	Azerbaijan	
Mali	Pakistan	Bulgaria	
Mauritania	Sri Lanka	Belarus	
Mauritius	Thailand	Croatia	
Mozambique	Vietnam	Estonia	
Namibia		Georgia	
Niger	<b>LA &amp; Caribbean</b>	Kyrgyzstan	
Nigeria	Belize	Latvia	
Rwanda	Brazil	Lithuania	

EE & CIS = Eastern Europe and Commonwealth of Independent States, LA & Caribbean = Latin America and the Caribbean, NA & ME = North Africa and the Middle East. Source: WFP/INTERFAIS (2008).



SSA=Sub-Saharan Africa, LA & Caribbean=Latin America and the Caribbean, EE & CIS= Eastern Europe and the CIS, NA & ME=North Africa and the Middle East. Source: WFP/INTERFAIS (2008).



SSA=Sub-Saharan Africa, LA & Caribbean=Latin America and the Caribbean, EE & CIS= Eastern Europe and the CIS, NA & ME=North Africa and the Middle East. Source: WFP/INTERFAIS (2008).



Table A.16: Allocation of EU Project and Program Food Aid across Recipients in 1988-2006

Recipient country	Total food aid		Per-capita food aid		Nb. of years receiving food aid
	Total	Average p.a.	Total	Average p.a.	
	(Tsd t)		(kg)		
Russian Federation	1 836.16	96.64	12.53	0.66	6
Bangladesh	1 719.13	90.48	13.06	0.69	14
Poland	1 434.46	75.50	37.42	1.97	2
Egypt	1 135.56	59.77	17.97	0.95	11
Albania	1 076.23	56.64	340.23	17.91	3
Ethiopia	1 046.53	55.08	17.07	0.90	16
Mozambique	880.64	46.35	52.26	2.75	16
Georgia	853.59	44.93	172.65	9.09	4
Azerbaijan	622.15	32.74	79.91	4.21	5
Romania	523.91	27.57	23.33	1.23	4
Lithuania	509.04	26.79	142.57	7.50	2
Armenia	475.97	25.05	147.57	7.77	8
Latvia	466.70	24.56	188.66	9.93	2
Kyrgyzstan	364.42	19.18	76.84	4.04	6
Malawi	361.48	19.03	33.05	1.74	17
Tajikistan	324.69	17.09	54.99	2.89	9
Angola	319.72	16.83	24.53	1.29	15
Peru	299.66	15.77	12.25	0.64	12
China	245.84	12.94	0.20	0.01	8
Tunisia	228.44	12.02	25.05	1.32	10
Yemen	218.20	11.48	13.23	0.70	11
Nicaragua	210.19	11.06	43.76	2.30	14
Moldova	201.56	10.61	47.82	2.52	2
Bolivia	196.16	10.32	25.06	1.32	13
Estonia	193.25	10.17	134.75	7.09	2
Madagascar	184.11	9.69	12.29	0.65	18
Haiti	162.94	8.58	20.04	1.05	19
Pakistan	158.83	8.36	1.23	0.06	15
Kenya	158.32	8.33	5.46	0.29	11
Zambia	157.57	8.29	16.22	0.85	16
India	151.71	7.98	0.16	0.01	15
Mauritania	130.06	6.85	54.42	2.86	14
Sri Lanka	110.35	5.81	6.01	0.32	4
Lesotho	97.32	5.12	54.50	2.87	9
Niger	90.85	4.78	8.92	0.47	17
Morocco	89.75	4.72	3.31	0.17	7
Guatemala	88.76	4.67	8.39	0.44	14
Congo, Dem. Rep.	87.87	4.62	1.85	0.10	12
Eritrea	77.27	4.07	21.55	1.13	5
Afghanistan	70.99	3.74	5.90	0.31	7
Vietnam	70.63	3.72	0.95	0.05	8
Rwanda	62.17	3.27	8.32	0.44	13
Uganda	57.48	3.03	2.52	0.13	10
Cape Verde	50.57	2.66	119.45	6.29	10
Burkina Faso	49.35	2.60	4.46	0.23	17
Somalia	48.08	2.53	6.90	0.36	7
Jordan	47.54	2.50	10.90	0.57	9
Sudan	47.43	2.50	1.53	0.08	9
Tanzania	46.57	2.45	1.48	0.08	8
Korea, Dem. Rep.	46.00	2.42	2.09	0.11	1

Cuba	44.44	2.34	4.05	0.21	10
Lebanon	43.09	2.27	12.18	0.64	9
Chile	37.94	2.00	2.58	0.14	8
Honduras	37.52	1.97	6.46	0.34	10
Algeria	34.23	1.80	1.18	0.06	8
Chad	29.69	1.56	3.79	0.20	11
El Salvador	26.98	1.42	4.61	0.24	11
Cote d'Ivoire	26.06	1.37	1.66	0.09	12
Djibouti	24.13	1.27	36.01	1.90	7
Namibia	23.23	1.22	13.47	0.71	3
Burundi	22.89	1.20	3.51	0.18	9
Bulgaria	22.50	1.18	2.72	0.14	1
Senegal	22.09	1.16	2.29	0.12	9
Ecuador	21.14	1.11	1.81	0.10	11
Sierra Leone	19.63	1.03	4.35	0.23	9
Mali	19.58	1.03	2.09	0.11	15
Dominican Republic	16.54	0.87	1.99	0.10	10
South Africa	15.00	0.79	0.37	0.02	1
Brazil	13.79	0.73	0.08	0.00	6
Sao Tome and Principe	13.52	0.71	101.68	5.35	9
Zimbabwe	12.97	0.68	1.09	0.06	10
Benin	11.92	0.63	1.79	0.09	10
Ghana	10.26	0.54	0.55	0.03	8
Botswana	8.96	0.47	5.57	0.29	7
Togo	7.98	0.42	1.61	0.08	9
Comoros	7.16	0.38	14.05	0.74	9
Guyana	6.50	0.34	8.83	0.46	8
Cameroon	6.03	0.32	0.41	0.02	7
Guinea-Bissau	6.00	0.32	4.71	0.25	8
Paraguay	5.61	0.30	1.12	0.06	6
Nepal	4.45	0.23	0.10	0.01	7
Colombia	4.43	0.23	0.11	0.01	5
Cambodia	3.96	0.21	0.34	0.02	1
Gambia	3.29	0.17	2.62	0.14	8
Congo, Republic	3.22	0.17	1.08	0.06	7
Central African Republic	2.52	0.13	0.70	0.04	7
Equatorial Guinea	2.12	0.11	5.24	0.28	5
Mongolia	2.06	0.11	0.89	0.05	1
Liberia	1.74	0.09	0.66	0.03	4
Bhutan	1.39	0.07	2.51	0.13	6
Uruguay	1.32	0.07	0.04	0.00	7
Swaziland	1.29	0.07	1.36	0.07	2
Mauritius	1.09	0.06	0.95	0.05	5
Dominica	1.02	0.05	14.24	0.75	7
Turkmenistan	1.00	0.05	0.23	0.01	1
Uzbekistan	0.80	0.04	0.03	0.00	1
Turkey	0.80	0.04	0.01	0.00	3
Grenada	0.59	0.03	5.93	0.31	4
French Guyana	0.53	0.03	n.a.	n.a.	1
Jamaica	0.48	0.03	0.19	0.01	1
Guinea	0.20	0.01	0.03	0.00	3
Seychelles	0.12	0.01	0.00	0.00	2
Laos	0.07	0.00	0.01	0.00	1
Myanmar	0.07	0.00	0.00	0.00	2
Thailand	0.03	0.00	0.00	0.00	1

n.a. = not available. Source: Own calculation using data from WFP/INTERFAIS (2008).

Table A.17: Allocation of EU Emergency Food Aid across Recipients in 1988-2006

Recipient country	Total food aid		Per-capita food aid		Nb. of years receiving food aid
	Total	Average	Total	Average	
	(Tsd t)		(kg)		
Ethiopia	3 487.42	183.55	56.88	2.99	19
Sudan	1 125.40	59.23	36.23	1.91	19
Serbia and Montenegro	700.28	36.86	94.62	4.98	13
Rwanda	596.16	31.38	79.83	4.20	13
Korea, Dem. Rep.	512.22	26.96	23.27	1.22	9
Eritrea	485.68	25.56	135.46	7.13	12
Malawi	470.67	24.77	43.03	2.26	13
Angola	419.21	22.06	32.17	1.69	19
Mozambique	362.91	19.10	21.54	1.13	11
Somalia	336.05	17.69	48.20	2.54	16
Zimbabwe	329.71	17.35	27.63	1.45	14
Afghanistan	298.88	15.73	24.85	1.31	13
Russian Federation	278.84	14.68	1.90	0.10	13
Occupied Palest. Territory	273.08	14.37	n.a.	n.a.	19
Bangladesh	268.88	14.15	2.04	0.11	10
Liberia	262.92	13.84	99.03	5.21	15
Kenya	256.49	13.50	8.84	0.47	11
Tanzania	220.49	11.61	7.00	0.37	17
Tajikistan	215.41	11.34	36.48	1.92	12
Pakistan	214.73	11.30	1.66	0.09	8
Algeria	171.09	9.00	5.90	0.31	18
Uganda	165.27	8.70	7.25	0.38	16
Congo, Dem. Rep.	161.46	8.50	3.40	0.18	17
Thailand	104.59	5.50	1.79	0.09	9
Iraq	95.02	5.00	4.58	0.24	9
Burundi	94.71	4.98	14.51	0.76	10
Azerbaijan	79.55	4.19	10.22	0.54	9
Georgia	72.59	3.82	14.68	0.77	11
Nepal	68.28	3.59	1.55	0.08	12
Cambodia	65.97	3.47	5.58	0.29	6
Croatia	65.67	3.46	14.42	0.76	3
Estonia	55.00	2.89	38.35	2.02	1
Zambia	53.92	2.84	5.55	0.29	12
Lebanon	44.84	2.36	12.68	0.67	16
Sierra Leone	40.73	2.14	9.02	0.47	10
Jordan	40.59	2.14	9.31	0.49	18
Mauritania	36.00	1.89	15.06	0.79	11
Sri Lanka	32.35	1.70	1.76	0.09	5
Egypt	29.21	1.54	0.46	0.02	2
Tunisia	27.39	1.44	3.00	0.16	3
Vietnam	26.90	1.42	0.36	0.02	2
Indonesia	25.37	1.34	0.13	0.01	4
Laos	25.21	1.33	5.18	0.27	7
Swaziland	24.25	1.28	25.51	1.34	9
Haiti	24.05	1.27	2.96	0.16	8
Lesotho	23.78	1.25	13.32	0.70	6
Niger	22.49	1.18	2.21	0.12	7
Syria	22.27	1.17	1.44	0.08	18
Armenia	21.87	1.15	6.78	0.36	7
Guinea	20.47	1.08	2.71	0.14	7

Madagascar	20.22	1.06	1.35	0.07	6
Chad	19.87	1.05	2.54	0.13	8
Iran	19.64	1.03	0.32	0.02	2
Peru	18.67	0.98	0.76	0.04	4
Timor Leste	17.41	0.92	21.66	1.14	4
Bosnia-Herzegovina	17.18	0.90	4.46	0.23	2
Senegal	14.52	0.76	1.51	0.08	11
Cote d'Ivoire	14.26	0.75	0.91	0.05	6
Colombia	11.82	0.62	0.30	0.02	7
Moldova	10.45	0.55	2.48	0.13	1
Myanmar	10.11	0.53	0.23	0.01	4
Nicaragua	9.40	0.49	1.96	0.10	8
Burkina Faso	9.39	0.49	0.85	0.04	7
Namibia	9.23	0.49	5.35	0.28	5
Congo, Republic	8.60	0.45	2.90	0.15	8
Ghana	7.97	0.42	0.42	0.02	5
Kyrgyzstan	6.86	0.36	1.45	0.08	2
India	6.10	0.32	0.01	0.00	3
China	5.75	0.30	0.00	0.00	1
Mongolia	5.48	0.29	2.36	0.12	1
Malaysia	5.45	0.29	0.25	0.01	2
Central African Republic	5.09	0.27	1.42	0.07	5
Yemen	4.81	0.25	0.29	0.02	6
Djibouti	3.48	0.18	5.20	0.27	6
Mexico	3.13	0.16	0.05	0.00	5
Albania	2.67	0.14	0.85	0.04	2
Cuba	2.50	0.13	0.23	0.01	1
Mali	2.41	0.13	0.26	0.01	6
Bolivia	2.09	0.11	0.27	0.01	2
Benin	2.00	0.11	0.30	0.02	2
Botswana	1.83	0.10	1.14	0.06	3
Turkey	1.69	0.09	0.03	0.00	3
Cameroon	1.64	0.09	0.11	0.00	4
Guatemala	1.19	0.06	0.11	0.01	4
Honduras	1.04	0.05	0.18	0.01	3
Guinea-Bissau	1.02	0.05	0.80	0.04	4
Papua New Guinea	0.89	0.05	0.18	0.01	5
El Salvador	0.74	0.04	0.12	0.01	2
Togo	0.61	0.03	0.12	0.00	2
Nigeria	0.59	0.03	0.01	0.00	1
Romania	0.41	0.02	0.02	0.00	2
Gambia	0.31	0.02	0.25	0.01	2
Dominican Republic	0.26	0.01	0.03	0.00	2
Cape Verde	0.26	0.01	0.61	0.03	1
Ecuador	0.21	0.01	0.02	0.00	2
Costa Rica	0.13	0.01	0.04	0.00	1
Chile	0.12	0.01	0.01	0.00	2
Gabon	0.09	0.00	0.08	0.00	1
Paraguay	0.04	0.00	0.01	0.00	1
Belarus	0.04	0.00	0.00	0.00	1
Belize	0.00	0.00	0.01	0.00	1

n.a. = not available. Source: Own calculation using data from WFP/INTERFAIS (2008).

Table A.18: Data Sources

Variable	Definition
FA	Food aid data provided by WFP/INTERFAIS (2008), Rome
ODON	Food aid data provided by WFP/INTERFAIS (2008), Rome
SS	FAO (2008b): FAO Statistical Database (FAOSTAT) – TradeSTAT, FAO (2008c): FAO Statistical Database (FAOSTAT) – ProdSTAT, own calculations
CAL	FAO (2008d): FAO Statistical Database (FAOSTAT) – Food Balance Sheet., Rome
SHOCK	FAO (2008d): FAO Statistical Database (FAOSTAT) – Food Balance Sheet, Rome, own calculations
GDP	IMF (2008): World Economic Outlook Database 2008, Washington D.C.
CAB	IMF (2008): World Economic Outlook Database 2008, Washington D.C.
POP	WORLD BANK (2008a): World Development Indicators Database, Washington D.C.
IMORT	UNDP (several years): Human Development Report, New York
CORR	WORLD BANK (2008b): Governance Indicators, Washington D.C.
WAR	SIPRI (several years): SIPRI Yearbook, Stockholm
NATDIS	EM-DAT (2008): Emergency Events Database, University of Louvain, Louvain
REFUGEES	UNHCR (2008): UNHCR Statistical Online Population Database, Geneva
DEM	FREEDOM HOUSE (2008): Freedom in the World – Country Ratings 1972-2006, Washington D.C.
EXP	UN (2008): United Nations Commodity Trade Statistics Database (Comtrade), New York
DIST	HAVEMAN, J. (1998): Havemans distance between capitals data, completed by the GEOBYTES (2008) database
COLUK	PRINZ, C. (1994) pp. 284
COLF	PRINZ, C. (1994) pp. 284
LOME	EC (2008c): Regions and Countries, Brussels
CIS	WFP/INTERFAIS (2008), Rome

Source: Own illustration.

Table A.19: Descriptive Statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
PFA (t)	1166	8,465.13	53,365.37	0	1,426,116.00
EFA (t)	1166	5,051.58	24,421.25	0	424,025.50
PFA lag (t)	1166	10,302.18	56,729.71	0	1,426,116.00
EFA lag (t)	1166	5,363.86	24,252.21	0	383,846.40
GDP (Tsd. int. Dollar)	1166	3.28	2.98	0	14.92
POP (Mio)	1166	43.18	153.61	0.07	1288.40
IMORT	1166	92.19	68.49	7.80	320.00
SS (%)	1166	0.68	0.30	0	0.99
CAL	1166	2,482.22	429.65	1,509.77	3,582.27
SHOCK (%)	1166	0.50	3.00	-17.17	34.14
CAB (USD)	1166	-0.34	4.38	-33.42	46.84
NATDIS	1166	0.07	0.25	0	1
WAR	1166	0.16	0.37	0	1
REFUGEES	1166	85.78	259.54	0	2,495.04
EXP (%)	1166	0.17	0.36	0	4.71
DIST (Tsd. kilometers)	1166	6.16	2.75	1.03	11.90
DEM	1166	0.97	0.76	0	2
CORR	1166	-0.48	0.60	-2.09	1.48
PODON (t)	1166	48,386.38	160,894.30	0	3,362,741.00
EODON (t)	1166	21,124.55	72,174.40	0	1,462,803.00
LOMÉ	1166	0.46	0.50	0	1
COLUK	1166	0.29	0.45	0	1
COLF	1166	0.23	0.42	0	1
CIS	1166	0.17	0.38	0	1

Source: see Table A.18 in the appendix.