

Household-Level Consumption in Urban Ethiopia: The Impact of Food Price Inflation and Idiosyncratic Shocks*

Yonas Alem[†] and Måns Söderbom[‡]

August 2010

Abstract

We use survey data to investigate how urban households in Ethiopia coped with the food price shock in 2008 and idiosyncratic shocks. Qualitative data indicate that the high food price inflation was by far the most adverse economic shock between 2004 and 2008, and that a significant proportion of households had to adjust food consumption in response. Regression results indicate that households with low asset levels, and casual workers, were particularly adversely affected by high food prices. In contrast, we find that household demographics and education matter little for the impact of the shock. Our analysis of idiosyncratic shocks indicates that losing one's job is a serious, uninsurable shock. We interpret the results as pointing to the importance of growth in the formal sector so as to generate more well-paid and stable jobs. Our results also imply that aid programs responding to food price shocks can be made more efficient by targeting low-asset households with members on the fringe of the labor market.

JEL classification: O12, O18, D12.

Keywords: consumption, food price inflation; shocks, Africa, urban Ethiopia.

[†] Department of Economics, University of Gothenburg, Sweden; School of Economics, Addis Ababa University, Ethiopia. E-mail: Yonas.Alem@economics.gu.se.

[‡] Department of Economics, University of Gothenburg, Sweden. E-mail: Mans.Soderbom@economics.gu.se.

* We would like to thank Arne Bigsten, Tessa Bold, Paul Collier, Stefan Dercon, Dick Durevall, Marie Gachassin, Gunnar Köhlin, Lennart Hjalmarsson, Francis Teal and seminar participants at the University of Gothenburg, participants at the CSAE conference "Economic Development in Africa", Oxford, March 21-23, 2010, and participants the Development Economics Workshop at Säröhus, Gothenburg, Oct 1-2, 2009 for very useful comments on earlier versions of the paper. The 2008/09 household survey was funded by Sida through the Environmental Economics Unit (EEU) of the Department of Economics, University of Gothenburg. Söderbom gratefully acknowledges financial support from Sida/Sarec. The views expressed in this paper are entirely those of the authors.

1. Introduction

In July 2008 food prices in Ethiopia had soared to an unprecedented level, on average 92 percent higher than twelve months earlier. Food prices then began to fall, and during the first six months of 2009 they stabilized at a level about 15% lower than at the peak in 2008, on average (Central Statistics Agency, 2008, 2009). These dramatic developments are illustrated in Figure 1. In this paper we use panel data on urban households in Ethiopia for 2008, 2004 and 2000 to investigate the effects of the food price shock in 2008. There are several reasons the effects on food consumption, and welfare more generally, may have been quite serious, at least for certain types of households.¹ First, the share of household expenditure spent on food in urban Ethiopia is high, suggesting that welfare is sensitive to food price changes. Second, little food production takes place in urban areas, thus higher food prices do not raise urban incomes. Urban households are not in a good position to produce for own consumption, another notable difference compared to rural households. Third, there is no formal insurance mechanism for this type of shock.

Taken together, these and other related factors suggest the welfare effects of higher food prices would vary considerably across urban households. One reason is that there is likely substantial heterogeneity across households in the ability to cope with shocks. Standard intertemporal models of consumption predict a small effect of a transitory price shock on utility if households are able to smooth consumption over time, e.g. by borrowing or by tapping into financial assets accumulated in the past. Since not all households in urban Ethiopia are in a position to smooth consumption along these lines, some will be more vulnerable than others. In particular, it seems likely that poor households may be unable to self-insure since they possess low levels of financial assets. Another reason why the welfare effects may vary across households is heterogeneity in consumption patterns. For example, in

our sample it is clear that poor households spend a larger share of their food budget on cereals, compared to households that are better off. As will be shown below, cereals one of the items within the food basket for which inflation was particularly high. Hence, it seems likely that poor households fared particularly badly during the period of high food prices.

The main goal of the paper is to establish what types of households were most adversely affected by the 2008 food price shock. Because the rapid food price inflation is an aggregate shock, identification of its effects is not straightforward. There does not exist in the cross-section a ‘control group’ of households that can be suitably compared to our sampled households which all experienced the shock. In view of this problem, our empirical approach consists of three different, but related, methods. First, we carry out a conventional before-after analysis, modeling the change in log consumption between 2004 and 2008 as a function of a set of household variables. This will tell us if and how changes in consumption varied across certain types of households over this period. A similar approach has been used by Glewwe and Hall (1998) in their analysis of the effects of the macroeconomic decline in Peru in the late 1980s on household welfare. Second, we undertake a dynamic comparison of consumption growth rates and their determinants, contrasting the shock period (2004-2008) to a baseline period (2000-2004). One attractive feature of using data from 2000-2004 to form a baseline is that price inflation over this period was low. Third, we investigate how self-reported effects of the food price shock on food consumption vary across households, using data from the most recent survey.²

Overall, we find that the dynamic comparison and the analysis of self-reported effects yield results that are qualitatively similar, with slightly better statistical significance for those based on the self-reported data. We find that households with low levels of assets, and households

headed by a casual worker, were particularly adversely affected by the food price inflation. In contrast, the results suggest that education has played at most a small role for the ability of households to cope with food price inflation. Similarly, household demographics appear to play a limited role in this context, suggesting that labor supply constraints are not first order important. We also consider the effects of idiosyncratic shocks such as the death or illness of a family member, the loss of assets, or unemployment. In this part of the analysis, we find that a job loss has a large negative effect on consumption growth, suggesting that households are unable to insure themselves against this type of shock.

Some implications for policy follow from our results. For example, our finding that workers whose skills are in low or volatile demand are very exposed points to the importance of facilitating for the creation of more relatively well-paid and stable jobs in urban Ethiopia. Policies facilitating for private sector growth may thus improve the ability of the urban population to cope with shocks. Our research also has implications for how to design effective policies in periods of high food prices. During the food price crisis in 2008, the Ethiopian government undertook to help urban households by providing low cost wheat. Since no explicit targeting of households was adopted, the allocation of the resources devoted to the support program may have been inefficient. For example, poor households had no better access to cheap wheat than relatively well-off households and therefore received less support than might have been possible with a well targeted program. With knowledge about which groups are least able to cope with shocks, better and more effective policies can be formulated.

The remainder of the paper is organized as follows. Section 2 provides background information on the performance of the Ethiopian economy and the inflation during 2004-2008.

Section 3 presents the conceptual framework forming the basis for our empirical analysis. Section 4 describes the data source and contains descriptive statistics. Section 5 contains the results from our econometric analysis. Section 6 provides conclusions.

2. Context: Inflation in Ethiopia

Ethiopia is one of the poorest countries in the world. The economy is predominantly agrarian; in the year 2009, for instance, about 43 % of the GDP, 60% of exports, and 85% of total employment was generated from this sector (CIA, 2009). Poverty is a serious development problem for the country and in the year 2005 about 38 percent of the population lived below the official poverty line. Bigsten and Shimeles (2008) document evidence indicating that shocks play an important role in moving people in and out of poverty. Beginning 2002, the Ethiopian government has adopted a development strategy called “Sustainable Development and Poverty Reduction Program (SDPRP)” centered on the principal goal of reducing poverty in the country.

Official statistics indicate that Ethiopia’s economy has grown rapidly during the last five years. Table A.1 in the Appendix shows some macroeconomic indicators. According to Table 1, real GDP on average grew by about 11 percent during the years 2004 to 2008. During the same period, however, the country exhibited the highest rate of inflation in its history and the highest in the world next to Zimbabwe in 2008 (CIA, 2009). The country has not suffered from high inflation prior to 2004 and annual average inflation was only 5.2 percent 1980/81-2003/04. The major hikes in the general price level occurred during war and drought times. The highest inflation episodes of 18.2, 21.1 and 15.5, respectively, occurred in 1984/85 due to severe drought, in 1991/92 at the peak of war, and in 2003 following drought (Loening et al. 2009).

Since 2005, global food prices have also been increasing. International food prices in April 2008 were 60 percent higher than 12 months earlier. There is some evidence indicating that world food prices have been driven by higher grain prices. For instance the international price of wheat more than tripled between 2002 and March 2008. The price has since then come down, but as of August 2008 it remained 70 percent higher than the average price in 2006. Similar trends have been exhibited for other cereals and food items (Ahmed, 2008; Ivanic and Martin, 2008).

Following trends in international food prices, inflation continued to increase after 2005 in Ethiopia as well, despite good weather and an agricultural production boom which according to official figures exhibited about 13 percent growth rate over the period 2004-2008. Inflation in general was mainly driven by food price inflation, which rose from 18 percent in June 2007 to a peak of 92 percent in July 2008. Overall inflation rose from 15 percent in June 2007 to 55 in June 2008 (Loening et al. 2009).³

Several factors have been mentioned as causes of the recent global food price inflation, for example: rising population; rapid economic growth in emerging economies which resulted in increased food demand; high energy and fertilizer prices; increased use of food crops for bio-fuels; depreciation of the US dollar; and declining global stocks of food grains due to changes to buffer stock policies in the US and European Union (Ahmed, 2008). FAO (2008a) however rejects the claim that emerging economies such as China and India have been the culprits behind the food price explosion, since domestic production in these countries has been growing in parallel during the same period. Rather, the use of agricultural products, in particular maize, wheat and vegetable oil, as feedstock for biofuel production has been the

most important factor behind the rise of global food prices during 2005-2008. More recently, Gilbert (2009) argued that the world food price hikes in 2006-2008 are mainly explained by depreciation of dollar and future market investments.

In summary, there appears to be little consensus on why Ethiopia experienced such a rapid rate of inflation. World Bank (2007) and IMF (2008) argue that excess aggregate demand generated by expansionary monetary policy were key driving factors, calling for forceful policy tightening. EDRI (2007) and FAO (2008b) however point out that domestic and external factors account for the recent inflation, among them (i) increase in international commodity prices including oil; (ii) structural change and continued good economic performance; (iii) increasing supply of money and injection of cash into the rural economy; (v) changes in farmers' behavior to supply products more uniformly over the year (improvements in access to micro-credit, storage facilities, marketing information, etc; and (vi) increased local purchases by governmental food security institutions, agricultural cooperatives, and relief agencies. More recently, Loening et al (2009) have argued that in the short to medium run, agricultural supply shocks and inflation inertia strongly affect domestic inflation in Ethiopia, causing large deviations from long-run price trends. In the long-run however, domestic food and non-food prices are determined by the exchange rate and international food and goods prices which means that the exchange rate and international prices explain a large fraction of Ethiopia's inflation. Whatever the causes were however, there has been unprecedented high rate of inflation in Ethiopia during 2005-2008 mainly driven by food price inflation and it is important to see its effect on household welfare using detailed household level data, which is the main objective of this study.

3. Conceptual Framework: Shocks and Vulnerability

The impact of shocks or adverse events, and the threat of such events, on individual and household welfare in developing countries is a research area which has attracted a lot of interest both from academics and policy makers.⁴ Much of the empirical literature on the effects of shocks takes as a starting point the theoretical result that the impact of temporary shocks on consumption will be small for households with access to perfect insurance and credit markets.⁵ Recognizing that credit and insurance markets in poor countries normally feature significant imperfections, the development literature considers other, sometimes informal, mechanisms for managing risk and smoothing consumption. For example, in the absence of credit and insurance markets, households may undertake their own precautionary measures to reduce the impact of shocks on welfare.⁶ Rosenzweig and Wolpin (1993) for instance document that bullock stocks have been used for consumption smoothing in rural India.⁷ Nevertheless, the empirical literature for developing countries, which primarily is concerned with rural households, typically provides evidence that shocks tend to affect welfare suggesting limited ability of in particular poor households to smooth consumption over time (e.g. Townsend, 1994; Gleewe and Hall, 1998; Dercon, 2004; Skoufias and Quisumbing, 2005).

Our main aim in this paper is to document the impact of the food price shock in 2008 on the welfare of urban households in Ethiopia. We specifically try to determine if and how the causal effect of the food price shock varied with household characteristics, which sheds light on whether certain types of households are relatively vulnerable to food price shocks.⁸ Two types of outcome variables are considered in the analysis. The first is consumption per adult equivalent (henceforth, consumption), a variable that has been used as a proxy for well-being

by a large number of authors in the literature.⁹ We define the effect of the shock on household consumption as

$$(1) \quad \Omega \equiv E(\ln C_{it} | \mathbf{X}_i, \delta_i, t, S_t = 1) - E(\ln C_{it} | \mathbf{X}_i, \delta_i, t, S_t = 0)$$

where C_{it} refers to consumption in household i at time t , $\mathbf{X}_i$ is a vector of observable household characteristics, δ_i is an unobserved household fixed effect capturing time invariant heterogeneity across households (e.g. with respect to the rate of time preference and risk aversion), and S_t is a dummy variable equal to 1 in the period of the food price shock and zero in all other periods. We distinguish between food consumption and general (including food) consumption here.

Our second outcome variable is based on qualitative, self-reported data on the effects of the food price shock as perceived by the respondents themselves. In the survey we specifically asked how the food price shock affected food consumption of the household (distinguishing *very negatively*, *negatively* or *not at all* as possible answers) and whether the household cut back on the quantity of food consumed as a result of the food price shock (yes or no).¹⁰ Because the underlying survey questions refer specifically to the shock that we are interested in, the impact of confounding factors, such as energy price inflation or economic growth, should be minimal. This is potentially an important advantage compared to the analysis based on consumption data, where confoundedness clearly may be an issue. A potential weakness of the qualitative data is that answers are subjective and therefore not necessarily comparable across households if different households have different reference points. Moreover, because only a small number of outcomes are distinguished in the qualitative variables they may not be very informative. Thus, there are strengths and weaknesses associated with both types of outcome variables, but since these are meant to proxy for a common underlying unobservable

variable (i.e. household welfare associated with food consumption), studying these outcomes jointly should be informative.

We specify the effect of the food price shock on consumption as

$$(2) \quad \Omega = \gamma_0 + \mathbf{X}_i \boldsymbol{\gamma}.$$

where γ_0 is an intercept and $\boldsymbol{\gamma}$ a parameter vector. With this specification, if the ability to cope with the food price inflation varies depending on household characteristics, this will be reflected by some or all elements of the vector $\boldsymbol{\gamma}$ being different from zero. This relates to vulnerability: for example, if the first element of $\boldsymbol{\gamma}$ is negative, this is interpretable as indicating that households with high values of the associated X -variable are relatively vulnerable to food price shocks. Drawing on the discussion in Glewwe and Hall (1998), we hypothesize that the ability to cope with the 2008 food price inflation will have varied with socioeconomic characteristics, such as household assets, source of livelihood, education and household demographics. In the empirical analysis below we specifically include the following variables in the vector $\mathbf{X}$: household size and its square; the dependency ratio in the household, defined as the ratio of children below the age of 15 and elderly above 65 to adult members; household assets; the age, education, occupation and sex of the household head; and location of the household. Time varying variables are measured in the beginning of the period, to mitigate endogeneity bias. The specification for the qualitative dependent variables is the same, except that we replace the linear functional form with probit.

To see how Ω can be identified, note that (2) follows from the following linear model of expected consumption:

$$(3) \quad E(\ln C_{it} | \mathbf{X}_i, \delta_i, t, S_i) = \alpha_0 + \beta_0 t + \gamma_0 S_i + \mathbf{X}_i \boldsymbol{\alpha} + (\mathbf{X}_i \cdot t) \boldsymbol{\beta} + (\mathbf{X}_i \cdot S_i) \boldsymbol{\gamma} + \delta_i$$

where α_0 and β_0 are scalars and α and β vectors. Suppose we have data for $t = 0, 1, 2$ with the shock occurring at $t = 2$. Taking first differences of (3) over periods 2 and 1, in order to eliminate unobserved time invariant heterogeneity, and adding a residual u_{i2} , we obtain the following regression model:

$$(4) \quad \Delta \ln C_{i2} = \beta_0 + \gamma_0 + \mathbf{X}_i(\beta + \gamma) + u_{i2}$$

where u_{i2} is assumed uncorrelated with the variables in the vector $\mathbf{X}$. Consider taking the before-after equation (4) to the data. We would define the dependent variable as the change in consumption between 2004 and 2008 and regress this on the explanatory variables in $\mathbf{X}$. The resulting parameter estimates would be interpretable as descriptive statistics, informative about patterns of consumption changes between the two time periods. But they are not interpretable as causal effects unless we insist that $\beta_0 = 0$, $\beta = 0$. This would amount to saying that in non-shock periods expected consumption growth is equal to zero and independent of household characteristics. Thanks to the availability of the baseline data, we can identify Ω under less unrealistic assumptions. Differencing the consumption equation over the two non-shock periods, we obtain

$$(5) \quad \Delta \ln C_{i1} = \beta_0 + \mathbf{X}_i\beta + u_{i1}$$

where u_{i1} is a residual. Combining (4) and (5) we can obtain the following expression:

$$(6) \quad \Delta \ln C_{it} = \beta_0 + \gamma_0 S_t + \mathbf{X}_i\beta + (\mathbf{X}_i \cdot S_t)\gamma + u_{it}$$

Estimating (6) using OLS we can thus identify γ_0 and γ (and hence Ω), from the time dummy and the coefficients on the interaction terms $(\mathbf{X}_i \cdot S_t)$, subject to the assumptions we have made above. This is how we will proceed below.

The above identification strategy draws on the treatment effects literature. In that literature, the most common way of constructing counterfactuals for treated individuals is to use data on

similar individuals not exposed to the treatment. As already discussed, in our application the food price shock is common to all households at one point in time, hence no control group exists in the cross-section. Instead we thus exploit the panel dimension of the data, and construct the comparison group as consisting of households observed prior to the shock period, in our case 2000-2004. The average inflation rate over the 2000-2004 period was lower than 4 percent on average, which stands in sharp contrast to the situation during 2004-2008.

4. Data and Descriptive Statistics

Our empirical analysis is based on survey panel data for 2008, 2004 and 2000. The most recent survey, fielded by us in late 2008 and early 2009, covered 709 households located in Addis Ababa, Awassa, Dessie and Mekelle. One of the key objectives was to generate data suitable for analysis of the effects of the food price inflation. We therefore included in the survey instrument several questions referring to the perceived effects of the food price inflation. We also ensured the data could be linked with data for 2004 and 2000, enabling us to analyze consumption growth. The two earlier waves of data derive from the Ethiopian Urban Socio-economic Survey (EUSS), organized by the Department of Economics at Addis Ababa University in collaboration with the University of Gothenburg in Sweden.¹¹ Out of the 709 households surveyed in 2008/09, 120 are new households included in the sample randomly. We surveyed these new households in order to investigate if the panel households – some of which were initially selected in 1994, see note 11 - have become atypical and not very well representative of the Ethiopian urban population. To form our estimation sample, we dropped 22 of the 589 panel households because information on these households was missing in the 2004 round. Our final sample based on the 2008/09 survey contains 567 households; 346 from Addis, 73 from Awassa, 71 from Dessie and 77 from Mekelle. Our dataset contains

information on household living-conditions including income, expenditures, demographics, health, educational status, occupation, production-activities, asset ownership and other variables. In addition, new modules on shocks and coping mechanisms were included in the 2008/09 survey instrument.

We first consider descriptive statistics for variables measuring shocks and coping mechanisms. Table 1 provides information on the incidence of shocks in urban Ethiopia during 2004-2008 based on self-reported data obtained in the most recent survey. By far the most common shocks refer to food price inflation (94 percent) and rising energy costs (74 percent).¹² Looking at idiosyncratic shocks, the most commonly cited one is death of a household member (non-spouse) (9 percent), followed by serious illness of wife (6 percent). When asked to indicate the most influential shock (idiosyncratic or covariate) during 2004-2008, 89 percent of the households considered food price inflation as the main shock, which completely dwarves the other types of shocks. A follow-up question on households' expectation of the re-occurrence of the most influential shock was also asked and 74 percent of the households responded that they thought the risk of such a shock happening again had increased, compared to what it was before the shock.

There has been a lot of evidence documented in the literature on shocks and coping mechanisms that households faced by uninsured risk and shocks adopt their own coping mechanisms to protect themselves against a serious decline in welfare. In view of this, the households interviewed in the 2008/09 survey were asked about the coping strategies they adopted in response to the food price shock. Table 2 presents these data. The four leading coping mechanisms are as follows: 38 percent of the households reported that they cut back on the quantities served per meal; 20 percent received assistance from relatives and friends both

from domestic and foreign sources; 16 percent coped by shifting resources from other consumption items to food; and 9 percent of the households earned extra income from activities such as increased labor force participation or renting out residential houses. Intriguingly, only 6 percent of the households seemed to use own assets or loans to cope with the shock. This suggests that consumption smoothing is not common in urban Ethiopia.

The data thus suggest the food price inflation has been a major adverse economic event in urban Ethiopia, affecting the consumption and, presumably, the welfare of a significant number of households. In the next section we discuss our econometric results on the heterogeneous effects of the food price inflation. Table 3 shows summary statistics for the key variables in the regression analysis, across the three years considered. Since households that were sampled for the first time in 2008/09 cannot be included in consumption growth equations, these are excluded from our estimation sample. All financial variables are expressed in real terms using 2008 as the base year. For general consumption, as well as food consumption per adult equivalent, we observe a modest increase in the sample average over time. This does not necessarily generalize for the population, because of the panel dimension in the data (e.g. it could be because average age increases with time across the samples). In 2008 the sample average of 4.78 corresponds to 119 birr per month. The share of food expenditure in total expenditure is around 0.8, suggesting a high sensitivity of welfare to food price changes. Related to this, sixty percent of the households interviewed in 2008/09 say that food consumption has been very negatively affected by the food price inflation; a further 29 percent say that the effect has been negative, leaving 11 percent stating that there had been no effect. Thirty-one percent of the households in the estimation sample state that they have cut back on the quantity of food served in response to the food price shock.¹³ About half of the household heads are female, and the average age of the head is 55 in the last wave of the data.

In 2008 the sample average of household size is 5.07 and the average dependency ratio is 0.39. Both numbers are much lower than in 2000, reflecting a natural process by which children and elderly exit from the household as they become older. Education is low on average, and around 40 percent of the household heads have no education. Slightly less than half of the households own their own house, and the average log real value of household assets ranges between 6.95 in 2000 (which corresponds to 1,043 Birr) and 7.38 in 2008 (1,598 Birr).¹⁴ The most common type of occupation for household heads that are in the labor force is to be self-employed (own account), followed by civil servant. However, between 37 and 48 percent of the heads are out of the labor force, a category that includes housewives, retired individuals and other individuals not actively seeking work.

5. Econometric Analysis

5.1 Consumption Levels

We begin by reporting results from regressions in which log consumption per adult equivalent in 2008 is the dependent variable, distinguishing food consumption and general (all types of) consumption. By definition, since the dependent variable is in levels and not differences, these results are not informative about vulnerability to food price shocks. The results are of interest for two reasons. First, estimating consumption levels regressions constitutes a useful ‘quality control’ on the consumption data. For example, were we to find no positive association between education and consumption, one might be concerned that our consumption data are not very accurate. Moreover, we consider results with and without the new households included, so as to check if the panel households have systematically different consumption levels compared to a random sample drawn from the 2008 population. Second, documenting the correlates of consumption is of interest in and of itself. The analysis sheds some light on,

for example, the differences in consumption across households of differing size, a question that has interested economists for a long time (see e.g. Deaton and Paxson, 1998) and the correlation between consumption and education. In all regressions reported below, standard errors are robust to heteroskedasticity.

The results, shown in Table 4, can be summarized as follows: consumption is somewhat lower in households in which the head is female; there is no evidence that consumption varies with the age of the household head or with the dependency ratio; consumption falls with household size until there are around 10 household members; consumption rises with education and household assets; consumption is lower amongst households in which the head is a casual worker than in households in which the head has a different occupation (including being out of the labor force, which is the reference category in these regressions); and there are no systematic differences across locations, conditional on other explanatory factors. The signs of these partial correlations appear reasonable. Furthermore, the explanatory variables explain around 50 percent of the variation in consumption, which is a fairly good fit. We conclude that the consumption data appear to be of sufficiently high quality for it to be possible to learn about vulnerability from consumption growth regressions. Finally, we observe that the coefficient on the dummy variable for new households is small and completely insignificant, suggesting that there are no systematic differences in consumption across new households and panel households.¹⁵

5.2 Changes in Food Consumption

We now analyze how consumption growth rates differ across households depending on observable characteristics. We begin by modeling food consumption growth rates during 2004-2008 as a function of household characteristics. A similar before-after approach has

been used by Glewwe and Hall (1998). Results are shown in Table 5, column 1. We find evidence that consumption growth over this period varies with household composition and household size. The dependency ratio has a negative and significant coefficient, suggesting lower growth rates in households with a large share of dependants. There is an inverse-U relationship between household size and consumption growth. The point estimates suggest that for households with less than eight members, there is a positive relationship between size and growth. We find no evidence of systematic growth differences depending on assets; in fact the estimated coefficients on the dummy for house ownership and log of household assets are both negative but insignificant. Age has a convex effect on food consumption growth, suggesting that moderately old households have experienced the lowest consumption growth rates over the 2004-2008 period. The coefficients on primary, secondary and tertiary education are negative, suggesting, somewhat surprisingly, that households headed by individuals with some education have experienced lower consumption growth rates than households in which the head has no education. Consumption growth varies across occupations of the household heads. In all the regressions shown in this section, the reference category (omitted dummy) consists of individuals out of the labor force. Casual workers stand out as being the job category for which consumption developed least favorably during 2004-2008, recording an average growth rate of consumption about 42 percent lower than the reference category.¹⁶

As discussed in Section 3 we cannot infer from these results how the causal effect of the food price inflation varies with households characteristics, since we do not know how consumption would have developed in the absence of the shock (the counterfactual). The macro nature of the shock implies it is not possible to find a counterfactual in the cross-section, which is why we exploit the panel dimension in the data. The period 2000-2004 was characterized by low average inflation, presenting us with a potentially useful comparison period. We show results

for the 2000-2004 period in Table 5, column 2. We are primarily interested in how these results differ from those for 2004-2008. To assess whether these differences are significantly different across the two periods, we pool the data, interact a dummy variable for the shock period with all explanatory variables, and regress the change in log consumption on all explanatory variables and the interaction terms (see eq. [6] above for the exact specification). The estimated coefficients on the interaction terms, and the associated standard errors (which are robust to heteroskedasticity and serial correlation) are shown in Table 5, column 3.¹⁷ Note that, by construction, these coefficients are equal to the difference in the coefficients between 2004-08 and 2000-04. We find that the coefficient on log household assets is higher in the shock period than in the baseline period, and that the difference is significant at the 5 percent level. In the baseline period, the coefficient on assets is negative and significant, possibly reflecting a convergence process by which households that have low assets initially tend to record higher subsequent growth rates. In contrast, in the shock period, the asset coefficient is close to zero. The results for the baseline period thus suggest that the ‘normal’ relationship between initial assets and subsequent growth is negative. Taking this to be the counterfactual relationship, we hence obtain evidence that households with little assets were particularly adversely affected by the food price shock. Households with higher levels of assets were better able to sustain food consumption during the shock period.

We also find that several of the coefficients on the occupation dummies are significantly different across the two periods, suggesting that labor market status matters for the effect of the food price shock. Recall that the omitted occupation dummy is ‘out of the labour force’. Hence, in the baseline period, participating in the labor market tends to lead to higher rates of consumption growth than if you are out of the labor force. In the shock period, however, this pattern is reversed. To the extent that the baseline period is a valid counterfactual, this is

interpretable as saying that the food price inflation had adverse effects on those in the labour market. The results in column 3 suggest civil servants, public sector employees and casual workers were the types of occupations most adversely affected by the food price shock. Different mechanisms clearly operate here. Civil servants and public sector employees have slowly changing nominal wages that will be eroded by high inflation. Casual workers, on the other hand, tend to have very uncertain and volatile earnings. The large growth shortfall recorded by this group thus suggests that high income variability in itself is associated with limited ability to smooth consumption, perhaps because of limited access to basic financial services such as overdrafts or savings accounts.

Some of the effects that were found to be statistically significant in the before-after analysis (column (1)) are not significant in the analysis based on the dynamic comparison. There is no strong evidence that the impact of the food price shock depends on household demographics. The coefficients on household size are fairly similar for the two periods and not significantly different. The difference in the dependency ratio effect is also not significant at conventional levels. It can be noted, however, that the estimated dependency ratio effect (column 3) is actually somewhat larger than the before-after estimate in column (1). The implied t-value is 1.58, so this effect is fairly close to being significant at the 10 percent level. The coefficients on the age of the household head are not significantly different across the two periods. This is also true for education, which can be interpreted as saying that education has not provided effective insurance against the food price shock.¹⁸ The coefficient on female household head is negative and significant at the 10 percent level.

As discussed in Section 3, we have data on the perceived impact of the food price shock on food consumption: very negatively, negatively or not at all. Assigning higher values to less

negative outcomes we model this variable using ordered probit.¹⁹ Column (4) in Table 5 shows the results. Reassuringly, most of the findings are similar to those obtained from the dynamic comparison contrasting the shock period to the baseline period. The coefficient on log household assets is positive and highly significant, supporting the notion that household with relatively high levels of assets were less affected by the food price shock. We also obtain a positive and significant (at the 10 percent level) coefficient on the dummy for house ownership, further supporting the idea that the effects of the shock vary with assets. Similar to the results for consumption growth we find a negative and significant effect of being a casual worker, suggesting that volatile incomes accentuate vulnerability. We also find statistically insignificant effects of household size and dependency ratio, although we note that the latter effect is negative and not too far from being significant at the 10 percent level. Unlike the results for consumption growth we find that tertiary education is associated with less adverse outcomes. We also find that age has a convex effect on the perceived severity of the effects of the food price inflation, suggesting that young household heads were less adversely affected than moderately old heads. The coefficients on age and age squared are jointly significant at the 10 percent level.

The final model that we consider in this part of the empirical analysis is a probit regression in which the dependent variable is equal to one if the household cut back on the quantity of food served in response to the food price shock, and zero otherwise. Unlike the other models shown in this table, a positive coefficient implies that an increase in the associated variable affects welfare negatively, and vice versa; i.e. the signs of the coefficients are expected to be the opposite of those for the previous regressions. Results are shown in Table 5, column 5. Again, we find strong evidence that household assets and house ownership mitigate the effect of the food price shock, and that casual employment of the household head is associated with

stronger sensitivity of food consumption to food price inflation. Taken together with the other results in Table 5, we thus have strong evidence that households with little assets and uncertain labor market outcomes are particularly vulnerable. The coefficients on age and age squared imply a concave relationship between age and the likelihood of consuming less food, suggesting that young households cope better with the food price shock than moderately old ones. However the coefficients on age and age squared are not quite jointly significant (p -value = 0.15), hence we do not reject the hypothesis that the impact of the food price shock is independent of the age of the household head. The household demographics variables have wholly insignificant effects, as is the case for education.

Why might the effect of the food price inflation on consumption vary with household assets? As discussed above, the standard explanation advanced in much of the literature on shocks is that assets enable households to self-insure against shocks. However, recall from the survey data reported in Table 2 that very few households in our sample appear to behave in a way consistent with self-insurance and consumption smoothing. Only about 6 percent of the households claim to have responded to the food price inflation by tapping into own assets or taking out a loan. This suggests that there is an alternative underlying reason for the relationship between assets and the impact of the shock observed in the data. Table 6 shows how food consumption patterns compare across households with high and low levels of assets for 2004, with the cut-off point defined as the sample median of the value of assets. Compared to households with asset values higher than the sample median, it is clear that households with lower levels of assets spend a larger share of their total food expenditure on items like cereals, pulses, spices, and coffee and tea, and a smaller share on meat, dairy products and oils and fats. The presence of such differences, which are all statistically significant, suggests that utility over food consumption is non-homothetic. More importantly, the last column of Table

7 shows price changes in specific food items between 2006 and 2008. Strikingly, there is a fairly clear pattern that the price increases have been particularly high for those food items more intensively consumed by the less well off. The price of cereals, for example, increased by 113% while that of spices rose by 102%. In contrast, for meat, which is more intensively consumed by richer households, the price increased by only 48%. Figure 2 plots the differences across the two sub-samples in food shares against the food price index. There is a clear negative association between these two variables. That is, in 2004, before food prices began to increase rapidly, the poorest households were allocating larger shares of their food expenditure towards food items for which subsequently prices increased atypically fast. This suggests that the effects documented for assets in the econometric analysis are attributable to underlying differences in the combination of food items consumed, depending on economic status.

5.3 Changes in General Consumption

We now consider a broader definition of the outcome variable, modeling general consumption growth rather than just food consumption growth. Results are shown in Table 7. Focusing on the estimates in column (3), it is clear that the results are very similar to those for food consumption in Table 5. Arguably, this is not very surprising given that the average food share in the data is as high as 0.8. We find a positive and significant (at the 5 percent level) estimate of household assets, and negative and significant effects of being a civil servant, a public sector employee or a casual worker. Possible reasons for these results have already been discussed above. All other effects are statistically insignificant. Moreover, most of the coefficients in the present regression are less significant than those in the food consumption models. This is not surprising: after all, one would expect the effects of higher food prices to matter more for food consumption than for the consumption of other products.

5.4 Idiosyncratic shocks

While the main focus of this paper is on the effects of the food price inflation, we also consider the effects of idiosyncratic shocks. Since there is cross-section variation in the incidence of idiosyncratic shocks, we can estimate the impact on consumption levels and growth and shed some light on whether idiosyncratic shocks are insured in urban Ethiopia.²⁰

Based on the 2008/09 survey data, we construct five idiosyncratic shock variables: death of a family member; illness of a family member; job loss of a family member; asset loss; and other idiosyncratic shocks, and add these to the set of explanatory variables in the growth models.²¹

Results are shown in Table 8. The variables measuring household demographics, assets, characteristics of the head and location are all included in these regressions, but we omit these results from the table in order to conserve space. Whether we look at food consumption or general consumption, or levels or growth rates, the result is the same: only job loss of a household member has a statistically significant negative effect. Quantitatively the job loss effect is large, reducing food consumption growth by 33 percent and general consumption growth by 37 percent. These results indicate, not very surprisingly, that urban households in Ethiopia cannot insure themselves fully against a job loss shock, and that when one occurs, the effects are very substantial. One way of interpreting the insignificance of the other types of shocks is that these are either easier to cope with, in terms of preserving the level of consumption, or that they simply do not matter at all.

6. Conclusions

In this study we use panel data on urban Ethiopian households to examine the effects of the dramatic food price inflation in 2008. We study how changes in food consumption and general

consumption relate to household-level variables. We also analyze self-reported data on the effects of the food price inflation on food consumption.

We obtain strong evidence that households with low levels of assets have been particularly adversely affected by the food price inflation. Overall, we assign a more important role to assets than, for example, do Glewwe and Hall (1998) and Lanjouw and Stern (1993) who, in different settings, find returns to endowments more important. We also find that households headed by a casual worker have been vulnerable to the food price shock. From the point of view of the urban poor, these are troubling results. With consumption oriented towards food items for which price increases have been particularly high, and being referred to informal employment and volatile earnings because of low skills, the urban poor appear to have been very adversely affected by the food price shocks.

Education appears to play a small role for the ability to cope with food price inflation. Only for one empirical specification – the ordered probit modeling the perceived impact of the shock - do we obtain a statistically significant coefficient on higher education. On balance we thus find little evidence supporting Shultz's (1975) hypothesis that education reduces vulnerability. Similarly, household demographics appear to play a limited role for the ability of coping with shocks. This suggests labor supply constraints are not first order important. For example, even though there are households in the sample with high dependency ratios, there is only weak evidence that this has hampered the ability of such households to respond to the shock, relative to other households. Given that food consumption is of primary importance, this is perhaps not very surprising. One possible implication, however, is that the ability of adults to care for the young and the elderly has diminished, but we do not have the data to

investigate this formally. Almost certainly there is a range of presumably adverse welfare effects of food price inflation that our empirical analysis fails to highlight.

The fact that aggregate (covariate) shocks are inherently not insurable limits the range of policy instruments that can be used to mitigate the effects of food price shocks. Findings like those in this paper can be used as a basis for the targeting of aid in response to such shocks. A more serious challenge for policy makers is to reduce the vulnerability of households to high food price inflation ex ante. One implication of our study is that the creation of good, well-paid and secure jobs reduces vulnerability. Recall that, analyzing the effects of idiosyncratic shocks, we found that experiencing a job loss has a large negative effect on consumption growth, suggesting that households are unable to insure themselves against this type of shock. We have also found that being a casual worker makes you vulnerable to food price shocks. Individuals at the fringe of the labor market may thus face large welfare fluctuations if food prices are volatile. This does not imply that such individuals are worse off on average than those out of the labor force. Rather, it implies that informal, uncertain employment does not provide individuals with a basis for accumulation of resources or stable levels of welfare. Seen in this light, from a welfare point of view the stagnation of the formal sector and the rapid expansion of the informal sector in Ethiopia during the last decade is arguably cause for concern (Bigsten, Gebreeyesus and Söderbom, 2009). Policies contributing to sustained growth and more jobs in the formal sector would have positive welfare effects through less volatile labor outcomes.

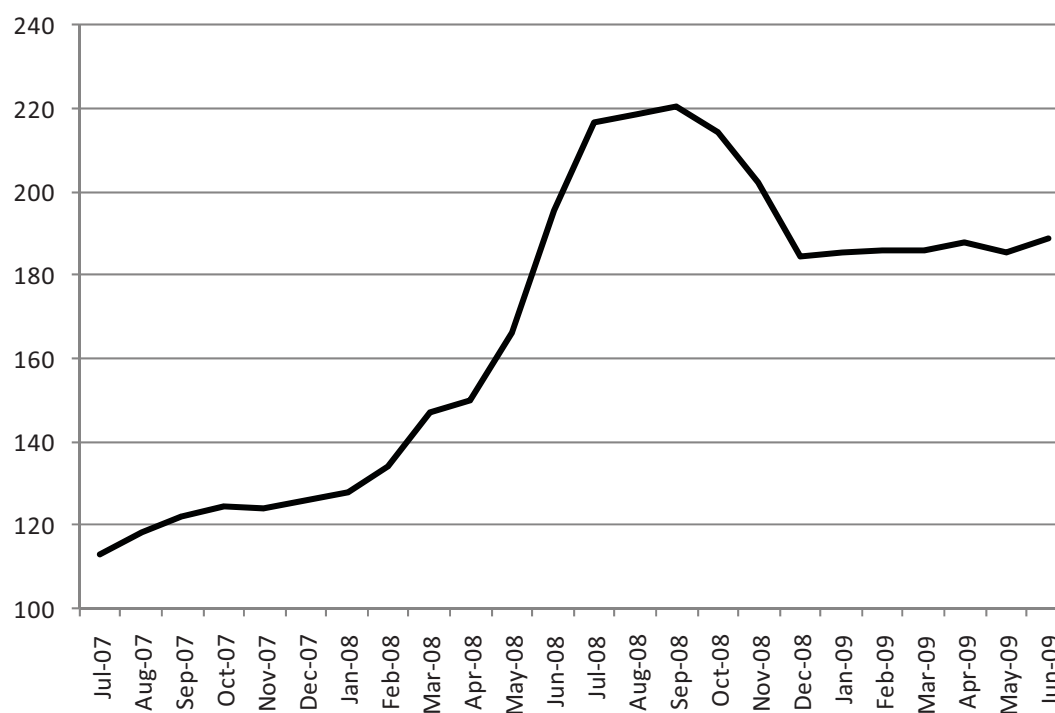
References

- Ahmed, S. (2008). "Global Food Price Inflation: Implications for South Asia, Policy Reactions and Future Challenges," Policy Research Working Paper No. 4796. Washington, DC: The World Bank,.
- Bigsten, A., Shimeles, A. (2008). "Poverty transition and persistence in Ethiopia," *World Development*, 36(9), 1559-1584.
- Bigsten, A. Gebreeyesus, M. and Söderbom, M. (2009) "Gradual Trade Liberalization and Firm Performance in Ethiopia," CSAE working paper WPS/2009-21. Oxford: Centre for the Study of African Economies, Department of Economics, University of Oxford.
- Central Statistics Agency (2008). *Country and Regional Level Consumer Price Indices, September 2008*. The Federal Democratic Republic of Ethiopia.
- Central Statistics Agency (2009). *Country and Regional Level Consumer Price Indices, August 2009*. The Federal Democratic Republic of Ethiopia.
- Central Intelligence Agency (2009). *The World Factbook. July, 2009*.
<https://www.cia.gov/library/publications/the-world-factbook/geos/et.html>
- Coate, S, Ravallion, M. (1993). "Reciprocity without commitment: Characterization and performance for informal insurance arrangements," *Journal of Development Economics* 40(1) 1-24.
- Deaton, A (1997). *The Analysis of Household Surveys: A Microeconomic Approach to Development Policy*. Baltimore: Johns Hopkins University Press.
- Deaton, A. 2002. Guidelines for constructing consumption aggregates for welfare analysis. Living standards measurement study working paper no. 135, World Bank, Washington D.C.
- Deaton, A. (2010). "Price indexes, inequality, and the measurement of world poverty," Presidential Address, American Economic Association, Atlanta, January 2010.
- Deaton, A., Grosh, M. (2000). "Consumption," in: Grosh, M. & Glewee, P. (Eds): *Designing household survey questionnaires for developing countries: lessons from 15 years of the living standards measurement study*. Oxford: Oxford University Press.
- Deaton, A. and C. Paxson (1998). "Economies of scale, household size, and the demand for food", *Journal of Political Economy* 106(5), 897-930.
- Dercon, S. (2004). "Growth and shocks: evidence from rural Ethiopia," *Journal of Development Economics* 74(2) 309-329.
- Dercon, S. (2006a). "Economic reform, growth and the poor: Evidence from rural Ethiopia," *Journal of Development Economics* 81, 1-24.

- Dercon, S. (2006b). "Vulnerability: a micro perspective," QEH Working Paper No. 149. Oxford: Department of Economics. Oxford University.
- Dercon, S., and P. Krishnan. 1998. "Changes in Poverty in Rural Ethiopia 1989-1995: Measurement, Robustness Tests and Decomposition." Working Paper, No. WPS 98/7, center for the study of African economies, University of Oxford,
- Dessus, S., Herrera, S. de Hoyos R. (2008). 'The Impact of Food Inflation in Urban Poverty and Its Monetary Cost'. Policy Research Working Paper 4666. Washington, DC: World Bank.
- EDRI (2007). *Determinants of Inflation in Ethiopia*, EDRI. The Federal Democratic Republic of Ethiopia.
- Fafchamps, M. (1993). "Sequential labor decisions under uncertainty: An estimable household model of West-African farmers," *Econometrica*, 61(5), 1173-1197.
- Fafchamps, M., Lund, S.S. (2003). "Risk sharing and quasi-credit," *Journal of International Trade and Economic Development*, 71(2), 261.
- FAO (2008a). *OECD-FAO Agricultural Outlook 2008-2017*.
- FAO (2008b). "Integrating the Crop and Food Supply and the Emergency Food Security Assessments", FAO/WFP Crop and Food Security Assessment Mission to Ethiopia, <http://www.fao.org/decrep/010/ah883e/ah883e00.htm>
- Friedman, M. (1957). *A theory of the consumption function*. Princeton: Princeton University Press for National Bureau of Economic Research.
- Gillbert L. C. (2009). "How to understand high food prices," presented on the 2009 ICABR conference, Ravello, Italy, 17-19 June 2009.
- Glewwe, P., Hall, G. (1998). "Are some groups more vulnerable to macroeconomic shocks than others? Hypothesis tests based on panel data from Peru," *Journal of Development Economics* 56, 181-206.
- IMF (2008) "Federal Democratic Republic of Ethiopia: 2008 Article IV Consultation Staff Report." IMF Country Report 08/264. Washington DC: International Monetary Fund.
- Ivanic, M. & Martin, W. (2008). "Implications of Higher Global Food Prices for Poverty in Low-Income Countries," Policy Research Working Paper WPS4594. Washington DC: The World Bank.
- Lanjouw, Peter and Nick Stern (1993). "Agricultural Change and Inequality in Palanpur 1957-84", in K. Hoff, A. Braverman and J. Stiglitz (eds), *The Economics of Rural Organization*. Oxford: Oxford University Press.
- Loening, L.J., Durevall, D., Birru, Y.A. (2009). "Inflation Dynamics and Food Prices in an Agricultural Economy: The Case of Ethiopia," Working Paper 347. Gothenburg: University of Gothenburg.

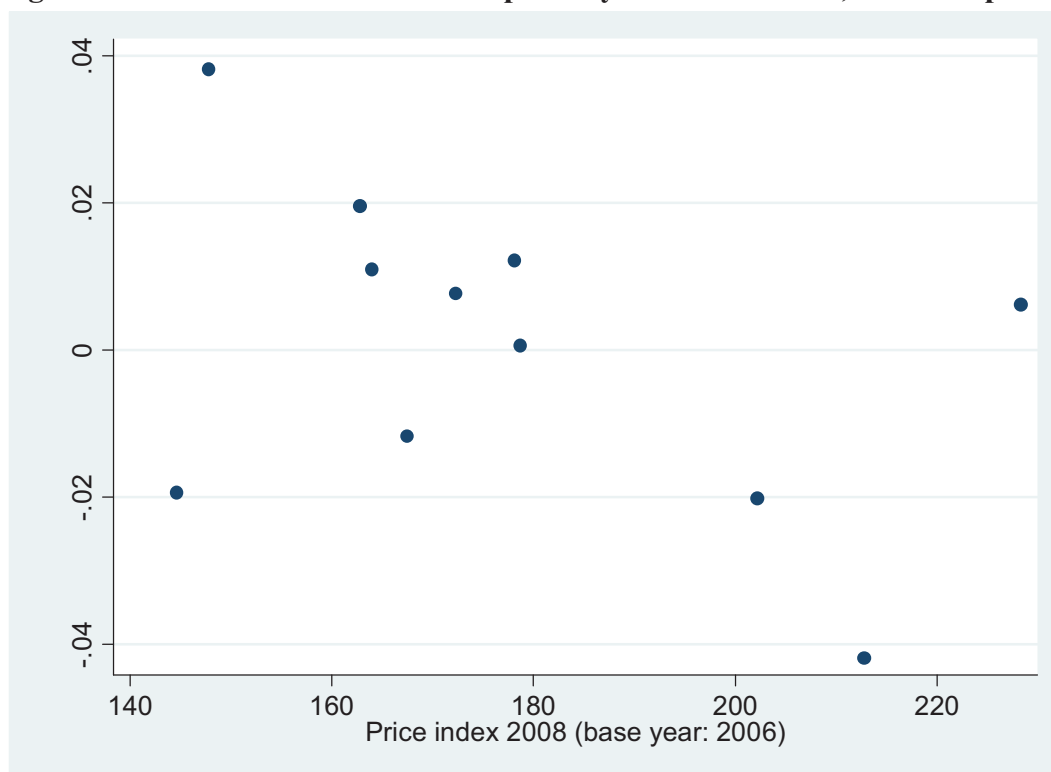
- Porter, C. (2008). "Examining the impact of idiosyncratic and covariate shocks on Ethiopian households' consumption and income sources," mimeo. Oxford: Department of Economics. Oxford University.
- Reardon, T., Nerdegue, C., Barrett, B., Stamoulis, K. (2007). "Household Income Diversification into rural nonfarm activities," pp. 115-141 in (eds.) Haggblade, S., Hazell, P., Reardon, T., *Transforming the Rural nonfarm Economy: opportunities and threats in the developing world*. Baltimore: John Hopkins Press.
- Rosenzweig, M. R., Wolpin, K.I (1993). "Credit market constraints, consumption smoothing, and the accumulation of durable production," *Journal of Political Economy* 101(2) 223.
- Schultz, T.W. (1975). "Human Capital and Disequilibrium," *Journal of Economic Literature* 13, 827-846.
- Skoufias, E., Quisumbing, A.R (2005). "Consumption insurance and vulnerability to poverty: A synthesis of the Evidence from Bangladesh, Ethiopia, Mali, Mexico and Russia," *European Journal of Development Research* 17(1) 24-58.
- Tadesse, M. 1996. "Food consumption and poverty in urban Ethiopia: A preliminary assessment. "In proceedings of the Fifth Annual Conference on the Ethiopian Economy, ed. Kebede, B., and M. Tadesse. Addis Ababa, Ethiopia.
- Townsend, R.M. (1994). "Risk and insurance in village India," *Econometrica* 62(3) 539-591.
- Wood, B., Nelson, C., Nogueira. (2009). "Food price crisis: Welfare impact on Mexican households,". presented at the International Agricultural Trade Research Consortium Research Symposium Seattle, Washington, June 22-23, 2009.
- Woldemichael, A. (2008). "Food Price Inflation and the Urban Poor in Ethiopia" presented at the 6th International Conference on the Ethiopian Economy, Addis Ababa, July 3-5, 2008.
- World Bank (2001). *World Development Report 2000/01. Attacking Poverty*. New York: Oxford University Press.
- World Bank (2007). *Ethiopia: Explaining Food Price Inflation Policy Note*. Washington DC. Processed.

Figure 1: Food Price Index in Ethiopia, July 2007 – June 2009



Note: The graph shows the price index for food for Ethiopia. December 2006 = 100. Source: Central Statistics Agency (2008, 2009)

Figure 2: Differences in food consumption by economic status, and food price inflation



Note: The vertical axis measures the difference in average food shares across households with low and high levels of assets. Each point in the graph represents one particular food item. See Table 7 for further details.

Table 1. Incidence of shocks, 2004-2008

	Household experienced this type of shock	This was the most influential shock
Increase in food price	0.94	0.87
Increase in energy price	0.74	0.01
Death of husband	0.05	0.02
Death of wife	0.02	0.004
Death of another member	0.09	0.02
Serious illness of husband	0.04	0.01
Serious illness of wife	0.06	0.01
Serious illness of another member	0.04	0.01
Divorce/separation/abandonment	0.01	0.004
Loss of job of a household member	0.04	0.01
Imprisonment for political reason	0.004	0.003
Destruction or theft of assets	0.04	0.01
Other shock	0.03	0.01
No shock	0.04	
Observations	709	684

Note: The numbers in the first column do not add up to 1.0 since households could indicate more than one shock. Household indicating there was no shock during the period are excluded from the calculations in the second column.

Table 2. Coping mechanisms to deal with food price inflation

	Sample proportion
Cut back quantities served per meal	0.36
Received assistance from relatives and friends	0.20
Shifted resources from other consumption items	0.16
Engaged in extra income generating activities	0.09
Reduced quality and quantity of food purchased	0.06
Used own saving	0.04
Received assistance from others	0.01
Borrowed money against household possessions	0.02
Received assistance from NGOs	0.01
Sold household possessions	0.003
Other	0.01
Did nothing	0.04
Observations	684

Table 3. Summary statistics

	(1) Year 2008		(2) Year 2004		(3) Year 2000	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
<i>Consumption</i>						
Log consumption per adult equivalent	4.78	0.63	4.76	0.70	4.70	0.78
Log food consumption per adult equivalent	4.56	0.63	4.46	0.73	4.43	0.82
Change in log consumption	0.01	0.69	0.05	0.73	-	-
Change in log food consumption	0.10	0.74	-0.02	0.81	-	-
Share of food in total expenditure	0.81	0.08	0.75	0.11	0.77	0.11
Food consumption very negatively affected	0.60					
Food consumption negatively affected	0.29					
Consumed less food because of food price shock	0.31					
<i>Household demographics</i>						
Dependency ratio	0.39	0.47	0.47	0.51	0.69	0.73
Household size	5.07	2.29	5.83	2.54	6.08	2.39
<i>Household assets</i>						
Owns a house	0.47		0.47		0.46	
log household assets	7.38	1.44	7.48	1.55	6.95	1.84
<i>Head of the household</i>						
Female	0.50		0.49		0.43	
Age	54.94	13.79	51.00	13.72	50.84	13.31
Primary schooling completed	0.39		0.40		0.20	
Secondary schooling completed	0.11		0.15		0.28	
Tertiary schooling completed	0.11		0.08		0.07	
Employer	0.01		0.01		0.01	
Own-account worker	0.22		0.23		0.22	
Civil servant	0.13		0.14		0.14	
Public sector employee	0.02		0.04		0.03	
Private sector employee	0.10		0.06		0.08	
Casual worker	0.05		0.04		0.06	
<i>Location</i>						
Addis Ababa	0.61		0.61		0.71	
Awassa	0.13		0.13		0.09	
Dessie	0.13		0.13		0.09	
Mekelle	0.14		0.14		0.10	
Observations	567		567		437	

Note: Standard deviations omitted for dummy variables.

Table 4: Covariates of Consumption 2008

	(1) Food consumption		(2) Food consumption		(3) General consumption		(4) General consumption	
	Coefficient	Std error	Coefficient	Std error	Coefficient	Std error	Coefficient	Std error
<i>Household demographics</i>								
Dependency ratio	-0.021	0.044	-0.014	0.041	-0.031	0.041	-0.025	0.038
Household size	-0.324***	0.038	-0.303***	0.031	-0.336***	0.036	-0.314***	0.029
Household size squared	0.016***	0.003	0.015***	0.002	0.017***	0.003	0.015***	0.002
<i>Household assets</i>								
Owens a house	0.092**	0.044	0.075*	0.039	0.093**	0.041	0.078**	0.036
Log of household assets	0.209***	0.017	0.219***	0.016	0.230***	0.017	0.238***	0.015
<i>Head of the household</i>								
Female	-0.120**	0.050	-0.108**	0.046	-0.122**	0.046	-0.114**	0.042
Age	-0.007	0.014	-0.012	0.011	-0.010	0.013	-0.014	0.010
Age squared / 100	0.007	0.013	0.012	0.010	0.009	0.012	0.014	0.009
Primary schooling completed	0.028	0.050	0.026	0.047	0.019	0.047	0.021	0.043
Secondary schooling completed	0.140*	0.075	0.118*	0.070	0.116*	0.067	0.095	0.062
Tertiary schooling completed	0.330***	0.081	0.302***	0.077	0.310***	0.076	0.278***	0.072
Employer	-0.053	0.235	0.030	0.208	-0.009	0.180	0.058	0.162
Own account worker	0.087	0.059	0.098	0.060	0.078	0.055	0.087	0.056
Civil servant	-0.062	0.066	-0.053	0.058	-0.040	0.064	-0.036	0.055
Public sector employee	0.125	0.148	0.185	0.117	0.102	0.137	0.149	0.107
Private sector employee	0.017	0.081	0.041	0.071	0.001	0.075	0.021	0.064
Casual worker	-0.154	0.101	-0.166*	0.087	-0.191**	0.095	-0.199**	0.081
<i>Location and sampling control</i>								
Addis Ababa	-0.018	0.059	-0.059	0.053	0.017	0.054	-0.016	0.048
Awassa	0.017	0.073	-0.009	0.061	0.061	0.067	0.052	0.055
Dessie	0.010	0.073	-0.030	0.065	0.024	0.066	0.001	0.059
New household			-0.041	0.046			-0.028	0.041
Observations	567		709		567		709	
R-squared	0.47		0.47		0.53		0.54	

Note: All models are estimated using OLS with the dependent variable expressed in logarithmic form. Standard errors are robust to heteroskedasticity.. Significance at the 1%, 5%, 10% level is indicated by ***, **, *, respectively. An intercept is included in all model specifications.

Table 5. Changes in Food Consumption

	(1) Consumption growth 2004-08 (OLS)		(2) Consumption growth 2000-04 (OLS)		(3) Difference in Difference (OLS)		(4) Perceived effect of food price shock (ordered probit)		(5) Cut-back quantity of food (binomial probit)	
	Coefficient	Std error	Coefficient	Std error	Coefficient	Std error	Coefficient	Std error	Coefficient	Std error
<i>Household demographics</i>										
Dependency ratio	-0.098**	0.049	0.024	0.059	-0.122	0.077	-0.144	0.105	-0.004	0.117
Household size	0.207***	0.056	0.319***	0.070	-0.111	0.090	0.107	0.094	0.033	0.094
Household size squared	-0.012***	0.004	-0.021***	0.005	0.008	0.006	-0.006	0.007	-0.004	0.007
<i>Household assets</i>										
Owms a house	-0.061	0.070	0.104	0.081	-0.165	0.107	0.198*	0.119	-0.314**	0.125
Log of household assets	-0.033	0.023	-0.117***	0.024	0.084**	0.033	0.222***	0.043	-0.091**	0.045
<i>Head of the household</i>										
Female	-0.010	0.071	0.180**	0.089	-0.190*	0.114	0.117	0.137	0.104	0.139
Age	-0.027**	0.013	-0.006	0.019	-0.021	0.024	-0.052**	0.025	0.054*	0.028
Age squared / 100	0.026**	0.013	0.009	0.018	0.017	0.022	0.049*	0.026	-0.049*	0.027
Primary schooling completed	-0.113	0.076	-0.016	0.119	-0.097	0.141	0.080	0.148	-0.232	0.147
Secondary schooling completed	-0.101	0.119	-0.094	0.114	-0.007	0.164	0.068	0.205	-0.147	0.220
Tertiary schooling completed	-0.207	0.137	-0.006	0.161	-0.201	0.211	0.501*	0.258	-0.362	0.292
Employer	0.129	0.230	0.044	0.647	0.085	0.685	0.358	0.455	0.018	0.654
Own account worker	-0.084	0.079	0.079	0.097	-0.163	0.125	0.110	0.148	0.163	0.152
Civil servant	-0.108	0.105	0.371***	0.120	-0.479***	0.159	-0.270	0.202	0.205	0.210
Public sector employee	-0.193	0.161	0.455***	0.148	-0.648***	0.219	0.225	0.300	0.105	0.340
Private sector employee	0.005	0.132	-0.022	0.132	0.027	0.187	-0.133	0.211	0.272	0.267
Casual worker	-0.555***	0.196	0.119	0.231	-0.674**	0.303	-0.798**	0.399	0.939***	0.305
<i>Location and time</i>										
Addis Ababa	0.023	0.100	0.221*	0.133	-0.198	0.166	1.321***	0.237	0.674***	0.190
Awassa	-0.013	0.114	0.115	0.155	-0.129	0.192	2.420***	0.281	0.290	0.241
Dessie	0.196*	0.114	0.112	0.171	0.084	0.205	1.053***	0.280	-0.191	0.243
2004-08 Period					1.100	0.707				
Observations	567		437		1001		567		567	
R-squared / Pseudo R-squared	0.08		0.17		0.13		0.19		0.10	

Note: Standard errors in (1) and (2) are robust to heteroskedasticity. Standard errors in (3) are robust to heteroskedasticity and autocorrelation. Significance at the 1%, 5%, 10% level is indicated by ***, **, *, respectively. An intercept is included in all model specifications. Column (3) shows the estimated coefficients on interaction terms between a dummy for the period 2004/08 and all explanatory variables, in a regression pooling the data underlying (1) and (2). The dependent variable in (4) is coded as follows: 0 – very negatively; 1 – negatively; 2 – not at all. The dependent variable in (5) is a dummy variable equal to 1 if the household cut back on the quantity of food consumed in response to the food price shock.

Table 6: Food Consumption by Asset Levels (2004) and Food Price Inflation

	Share in total food spending			H ₀ : Common mean (t-stat)	Price increase 2006- 2008
	Sub-sample: Assets high	Sub-sample: Assets low	Difference in means		
Cereals	0.306	0.348	-0.042	-3.96	212.8
Pulses	0.082	0.093	-0.012	-2.32	167.5
Bread and Other Prepared Food	0.097	0.091	0.006	0.71	228.3
Meat	0.072	0.034	0.038	6.90	147.8
Milk, Cheese and Egg	0.026	0.015	0.011	4.38	164.0
Oils and Fats	0.110	0.091	0.020	4.36	162.8
Vegetables and Fruits	0.077	0.070	0.008	1.76	172.3
Spices	0.088	0.108	-0.020	-3.75	202.2
Coffee and Tea Leaves	0.042	0.062	-0.019	-5.29	144.6
Drinks	0.021	0.009	0.012	5.48	178.1
Other Food Items	0.081	0.080	0.001	0.09	178.7

Note: To compute the share spent on various food items in total food spending, we use the entire sample for 2004. We divide the sample into households with high and low levels of assets, using the median of asset values as the cut-off point. The price increase for the food items were computed using official data published by the Central Statistics Agency (various issues).

Table 7. Changes in General Consumption

	(1) Consumption growth 2004-08 (OLS)		(2) Consumption growth 2000-04 (OLS)		(3) Difference in Difference (OLS)	
	Coefficient	Std error	Coefficient	Std error	Coefficient	Std error
<i>Household demographics</i>						
Dependency ratio	-0.105**	0.047	-0.002	0.057	-0.103	0.079
Household size	0.196***	0.052	0.337***	0.065	-0.141	0.091
Household size squared	-0.012***	0.004	-0.022***	0.005	0.010	0.007
<i>Household assets</i>						
Owns a house	-0.087	0.067	0.096	0.071	-0.182	0.113
Log of household assets	-0.031	0.022	-0.101***	0.021	0.071**	0.034
<i>Head of the household</i>						
Female	0.013	0.066	0.153**	0.077	-0.141	0.114
Age	-0.024*	0.013	0.000	0.019	-0.024	0.024
Age squared / 100	0.022*	0.013	0.003	0.018	0.020	0.023
Primary schooling completed	-0.113	0.071	0.001	0.108	-0.114	0.131
Secondary schooling completed	-0.096	0.109	-0.048	0.101	-0.048	0.151
Tertiary schooling completed	-0.151	0.128	-0.045	0.142	-0.106	0.204
Employer	0.124	0.206	0.053	0.595	0.071	0.620
Own account worker	-0.041	0.074	0.053	0.089	-0.094	0.125
Civil servant	-0.079	0.096	0.265**	0.105	-0.344**	0.154
Public sector employee	-0.170	0.156	0.307**	0.136	-0.477**	0.220
Private sector employee	-0.023	0.126	-0.073	0.125	0.051	0.189
Casual worker	-0.485**	0.189	0.053	0.197	-0.539*	0.286
<i>Location and time</i>						
Addis Ababa	0.065	0.094	0.135	0.122	-0.069	0.185
Awassa	0.019	0.104	0.042	0.140	-0.023	0.209
Dessie	0.233**	0.106	0.094	0.154	0.139	0.220
2004-08 Period					1.023	0.725
Observations	567		437		1001	
R-squared / Pseudo R-squared	0.08		0.17		0.13	

Note: Standard errors in (1) and (2) are robust to heteroskedasticity. Standard errors in (3) are robust to heteroskedasticity and autocorrelation. Significance at the 1%, 5%, 10% level is indicated by ***, **, *, respectively. An intercept is included in all model specifications. Column (3) shows the estimated coefficients on interaction terms between a dummy for the period 2004/08 and all explanatory variables, in a regression pooling the data underlying (1) and (2).

Table 8: The Effects of Idiosyncratic shocks

	(1) Food consumption		(2) Change in food consumption		(3) General consumption		(4) Change in general consumption	
	Coefficient	Std error	Coefficient	Std error	Coefficient	Std error	Coefficient	Std error
Death of family member	-0.084	0.074	0.117	0.093	-0.071	0.069	0.099	0.088
Illness of family member	0.005	0.061	0.152	0.107	0.018	0.054	0.124	0.098
Job loss of household member	-0.227*	0.120	-0.400**	0.158	-0.244**	0.110	-0.454***	0.159
Asset loss	-0.030	0.096	-0.312	0.205	-0.029	0.095	-0.273	0.179
Other idiosyncratic shocks	0.176	0.116	0.201	0.159	0.160	0.110	0.218	0.159
Controls								
Household demographics	Yes		Yes		Yes		Yes	
Household assets	Yes		Yes		Yes		Yes	
Characteristics of the head	Yes		Yes		Yes		Yes	
Location	Yes		Yes		Yes		Yes	
Observations	567		567		567		567	
R-squared	0.48		0.11		0.54		0.12	

Note: Standard errors are robust to heteroskedasticity. Significance at the 1%, 5%, 10% level is indicated by ***, **, *, respectively. An intercept and a full set of explanatory variables are included in all model specifications.

Appendix

Consumption aggregation and adult equivalences

We computed aggregate household consumption expenditure by adding up reported household expenditure on food and non-food items. The non-food component of consumption includes expenditures on items such as; clothing, footwear, energy, personal care, utilities, health and education. We excluded expenditure on consumer durables. According to Deaton (2002), from the perspective of welfare analysis, it is the value of services that flows from ownership of these consumer durables that should enter the aggregation of consumption expenditure. This was not possible in our analysis because we didn't have information that is useful to impute depreciation rate of household fixed assets. This is unlikely to distort the values of the aggregated consumption expenditure because the value of expenditure that goes to durables goods in Ethiopia is insignificant (Tadesse, 1996).

Aggregate household consumption expenditure is converted into adult equivalences to adjust for household size and composition using the method proposed by Dercon and Krishnan (1998). Moreover, to allow for temporal and spatial comparisons of consumption among households, we deflated consumption expenditure using the CPI reported in Table A.1 using the year 2000 as the base year. We adjusted for spatial price differences using temporal spatial price information made available by Central Statistics Agency (2009).

Table A.1 Selected Macroeconomic Indicators of Ethiopia 2000-2008

Variable	Units	Scale	2000	2001	2002	2003	2004	2005	2006	2007	2008
GDP, constant prices	National currency	Billions	64.40	69.36	70.22	67.76	74.40	83.80	93.47	104.20	116.30
GDP, constant prices	Annual percent change		5.93	7.71	1.24	-3.51	9.80	12.64	11.54	11.47	11.61
GDP, current prices	National currency	Billions	64.40	65.69	63.46	68.90	86.66	106.47	131.67	170.92	239.13
GDP, current prices	U.S. dollars	Billions	7.90	7.88	7.43	8.03	10.05	12.31	15.17	19.43	25.66
GDP, deflator	Index		100.00	94.70	90.38	101.69	116.48	127.05	140.87	164.04	205.62
GDP per capita, constant prices	National currency	Units	1014.14	1,060.497	1,044.618	980.51	1,047.300	1,147.591	1,245.138	1,350.171	1,468.752
GDP per capita, current prices	National currency	Units	1014.14	1,004.317	944.10	997.05	1,219.941	1,458.011	1,753.967	2,214.790	3,020.055
GDP per capita, current prices	U.S. dollars	Units	124.40	120.47	110.51	116.20	141.53	168.52	202.05	251.79	324.05
GDP based on PPP	Current international dollar	Billions	29.59	32.63	33.61	33.12	40.76	47.24	54.39	62.26	71.00
GDP based on PPP per capita	Current international dollar	Units	465.92	498.90	500.01	479.31	573.81	646.85	724.44	806.70	896.64
GDP based on PPP share of world total	Percent		0.07	0.08	0.07	0.07	0.08	0.08	0.09	0.10	0.10
Implied PPP conversion rate			2.18	2.01	1.89	2.08	2.13	2.25	2.42	2.75	3.37
Inflation, average consumer prices	Index, 2000=100		100.00	94.79	87.94	101.18	109.90	117.42	131.81	152.69	191.34
Inflation, average consumer prices	Annual percent change		6.16	-5.21	-7.22	15.06	8.62	6.84	12.26	15.84	25.32
Inflation, end of period consumer prices	Index, 2000=100		100.00	88.57	87.67	108.28	110.17	124.48	138.88	159.88	248.24
Inflation, end of period consumer prices	Annual percent change		0.27	-11.43	-1.02	23.51	1.75	12.99	11.57	15.12	55.27
Population	Persons	Millions	63.50	65.41	67.22	69.10	71.04	73.03	75.07	77.17	79.18
Current account balance	U.S. dollars	Billions	-0.34	-0.23	-0.35	-0.11	-0.40	-0.74	-1.39	-0.87	-1.49
Current account balance	Percent of GDP		-4.24	-2.96	-4.67	-1.36	-4.00	-6.00	-9.14	-4.48	-5.80

-
- ¹ Dessus et al. (2008), Ivanic and Martin, (2008), Wood et al. (2009) study the implications of rising world food prices on poor households in developing countries, especially the urban poor, and they argue that the negative welfare effects have been tremendous. The data used in these studies do not cover the period of the dramatic global food price increase in 2007-2008.
- ² The practice of using self-reported data in poverty analysis has recently been endorsed by Angus Deaton: “there is something to be said for directly asking people around the world how their lives are going, whether they have enough, or whether they are in financial difficulty” (Deaton, 2010, p.38).
- ³ There is evidence that the unprecedented high rate of inflation in Ethiopia in the past few years eroded living standard of the majority of the urban population. Woldemichael (2008) documents that cumulative salary increment in the government sector (which is the major employer of the labour force in urban areas) between July 2001 and 2007 was about 60 percent, while the general and food price inflation rates during the same period were 96 percent 125 percent respectively.
- ⁴ See for example the World Development Report 2000/01 (World Bank, 2001)
- ⁵ In empirical research, formulations based on the permanent income hypothesis of Friedman (1957) have been common. Friedman originally argued that rational households with access to perfect markets in insurance and credit will maximize the sum of expected lifetime discounted utility, constrained only by the sum of initial assets, and value of their future savings; their “permanent income”.
- ⁶ Coate and Ravallion, (1993), Fafchamps, (1999), Fafchamps and Lund (2003) discuss the different informal arrangements that have evolved to cope with market failures in developing countries.
- ⁷ Reardon et al. (2007) on the other hand, discuss the mechanism of engaging in non-farm income generating activities to deal with risk and shocks and more recently, Porter (2008) found some evidence that households and their members divert labour towards relatively higher return activities in order to smooth income in rural Ethiopia during shocks.
- ⁸ Vulnerability is defined by the World Bank (2001) as measuring “...the likelihood that a shock will result in a decline in well-being” (p.139). Note that vulnerability is not synonymous with poverty. For an excellent survey of the micro literature on risk, vulnerability and poverty, see Dercon (2006b).
- ⁹ There has been a longstanding debate about using income or consumption expenditure to measure household welfare. In the context of developing countries, it is strongly recommended to use consumption measures because income is often underreported and in many cases, volatile and difficult to remember. See Deaton (1997), Deaton and Grosh (2000) for further discussion.
- ¹⁰ In treatment literature jargon, households were thus asked to assess the (qualitative) difference in consumption under treatment (the food price shock) compared to the counterfactual.
- ¹¹ The waves for 2000 and 2004 cover approximately 1,500 households in Addis Ababa, Awassa, Bahir Dar, Dessie, Dire Dawa, Jimma and Mekelle. Still earlier waves of data deriving from the EUSS exist for 1994, 1995 and 1997. See Bigsten and Shimeles (2008) for details on these data. Lack of sufficient funding prevented us from covering Bahir Dar, Dire Dawa and Jimma in the 2008/09 survey.
- ¹² The average share of energy expenditures in total household expenditures is about 6 percent in our sample. Hence, while energy prices have risen rapidly over the sample period, energy expenditures have remained relatively low. Moreover, the data shown in column 2 in Table 1 indicate that few households refer to energy price inflation as big problem. We therefore assume the energy price inflation is a less significant shock for households in urban Ethiopia than the food price inflation.
- ¹³ This figure differs from that reported in Table 2, since new households are excluded here.
- ¹⁴ This household asset variable includes assets such as TV, refrigerator, motor vehicles etc.
- ¹⁵ We have also done a pooling test, by interacting the dummy for new households and the explanatory variables and adding these to the baseline specification. The coefficients on the interaction terms are insignificantly different from zero at the 5% level of significance, indicating no systematic difference between new households and panel households.
- ¹⁶ $\exp(-0.55)-1=-0.42$.
- ¹⁷ The panel dimension of the data implies that the residuals are likely serially correlated, and therefore we ‘cluster’ the standard errors at the household level.
- ¹⁸ A statement that is valid, of course, only to the extent that the baseline period is an accurate counterfactual.
- ¹⁹ We have also estimated the model using OLS. Results are available on request.
- ²⁰ This type of analysis is not possible for food price shocks, hence our earlier focus on the heterogeneity in the effects of the food price inflation.
- ²¹ Data on idiosyncratic shocks were collected for the first time in the 2008/09 survey, thus no panel data exist for these variables.