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Does Food Aid Harm the Poor? Household Evidence from Ethiopia

James Levinsohn and Margaret McMillan

In developing countries, food aid undermines local agriculture and creates dependence on imports. Many of the U.S.'s biggest markets—from Egypt to Colombia and Nigeria—once received large amounts of food aid. The arrival of U.S. surpluses effectively drove down local prices, undermined investment in farming and created this dependence on imports.
—Kevin Watkins, head of research, Oxfam (*The Independent,* October 18, 2003)

Food aid is a unique resource for addressing hunger and nutrition problems, addressing emergency food needs, supporting development programs, and directly feeding vulnerable groups. The United States is continuing its efforts to better target and increase the effectiveness of its food aid programs, while continuing their fundamental humanitarian nature.
—Ann M. Veneman, U.S. secretary of agriculture (*Economic Perspectives,* March 2002)

13.1 Introduction

Food aid is supposed to provide relief for the poor. Yet, by increasing the supply of food, food aid may actually reduce prices and farmers' incomes

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and ultimately discourage domestic production.[1] In developing countries, since the poor tend to be farmers and concentrated in rural areas, most people assume that the negative impact of food aid will be felt disproportionately by the poor. However, most food aid is a by-product of policies designed to aid farmers in *rich* countries, by disposing of surplus agricultural commodities. Thus, far from being created to help the poor, these policies are actually part of the overall agricultural policies of the rich countries. Such policies have been severely criticized during the most recent round of World Trade Organization (WTO) negotiations, and many researchers claim that food aid policies are responsible for keeping the poor, poor.

However, as Panagariya (2002) notes, the claim that these interventions in agriculture in the Organization for Economic Cooperation and Development (OECD) countries are hurting poor countries is not grounded in facts. Forty-eight of the world's sixty-three poorest countries were actually net food importers during the period 1995–97 (Valdes and McCalla 1999); thus, the removal of wealthy countries' subsidies on food products would lead to welfare losses for most of the world's poorest countries. This still leaves unanswered the question of what happens to the poorest members of the poor countries. Within any country, households that are net buyers of cereals would be hurt by a price increase, while households that are net sellers of cereals would see their welfare increase with cereal prices. Thus, the effect of a change in price on the poor depends on whether poor households are net buyers or net sellers of cereals. Therefore, one way to study the impact of these policies on the poor is to use the household as the unit of analysis.

Broadly speaking, the existing research on food aid can be divided into two areas—research on the disincentive effects of food aid and research on the efficacy with which food aid has been targeted. The work on the disincentive effects of food aid typically uses aggregate data to estimate country-level supply-and-demand equations. These estimates are then used to derive multipliers for determining the cumulative impact of food aid on domestic production and trade via the impact of food aid on the domestic price (see, for example, Bezuneh, Deaton, and Zuhair 2003).[2] Less work

1. Although food aid can take several different forms, some part of all types of food aid (including emergency relief) is sold on local markets and therefore either competes against domestic production or reduces the demand for commercial imports (Abbott and Young 2003). The idea that food aid could harm the poor was raised as a theoretical possibility by Nobel laureate Theodore Schultz (1960). In the United States, the potential disincentive effects of food aid were officially recognized by the Bellmon Amendment to Public Law 480[3], which sets out the following criteria for approving a food aid program: "1. The distribution of commodities in the recipient country will not result in a substantial disincentive or interference with domestic production or marketing in that country; and 2. Adequate storage facilities are available in the recipient country at the time of exportation of the commodity to prevent the spoilage or waste of the commodity" (Amendment to Section 401(b) of U.S. Public Law 480, 1977).

2. A body of work similar to this, although using less sophisticated econometric techniques, is reviewed by Maxwell and Singer (1970), who conclude that price disincentives can be avoided by an appropriate mix of policy.

has been done on the issue of targeting, at least in part because household data on the receipt of food transfers are usually unavailable (Jayne et al. 2002). The work that has been done typically uses household data and asks who is getting food aid and why. Our work is most closely related to recent work by Jayne et al. (2002), who study the targeting of food aid in rural Ethiopia. These authors use nationally representative rural household data from Ethiopia collected in 1996 to study the extent to which food aid is targeted to poor households and communities. They find that food aid does not tend to go to the poorest households and that there tends to be inertia in the distribution of food aid.

We ask a slightly different question: does food aid have the potential to help the poor in Ethiopia? In other words, who are the poor, and are they selling the items distributed by food aid programs? In theory, food aid could still hurt the poor if it lowered prices for poor net sellers of food *and* markets were sufficiently segmented that it didn't lower prices for poor net buyers of food. This theoretical possibility seems practically implausible for at least two reasons. First, according to Harrison (2002), there is a high degree of serial and spatial correlation between producer and consumer prices of grain.[3] And second, although Jayne et al. (2002) and Dercon and Krishnan (2003) find evidence of imperfect targeting, they do find that poorer households are significantly more likely to receive food aid. They also find that women, children, and the elderly are more likely to receive food aid.

In addition, we use more recent data (1999–2000) and a sample that includes not just rural households but also urban households. Including urban households is particularly important for our study because one of the criticisms of food aid is that it is used to feed the relatively better-off urban residents at the expense of poor rural farmers. Finally, we obtain empirical estimates of the likely impact of food aid on cereals prices using a standard supply and demand framework.

We choose to focus on Ethiopia for several reasons. Ethiopia receives more food aid than almost any other country in the world. Food aid reached 15 percent of annual cereal production in 2003 and typically represents between 5 and 15 percent of total annual cereal production (Jayne et al. 2002). At the same time, it is widely recognized that raising the productivity and profitability of smallholder agriculture is essential for poverty reduction in Ethiopia. In 1992, the Ethiopian government launched its poverty reduction strategy of Agricultural Development-Led Industrial-

3. One drawback of the analyses by Harrison (2002) and others is that they are based on prices between major wholesale centers. According to a personal communication from Eleni Gabre-Madhin, an economist and specialist on Ethiopia then based at the International Food Policy Research Institute, there is some evidence that markets in remote areas are not as well integrated. In future work, we plan to test this hypothesis using HICES data on unit values appropriately adjusted for quality.

ization (ADLI). The centerpiece of this strategy has been a massive extension program aimed at diffusing agricultural technology, the Participatory Demonstration and Training Extension System, dubbed PADETES. Recent work by the Ethiopian Economic Association (EEA; 2000, 2001) suggests that the results of ADLI have been somewhat disappointing. For most crops, average yields have remained stagnant, in spite of increased imports of agricultural inputs. Average farm size has declined and prices have fallen, leaving many farmers worse off than they were when ADLI began (Hamory and McMillan 2003). Although it is unlikely that food aid alone is responsible for the failure of PADETES, it is conceivable that food aid has contributed to the decline in prices.

Interestingly, in the June 2004 meetings of the EEA, in a presentation titled "The Impact of Globalization: Its Promises and Perils to the Ethiopian Economy," author Amdetsion GebreMichael claimed that

> One major problem facing farmers has been the absence of appropriate policy instruments to stabilize farm gate price and to safeguard the income of small farmers. In the case of cereal prices, the absence of such a policy combined with uncoordinated food aid flows, has led to depressed cereal farm gate prices—often to levels below costs of production.

GebreMichael goes on to argue that the downward pressure on cereal prices owing in part to the uncoordinated delivery of food aid has undoubtedly reduced farmers' incentives to enhance productivity and increase output. The author provides no evidence for this statement but does cite a report by a consultant to the World Bank that makes the same claim (Harrison 2002).

We take the household as our basic unit of analysis, and we ask whether households are net buyers or sellers of the basic foodstuffs typically distributed in the form of food aid. The first-order approximation of the welfare effect of food aid is net production of the commodity multiplied by the change in the price of the commodity caused by food aid (see Deaton 1989 and 1997 for a more detailed discussion). Thus, if a household buys more wheat than it sells, we call that household a net buyer of wheat. Since food aid is expected to depress food prices, food aid will benefit net food buyers and harm net food sellers. To determine the poverty impact of food aid, we then classify households according to expenditure per capita on an adult equivalency basis and ask whether the households classified as poor are net buyers or net sellers of food.[4]

Finally, we obtain some rough estimates of the magnitude of the price

4. This analysis ignores the cross-price effects of a reduction in the price of wheat. A reduction in the price of wheat could depress the prices of other crops for which the poor are net sellers, such as teff or maize. However, an analysis not included in this version of the paper suggests that the poor are net sellers of all crops (teff, maize, sorghum, and barley) that are close substitutes for wheat.

change caused by food aid and hence the magnitude of the first-order welfare effects of an increase in the price of food. To do this, we use supply and demand elasticities for cereals, combined with information on total cereal production and cereal food aid, to identify the equilibrium price and quantity of cereals in the absence of food aid. Using the equilibrium price and quantity in the absence of food aid and the observed prices and quantities, we obtain an estimate of the aggregate welfare effects of the price change associated with eliminating food aid.[5] In future work we hope to refine this analysis by using the household data to compute regional elasticity estimates and by using regional data on food aid and food production to compute welfare effects by region.

Our household data come from two surveys conducted by the Central Statistical Authority (CSA) of the Government of Ethiopia. The Household Consumption and Expenditure Survey 1999–2000 is a nationally representative survey that covers 17,332 households. The Welfare Monitoring Survey is also nationally representative and covers 25,917 households. Our food aid data come from Ethiopia's Disaster Prevention and Preparedness Committee and the WFP. Our data on national cereal production come from the CSA.

Our results indicate that (a) net buyers of wheat are poorer than net sellers of wheat, (b) there are more net buyers of wheat than net sellers of wheat at all levels of income, (c) the proportion of net sellers is increasing in living standards, and (d) net benefit ratios are higher for poorer households, indicating that poorer households benefit proportionately more from a drop in the price of wheat. In light of this evidence, it appears that households at all levels of income benefit from food aid and that—somewhat surprisingly—the benefits go disproportionately to the poorest households. Several caveats must be kept in mind, however. First, even the nonparametric regressions are averages by income category and so could mask underlying trends. The extent to which these averages reflect the true effects of price changes on poverty depend on whether these averages truly represent the typical household, or whether there is a significant amount of variation *among* poor households even at the poorest income levels. Second, it is important to note that we do not attempt to quantify the possible dynamic effect of higher food prices. It is possible that higher food prices, by increasing the incentives to invest in agriculture, could eventually lead to lower food prices.

5. The Ethiopian government has no official restrictions on commercial imports of wheat or other grains. However, Ethiopia imports virtually no grains on a commercial basis. In 1999, commercial imports of wheat amounted to only 6 percent of all wheat imports; these were imported by four large food processing companies based in Addis Ababa. Ethiopia does not import wheat or any other grain on a commercial basis because transport costs are prohibitive. Thus, "dumping" of food aid will depress market prices. This hypothesis has been tested and confirmed in a recent review of grain marketing in Ethiopia (Harrison 2002).

In interpreting our results, it is also important to note that we are considering only the effects of food aid that is imported into the country and not food aid that is purchased from local farmers and redistributed. An increasing amount of food aid is purchased locally. However, most donors do not purchase any food aid locally but rather purchase the food from their own farmers for distribution in Ethiopia. It may be that local purchase is a preferable alternative for Ethiopians; however, at least so far, it has not been deemed a politically feasible option for the majority of the donating countries.

Recently, the United States has been heavily criticized for refusing to purchase food aid locally. However, it is important to note that importing food aid appears to be a widespread practice not limited to the United States. In 1999, for example, 663,000 tonnes (t) of wheat food aid were imported into Ethiopia, while only 30,000 t of wheat food aid were purchased locally. Of the 663,000 t that were imported, only 21 percent came directly from the United States; 31 percent came from the WFP, and 32 percent from the European Community. In 2000, the numbers look similar: 1,074,000 t of wheat food aid were imported, and only 59,000 t were purchased locally.[6]

The remainder of the paper is organized as follows: section 13.2 describes our methodology. Section 13.3 describes our data and presents descriptive statistics. Section 13.4 presents our results. Section 13.5 considers the impact of food aid on cereal prices, and section 13.6 synthesizes our conclusions.

13.2 Methodology

The approach we use follows Deaton (1989) and considers the impact of changes in cereal prices on the distribution of income. In general, households that are net sellers of cereals will gain from higher prices, while net buyers will lose. Changes in these prices will affect the distribution of real income between urban and rural areas as well as the distribution within sectors, depending on the relationship between living standards and the net consumption and production of cereals.

Many rural households are both producers and consumers of these products, and the empirical strategy takes this into account. Following Deaton (1989), we model the effects of price changes using an indirect utility function in which the household's utility is written as a function of its income and prices. These effects can be summarized in the following way:

$$\frac{\partial W}{\partial \ln p_{\text{cereal}}} = \sum_h \theta_h(x_h, z_h) p_{h,\text{cereal}}(y_{h,\text{cereal}} - c_{h,\text{cereal}})/x_h, \tag{1}$$

6. See table 13.3 for details and sources.

where W is the social welfare function, θ captures the social marginal utility of money, h is household, x is the household's total consumption, z is household characteristics, y is household production of the food crop, and c is household consumption of the food crop. The general approach is to calculate net benefit ratios for each household and to examine the distribution of these ratios in relation to living standards and region.[7] As noted by Deaton, higher food prices are likely to redistribute real income from the urban to rural sectors. What is less obvious is how price changes redistribute real income between the rich and poor within the rural sector.

Note that these are only the first-order effects of price changes and ignore both the partial equilibrium effects of food price changes on quantities demanded and supplied as well as the general equilibrium effects on employment patterns, wages, the price of other factors, and technological innovation.

Our approach is best thought of as a good approximation to what would happen in the short run (see Panagariya 2002; Barrett 1998). We focus on these short-run changes for several reasons. First and most important, using short-run changes seems to be most appropriate for studying the impact of price changes on the poor, who, as Barrett and Dorosh (1996) say, are "likely to be teetering on the brink of survival" and less able to take advantage of supply-side effects of price changes. We are also limited by our data. To the extent that food aid drives prices down, food aid may act as a disincentive to food production over the long run. We do not have time series data and so are unable to directly test this hypothesis. However, for all five cereals produced in Ethiopia, there is an upward trend in production over the period 1980–2000 (Hamory and McMillan 2003).

As we mentioned earlier, it is important to disaggregate the analysis. Although the agricultural sector might benefit as a whole from higher food prices, aggregation could disguise a highly concentrated intrasectoral distribution of the benefits and costs of food price changes. Following standard procedure, we use per capita consumption as a conditioning variable. In future work, we intend to condition on land holdings and per capita income.

Our approach is to study the way in which the net benefit ratio varies according to living standards. The ratio is unitless and measures the elasticity of real income with respect to a price change. The manner in which the net benefit ratio varies across the income distribution tells us something about how the price change affects households across the distribution of income. For this reason, we estimate the net benefit ratio relative to measures of per capita expenditure or the conditional expectation of the net benefit ratio given a household's expenditure.

7. For a complete discussion of this type of analysis and its limitations, see Deaton (1997).

Note that we could simply run a linear regression with the net benefit ratio as the dependent variable and per capita expenditure as the explanatory variable. However, to avoid the problems associated with specifying a functional form, we choose instead to analyze the net benefit ratios using the nonparametric techniques introduced by Deaton (1989). The advantage of using nonparametric techniques is that they let the data do the talking. Readers are directed elsewhere for a comprehensive treatment of the nonparametric techniques employed here.

We also estimate density functions of the per capita expenditure (adult equivalent) according to whether individuals are net buyers or sellers of cereals. In the univariate case, the best way to conceptualize what we are doing is to imagine first creating a histogram where the heights of the bars represent the proportion of the population falling within a given band. The problem with the histogram is the arbitrariness of the choice of the number of bands and their width. Kernel estimates of the density function allow us to smooth the histogram and place confidence intervals around the distribution. In the univariate case, the kernel estimate of the density function of per capita expenditure, x, is given by

$$\hat{f}(x) = \frac{1}{nh} \sum_{i=1}^{n} K\left[\frac{x - x_i}{h}\right], \tag{2}$$

where n is the number of households, h is the bandwidth, and K is the kernel. The kernel function K and the bandwidth h are chosen with the efficiency bias trade-off in mind. A larger bandwidth will generate a smoother estimate and reduce the variance but increase the bias.

To determine whether an increase in the price of food would be regressive or progressive, we use a nonparametric regression. This regression is the conditional expectation corresponding to the joint densities computed for expenditure and net benefit ratios and hence contains no new information. However, the regression does provide the answer to the question of by how much the people at each level of per capita expenditure would lose from the increase in the price of food. Since the net benefit ratio expresses the net benefit as a fraction of total household expenditure, a flat line would indicate that all rural households benefit proportionately, an upward sloping line that richer households benefit proportionately more and a downward sloping line that poor households benefit disproportionately. The kernel regression estimator can be written as follows:

$$\hat{\beta}(x) = \frac{\sum_{i=1}^{n} y_i K\left[\frac{x - x_i}{h}\right]}{\sum_{i=1}^{n} K\left[\frac{x - x_i}{h}\right]} \tag{3}$$

13.3 Data

Our household data are taken from two nationally representative surveys administered by Ethiopia's CSA during the period 1999–2000, the Welfare Monitoring Survey (WMS) and the Household Income, Consumption, and Expenditure Survey (HICES). The WMS was introduced in 1994 with the explicit purpose of monitoring poverty in Ethiopia and is conducted every two years. The WMS 2000 covered 25,917 households and 123,735 individuals. The HICES, also introduced in 1994, covers a subset of the households surveyed in the WMS and collects more detailed information on consumption and expenditure by product by household than the WMS. One of the primary purposes of the HICES is to provide a basis for computing national accounts statistics. The HICES covered 17,332 households in 1999–2000.

Table 13.1 describes the size and structure of the two data sets employed to study whether households are net buyers or sellers of various crops. Both data sets employ standard clustered samples, derived from a two-stage sampling procedure. The first stage of sampling selected a random sample of small geographic units called enumeration areas (EAs), or neighborhoods of around 200 (100) households in urban (rural) areas. In the second stage, random samples of 12 to 35 households were selected from within each EA, as described in the table. The sample frame for both of these data sets excludes the nonsedentary populations concentrated in the regions of Afar and Somali. For details on sample design and data collection, see CSA (2001a, 2001b).

Ethiopia's sedentary population is about 14 percent urban and 86 percent rural (CSA 2001a). According to the CSA, the urban category includes the capitals of regions, zones, and weredas, any locality that is within an Urban Dweller's Association (or kebele), any locality with 2,000 or more residents, and any locality with 1,000 or more residents whose residents are "primarily engaged in nonagricultural activities." Our merged data set includes 8,212 urban and 8,308 rural households. Ethiopia is administratively divided into eleven regions, called killils. Certain killils correspond with urban areas, such as Addis Ababa, Harari, and Dire Dawa. The other killils contain a combination of urban and rural areas.

Our measures of total expenditure are taken from the HICES. Because the version of the HICES that provides information on prices and quantities of crops purchased and sold is not yet available to the public, we use information from the WMS on total income and total expenditure by crop to compute net buyer status. The WMS includes two measures each for income and expenditure: for each cereal, it records the income in the past month, income in the past six months, expenditure in the past week, and expenditure in the past month. We use income in the past six months supplemented by income in the past month times 6 when income in the past six

Table 13.1 **Data structure**

	Welfare Monitoring Survey 2000		1999–2000 HICES	
Regional states	Sample EAs	Sample households	Sample EAs	Sample households
Tigray				
Rural	100	1,196		
Urban	43	687		
Total	143	1,883	90	1,252
Afar				
Rural	59	699		
Urban	25	400		
Total	84	1,099	58	792
Amhara				
Rural	283	3,393		
Urban	100	1,593		
Total	383	4,986	245	3,340
Oromia				
Rural	360	4,318		
Urban	119	1,903		
Total	479	6,221	271	3,728
Somalia				
Rural	56	672		
Urban	30	480		
Total	86	1,152	61	852
Benishangul-Gumuz				
Rural	75	900		
Urban	25	400		
Total	100	1,300	68	916
SNNPR				
Rural	394	4,727		
Urban	48	768		
Total	442	5,495	204	2,640
Gambela				
Rural	30	360		
Urban	24	283		
Total	54	743	54	744
Harari				
Rural	30	360		
Urban	23	368		
Total	53	728	53	728
Addis Ababa				
Rural	25	300		
Urban	75	1,181		
Total	100	1,481	100	1,500
Dire Dawa Adm council				
Rural	30	360		
Urban	30	480		
Total	60	840	60	840
Rural total	1,442	17,285	722	8,660
Urban total	542	8,643	542	8,672
Grant total	1,984	25,928	1,264	17,332

Note: SNNPR = Southern Nations, Nationalities, and Peoples Region.

months is missing, and expenditure in the past month times 6 supplemented by expenditure in the past week times 24 when expenditure in the past month is missing to measure net expenditure. Because the WMS covers only a subset of the HICES, we end up with a sample of 16,520 households after merging the two data sets.

To obtain measures of income and expenditure that can be meaningfully compared across households, we adjust for variations in regional prices and household composition. First, we deflate nominal values of income and expenditure by a regional price index computed by the CSA and reported in the "Poverty Profile of Ethiopia" (Welfare Monitoring Unit 2002). Next, it is useful to recognize that the same total household expenditure may feed more (fewer) members of a family with relatively more (fewer) children (adults) and relatively more (fewer) women. Thus, we convert our measure of real household expenditure to a measure of real per capita expenditure on an adult equivalency basis using the East African adult equivalency scale developed by Dercon.[8]

The WMS 2000 was conducted from January to February 2000. Therefore, the variable for six-month income covers the main harvesting season, which is September to December. Thus, the six-month income variable that we use to calculate net expenditure measures income from the latter half of the year and so includes the harvest months as well as the months immediately preceding the harvest, when cereals are least plentiful. Therefore, it is likely to be representative of annual cereal consumption. However, because the period of data collection immediately follows the harvest, the weekly and monthly expenditure variables may overstate average cereal consumption. However, since prices of cereals are likely to be lower during this period, this bias is likely to be minimal.

The HICES was conducted to capture the seasonality aspect of agriculture in Ethiopia. Each household was visited eight times: four times (once a week over the period of a month) during the rainy or lean season when stocks are low (June 11, 1999, to August 7, 1999) and then four times during the harvest period when stocks are plentiful (January 3, 2000, to February 26, 2000).[9] Monthly totals for the two periods are then averaged to obtain monthly annual average household consumption expenditure and income.

Table 13.2 presents means of the main variables of interest. We use total real household expenditure per adult equivalent (rexpae) as our primary measure of household living standards. It is measured as total consumption expenditure per adult equivalent per year adjusted for regional varia-

8. Thanks are due to Julie Schaffner for providing the adult equivalency scale and regional index programs for Stata. The adult equivalency scale is for East Africa and is based on a program provided by Stefan Dercon.

9. There are two rainy seasons in Ethiopia. The main rainy season, *meher,* falls between May and September. The secondary rainy season, *belg,* falls between February and May.

Table 13.2 Means of variables used in analysis

	All	Urban	Rural	Tigray	Afar	Amhara	Oromia	Somali	Benishangul-Gumuz	SNNPR	Gambela	Harari	Addis Ababa	Dire Dawa
A. Household characteristics														
Family size	4.87	4.54	4.92	4.69	4.44	4.52	5.07	5.08	4.61	5.05	4.45	4.39	5.05	4.59
Head's age	43.76	43.74	43.76	48.02	40.93	44.52	43.28	42.23	41.76	42.29	39.67	44.58	45.36	43.15
Total expenditure	5,713.02	7,336.59	5,443.09	4,472.35	5,835.32	5,533.80	5,922.37	7,089.05	4,909.17	5,379.48	4,833.55	6,909.33	9,078.13	6,814.38
Expenditure per capita	1,303.63	1,859.12	1,211.27	1,059.23	1,578.70	1,352.40	1,300.83	1,718.06	1,194.74	1,174.44	1,288.95	1,755.70	1,985.57	1,737.75
Expenditure per adult equiv	1,576.31	2,146.85	1,481.46	1,309.74	1,819.47	1,632.22	1,585.12	2,028.09	1,453.95	1,427.88	1,514.82	2,081.07	2,231.76	2,042.74
B. Production value income														
Teff	121.07	60.89	131.07	102.13	232.15	131.98	162.81	22.28	27.42	58.33	1.06	0.17	98.95	0.96
Mean income from positive income	543.16	1730.58	515.82	319.45	1236.49	422.24	774.15	1507.87	280.62	365.77	425.55	102.88	7328.94	452.47
% reporting positive income	11.24	1.89	20.49	17.19	5.44	17.56	12.19	2.65	8.05	15.26	0.31	0.14	9.20	0.37
Wheat	73.94	58.53	76.51	45.46	0.00	30.54	140.60	58.80	4.47	45.94	0.00	0.00	8.97	2.52
Mean income from positive income	603.63	1928.84	555.12	263.33	0.00	277.86	978.89	952.62	343.04	371.80	0.00	0.00	1101.92	2352.28
% reporting positive income	6.65	1.45	11.78	11.21	0.00	6.68	8.94	5.69	1.03	9.86	0.00	0.00	8.43	0.24
Barley	24.53	16.32	25.89	37.85	0.17	28.18	22.51	74.97	3.50	23.34	0.88	0.00	0.29	0.64
Mean income from positive income	234.88	1567.23	215.66	258.40	323.95	188.20	320.61	1247.97	299.21	190.72	594.47	0.00	317.45	188.40
% reporting positive income	5.17	0.61	9.68	9.47	0.27	9.10	4.46	3.92	1.15	9.51	0.16	0.00	0.21	0.49
Maize	97.56	28.03	109.12	45.92	202.08	44.23	98.26	104.13	90.94	198.73	188.99	4.19	0.04	1.63
Mean income from positive income	427.86	1169.62	416.57	280.73	1039.92	263.90	402.67	622.75	202.65	594.62	465.25	296.37	369.07	314.53
% reporting positive income	12.99	2.46	23.40	9.14	22.58	8.91	13.95	8.47	26.55	22.86	27.74	1.28	0.14	0.98
Sorghum	28.63	45.09	25.89	51.19	23.20	32.20	34.61	94.04	67.69	6.17	24.89	7.25	0.16	19.02
Mean income from positive income	358.29	2882.77	285.78	407.94	340.27	363.16	390.43	633.79	221.78	168.77	197.43	416.85	191.51	541.22
% reporting positive income	5.95	1.23	10.62	7.56	2.26	5.29	4.84	7.21	25.63	5.63	7.99	1.71	0.07	5.61
Coffee	87.20	23.67	97.77	0.35	27.91	1.53	78.27	0.00	84.56	265.16	141.50	1.16	0.00	10.09
Mean income from positive income	659.33	2226.45	641.16	20240.80	143.12	611.91	0.00	1256.08	699.64	831.54	151.93	4.79	475.34	
% reporting positive income	6.57	0.78	12.29	0.33	0.40	0.90	7.90	0.00	4.60	24.50	8.93	0.86	0.07	3.41

C. Expenditures														
Teff	542.44	774.89	503.79	1065.33	673.40	959.39	370.24	167.73	161.98	104.65	167.79	362.21	966.74	377.82
Mean expenditure from positive expenditure	1231.02	1014.60	1302.05	2075.05	1152.23	1529.50	879.72	1240.76	561.05	624.58	953.42	811.33	1167.74	852.15
% reporting positive expenditure	54.56	76.36	33.02	61.96	51.00	73.76	59.82	25.54	42.07	33.85	31.66	39.09	85.02	35.24
Wheat	206.47	173.24	211.99	292.28	38.13	232.35	237.98	329.55	16.04	119.09	40.96	271.30	112.77	78.21
Mean expenditure from positive expenditure	624.13	405.70	673.40	660.99	384.26	718.05	625.73	645.66	300.09	481.52	416.77	598.27	427.46	398.07
% reporting positive expenditure	35.65	39.10	32.25	49.09	13.15	30.15	46.70	52.72	14.02	36.10	12.70	48.50	34.56	22.32
Barley	123.82	44.34	137.04	217.58	27.01	189.64	110.11	46.25	9.57	67.17	7.30	19.32	13.23	19.75
Mean expenditure from positive expenditure	512.60	295.45	533.71	638.18	319.20	648.28	461.37	323.45	244.48	320.75	391.90	196.91	338.28	212.27
% reporting positive expenditure	17.72	13.92	21.47	24.09	7.44	19.75	25.07	15.68	4.37	27.21	2.04	9.27	4.11	7.07
Maize	289.11	116.70	317.78	233.82	481.52	171.05	352.61	562.67	299.04	380.07	522.29	163.58	25.34	87.22
Mean expenditure from positive expenditure	565.45	380.37	582.77	641.17	890.64	515.37	608.15	776.36	428.20	518.90	759.88	518.17	309.56	691.78
% reporting positive expenditure	42.26	27.83	56.54	24.92	61.75	22.50	52.23	45.13	56.78	70.26	65.67	37.09	9.48	17.80
Sorghum	189.24	70.91	208.92	262.55	210.08	234.85	211.03	231.55	286.35	78.70	184.85	492.89	4.91	510.12
Mean expenditure from positive expenditure	609.07	341.83	637.21	698.62	695.64	778.62	557.35	705.92	469.54	391.48	499.48	768.37	165.09	890.60
% reporting positive expenditure	30.79	21.51	39.97	28.41	13.94	22.79	30.65	30.34	71.61	26.71	31.50	68.05	2.79	67.20
Coffee	144.58	152.45	143.28	117.44	150.66	111.67	146.36	154.00	144.07	195.78	104.10	93.00	139.40	105.65
Mean expenditure from positive expenditure	168.48	169.27	168.34	148.73	191.73	127.63	173.75	170.59	164.99	222.15	178.50	131.10	152.49	131.60
% reporting positive expenditure	85.40	90.12	80.73	83.64	80.35	87.28	89.19	90.77	91.38	85.33	63.64	67.76	92.96	76.22
D. Budget shares														
Teff	0.10	0.12	0.10	0.28	0.15	0.18	0.06	0.02	0.03	0.02	0.03	0.06	0.14	0.06
Mean expenditure from positive expenditure	0.24	0.16	0.26	0.54	0.26	0.29	0.15	0.15	0.09	0.11	0.16	0.13	0.17	0.13
Wheat	0.04	0.03	0.04	0.07	0.01	0.05	0.04	0.05	0.00	0.02	0.01	0.04	0.02	0.01
Mean expenditure from positive expenditure	0.12	0.07	0.13	0.17	0.09	0.15	0.11	0.10	0.04	0.09	0.09	0.08	0.06	0.07
Barley	0.03	0.01	0.03	0.06	0.01	0.04	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.00
Mean expenditure from positive expenditure	0.11	0.05	0.12	0.17	0.08	0.14	0.10	0.06	0.03	0.07	0.09	0.03	0.04	0.03
Maize	0.06	0.03	0.07	0.06	0.12	0.04	0.07	0.10	0.08	0.08	0.12	0.03	0.01	0.01
Mean expenditure from positive expenditure	0.12	0.08	0.12	0.16	0.22	0.12	0.12	0.13	0.11	0.11	0.18	0.08	0.08	0.12
Sorghum	0.04	0.02	0.04	0.07	0.06	0.05	0.04	0.05	0.07	0.02	0.04	0.08	0.00	0.09
Mean expenditure from positive expenditure	0.13	0.08	0.13	0.19	0.20	0.16	0.11	0.14	0.12	0.10	0.12	0.12	0.03	0.15
Coffee	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.03	0.04	0.02	0.02	0.02	0.02
Mean expenditure from positive expenditure	0.03	0.03	0.04	0.04	0.04	0.03	0.03	0.03	0.04	0.05	0.04	0.02	0.03	0.02

tions in prices. Not surprisingly, judging by this standard, urban households enjoy a higher standard of living than rural households. In addition, there are marked variations across regions, with Addis Ababa recording the highest rexpae, 2,232 birr (Br), and Tigray recording the lowest rexpae, Br1,310. Using the 1999 average nominal dollar-birr exchange rate of 8.23, these translate into US$271 and US$159, respectively. The poorest regions in Ethiopia (Amhara; Oromia; Southern Nations, Nationalities, and Peoples Region [SNNPR]; and Tigray) also produce the majority of the nation's cereals. However, these regions are vast, and agroecological conditions—and hence poverty—vary widely within the regions. Note also that the poorer regions tend to have larger households and that there appears to be no systematic variation in the age of household heads.

Panels B and C of table 13.2 show the regional distribution of total real annual income and expenditure from the various cereals and coffee. We include coffee as a point of interest since it is widely consumed in Ethiopia and is Ethiopia's largest source of export earnings. For each crop, three items are reported: the mean across all households, the mean across only households who report receiving income from that crop, and the percent of households reporting positive income from this crop. Based on these data, it appears that households tend to earn income from only one or two cereals, probably based on agroecological conditions. Looking at panel B, we see that rural households rely much more heavily on income from cereals than do urban households, with 21 percent of rural households reporting positive income from teff, 12 percent from wheat, 10 percent from barley, 24 percent from maize, 11 percent from sorghum, and 12 percent from coffee. For urban households, these figures are 2 percent, 1 percent, 0.6 percent, 3 percent, 1 percent, and 0.8 percent respectively.

Panel C presents information on total real expenditure per household. On average, expenditures exceed income for all crops, and a much larger share of the population reports positive expenditures on the various crops, with more than half reporting that they spent some money on teff, for example. There is a marked difference between urban and rural expenditures, with a much larger percentage of the urban population (76 percent) reporting expenditure on the most expensive cereal, teff, than the rural population (33 percent). The most widely consumed cereals in the rural sector are maize (57 percent), sorghum (40 percent), teff (33 percent), wheat (32 percent), and barley (22 percent). The most widely consumed cereals in the urban sector are teff (76 percent), wheat (39 percent), maize (28 percent), sorghum (22 percent), and barley (14 percent).

Panel D presents data on budget shares for all households and then only for those households that report spending anything on that particular item. These figures indicate that households spend a large fraction of their annual income on cereals, ranging from 26 percent to 12 percent for rural households and 16 percent to 5 percent for urban households. Thus,

changes in cereal prices can have substantial welfare effects, and reduction in cereal prices is likely to transfer real income from urban households to rural households. Only 12 percent of rural households in the survey received any income from wheat, the only cereal imported in the form of food aid, and it is these households that stand to gain from an increase in the price of wheat.

The fact that mean expenditures on cereals exceed mean income from cereals naturally leads to the following question: what are the other sources of income in Ethiopia? Also using these data, Peacemaker-Arrand (2004) reports that rural respondents predominantly describe themselves as subsistence farmers, with 87 percent reporting that the household's main source of income is subsistence farming. Interestingly, she finds that the most widespread source of income among these rural households is livestock. Only 4.1 percent of rural households support themselves with formal employment, while 2.4 percent rely on "casual labor." Moreover, the picture is very different in urban areas, where the majority of households report main income source as formal employment, while an additional 10 percent rely on casual labor. Interestingly, Peacemaker-Arrand also finds that urban residents rely more on pensions, rent, and family remittances than rural households.

Our data on food aid come from the WFP and Ethiopia's Disaster Preparedness and Prevention Centre (DPPC). Table 13.3 presents cereal production and cereal food aid from 1995 to 2001. Several facts are worth noting. First, virtually all imported cereal food aid comes in the form of wheat. Second, although the United States provides a substantial share of the wheat food aid (42.5 percent in 1999), the *majority* of the imported wheat comes from a variety of other donors, mostly European. This is notable because of the Europeans' tendency to blame these phenomena on the United States. Third, although some food aid is purchased locally, the majority of food aid is imported, and the majority of food aid is wheat. Over the period 1995–2001, an average of 20 percent of cereal food aid was purchased locally. Locally purchased food aid consists primarily of wheat, maize, and sorghum and accounts for a tiny fraction of the total production of each of these commodities. By contrast, 663,000 t of wheat food aid were imported in 1999, while only 1,114 t were produced locally. Thus, wheat food aid accounted for more than a third of the total supply of wheat and potentially had a significant effect on the price of wheat.

13.4 Who Benefits from Food Aid?

Since all imported cereal food aid is wheat, we now restrict our attention to the impact of an increase in the price of wheat that would probably result if there were no food aid. The averages reported in table 13.2 do not tell us anything about production and consumption patterns of wheat accord-

Table 13.3 Cereal production and food aid (in thousands of tonnes)

	1995	1996	1997	1998	1999	2000	2001
Imported cereal food aid (wheat)	643	320	369	579	663	1074	574
Food aid imported from the United States	151	64	114	85	144	251	155
Food aid imported from Other[a]	492	256	255	494	493	813	419
Commercial imports	0	0	0	78	26	10	10
Locally procured cereal food aid	34	109	111	58	111	213	235
Total cereal food aid	677	429	480	637	774	1287	809
Imported as % of total	94.98	74.59	76.88	90.89	85.66	83.45	70.95
Locally procured as % of total	5.02	25.41	23.13	9.11	14.34	16.55	29.05
Total cereal production	6,740	9,379	9,473	7,197	8,013	8,310	9,209
Total wheat production	1,024	1,076	1,002	1,107	1,114	1,213	1,571
Imported wheat food aid as % of wheat production	62.79	29.74	36.83	52.30	59.52	88.54	36.54
Total maize production	1,673	2,539	2,532	1,929	2,417	2,526	3,139
Total teff production	1,298	1,752	2,002	1,307	1,642	1,718	1,737
Total sorghum production	1,122	1,723	2,007	1,070	1,321	1,181	1,538

Source: World Food Programme (1995–2000).

Notes: Cereals include barley, maize, millet, sorghum, teff, and wheat. For the years 1999–2001, all imported cereals are in the form of wheat and all locally procured cereals are in the form of maize.

[a]In 1999, other includes 206,000t from the World Food Programme, 166,000t from the European Commission, and roughly 10,000t each from Denmark, Italy, France, and the Netherlands. In 2000, other includes: 464,799t from the World Food Programme, roughly 20,000t each from Canada, Italy, Great Britain, the EC and DFID, 12,572t from Germany, and 6,000t from France.

ing to income level. We are specifically interested in the impact of changes in the price of wheat on the poor; thus, we need to know whether the poor earn more or less income from wheat than rich households. We would also like to know whether they spend more or less on wheat than rich households. In what follows, we examine the living standards of buyers and sellers of wheat. We also examine who is most likely to benefit in proportional terms from a reduction in wheat prices.

Figures 13.1–13.3 show estimates of the distribution of real per-adult-equivalent expenditure across households that are net buyers of wheat and across households that are net sellers of wheat. Since the distribution for the entire population is almost identical to the distribution of net buyers, we do not overlay this density function on figures 13.1–13.3. Rather, the densities for the entire population are presented in appendix figure 13A.1. Figure 13.1 is the distribution for the entire population, figure 13.2 is the distribution for the rural population, and figure 13.3 is the distribution for the urban population. All three graphs show the estimated density functions of the logarithm of household per-adult-equivalent expenditure by whether a household is classified as a net seller or buyer of wheat. The log transformation is chosen because the distribution of expenditure per

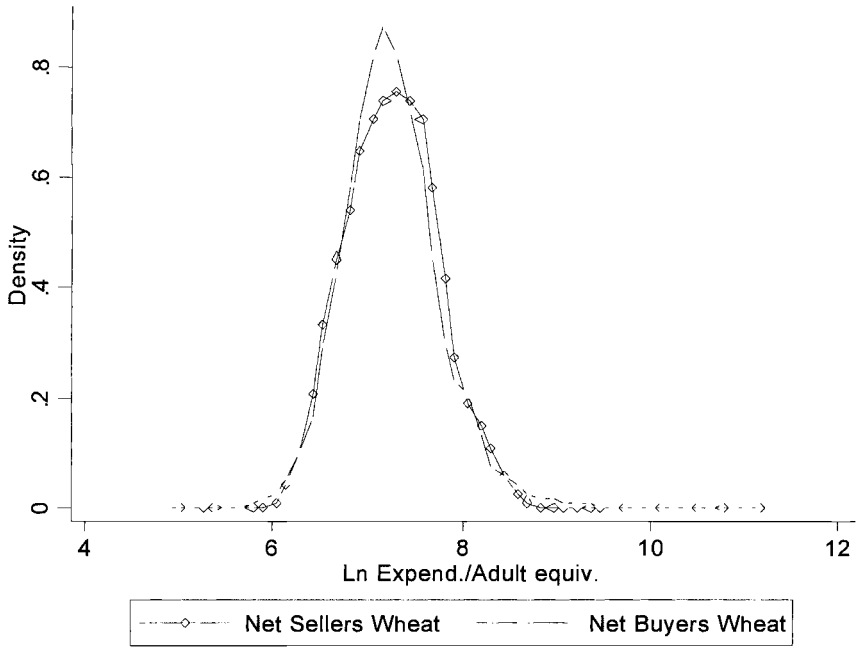

Fig. 13.1 Living standard of net buyers and sellers of wheat: Entire population

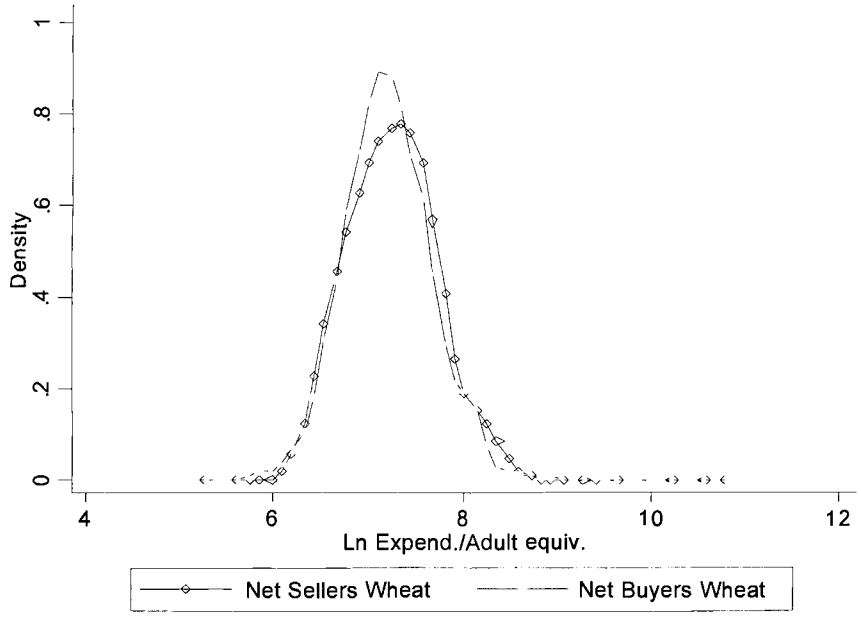

Fig. 13.2 Living standard of net buyers and sellers of wheat: Rural population

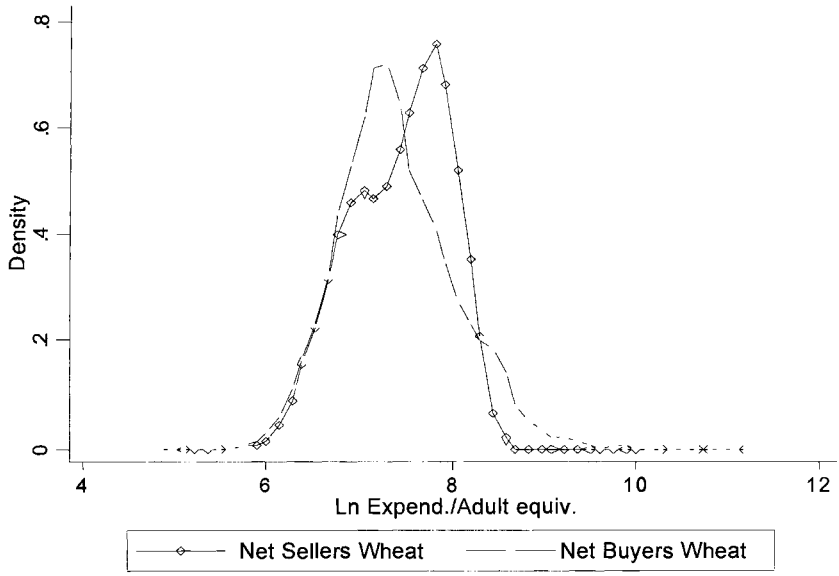

Fig. 13.3 Living standard of net buyers and sellers of wheat: Urban population

capita is strongly positively skewed and taking logs introduces something closer to symmetry.

The most striking feature of figure 13.1 is the similarity of the two distributions. The modal net seller is only slightly wealthier than the modal net buyer: modal expenditure per capita per adult equivalent of the net buyer is Br1,096 ($134), compared to Br1,211 ($148) for net sellers.[10] Although the patterns are similar, the differences are slightly more pronounced once the sample is split into urban and rural households. Figure 13.2 shows that for rural households, modal expenditure per capita per adult equivalent of the net buyer is Br1,096 ($134), compared to Br1,339 ($163) for net sellers. Figure 13.3 shows that the differences are most pronounced for urban households, where the modal expenditure per capita per adult equivalent of the net buyer is Br1,212 ($148), compared to Br2,981 ($364) for net sellers. Figures 13.2 and 13.3 confirm the fact that urban households tend to enjoy a higher standard of living and that there is more diversity among the urban population.

Figures 13.4–13.11 show results of nonparametric regressions of buyers and sellers of wheat by expenditure category. Each graph contains two lines. The line that is connected by squares shows the proportion of households out of all households that report spending any money on wheat. The

10. All dollar figures are obtained using the nominal average exchange rate of Br8.2 per U.S. dollar in 1999.

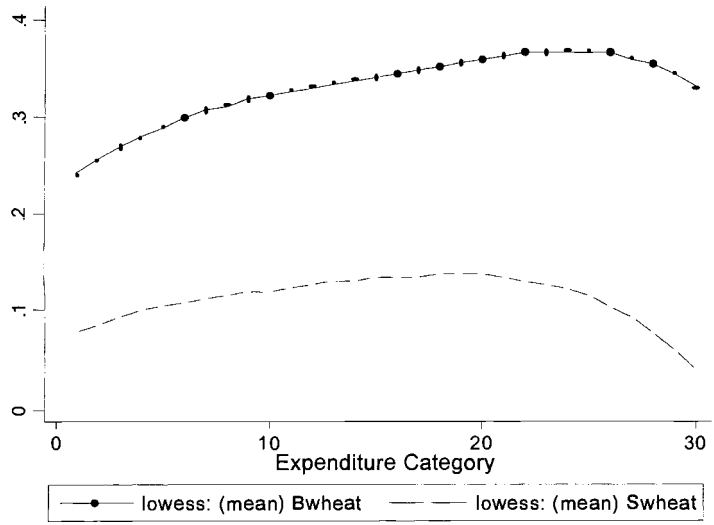

Fig. 13.4 Buyers and sellers of wheat by expenditure category: Entire country (with fitted values based on nonparametric regression)

line that is connected by diamonds shows the proportion of households out of all households that report earning any income from selling wheat. These are the results of two separate nonparametric regressions where the dependent variable takes a value of 1 if the household reports purchasing (selling) any wheat and 0 otherwise and the explanatory variable is expenditure per adult equivalent divided into thirty quantiles. The bottom third of the expenditure per adult equivalent distribution ranges between Br1,113 ($136) and Br2,302 ($281). The middle third of the distribution ranges between Br2,417 ($295) and Br3,718 ($453). The top third of the distribution ranges between Br3,933 ($480) and Br10,762 ($1,312). For each quantile, these graphs tell us the proportion of households that report spending any money on wheat and the proportion of households that report purchasing any wheat. The graphs provide more detail on the structure of our data. In figure 13.4, we report this information for the entire country. We then present results for rural and urban populations and for several regions separately.

Figures 13.4–13.11 all show that at all levels of income there are more buyers than sellers of wheat. This is important because it means that at all levels of living standards, more households will benefit from food aid (a reduction in wheat prices) than will be hurt. This is consistent with the fact that Ethiopia is a net importer of food. However, even though Ethiopia is a net food importer, it is not the case that among the poor the majority of

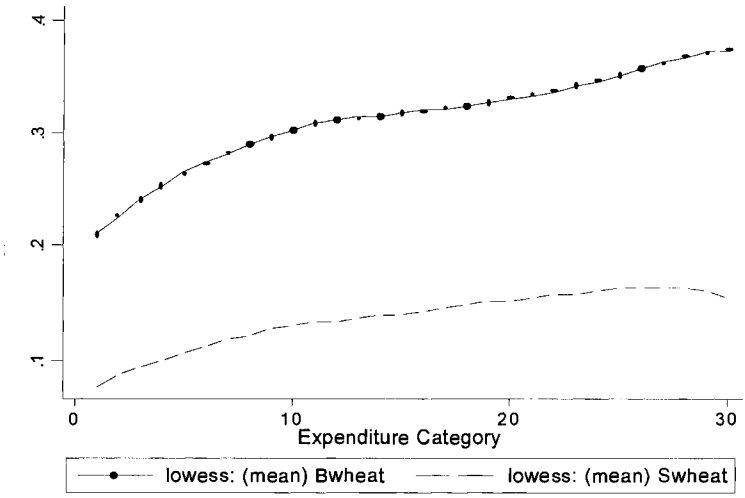

Fig. 13.5 Buyers and sellers of wheat by expenditure category: Rural population (with fitted values based on nonparametric regression)

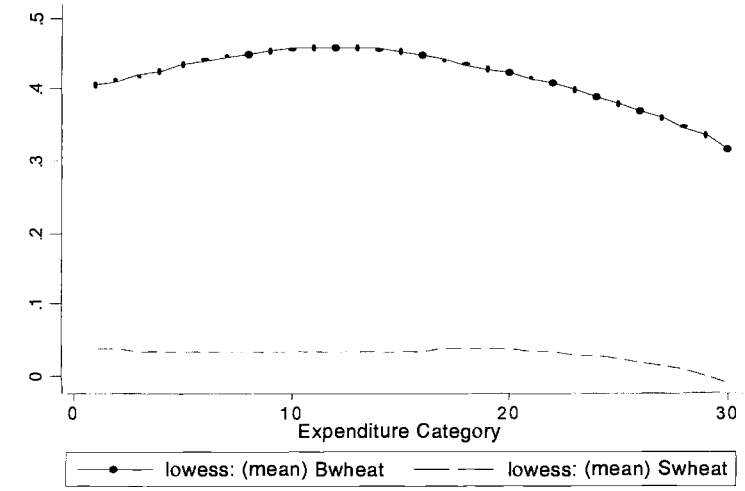

Fig. 13.6 Buyers and sellers of wheat by expenditure category: Urban population (with fitted values based on nonparametric regression)

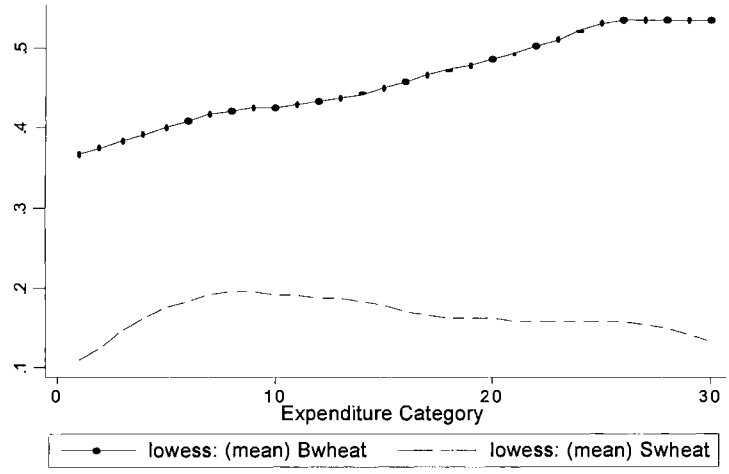

Fig. 13.7 Buyers and sellers of wheat by expenditure category: Tigray (with fitted values based on nonparametric regression)

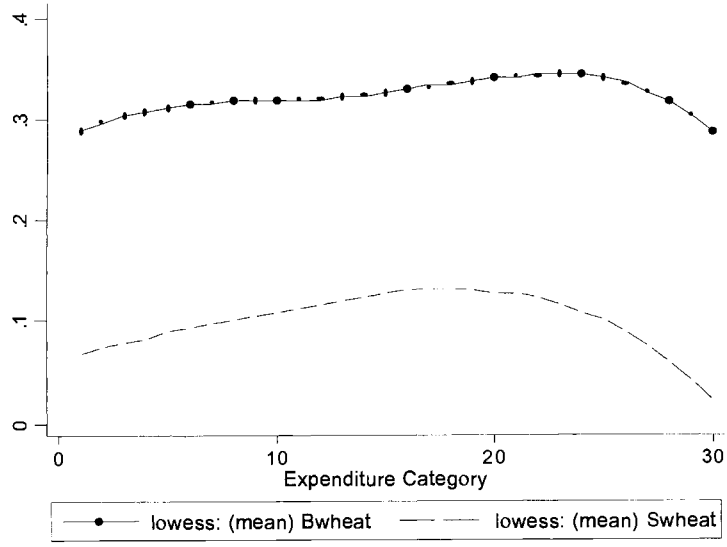

Fig. 13.8 Buyers and sellers of wheat by expenditure category: Amhara (with fitted values based on nonparametric regression)

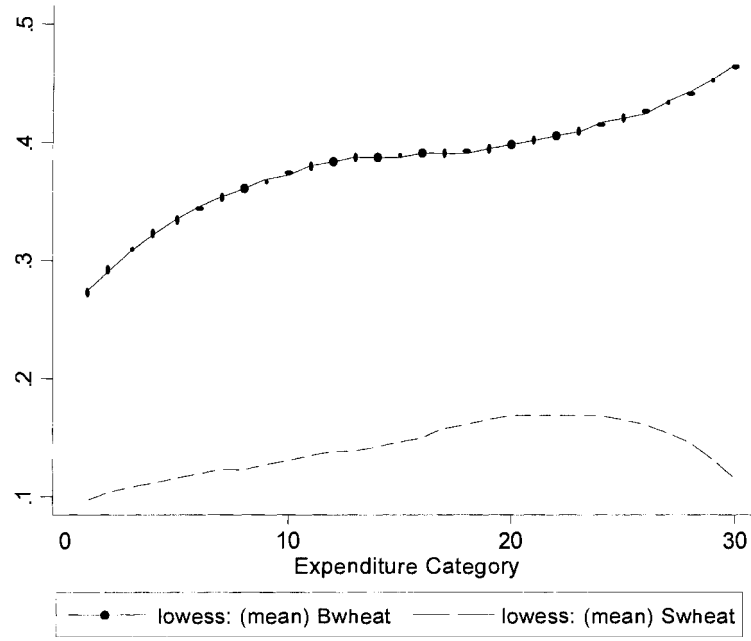

Fig. 13.9 Buyers and sellers of wheat by expenditure category: Entire Oromiya (with fitted values based on nonparametric regression)

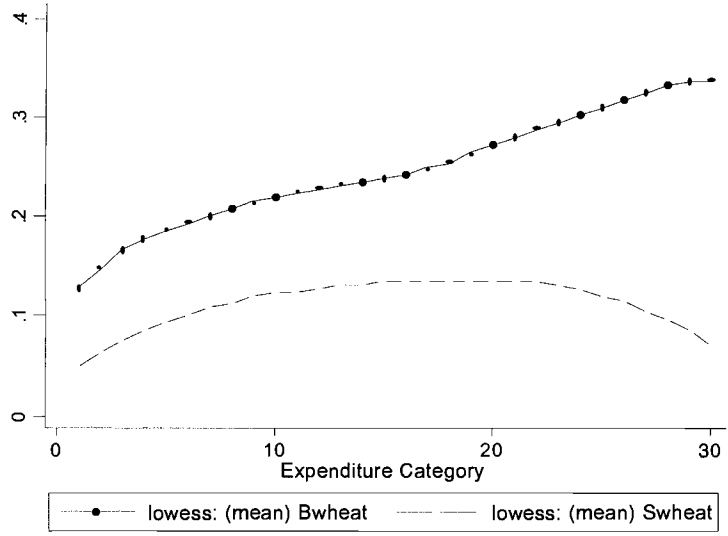

Fig. 13.10 Buyers and sellers of wheat by expenditure category: SNNPR (with fitted values based on nonparametric regression)

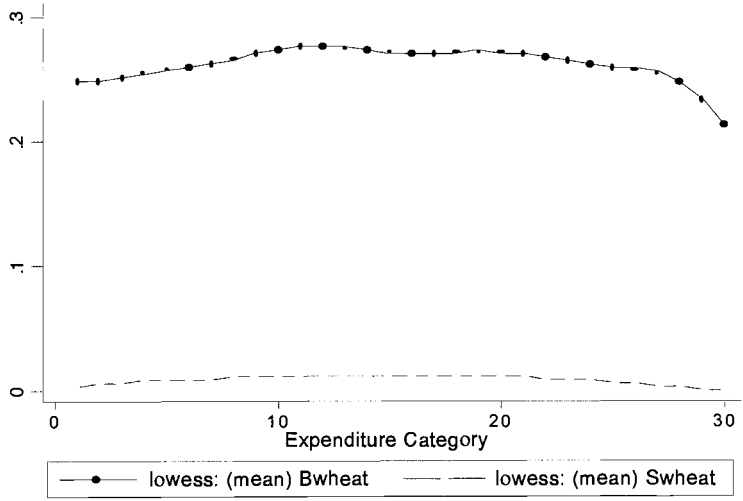

Fig. 13.11 Buyers and sellers of wheat by expenditure category: Addis Ababa (with fitted values based on nonparametric regression)

households are net sellers of food. Thus, it is not the case that food imports benefit only the relatively better-off urban population.

For the population as a whole, the proportion of households that sells wheat hovers around 10 percent until it drops sharply at the very highest levels of income. The proportion of households that purchase wheat tends to increase with income starting at around 25 percent and tapering off at around 35 percent until it too falls—though less sharply—at the very highest levels of income.

Figure 13.5 shows that among the rural population, the proportion of households that sell wheat is increasing in income. The proportion of households that buy wheat is also increasing in income and goes from around 20 percent for the poorest households to almost 40 percent for the wealthiest households. Figure 13.6 shows that among urban households there is no significant relationship between living standards and the proportion of buyers and sellers of wheat—except at the very highest levels of income, where both taper off. A comparison between figures 13.5 and 13.6 yields some interesting insights. There is much more diversity among rural households, and—at all levels of income—more rural households are engaged in selling wheat than are urban households.

Figures 13.7 through 13.11 confirm that the importance of wheat also varies by region. Figure 13.7 confirms the statistics in table 13.2 that suggest that wheat is most important in Tigray, where more than 11 percent of

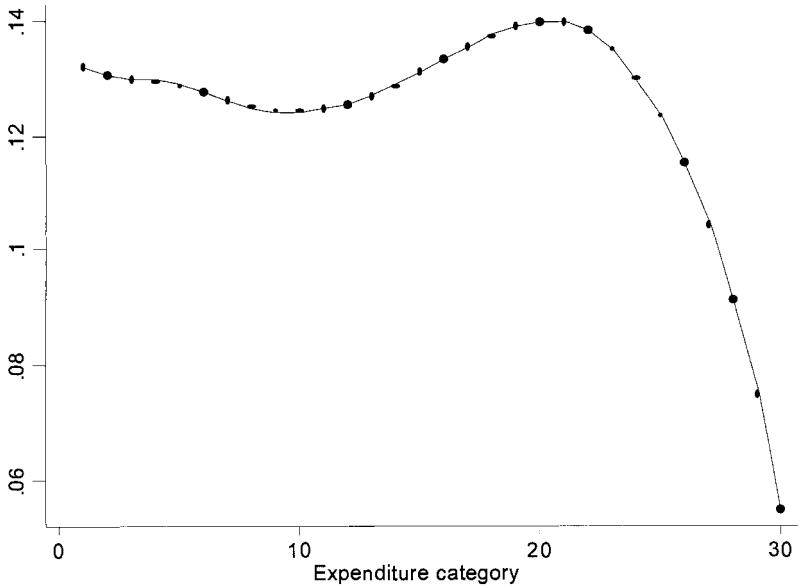

Fig. 13.12 Net sellers of wheat by expenditure category: Entire country

households report earning income from wheat and 49 percent of households report spending any money on wheat. Interestingly, Tigray is also the poorest region and the region from which most of the current government originates. The pattern of income in Tigray appears to be slightly different from the pattern for the rest of the country. The proportion of households reporting income from wheat increases with income and then begins to taper off after the tenth quantile, suggesting that more poorer households in Tigray rely on wheat as a source of income than do richer households—though the differences are not large (20 percent versus 15 percent). On the income side, the pattern is similar, with one interesting difference: even among the very poorest households, roughly 40 percent spend money on wheat. This compares with between 10 and 30 percent for the remaining regions and 20 percent for the country as a whole. Thus, Tigray is the region most likely to be affected by changes in wheat prices.

The next step is to combine the information on income and expenditure of wheat and to examine net sellers of wheat by expenditure category. Net sellers of wheat are the households that would be hurt by the reduction in wheat prices associated with food aid. Figure 13.12 presents these results for the entire population, while figure 13.13 presents results for the rural population and figure 13.14 for the urban population. These figures are results of a nonparametric regression where the dependent variable takes a value of 1 if the household is a net seller and 0 otherwise and the explana-

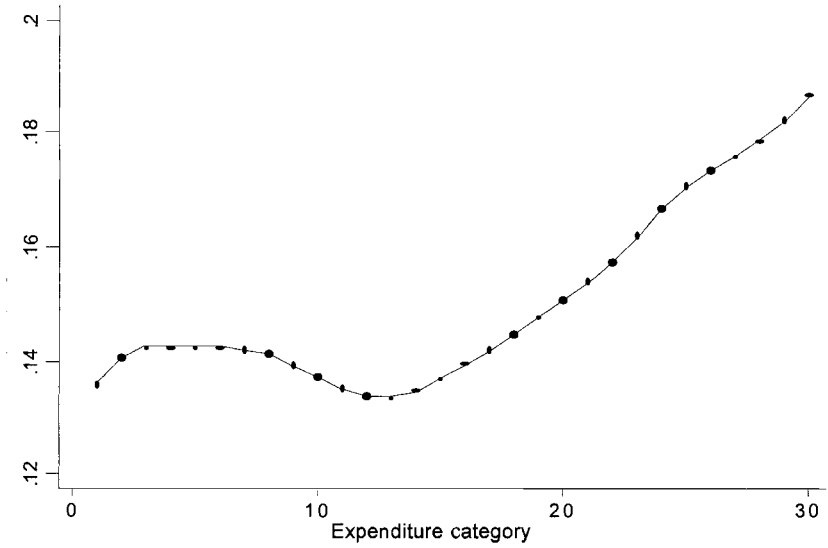

Fig. 13.13 Net sellers of wheat by expenditure category: Rural population

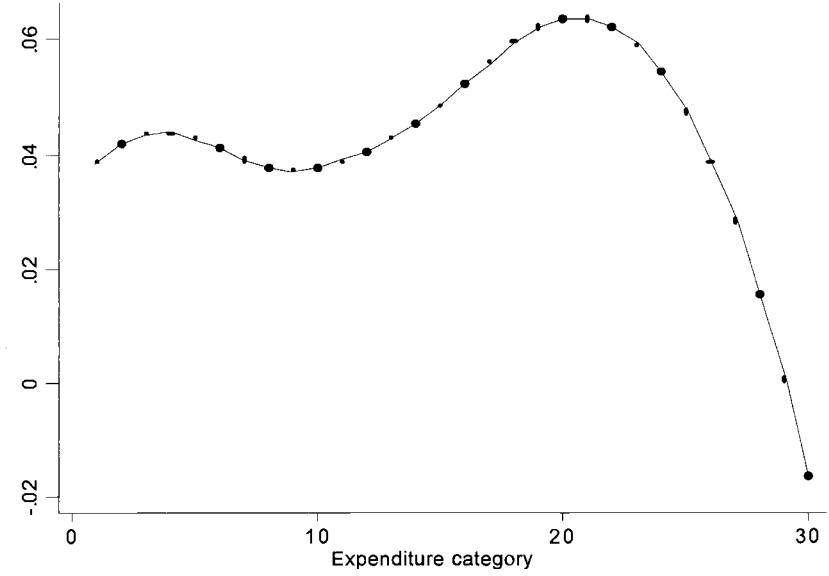

Fig. 13.14 Net sellers of wheat by expenditure category: Urban population

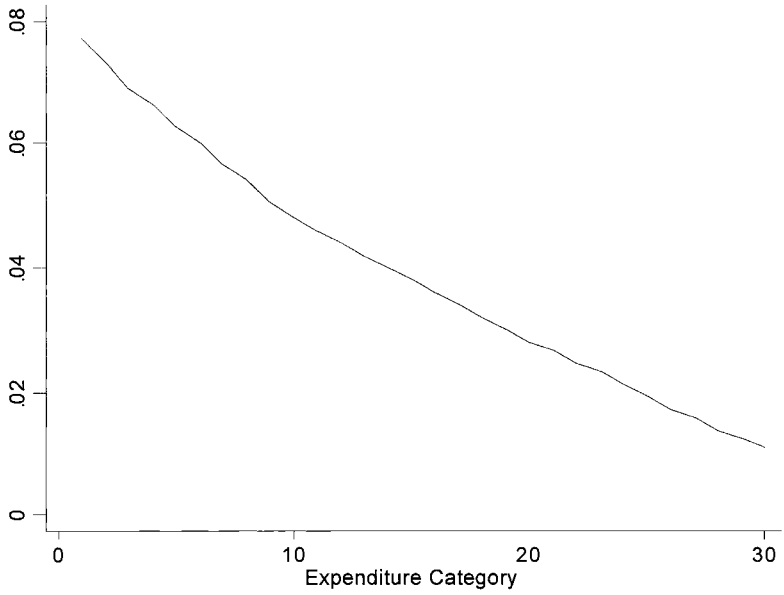

Fig. 13.15 Net benefit ratio by expenditure category: Entire country

tory variable is expenditure quantiles. The shape of the line in figure 13.12 is clearly driven by the households in the upper tail of the expenditure categories, so we turn immediately to figures 13.13 and 13.14, which are easier to interpret. Figure 13.13 shows that there is a positive relationship between whether a household is a net seller of wheat and living standards. Among the rural population, contrary to popular wisdom, there are more net sellers of wheat among the richer households, and the relationship is close to linear. Figure 13.13 also makes it clear that roughly 85 percent of the poorest households are net buyers of wheat. Figure 13.14 shows that net seller status among urban households is also increasing in income for the first two terciles of the distribution. Among the wealthiest urban households net sellers of wheat drop off quickly. Not surprisingly, a comparison of figures 13.13 and 13.14 shows that at all levels of income there are proportionately more net sellers among the rural population.

Figures 13.15–13.17 show results of regressions of the net benefit ratio on quantiles of per-adult-equivalent expenditure.[11] The net benefit ratio is defined as total household expenditure on wheat per year less total household income from wheat per year divided by total household expenditure per year. Thus, a ratio greater than zero indicates that the household is a

11. Note that these figures exclude households that report both zero income from wheat and zero expenditure on wheat.

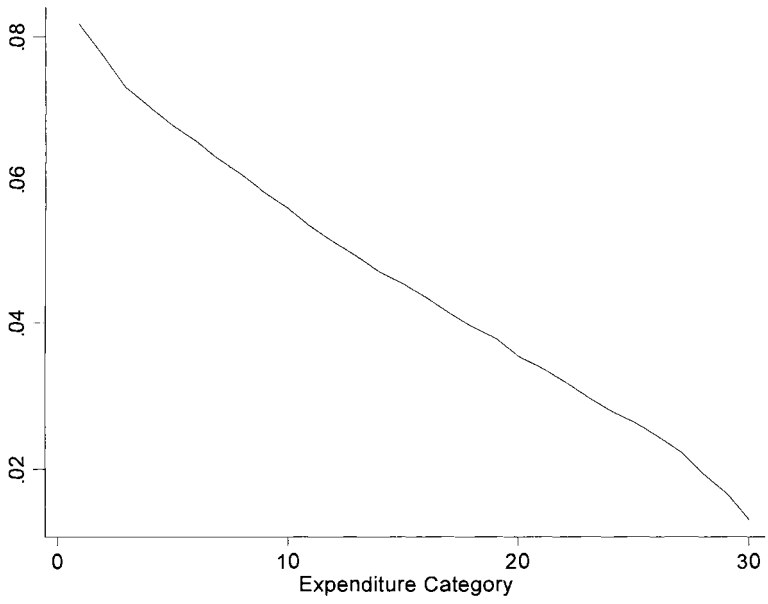

Fig. 13.16 Net benefit ratio by expenditure category: Rural population

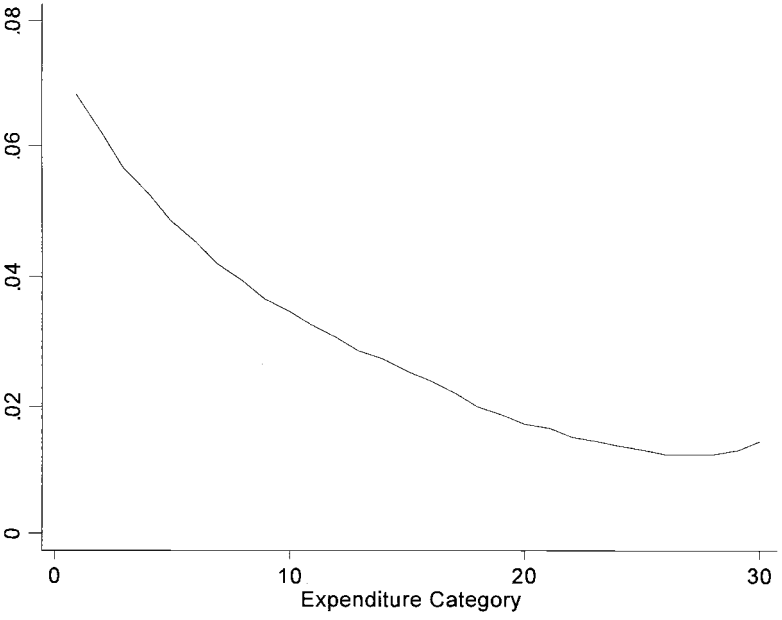

Fig. 13.17 Net benefit ratio by expenditure category: Urban population

net buyer of wheat and expresses the household's deficit as a fraction of total household expenditure. These figures show by how much Ethiopians at each level of living would benefit from a reduction in the price of wheat. Since the ratio expresses the net benefit as fraction of total household consumption, a flat line would show that all rural households benefit proportionately; thus, the change is neither regressive nor progressive. Our data show that a reduction in the price of wheat would benefit poor households disproportionately and hence be progressive. This is true for the population as a whole (figure 13.15), for the rural population (figure 13.16), and for the urban population (figure 13.17). These figures also suggest that the magnitude of the deficit as a share of total expenditure is fairly large for the poorest households (slightly higher than 8 percent) and close to insignificant for the richest households (between 1 and 2 percent).

In summary, our analysis indicates that (a) net buyers of wheat are poorer than net sellers of wheat, (b) there are more buyers of wheat than sellers of wheat at all levels of income, (c) the proportion of net sellers is increasing in living standards, and (d) net benefit ratios are higher for poorer households, indicating that poorer households benefit proportionately more from a drop in the price of wheat. In light of this evidence, it appears that the *average* household at all levels of income benefits from food aid and that—somewhat surprisingly—the benefits go disproportionately to the poorest households. Several caveats must be kept in mind. First, even the nonparametric regressions are averages by income category and so could mask underlying trends. The extent to which these averages reflect the true effects of price changes on poverty depend on whether these averages truly represent the typical household, or whether there is a significant amount of variation *among* poor households even at the poorest income levels. Second, we have not considered dynamic effects. It is possible that higher wheat prices could increase the incentive to invest in agriculture and eventually lead to lower wheat prices.

We have established that food aid is likely to help the poor disproportionately. We have also established that for the poorest households the deficit is large at around 8 percent, and so the overall impact of food aid on household welfare can have a substantial impact on the poorest households. What we still do not know is whether food aid has a significant impact on prices. We turn now to this issue.

13.5 Does Food Aid Depress Wheat Prices?

To answer this question, we use the supply-and-demand framework presented in figure 13.18. For simplicity, we assume constant-elasticity demand and supply functions,

$$D = k_0 P^{-\varepsilon} \text{ and } S = k_1 P^{\nu},$$

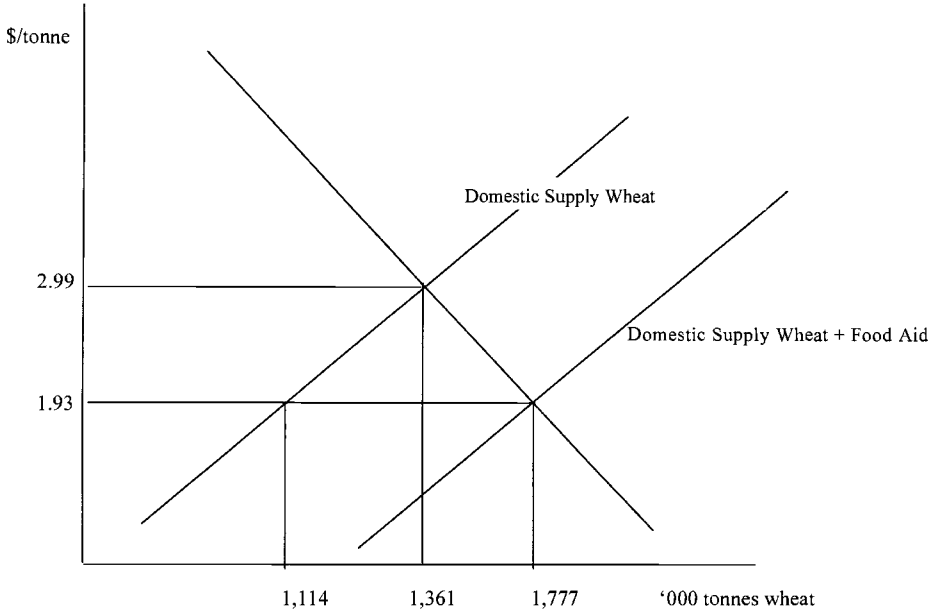

Fig. 13.18 Price effects of food aid

Notes: $1.93 is the production weighted (by region) average of producer prices for wheat received in Ethiopia in 1999 converted at the average nominal exchange rate of 8.23 birr per dollar. 1,114 is total thousands of tonnes of wheat produced in Ethiopia in 1999. 1,777 is total thousands of tonnes of wheat consumed in Ethiopia in 1999 or 1,114 plus food aid equal to 663 thousand tonnes of wheat. $2.99 is the price that would prevail in the market if food aid wheat were not imported. It is obtained assuming constant elasticity of supply and demand functions, an elasticity of supply of wheat equal to .45, and an elasticity of demand for wheat equal to –.6.

where k_0 and k_1 are parameters, P is the market price of wheat, and ε and ν are demand and supply elasticities, respectively. Our estimate of P is a production weighted regional average of wheat producer prices for 1999. Our estimate of the elasticity of supply is 0.45 and is based on Soledad Bos (2003). Our estimate of the elasticity of demand is based on Regmi et al. (2001), who found that low-income countries have own-price elasticities of demand for cereals of about –.6. Using these estimates and the observed quantities of wheat produced and consumed in Ethiopia, we are able to calibrate the model. The resulting supply and demand for wheat in Ethiopia are given by

$$D = 41{,}325P^{-.6} \text{ and } S = 104P^{.45}.$$

Using these estimates of the supply and demand functions, we find that the price of wheat would be $295 per tonne in the absence of food aid compared with an average observed price of $193 per tonne in 1999. We also

find that the price increase would lead to an increase in producer surplus of around US$125 million and a reduction in consumer surplus of around US$159 million. Overall, the increase in the price of wheat leads to a net welfare loss of approximately US$34 million. There were roughly 12 million households in Ethiopia in 1999, of which 4.3 million reported spending money on wheat and 0.8 million reported earning income from wheat. Therefore, *on average,* the loss in consumer surplus works out to roughly US$37 per household per year for households that consume wheat, and the gain in producer surplus works out to roughly US$157 per household per year for households that sell wheat. In Ethiopia, where the poverty line is roughly Br1,057 ($132), these effects are quite large.

13.6 Conclusions

The argument against developed countries' agricultural subsidies is largely motivated by a desire to improve the living standards of the world's rural poor. Yet, for countries like Ethiopia that are net food importers, a rise in food prices leads to a *net* welfare loss. This might be acceptable if, in the process, real income were being transferred from the relatively better-off urban population to the rural poor. However, our analysis suggests that this is not the case. Although households at all levels of living standards benefit from a reduction in food prices, the benefits are proportionately larger for the poorest households. Rough estimates suggest that the welfare impacts of the price changes associated with food aid are substantial.

Because of the magnitude of the average welfare effects per household, we believe that this issue warrants further attention. In particular, it will be important in future work to confirm that prices in remote areas follow the same pattern as prices in major retail centers. To better understand where the price effects of food aid are being felt and how the magnitude of these effects varies across locations, it will also be important to compare food aid deliveries to local production by region or wereda. A somewhat more difficult issue has to do with the timing of food aid deliveries. If food aid is not delivered in a timely manner, it could aggravate the cyclicality of prices associated with the harvesting and lean seasons due to inadequate storage. The most difficult issue has to do with the disincentive effects of food aid. Again, given the magnitude of the price changes associated with food aid and the associated per-household welfare implications, this seems like an issue worth exploring.

Appendix

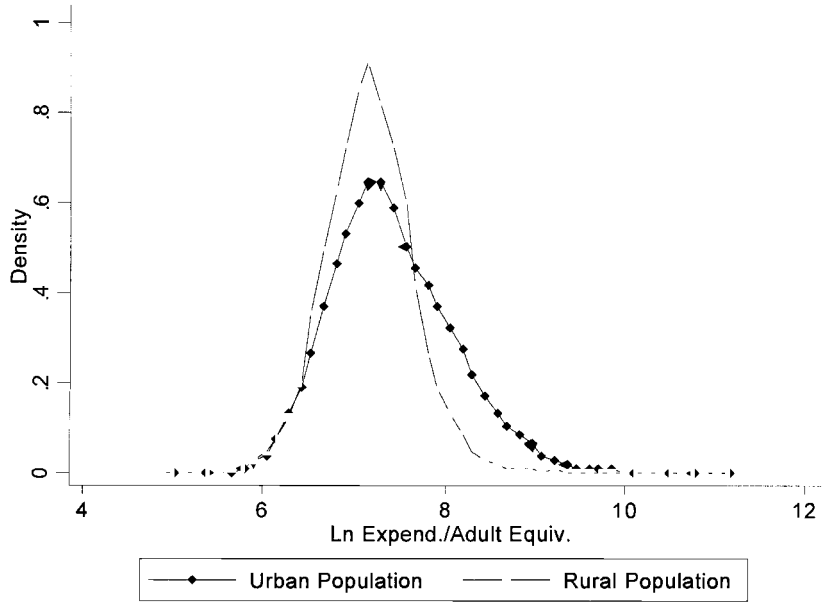

Fig. 13A.1 Living standard of entire population by urban/rural

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Comment

Rohini Pande

Food donations or sales substantially below market price by a country with an exportable surplus of food to a country in need are defined as food aid.

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Supporters of this form of aid have argued that it is an effective means of reducing hunger; that, used for food for work programs, it may stimulate development; and that by reducing the need for food imports it prevents large cumulative deficits for poor countries, and so provides a platform for growth. Opponents argue that food aid increases the dependence of developing countries on food imports. The dumping of the surplus production for free or nearly no cost to poorer nations means that the farmers from such countries either cannot produce at competitive prices or lose the incentive to produce entirely (leading, over time, to the deterioration of the infrastructure of production). They also argue that food aid is inefficient—it often doesn't reach the most needy, and has high administrative costs.

Credible empirical evidence on the role of food aid in combating poverty is, however, very limited. Levinsohn and McMillan's study is an important first step. They use household-level nonparametric regressions, based on two Ethiopian household surveys (1999–2000), to identify the relationship between household income and the household's selling or buying wheat (a cereal typically distributed by food aid programs). Their main results are as follows:

1. Net buyers of wheat are poorer than net sellers.
2. At all income levels there are more buyers of wheat than sellers. Only 12 percent of Ethiopian households sell wheat.
3. The net benefit ratios are higher for poorer households, indicating that poorer households benefit proportionately more from a drop in the price of wheat.

Levinsohn and McMillan also undertake a welfare analysis of food aid in Ethiopia. They treat the Ethiopian wheat market as a partial equilibrium in a closed country, which received extra wheat via food aid. They observe the actual price (with the wheat aid), and then calculate a counterfactual wheat price that they believe would have held, given some posited elasticity of demand, absent food aid. Finally, they calculate the distributional effect under the counterfactual price and conclude that the poor were typically better off with the low (with food aid) price rather than the high (without food aid) price.

Based on these findings, they conclude that Ethiopian households at all levels of income potentially benefit from food aid, and that the benefits go disproportionately to the poorest households.

Discussion

While focused on food aid, this paper is an important contribution to the broader program evaluation literature, which examines the poverty impact of different public policy interventions. The paper provides valuable evidence on the potential impact of food aid on households at different points in the income distribution. However, the exclusive focus on household ben-

efit ratios at a single point in time limits the lessons to be learned regarding the overall worth of food aid. In order to conclude whether food aid is a beneficial policy intervention one would need a more comprehensive analysis of the history of food aid in Ethiopia, and an analysis of the way that aid is targeted. I will address these issues in turn.

History and Context

Levinsohn and McMillan consider households' wheat trading status as of 1999–2000 and show that food aid today can benefit the poor. However, food aid has been important in Ethiopia since the early 1980s (see figure 1 in Jayne et al. 2002). This history implies that to evaluate more effectively the worth of food aid as a public policy one must also ask whether the observed short-run beneficial effect of food aid is a result of a history of food aid. That is, in the long run can food aid change production patterns and thereby worsen poverty? This is particularly important because most critics of food aid point to the long-run disincentive effects of food aid for domestic production.

Ideally, therefore, one would like to augment this study with an analysis of net benefit ratios along the Ethiopian income distribution pre– and post–food aid. This would tell us whether the provision of food aid was associated with households' changing from being net producers of wheat to becoming net consumers of wheat. In the absence of longitudinal or repeated cross-sectional data that allow for such a direct assessment of the dynamics of food production, indirect evidence could be used to examine the dynamics of food aid.

One possibility would be to use aggregate data to examine the evolution of annual wheat production, amount of food aid, and wheat prices between 1980 and 2000.[1] Such an analysis, while unlikely to be informative about the causal impact of food aid, can provide evidence on whether changes in food aid provision were correlated with long-term changes in production patterns in Ethiopia.

It may also be possible to exploit the fact that food aid programs do not cover all crops to provide further indirect evidence on the long-term effects of food aid. It would be interesting to see whether the net benefit ratios along the income distribution look similar for another important crop that is not covered by food aid programs. This analysis could be made more rigorous by undertaking a difference-in-difference analysis that exploits, in addition to differential crop coverage by food aid, cross-regional differences in food aid flows.

Turning to the welfare analysis undertaken by the authors, it would have been good to have more information on the relevance of the assumed de-

1. Figure 1 in Jayne et al. (2002) suggests that the responsiveness of food aid to domestic food production is relatively limited.

mand and supply elasticities in the welfare analysis for Ethiopia. For, despite food aid, Ethiopia remains a net importer of wheat. Hence, if Ethiopia is a small player in the world wheat market, then the relevant wheat price for Ethiopia would be the world wheat price, and food aid need not depress food prices.[2]

Targeting

Levinsohn and McMillan's study examines the potential of food aid to help the poor. However, if this analysis is to be relevant for policy design it is important to ask who, in reality, benefits from food aid programs. Two recent papers, Jayne et al. (2002) and Clay, Molla, and Habtewold (1999), specifically examine who received food aid in Ethiopia during 1995–96. Both papers found evidence of imperfect targeting—the very poor are more likely to get food aid, but so are the very rich. They also report evidence of inertia in both the regional and household-level allocation of food aid over time. That is, the best predictor of a household or region's current food aid recipient status is its previous recipient status. In contrast, the food aid need of a region or household does vary over time. They therefore hypothesize that the rigidity in food aid targeting is probably due to high fixed program costs, rigidities in the governmental process of determining food aid allocations to local administrative units, and political income-transfer objectives.

Per se, these findings do not affect any of Levinsohn and McMillan's analysis. They do, however, suggest that any welfare calculation of the impact of food aid should take into account the partial targeting of such schemes.

Conclusion

If there are domestic markets for food, then an alternative to food aid is cash transfers. Clearly, all the welfare effects of cash transfers to the poor would be positive if they led to poor consumers buying up poor farmers' wheat. More generally, Coate (1989) shows that whether food aid is preferable to cash transfers depends on whether the relief agency distributing food aid is more efficient at transferring food to the poor than traders.

Food aid began in the 1950s as a means for rich countries to dispose of agricultural surplus. If the domestic imperatives of rich countries are such that some fraction of aid from rich to poor countries will always take the form of food aid, then Levinsohn and McMillan's results are reassuring (at least for the short run). However, if the form of aid to developing countries can be altered and food aid replaced with other forms of aid, such as cash transfers, then it remains unclear whether food aid is a preferred public policy intervention in situations other than emergencies.

2. I am grateful to Don Davis for this observation.

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IV

Other Outcomes Associated with Globalization (Risk, Returns to Speaking English)