

Food Aid And Commercial International Food Trade

Christopher B. Barrett*
Department of Applied Economics and Management
Cornell University
315 Warren Hall
Ithaca, NY 14853-7801 USA
Telephone 607-255-4489
Fax 607-255-9984
Email: cbb2@cornell.edu

March 2002

Background paper prepared for the Trade and Markets Division,
Organisation for Economic Co-operation and Development

* I thank Robin Jackson and Loek Boonekamp for early guidance and Arvind Chandrasekar and Joy Learman for research assistance. Any remaining errors of fact or interpretation are entirely mine.

I. Introduction

1. This paper was commissioned by the Trade and Markets Division of the Organisation for Economic Co-operation and Development (OECD) to address the relationship between food aid and commercial international food trade as background to an anticipated OECD study on the export competition aspects of food aid. The terms of reference for this study call for "a critical review of the existing literature on the potential use of food aid as an export support policy or, alternatively, the potential that food aid bears implications similar to those of export supporting policies."

2. This paper can be summarized as follows. Food aid has multiple objectives, modalities and effects and there has been significant movement over time in each of these areas. Concerns about the use of food aid as an export support policy are founded in both the history of bilateral food aid, in the political economy of food aid support in major donor countries, and in some current uses. The effects of food aid on commercial international food trade turn on several key factors, chief among which is its targeting, of which timing of deliveries is an important subfactor. Due to inevitably imperfect targeting at both macro and micro levels, food aid clearly displaces commercial sales of food contemporaneously in recipient economies. The evidence is unclear as to the distribution of these short-term losses across domestic and foreign suppliers in recipient countries, but the evidence somewhat favors the conclusion that most of the displacement comes out of commercial imports. Whether this displacement adversely affects international food markets depends on the manner in which the food aid is obtained, how well integrated the recipient economy market is with the global market, and recipient demand for variety. The longer-term effects of food aid turn on the dynamic income effects of food aid receipt and the extent to which these stimulate future food demand. The crucial questions then are how the short-term losses due to contemporaneous displacement of commercial imports, the global market effects of alternative food aid procurement modalities, and the long-term gains from any derivative income stimulus balance out over time and how these costs and benefits are distributed among donors and third party exporters. Research on these topics has been surprisingly scarce and, largely as a consequence, premature conclusions are too often drawn on the basis of quite limited evidence on the contemporaneous displacement effects of food aid on recipient country markets. Finally, because food aid's effects on trade stem directly from the efficacy of targeting, policymakers exploring the effects of food aid on commercial international food trade must consider explicitly the trade-off between higher expected displacement of commercial trade and higher expected targeting errors of exclusion of intended beneficiaries through restrictive distribution rules.

II. Historical and Institutional Background¹

3. When the United States Congress passed the Agricultural Trade Development and Assistance Act (Public Law 83-480) in July 1954, the modern era of food began.^{2,3} As is

¹ This section draws heavily on Barrett (forthcoming).

² Section 416(b) of the Agricultural Act of 1949 also provided for overseas commodity donations of surplus commodity by the Commodity Credit Corporation administered by the U.S. Department of Agriculture. It has remained an active facility for United States food aid, although section 416(b) shipments vary considerably in response to changing surplus volumes and have been swamped by PL480 over time. There has been a sharp increase again in 416(b) shipments since late 1998, much of it tied to the launch of the global food for education initiative in July 2000 (Hanrahan 2002).

suggested in the title of the act, known ever after as PL 480 or the Food for Peace program, food aid was not originally envisioned as an entirely humanitarian program. Rather, it was a part of American agricultural and foreign policy through which the United States shared its farm surpluses with food-deficit countries around the world. As such, there were several stated goals in the original act: disposal of surpluses generated by domestic farm support programs, and promotion of international demand for agricultural exports from the United States. Relative emphasis among goals has shifted over time in response to changing domestic and global conditions, but the multi-purpose approach to food aid persists (Hopkins 1984, Ruttan 1993, Ruttan 1995, Ball and Johnson 1996, Christensen 2000, Clay and Stokke 2000).

4. Multiple objectives beget multiple forms of food aid shipments. Food aid is commonly divided into three categories: program, project, or emergency (humanitarian). Program aid is generally an untargeted distribution sold on recipient country markets to raise general local currency revenue ("counterpart funds") used to support recipient country development interventions approved by the donor. Project food aid, by contrast, is targeted at clearly defined beneficiary groups within the recipient country, often through supplementary feeding programs or food-for-work schemes. Humanitarian or emergency assistance is directed at unanticipated man-made and natural disasters, and is thus commonly used for supplementary feeding programs for refugees and internally displaced persons. The latter two types of food aid are almost always completely free and are commonly distributed through private voluntary organizations (PVOs). Historically, half to three-quarters of the total value of all food aid has been distributed for free, and the proportion has been rising steadily as humanitarian shipments have grown as a proportion of total food aid flows.

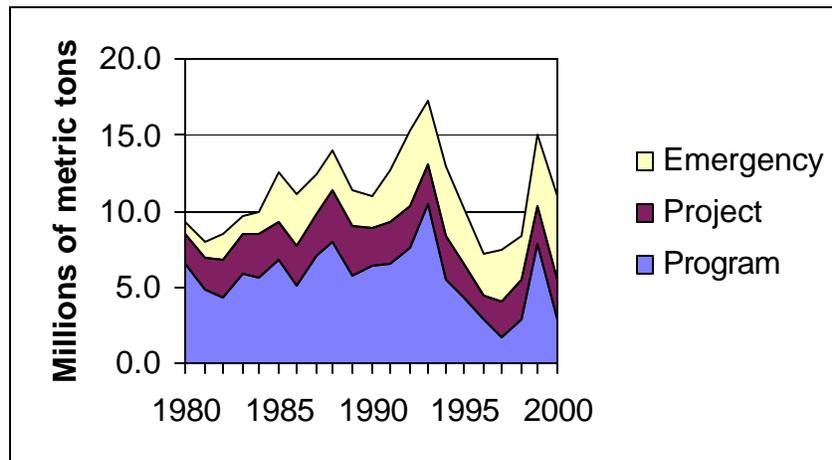


Figure 1, Data Source: World Food Programme (2001)

5. Program food aid has traditionally swamped the other two forms, although the 1990s brought a dramatic transition, with program food aid flows falling sharply with the reduction in donor country farm programs and resulting food surpluses for concessional distribution. In the late 1980s and early 1990s, global program food aid flows averaged about 7.5 million metric tons annually (Figure 1). By contrast, leaving out the aberration year of 1999,⁴ global program food

³ Canada's modern food aid program began in 1951 and thus predates the American program slightly. But the Canadian program has always been considerably smaller than its southern cousin. See Charlton (1992) for details.

⁴ There were a few temporary program food aid increases in 1999, of which the most significant by far were massive United States flows to Russia, making it temporarily the world's largest food aid recipient.

aid averaged only about 2.5 million metric tons annually, 1996-2000 (Figure 1).⁵ Title I PL 480 flows from the United States have historically accounted for the overwhelming majority of program food aid flows. Title I PL 480 provides concessional credits products to recipient country governments, with the credit tied to the imports of farm products from the United States. Program food aid is marketed through existing commercial channels, leading to significant opportunities for displacement. Displacement of commercially supplied food is especially likely in recipient country markets because recipient governments monetize most or all the shipments on arrival to raise funds for domestic programs, which may or may not be food-related. In essence, program food aid is foreign aid distributed in the form of food. It was born of domestic farm support programs that generated surpluses in need of disposal so that food was a relatively cheap medium in which to provide export subsidies and foreign assistance to friendly governments.

6. Times have changed, however. In the past few years, humanitarian aid shipments have become the largest single source of flows, up sharply from the 10-15% average pre-1990 (figure 1). While shipments under Titles I and III of PL 480 (operated by the U.S. Department of Agriculture) have fallen sharply, shipments under Title II PL 480 (operated by the U.S. Agency for International Development) exhibit a largely stable trend, albeit with considerable volatility. Title II PL 480 is food donated for humanitarian purposes, such as disaster relief, and for targeted projects such as food-for-work schemes, school feeding programs, etc. However, although emergency food aid such as Title II PL 480 has historically been much more carefully targeted at food distribution to needy individuals, it has gradually come to look more like program food aid because an increasing proportion of humanitarian food aid is monetized (i.e., sold on the open market by the receiving agency to raise cash for operations, akin to counterpart funds raised by governments receiving program food aid). The minimum monetization level has increased to 15% on nonemergency Title II PL480 flows and many agencies monetize considerably greater proportions as food aid has become a primary source of resources for many PVOs (Barrett et al. forthcoming).

7. The rise of humanitarian food aid has gone hand-in-hand with the rise of multilateral distribution over the past quarter century. The United Nations' World Food Programme (WFP), established in 1963, has accounted for a rapidly increasing share of world food aid flows since the World Food Conference of 1974. In 2000, multilateral food aid flows (of which WFP comprises 99%) accounted for 38 percent of global deliveries, larger than the 34 percent distributed through bilateral channels or the 28 percent distributed through PVOs (WFP 2001). In large measure, the rapid growth of the WFP reflects the (partial) disengagement of food aid from (declining) surpluses generated by donor country farm programs. More than half the WFP's budget now comes from cash contributions, giving it greater flexibility in delivery modalities than many bilateral donors. As Charlton (1992, p.46) notes, "although the WFP has frequently not received much publicity, it has emerged as the second largest source [globally] of development funds after the World Bank."

8. Because the WFP, as an international organization, has no other diplomatic agenda, no farm surpluses to liquidate and no food exporters to promote, its rise has led to greater focus on

⁵ Shaw and Singer (1996) raise insightful questions about official statistics on food aid flows, suggesting that considerable undercounting takes place. While I echo their concerns about the quality of the available data, attempting any correction for errors in extant food aid data lies well outside the scope of this brief review. All figures reported or used here rely on data publicly available from the FAO, the WFP, or USDA.

the food security promotion objective of food aid.⁶ The WFP has consequently pushed the use of local purchases and triangular transactions as innovative means of sourcing distributed food.⁷ In 2000, 11 percent of food aid was procured in developing countries (WFP 2001). EU food aid programs have likewise sharply expanded the use of local purchases and triangular transactions, from 16 percent of total shipments in 1989-91 to 24 percent in 1992-94, with countries like Ireland, the Netherlands, and the U.K. now using these modalities for most of their food aid donations (Clay et al. 1996). The WFP's greater attention to recipient country food security is manifest in a record of food aid shipments that have proved considerably more responsive to fluctuations in recipient country nonconcessional food availability – defined as domestic production plus commercial imports – than have PL 480 flows from the United States (Barrett 2001a, Barrett and Heisey 2001).

9. Along with the shift in emphases, sources and delivery modalities has come an adjustment in the geography of food aid. Where the primary beneficiaries were in Europe and east Asia in the 1950s, India and south Asia in the 1960s, sub-Saharan Africa received the largest share of international food aid in the early 1990s. However, Africa's share and that of Latin America and the Caribbean declined sharply over the course of the 1990s as shipments to Eastern Europe and the former Soviet Union became substantial (Figure 2). Low-income economies generally have received an increasing proportion of food aid flows over the past twenty years.

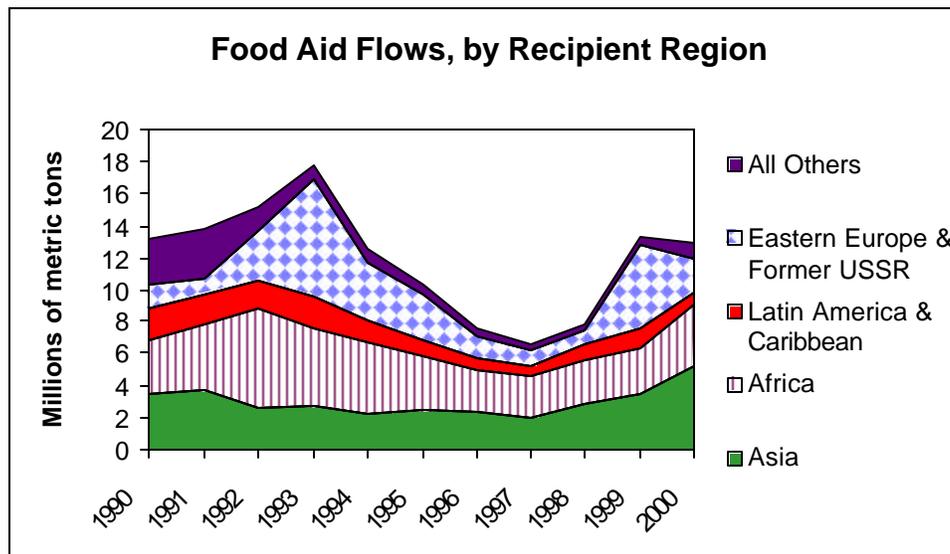


Figure 2, Data source: World Food Programme (2001)

⁶ This is consistent with the more general finding that recipient need tends to play a larger role in multilateral assistance, while donor self-interest plays a relatively large role in bilateral assistance (Maizels and Nissanke 1984, Ruttan 1995).

⁷ Local purchase schemes use donated funds to purchase food in surplus areas of the recipient country for distribution in deficit areas. This helps stimulate local production while circumventing market impediments — often weaknesses in the marketing infrastructure, sometimes simply insufficient purchasing power in deficit regions — that impede the free domestic flow of foodstuffs in the recipient country and saving on ocean transport costs. For example, there has been a sharp increase in donor procurement of food on the Ethiopian domestic market for distribution within that country, the largest food aid recipient in Africa (Amha et al. 1997). Triangular transactions work the same way, except that foods are purchased or traded for in a country other than the recipient or donor countries. Triangular transactions are commonly used when a national-level shock (e.g., drought, floods, or cyclones) that destroyed much of a nation's crop did not affect a neighboring country's harvest.

10. The changing geography of food aid applies on the donor end as well as the recipient side. Where the U.S. accounted for more than 90 percent of global food aid flows every year from 1955-70, due to its unparalleled food surpluses and global political interests, the EU and the WFP now account for almost half of all food aid flows. The changing sources and uses of food aid reveal how the emphasis of food aid distribution has shifted from Cold War and trade promotion objectives to humanitarian ones for which the Europeans especially are champions.⁸

11. On balance, food aid flows have fallen sharply over the past decade, from a high of 15 million metric tons⁹ in 1992-93 to less than 7 million metric tons only four years later, before stabilizing and recovering to around 11 million metric tons again by 2000 (WFP 2001, Figure 2). The United States has cut its food aid donations especially sharply, from 8.5 million metric tons to less than three million tons by 1996-97 before recovering a bit to around five million metric tons each of the past four years.

12. Food aid accounts for a small and declining share of cross-border food flows and an even smaller share of total food availability. From the late 1950s through the mid-1960s, food aid from the United States accounted for at least one quarter and sometimes greater than one half of U.S. agricultural exports. By the early 1970s, food aid had fallen in relative terms to only ten percent of world cereal trade, then down further to about five percent in the early 1990s, and just three percent in 2000 (Figure 3). This pattern holds true even among low-income, food deficit countries, who now receive food aid worth less than ten percent of their commercial food imports, according to FAO data. Food aid represents only about 0.3 percent of total food availability (Figure 3) and has accounted for as much as ten percent of total food available in a recipient economy in less than ten percent of country-years (Barrett 2001a).

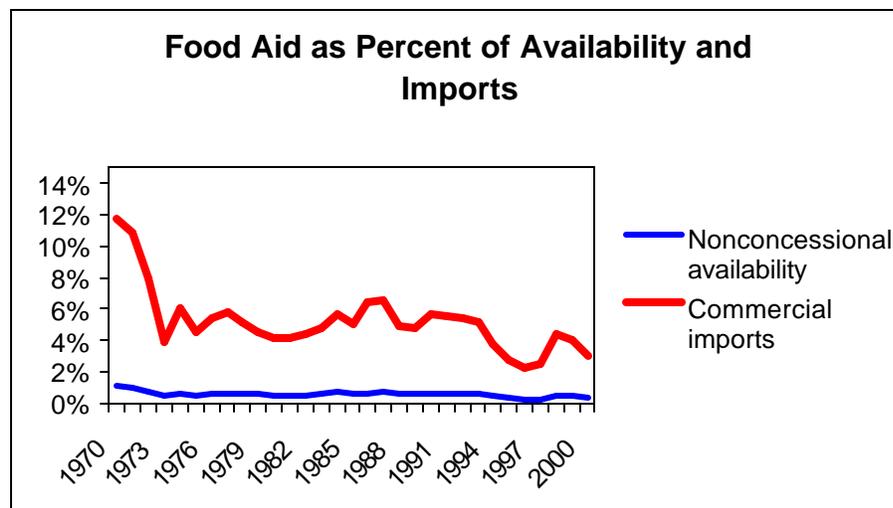


Figure 3, Data source: FAO

⁸ The increased prominence of European donors and widespread concern for vulnerable subpopulations in the transition economies of eastern and central Europe and the former Soviet Union has triggered substantial food aid flows to those regions in the 1990s (Figure 1), some of which appear to have been additional to and some of which seem to have been diverted from low-income countries (Figure 1 and Benson and Clay 1998).

⁹ All figures are in wheat equivalents unless indicated otherwise.

13. Food aid remains important in a few commodities, however, such as wheat and soybean oil. By weight, cereals comprise the vast majority of food aid, at least 90 percent most years. Wheat and wheat flour are the principal commodities, although massive dairy surpluses in the U.S. and the EU have occasionally sparked significant dairy shipments. The same has been the case for vegetable oils from the U.S. Generally, the commodity composition of donor countries' food aid reflects those items currently in surplus in the donor economy. As a consequence, while food aid represents a small share of total agricultural exports from donors, there are a few commodities (notably U.S. soybean oil and EU skimmed milk powder in the 1990s) for which food aid accounts for half or more of all shipments overseas. With the rapid increase in humanitarian food aid flows and the reduction of program aid flows, there has been a parallel expansion in noncereals food aid, notably "blended foods" — usually cereals fortified with milk powder and micronutrients for use in supplementary feeding programs.

14. Along with the other shifts, so too has the commodity composition of food aid begun to adjust. Denmark and a few other, smaller European donors have made significant shifts in their food aid strategies, away from domestic farm support and export promotion and in favor of attending to recipient nutritional needs at minimum cost. For example, in 1993 Denmark reduced its use of more expensive, processed animal products to less expensive basic vegetable commodities, thereby enabling Danish contributions to the World Food Programme to provide six times more calories and three times more protein than the 1990 Danish food aid basket, and at lower cost (Colding and Pinstrup-Andersen 1999).

15. The many changes notwithstanding, export market development remains an important political justification for food aid, especially in the United States. PL 480 Titles I and III still comprise a major share (about 20%) of global food aid flows, and there has been significant resurgence in use of 416(b) and Food for Progress flows from the United States in the past few years (Hanrahan 2002). In late 1998, the U.S. Congress approved a 3.1 million metric ton food aid program for Russia. This exceeded the sum of all US food aid shipments just two years earlier and underscores the continued use of food aid for export promotion purposes. The United States' 1996 farm bill, known as the Federal Agriculture Improvement and Reform (FAIR) Act, identified food aid as one of four programs to be used in support of commercial agricultural exports. It is plain that the trade promotion objective of food aid persists.

16. Since export subsidies have been and continue to be reduced under the disciplines of the Uruguay Round Agreement on Agriculture (URAA), signed at Marrakesh, Morocco, in April 1994, but food aid programs are not subject to the same restrictions, there is reason to worry about the use of food aid as a means to circumvent trade liberalization agreements. Under Article 10 of the URAA, World Trade Organisation (WTO) member countries that are international food aid donors are prohibited from tying food aid directly or indirectly to commercial exports of agricultural products to recipient countries. This restriction was intended to prevent the circumvention of the export subsidy commitments made under the URAA. The URAA also stipulates that food aid is to be given in fully grant form to the maximum extent possible, or on terms no less concessional than those provided for in Article IV of the 1986 Food Aid Convention (FAC). Furthermore, all food aid transactions (including bilateral food aid) are to be carried out in accordance with the Food and Agriculture Organisation of the United Nations' (FAO) "Principles of Surplus Disposal and Consultative Obligations," including the system of Usual Marketing Requirements (UMR). UMRs aim to minimize the harmful impact of food aid shipments on commercial trade and agricultural production.¹⁰ This is intended to prevent exporting countries from supplying food aid to markets that would otherwise be commercial (non-food-aid) markets

¹⁰ Adherence to UMRs is monitored and "enforced" by the FAO's Committee on Surplus Disposal (CSD).

and thereby disrupt international commodity flows and prices. Recipients are thus obliged to maintain a certain minimum level of commercial imports under the FAC. A new, three-year FAC came into force on July 1, 1999, wherein donors agreed to donate to developing countries certain minimum food aid donation volumes (or the cash equivalent) as specified below (FAO, 1999), with at least 80% of the donation on a fully grant basis.

17. The FAO (1995) estimated that the increase in world market prices as a result of the URAA would be around 7% for wheat, 7% for rice, 4% for maize and 4% for millet/sorghum, and other model-based estimates similarly anticipated increased world food prices (Konandreas et al. 2000). The resulting increase in export revenues from these cereals were estimated to roughly equal the income transfer to food importers through food aid. The low-income food-deficit countries worried openly throughout the Uruguay Round and thereafter that post-URAA food aid volumes would prove insufficient to compensate for the higher market prices they would face, thereby putting still greater food insecurity pressures on their economies (Ballenger Mabbs-Zeno 1992, Shaw and Singer 1996, Konandreas et al. 2000). The food aid provisions of the URAA didn't indicate either the levels at which food aid should continue to be provided or whether it should go beyond existing needs to improve the nutritional levels in developing countries. These commitments have traditionally been made under the FAC, but did not increase with the 1999 agreement.

18. Food aid is thus a complex set of different facilities and donors, some of which are more focused on donor concerns such as surplus disposal and trade promotion, some of which pay greater attention to recipient concerns for a stable source of sufficient food to supply impoverished populations. Furthermore, the objectives, modalities and geography of food aid have shifted considerably over time. Of most immediate concern in this paper, although food aid continues to account for only a very small fraction of food availability or cross-border food flows globally, it continues to be motivated in part by export promotion objectives and may affect international food trade at the margin. The next section provides a conceptual review of these issues before section IV's review of the limited empirical evidence on the relationship between food aid and commercial international food trade.

III. Theory and Issues of the Food Aid-Trade Relationship

19. Differences in climate, technology and the availability of land and water create sharp differences in agricultural productivity around the globe. On balance, the world today enjoys significant and growing food surpluses. These surpluses are concentrated in a relatively small number of countries, especially in North America, Europe, Australia and the southern cone countries of South America. Most commercial food trade takes place among these countries and the large economies that do not enjoy large domestic food surpluses, such as China, Japan and Russia. Food trade has grown quite rapidly over the past generation as increasing incomes and falling costs of commerce have stimulated faster expansion in trade than in output. Nonetheless, a large share of the world's population continues to suffer food insecurity or hunger and many low-income countries have insufficient food available to provide nutritionally adequate diets for all their citizens even if food were evenly distributed throughout the population. Food aid is thus intended to address the commercial food distribution problem that leaves 800 million or more people hungry in a world enjoying food surpluses.

20. Since the objective of food aid is to mitigate the failure of the commercial food distribution system to ensure adequate food access for all, the central questions about food aid's effects on global food markets revolve around targeting. Were food aid to flow exclusively to

those who would otherwise go hungry, and only in amounts and forms such that those needy recipients did not correspondingly reduce their own production or commercial purchase of food, then food aid would be wholly additional. The term "additionality" is thus central to discussions of food aid efficacy, for one key objective of food aid is to add as much as possible to the food consumption of the poor. This is entirely consistent with the UMR requirement under the FAC, although the UMR exists primarily to defend commercial trade markets.

21. The FAC definition of UMRs nonetheless ignores one of the most basic laws of consumer behavior, Engel's law, which states that food is a normal good characterized by an income elasticity of demand less than one. So each dollar of added income received, whether by an individual or a collection of individuals (e.g., a recipient country) almost inevitably generates less than a dollar's additional consumption of food. The empirical evidence suggests that the marginal propensity to consume food is somewhat higher when the additional income is received in the form of food, rather than as cash, but Engel's Law holds nonetheless (Barrett forthcoming). Key questions as to food aid's short-term effects on commercially sourced food in recipient country markets thus include (i) what affects the degree of additionality of food aid? and (ii) what commercial sources are displaced by food aid and by how much? Most of the empirical work on the relationship between food aid and trade have focused entirely on these questions, as section IV reviews.

22. The question of additionality is a purely short-run concern, however, and not even the only factor influencing the short-run effects of food aid on international food trade. The remainder of this section enumerates the various factors that condition food aid's inherently ambiguous short- and long-run effects on commercial food trade, both exports by food aid donors and spillover effects on third country exporters. Beyond the first question of additionality, however, there has been scant empirical research. As a consequence, it remains difficult to make any scientifically sound statements as to how food aid affects trade.

23. First we consider the effects of food aid on recipient behavior before we turn to considering the effects of donor sourcing and the nature of international markets. One can usefully four distinct effects of food aid on recipient country food markets: static income effects, dynamic income effects, demand for variety, and dynamic domestic producer response. We address the concepts of each in turn here, then present the empirical evidence in section IV.

24. The most obvious consequence of food aid receipt is the static income effect associated with the transfer of resources in the form of food, for which the income elasticity of demand is less than one. The increase in local food supply from food aid shipments necessarily exceeds the induced increase in food demand, resulting in less than one-for-one additionality and inevitably some contemporaneous displacement of commercial food purchases. The magnitude of the displacement turns largely on the efficacy of food aid distribution in targeting the poor. Because income elasticities of demand fall sharply as one approaches and moves beyond the poverty line (Strauss and Thomas 1995, Deaton 1997, Barrett forthcoming), additionality is highest when food aid reaches almost exclusively intended poor beneficiaries. Leakage to unintended recipients of better means necessarily increases the contemporary market displacement effects of food aid. Because effective targeting is costly, leakage is inevitable. While there has been considerable improvement in targeting methods over the past decade or two, it remains extremely difficult, both politically and administratively, to concentrate food aid distribution on just the poor (Barrett forthcoming). Timing is an important dimension of targeting. If food aid is meant to respond to short-term, adverse shocks in recipient nonconcessional food availability, donors need to identify emerging needs early and deliver the food quickly. The difficulties of targeting across both time

and recipients give rise to diminished additionality. We review the empirical evidence on food aid targeting efficacy in section IV.

25. The magnitude of contemporaneous displacement is not the only issue. Displaced commercial sales could be taken from donor country exporters, third country exporters or domestic producers. In so far as displacement of donor country exports is not of great concern – this effectively constitutes a relabelling of the flow¹¹ – the issue revolves around the extent to which food aid displaces third country exports or domestic production. A longstanding literature in development economics, dating from Schultz (1960) and Fisher (1963) and nicely summarized by Maxwell and Singer (1979), explores the possible adverse effects of food aid flows on recipient country farmers. As presented by Mohapatra et al. (1999) in an analytical general equilibrium model, the issue turns on how factor market effects on purchased (especially imported) inputs, capital and labor balance out against product market effects about which earlier, partial equilibrium analyses worried extensively. The outcome is analytically ambiguous; recipient country farmers could either benefit or lose from food aid shipments into their local market.

26. The concern within the OECD and WTO tends to revolve not only around displacement of recipient country produce but also around induced reductions in third country commercial exports. The contemporaneous displacement effect results entirely because the extra increment of income received by the recipient comes in the form of food. But there may be important dynamic income multiplier effects. Food aid may improve recipient nutrition, thereby creating human capital and improving physical and cognitive performance. Food aid may also provide scarce working capital for productive investments, precisely because it displaces some contemporaneous food purchases, thereby relieving the recipient's budget constraint. No matter the channel, there is good reason to hypothesize that food aid can have dynamic income multiplier effects among recipients. In that case, induced increases to future income should stimulate future demand for food. The combination of short-term displacement of commercial food purchases and stimulus of long-term (demand for and thus) purchases of food prompted Barrett (1998) and Barrett et al. (1999) to hypothesize the existence of a J-curve effect of food aid on commercial food imports by recipients. The hypothesis holds that commercial purchases initially fall due to less than one-for-one additionality, but that they then recover and ultimately surpass the *ex ante* level due to dynamic income multiplier effects. If food aid also helps to shape consumer preferences for the imported foodstuff instead of indigenous foods, this could further reinforce the dynamic trade gains resulting from food aid.

27. Just as aggregation across time can prove misleading, so can aggregation across commodities. The demand for dietary variety has been well-documented (Berhman and Deolalikar 1989). When food aid is quite concentrated in just a few commodities, as is true in most food aid programs, the likelihood grows that the market for the donated commodity becomes sated – thereby displacing commercial sales of that commodity in that place at that time – but also that this stimulates additional demand in markets for different foods, especially luxuries such as processed foods, meats, fresh fruits and vegetables, and other higher-value products. The aggregate effects on food trade may therefore mask qualitatively different effects across commodities – and therefore producer groups – due to the demand for variety and its effects on expenditures out of marginal income received in the form of a particular commodity.

¹¹ There is also a likely increase in the total cost of delivered food due to the more complex distribution, but that issue is outside the scope of the present review.

28. The consequences of food aid for food trade depend not only on recipient behavior but also on donor and broader market behavior. In particular, it matters whether food aid is sourced from cash appropriations used to make *de novo* purchases on the open market, or from government-owned stocks of surplus commodities, and it matters how well integrated recipient and source markets are with other food markets worldwide. We close this section by considering these issues.

29. As Gilbert (1996) points out, food aid supply curves are unlike the supply curves economists derive from the theory of the firm, based on the quantity summation of marginal cost curves under perfect competition. Rather, the food aid supply curve is really a policy reaction function reflecting donors' preferences for (supplying) food aid and the opportunity cost of the food given. As a consequence, the market effects of food aid depend fundamentally on the nature of food aid procurement. Until the early 1970s, food aid was almost always procured from extant government food stocks created by domestic farm support programs. With the decline in farm surpluses in the European Union and the United States over the 1990s, impressionistic evidence suggests that a significantly increased share of food aid now arises from cash appropriations, although hard data on this question does not seem to exist. The shift may make a difference, however, so this question merits research.

30. Donors who are highly motivated by humanitarian concerns may not only be willing to spend more on food aid, they may appropriate cash for the purchase of food to distribute to intended beneficiaries. Open market procurement of food necessarily shifts out the aggregate demand curve for food on the source market(s), thereby driving up local prices and benefiting commercial suppliers on that market. This is the core logic behind local purchases and triangular transactions, the idea that food aid can benefit not only poor consumers in the location where it is to be distributed, it can also benefit poor producers elsewhere in the recipient country (in the case of local purchases) or in another, nearby low-income country (in the case of triangular transactions). The same logic also motivates many donor country commodity groups to lobby for food aid, which they perceive as generating domestic price support effects separate from any export promotion benefits that might result.

31. When food aid originates in domestic surplus stocks, food aid does not stimulate demand, rather it changes the nature and perhaps the volume of supply. Food aid supplied out of surplus stocks permits the donor to undertake price discrimination, charging one price (the world market price) to commercial buyers with a higher willingness to pay and another, lower price (often zero) to aid recipients with a lower willingness to pay (Srinivasan 1989).¹² Price discrimination always benefits producers since it permits them to capture a greater share of the economic surplus generated by exchange. Suppliers' capacity to price discriminate successfully depends fundamentally on market segmentation so that food aid recipients do not turn around and sell the aid on the world market to other buyers. Hence the UMR restriction on recipients under the FAC. In fact, for reasons already discussed, leakage almost inevitably occurs in the form of reduced commercial imports, which should reduce world market prices relative to what they would be if donors could enforce UMRs and thereby accomplish perfect price discrimination between commercial customers and food aid recipients.

32. As soon as one recognizes that food aid provided by net exporting countries enables *de facto* price discrimination, it becomes plain that the effects of food aid on world market prices depends on one's counterfactual: should one assume that the surplus stocks would otherwise be

¹² Put differently, given that food is being given away on highly (in the limit, fully) concessional terms, it is akin to dumping.

held off the market or that they would otherwise be indistinguishably commingled with the commercial aggregate supply? If one conjectures that stocks would otherwise be completely held off the market, then the leakage inherent to food aid distribution implies that food aid depresses market prices, thereby hurting commercial suppliers. On the other hand, if one believes stocks would be marketed commercially if they were not given away as food aid, then food aid increases world market prices by removing supplies from commercial distribution channels.

33. The extent of international food market integration is the final factor that determines how food aid affects commercial suppliers. If cash procurement of food stimulates commercial demand in the source market or if the limited additionality of food aid increases aggregate supply in recipient economies, are the resulting price effects transmitted to other source or destination markets internationally and, if so, to what extent and with what speed? How does food aid in the form of one commodity affect market equilibria in markets for other commodities, including for processed products derived from the same commodity (e.g., how does maize distribution affect the market for maize flour)? Economic theory clearly implies that in the absence of any associated changes in marketing costs, price changes in one spatial market for a donated commodity should be transmitted fully to other spatial markets according to the law of one price unless trade restrictions impede spatial arbitrage (Barrett 2001b, Fackler and Goodwin forthcoming). Similarly, economics' theory of the consumer plainly suggests that food aid in the form of one commodity will have general equilibrium effects on the price of others commodities in the same spatial market so long as the cross-price elasticities of supply by local producers and the cross-price elasticities of demand by local consumers do not all equal zero, a highly unlikely event. In sum, food aid shipments should have ripple effects that depend fundamentally on the degree to which markets are integrated across space, time and commodities.

34. As this section has made plain, economic theory generates a variety of hypotheses as to the effect of food aid on international food trade and the welfare of commercial suppliers in recipient, donor and third countries. Many of these posited influences have countervailing effects, rendering analytically ambiguous the net effect of food aid on commercial food trade and world food market prices. Some of these hypotheses have been tested empirically, a few of them rather extensively. The next section reviews this evidence and identifies the key holes in the empirical literature on the effects of food aid on commercial international food trade.

IV. Empirical Evidence on Food Aid and International Food Markets

35. The relevant empirical literature concerns not just the direct relationship between food aid and trade, but also several related literatures that touch on the questions posed in Section III. This section offers a compact, critical review of past studies. It necessarily blends evidence from both macro and micro scales of analysis. Perhaps the central conclusion of this section is that the extant empirical literature is woefully incomplete with regard to the central questions laid out in section III, having focused excessively on questions of static income effects related to the additionality of food aid and not nearly enough on the other core questions. Hopefully, the OECD's ensuing research project will address at least some of these holes in the literature and thereby make an important contribution.

36. The studies reviewed below employ a mix of empirical methods. Much of the literature, especially that prior to the 1980s, consisted of in depth case studies of particular countries and food aid programs. Maxwell and Singer (1979) and Shaw and Clay (1993) review this literature well, so I do not revisit those older case studies here. The strength of the case studies lies in their attention to details of food aid program design and implementation that affect the market

outcomes of food aid shipments. However, case study methods suffer well known problems of generalizability and of credible determination of causality as distinct from correlation.

37. A second, much smaller subliteration employs statistical methods other than regression analysis to try to establish the effects of food aid. These studies commonly combine descriptive statistics with simple, nonparametric tests based explicitly or implicitly on analysis of variance. Since food aid and international food markets are plainly both affected by domestic farm policies in leading economies, questions of endogeneity bedevil most studies that employ non-regression statistical approaches because food aid cannot be taken as an exogenous treatment that generates observed differences in outcomes. This method seems generally inadvisable.

38. A more convincing literature relies on parametric modeling following either the econometric or programming traditions. A burgeoning literature on international agricultural trade makes extensive use of multi-market or computable general equilibrium (CGE) modeling techniques based on nonlinear programming methods. Notable examples include Tyers and Anderson (1992), Hertel (1997) and Pinstrup-Andersen et al. (1997). There seems to have been scant direct use of such models to explore food aid questions, however.

39. Next to case studies, the most common empirical method in the literature has been regression analysis using single country time series or cross-sectional data from a set of countries. The earlier studies in this genre used single equation techniques that almost surely suffer from significant endogeneity problems inasmuch as aid flows interact with other key explanatory variables and the dependent variable (typically, commercial imports or domestic food production). Researchers then generally moved to estimation of systems of structural equations as a means to obviate this problem. The chief problems with the structural approach are that they typically demand more data than are available if precision and consistency are to be achieved in estimation and that they inherently miss the dynamic issues at play. These studies are ably reviewed by Nathan Associates (1990), so that material is not covered in depth here.

40. The most useful empirical studies of food aid rely on dynamic regression analysis methods that allow identification of both temporal causality among variables and cross-sectional variation and which permit estimation of the time path of food aid's effects on international trade and markets. Vector autoregression (VAR) methods are especially appropriate (used by, for example, Lavy 1990, Barrett et al. 1999, Donovan et al. 1999) because they permit unrestricted estimation of the dynamic relationship between food aid flows, trade flows, production volumes and food market prices. Absent a clear theory as to the appropriate identifying restrictions for such a system of simultaneous equations, the VAR approach has much to recommend it. Of particular value are the impulse response functions (IRFs) one can derive from VAR estimation permit one to trace out the time path of adjustments in the vector of dependent variables to a shock in any one of them.¹³ Time series methods of testing explicitly for structural breaks could also be used to explore an important but thus-far-untested hypothesis, that the effect of food aid on commercial trade and world market prices has shifted over time.¹⁴ The qualitative evidence and the changing foci and modalities of food aid might reasonably lead one to conjecture that food aid had, on balance, a negative effect on world food prices and commercial trade flows in the past, when it was dominated by program flows originating in donor country surplus stocks, but that a shift has occurred in the past decade or so such that food aid now boosts and stabilizes

¹³ See Hamilton (1994) or Enders (1995) for greater detail on VAR estimation methods and impulse response functions.

¹⁴ Leon and Soto (1995) provide a nice example applied to world commodity prices. Hamilton (1994) discusses the econometrics of structural breaks in detail.

prices by stabilizing market demand through more effective delivery and greater open market procurement. There is no research to date on this question and, partly as a consequence, one gets the impression that much current debate works from dated evidence.

41. One final, important methodological prologue concerns the general failure of empirical studies to distinguish between program, project and emergency food aid. Because program food aid dominated the landscape until the past decade and because scholarly interest in food aid fell off sharply by the early 1990s, most empirical studies have implicitly focused on program food aid. Yet it must be kept in mind that by its nature, program food aid did not target households whose poverty would lead them to have a high income elasticity of demand for food. Because program food aid flows to governments are largely monetized by recipient governments at port, they merely flow into regular commercial food distribution channels, limiting their additionality. Project and emergency food aid flows that are explicitly targeted at food insecure households should in theory enjoy higher rates of additionality, although at the macro level this does not seem to have been of PL 480 shipments, the only food aid program where one can readily compare program and emergency flows (Barrett 2001a). This is likely due to the fact that the United States Congress has imposed monetization requirements on Title II PL 480 shipments, and many recipient NGOs support or encourage monetization of a majority of the food aid they receive because it permits them to raise funds for non-food development and relief activities. Unfortunately, this recreates some of the problems of program food aid and undoes some of the benefits of emergency food aid. This said, it would be useful to study more specifically the effects of emergency and project food aid distribution (i.e., WFP and Title II PL 480 flows) as these now comprise the overwhelming majority of food aid flows globally.

42. With these methodological preliminaries out of the way, let us now turn to examining the empirical evidence on each of the key issues enumerated in section III.

(i) Evidence on additionality and targeting

43. The most extensively researched issue to date in the empirical literature concerns the additionality of food aid. As one would expect on the basis of Engel's Law, the empirical evidence suggests overwhelmingly that food aid partly substitutes for commercial food imports contemporaneously, thereby providing a net foreign exchange transfer, generally on the order of 40-70% of the value of the food aid delivered (Abbott and McCarthy 1982, von Braun and Huddleston 1988, Fitzpatrick and Storey 1989, Nathan Associates 1990, Saran and Konandreas 1991, Clay et al. 1996, Barrett et al. 1999). Put differently, food aid seems to be, on average, only 30-60 percent additional. So the macroeconomic marginal propensity to consume food out of food aid transfers is roughly in line with the microeconomic evidence on consumer demand for food (Strauss and Thomas 1995). One conclusion that comes through in the case study evidence (e.g., Isenman and Singer 1977, Stevens 1979, Farzin 1991, Shaw and Clay 1992) is that the additionality of food aid depends to a considerable degree on the design and implementation of the program, variables that are difficult to quantify and capture in more formal, quantitative analyses. One of the key features, according to Herrmann et al (1992) is the use to which recipient country governments put counterpart funds generated by monetization of the shipment, in particular, whether these are spent on subsidizing demand or supply. They specify and estimate a cereals import demand model for five countries (Peru, Botswana, Egypt, Sudan and Morocco) using 1971-87 data, and conclude that when counterpart funds are used to stimulate food production, commercial imports decrease and when they are used to subsidize demand (through income transfer to the poor), commercial imports increase.

44. As discussed in section III, the extent of food aid's additionality depends fundamentally on how well targeted it is, which is the likely mechanism through which food aid program design and implementation affects additionality. It is very difficult to target effectively, as an extensive microeconomic literature on transfers discusses.¹⁵ Even reasonably well-executed transfer programs incur significant errors of inclusion (of unintended beneficiaries) and errors of exclusion (of intended beneficiaries). Especially where means-based screening of prospective beneficiaries proves administratively infeasible – as is true in most low-income countries – then intra-community heterogeneity and factor market failures tend to generate significant errors of inclusion even in self-targeting program designs (Webb and Reardon 1992, Clay et al. 1999, Barrett and Clay 2001, Jayne et al. 2001, Barrett et al. forthcoming, Jayne et al. forthcoming). The result is displacement of market food purchases.

45. The macro level evidence generally corroborates the micro level evidence. Quite a few studies have found at best weak relationships between various indicators of nonconcessional food availability in recipient countries and the food aid volumes they receive (Ruttan 1993, Ruttan 1995, Ball and Johnson 1996, Clay et al. 1996, Gabbert and Weikard 2000, Barrett 2001a, Barrett and Heisey 2001). One reason is that food aid – especially program food aid – is multiply targeted, first to a recipient country with a particular bundle of commodities, and then to a subpopulation within the recipient country through a FAP vehicle (Barrett forthcoming). More importantly, however, food aid allocations have traditionally been made largely on the basis of political criteria, and there has been only modest movement toward targeting food aid to low-income, food-deficit countries over the past decade (Ball and Johnson 1996, Clay et al. 1996). Moreover, once in the recipient economy, food aid disproportionately facilitates explicit or implicit consumer food subsidies (Pinstrup-Andersen 1988, Hoffman et al. 1994), few of which are well-targeted.

46. Poor targeting, including that due to mistiming of deliveries, often reveals itself through price adjustments on local food markets. For example, large shipments of food aid to Russia in the 1990s seem to have caused prices to fall well below *ex ante* market prices (*The Economist*, 1998). Tschirley et al. (1996) and Donovan et al. (1999) each found that large shipments of yellow maize to Mozambique caused both white and yellow maize market prices to fall sharply. Tschirley et al. (1996) emphasize in particular that if food aid shipments are unstable and large relative to demand, market prices may become unstable since prices are then determined by the variable quantity of food aid in the market.

47. An oft-overlooked feature of targeting relates to timing. In theory, food aid could be used to stabilize prices and food availability if donors adjust food aid flows in response to (positive and negative) shocks to food output, world market prices, and foreign exchange availability in recipient countries. In this way, food aid could provide a countercyclical transfer so as to help reduce food insecurity. In fact, tends to flow procyclically, for multiple reasons.

48. First, much food aid – especially program food aid – suffers extraordinarily long lags between the time of commitment and delivery. Clay et al. (1996) report lags of up to two years in flows from the European Union. PL480 flows seem no better since the United States relies heavily on domestic procurement of food aid and its flagging restrictions on sea freight shipments commonly induce delays (as well as higher shipment costs). It is reasonable to believe that operational improvements and advances in early warning systems might improve the timeliness of food aid deliveries. Ultimately, however, these situations are subject to political determinants that can disrupt deliveries to even long-anticipated emergencies in places where food aid

¹⁵ Barrett (forthcoming) summarizes this literature as it applies to food assistance programs such as food aid.

distribution operations have become reasonably efficient through considerable practice, as the Ethiopia crisis of 2000 clearly showed.

49. Second, because donors budget food aid on a monetary basis, food aid flow volumes generally covary negatively with international market prices and donor country food inventories (von Braun and Huddleston 1988, Taylor and Byerlee 1991, Clay et al. 1996, Merbis and Nubé 2001).¹⁶ As a consequence, food aid volumes are far more volatile than are food production or trade volumes (Barrett forthcoming). Available food aid volumes tend to shrink precisely when importing countries most need concessional food flows — when food prices rise — causing both food import volumes and food import unit costs to increase. Program food aid disbursement patterns may thereby destabilize food availability and prices in recipient nations. As a consequence, bilateral food aid generally fails to accomplish the objective of stabilizing food availability, and thereby food markets, in recipient countries (Barrett 2001a), while multilateral food aid is too small in volume to have an appreciable stabilizing effect although it does have a statistically significant stabilizing effect on food availability in recipient countries (Barrett and Heisey 2001).

(ii) Evidence on the distribution of losses due to displaced sales

50. Surprisingly, the literature on additionality generally makes little or no effort to establish how any lost market sales are distributed across domestic and foreign suppliers, much less between foreign suppliers from the donor country and those from third countries. This is surprising because it is so central an issue in the international political economy of food aid, with food producer groups in this or that country invariably worrying that food aid from some other nation is taking away their export markets today, in the future or both. Similarly, development practitioners and scholars since at least Schultz (1960) have long worried that food aid takes markets away from smallholder producers in poor recipient economies. Indeed, this latter topic has been the focus of perhaps the largest vein within the literature on food aid. Maxwell and Singer (1979) summarize a wealth of evidence through the mid-to-late 1970s on this latter point. Little has changed since then (Barrett forthcoming). The empirical evidence is strikingly inconclusive. There are plenty of studies finding positive effects of food aid on recipient country food production, plenty finding negative effects, and many with mixed results. This would seem to reflect, following Mohapatra et al. (1999) countervailing factor and product market effects, the net result of which depends on a host of country and program specific characteristics. There certainly does not seem to be a mass of empirical evidence in support of the hypothesis that food aid significantly displaces domestically produced food on recipient country markets. Rather, it seems that on balance, (positive) factor and (negative) product market effects seem to net out. As a result, most of any displacement losses resulting from food aid shipments seem to be distributed among foreign commercial suppliers.

51. Barrett et al. (1999) seems to be the only study that looks at how food aid affects recipient country imports from the donor country versus from other countries. Using VAR estimation methods to study the dynamic effect of PL 480 shipments, that study estimates that food aid has nearly identical negative effects on contemporaneous commercial imports from the United States and from the rest of the world. For each kilogram per capita of food aid received, each foreign supplier group loses an estimated 0.3 kilograms of commercial sales. So the very

¹⁶ Because the EU food aid budget is fixed in volume terms rather than expenditure terms, there is no discernible correlation between world food prices and EU food aid flow volumes (Clay et al. 1996).

limited available empirical evidence suggests that there are indeed contemporaneous displacement effects and that these are distributed roughly equally between donor and other foreign commercial suppliers, with domestic producers not suffering any systematic loss of market sales. Given the importance of these distributional questions, however, this is plainly a topic in need of further research.

(iii) Evidence on dynamic income effects

52. Claims regarding the dynamic income effects abound in popular discussions of food aid, yet there has been scant research on the topic. For example, Barrett (1998, p.569) notes that

“farm lobby advocates commonly argue that food aid promotes commercial trade, noting that 43 of the top 50 importers of U.S. farm products once received PL 480 food aid and that the major U.S. food aid recipients of the 1950s and 1960s (e.g., India, Israel, Italy, Korea, Spain) are now major commercial customers. These are facile claims. For example, because roughly 90% (153) of the world’s economies have at one time received food aid, it is little surprise that about the same proportion of US farmers’ export customers once received food aid. And the longest standing recipients of U.S. food aid (Peru, Haiti, India, Indonesia, Jordan, and the Philippines) are relatively small markets for U.S. food exporters.”

The common claim by agricultural producer groups advocating for food aid is thus that while in the short-run food aid may significantly substitute for commercial food imports, it nonetheless stimulates long-run demand for commercial food imports, especially from the donor. However, the dynamics of the relationship between food aid and commercial trade flows have received almost no scholarly attention, so it is impossible to either accept or reject the popular wisdom conclusively. The only paper that explores this question, Barrett et al. (1999), finds empirical support for this hypothesis of a J-curve relation between food aid and commercial food trade. Perhaps of greatest interest, Barrett et al. (1999) distinguish between recipient country imports from the donor (the United States) and from other exporters. They find that U.S. program food aid primarily stimulates medium-to-long term commercial imports from non.-U.S. producers, largely because of considerable persistence in food aid shipments and recipient demand for variety (Barrett 1998). As a consequence, estimated internal rates of return on U.S. program food aid (PL 480 Titles I and III) shipments were found to be negative at all meaningful horizons. This limited evidence suggests that food aid makes for a rather ineffective trade promotion instrument.

53. There is some micro-level evidence that food aid can generate the sorts of dynamic income gains that would underpin results such as those reported in the preceding paragraph. In a study based on whole farm programming methods, Bezuneh et al. (1988) found that food aid in rural Kenya increased food production by program participants by relieving working capital constraints that encouraged on-farm investment. Mellor (1978), Dearden and Ackroyd (1989), and Dorosh et al. (1995) obtain similar results using different methods, while Barrett et al. (2001) come up with very similar findings using data from the same subpopulation a decade later. Given the frequency with which working capital constraints bind at the household level and balance of payments constraints bind at the macroeconomic level in low-income countries, there seems good reason to believe the limited empirical evidence suggesting that food aid’s contemporaneous displacement of food purchases might foster productive investments that generate significant dynamic income gains from food aid.

(iv) Evidence on differential inter-commodity effects

54. There seems to be little direct empirical evidence on either the question of whether food aid either induces shifts in consumer tastes, thereby inducing substitution of imported foods for indigenous ones over time, or the question of whether taste for variety results in differential inter-commodity effects of food aid shipments. Delgado and Miller (1995) argue that food aid has contributed to shifting consumer demand from rice to hard wheat in west Africa. Merbis and Nubé (2001) likewise argue that food aid can be an effective marketing tool, much as corporate marketers in other sectors will commonly distribute free samples so as to build up brand identity. These claims are not, however, based on particularly rigorous empirical methods, so the extent to which such effects truly exist remains quite unclear.

55. Barrett et al. (1999) invoke the argument about consumer taste for variety to try to explain their finding that PL480 food aid shipments stimulate lagged recipient country demand for food exports from countries other than the United States. But they offer no direct evidence in support of this claim. Donovan et al. (1999) likewise indirectly invoke the issue in discussing the effects of yellow maize food aid distribution on white maize markets in Mozambique. Barrett (1997) similarly discusses the effects of releases from Madagascar's rice buffer stock facility – which was partly supplied through food aid shipments and which functions like program food aid in releasing surplus stocks onto local markets – on the price distributions of several food commodities. There are certainly plenty of anecdotes about relating how food aid beneficiaries receiving a sack of wheat or corn-soy-blend will happily trade much of it for meat and alcohol. But there is scant rigorous empirical evidence on the cross-commodity effects of food aid and any associated international differences.¹⁷

(v) Donor behavior and the effects of food aid sourcing

53. Gilbert derived a formal model of demand for food aid by the United States government, which he used to specify an econometric model for estimating the effects of expected reductions in publicly held cereal stocks on food aid flows. In econometric studies, Shapouri and Missaen (1990) found that wheat prices and government held commodity stocks were the primary determinants of aggregate food aid flows from Canada, the EC and the United States. Taylor and Byerlee (1991) and Ruttan (1993) obtained qualitatively similar results in related econometric studies. Saran and Konandreas (1991) similarly emphasize the opportunity cost of food aid as dependent on world market prices and extant surplus stocks. Based on such research, higher world food prices and lower government surplus stocks post-URAA were expected to lead to decreased food aid flows. There has indeed been some reduction in food aid flows (Figure 1), yet the recovery in food aid flows over the past three years also underscores changes in the nature of procurement.

54. There do not appear to be any studies to date on the potentially differential trade effects of different food aid procurement modalities. Shaw and Clay (1993) cite a USDA study of the effect of United States food aid shipments of wheat on prices prevailing in the American market, 1986-89, and, derivatively, on the producer surplus of United States wheat growers. But this

¹⁷ One might imagine that coarse grains shipments could, for example, depress market demand for coarse grains in the recipient economy but stimulate demand for animal products, sugar and vegetable oils.

study, a copy of which could not be tracked down for this review, does not appear to have controlled for different procurement methods and much has changed in the intervening 15 years.

55. One major obstacle to such research is data availability. Only 11 percent of global food aid shipments were procured via local purchases or triangular transactions. Figures are not available on the share of the remainder that was purchased by donors rather than donated from their existing stocks (or from purchases to which they were otherwise committed, for example due to domestic farm support programs). Without developing such data series, it will be difficult to establish either the extent to which food aid actually expands market demand for food or the markets in which this happens. The issue is nonetheless of considerable current importance. For example, in the United States, the Bush Administration is presently pushing to transition food aid away from dependence on surplus stocks under section 416(b) and toward cash appropriations under Title II PL 480. One can well imagine that such changes, if implemented at significant scale, could have a measurable effect on United States and presumably international food markets.

(vi) Market integration and price transmission

56. This brings us to the final set of issues that condition the effects food aid shipments have on international food markets: the degree of spatial market integration and the speed and extent of intermarket price transmission. If markets are reasonably well integrated, then price shocks induced by procurement in source markets or limited additionality in destination markets should transmit well beyond those local markets. In this way, food aid may affect international markets. Surprisingly, there seems to have been no careful empirical research on this question at the international scale. Granted, food aid flows represent a small – and steadily falling – share of global food trade (Figure 3), but there may well exist nontrivial marginal effects due to significant local food aid shocks (such as the massive sudden flows to Russia in 1999).

57. Most recent studies suggest that world agricultural markets are reasonably well integrated and that price shocks in one major market transmit relatively completely and quickly to spatially distant markets (Leon and Soto 1995, Miljkovic 1999, Barrett 2001b, Fackler and Goodwin forthcoming). Increasingly open markets in the wake of the URAA and prospective further liberalization through the WTO and regional agreements should reinforce this pattern. Nonetheless, low-income country markets tend not to be as well integrated with global markets (Barrett 1997), so price transmission of shocks due to deliveries or procurement in low-income countries may be less than price transmission due to procurement in donor country economies. Understanding such patterns is essential to mapping out the spillover effects of food aid on commercial producers around the world. There have been considerable recent advances in spatial price analysis methods which could facilitate such work (Barrett and Li forthcoming, Fackler and Goodwin forthcoming).

58. There has been at least one careful study of price transmission questions at the local level. Applying VAR methods to estimate impulse response functions out of weekly time series on food aid deliveries and local market prices, Donovan et al. (1999) found that deliveries of yellow maize food aid to Mozambique depress yellow maize prices in the Maputo market, with the effects dampening out after eight to ten weeks. Qualitatively similar, but more muted effects were transmitted to the white maize market, corroborating the inter-commodity spillover hypothesis and that at least urban port markets such as Maputo seem to be able to absorb food aid shipments without incurring large, long-term adverse effects.

V. Summary and Future Research Directions

59. If food aid could be perfectly additional, there would be no trade distortions. Economic theory offers the clear prediction that income transfers in the form of food will not prove wholly additional in the short-term because food is a normal good characterized by relatively low income elasticity of demand among all but the poorest subpopulations in the world. The salient question then becomes how reduced contemporaneous commercial sales of food are distributed across alternate suppliers (domestic producers in recipient economies, exporters in donor countries, and exporters in third countries, including other developing countries). The empirical evidence suggests that the bulk of contemporaneous displacement of commercial food sales is suffered by exporters to the recipient country market, both exporters from the donor country and from third countries.

60. However, this question of contemporaneous additionality is but one of a variety of key questions one must address to arrive at an accurate assessment of the impact food aid has on international commercial food trade. The limited evidence available on other key points suggests, for example, that food aid provides a longer-term stimulus to food import demand in recipient economies, especially imports from countries other than the donor. These sorts of dynamic and cross-sectional spillover effects have not been widely researched, however, so no firm conclusions can yet be reached. Nor has there been significant empirical research to date on questions of induced change in consumer tastes, the differential inter-commodity effects that might arise due to consumer demand for dietary variety, or the effects of alternative food aid procurement methods on source market conditions. In spite of more than forty years' research on food aid and longstanding concerns about the relationship between food aid and commercial trade, we remain woefully underinformed about the most basic mechanisms that underpin that relationship.

61. In reflecting on that relationship, and on the data and methods through which analysts might shed light on it, it is important to bear in mind that food aid has changed dramatically over the years. Unlike a quarter century ago, food aid today is primarily distributed by multilateral agencies and PVOs, for humanitarian purposes for which it is better integrated with famine early warning systems, and it relies more heavily on cash appropriations than on surplus disposal and makes more extensive use of local purchases and triangular transactions. Moreover, food aid has shrunk markedly in relation to commercial trade flows, limiting its capacity to affect global markets appreciably. Whatever spillover effects exist by which food aid distorts trade patterns or international food market prices, the effects are likely quite modest today. Moreover, there's an inherent tradeoff between increasingly restrictively targeted food aid that will increase errors of exclusion among intended beneficiaries, on the one hand, and increased distortion of commercial food trade patterns, on the other.

VI. References

Abbott, P.C. (1979), "Modelling International Grain Trade With Government Controlled Markets," *American Journal of Agricultural Economics* 61, 1: 22-31.

Amha, W., J. Stepanek, T.S. Jayne and A. Negassa (1997), "Meeting Food Aid and Price Stabilization Objectives Through Local Grain Purchase: A Review of the 1996 Experience," Ethiopia Ministry of Economic Development and Cooperation Grain Market Research Project working paper no. 7.

Ball, R. and C. Johnson (1996), "Political, Economic, and Humanitarian Motivations for PL 480 Food Aid: Evidence from Africa," *Economic Development and Cultural Change* 44, 3: 515-537.

Ballenger, N. and C. Mabbs-Zeno (1992), "Treating Food Security And Food Aid Issues at the GATT," *Food Policy* 264-276.

Barrett, C.B. (forthcoming) "Food Security and Food Assistance Programs," in B.L. Gardner and G.C. Rausser, eds., *Handbook of Agricultural Economics* (Amsterdam: Elsevier Science).

Barrett, C.B. (2001a), "Does Food Aid Stabilize Food Availability?" *Economic Development and Cultural Change*, 49, 2: 335-349.

Barrett, C.B. (2001b) "Measuring Integration and Efficiency in International Agricultural Markets." *Review of Agricultural Economics* 23,1:19-32.

Barrett, C.B. (1998), "Food Aid: Is It Development Assistance, Trade Promotion, Both or Neither?" *American Journal of Agricultural Economics*, 80, 3: 566-571.

Barrett, C.B. (1997) "Liberalization and Food Price Distributions: ARCH-M Evidence From Madagascar," *Food Policy* 22, 2: 155-173.

Barrett, C.B., M. Bezuneh, and A. Aboud (2001), "Income Diversification, Poverty Traps and Policy Shocks in Côte d'Ivoire and Kenya," *Food Policy*, 26, 4: 367-384.

Barrett, C.B. and M.R. Carter (2001), "Can't Get Ahead For Falling Behind: New Directions for Development Policy To Escape Poverty and Relief Traps," *Choices*, 16, 4: in press.

Barrett, C.B. and D.C. Clay (2002), "Self-Targeting Accuracy in the Presence of Imperfect Factor Markets: Evidence from Food-for-Work in Ethiopia," Cornell University working paper.

Barrett, C.B. and K.C. Heisey (2001), "How Effectively Does Multilateral Food Aid Respond To Fluctuating Needs?" Cornell University working paper.

Barrett, C.B., S. Holden, and D.C. Clay (forthcoming), "Can Food-For-Work Programs Reduce Vulnerability?" in S. Dercon, editor, *Insurance Against Poverty* (Helsinki: United Nations University/World Institute for Development Economics Research).

Barrett, C.B. and J.R. Li (forthcoming), "Distinguishing Between Equilibrium and Integration in Spatial Price Analysis," *American Journal of Agricultural Economics* 84, 2: in press.

Barrett, C.B., S. Mohapatra, and D.L. Snyder (1999), "The Dynamic Effects of U.S. Food Aid," *Economic Inquiry*, 37,4: 647-656.

Behrman, J. and A.B. Deolalikar (1989) "Is Variety the Spice of Life? Implications for Calorie Intake," *Review of Economics and Statistics* 71 (3): 666-672.

Benson, C. and E.J. Clay (1998), "Additionality or Diversion? Food Aid to Eastern Europe and the Former Soviet Republics and the Implications for Developing Countries," *World Development* 26, 1: 31-44.

- Bezuneh, M., B.J. Deaton and G.W. Norton (1988), "Food Aid Impacts in Rural Kenya," *American Journal of Agricultural Economics* 70,1: 181-191.
- Charlton, M. W. (1992), *The Making of Canadian Food Aid Policy*. Montreal: McGill-Queen's University Press.
- Christensen, C. (2000), "The new policy environment for food aid: The challenge of sub-Saharan Africa," *Food Policy* 25, 2: 255-268.
- Clay, D.C., D. Molla and D. Habtewold (1999), "Food Aid Targeting in Ethiopia: A Study of Who Needs It and Who Gets It," *Food Policy* 24,3: 391-409.
- Clay, E.J., S. Dhiri and C. Benson (1996), *Joint Evaluation of European Union Programme Food Aid - Synthesis Report*. London: Overseas Development Institute.
- Clay, E. and O. Stokke, eds. (2000), *Food Aid and Human Security*. London: Frank Cass.
- Colding, B. and P. Pinstrup-Andersen (1999), "Denmark's contribution to the World Food Programme: A success story," *Food Policy* 24, 1: 93-108.
- Dearden, P.J. and P.J. Ackroyd (1989), "Reassessing the Role of Food Aid," *Food Policy* 14, 3: 218-231.
- Donovan, C., R. Myers, D. Tschirley and M. Weber (1999), "The Effects of Food Aid on Maize Prices in Mozambique," in G.H. Peters and J. von Braun, eds., *Food Security, Diversification and Resource Management: Refocusing the Role of Agriculture?* Proceedings of the Twenty-Third International Conference of Agricultural Economists. Brookfield, VT: Ashgate.
- Dorosh, P.A., C. Ninno and D.E. Sahn (1995), "Poverty Alleviation in Mozambique: A Multi-market Analysis of the Role of Food Aid," *Agricultural Economics* 13, 1: 89-99.
- Enders, W. (1995), *Applied Econometric Time Series*. New York: John Wiley & Sons.
- Fackler, P.L. and B.K. Goodwin (forthcoming), "Spatial Price Analysis" in B.L. Gardner and G.C. Rausser, eds., *Handbook of Agricultural Economics*. Amsterdam: Elsevier Science.
- Fisher, F.M. (1963), "A Theoretical Analysis of the Impact of Food Surplus Disposal on Agricultural Production in Recipient Countries," *Journal of Farm Economics* 45, 4: 863-875.
- Fitzpatrick, J. and Storey, A. (1989), Food aid and agricultural disincentives, *Food Policy* 14 (3): 241-247.
- Food and Agriculture Organization of the United Nations (1995), *Impact of the Uruguay Round on Agriculture*. Rome: FAO.
- Gabbert, S. and H.-P. Weikard (2000), "The Poor Performance of the Rich – Bilateral Versus Multilateral Food Aid Allocation," *Quarterly Journal of International Agriculture* 39, 2: 199-218.
- Gilbert, C.L. (1996), "A Model of US Cereals Food Aid Flows With An Application To Trade Liberalisation," *Journal of Agricultural Economics* 47, 2: 143-157.

- Hamilton, James S. (1994), *Time Series Analysis*. Princeton: Princeton University Press.
- Hanrahan, Charles E. (2002), "Agricultural Export and Food Aid Programs," Congressional Research Service Issue Brief IB98006.
- Herrmann, R., C. Prinz, and P. Schenck (1992), "The Relationship between Food Aid and Food Trade: Theoretical Analysis and Quantitative Results," in M. Bellamy and Greenshields, B., eds., *Issues in Agricultural Development: Sustainability and Cooperation*, International Association of Agricultural Economists Occasional Paper No. 6.
- Hertel, Thomas W., ed. (1997), *Global trade analysis : modeling and applications* Cambridge: Cambridge University Press.
- Hoffman, W.L., B.L. Gardner, R.E. Just and B.M. Hueth (1994), "The Impact of Food Aid on Food Subsidies in Recipient Countries," *American Journal of Agricultural Economics* 76, 3: 733-743.
- Hopkins, R.F. (1984), "The evolution of food aid: Towards a development first regime," *Food Policy* 345-362.
- International Grains Council (1999), *Food Aid Convention 1999*. London: International Grains Council.
- Jayne, T.S., J. Strauss, T. Yamano and D. Molla (forthcoming), "Targeting of food aid in rural Ethiopia: Chronic needs or inertia?" *Journal of Development Economics*: in press.
- Jayne, T.S., J. Strauss, T. Yamano and D. Molla (2001), "Giving to the Poor? Targeting of Food Aid in Rural Ethiopia," *World Development* 29, 5: 887-910.
- Konandreas, P., R. Sharma and J. Greenfield (2000), "The Uruguay Round, the Marrakesh Decision and the Role of Food Aid," in E. Clay and O. Stokke, eds., *Food Aid and Human Security*. London: Frank Cass.
- Lavy, V. (1990), "Does Food Aid Depress Food Production? The Disincentive Dilemma in the African Context," World Bank working paper.
- Leon, J. and R. Soto (1995), "Structural breaks and long run trends in commodity prices," World Bank Policy Research Working Paper no. 1406.
- Maizels, A. and M. Nissanke (1984), "Motivations for Aid to Developing Countries," *World Development* 12, 6: 879-900.
- Maxwell, S. and H.W. Singer (1979), "Food Aid to Developing Countries: A Survey," *World Development* 7, 3: 225-47.
- Merbis, M. and M. Nubé (2001), "Food Aid: Selected problems of implementation and international coordination," Centre for World Food Studies, Vrije Universiteit Amsterdam, unpublished report to the Netherlands Ministry of Foreign Affairs.
- Miljkovic, D. (1999), "The Law of One Price in International Trade: A Critical Review," *Review of Agricultural Economics* 21, 1: 126-139.

- Mohapatra, S., C.B. Barrett, D.L. Snyder and B. Biswas (1999), "Does Food Aid Really Discourage Food Production?" *Indian Journal of Agricultural Economics* 54, 2: 212-219.
- Nathan Associates, Inc. (1990a), "Food Aid Impacts On Commercial trade: A Review of the Quantitative Evidence." Consulting report to Bureau for Food for Peace, United States Agency for International Development.
- Pinstrup-Andersen, P., ed. (1988), *Food Subsidies in Developing Countries* Baltimore: Johns Hopkins University Press.
- Pinstrup-Andersen, P., R. Pandya-Lorch and M. Rosegrant (1997), *The World Food Situation: Recent Development, Emerging Issues and Long-Term Prospects*. 2020 Vision Food Policy Report. Washington: International Food Policy Research Institute.
- Ruttan, V.W. (1993), *Why Food Aid?* Baltimore: Johns Hopkins University Press.
- Ruttan, V.W. (1995), *United States Development Assistance Policy: The Domestic Politics of Foreign Economic Assistance*. Baltimore: Johns Hopkins University Press.
- Saran, R. and Konandreas, P. (1991), "An Additional Resource? "A Global Perspective on Food Aid Flows in Relation to Development Assistance", in E.J. Clay and O. Stokke, eds., *Food Aid Reconsidered: assessing the impact on third world countries*. London: Frank Cass.
- Schultz, T.W. (1960), "Value of U.S. Farm Surpluses to Underdeveloped Countries," *Journal of Farm Economics* 42, 5: 1019-1030.
- Shapouri, S. and M. Missiaen (1990), *Food Aid: Motivation and Allocation Criteria*. United States Department of Agriculture Economic Research Service Foreign Agricultural Economic Report no. 240.
- Shaw, J. and E. Clay, eds. (1993), *World Food Aid: Experiences of Recipients and Donors*. Portsmouth, NH: Heinemann.
- Shaw, D.J. and H.W. Singer (1996), "A Future Food Aid Regime: Implications of the Final Act of the Uruguay Round," *World Development* 21, 4/5: 447-460.
- Srinivasan, T.N. (1989), "Food Aid: A Cause of Development Failure or an Instrument for Success?" *World Bank Economic Review* 3, 1: 39-65.
- Strauss, J. and D. Thomas (1995), "Human resources: Empirical Modeling of Household and Family Decisions," J. Behrman and T.N. Srinivasan, eds., *Handbook of Development Economics, volume 3A*. Amsterdam: Elsevier Press.
- Suarez, Nydia R. (1994), *U.S. Agricultural Exports Under Public Law 480*. United States Department of Agriculture Economic Research Service Statistical Bulletin no. 876.
- Taylor, D. and D. Byerlee (1991), "Food aid and food security: A cautionary note," *Canadian Journal of Agricultural Economics* 39, 1: 163-175.
- The Economist* (1998), "But Will it Help?", 349 (8094): 54.

Tschirley, D., Donovan, C., and Weber, M.T. (1996), Food Aid and Food Markets: Lessons from Mozambique, *Food Policy*, 21 (1): 189-209.

Tyers, R. and K. Anderson (1992), *Disarray in World Food Markets: A Quantitative Assessment*. Cambridge: Cambridge University Press.

von Braun, J. and B. Huddlestone (1988), "Implications of Food Aid for Price Policy in Recipient Countries," in: J.W. Mellor and R. Ahmed, eds., *Agricultural Price Policy for Developing Countries*. Baltimore: Johns Hopkins University Press.

Webb, P. and T. Reardon (1992), "Drought Impact and Household Response in East and West Africa," *Quarterly Journal of International Agriculture* 3, 2: 230-246.

World Food Programme (2001), *2000 Food Aid Flows*. Rome: WFP.