

Nutrient adequacy in Africa would improve with higher income for poorer households and lower cereal prices

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Abstract

Healthy diets are not affordable in Africa due to a combination of high food prices and low incomes. Without comprehensive demand modeling using recent data, however, one cannot predict how African consumers might change demand patterns if prices or incomes were to change. Using nationally representative household panel survey data from five sub-Saharan African countries, we model consumer preferences and examine how nutrient intake responds to changing food prices, total expenditures, and other demand determinants. We find a stronger positive relationship between growth in poor consumers' total expenditures and their nutrient intake adequacy than has been previously documented. We find that poor consumers' intake adequacy is especially sensitive to food staple prices in countries where one food staple dominates poor consumers' diets. In countries with multiple food staples, no single staple's price is a strong determinant of poor consumers' dietary intake adequacy.

Keywords: global nutrition, undernutrition, diet quality, food demand, sub-Saharan Africa

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Historically, progress in improving global food security has come from both lowering food prices and raising poor consumers' incomes. One of the most important drivers of dietary improvement, the Green Revolution, raised per capita incomes in developing countries by 50%, lowered the real prices of food staples by 35%–66%, increased caloric intake in developing countries by 13.3%–14.4%, and decreased child under-nourishment by 6.1%–7.9%.^[1, 2] While progress in sub-Saharan African has lagged, with only 25% of food crop area planted to modern varieties and average cereal yields of 1.3 t/ha even in the late 1990s, adoption increased rapidly to 43% and yields to 1.6 t/ha by 2010.^[3, 4]

Compared to the rest of the world, improvements in nutrition have also lagged in sub-Saharan Africa, which has the lowest share of its population meeting internationally comparable diet quality standards (e.g., the minimum dietary diversity standard for women).^[5] African diets are limited in intake of not just dietary energy and protein but also important micro-nutrients like iron, zinc, vitamin A, and folate.^[6] Anemia afflicts 39% of African women of reproductive age.^[6] Altogether, the disease burden associated with nutrition deficiencies is higher in sub-Saharan Africa than anywhere else in the world, with 56 disability-adjusted life-years (DALYs) lost per 1,000 people in 2010 to protein and energy deficiencies and an additional 30 DALYs lost to micro-nutrient intake deficiencies.^[7] The urgency of addressing nutrition deficiencies is underscored by the fact that children under the age of 5, 31% of whom are stunted,^[6] bear over half of Africa's hunger-related disease burden.^[8] Young children experience irreversible, life-long health and economic productivity consequences as a result of undernutrition.^[9]

Efforts to understand and address the challenge of undernutrition in sub-Saharan Africa have highlighted the importance of raising consumer incomes

by demonstrating that nutritious diets are out of reach for most poor consumers. The EAT-*Lancet* diet, a well-recognized global benchmark diet, costs over 70% of the mean sub-Saharan African's household income, and the least expensive nutritionally adequate diet is similarly unaffordable, costing 50% of mean household income.[10] High per calorie prices of nutrient-rich foods relative to starchy staples offer one explanation for the low affordability of good quality diets.[10–13] Many have emphasized the need to lower the prices of nutrient-rich foods, especially in Africa.[14–17] While there is widespread recognition that the cost of a healthy diet is quite large compared to poor households' purchasing power, very little recent evidence from Africa quantifies, in a comprehensive way, how consumers alter their overall diets in response to changes in food prices.[18]

Consumer demand system modeling, exemplified by the work of Deaton and Muelbauer,[19] flourished in the 1970s as an important empirical application in consumer economics, allowing researchers to formally understand consumers' preferences, test theoretical predictions about consumption behavior, and predict the impacts of policies that affect key demand determinants. A key advantage of the demand system approach is that it allows researchers to understand consumer behaviors, such as substitutions, that are consistent with consumer utility theory. All demand models assume that the preferences of everyone in the sample can be described by the same set of parameters, with differences in demand explained by differences in total expenditures, prices, and covariates. Demand modeling studies done in the 1980s and 1990s gave us much of our conventional knowledge about income and price elasticities in low-income countries.[20–25] Early demand modeling research mostly ignored Africa, where few household survey datasets were suitable for estimating demand models. Those early studies are not fully relevant for today's

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nutritional landscape, which is characterized by the Westernization of diets, widespread fortification of food staples, and a rapid rise in consumption of packaged and processed foods.[26] Since the 1970s and 1980s, demand modeling tools have improved considerably, with more flexibility and features.[27–29]

5 However, very few studies in Africa have incorporated these new modeling features, and none of them offer evidence from more than one African country.

Building on consumer demand theory and careful implementation of new modeling techniques, we use a structural approach to model consumer demand using nationally representative panel data from five sub-Saharan African countries,
10 the full set of countries for which comparable data are available (as explained with our Methods). To date, our approach is the most comprehensive study to draw on evidence from multiple countries, use a flexible functional form with respect to total expenditures and prices, allow consumers to substitute freely between food and non-food expenditures by modeling demand conditional on *total expenditures* rather than *total food expenditures*, address price endogeneity, and control for unobserved heterogeneity in consumer preferences. Using modeled consumer preferences, we quantify diet quality sensitivity to changing income and prices of specific foods, exploring how the dietary patterns of poor consumers differ from those of wealthy consumers. Using these
15 demand system parameters, we then link macro- and micro-nutrient adequacy to total household expenditures and prices in ways that are directly relevant for major policies and programs (i.e. those seeking to raise consumers' incomes or lower the prices consumers face in the marketplace). We use the model to evaluate how consumers' diets change with very simple policy interventions that
20 mimic the key drivers of food demand—a cash transfer designed to raise households' total expenditures and price vouchers, which would lower households' purchase prices of specific foods.
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Modeling consumer demand

Much of what we know about the expenditure elasticity of food demand in Africa comes from estimating demand models, with more analyses focusing on Africa as data become available.[30, 31] According to a meta-analysis of 66 studies that modeled expenditure elasticities of demand for foods and nutrients across 48 African countries, African consumer demand generally follows patterns observed in other regions, with income-inelastic demand for basic staples and more elastic demand for more aspirational foods.[32] Income elasticities for the same food groups vary widely across countries, though, which begs the question of whether these differences are driven by differences in modeling methodologies, consumer attributes, or consumer preferences themselves. The vast majority (95%) of African food expenditure elasticities were estimated using cross-sectional data.[32] Our study extends the panel approach of McCullough *et al.* to a total of five countries,[33] holding methodological decisions constant across them, which allows us to isolate differences in either demand determinants (i.e., prices, expenditures and covariates) or preferences (model parameters) as the reason for differences in demand patterns. The only other recent study to carefully estimate food expenditure elasticities in multiple African countries relies on cross-sectional data, assumes that food demand is fully separable from non-food demand, limits the relationship between demand and total expenditures to a second-order polynomial, and does not report price elasticities of demand.[13]

In recent decades, experimental methods to measure consumer preferences have supplanted demand modeling. These methods, which include choice experiments or randomized controlled trials, experimentally induce variation in key demand determinants and then measure the demand response. Evidence from both randomized controlled trials and quasi-experiments confirms

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that poor consumers raise their intake of dietary energy and their dietary diversity in response to rising incomes.[34–36] Experimental assessments of demand responses often differ from those predicted using demand models, with a demand model under-predicting food expenditure elasticities following

- 5 conditional cash transfer in Colombia and over-predicting food expenditure elasticities following an unconditional cash transfer in Kenya.[34, 36] In both cases, the authors compare experimentally derived elasticities that use pre- and post-intervention data with a cross-sectional prediction based only on pre-intervention data. Differences in observed and predicted elasticities could
- 10 also arise due to mis-specification of demand models, bias in demand model estimation due to endogeneity of consumption or prices, or program implementation resulting in a change in household preferences (e.g., by targeting women).

The classic demand modeling literature, mostly from Asia, finds conflicting relationships between changing food prices and nutrient intake, even after compensating for income effects, which highlights the important substitution patterns that consumers make when prices change.[37] Studies show that poor consumers often react very differently to price changes than wealthy consumers,[37] suggesting that demand models should allow the price response

- 20 to vary across the expenditure distribution. Recent evidence from Africa about consumers' price elasticities of demand is much more scant than evidence about consumers' expenditure elasticities of demand. McCullough *et al.* provide the only panel evidence of price elasticities of demand, and the only evidence that allows price elasticities to vary with total household expenditures.[33] Several
- 25 prior studies report price elasticities measured using cross-sectional data from Malawi and Tanzania.[30, 38] These studies find that dietary energy, protein, and iron intake are more sensitive to maize prices than to any other prices,

with rural consumers' dietary energy intake decreasing by 0.62% following a 1% increase in maize prices in Malawi.[30] Demand for most food groups in Tanzania is less price-elastic when estimated using panel data than when using cross-sectional data.[33] Given the scarcity of food price elasticity evidence from Africa, especially in countries with different types of diets, additional price elasticity modeling is warranted.

There is less evidence available that either models *ex ante* or evaluates *ex post* the impacts of consumer price subsidies or vouchers on food demand. The literature on taxing unhealthy foods or subsidizing healthy foods is restricted to middle- and high- income countries.[13] In China, a randomly allocated food staple voucher did not improve recipients' dietary intake of energy or nutrients, though the evidence suggests that consumers altered their demand to enhance non-nutritive aspects of their diets (e.g., grain quality).[39] When India began subsidizing pulses by incorporating them into the public distribution system, it was found to have a positive but very small effect on demand for pulses.[40] Both 10% and 25% price discounts on healthy foods in South Africa were found to increase intake of fresh fruits and whole grains but also to increase consumption of meat and foods that were fried or high in salt, fat, and added sugar.[41]

Results

Diet quality and total household expenditures

We explore the relationship between total household expenditures and diet quality in two ways. First, we use the parameters of large food demand systems estimated in five sub-Saharan African countries (Malawi, Niger, Uganda, Tanzania, and Nigeria) to describe intake sensitivity of dietary energy (DE), macro-nutrients, and micro-nutrients (hereafter dietary intake) to changes

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in total expenditures. We summarize these results according to expenditure groups (for ease of notation referred to as quartiles), which use the same cutoffs in all countries. Second, we simulate a cash transfer (CT) and then examine its impact on dietary intake and on two additional per-calorie measures of diet quality: macro-nutrient balance and the Nutrient-Rich Food Index (a measure of a diet's nutrient density).

Food demand is more expenditure-elastic than previous studies show

Fig. [SMB.1](#) and Tables [SMC.1–SMC.20](#) depict the expenditure elasticities of demand calculated for each food group and expenditures quartile using estimated model parameters. Like Colen *et al.*, we find that demand is most expenditure elastic for animal source foods and beverages, and less so for fruits, vegetables, nuts, fats, cereals, and tubers.[\[32\]](#) For most food groups (staple grains, starchy staples, pulses & nuts, and animal source foods), our average expenditure elasticity is 80–140% larger than the average elasticity reported by Colen *et al.*. For fats & oils, our expenditure elasticities are very close, while for fruits & vegetables, our expenditure elasticities are 16% lower and for beverages they are 10% lower. Our elasticities are also higher, by 28–58% on average per country, than those estimated by Muhammad *et al.* using International Comparison Program data.[\[42\]](#) For three additional countries where cross-sectional demand models have been carefully estimated (Malawi, Uganda and Tanzania), our expenditure elasticities are very close in Tanzania and are larger by 24% in Malawi and by 21% in Uganda.[\[13, 30\]](#) Our larger expenditure elasticities suggest both a greater opportunity for economic growth to increase food intake and a greater risk for income shocks to result in nutrient poverty traps.

Macro- and micro-nutrient intake increases with expenditure growth

Using estimated expenditure elasticities of food demand, we then calculate expenditure elasticities of intake for each macro- and micro-nutrient, which represent the extent to which intake would increase if household expenditures increase by 1%. Fig. SMB.2 shows these intake elasticities, separated by total expenditures quartile, for each country. Tables SMC.21–SMC.40 report these same nutrient demand elasticities by country and expenditures quartile.

Demand for DE is expenditure inelastic (i.e., intake increases by less than 1% when total expenditures increase by 1%) for most consumers, except for poor consumers (Q1) in Niger, Uganda and Tanzania. Demand for carbohydrates is similar to demand for DE. Consumers show more expenditure-elastic demand for fat and for protein than for DE, with a few exceptions (demand for fat is less elastic than demand for DE in Uganda (Q3–Q4) and Nigeria (Q1–Q4)). As consumers become wealthier, they generally shift food expenditures toward fat and/or protein at the expense of carbohydrates, which is consistent with improving diet quality.

Micro-nutrient expenditure elasticity patterns vary from country to country. Poor consumers have expenditure-elastic demand for iron in Nigeria only. They have expenditure-elastic demand for zinc everywhere except Malawi. They have expenditure-elastic demand for vitamin A in Niger, Uganda and Tanzania but not Malawi or Nigeria. Poor (Q1) consumers have expenditure-elastic demand for folate everywhere except for Nigeria. in Niger, Tanzania,

For all five countries and for all macro- and micro-nutrients (with the exception of vitamin A in Malawi and Niger and folate in Malawi), wealthier consumers have smaller expenditure intake elasticities than do poorer consumers. Therefore, income growth results in a larger increase in macro- and

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micro-nutrient intake for poorer consumers (Q1 and Q2) than for wealthier consumers.

Dietary energy sufficiency rises with expenditure growth

Fig. 1 shows the relationship between total per capita expenditures and the probability that a household's DE intake is sufficient (i.e., meets the household's estimated average requirement (EAR)).¹ This probability of sufficient intake increases rapidly with a rise in total household expenditures. The increase in DE sufficiency with expenditure growth is especially strong, increasing by 35 percentage points (pp) or more, in Malawi, Niger and Nigeria.

In all countries, the average Q3 and Q4 household's intake of DE meets the EAR for DE (Fig. SMB.3). This is not the case for Q1 households anywhere except Malawi or for Q2 households in Uganda or Tanzania who do not, on average, consume sufficient DE to meet household requirements. Many households that consume sufficient DE to meet the household's total requirements do not consume sufficient micronutrients to meet the household's total requirements.

Cash transfers close intake gaps for poor consumers

A cash transfer (CT) simulation results in a large increase in the probability that extremely poor (Q1) households consume sufficient DE in all countries. Fig. 2 depicts the share of Q1 households with sufficient dietary intake pre- and post-CT for each country and Fig. SMB.4 shows the same for Q2-Q4 households. A CT targeting Q1 consumers would increase the share of Q1 households whose intake of DE meets the household's estimated requirement (from 75% to 82% in Malawi, 59% to 76% in Niger, 34% to 42% in Uganda, 25% to 37% in Tanzania, and 50% to 61% in Nigeria). The effect of the CT in

¹As discussed in the Methods / Household Data section, we observe household consumption rather than individual intake. We assess whether the household's total 7-day consumption exceeds the sum of the average requirements for all members of the household.

pushing households above the DE intake requirement is largest for the poorest households and decreases in total expenditures (Fig. 1).

A CT would raise the share of consumers with sufficient intake of key macro- and micro-nutrients in addition to DE. Following the CT, the share of Q1 households with sufficient protein intake increases from 45% to 61% in Tanzania, the country with the largest increase. The increase is also large in Malawi (7pp), Niger (11pp), Uganda (9pp), and Nigeria (9pp). The CT is also effective in increasing the share of poor households that have sufficient intake of iron, zinc, and total folate. The only exception is iron in Niger and vitamin A in Nigeria, where pre-CT intake is already sufficient for most poor households.

Cash transfers improve dietary nutrient density for poor consumers

CTs also improve the Nutrient-Rich Food Index, our measure of overall density of nutrients per unit of dietary energy consumed by the household. As discussed in the Methods section, NRFI is comprised of twelve dietary components, of which nine are positively associated with improved diet quality and three are negatively associated.^[43] Because consumers' diets evolve in many ways as their expenditures increase, the CT sometimes improves and sometimes worsens nutrient density (Fig. SMB.5). The CT improves NRFI for all but the poorest consumers in Malawi and Niger. It improves NRFI for all but the wealthiest consumers in Tanzania. It decreases NRFI for all consumers in Nigeria and all but the wealthiest consumers in Uganda.

Cash transfers do not exacerbate dietary imbalance

Many Q1 consumers in all five countries consume protein in a smaller share of total DE than is recommended by the World Health Organization (WHO), a sign of dietary imbalance. Many Q1 consumers in Malawi and Tanzania also consume a larger share of carbohydrates in total DE than recommended. Fat

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is often under-consumed by poor consumers in Malawi, Niger and Tanzania. In Malawi, Uganda and Nigeria, dietary imbalance is common even for Q4 consumers.

As shown in Fig. 3, the CT improves problems of DE under-consumption

5 for Q1 consumers in that it lowers the share of consumers who consume an excess share of carbohydrates (exceeding 75% of DE) in Malawi and Tanzania, though it slightly increases the share of Q1 households with carbohydrate-heavy diets in Nigeria. It does not have a large impact on the share of Q1 households who under-consume fat or protein.

10 Few Q1 households in any country exceed the upper bound of recommended fat or protein intake as a share of DE, though prevalence of fat- and protein-heavy diets by Q1 households is reduced by the CT in Niger. For Q2–Q4 households, the CT does not increase the share of households with fat- or protein-heavy diets in any country (Figs. SMB.6–SMB.8).

15 **Diet quality and food prices**

When the price of one food becomes more expensive, consumers adjust demand not only for that food but also for other foods, thus affecting all three of our diet quality measures. By allowing for a flexible price response over total expenditures, our demand model does not impose by assumption that price effects are

20 the same for wealthy and poor consumers. After we explore consumers' price substitution patterns and their implications for determining dietary intake of macro- and micro-nutrients, we simulate consumers' responses to price vouchers (PVs), targeting five food categories: staple grains, starchy staples, pulses & nuts, fresh fruits & vegetables, and animal-source foods.

25 Tables SMC.1–SMC.20 and Figures SMB.9–SMB.13 present median price elasticities of demand by quartile and country. There is almost no comparable

cross-price elasticity evidence available for us to compare our findings, and limited own-price elasticity evidence. While differences vary across food groups and countries, our model results suggest consumers are slightly less responsive to own-price changes than previous comparable studies.[13, 30]

Food staple prices drive macro- and micro-nutrient intake in single-staple countries

Figs. SMB.14–SMB.18 depict the elasticity of each nutrient's intake with respect to each food group's price by country and expenditure quartile.

We see two distinct patterns in the relationship between food prices and dietary intake depending on whether any single food staple dominates a country's diet. Single-staple sensitivity is pronounced in Malawi with maize, Niger with millet, and Tanzania with maize, which account for 34%, 31%, and 21% of Q1 households' total expenditures, respectively (Tables SMC.41 –SMC.45). In these countries, sensitivity of dietary intake by poor (Q1–Q2 consumers) to the dominant staple's price can be seen in a prominent vertical red band in the matrix that depicts intake elasticity with respect to food group prices (Figs SMB.14, SMB.15 and SMB.17). A large negative intake elasticity with respect to the dominant staple's price cuts across all (or almost all) dietary components, even those that are not concentrated in the food staple. Maize's price dominates intake even for Q4 consumers in Niger. Micro-nutrient intake sensitivity to a staple food's price has previously been documented with maize in Malawi and rice in Bangladesh.[20, 30]

In countries with multiple staple foods, where no single food dominates households' expenditures, intake is not highly sensitive to any single food's price. In these countries, dietary intake responds to collective increases in staple food prices, but also comparably to the prices of pulses and nuts & seeds and other foods. No single food group strongly determines intake in these settings.

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We observe this pattern in Uganda and Nigeria, where the largest food group's budget share is 12% of poor households' total expenditures.

Cross-price effects are important intake determinants

Cross-price effects help to explain why food staple prices are such strong deter-

- 5 minants of macro- and micro-nutrient intake, even for nutrients that are not themselves highly concentrated in food staples. For example, in Fig. [SMB.19](#) we decompose protein intake elasticities with respect to staple food prices into an own-price effect (i.e., the change in protein intake arising from a change in the price of the food staple resulting from changing intake of that same food staple) and a cross-price effect (i.e., the change in protein intake arising from changing intake of *all other foods* apart from that food staple). Decreased consumption of complementary foods accounts for about half of the decrease in protein intake that occurs after a millet price increase in Niger or one third of the decrease in protein intake after a maize price increase in Malawi. Cross-
- 10 price patterns explain a large share of the reduction of protein intake following a rice price increase in Niger, a rice price increase in Uganda, a rice or root & tuber price increase in Tanzania, or a cassava price increase in Nigeria.

Due to cross-price effects, intake of a specific macro- or micro-nutrient often

is more sensitive to the prices of foods with low concentrations of that nutrient

- 20 than it is to the prices of foods with high concentrations of that nutrient (Figs. [SMB.20](#) and [SMB.21](#), respectively).

Because of complex patterns of substitutions and complementarities, lowering

a single food's price can result in opposing overall diet impacts in different

contexts (Fig. [SMB.22](#)). For example, when pulses become more expensive,

- 25 NRFI worsens in Malawi, Uganda, and Tanzania but improves in Nigeria. When maize becomes more expensive, NRFI improves in Uganda and Tanzania, but the response varies over income quartiles in Malawi and Nigeria.

Similar opposing effects are seen with the prices of cassava, vegetables, fruit, and eggs. As a result, NRFI is often quite sensitive to the prices of food groups that do not have high NRFI scores. The most nutrient-dense foods are fruits & vegetables, but NRFI is not just as responsive to the prices of less nutrient-dense foods (e.g., pulses & nuts in Nigeria and Tanzania) (Fig. 5 SMB.23).

Price vouchers targeting poor consumers close dietary intake gaps

Except in a few cases, price vouchers targeting any of the five categories we modeled (staple grains (SG), starchy staples (SS), pulses & nuts (PN), fresh fruits & vegetables (FFV), and animal-source foods (ASF)) would increase the share of Q1 households with sufficient dietary energy. The exceptions include price vouchers targeting SS in Niger and ASF in Nigeria, which reduce DE intake for Q1 households. For poor consumers, no single voucher impacts DE intake as much as the cash transfer (Fig. 2), but SG price vouchers come close to the cash transfer in Niger and Malawi. To increase the share of poor households with sufficient protein, vouchers targeting SG and PN in Malawi, Niger and Tanzania are effective, as are vouchers targeting PN in Niger and Uganda and ASF in Malawi, Tanzania and Nigeria.

No single food category offers a consistent vehicle for improving poor consumers' intake of all micro-nutrients in all countries. SG vouchers do not worsen intake of any nutrient in any country (except for vitamin A intake in Niger and Uganda). SS vouchers do not reduce intake except for zinc and folate in Niger. PN vouchers achieve at least small improvements in intake except for vitamin A in Uganda. FFV vouchers also achieve at least small improvements in intake with the exception of vitamin A in Uganda. ASF vouchers do not achieve large intake increases, but they decrease iron intake in Uganda and vitamin A and folate intake in Uganda and Tanzania.

Wealthier households are more likely than poor households to consume adequate macro- and micro-nutrients at baseline; in most cases, price vouchers do not have a major impact on their sufficiency. The exceptions include vouchers targeting PN in Uganda, which considerably improve Q3 and Q4 households' sufficiency for all dietary components. Wealthier Tanzanian consumers are also responsive to SG, SS and FFV vouchers. In a few cases (e.g., SG vouchers in Niger and PN vouchers in Uganda), price vouchers can increase wealthier consumers' dietary intake more than the cash transfer (Fig. 2). In Tanzania, the PN vouchers considerably reduces the share of Q4 consumers with sufficient intake of folate.

Price vouchers can exacerbate dietary imbalance

Because almost all price vouchers targeting Q1 households increase DE intake (Fig. 2), one might be concerned that PVs could exacerbate over-consumption. At baseline, we find little evidence of over-consumption in the form of excess shares of fat or protein in DE intake, except for in Uganda and Nigeria, where fat comprises an excess share of DE intake for about 40% and 30% of households, respectively (Fig. 3). Under-consumption is the larger problem, with carbohydrates comprising an excess share of DE intake for the majority of poor households in Malawi and Tanzania. Similarly, protein comprises too small a share of DE intake for the majority of poor households all countries, as does fat in Malawi, Niger, and Tanzania.

No single price voucher universally improves or worsens macro-nutrient balance across countries. The SG voucher is problematic in that it exacerbates the share of households for which carbohydrates comprise too large a share of DE everywhere except for Malawi (where carbohydrate-heavy imbalance is already above 80% before the PV). The PN and ASF vouchers reduce the share of carbohydrate-heavy households in Malawi. For wealthy consumers,

over-consumption of fat is high in Uganda and made worse by the PN and ASF vouchers. In Niger, dietary imbalance of even Q4 consumers is exacerbated by the SG voucher, which increases over-consumption of carbohydrates and under-consumption of fats. The SS voucher achieves the opposite, balance-improving effect for Q4 consumers in Niger.

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Price vouchers targeting poor consumers have mixed effects on overall diet quality

Many price vouchers improve NRFI, while some lower it. No single voucher would raise NRFI for consumers in all expenditure quartiles in all countries (Fig. SMB.24). The SG voucher would improve only wealthy households' NRFI only in Niger, Uganda and Tanzania. The SS voucher would improve NRFI for all households in Malawi and Niger and for poor households in Tanzania. The PN voucher would improve NRFI in all countries across the expenditure distribution, with very small negative effects for wealthy households only in Uganda. The FFV voucher would improve NRFI in most cases except for in Niger and for wealthy households in Malawi. The ASF voucher would decrease NRFI for all households in Niger and Nigeria and for wealthy households in Tanzania.

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Costs of price vouchers vary considerably across food categories, countries, and expenditures

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The redeemed value of a PV, which by assumption would reduce the consumer's purchase price of targeted food items by 25%, varies according to how much the household would demand of the subsidized food items. We report the mean household-level value of each PV, which is based on predicted post-PV demand, in Table 1.

25

Ignoring implementation costs, we assume that the cost to the government of granting a price voucher equals its redeemed value to beneficiary households. PVs that target poor households are almost always less costly than those targeting non-poor households, as poor households consume less food and also lower quality foods within each category than do wealthier households. The only exception is PN vouchers for poor households, which cost less for Q3 households in Malawi, Tanzania and Nigeria. These regressive features of a PV could be addressed by designing a program that excludes higher quality items or places a cap on the quantity subsidized. Because our focus is on a PV's impact on poor consumers' food demand, we did not incorporate such design features into these simulations.

Across all food categories, Q1 price vouchers are always lower cost per household than the cash transfer, which ranges in cost from \$US 30 per household per month in Uganda to \$US 47 in Nigeria. The SG voucher is by far the most expensive, costing up to \$US 24 per household per month for Q1 households in Niger and \$US 58 for Q4 households. Only in Uganda, where starchy bananas are a key staple, is a different food category voucher (SS) more expensive than the SG voucher. PN vouchers are reasonably cost effective, with a median cost of \$US 4 per month per poor (Q1) household in Uganda (the highest of the countries). The PN voucher is not excessively expensive for wealthy consumers either, suggesting that the cost of program leakage in the case of imperfect targeting would not be overly burdensome. The FFV voucher is also relatively low cost per Q1 household (the most expensive country average is \$US 3.98 per household per month in Malawi). The ASF voucher is small for Q1 consumers (the highest country is Nigeria at 4.83 per household per month) but quite expensive for wealthy consumers, (topping off at \$US 24.86 per month per Q4 household in Malawi).

When assessing the dietary impacts of cash transfers and price vouchers (Fig. SMB.24) alongside the predicted costs, PN and FFV PVs are more promising than SG or ASF vouchers with regards to impacts on NRFI.

Discussion

With new, comprehensive evidence, our findings support the widespread belief that poverty reduction is central to improving diet quality. Compared to other studies, we find a stronger link between growth in total expenditures and improvements in multiple dimensions of diet quality, and this link is especially strong for poor consumers with expenditures below the international \$US 1.90/day purchasing power parity (PPP) extreme poverty line. Poor consumers associate increased expenditures very closely with increased intake of macro- and micro-nutrients.

We assess the diet quality impacts of poverty reduction by simulating a stylized cash transfer (CT) that would raise consumers' total expenditures without changing prices. We find that a CT would lead to more households consuming sufficient levels of macro- and micro-nutrients almost without exception. A CT would not close all intake gaps between recommended and actual intake, nor would it noticeably improve macro-nutrient imbalance. The simulated CT would broadly improve diets without exacerbating problems associated with over-consumption (e.g., excessive intake of fat as a share of DE).

We also find evidence that food prices are important determinants of nutrient intake and diet quality. Intake is highly sensitive to the main staple food's price in countries that rely on one major staple food (e.g., Malawi, Niger, and Tanzania). In multi-staple countries (e.g., Uganda and Nigeria), intake is sensitive to the prices of many different foods, including staple grains, starchy staples, and pulses & nuts.

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Our results highlight the importance of understanding consumers' complex cross-price adjustments in response to food price changes, which vary from country to country and within a country between wealthy and poor consumers. Due to these adjustments, it is difficult to predict the overall diet quality response of any food price change. There is no single food category subsidy that would improve diet quality along all dimensions for all consumers in all countries. Lowering staple grain prices with vouchers could improve diet quality along many dimensions, though it also quite costly to provide poor consumers with these vouchers. Lowering the prices of nutrient-dense foods like fruits & vegetables and animal-source foods can help to improve diet quality along many dimensions, though the effects are much smaller and require trade-offs along other dimensions of diet quality. The pulse & nut voucher is promising in that it results in meaningful improvements in poor consumers' intake of macro- and micro- nutrients without tradeoffs, and these subsidies are not as costly to implement as other subsidies.

Our findings are consistent with the idea that healthy diets are costly relative to the purchasing power of poor consumers.[10] While many studies emphasize the high relative prices of food items that are rich in nutrients as a key barrier to diet quality,[11, 44] we find that lowering the prices of healthy foods alone is unlikely to close dietary intake gaps. Rather, consumers show a strong overall propensity to improve diet quality as staple food prices are decreased and as poverty is reduced.

Due to data availability, our analysis has limitations. First, we do not observe, and thus cannot model, consumption of individuals within households. Instead, we model household intake and compare it with the household's dietary requirements. While sufficient household intake is necessary for ensuring sufficient intake for individuals within a household, it cannot guarantee

sufficient individual intake when intra-household distribution is inequitable. Second, due to survey design, we observe 7-day estimates of food consumption, which is measured with error.^[45] Measurement error in the dependent variable generally does not cause bias in coefficient estimates.^[46] Third, we do not have enough information about the content of food consumed away from home to model its contribution to dietary intake, which could be meaningful in some contexts but is unlikely to be shared by entire households so is less relevant for our assessment of household level intake adequacy. Fourth, we do not observe processing steps like milling or fortification, which determine the nutritive values of foods.

Our simulations are designed to trace out diet quality sensitivity to the key demand drivers of total expenditures and food prices. We make important simplifying assumptions, and the simulations should not be interpreted as *ex ante* predictions of any program's full impact. We do not have a way to model what portion of a cash transfer households may use to raise total expenditures (as opposed to accumulating assets or investing in a household enterprise). In our CT simulations, we assume that consumers use a fixed proportion of the cash transfer to raise their total household expenditures and that there is no change in their total incomes arising from investments made with the remaining portion of the CT. These are conservative assumptions, as CTs could generate additional returns beyond what we model. CT impacts on diet quality are positive even when we ignore these additional channels through which CTs could raise total household expenditures. Fourth, we assume that any CT or PV will not result in a change in producer prices, wage rates, or consumer prices (apart from the PV being simulated). Equilibrium price increases induced by a CT or PV could dampen or undermine impacts, but

these price effects could be minimized if CTs and PVs are well targeted and implemented in open markets.

For policy makers and development practitioners seeking to improve diet quality in developing countries, we offer analysis of the role consumer preferences play in shaping consumers' responses to changing price signals. Because of consumers' complex patterns of substitutions and complementarities, our findings are counter-intuitive in that lowering the relative prices of healthy foods does not necessarily offer the best intervention to raise intake of healthy foods. Staple food prices are key important determinants of overall diet quality especially in single-staple settings. Our modeling approach can assist the agricultural research and development community in prioritizing crops whose productivity gains are likely to result in the most substantial benefits for poor consumers.

Methods

- 15** We include more details about the methods used in this study, from data to estimation to policy simulation, in Appendix [SMA](#).

Household Data

We model food demand systems using Living Standards Measurement Study – Integrated Surveys on Agricultural (LSMS-ISA) nationally representative panel data from five countries: Malawi, Niger, Uganda, Tanzania, and Nigeria.^[47] These countries represent the full set of countries from sub-Saharan Africa for which fully nationally representative, household level, panel datasets are available.² Table 2 reports details about each country's survey years and sample. All samples include urban and rural households.

²A LSMS-ISA panel dataset is also available from Ethiopia, but the food item list is quite limited in two of the three survey waves, and the first wave excludes urban households.

Households report at-home food consumption by food item and source (purchased, self-provisioned, or gift/transfer) over the 7-day period preceding the household interview. We impute the value per standard unit (hereafter, unit value) of each non-purchased item using acquisition costs. We aggregate nutritionally similar food items into 18–19 food groups, depending on the country. Tables SMC.46–SMC.50 list the food items included in each country’s survey and shows how they are placed into food groups. Consumption by food group is summarized in Tables SMC.41–SMC.45.

We match food items to their nutritional content using food composition tables as described in Appendix SMA. Tables SMC.52–SMC.56 summarize DE intake from each food group in each country. We do not directly observe daily intake per household member, but we infer it based on reported household total consumption and the household composition.

We construct a 7-day total expenditures aggregate for each household which includes total expenditures on food consumed at home as well as other expenditures, such as food consumed away from the home, alcoholic beverages and tobacco, education and health expenses, and expenditures on non-food goods and services. Food away from home consumption is included as numéraire good (i.e., non-food) consumption because we do not have enough information about the items consumed to know their nutrient content or to compute unit values. Consumption of food away from home is largest in Nigeria, where it comprises under 10% of total household expenditures.[48]

For the purpose of describing results, we use the total expenditures aggregate to partition each country’s sample into four comparable total expenditure “quartiles” based on expenditures per day per adult equivalent.³ The poorest group (Q1) has expenditures below the international extreme poverty line

³Children and elderly members are counted as less than one full adult equivalent, reflecting lower average levels of economic consumption.

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(\$US 1.90 per capita per day in constant 2017 international \$US, adjusted for 2011 purchasing power parity (PPP) and the country's consumer price index).

Daily per capita expenditures are between \$US 1.90 and \$US 3.20 (the international poverty line) for Q2 households, between \$US 3.20 and \$US 5.50 for

- 5 Q3 households, and above \$US 5.50 for Q4 households. Table 2 reports the share of each country's population in each quartile.

Prices

For each food item, we use the values per unit from purchasing households to impute unit values for non-purchasing households, as market prices are not

- 10 observed for food items not purchased by households even when the items are consumed. Imputed unit values reflect the opportunity cost that a household faces when determining whether to consume an item (versus, e.g., selling it or storing it for later consumption) even if the household did not purchase it from a market.

15 Statistical Analyses

Demand Model

We characterize household demand for food and a composite numéraire good (incorporating all non-food consumption goods and services) using the Exact

Affine Stone Index (EASI) demand model.[27] The EASI model is an incom-

- 20 plete demand system, omitting demand for leisure. (Consumers' preferences for leisure relative to consumption goods dictate the trade-off between working more to consume more goods and working less to increase leisure.) Because

we include a numéraire good encompassing non-food consumption, we avoid the common (yet problematic) assumption that food consumption is separable

- 25 from non-food consumption.

The EASI model is much more flexible than alternatives that are more commonly used, such as the Almost Ideal Demand (AID) system or the Quadratic AID system. This flexibility allows for more curvature in the Engel curves that describe the relationship between expenditures and food demand and in the Slutsky matrix that describes the relationship between prices and demand.^[27]

We estimate the specification used by McCullough *et al.*^[33] The dependent variable is a vector of budget shares for each food group (and 1 for the numéraire good). The independent variables include a vector of log price indices, the log of real total expenditures (total expenditures deflated by the Stone price index), and a polynomial of real total expenditures to the highest degree as selected during the estimation procedure. We also include a vector of price-expenditure interactions and demand shifters to control for observed household characteristics. Finally, we include community-level correlated random effects to control for time-invariant unobserved heterogeneity in preferences.

Estimation

To account for censoring (non-consumption of a food group during the 7-day recall period), we estimate latent demand using a Tobit model.^[28, 49, 50] We impose cross-equation restrictions on the latent demand system parameters consistent with the widely acknowledged properties of a well-behaved demand system: homogeneity, symmetry, and adding-up. We address two sources of endogeneity in estimation. The first source arises from the fact that each household's own budget shares (the dependent variables in demand system) are contained within its Stone price index, which is part of the household's real total expenditures variable (a regressor in the demand system). We instrument each household's Stone price index with a modified index that deflates expenditures by the sample average budget share for each food group.^[27]

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The second source of endogeneity arises from unobserved quality heterogeneity and price search behavior.[51, 52] Quality could vary systematically with total expenditures, for example, if wealthier households seek out higher quality items within a food group (e.g., beef rather than goat meat within the red meat food group). Price search behavior could occur, for example, if consumers who prefer an item more try harder to find better prices for that item. We address quality heterogeneity within food groups by constructing a Fisher Ideal price index at the food group level. We address bias caused by price search behavior by constructing price instruments for each household using neighbor households.

Food Demand Elasticities

We use estimated parameters to predict budget shares, expenditure elasticities, and price elasticities, evaluating each price and expenditure elasticity at each household-year observation. We simulate standard errors for each elasticity by drawing parameters from a multivariate normal distribution with means equal to the parameter vector and variance equal to its covariance matrix.[53]

Tables SMC.1–SMC.20 report the sample-wide median price and expenditure elasticities and their standard errors by expenditure quartile for each country. Figs. SMB.9–SMB.13 show the own- and cross-price elasticities in matrix form for all four expenditure groups in each country.

Nutrient Demand Elasticities

We derive nutrient demand elasticities using the price and expenditure elasticities described above and each food's nutrient composition. We report the median nutrient demand elasticity of each macro- and micro-nutrient with respect to total expenditures and each food group's price by country and expenditure quartile in Tables SMC.21–SMC.40.

Diet Quality Assessment

We assess diet quality using three measures. First, intake sufficiency refers to the sufficiency of each household's consumption of a nutrient relative to the household's total requirement for that nutrient. To examine the intake sufficiency of each dietary component (dietary energy, carbohydrates, protein, fat, iron, zinc, vitamin A, and total folate, hereafter "nutrient"), we assess whether a household's consumption of that nutrient exceeds the household-level estimated average requirement (EAR) for that nutrient, which we describe in detail in Appendix SMA.⁴

Our next two diet quality measures are normalized per unit of energy intake and thus are not sensitive to misreporting of quantities consumed, assuming quantities are similarly misreported for all food items. The dietary balance measure is based on the share of carbohydrates, fat, and protein in total DE intake. The WHO specifies a range of recommended intake for each macro-nutrient (10%–15% for protein, 15%–30% for fat, and 55%–75% for carbohydrates), and consumption in ratios outside these ranges indicates dietary imbalance that is predictive of chronic disease.[54] Consuming macro-nutrients within the recommended ranges does not guarantee low disease risk. Other diet-related indicators, such as including high consumption of sodium, low consumption of fruit, and low consumption of whole grains and vegetables.such as inadequate fruit intake, can also predict chronic disease.[55]

The Nutrient-Rich Foods Index (NRFI) is a single diet quality measure that favors higher concentration of nine healthy components (density of protein, fiber, vitamin A, vitamin C, vitamin E, calcium, iron, magnesium, and potassium) and penalizes higher concentration of three moderation components (density of saturated fat, added sugar, and sodium).[43, 56]

⁴Energy requirements are typically referred to as estimated energy requirements (EER), but when we discuss DE requirements alongside macro- and micro- nutrients we use the term EAR for simplicity.

Policy Simulations

We use policy simulations to assess the sensitivity of diet quality to changes in total expenditures and food prices. We simulate two policies: a cash transfer (CT) of fixed size, and a price voucher (PV) that offers a 25% price discount

- 5 on various categories of foods. Both the size of the CT and the PV discount level are selected using real-world policy precedents. For each country, we select a CT size that corresponds with 20% of the median household expenditure levels of Q1 households, as depicted in Table 1. We do not adjust CT based on household size or composition. We provide more details about the CT
- 10 simulation and its underlying assumptions in Appendix [SMA](#).

The price voucher (PV) policy simulation mimics policies intended to lower the costs of healthy foods thereby encouraging their consumption,[57] or to subsidize food staple prices as a safety net intervention (e.g., India's Public Distribution System).[58] The PV simulation could mimic the effect of raising

- 15 productivity and supply of specific crops by investing in agricultural research.

We separately apply a 25% PV to five food categories (staple grains (SG), starchy staples (SS), pulses & nuts (PN), fruits & vegetables (FFV), and animal-source foods (ASF)), which we map to their corresponding food groups in Table [SMC.51](#). We discuss relevant PV policy precedents, our PV estimation

- 20 procedures, and underlying assumptions in Appendix [SMA](#).

Simulation Cost Calculations

While CT costs are constant for all households in a country, the cost of each PV depends on the discount provided and the post-subsidy demand for each subsidized food. We use predicted post-PV demand, which is based on pre-PV

- 25 demand and each household's price elasticity estimates, to calculate each PV's implementation cost, ignoring costs of program administration.

Declaration of interests

The authors declare no competing interests.

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References

- [1] Evenson, R.E., Gollin, D.: Assessing the impact of the green revolution, 1960 to 2000. *Science* **300**(5260), 758–762 (2003)
- [2] Gollin, D., Hansen, C.W., Wingender, A.: Two Blades of Grass: The Impact of the Green Revolution. *Journal of Political Economy* **129**(8) (2021). <https://doi.org/10.3386/w24744>
- [3] Walker, T.S., Alwang, J., Alene, A., Ndjuenga, J., Labarta, R., Yigezu, Y., Diagne, A., Andrade, R., Andriatsitohaina, R.M., de Groote, H., Mausch, K., Yirga, C., Simtowe, F., Katungi, E., Jogo, W., Jaleta, M., Pandey, S., Charyulu, D.K.: Varietal adoption, outcomes and impact. In: Walker, T.S., Alwang, J. (eds.) *Crop Improvement, Adoption, and Impact of Improved Varieties in Food Crops in sub-Saharan Africa*. CABI Books, Wallingford, UK (2015). Chap. 19. <https://doi.org/10.1079/9781780644011.0388> <https://doi.org/10.1079/9781780644011.0388>
- [4] Food and Agriculture Organization of the United Nations: FAOSTAT statistical database. [Rome] : FAO (2020). <https://search.library.wisc.edu/>

[catalog/999890171702121](https://doi.org/10.5281/zenodo.5530333)

- [5] Global Diet Quality Project: Measuring What the World Eats: Insights from a New Approach. Technical report, Global Alliance for Improved Nutrition (GAIN); Harvard T.H. Chan School of Public Health, Department of Global Health and Population, Geneva; Boston (2022). <https://doi.org/10.36072/dqq2022>
- [6] Food and Agriculture Organization of the United Nations, United Nations Economic Commission for Africa, African Union: Africa - Regional Overview of Food Security and Nutrition 2021: Statistics and Trends. FAO, Accra (2021). <https://doi.org/10.4060/cb7496>. <https://www.fao.org/3/cb7496en/cb7496en.pdf>
- [7] Gödecke, T., Stein, A.J., Qaim, M.: The global burden of chronic and hidden hunger: Trends and determinants. *Global Food Security* **17**(December 2017), 21–29 (2018). <https://doi.org/10.1016/j.gfs.2018.03.004>
- [8] Global Burden of Disease Collaborative Network: Global burden of disease study 2019. Technical report, Institute for Health Metrics and Evaluation (IHME), Seattle (2019). <https://vizhub.healthdata.org/gbd-results/>
- [9] Black, R.E., Allen, L.H., Bhutta, Z.A., Caulfield, L.E., de Onis, M., Ezzati, M., Mathers, C., Rivera, J.: Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet* **371**, 243–260 (2008). [https://doi.org/10.1016/S0140-6736\(07\)61333-2](https://doi.org/10.1016/S0140-6736(07)61333-2)
- [10] Hirvonen, K., Bai, Y., Headey, D., Masters, W.A.: Affordability of the EAT–Lancet reference diet: A global analysis. *The Lancet Global Health* **8**(1), 59–66 (2020). [https://doi.org/10.1016/S2214-109X\(19\)30447-4](https://doi.org/10.1016/S2214-109X(19)30447-4)

- [11] Headey, D.D., Alderman, H.H.: The relative caloric prices of healthy and unhealthy foods differ systematically across income levels and continents. *The Journal of Nutrition* **149**, 2020–2033 (2019). <https://doi.org/10.1093/jn/nxz158>
- [12] Masters, W.A., Bai, Y., Herforth, A., Sarpong, D., Mishili, F., Kinabo, J., Coates, J.: Measuring the affordability of nutritious diets in Africa: Price indexes for diet diversity and the cost of nutrient adequacy. *American Journal of Agricultural Economics* **100**(5), 1285–1301 (2018). <https://doi.org/10.2139/ssrn.2970745>
- [13] Headey, D.D., Ecker, O., Comstock, A.R., Ruel, M.T.: Poverty, price and preference barriers to improving diets in sub-Saharan Africa. *Global Food Security* **36**(December 2022), 100664 (2023). <https://doi.org/10.1016/j.gfs.2022.100664>
- [14] Gillespie, S., Haddad, L., Mannar, V., Menon, P., Nisbett, N.: The politics of reducing malnutrition: Building commitment and accelerating progress. *The Lancet* **382**(9891), 552–569 (2013). [https://doi.org/10.1016/S0140-6736\(13\)60842-9](https://doi.org/10.1016/S0140-6736(13)60842-9)
- [15] Sibanda, L.M., Mwamakamba, S.N.: Policy considerations for African food systems: Towards the United Nations 2021 Food Systems Summit. *Sustainability* **13**(16), 1–15 (2021). <https://doi.org/10.3390/su13169018>
- [16] Fanzo, J.: Ethical issues for human nutrition in the context of global food security and sustainable development. *Global Food Security* **7**, 15–23 (2015). <https://doi.org/10.1016/j.gfs.2015.11.001>

32 *Nutrient adequacy in Africa*

- [17] Ryckman, T., Beal, T., Nordhagen, S., Chimanya, K., Matji, J.: Affordability of nutritious foods for complementary feeding in Eastern and Southern Africa. *Nutrition Reviews* **79**, 35–51 (2021). <https://doi.org/10.1093/nutrit/nuaa137>
- [18] Haddad, L., Hawkes, C.: A new global research agenda for food. *Nature* **540**(7631), 30–32 (2016)
- [19] Deaton, A., Muellbauer, J.: Economics and Consumer Behavior. Cambridge University Press, ??? (1980)
- [20] Pitt, M.M.: Food preferences and nutrition in rural Bangladesh. *The Review of Economics and Statistics* **65**(1), 105–114 (1983)
- [21] Sahn, D.E.: The effect of price and income changes on food-energy intake in Sri Lanka. *Economic Development and Cultural Change* **36**(2), 315–340 (1988)
- [22] Behrman, J.R., Wolfe, B.L.: More evidence on nutrition demand. Income seems overrated and women's schooling underemphasized. *Journal of Development Economics* **14**(1), 105–128 (1984). [https://doi.org/10.1016/0304-3878\(84\)90045-2](https://doi.org/10.1016/0304-3878(84)90045-2)
- [23] Behrman, J.R., Deolalikar, A.B.: Will Developing Country Nutrition Improve with Income? A Case Study for Rural South India. *Journal of Political Economy* **95**(3), 492–507 (1987)
- [24] Pitt, M.M., Rosenzweig, M.R.: Health and nutrient consumption across and within farm households. *The Review of Economic Studies* **67**(2), 212–223 (1985)

- [25] Subramanian, S., Deaton, A.: The Demand for Food and Calories. *Journal of Political Economy* **104**(1), 133–162 (1996). <https://doi.org/10.1086/262020>
- [26] Popkin, B.M., Adair, L.S., Ng, S.W.: The global nutrition transition: the pandemic of obesity in developing countries. *Nutrition Reviews* **70**, 3–21 (2012). <https://doi.org/10.1111/j.1753-4887.2011.00456.x>
- [27] Lewbel, A., Pendakur, K.: Tricks with Hicks: The EASI demand system. *American Economic Review* **99**(3), 827–863 (2009). <https://doi.org/10.1257/aer.99.3.827>
- [28] Meyerhoefer, C.D., Ranney, C.K., Sahn, D.E.: Consistent estimation of censored demand systems using panel data. *American Journal of Agricultural Economics* **87**(3), 660–672 (2005)
- [29] Zhen, C., Finkelstein, E.A., Nonnemaker, J.M., Karns, S.A., Todd, J.E.: Predicting the effects of sugar-sweetened beverage taxes on food and beverage demand in a large demand system. *American Journal of Agricultural Economics* **96**(1), 1–25 (2014). <https://doi.org/10.1093/ajae/aat049>
- [30] Ecker, O., Qaim, M.: Analyzing nutritional impacts of policies: An empirical study for Malawi. *World Development* **39**(3), 412–428 (2011)
- [31] Abdulai, A., Aubert, D.: A cross-section analysis of household demand for food and nutrients in Tanzania. *Agricultural Economics* **31**(2004), 67–79 (2004). <https://doi.org/10.1016/j.agecon.2003.03.001>
- [32] Colen, L., Melo, P.C., Abdul-salam, Y., Roberts, D., Mary, S., Paloma, S.G.Y.: Income elasticities for food, calories and nutrients across Africa: A meta-analysis. *Food Policy* **77**(May 2016), 116–132 (2018)

34 *Nutrient adequacy in Africa*

- [33] McCullough, E., Zhen, C., Shin, S., Lu, M., Arsenault, J.: The role of food preferences in determining diet quality for Tanzanian consumers. *Journal of Development Economics* **155**(March 2022), 673–711 (2021). <https://doi.org/10.1016/j.jdeveco.2021.102789>
- [34] Almås, I., Haushofer, J., Shapiro, J.P.: The Income Elasticity for Nutrition: Evidence from Unconditional Cash Transfers in Kenya. Working Paper 25711, NBER (2019)
- [35] Hoddinott, J., Sandstrom, S., Upton, J.: The impact of cash and food transfers: Evidence from a randomized intervention in Niger. *American Journal of Agricultural Economics* **100**(4), 1032–1049 (2018). <https://doi.org/10.1093/ajae/aay019>
- [36] Attanasio, O., Battistin, E., Mesnard, A.: Food and cash transfers: Evidence from Colombia. *Economic Journal* **122**(559), 92–124 (2012). <https://doi.org/10.1111/j.1468-0297.2011.02473.x>
- [37] Behrman, J.R., Deolalikar, A.: Health and nutrition. In: Chenery, H., Srinivasan, T.N. (eds.) *Handbook of Development Economics* vol. 1, pp. 631–711. Elsevier, ??? (1988). Chap. 14. [https://doi.org/10.1016/S1573-4471\(88\)01017-4](https://doi.org/10.1016/S1573-4471(88)01017-4). <https://www.sciencedirect.com/science/article/pii/S1573447188010174>
- [38] Zhen, C., Lazaro, E., Mitchell, D.: Cross-Sectional Estimation of Food and Nutrient Demand in Tanzania Using a Large Demand System (2016)
- [39] Jensen, R.T., Miller, N.H.: Do consumer price subsidies really raise nutrition? *Review of Economics and Statistics* **93**(4), 1205–1223 (2010). https://doi.org/10.1162/REST_a_00118

- [40] Chakrabarti, S., Kishore, A., Roy, D.: Effectiveness of food subsidies in raising healthy food consumption: Public distribution of pulses in India. *American Journal of Agricultural Economics* **100**(5), 1427–1449 (2018). <https://doi.org/10.1093/ajae/aay022>
- [41] An, R., Patel, D., Segal, D., Sturm, R.: Eating better for less: A national discount program for healthy food purchases in South Africa. *American Journal of Health Behavior* **37**(1), 56–61 (2013). <https://doi.org/10.5993/AJHB.37.1.6>
- [42] Muhammad, A., Seale Jr, J.L., Meade, B., Regmi, A.: International Evidence on Food Consumption Patterns: An Update Using 2005 International Comparison Program Data. Technical Bulletin **Number 192**(February) (2011)
- [43] Fulgoni III, V.L., Keast, D.R., Drewnowski, A.: Development and validation of the nutrient-rich foods index: A tool to measure nutritional quality of foods. *The Journal of Nutrition* **139**(8), 1549–1554 (2009)
- [44] Bai, Y., Naumova, E.N., Masters, W.A.: Seasonality of diet costs reveals food system performance in East Africa. *Science Advances* **6**(49), 1–11 (2020). <https://doi.org/10.1126/sciadv.abc2162>
- [45] Abate, G.T., de Brauw, A., Gibson, J., Hirvonen, K., Wolle, A.: Telescoping causes overstatement in recalled food consumption: Evidence from a survey experiment in Ethiopia. Technical Report 1976, International Food Policy Research Institute (IFPRI) (2020). <https://econpapers.repec.org/RePEc:fpr:ifprid:1976>
- [46] Hausman, J.: Mismeasured variables in econometric analysis: Problems

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from the right and problems from the left. *The Journal of Economic Perspectives* **15**, 57–67 (2001)

- [47] World Bank Group: Living Standards Measurement Study - Integrated Surveys on Agriculture (2022). <https://www.worldbank.org/en/programs/lsms/initiatives/lsms-ISA>
- [48] de Brauw, A., Herskowitz, S.: Income variability, evolving diets, and elasticity estimation of demand for processed foods in nigeria. *American Journal of Agricultural Economics* **00**, 1–20 (2020). <https://doi.org/10.1111/ajae.12139>
- [49] Perali, F., Chavas, J.-P.: Estimation of censored demand equations from large cross-section data. *American Journal of Agricultural Economics* **82**(4), 1022–1037 (2000)
- [50] Kasteridis, P., Yen, S.T., Fang, C.: Bayesian estimation of a censored linear almost ideal demand system: Food demand in Pakistan. *American Journal of Agricultural Economics* **93**(5), 1374–1390 (2011). <https://doi.org/10.1093/ajae/aar059>
- [51] Cox, T.L., Wohlgenant, M.K.: Prices and Quality Effects in Cross-Sectional Demand Analysis. *American Journal of Agricultural Economics* **68**(4), 908–919 (1986). <https://doi.org/10.2307/1242137>
- [52] Deaton, A.: Quality, quantity, and spatial variation of price. *The American Economic Review* **78**(3), 418–430 (1988)
- [53] Krinsky, I., Robb, A.L.: On approximating the statistical properties of elasticities: A correction. *The Review of Economics and Statistics* **72**(1), 189–190 (1990)

- [54] Amine, E.K., Baba, N.H., Belhadj, M., Deurenberg-Yap, M., Djazayery, A., Forrestre, T., Galuska, D.A., Herman, S., James, W.P.T., Kabangu, J.R.M.: Diet, nutrition and the prevention of chronic diseases. Technical Report 916, World Health Organization (2003)
- [55] Forouzanfar, M.H., Alexander, L., Bachman, V.F., Biryukov, S., Brauer, M., Casey, D., Coates, M.M., Delwiche, K., Estep, K., Frostad, J.J., *et al.*: Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990–2013: A systematic analysis for the global burden of disease study 2013. *The Lancet* **386**, 2287–2323 (2015).
[https://doi.org/10.1016/S0140-6736\(15\)00128-2](https://doi.org/10.1016/S0140-6736(15)00128-2)
- [56] Drewnowski, A.: The Nutrient Rich Foods Index helps to identify healthy, affordable foods. *The American Journal of Clinical Nutrition* **91**(4), 1095–1101 (2010)
- [57] Gittelsohn, J., Trude, A.C.B., Kim, H.: Availability, purchase, and consumption of healthy foods and beverages: A systematic review. *Preventing Chronic Disease* **14**(E107), 1–24 (2017)
- [58] Kishore, A., Chakrabarti, S.: Is more inclusive more effective? The ‘New Style’ public distribution system in India. *Food Policy* **55**, 117–130 (2015).
<https://doi.org/10.1016/j.foodpol.2015.06.006>
- [59] Lukmanji, Z., Hertzmark, E., Mlingi, N., Assey, V., Ndossi, G., Fawzi, W.: Tanzania Food Composition Tables. MUHAS-TFNC, HSPH, Dar es Salaam, Tanzania (2008)
- [60] Vincent, A., Grande, F., Compaoré, E., Amponsah Annor, G., Addy,

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- P.A., Aburime, L.C., Ahmed, D., Bih Loh, A.M., Dahdouh Cabia, S., Deflache, N., Dembélé, F.M., Dieudonné, B., Edwige, O.B., Ene-Obong, H.N., Fanou Fogny, N., Ferreira, M., Omaghomi Jemide, J., Kouebou, P.C., Muller, C., Nájera Espinosa, S., Ouattara, F., Rittenschober, D., Schönenfeldt, H., Stadlmayr, B., van Deventer, M., Razikou Yiagnigni, A., Charrondière, U.R.: FAO/INFOODS Food Composition Table for Western Africa (2019) User Guide & Condensed Food Composition Table. FAO, Rome, Italy (2020)
- [61] Stadlmayr, B., Charrondiere, U., Enujiugha, V., Bayili, R., Fagbohoun, E., Samb, B., Addy, P., Barikmo, I., Ouattara, F., Oshaug, A., Akinyele, I., Annor, G., Bomfeh, K., EneObong, H., Smith, I., Thiam, I., Burlingame, B.: West African Food Composition. FAO, Rome, Italy (2012)
- [62] University of Ibadan: Nigeria Food Database. <http://nigeriafooddata.ui.edu.ng/> Accessed Jan 10, 2022
- [63] Hotz, C., Lubowa, A., Sison, C., Moursi, M., Loechl, C.: A Food Composition Table for Central and Eastern Uganda. HarvestPlus Technical Monograph. International Food Policy Research Institute (IFPRI) and International Center for Tropical Agriculture (CIAT), Washington, DC and Cali, Colombia (2012)
- [64] Calloway, D., Murphy, S.: WorldFood Dietary Assessment System, 2nd edn. University of California at Berkeley, Berkeley, CA (2006)
- [65] US Department of Agriculture Agricultural Research Service: Food-Data Central. US Department of Agriculture, Washington, DC (2019). fdc.nal.usda.gov

- [66] Global Fortification Data Exchange: Global Fortification Data Exchange. <https://fortificationdata.org> Accessed 2021-01-15
- [67] Matthews, R.H., Garrison, Y.J.: Food yields summarized by different stages of preparation. Agriculture Handbook 102, US Department of Agriculture, Beltsville, MD (1975)
- [68] US Department of Agriculture Agricultural Research Service: USDA Table of Nutrient Retention Factors, Release 6. US Department of Agriculture, Beltsville, MD (2007)
- [69] Haughton, J., Khandker, S.R.: Handbook on Poverty and Inequality. World Bank Publications, Washington, DC (2009)
- [70] De Janvry, A., Sadoulet, E.: Development Economics: Theory and Practice. Routledge, London, UK (2015)
- [71] Atkin, D.: Trade, tastes, and nutrition in India. *American Economic Review* **103**(5), 1629–63 (2013)
- [72] Cockx, L., Colen, L., De Weerdt, J.: From corn to popcorn? Urbanization and dietary change: Evidence from rural-urban migrants in Tanzania. *World Development* **110**, 140–159 (2018). <https://doi.org/10.1016/j.worlddev.2018.04.018>
- [73] Hanemann, M., Morey, E.: Separability, partial demand systems, and consumer's surplus measures. *Journal of Environmental Economics and Management* **22**(3), 241–258 (1992)
- [74] LaFrance, J.T., Hanemann, W.M.: The dual structure of incomplete demand systems. *American Journal of Agricultural Economics* **71**(2),

262–274 (1989)

- [75] Kastens, T.L., Brester, G.W.: Model selection and forecasting ability of theory-constrained food demand systems. *American Journal of Agricultural Economics* **78**(2), 301–312 (1996)
- [76] Klaiber, H.A., Holt, M.T.: The role of theoretical restrictions in forecasting with inverse demand models. *American Journal of Agricultural Economics* **92**(1), 70–85 (2010). <https://doi.org/10.1093/ajae/aap023>
- [77] Huang, K.S.: Nutrient elasticities in a complete food demand system. *American Journal of Agricultural Economics* **78**(1), 21–29 (1996)
- [78] Huang, K.S., Lin, B.-H.: Estimation of food demand and nutrient elasticities from household survey data. Technical Bulletin TB-1887, US Department of Agriculture, Washington, DC (2000)
- [79] FAO/WHO/UNU: Human Energy Requirements: Human Energy Report of a Joint FAO/WHO/UNU Expert Consultation. FAO/WHO/UNU, Rome, Italy (2004)
- [80] Institute of Medicine: Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. National Academies Press, Washington, DC (2006)
- [81] International Zinc Nutrition Consultative Group, Brown, K., Rivera, J., Bhutta, Z., Gibson, R., King, J., Lonnerdal, B., Ruel, M., Sandtrom, B., Wasantwisut, E., Hotz, C.: International zinc nutrition consultative group (izincg) technical document no. 1: Assessment of the risk of zinc deficiency in populations and options for its control. *Food Nutrition Bulletin* **25**(1), 99–203 (2004)

- [82] Institute of Medicine (US) Panel on Micronutrients: Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. National Academies Press, Washington, DC (2002)
- [83] WHO and FAO: Vitamin and Mineral Requirements in Human Nutrition, 2nd edn. World Health Organization, Geneva, Switzerland (2004)
- [84] Bai, Y., Herforth, A., Masters, W.A.: Global variation in the cost of a nutrient-adequate diet by population group: an observational study. *The Lancet Planetary Health* **6**(1), 19–28 (2022). [https://doi.org/10.1016/S2542-5196\(21\)00285-0](https://doi.org/10.1016/S2542-5196(21)00285-0)
- [85] Schneider, K.R., Christiaensen, L., Webb, P., Masters, W.A.: Assessing the affordability of nutrient-adequate diets. *American Journal of Agricultural Economics* **105**, 503–524 (2023). <https://doi.org/10.1111/ajae.12334>
- [86] Bastagli, F., Hagen-Zanker, J., Harman, L., Barca, V., Sturge, G., Schmidt, T., Pellerano, L.: Cash Transfers: What Does the Evidence Say? Overseas Development Institute, London, UK (2016). <https://cdn.odi.org/media/documents/11316.pdf>
- [87] Alderman, H.: Can transfer programs be made more nutrition sensitive? In: Sahn, D.E. (ed.) *The Fight Against Hunger and Malnutrition: The Role of Food, Agriculture, and Targeted Policies*, pp. 37–60. Oxford University Press, Oxford, UK (2015). Chap. 2
- [88] Ralston, L., Andrews, C., Hsiao, A.: The impacts of safety nets in Africa: What are we learning? Policy Research Working Paper 8255, World Bank

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- (2017). <https://doi.org/10.1596/1813-9450-8255>
- [89] Beegle, K., Coudousel, A., Monsalve, E.: Realizing the Full Potential of Social Safety Nets in Africa. Africa Development Forum Series, Agence Française de Développement and The World Bank Group, Washington, DC, and Paris, France (2018)
- [90] Filmer, D., Friedman, J., Kandpal, E., Onishi, J.: Cash Transfers, Food Prices, and Nutrition Impacts on Nonbeneficiary Children. Policy Research Working Paper 8377, World Bank (2018)
- [91] Handa, S., Daidone, S., Peterman, A., Davis, B., Pereira, A., Palermo, T., Yablonski, J.: Myth-busting? Confronting six common perceptions about unconditional cash transfers as a poverty reduction strategy in Africa. World Bank Research Observer **33**(2), 259–298 (2018). <https://doi.org/10.1093/wbro/lky003>
- [92] Gertler, P., Martinez, S., Rubio-Codina, M.: Investing cash transfers to raise long term living standards. American Economic Journal: Applied Economics **4**(1), 164–192 (2012). <https://doi.org/10.1596/1813-9450-3994>
- [93] Olsho, L.E.W., Klerman, J.A., Wilde, P.E., Bartlett, S.: Financial incentives increase fruit and vegetable intake among Supplemental Nutrition Assistance Program participants: A randomized controlled trial of the USDA Healthy Incentives Pilot. American Journal of Clinical Nutrition **104**(2), 423–435 (2016). <https://doi.org/10.3945/ajcn.115.129320>
- [94] Nordström, J., Thunström, L.: The impact of tax reforms designed to encourage healthier grain consumption. Journal of Health Economics

28(3), 622–634 (2009). <https://doi.org/10.1016/j.jhealeco.2009.02.005>

Tables

Table 1: Costs of implementing a cash transfer (CT) program and five different price voucher (PV) programs, by country and targeted population quartile.

		Malawi	Niger	Uganda	Tanzania	Nigeria
Median marginal propensity to consume cash transfer on food (% of CT)	Q1	0.42	0.58	0.48	0.54	0.46
	Q2	0.50	0.52	0.40	0.54	0.43
	Q3	0.56	0.50	0.31	0.48	0.35
	Q4	0.43	0.47	0.17	0.38	0.17
Average monthly transfer size per household (2011 \$US, PPP)	Q1-4	35.65	43.53	29.65	32.80	47.33
Staple grains	Q1	13.15	24.09	2.97	8.64	11.30
	Q2	22.58	40.03	5.68	15.89	14.52
	Q3	31.83	50.97	7.32	20.69	14.69
	Q4	40.54	58.42	8.84	20.72	12.42
Median monthly cost of PV program per household (2011 \$US, PPP)	Q1	1.03	0	6.69	1.47	3.33
Starchy staples	Q2	3.22	0	12.01	3.19	7.98
	Q3	4.46	0	14.46	4.17	11.04
	Q4	5.91	1.10	14.89	4.31	11.65
	Q1	2.12	0	4.01	2.10	2.29
Pulses & nuts	Q2	4.30	1.49	7.03	3.04	3.59
	Q3	5.16	2.49	8.24	3.08	4.03
	Q4	5.90	2.50	8.77	2.05	5.58
	Q1	3.98	0.77	2.34	3.27	3.90
Fruits & vegetables	Q2	6.03	1.78	3.95	5.18	6.03
	Q3	7.92	3.31	5.64	7.36	7.21
	Q4	8.29	6.02	7.76	10.31	8.30
	Q1	0	0	0.98	1.14	4.83
Animal-source foods	Q2	4.71	0.99	7.21	6.53	11.83
	Q3	15.99	3.18	13.55	13.53	18.72
	Q4	24.35	8.28	18.93	21.91	24.86

Note: The average monthly transfer size depicts the absolute size of cash transfer that we simulated for each household. The median marginal propensity to consume food in total is based on the share of the modeled CT that is used to increase total food expenditures (as opposed to numéraire good expenditures). The median monthly cost of each PV program is based on the post-PV quantities consumed of the food groups contained in each category, which varies by total expenditure quartile. Table SMC.51 lists the food groups included in each PV category.

Table 2: Sample characteristics of nationally representative datasets used to model demand systems

	Malawi	Niger	Uganda	Tanzania	Nigeria
Survey rounds	2010–11, 2012–13, 2016–17	2011, 2014	2005–06, 2019–10, 2011–12, 2013–14, 2015–16, 2018–19	2008–09, 2010–11, 2012–13	2010–11, 2012–13, 2015–16 ^a
Unique households	3,104	3,973	3,279	3,165	4,407
Household-year observations ^b	8,089	13,086	14,420	9,196	25,977
Food items reported (number)	58	73	47	50	74
Food groups modeled (number)	18	19	19	19	19
Share of households in Q1 (round 1)	34.16	20.99	36.93	16.40	25.72
Share of households in Q2 (round 1)	28.31	30.74	27.27	29.01	30.82
Share of households in Q3 (round 1)	21.46	30.18	21.42	31.23	28.01
Share of households in Q4 (round 1)	16.07	18.09	14.38	23.36	15.46

Note: Quartiles (denoted Q1–Q4) divide the observations by the household's total expenditures within each round, with Q1 representing the poorest households, which consume less than the international extreme poverty line (\$1.90 per capita per day, PPP), Q2 households represent the international poverty line (above the extreme poverty line < \$3.20 per capita per day, PPP), Q3 households are characterized by consuming above the international poverty line but < \$5.50 per capita per day, PPP, and Q4 households consume > \$5.50 per capita per day, PPP.

^a In Nigeria, consumption data were collected twice within each survey rounds, so we effectively have six rounds of panel data.

^b Household year observations reflect the size of the pooled sample that includes all cross-sectional waves, with households observed multiple times over the survey.

Figures

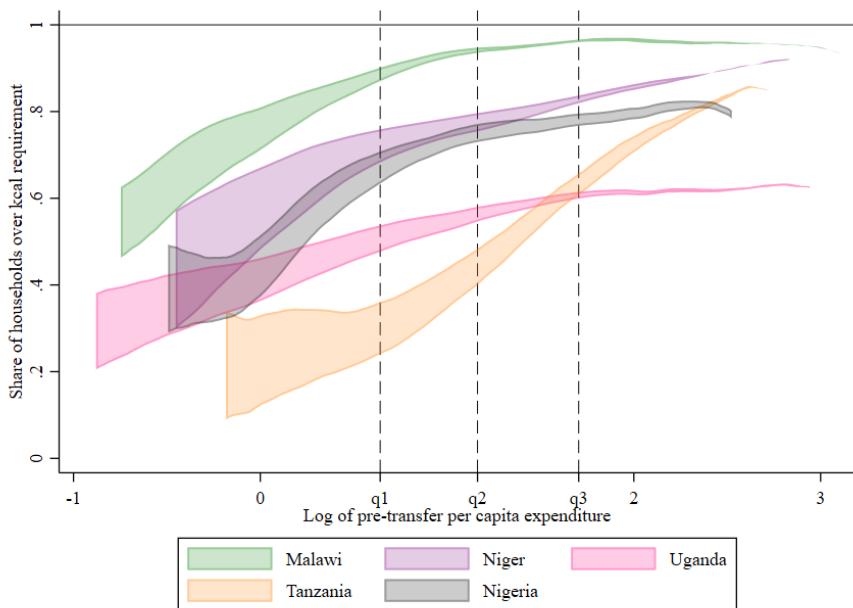


Fig. 1: Predicted probability of dietary energy (DE) sufficiency conditional on total household expenditures, before and after a simulated cash transfer (CT). The horizontal axis depicts the log of total household expenditures per adult equivalent (in \$US, PPP). The vertical axis depicts the share of households with sufficient intake of DE (i.e., DE intake exceeds the household's estimated energy requirement (EER)). The shaded area depicts the predicted increase in the share of households with sufficient DE intake following the simulated CT. Each country's shaded area is bounded below by the pre-transfer share of households with sufficient DE intake and above by the post-transfer share of households with sufficient DE intake. The dashed vertical lines represent the upper expenditure cutoff for each expenditure quartile, as labeled.

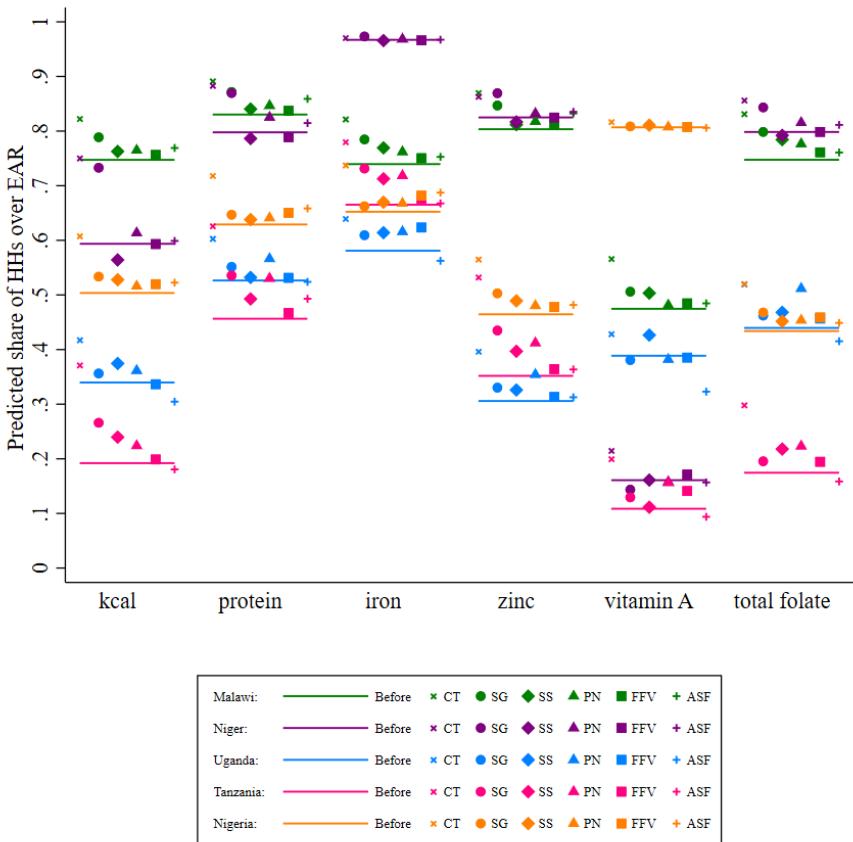


Fig. 2: Predicted share of Q1 households with sufficient intake (exceeding the estimated average requirement (EAR)) of each macro- and micro-nutrient before (solid line) and after the cash transfer (CT) and each of the five price vouchers (PVs), which are denoted by SG (staple grains, which include crops like rice, maize, wheat & other cereals, millet, and teff); SS (starchy staples, which include cassava, roots, tubers, & other starches); PN (pulses, nuts, & seeds); FFV (fresh fruits & vegetables); and ASF (animal-source foods, which include red meat, poultry, eggs, dairy, fish, & seafood). Food group mapping into PV categories is listed, country by country, in Table SMC.51. Each country is depicted by one color, and each symbol depicts one CT or PV simulation as represented in the legend.

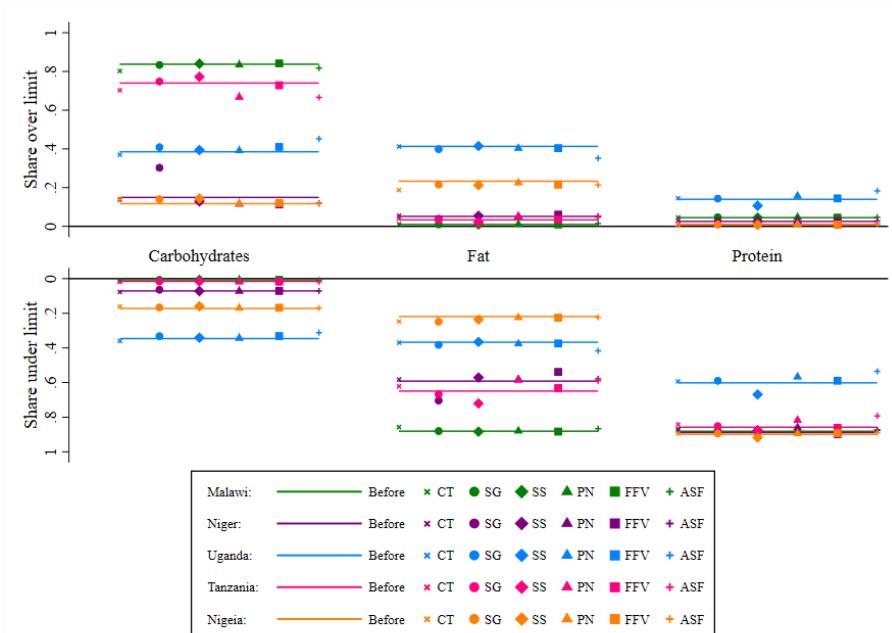


Fig. 3: Dietary balance before (solid line) and after cash transfer (CT) and each of the five price voucher (PV) simulations for Q1 households. Each country is depicted by one color, and each symbol depicts one CT or PV simulation as represented in the legend. The PV simulations are denoted by SG (staple grains) SS (starchy staples), PN (pulses, nuts, & seeds); FFV (fresh fruits & vegetables); and ASF (animal-source foods) as described in Table SMC.51. The left column above the label depicts the share of the country's population whose intake of carbohydrates exceeds the WHO recommended 75% limit, while the left column below the label depicts the share of the country's population whose intake of carbohydrates is less than the recommended 55% lower limit. The solid line depicts the share of households at baseline that consume above (below) the upper (lower) recommended limit. The second column depicts the same dietary balance analysis for fat, while the right-most column for protein.

Supplementary Materials

for

African Diets: the role of income, prices and preferences

Ellen McCullough, Meichen Lu, Yawotse Nouve, Joanne Arsenault, and Chen Zhen

SMA: Methods Supplementary Text

SMB: Supplementary Figures (Fig. **SMB.1**–Fig. **SMB.13**)

SMC: Supplementary Tables (Table **SMC.1**–Table **SMC.51**)

SMA Methods Supplementary Text

Consumption

Households report food items consumed at home over the 7 full days preceding the interview, according to the item list in Tables SMC.46–SMC.50. Food items are grouped into 18–19 food categories in each country as depicted in the tables. We use the interquartile method to clean outliers of consumption per adult equivalent at the household-item level.⁵ We assign nutrient values to food items using available food composition tables from Africa,[59–64, 64] and from the USDA.[65] We assume rates of fortification of staple foods based on data in the Global Fortification Data Exchange.[66] We adjust for edible portions using information and nutrient losses in cooking from USDA.[67, 68]

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Prices

To construct unit values for households that do not purchase any given food item, we follow several steps. First, we convert consumption of each food item to the most commonly reported unit for that item. Second, we use total expenditures and the total quantity purchased to create a unit value for each purchased item. Third, we clean unit value outliers by top- (bottom-) coding them at the item level to the 99th (1st) percentiles. Fourth, we impute item-level unit values for households that do not consume any market-purchased portion of an item during the 7-day recall period preceding the interview.[49] We impute these unit values for each food item and unit at the most dis-aggregated geographic level for which we have at least three unit value observations, in order to reduce the influence of unit value outliers. We start with the most dis-aggregated geographic level (the enumeration area)

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⁵In Tanzania, we retain the 1st and 99th percentile outlier cleaning approach used by McCullough *et al.*[33]

and then continue with the ward, district, region (interacted with urban), and then national level (interacted with urban).

Demand Model

Our two-way Exact Affine Stone Index (EASI) demand model consists of the

5 following system of equations:

$$w_{hit}^* = \mu_i + \sum_{j=1}^J \alpha_{ij} p_{hjt} + \sum_{r=1}^L \beta_{ir} y_{ht}^r + \sum_{j=1}^J \alpha_{ijy} (y_{ht} \times p_{hjt}) + \sum_{k=1}^K \gamma_{ik} z_{hkt} + u_{hit},$$

($h = 1, \dots, H; i = 1, \dots, J - 1; t = 1, \dots, T$).

(SMA.1)

In Equation SMA.1, w_{hit}^* represents household h 's latent budget share for food group i at time t . The household's observed budget share during the 7-day recall period, w_{hit} , is the latent budget share that is censored at zero. The log price index for household h and food group j at time t is denoted by p_{hjt} .

- 10 The variable y_{ht} represents the log of household h 's real total expenditures in period t . We construct y_{ht} as the log of total household expenditures deflated by the Stone price index: $\log x_{ht} - \sum_{j=1}^J w_{hjt} p_{hjt}$, where x_{ht} is nominal total household expenditures on food and non-food items [27]. J represents the total number of goods in our demand system (the number of food groups in Table 15 2 plus the numéraire good). H represents the total number of households in each dataset. L represents the highest degree of total expenditure polynomial included in the specification and is selected during the estimation procedure.

The vector z_{hkt} in Equation SMA.1 represents K demand shifters used to control for observed household characteristics that explain consumption.

- 20 This vector includes the household head's age, household size adjusted for

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adult equivalence,⁶ household dependency ratio, indicators for the household head's marital status and gender, indicators for each survey wave, geographic controls for each region and for urban (vs rural) areas, and an intercept.⁷ We control for time-invariant unobserved heterogeneity in tastes and preferences at the community level by including a vector of correlated random effects in z_{hkt} .^[33] These effects include enumeration area (EA) level means across survey waves of both the price vector ($\overline{p_{hjt}}^c$) and the interaction between the price vector and real total household expenditures ($\overline{(y_{ht} \times p_{hjt})}^c$) into z_{hkt} . Each household is linked with its corresponding EA in the first survey wave. We associate households that move away from their communities with the tastes and preferences from their originating communities.^[71, 72]

By including a numéraire good in our demand model, which encompasses all non-food consumption, we avoid a common and problematic assumption that it is appropriate to model demand for food groups conditional on *total food expenditures* (as opposed to *total household expenditures*).^[73, 74]

Estimation

With the cross-equation restrictions that we impose on homogeneity, symmetry and adding up, we ensure that modeled households view their incomes in real terms, respond to cross price changes symmetrically once compensated to maintain a fixed standard of living, and do not spend more than what they have. The predictive performance of a demand model is improved when these theoretical constraints are imposed on a demand system's parameters.^[75, 76]

⁶Following the literature, we adjust for adult equivalence using 1 as a weight for household members who are above age 17, 0.5 for members who are 13–17, 0.3 for members who are 7–12, 0.2 for members who are under 7.^[69, 70]

⁷The demand shifters of Uganda's model do not include the indicator for the household head's gender and household dependency ratio. Continuous demand shifters are logged and demeaned in the models for consumers in Tanzania, Malawi, and Nigeria. The choice of the demand shifters and whether to log or demean the continuous variables is guided by the performance of the model based upon a series of tests to evaluate the model.

We estimate this censored demand system with cross-equation restrictions using the extended Amemiya's generalized least squares (AGLS) estimator, which was adapted to a very similar application by Zhen *et al.*[29] Using the adding up restriction, we recover the parameters of the budget share equation 5 for the numéraire good.

We create a Fisher Ideal price index at the food group level in order to reduce the influence of unit value bias caused by substitution between food items within a food group (e.g., between types of red meat). For the numéraire good, we use each country's consumer price index (CPI) less food, alcoholic 10 beverages, tobacco, and narcotics, as the price index. We reduce the influence of household-level price search behavior and within-item substitutions by constructing three instruments for each price index; the first uses donor households from the same survey wave and EA, the second uses donor households from the same survey wave and region, and the third uses donor households 15 from the same geographic zone and survey month and year. For the numéraire good, the instrument is based on CPI lagged by 2 months.

Food Demand Elasticities

In order to calculate total expenditure elasticity of demand for each food group, we take the partial derivative of a matrix formation of Eq. SMA.1 with respect 20 to total expenditures, $\log x$. We must account for the fact that the budget share w_i appears on both sides of the demand equation. This gives the following $J \times 1$ semi-expenditure elasticity vector, se :

$$se = (I_J + TP')^{-1} P, \quad (\text{SMA.2})$$

where I_J is an identify matrix with dimension J , T is a $J \times 1$ vector whose i^{th} element equals $\sum_{r=1}^L r\beta_{ir}y^{r-1}$, and P is the $J \times 1$ vector of log prices. J

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represents the number of food groups in the demand system plus 1 for the numéraire good. Because the total expenditure elasticity, η_i , is a function of the semi-elasticity ($\eta_i = \frac{se_i}{w_i} + 1$), we calculate the $J \times 1$ vector of total expenditure elasticities as:

$$\eta = (\text{diag}(W))^{-1} [(I_J + TP')^{-1} T] + 1_J, \quad (\text{SMA.3})$$

where W is the $J \times 1$ vector of observed budget shares and 1_J is a $J \times 1$ vector of ones.

We calculate predicted budget shares (i.e., conditional means of observed budget shares) and replace the observed budget shares with the predicted in the above equations to obtain expected demand elasticities.

Following Lewbel *et al.*,[27] and as discussed in more detail in McCullough *et al.*,[33] we calculate price elasticities from the partial derivatives of the demand system equation with respect to $\log p_j$. This gives the Hicksian budget share semi-elasticity of $\frac{\partial w_i}{\partial \log p_j} = \alpha_{ij} + \alpha_{ijy}y$. Because $w_i = q_i^H p_i / x^H$ where the superscript H emphasizes variables are compensated, we can express the Hicksian semi-elasticity as a function of the conventional Hicksian price elasticity, so that $\frac{\partial w_i}{\partial \log p_j} = \frac{\partial(q_i^H p_i / x^H)}{\partial \log p_j}$, which becomes $\frac{\partial \log q_i^H}{\partial \log p_j} w_i + 1_{ij} w_i - w_i w_j$ with some rearrangement, where $1_{ij} = 1$ when $i = j$ and 0 otherwise [33]. The Hicksian price elasticity matrix is then $h_{ij} = \frac{\alpha_{ij} + \alpha_{ijy}y}{w_i} - 1_{ij} + w_j$.

Nutrient Demand Elasticities

We derive nutrient demand elasticities following Huang.[77, 78] First, we start with the total quantity φ consumed of each macro- and micro-nutrient arising from each food group i ($\varphi_{\gamma i}$). Hereafter we use “nutrient” as shorthand for DE and each macro- and micro-nutrient. The total intake of each nutrient is then

the sum across all food groups of nutrient intake for that food group, so that $\varphi_\gamma = \sum_i \varphi_{\gamma i}$, for $i \neq J$, i.e., excluding the numéraire good good.

Each nutrient γ 's content in food group i is given by:

$$\varphi_{\gamma i} = \alpha_{\gamma i} q_i(p_1, \dots, p_J, y), \quad (\text{SMA.4})$$

where $\alpha_{\gamma i}$ represents the nutrient γ content of food group i , and q_i represents

the quantity demanded of food group i .

We derive nutrient demand elasticities by totally differentiating Eq. SMA.4 with respect to prices and total expenditures, which results in

$$\frac{d\varphi_\gamma}{\varphi_\gamma} = \sum_i a_{\gamma i} dq_i \frac{1}{\varphi_\gamma}. \quad (\text{SMA.5})$$

Given q_i is a function of prices (including for the numéraire good) and total expenditure y , we totally differentiate q_i with respect to prices and total expenditure to get the following formula:

$$\begin{aligned} \frac{dq_i}{q_i} &= \sum_j e_{ij} \frac{dp_j}{p_j} + \eta_i \frac{dy}{y} \\ dq_i &= \left[\sum_j e_{ij} \frac{dp_j}{p_j} + \eta_i \frac{dy}{y} \right] q_i, \end{aligned} \quad (\text{SMA.6})$$

where e_{ij} indicates own- or cross-price elasticities and η_i represents total expenditure elasticities.

Substituting the expression dq_i from Eq. SMA.6 into Eq. SMA.5, we have the following equation:

$$\begin{aligned} \frac{d\varphi_\gamma}{\varphi_\gamma} &= \sum_i a_{\gamma i} \left[\sum_j e_{ij} \frac{dp_j}{p_j} + \eta_i \frac{dy}{y} \right] \frac{q_i}{\varphi_\gamma} \\ &= \sum_j \pi_{\gamma j} \frac{dp_j}{p_j} + \rho_\gamma \frac{dy}{y}, \end{aligned} \quad (\text{SMA.7})$$

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where $\pi_{\gamma j} = \sum_i a_{\gamma i} q_i \frac{e_{ij}}{\varphi_\gamma}$ is the elasticity of demand for nutrient γ with respect to price of the j th food and $\rho_\gamma = \sum_i a_{\gamma i} q_i \frac{\eta_i}{\varphi_\gamma}$ is the total expenditure elasticity of demand for nutrient γ .

Diet Quality Assessment

We construct household-level estimated average requirements (EARs) following McCullough *et al.*[33] These requirements are based on the age and gender composition of the household, assuming adults are of average weight and moderate activity levels. We take individual DE and protein requirements from FAO/WHO/UNU,[79] adjusting protein for low quality (by a factor of 75% of dietary protein) due to African diets' low reliance on animal-source protein. EARs for vitamin A, total folate and iron are from Otten *et al.*,[80] for zinc from International Zinc Nutrition Consultative Group *et al.*,[81] and for iron from Institute of Medicine (US) Panel on Micronutrients.[82] We assume low bioavailability of zinc because diets rely heavily on unrefined cereals and of iron because diets are high in phytate and low in animal-source foods.[83]

FAO and WHO requirements for DE and nutrients are based on literature that is widely used despite other sources of energy requirements. We acknowledge other recent papers have used different methods of assessing nutrient intakes for households,[84] as well as for individuals within households.[85]

In addition to our binary sufficiency variable which equals 1 if intake exceeds the household's EAR and 0 if intake is less than EAR, we also present a nutrient intake gap in some cases. This is the ratio between a household's nutrient intake and the household's requirement (EAR). When the gap is greater than one, the household's intake exceeds the EAR. When the gap is less than 1, the household's intake is that fraction of the EAR.

Policy Simulations

Social protection programs such as cash transfers are seen as an important vehicle for improving nutrition because they raise incomes for poor consumers, which is strongly associated with poverty reduction and improved food security.[86] Delivery mechanisms used in social protection programs can also affect behaviors that determine household food security, for example by empowering women, imposing conditions that reinforce desired behaviors such as school enrollment for girls, or by delivering specific food products in kind.[87]

We select a CT size following a meta-analysis of 57 evaluations conducted

- 10 on 24 different social safety net programs across Africa.[88] We benchmark the CT at 20% of the median household expenditure levels of households whose per capita expenditures fall below the \$1.90/day international poverty line equivalent. We present the CT size for each country in Table 1. No adjustments are made based on household size or composition. In discussing program costs,
- 15 we assume there are no overhead administration or targeting costs.

Following the same meta-analysis social safety net programs Africa,[88] we

assume that recipient households use 75% of the CT to increase total household expenditures (rather than, e.g., saving it or investing it in a farm or non-farm enterprise). Additional CT simulation details are presented in the Methods

- 20 SM. For the sake of comparing the distributional effects of CTs, we simulate CTs not just for Q1 (poor) consumers but for all consumers. Social protection programs often include non-poor households,[89] so CT simulations for non-poor households are also policy relevant.

When implementing the CT, we assume it does not result in any equilib-

- 25 rium impacts on relative prices that consumers face (for each food group and the numéraire good). There is evidence that CTs can increase prices of perishable foods in remote markets if CT program saturation rates are large.[90]

10 *Nutrient adequacy in Africa*

We also assume that CTs would not change consumers' incomes apart from the transfer itself, either by changing the household's labor supply or wage rates, or if the household uses CT proceeds to invest in a household managed enterprise (e.g., a farm). CTs could enable investments or allocations that result in increased earnings,[91, 92] thus enhancing total impacts on household expenditures.

Next, we design a price voucher (PV) policy simulation. High nutrient density foods are generally costlier per calorie than low nutrient-density foods worldwide and especially in sub-Saharan Africa, which deters poor consumers from consuming high nutrient density foods.[11] Nutritious diets are expensive relative to poor consumers' purchasing power, with the EAT Lancet diet costing about 75% of the daily mean per capita income of a sub-Saharan African household.[10] PVs have been used to lower the costs of, and thereby encourage consumption of, healthy foods.[57] PVs are also used to subsidize the prices of food staples for poor consumers as a safety net intervention, such as the Targeted Public Distribution System in India.[58]

We select a PV size of 25% to align with consumer subsidy interventions that have been used to influence diet quality. Consumer price subsidies between the range of 10% and 50% have been used to encourage consumption of healthy foods like fresh fruits & vegetables, though discounts that exceed 30% are uncommon.[57] Much PV evidence comes from developed countries, where fresh fruits & vegetables are often targeted. A piloted FFV subsidy of 30% targeting SNAP beneficiaries increased FFV intake by about 26% in the USA.[93] In Sweden, a 50% subsidy of whole grain bread and breakfast cereals led to a 38% increase in fiber intake.[94] In South Africa, the HealthyFood program, which offered a 25% price discount on selected fresh fruits and vegetables and whole grains to 260,000 households increased consumption of healthy items

while lowering consumption of unhealthy foods.[41] In China, staple grain PVs ranging from 8% to 25% have altered food consumption patterns.[39]

We identify the food groups in each country that fall into each PV category (staple grains, starchy staples, pulses & nuts, fruits & vegetables (FFV), and animal-source foods (ASF)), as depicted in Table SMC.51. In order to predict post-PV consumption, we multiply pre-PV intake of each food group by the 25% PV and the vector of own- and cross-price elasticities with respect to all of the category's subsidized food groups, thus accounting for the own-price and cross-price effects. We then compare households' diet quality indicators with and without each PV. As with CTs, we assume that the PV does not result in any equilibrium price effects (e.g., by driving up demand for specific foods or altering production of specific foods) or income effects (which could occur if smallholder farming households were to face different output or input prices).

Simulation Cost Calculations

In order to calculate the cost of giving a household a price voucher that targets food groups within category a with a discount of PV , we multiply the post-voucher total household expenditures on food by the size of the price discount. The value to a recipient household of a voucher discounting food groups in category a by 25% ($PV_a = 25\%$) follows. Ignoring administrative costs, this value to the beneficiary is the same as the cost of the voucher to the government:

$$\begin{aligned} V_{PV_a} &= \sum_{i \in a} \left(1 + \sum_{j \in a} (-PV_a \cdot \varepsilon_{ij}) \right) \cdot q_i p_i \cdot PV_a \\ &= \sum_{i \in a} \left(1 + \sum_{j \in a} (-PV_a \cdot \varepsilon_{ij}) \right) \cdot w_i y \cdot PV_a \end{aligned}$$

We also calculate the marginal propensity to consume food in the aggregate for a household, as depicted in rows 9–12 of Table 1. The marginal propensity to consume food (MPC) represents the share of the cash transfer that is used to increase food consumption. V_{CT} represents the change in food expenditure that is induced by the cash transfer as a proportion of baseline food expenditure. We assume that a fixed percentage (e.g., 75%) of the cash transfer (CT) is used to raise total consumption expenditures (EI). 5

$$\begin{aligned}
 MPC_F &= V_{CT} \frac{\sum_{j \neq 20} w_j \cdot y}{CT}, \\
 \text{where } V_{CT} &= \frac{\partial \ln(\sum_{j \neq 20} w_j y)}{\partial \ln y} \cdot \frac{EI}{y} = \frac{1}{\sum_{j \neq 20} w_j y} \cdot \frac{\partial(\sum_{j \neq 20} w_j y)}{\partial \ln y} \cdot \frac{EI}{y} \\
 &= \frac{1}{\sum_{j \neq 20} w_j y} \cdot \frac{\partial(\sum_{j \neq 20} \frac{p_j q_j}{y} y)}{\partial \ln y} \cdot \frac{EI}{y} \\
 &= \frac{1}{\sum_{j \neq 20} w_j y} \cdot \frac{EI}{y} \cdot \frac{\partial(\sum_{j \neq 20} \frac{p_j q_j}{y} y)}{\partial \ln y} \\
 &= \frac{1}{\sum_{j \neq 20} w_j y} \cdot \frac{EI}{y} \cdot \sum_{j \neq 20} \frac{\partial q_j}{\partial \ln y} \frac{p_j q_j}{q_j} \\
 &= \frac{1}{\sum_{j \neq 20} w_j y} \cdot \frac{EI}{y} \cdot \sum_{j \neq 20} \eta_j p_j q_j \\
 &= \frac{EI}{\sum_{j \neq 20} w_j y} \cdot \sum_{j \neq 20} \eta_j w_j,
 \end{aligned}$$

where CT is the size of the cash transfer in level \$US PPP, EI is the increase in total consumption expenditures due to the cash transfer, y is total pre-transfer household expenditures (in level \$US PPP) for a poor household (i.e., median across Q1 and Q2), w_j is budget share for food group j (with $j = 20$

representing the the non-food “other” expenditures), and η_j represents the total expenditure elasticity of demand for food group j .

SMB Supplemental Figures

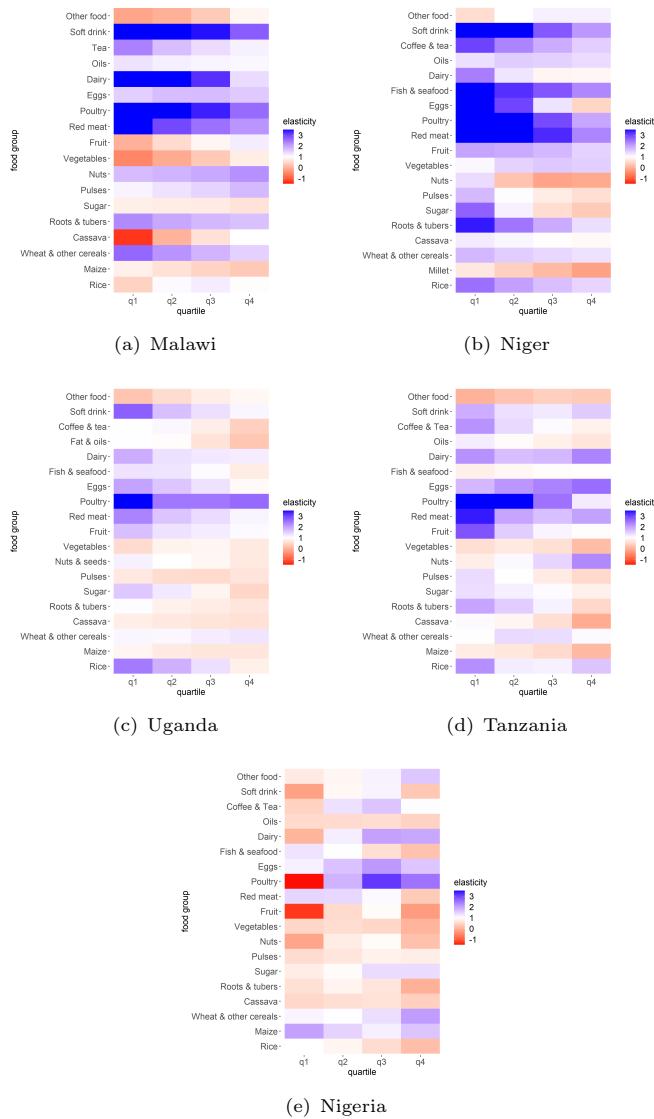


Fig. SMB.1: Expenditure elasticities of food demand, separated by total expenditure quartile, in (a) Malawi, (b) Niger, (c) Uganda, (d) Tanzania, and (e) Nigeria. Each cell's color depicts the median expenditure elasticity of demand for the corresponding food group (row) and total expenditure quartile (column).

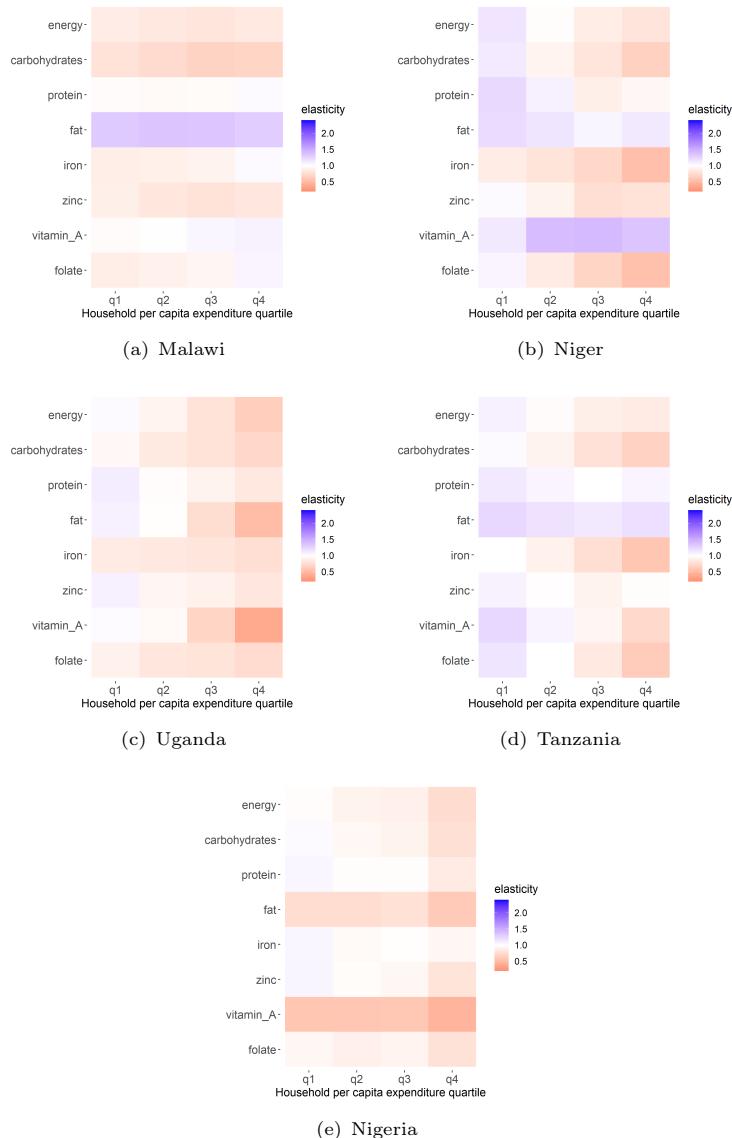


Fig. SMB.2: Expenditure elasticities of demand for each macro- and micro-nutrient, by total expenditure quartile, in Malawi (a), Niger (b), Uganda (c), Tanzania (d), and Nigeria (e). Each cell's color depicts the median expenditure elasticity of demand for the corresponding nutrient (row) and total expenditure quartile (column).

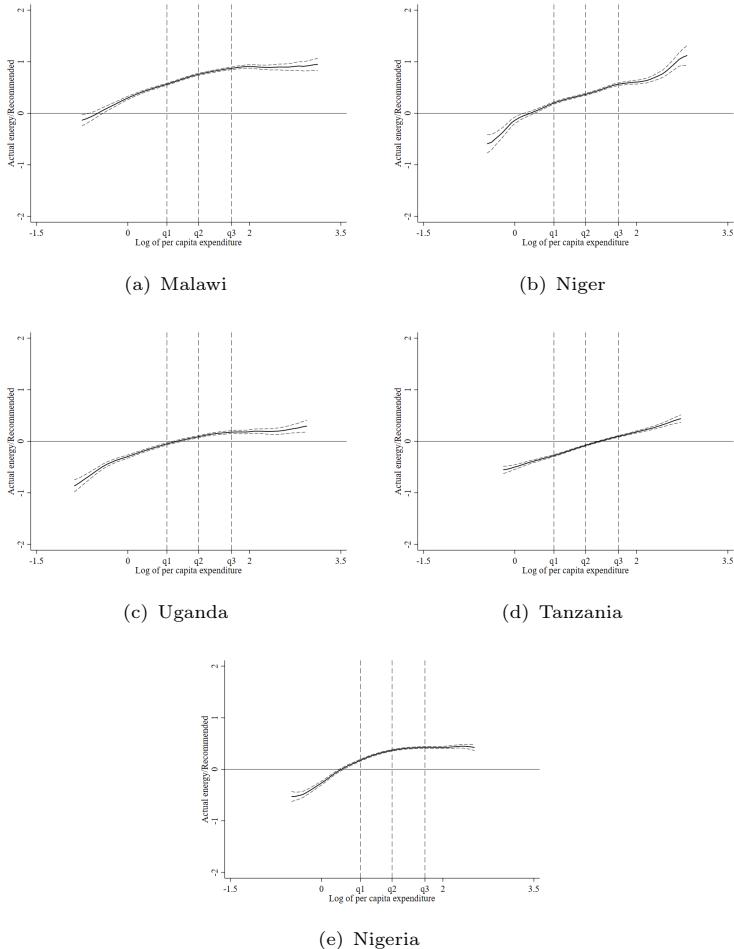


Fig. SMB.3: Dietary energy expansion path. The horizontal axis depicts the log of total household expenditures per adult equivalent. The vertical dashed lines mark the upper bound of each consumer total expenditure quartile. The vertical axis depicts the log of dietary energy intake as a share of the household's total dietary energy requirement (which is specific to each household's composition).

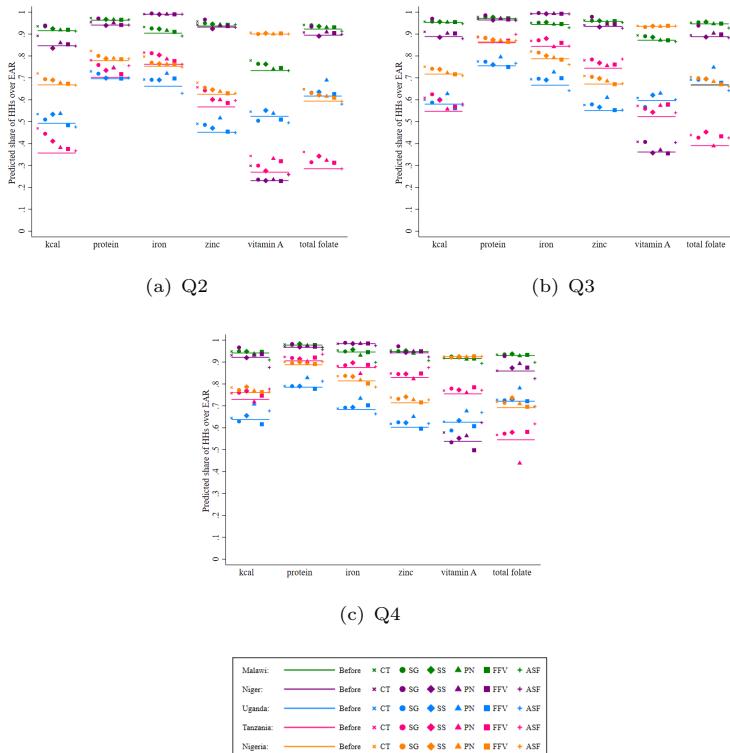


Fig. SMB.4: Predicted share of Q2 - Q4 households with sufficient intake (exceeding the estimated average requirement (EAR)) of each macro- and micro-nutrient before (solid line) and after the cash transfer (CT) and each of the five price vouchers (PVs), which are denoted by SG (staple grains, which include crops like rice, maize, wheat & other cereals, millet, and teff; SS (starchy staples, which include cassava, roots, tubers, & other starches); PN (pulses, nuts, & seeds); FFV (fresh fruits & vegetables); and ASF (animal-source foods, which include red meat, poultry, eggs, dairy, fish, & seafood). Food group mapping into PV categories is listed, country by country, in Table SMC.51. Each panel depicts households from one total expenditures quartile. Each country is depicted by one color, and each symbol depicts one CT or PV simulation as represented in the legend.

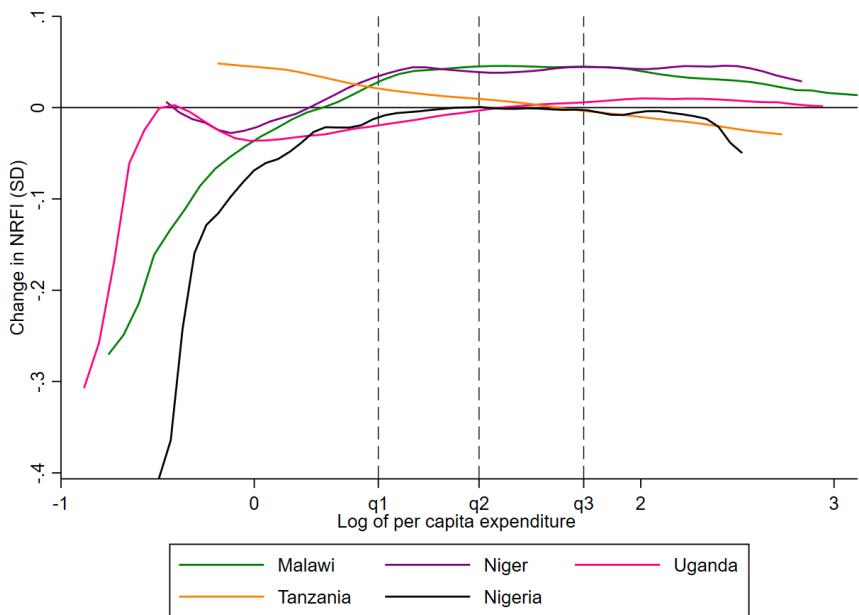


Fig. SMB.5: NRFI response to a simulated cash transfer. The horizontal axis depicts the log of total household expenditures per adult equivalent. The vertical dashed lines mark the upper bound of each consumer total expenditure quartile. The vertical axis depicts the predicted change in NRFI after a CT. NRFI is standardized within each country, so an increase of NRFI by 0.05 corresponds with a one-twentieth of a standard deviation increase in NRFI.

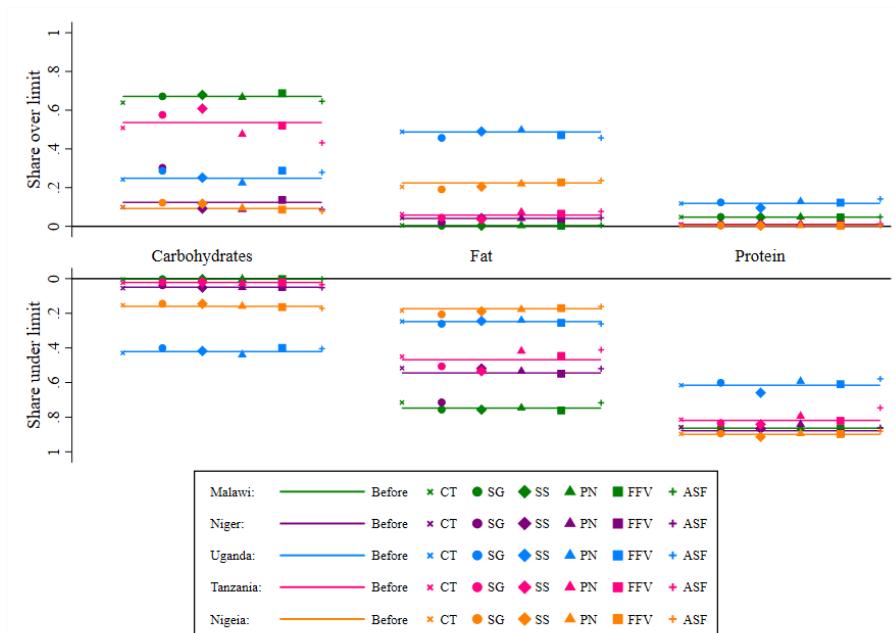


Fig. SMB.6: Dietary balance before (solid line) and after cash transfer (CT) and each of the five price voucher (PV) simulations for Q2 households. Each country is depicted by one color, and each symbol depicts one CT or PV simulation as represented in the legend. The PV simulations are denoted by SG (staple grains) SS (starchy staples), PN (pulses, nuts, & seeds); FFV (fresh fruits & vegetables); and ASF (animal-source foods) as described in Table SMC.51. The left column above the label depicts the share of the country's population whose intake of carbohydrates exceeds the WHO recommended 75% limit, while the left column below the label depicts the share of the country's population whose intake of carbohydrates is less than the recommended 55% lower limit. The solid line depicts the share of households at baseline that consume above (below) the upper (lower) recommended limit. The second column depicts the same dietary balance analysis for fat, while the right-most column for protein.

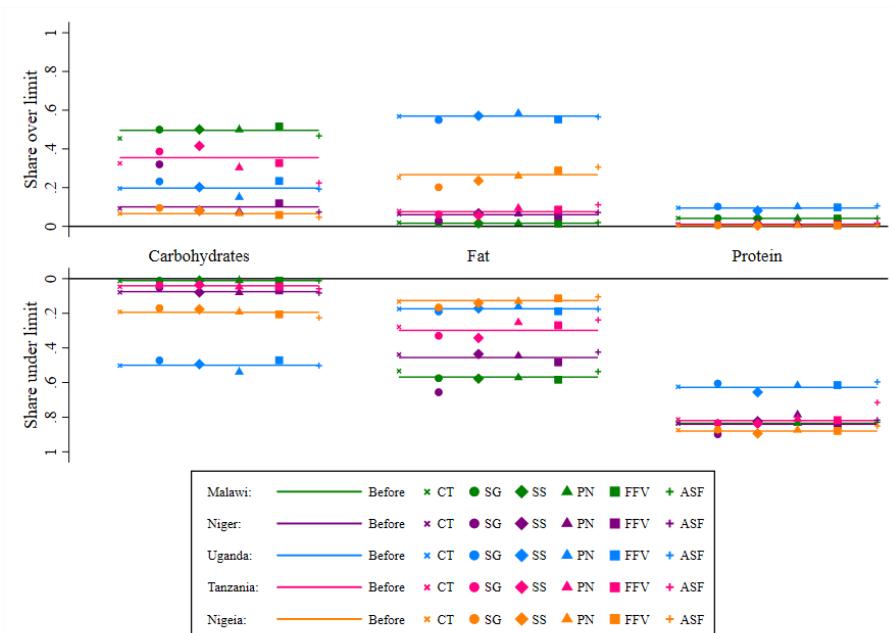


Fig. SMB.7: Dietary balance before (solid line) and after cash transfer (CT) and each of the five price voucher (PV) simulations for Q3 households. Each country is depicted by one color, and each symbol depicts one CT or PV simulation as represented in the legend. The PV simulations are denoted by SG (staple grains) SS (starchy staples), PN (pulses, nuts, & seeds); FFV (fresh fruits & vegetables); and ASF (animal-source foods) as described in Table SMC.51. The left column above the label depicts the share of the country's population whose intake of carbohydrates exceeds the WHO recommended 75% limit, while the left column below the label depicts the share of the country's population whose intake of carbohydrates is less than the recommended 55% lower limit. The solid line depicts the share of households at baseline that consume above (below) the upper (lower) recommended limit. The second column depicts the same dietary balance analysis for fat, while the right-most column for protein.

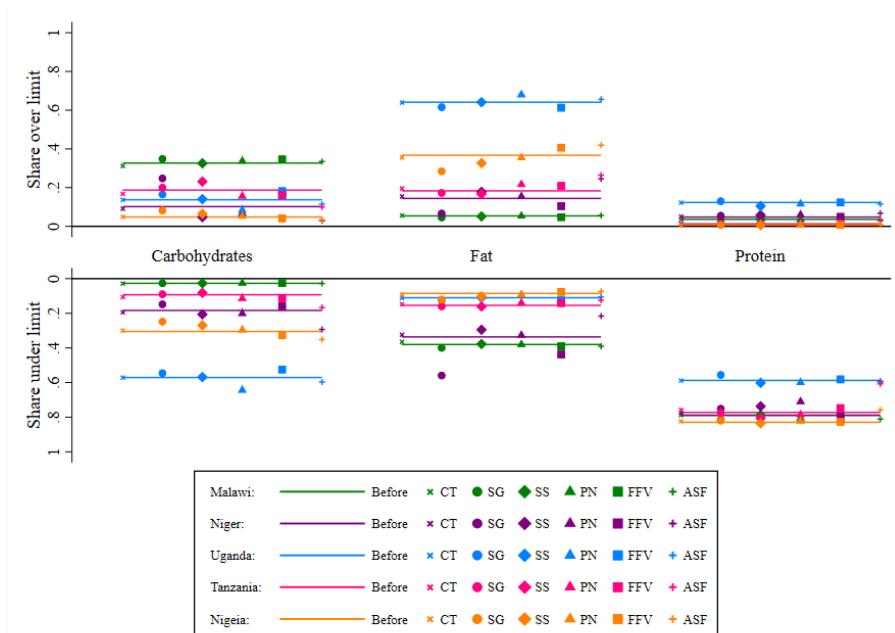


Fig. SMB.8: Dietary balance before (solid line) and after cash transfer (CT) and each of the five price voucher (PV) simulations for Q4 households. Each country is depicted by one color, and each symbol depicts one CT or PV simulation as represented in the legend. The PV simulations are denoted by SG (staple grains) SS (starchy staples), PN (pulses, nuts, & seeds); FFV (fresh fruits & vegetables); and ASF (animal-source foods) as described in Table SMC.51. The left column above the label depicts the share of the country's population whose intake of carbohydrates exceeds the WHO recommended 75% limit, while the left column below the label depicts the share of the country's population whose intake of carbohydrates is less than the recommended 55% lower limit. The solid line depicts the share of households at baseline that consume above (below) the upper (lower) recommended limit. The second column depicts the same dietary balance analysis for fat, while the right-most column for protein.

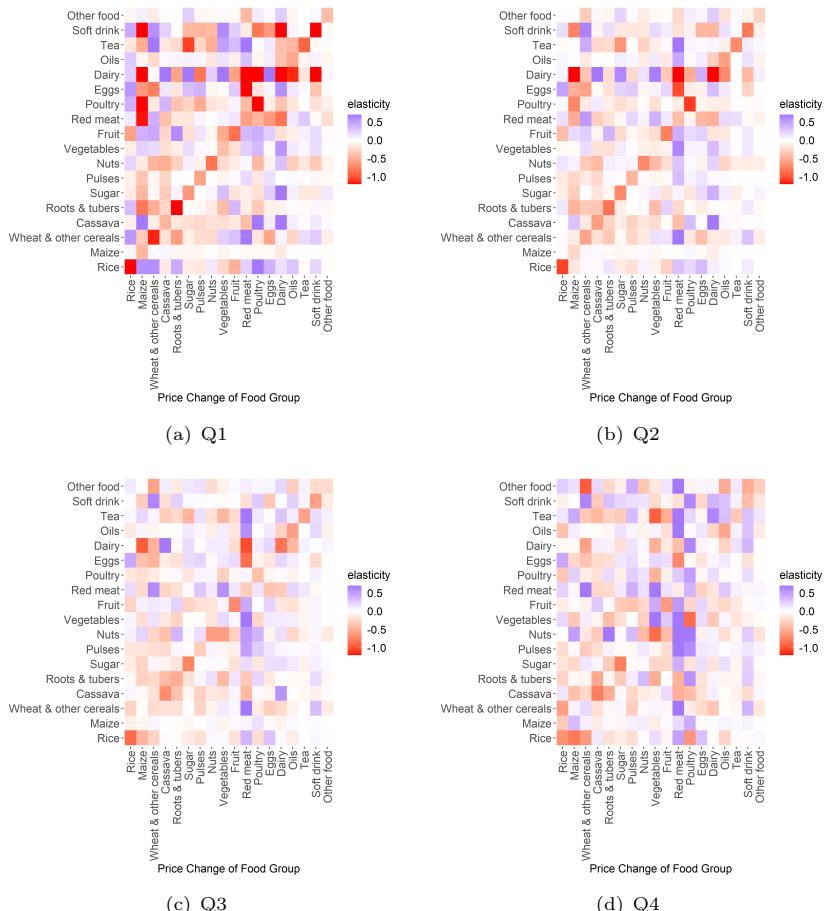


Fig. SMB.9: Malawi: median elasticities of demand for each food group with respect to each food group's price separated by consumer total expenditure quartile: (a) Q1, (b) Q2, (c) Q3, and (d) Q4. Each cell's color depicts the median elasticity of demand for its corresponding row's food group with respect to a price change in the corresponding column's food group.

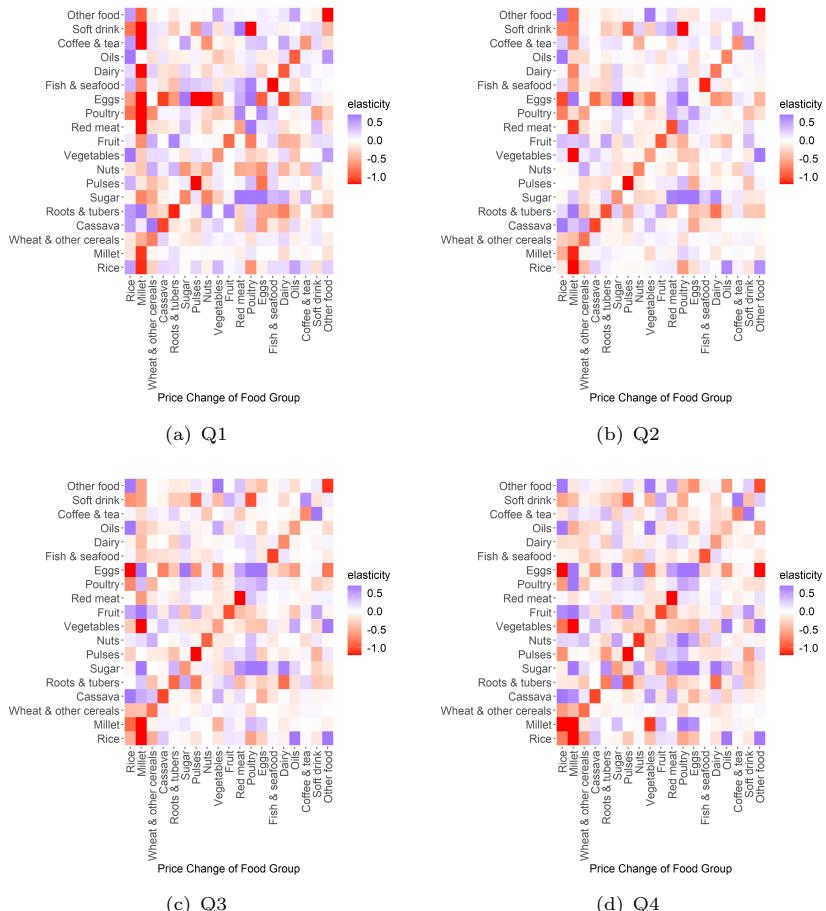


Fig. SMB.10: Niger: median elasticities of demand for each food group with respect to each food group's price separated by consumer total expenditure quartile: (a) Q1, (b) Q2, (c) Q3, and (d) Q4. Each cell's color depicts the median elasticity of demand for its corresponding row's food group with respect to a price change in the corresponding column's food group.

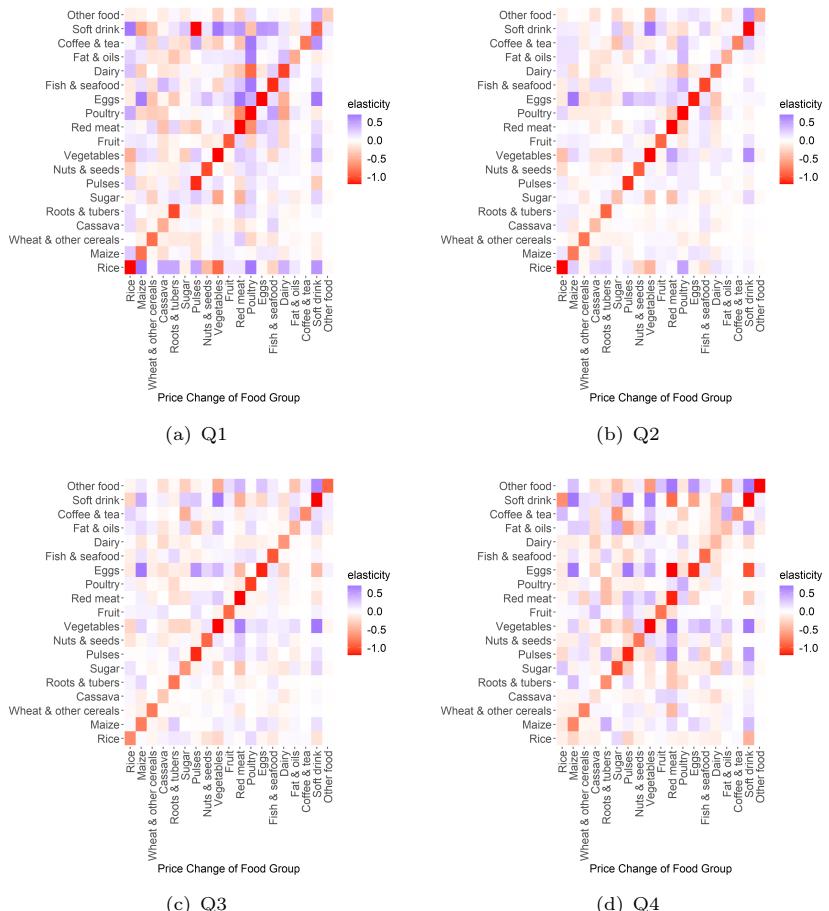


Fig. SMB.11: Uganda: median elasticities of demand for each food group with respect to each food group's price separated by consumer total expenditure quartile: (a) Q1, (b) Q2, (c) Q3, and (d) Q4. Each cell's color depicts the median elasticity of demand for its corresponding row's food group with respect to a price change in the corresponding column's food group.

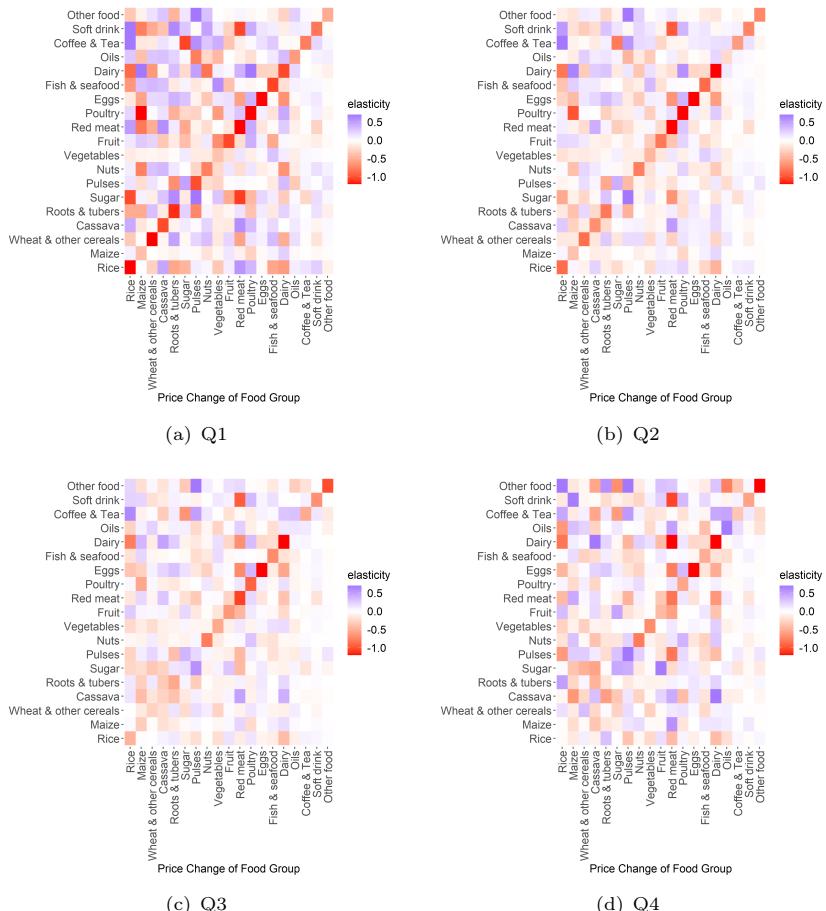


Fig. SMB.12: Tanzania: median elasticities of demand for each food group with respect to each food group's price separated by consumer total expenditure quartile: (a) Q1, (b) Q2, (c) Q3, and (d) Q4. Each cell's color depicts the median elasticity of demand for its corresponding row's food group with respect to a price change in the corresponding column's food group.

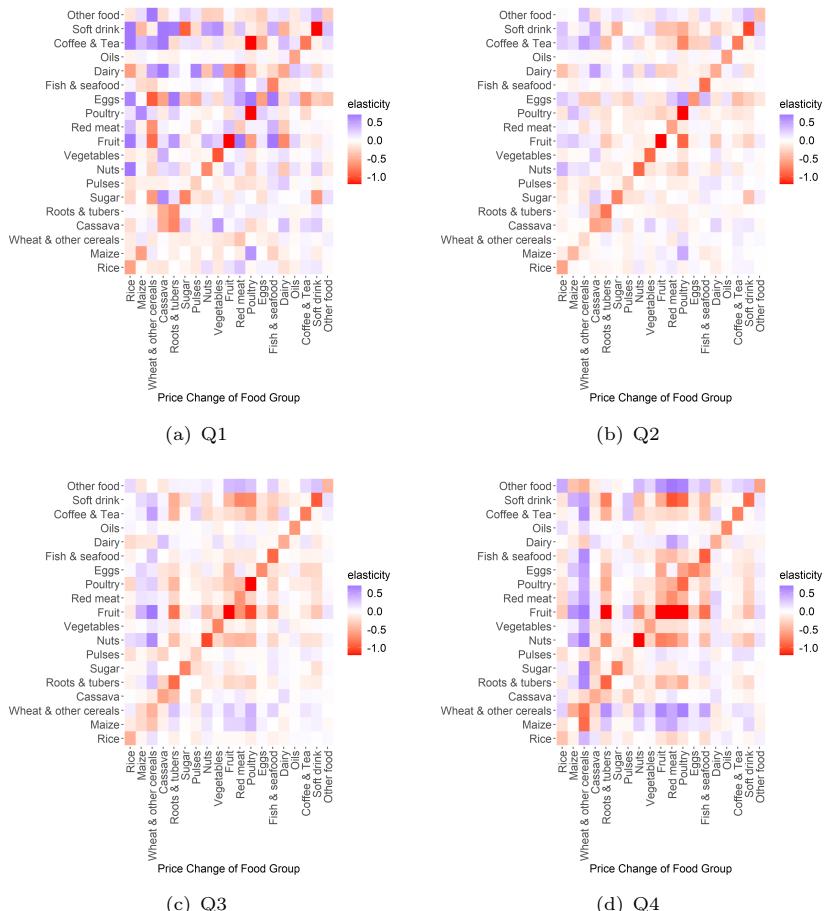


Fig. SMB.13: Nigeria: median elasticities of demand for each food group with respect to each food group's price separated by consumer total expenditure quartile: (a) Q1, (b) Q2, (c) Q3, and (d) Q4. Each cell's color depicts the median elasticity of demand for its corresponding row's food group with respect to a price change in the corresponding column's food group.

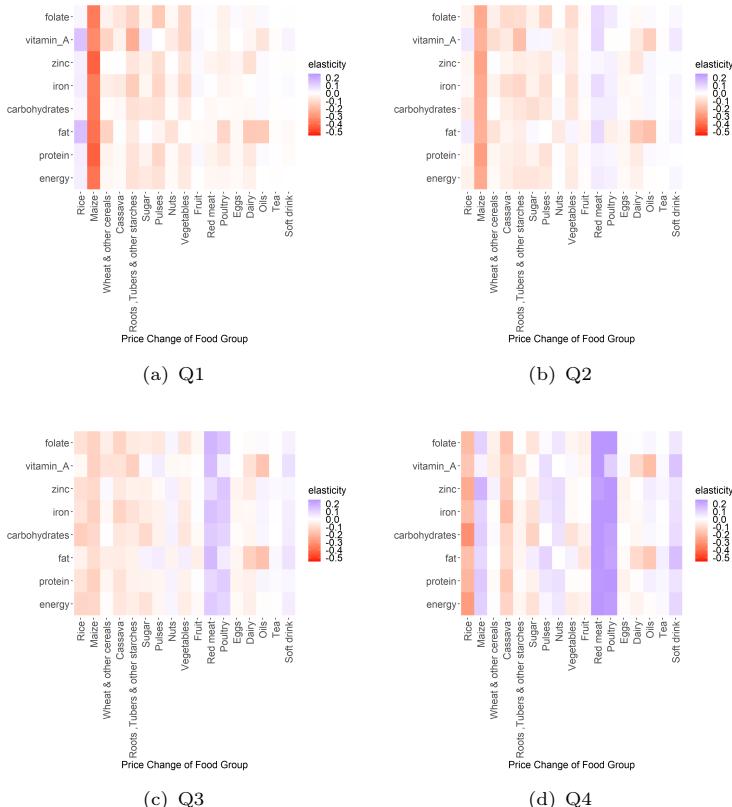


Fig. SMB.14: Malawi: elasticities of demand for each macro- and micro-nutrient (including DE) with respect to each food group's price, for consumers in each expenditure quartile: (a) Q1, (b) Q2, (c) Q3, and (d) Q4. Each cell's color depicts the median elasticity of demand for the corresponding nutrient (row) with respect to the price of the good depicted in each column.

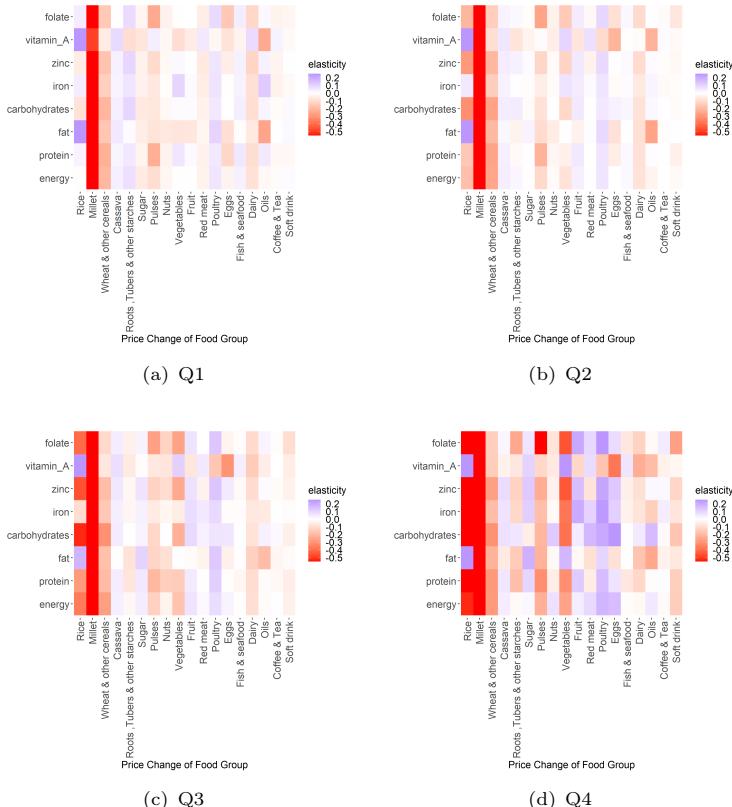


Fig. SMB.15: Niger: elasticities of demand for each macro- and micro-nutrient (including DE) with respect to each food group's price, for consumers in each expenditure quartile: (a) Q1, (b) Q2, (c) Q3, and (d) Q4. Each cell's color depicts the median elasticity of demand for the corresponding nutrient (row) with respect to the price of the good depicted in each column.

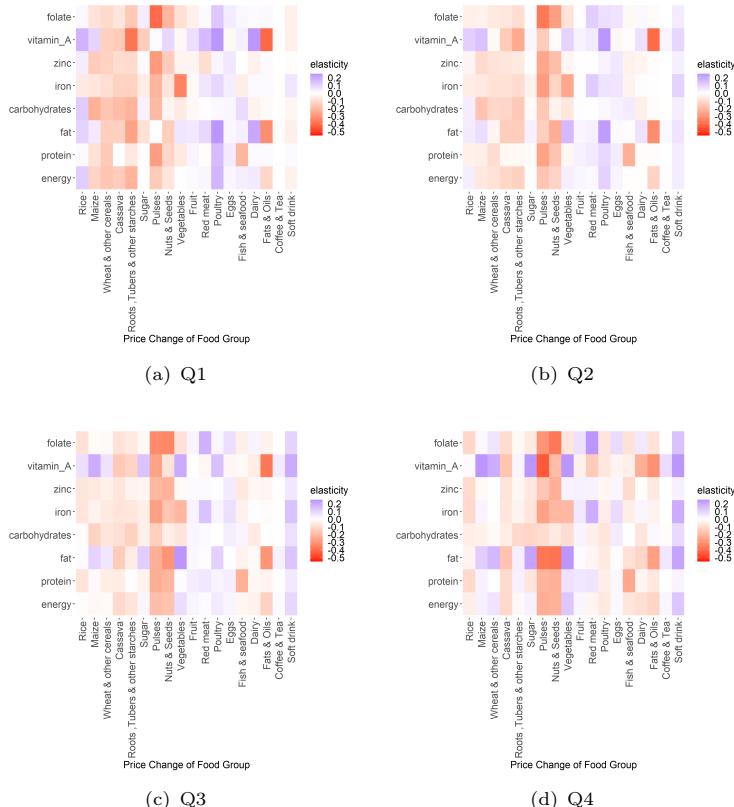


Fig. SMB.16: Uganda: elasticities of demand for each macro- and micro-nutrient (including DE) with respect to each food group's price, for consumers in each expenditure quartile: (a) Q1, (b) Q2, (c) Q3, and (d) Q4. Each cell's color depicts the median elasticity of demand for the corresponding nutrient (row) with respect to the price of the good depicted in each column.

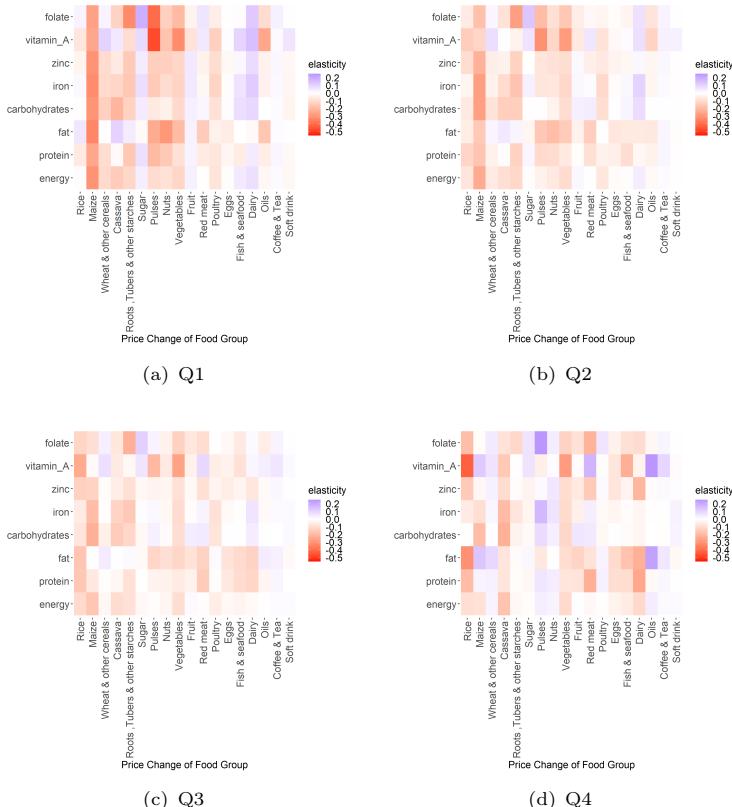


Fig. SMB.17: Tanzania: elasticities of demand for each macro- and micro-nutrient (including DE) with respect to each food group's price, for consumers in each expenditure quartile: (a) Q1, (b) Q2, (c) Q3, and (d) Q4. Each cell's color depicts the median elasticity of demand for the corresponding nutrient (row) with respect to the price of the good depicted in each column.

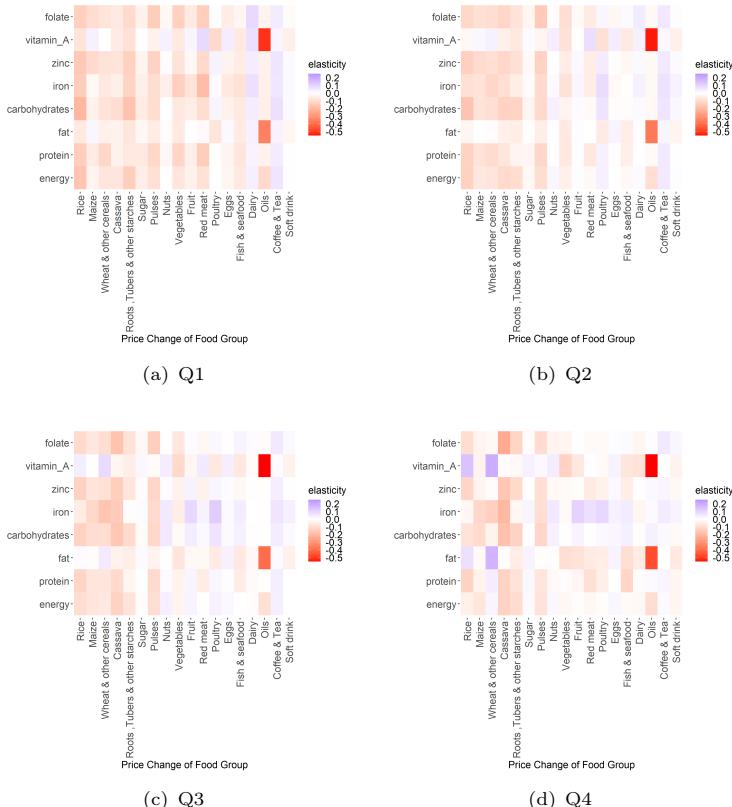


Fig. SMB.18: Nigeria: elasticities of demand for each macro- and micro-nutrient (including DE) with respect to each food group's price, for consumers in each expenditure quartile: (a) Q1, (b) Q2, (c) Q3, and (d) Q4. Each cell's color depicts the median elasticity of demand for the corresponding nutrient (row) with respect to the price of the good depicted in each column.

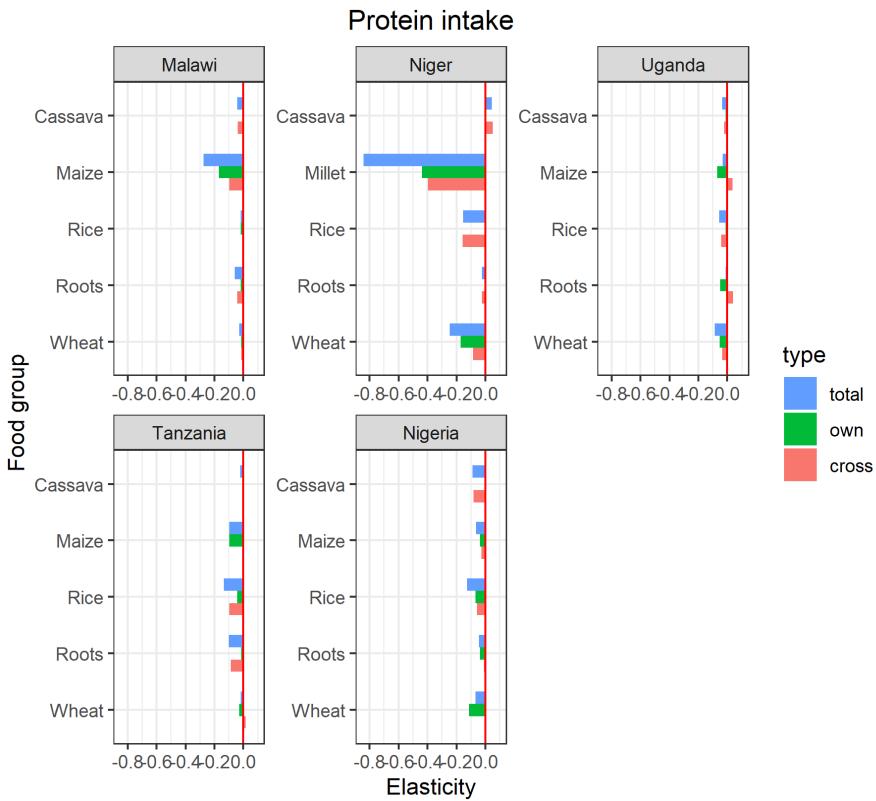


Fig. SMB.19: Decomposition of the total elasticity of protein intake with respect to the price of each food staple (blue bar labeled “total”) into two effects: an own effect (green bar labeled “own,” which reflects a change in protein intake arising from a change in intake of that same food staple) and a cross-effect (red bar labeled “cross,” which reflects a change in protein intake arising from a change in intake of all other foods). The food group “wheat and other cereals” is represented by the label “wheat,” and the food group “roots, tubers & other starches” is represented by the label “roots.” Cassava is excluded from this group as it is represented by its own food group. Items contained in each food group are listed by country in Tables SMC.46–SMC.50.

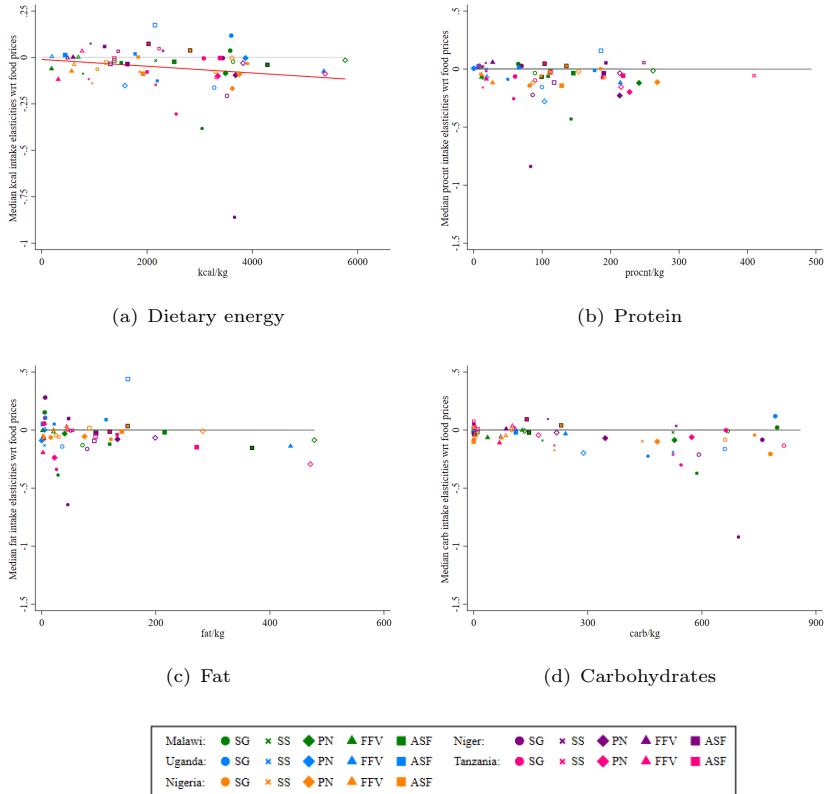


Fig. SMB.20: Visualization of the importance of each food's price in determining dietary intake versus that foods' dietary composition. Each panel depicts a scatter plot between elasticity of the macro-nutrient intake with respect to each food group's concentration of that nutrient (quantity per kg). We categorize food groups into five categories: staple grains, starchy staples, pulses & nuts, fruits & vegetables, and animal-source foods, with food groups from each category represented by one common symbol.

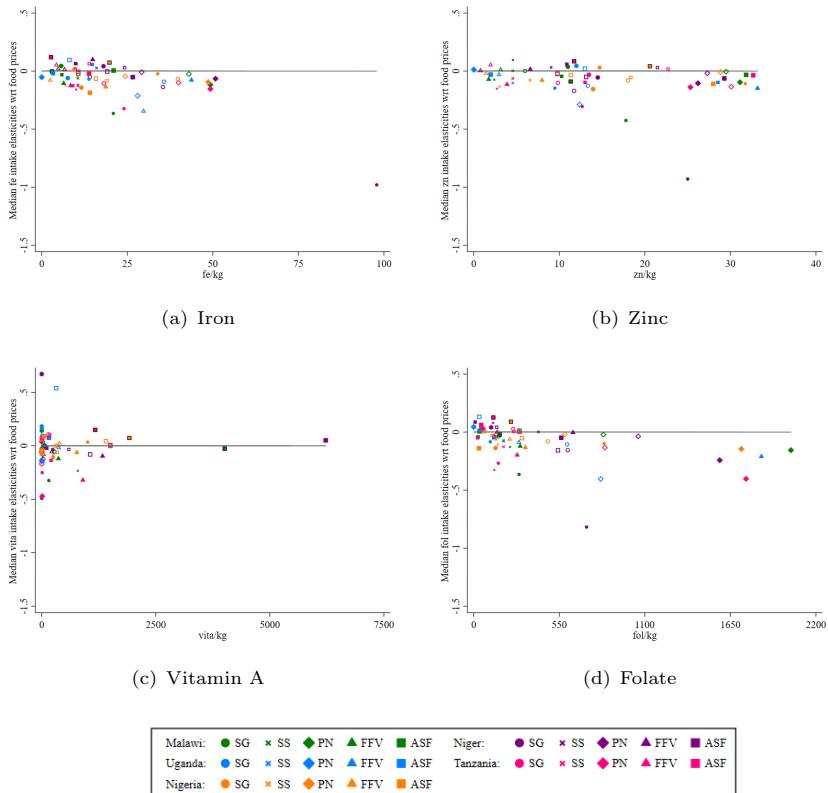


Fig. SMB.21: Visualization of the importance of each food's price in determining dietary intake versus that foods' dietary composition. Each panel depicts a scatter plot between elasticity of the micro-nutrient intake with respect to each food group's concentration of that nutrient (quantity per kg). We categorize food groups into five categories: staple grains, starchy staples, pulses & nuts, fruits & vegetables, and animal-source foods, with food groups from each category represented by one common symbol.



Fig. SMB.22: Elasticity of Nutrient-Rich Food Index (NRFI) with respect to each food group's price and with respect to total expenditures (bottom row of each matrix), reported by total expenditures quartile.

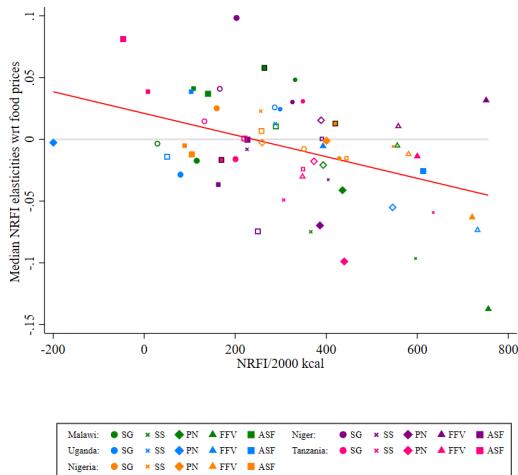


Fig. SMB.23: Scatter plot between the sample-wide median elasticity of overall dietary NRFI with respect to each food's price and each food's own NRFI score (per 2000 kCal). Each country is represented by one color. We categorize food groups into five categories: staple grains (SG), starchy staples (SS), pulses & nuts (PN), fruits & vegetables (FFV), and animal-sources food (ASF), with food groups from each category represented by one common symbol.

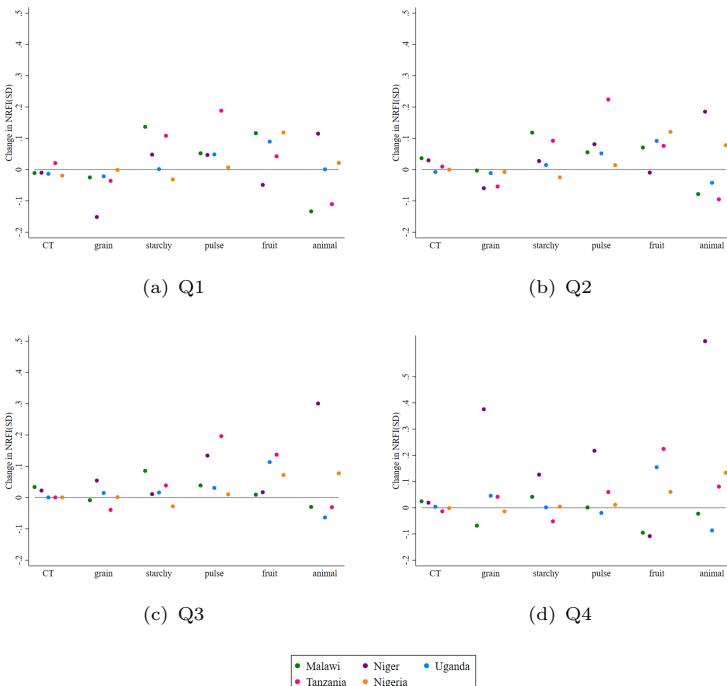


Fig. SMB.24: Nutrient-Rich Food Index (NRFI) response to the cash transfer simulation (labeled “CT”) and to each of the five price voucher (PV) simulations (each labeled by the targeted food category “grain” (staple grains), “starchy” (starchy staples), “pulse” (pulses & nuts), “fruit” (fruits & vegetables), and “animal” (animal-source foods)). The NRFI measure is standardized in each country by the sample-wide standard deviation. Panel 24(a) depicts the NRFI response for Q1 consumers relative to the NRFI level at baseline. The dot corresponding to each country depicts NRFI following the CT. Dots above the horizontal line indicate an improved NRFI score compared to baseline, while dots below the horizontal line represent a lower NRFI score compared to baseline. Response of Q2, Q3, and Q4 consumers to the same simulations are depicted in Panels 24(b), 24(c) and 24(d) respectively.

SMC Supplementary Tables

Table SMC.1: Food demand elasticities with respect to food prices and total household expenditures for Q1 consumers (with per capita expenditures less than \$1.90 per day) in Malawi

	Food Group												Exp.					
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Dairy	Oils	Tea	SoftDrink	OtherFood
1. Rice	-1.38*	0.58	0.58**	-0.14	0.44	-0.12	-0.15	0.12	-0.24	-0.49*	0.24	0.90*	0.41*	0.30	-0.02	0.22	-0.02	0.42
2. Maize	0.05	-0.45**	0.03	0.05	-0.05	-0.06**	-0.06	0.01	-0.06	-0.04	-0.04	-0.13*	0.01	-0.00	-0.01	-0.02*	0.80**	
3. Wheat	0.53*	-0.32	-1.15**	-0.20	-0.61**	-0.10	-0.21	-0.24*	0.25	0.31*	0.69*	-0.16	-0.55**	0.06	-0.26	0.18**	0.27	2.61**
4. Cassava	-0.10	1.07**	-0.11	-0.47	-0.15	-0.20	-0.24	-0.18*	-0.20	-0.13	-0.40	0.76**	0.09	0.45**	0.08	(0.17)	(0.17)	(0.46)
5. Roots	0.34	-0.82*	-0.50*	-0.26	-1.24**	0.01	-0.05	-0.13	-0.41	0.37*	-0.11	-0.34	-0.10	-0.08	0.01	-0.03	0.04	-0.04
6. Sugar	-0.13	-0.45**	-0.05	-0.33*	0.05	-0.63**	0.02	0.05	0.33*	-0.18	-0.11	0.24*	0.86**	0.08	-0.15**	-0.14	0.12**	0.79**
7. Pulses	-0.10	-0.36*	-0.06	-0.27	0.01	-0.00	-0.57**	-0.01	-0.07	0.03	0.19	-0.15	0.16	-0.01	0.03	(0.11)	(0.11)	(0.17)
8. Nuts	0.21	-0.13	-0.47*	-0.51	-0.29	0.09	-0.08	-0.84*	-0.22	-0.12	0.04	-0.44	-0.09	0.32	-0.32*	-0.15*	-0.34	-0.07
9. Vegetables	-0.11	0.23*	0.19**	-0.12	0.19**	0.04	-0.02	-0.41**	-0.20*	0.25	0.36**	0.02	0.55*	0.11*	0.04	0.19*	0.01	-0.54**
10. Fruit	-0.58*	-0.40	0.44**	-0.26	0.58**	-0.20	0.14	-0.20	0.14	-0.06	-0.54	-0.85**	0.36	0.41	0.25	-0.19	-0.10	0.07
11. RedMeat	0.12	-1.19*	0.42	-0.40	-0.15	-0.16	0.06	-0.01	0.08	0.13	-0.59	-0.45	-0.63**	-0.45*	0.12	0.28**	-0.03	3.98**
12. Poultry	0.41	-2.21**	-0.14	0.38	-0.37	-0.27*	-0.52*	-0.16	-0.12	0.06	-0.42	-2.44**	-0.10	-0.38	-0.17	-0.01	-0.19	7.05**
13. Eggs	0.55*	-0.63*	-0.78**	0.12	-0.16	0.35*	0.38	-0.06	-0.01	0.27	-1.34**	-0.16	0.05	0.58*	0.12	0.02	0.37*	1.52**
14. Dairy	0.24	-7.09**	-0.03	3.86**	-0.57	1.59**	-0.82	0.25	1.57	-0.58	-3.12*	-1.07	0.85	-3.94**	-0.15	-0.15	-1.36	14.72**
15. Oils	0.29	-0.06	-0.23	0.04	0.05	0.07	0.04	-0.16*	0.04	0.15	-0.41	0.66	0.14	-0.38*	0.10	-0.07	0.07	(3.41)
16. Tea	-0.15	-0.51	1.18**	-0.15	-0.22	-1.07**	-0.26	-0.51*	0.51	0.34	2.85*	-0.02	0.11	-0.39	-0.46*	-0.91**	-0.03	0.02
17. SoftDrink	0.45	-1.46	0.23	0.00	-0.45	-0.46	-0.43	0.61	0.26	-0.12	-0.82	-0.63*	-1.36*	0.04	-0.02	-1.25	-0.04	5.07**
18. OtherFood	-0.05	0.08	-0.12*	-0.01	0.00	0.25**	-0.06	-0.04	0.03	-0.04	-0.44**	0.10	0.03	0.26*	-0.07	0.04	-0.16	(0.13)

Note: This table shows the sample-wide median elasticity of food demand (quantity consumed) with respect to food prices (columns 1 thru 18) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.46.

Table SMC.3: Food demand elasticities with respect to food prices and total household expenditures for Q3 consumers (with per capita expenditures between \$3.20 and \$5.50 per day) in Malawi

	Food Group												Eggs	Dairy	Oils	Tea	SoftDrink	OtherFood
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry						
1. Rice	-0.89*	-0.46	-0.27	0.03	-0.02	-0.13	-0.20	0.04	0.03	-0.18	0.38	-0.21	0.32	0.03	-0.11	0.01	0.04	0.02
2. Maize	-0.10*	-0.06	-0.06	-0.01	-0.01	-0.05*	0.00	-0.05*	-0.07	0.02	0.06	0.16	-0.04	-0.08*	0.03	0.01*	-0.00	0.43**
3. Wheat	-0.28*	-0.01	-0.23	-0.18	-0.19	0.00	-0.26**	-0.09	0.11	0.05	1.06**	-0.13	-0.31**	-0.23*	-0.08	0.01	0.34**	-0.13**
4. Cassava	0.04	-0.03	-0.18	-0.68	-0.38*	-0.06	-0.28	0.15	-0.18	0.19	-0.15	0.04	-0.44	0.04	-0.07	0.56**	0.02	-0.08
5. Roots	-0.04	-0.27	-0.23	-0.16*	-0.52*	-0.20*	0.04	0.16*	-0.44*	0.14	-0.34	0.21	-0.14	0.01	-0.04	-0.05	0.18	-0.04
6. Sugar	-0.13	-0.28**	0.05	-0.08	-0.16	-0.75**	0.00	0.03	-0.03	-0.19*	0.19	-0.16	0.17	0.18	0.11	-0.09*	0.08	0.74**
7. Pulses	-0.16	-0.16	-0.20*	-0.23	0.04	-0.02	-0.30	0.06	-0.06	-0.11	0.07	0.27	0.13	0.05	0.02	0.02	0.05	0.46**
8. Nuts	0.08	-0.23	-0.26	-0.39	0.38	0.04	0.17	-0.60**	-0.60**	-0.39	0.53	-0.39	-0.08	0.16	-0.25*	-0.09*	0.04	-0.13**
9. Vegetables	0.05	-0.20	0.15	-0.15	-0.27	-0.01	-0.01	-0.17*	0.19	0.04	1.01**	-0.26	0.11	0.10	0.09	-0.06	0.05	-0.02
10. Fruit	-0.28	0.08	0.08	0.11	0.23	-0.27**	-0.19	-0.17*	0.06	-0.729*	0.45*	-0.01	0.22	-0.16	-0.19*	-0.06	0.05	0.01
11. RedMeat	0.18	-0.23	0.61**	-0.27	-0.20	0.03	0.29	0.11	0.58**	0.13	-0.31	0.14	-0.36**	-0.32**	-0.21**	-0.12**	-0.04	2.53**
12. Poultry	-0.15	-0.20	-0.12	-0.04	-0.16	-0.08	0.06	0.06	-0.30*	0.07	0.30	0.05	-0.40	-0.05	-0.06	0.07	-0.02	3.35**
13. Eggs	0.45*	-0.39*	-0.47**	-0.12	-0.19	0.17	0.22	-0.04	0.12	0.18	0.13	0.23	-0.01	0.23*	-0.16	0.20	0.10	0.01
14. Dairy	0.00	-0.05**	-0.48*	0.89**	-0.04	0.18	0.01	0.09	-0.22	-1.03**	0.09	0.09	-0.84**	-0.46**	0.08*	0.01	0.05	3.20**
15. Oils	-0.13	0.05	-0.07	0.00	-0.02	0.11	0.05	-0.10*	0.09	-0.15*	0.38*	-0.01	0.11	-0.27**	-0.60*	0.02	0.20*	-0.09**
16. Tea	0.04	0.20	0.06	-0.32	-0.23	-0.19*	0.16	-0.19*	-0.45	-0.23	1.27**	0.11	-0.02	0.30	0.09	-0.57**	0.08	1.37**
17. SoftDrink	0.02	-0.32	0.63**	-0.21	0.25	0.04	0.02	0.01	-0.02	0.01	-0.20	0.27	-0.35*	0.00	0.24	0.05	-0.60*	-0.12**
18. OtherFood	0.11	-0.01	-0.57**	0.10	-0.14	0.12	0.16	-0.22*	-0.09	0.04	0.09	0.05	0.05	0.21	-0.31**	0.07	-0.23**	0.32

Note: This table shows the sample-wide median elasticity of food demand (quantity consumed) with respect to food prices (columns 1 thru 18) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.46.

Table SMC.6: Food demand elasticities with respect to food prices and total household expenditures for Q2 consumers (with per capita expenditures between \$1.90 and \$3.20 per day) in Niger

	Food Group												Eggs	Fish	Dairy	Oils	Coffee	SoftDrink	OtherFood
	Rice	Millet	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Oils	Coffee	SoftDrink	OtherFood
1. Rice	-0.12	-1.76	-0.43**	0.25	0.07	-0.03	-0.03	0.05	0.09	0.11	-0.60*	-0.21	0.11	0.01	0.63*	0.08	-0.17	0.59**	2.02**
2. Millet	-0.49	-1.15**	-0.07	0.05	0.11	0.05	0.02	-0.02	-0.23*	0.05	-0.08	0.23	0.12	0.00	-0.17	-0.01	-0.13	(0.31)	(0.53)
3. Wheat	(0.34)	(0.38)	(0.12)	(0.05)	(0.14)	(0.11)	(0.07)	(0.11)	(0.07)	(0.10)	(0.04)	(0.08)	(0.21)	(0.09)	(0.04)	(0.09)	(0.13)	(0.07)	(0.35)
4. Cassava	0.69	0.29	0.49**	-1.06**	-0.09	-0.06	-0.25*	0.04	0.34**	-0.05	-0.03	0.11	-0.54**	-0.16*	-0.13	0.01	-0.01	-0.02	1.09*
5. Roots	0.19	0.71	-0.40	-0.14	-1.00**	0.27	-0.51	0.18	0.09	0.44*	-0.38	-0.40	-0.40	-0.33	-0.12	-0.23	-0.12	-0.34	2.49
6. Sugar	-0.07	0.28	-0.22	-0.06	0.23	-0.66	0.02	-0.26	-0.23	-0.14	0.66	0.73	0.33	0.27	0.57	0.07	0.14	-0.15	-0.14
7. Pulses	(0.59)	(1.44)	(0.60)	(0.21)	(0.58)	(0.98)	(0.43)	(0.73)	(0.52)	(0.22)	(0.92)	(2.25)	(1.15)	(0.40)	(1.02)	(0.25)	(0.20)	(0.42)	(0.28)
8. Nuts	0.05	0.45	0.04	0.13	-0.21	-0.14	-0.76	-0.03	-0.07	-0.21	(0.24)	(0.21)	(0.48)	(1.19)	(0.41)	(0.23)	(0.39)	(0.19)	(0.22)
9. Vegetables	0.14	-1.58*	0.11	0.26*	0.07	-0.17	-0.04	-0.05	-0.59*	-0.04	-0.06	-0.37	-0.33	0.03	0.02	0.11	-0.14	1.16	1.16*
10. Fruit	0.33	0.28	0.35**	-0.08	0.47**	-0.20	0.22	-0.13	-0.09	-0.96**	-0.25	-0.49	-0.05	0.09	-0.09	0.01	0.02	-0.38*	1.03
11. RedMeat	-0.03	-1.11*	-0.20	-0.04	-0.12	0.20	-0.01	-0.12	-0.11	-0.09	-1.02**	-0.12	-0.49	0.12	0.06	-0.05	-0.04	-0.07	0.22
12. Poultry	-0.78	-0.22	-0.57	0.01	-0.01	0.11	-0.03	-0.25	-0.14	0.41	0.18	0.49	0.13	0.04	-0.13	0.01	-0.41	-0.21	4.31
13. Eggs	-1.04	0.93	0.03	-0.87*	-0.46	1.30	-1.27*	-0.43	-0.74	-0.07	0.44	0.47	0.82	0.12	0.04	-0.13	0.07	-0.29	2.43*
14. Fish	0.18	-0.55	-0.12	-0.18*	(0.14)	(0.27)	(0.11)	(0.20)	(0.10)	(0.06)	(0.26)	(0.47)	(0.14)	(0.08)	(0.24)	(0.07)	(0.15)	(0.07)	(1.75)
15. Dairy	0.04	-0.76	0.10	-0.07	-0.27	0.25	-0.07	-0.12	0.01	-0.07	0.04	0.18	-0.19	0.07	-0.02	0.07	-0.04	0.07	1.28*
16. Oils	1.26*	-0.24	-0.23**	0.00	-0.10	0.04	-0.02	-0.07	0.11	-0.19*	0.09	0.04	-0.21*	-0.04	-0.02	0.04	0.10	1.54**	(0.35)
17. Coffee	0.25	-0.70	0.12	-0.02	0.14	0.17	0.02	-0.49*	-0.01	-0.01	-0.20	0.08	0.14	0.00	0.18	0.00	-0.08	3.22**	(0.75)
18. SoftDrink	(0.26)	(0.42)	(0.09)	(0.08)	(0.18)	(0.27)	(0.14)	(0.23)	(0.13)	(0.08)	(0.25)	(0.61)	(0.30)	(0.18)	(0.23)	(0.09)	(0.08)	(0.78)	(0.44)
19. OtherFood	1.17**	-0.86**	-0.06	-0.01	-0.14*	-0.08	0.05	-0.02	0.69**	0.03	0.19*	-0.14	-0.17*	0.01	0.11	0.11	-0.02	0.01	3.84*

Note: This table shows the sample-wide median elasticity of food demand (quantity consumed) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.47.

Table SMC.9: Food demand elasticities with respect to food prices and total household expenditures for Q1 consumers (with per capita expenditures less than \$1.90 per day) in Uganda

		Food Group																			
		Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Fats	Coffee	SoftDrink	OtherFood	
1. Rice	-2.18**	0.71**	-0.02	0.46*	0.46*	-0.10	0.47*	-0.42**	-0.88**	0.12	0.13	1.04**	-0.05	-0.27	0.41*	0.12	0.00	0.55	-0.04*	2.44**	
2. Maize	0.28**	-0.86**	-0.05	-0.20*	0.04	-0.05	-0.17**	0.03	0.10*	(0.19)	(0.11)	0.11*	-0.04	0.11*	-0.12	0.02	0.01*	-0.11	(0.02)	-0.01*	0.87**
3. Wheat	0.01	-0.09	-0.87**	-0.09	-0.14	-0.13**	-0.16*	-0.03	-0.10*	(0.05)	(0.05)	0.04	0.27*	-0.26	-0.07	-0.16*	0.02	-0.05*	-0.09	-0.00	1.10**
4. Cassava	0.19**	-0.18*	-0.05	-0.50**	-0.10	(0.10)	(0.10)	0.04	0.05	(0.05)	(0.05)	0.05	-0.20*	-0.05	0.00	0.22**	-0.04	-0.03	0.01	0.01	0.78**
5. Roots	0.18**	-0.02	-0.07	-0.09	-0.14*	-0.10*	-0.11*	-0.03	-0.05	(0.05)	(0.05)	0.10	(0.11)	(0.05)	0.07	(0.07)	0.01	0.05	(0.02)	(0.00)	0.15**
6. Sugar	-0.07	0.11	-0.29**	0.07	0.16	0.11	0.27**	0.12*	-0.54**	0.00	(0.14)	(0.08)	(0.25)	(0.16)	(0.09)	(0.08)	(0.07)	(0.03)	0.22*	-0.11	-0.04*
7. Pulses	0.24**	-0.19*	-0.12*	0.06	-0.13	0.14**	-1.14**	0.05	0.16**	(0.05)	(0.05)	0.01	-0.20	0.15	0.04	0.11	0.01	0.01	0.03**	(0.16)	-0.32**
8. Nuts	-0.28**	0.06	-0.06	-0.09	-0.09	0.10*	0.08	-1.04**	0.01	(0.05)	(0.05)	0.04	(0.11)	(0.05)	0.06	(0.06)	(0.05)	0.05	(0.02)	(0.00)	0.13*
9. Vegetables	-0.50**	0.21*	0.15*	-0.20*	-0.05	-0.31**	0.27**	0.03	-1.37**	(0.05)	(0.05)	0.01	-0.04	0.28	0.20	0.05	-0.26**	0.08	0.05	-0.03	0.41**
10. Fruit	0.12	(0.10)	(0.07)	(0.09)	(0.19)	(0.09)	(0.10)	(0.05)	(0.17)	(0.06)	(0.19)	(0.13)	(0.06)	(0.08)	(0.08)	(0.05)	(0.05)	(0.02)	(0.15)	(0.01)	0.53**
11. RedMeat	0.07	-0.05	(0.12)	(0.10)	(0.11)	(0.15)	(0.07)	-0.07	-0.00	(0.03)	(0.03)	-0.10	(0.08)	(0.11)	(0.15)	(0.10)	-0.27	0.08	0.22**	-0.24*	0.05
12. Poultry	0.44**	-0.25	-0.32*	-0.28	0.01	0.04	-0.06	0.04	-0.01	(0.13)	(0.13)	0.14*	-0.18*	(0.17)	(0.18)	(0.19)	-0.72**	0.08	0.48*	-0.57**	0.13*
13. Eggs	-0.12	0.67	-0.37	-0.07	-0.33	-0.03	0.14	0.33*	0.12	(0.05)	(0.05)	0.22	1.42*	(0.20)	(0.42)	(0.17)	-0.49	-0.03	0.04	0.84	-0.01
14. Fish	-0.14	(0.14)	(0.11)	(0.13)	(0.11)	(0.14)	(0.13)	(0.13)	-0.07	(0.11)	(0.12)	0.14	(0.10)	(0.08)	(0.11)	(0.12)	-0.69**	0.29**	0.21	-0.02	-0.03
15. Dairy	0.31**	-0.32*	0.01	-0.17	-0.14	0.05	-0.06	0.04	0.04	(0.05)	(0.05)	0.09	-0.31*	(0.07)	(0.17)	(0.15)	-0.72**	0.08	0.48*	-0.57**	0.13*
16. Fats	0.24	(0.13)	(0.12)	(0.11)	(0.14)	(0.11)	(0.13)	(0.13)	-0.16	(0.11)	(0.11)	0.10	0.12	(0.14)	(0.12)	(0.11)	-0.49	-0.03	0.04	0.84	-0.01
17. Coffee	0.05	-0.27**	0.19	-0.17	0.44**	-0.23	0.44**	-0.11*	0.02	(0.05)	(0.05)	0.16*	0.74*	(0.17)	(0.17)	(0.15)	-0.13*	0.05	0.21*	0.01	0.00
18. SoftDrink	0.80	-0.57	-0.33	-0.05	0.14	0.29	-0.14	0.14	0.04	(0.05)	(0.05)	0.04	-0.21*	(0.07)	(0.14)	(0.11)	-0.37	0.03	0.14**	-0.16*	0.01
19. OtherFood	-0.11	-0.08	-0.01	-0.12*	0.05	-0.12	0.04	-0.02	-0.27**	(0.05)	(0.05)	0.06	-0.29*	(0.02)	(0.17)	(0.10)	-0.52**	0.00	-0.12	-0.04*	0.02*

Note: This table shows the sample-wide median elasticity of food demand (quantity consumed) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.48.

Table SMC.10: Food demand elasticities with respect to food prices and total household expenditures for Q2 consumers (with per capita expenditures between \$1.90 and \$3.20 per day) in Uganda

	Food Group	Exp.																		
		Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Fats	Coffee	SoftDrink	OtherFood
1. Rice	-1.22**	0.26	-0.05	0.20	0.22	0.03	0.13	-0.27**	-0.46**	0.07	0.02	0.48**	-0.05	-0.19	0.15	0.06	0.02	0.07	-0.02	1.84**
2. Maize	0.15*	-0.82**	-0.05	-0.15	0.16*	0.03	-0.08	0.01	0.10*	0.06	0.08	-0.03	0.15**	0.11	(0.12)	(0.12)	0.01	0.04	(0.01)	(0.28)
3. Wheat	-0.02	-0.09	-0.83**	-0.05	-0.08	-0.08	-0.08*	-0.06	0.01	0.04	0.05	0.04	-0.12	-0.05	-0.12	-0.01	-0.01	-0.03	-0.00	0.73**
4. Cassava	0.11	-0.14	-0.02	-0.12**	-0.05	0.02	0.02	-0.04	-0.07	0.03	-0.07	-0.03	-0.02	0.13*	-0.09	-0.03	0.00	0.03	-0.01*	0.69**
5. Roots	0.11*	0.12	-0.03	-0.05	-0.05	-0.04	-0.01	-0.02	-0.06	0.00	0.04	-0.02	0.11*	-0.02*	-0.02	(0.02)	(0.02)	(0.01)	(0.14)	
6. Sugar	0.05	0.03	-0.15*	0.02	0.10	-0.38**	0.05	0.07	-0.37**	-0.00	-0.41*	0.09	-0.04	-0.11*	-0.06	0.02	-0.05*	0.21	-0.03*	1.24**
7. Pulses	0.11	-0.09	-0.04	0.03	0.02	0.05	-1.13**	0.00	0.06	0.08	0.02	0.10	0.10*	0.01	0.01	-0.05*	0.07	(0.02)	(0.01)	(0.15)
8. Nuts	0.06	(0.06)	(0.05)	(0.07)	(0.05)	(0.06)	(0.06)	(0.05)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	0.55**
9. Vegetables	-0.40**	0.21*	-0.07	-0.17	-0.17	-0.30**	0.08	0.08	-1.57**	-0.07	0.49*	0.17	0.12	-0.10	0.09	0.12*	-0.06	0.07	-0.05*	0.84**
10. Fruit	0.08	0.10	0.07	0.03	-0.02	-0.01	0.09	-0.05	-0.09	-0.02	-0.03	-0.14	0.05	0.13	-0.10	0.02	0.00	0.14	0.01	1.31**
11. RedMeat	0.02	0.04	0.02	-0.13	-0.03	-0.19**	-0.04	0.02	0.22*	0.01	-1.65**	-0.28*	0.05	0.13	-0.13	-0.01	-0.03	-0.01	-0.00	1.62**
12. Poultry	0.22**	-0.12	-0.12	-0.11	-0.15	-0.10	-0.00	-0.01	0.04	-0.10	-0.34*	-0.26**	0.03	0.25*	-0.27*	0.08*	0.02	-0.07	-0.00	2.47**
13. Eggs	-0.13	0.80**	-0.20	-0.15	-0.19	-0.10	0.40	0.25*	0.28	0.13	0.25	0.14	-1.17**	0.14	-0.36	-0.02	0.02	0.04	0.04*	1.61**
14. Fish	-0.12	0.15	-0.15	-0.14	0.17	0.18	-0.03	-0.01	-0.09	0.10	0.19	0.39*	0.04	-1.05**	0.06	-0.01	-0.01	0.12	0.01	1.27**
15. Dairy	0.13	-0.21*	-0.01	-0.20	-0.09	-0.05	-0.02	0.07*	0.06	-0.09	-0.21	-0.40*	-0.11	0.07	-0.81**	0.04	-0.00	-0.03	-0.00	1.32**
16. Fats	0.15	-0.02	-0.16	-0.19	0.04	-0.19*	-0.02	0.23*	0.05	0.03	0.37*	-0.01	-0.00	0.11	-0.51**	0.03	0.08	-0.06*	0.96**	
17. Coffee	0.15	0.15	-0.12	0.04	-0.09	-0.39*	0.22*	-0.11	0.03	-0.23	0.35*	0.09	0.00	-0.03	0.13	-0.75**	0.32*	0.06	1.08**	
18. SoftDrink	0.10	0.09	-0.09	0.06	0.00	0.27	-0.27	0.07	0.90*	-0.21	-0.13	0.24	-0.08	0.05	0.05	-1.27	0.10**	(0.16)	(0.23)	
19. OtherFood	-0.09	-0.01	-0.02	-0.18**	-0.00	-0.22**	-0.03	-0.00	-0.43**	0.10*	0.02	0.11	0.15**	0.08*	-0.02	-0.04	0.54**	(0.04)	(0.12)	0.54**

Note: This table shows the sample-wide median elasticity of food demand (quantity consumed) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.48.

Table SMC.16: Food demand elasticities with respect to food prices and total household expenditures for Q4 consumers (with per capita expenditures greater than \$5.50 per day) in Tanzania

	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Oils	Coffee	SoftDrink	OtherFood	Exp.
1. Rice	-0.03	-0.14	0.09	-0.09	0.33	-0.01	-0.38	-0.05	-0.24	0.17	-0.42	0.06	-0.10	-0.42	-0.20	0.04	-0.02	0.04	1.62	
2. Maize	(1.16)	(0.49)	(0.26)	(0.46)	(0.36)	(0.14)	(0.34)	(0.47)	(0.31)	(0.25)	(0.71)	(0.95)	(0.23)	(0.20)	(0.56)	(0.16)	(0.06)	(0.15)	(0.91)	
3. Wheat	-0.01	-0.21	-0.03	-0.36	-0.15	-0.10	0.13	0.19	-0.04	-0.04	0.56	-0.17	0.00	0.13	0.10	-0.01	0.11	-0.01	0.08	
4. Cassava	(0.44)	(0.35)	(0.13)	(0.24)	(0.17)	(0.08)	(0.11)	(0.28)	(0.11)	(0.10)	(0.47)	(0.39)	(0.11)	(0.14)	(0.23)	(0.06)	(0.02)	(0.09)	(0.57)	
5. Roots	0.16	-0.13	0.34	-0.25	0.03	0.25	0.18	0.00	-0.29*	-0.04	0.12	0.15	0.03	-0.23	0.07	0.08	0.01	-0.01	1.07*	
6. Sugar	0.03	-0.37*	-0.49**	-0.56**	-0.02	0.45	0.42	-0.14	-0.02	0.69**	-0.23	0.14	0.10	-0.13	-0.00	0.08	-0.17**	-0.03	0.81*	
7. Pulses	-0.06	-0.64	-0.25	0.33	-0.60	-0.34*	0.13	-0.28	-0.04	0.22	0.43	-0.42	0.13	-0.17	0.76	-0.11	-0.10*	-0.00	-0.06	
8. Nuts	0.30	-0.25	0.06	-0.47	-0.17	-0.00	-0.15	0.06	-0.08	0.08	0.03	0.13	0.08	0.22	0.01	0.02	-0.04	0.05	0.49	
9. Vegetables	0.25	(0.17)	(0.19)	(0.15)	(0.12)	(0.33)	(0.10)	(0.10)	(0.15)	(0.26)	(0.22)	(0.22)	(0.16)	(0.06)	(0.20)	(0.06)	(0.04)	(0.11)	(0.07)	
10. Fruit	0.34	-0.15	-0.03	0.19	-0.13	0.47**	-0.19	-0.09	-0.02	-0.43*	-0.20	-0.24	-0.06	-0.24	-0.42	0.00	0.11	-0.04	0.14*	
11. RedMeat	-0.43	0.44	0.04	0.18	-0.01	-0.12	-0.48	0.08	-0.01	-0.35	-0.84	0.13	-0.18	-0.03	-0.64	0.10	-0.01	-0.17	2.27*	
12. Poultry	0.06	-0.23	0.09	-0.28	-0.10	0.01	0.03	-0.00	-0.69**	0.01	0.12	-0.02	0.06	0.24	-0.10	-0.03	0.00	0.13	(0.52)	
13. Eggs	0.45	-0.15	-0.03	0.17	-0.17	0.15	(0.14)	(0.10)	(0.14)	(0.13)	(0.19)	(0.19)	(0.14)	(0.01)	(0.13)	-0.37*	0.02	-0.03	0.04	
14. Fish	0.02	0.18	-0.29	-0.22	0.09	-0.10	(0.24)	(0.19)	(0.27)	(0.30)	(0.14)	(0.45)	(0.20)	(0.12)	(0.27)	(0.23)	(0.06)	(0.08)	(0.64)	
15. Dairy	-0.83	0.10	0.03	0.72	0.22	-0.04	-0.47	0.25	0.16	-0.41	-0.55	0.10	0.01	0.08	-0.02	-0.02	0.06	-0.00	1.21	
16. Fats	-0.63*	0.33*	0.23	0.02	0.22	0.29	0.10	-0.17	-0.27	0.04	-0.78	0.35	-0.23**	-0.17	-0.52	-0.07	0.00	0.01	-0.02	
17. Coffee	0.45	-0.13	0.08	-0.53**	0.13	-0.61**	0.52	0.08	-0.18	-0.02	-0.25	-0.22	0.13	-1.22*	-0.22	-1.54*	-0.03	0.08	2.33**	
18. SoftDrink	(0.34)	(0.21)	(0.26)	(0.19)	(0.20)	(0.22)	(0.31)	(0.13)	(0.21)	(0.16)	(0.15)	(0.32)	(0.26)	(0.07)	(0.21)	(0.18)	(0.16)	(0.08)	(0.28)	
19. OtherFood	0.71	-0.15	-0.06	-0.55	0.57	-0.63**	1.06	-0.14	0.02	0.32	0.30	-0.05	-0.13	0.30	-0.76*	-0.35*	0.05	-0.19*	0.32	
	(0.30)	(0.27)	(0.33)	(0.29)	(0.33)	(0.34)	(0.54)	(0.19)	(0.26)	(0.24)	(0.47)	(0.40)	(0.10)	(0.23)	(0.31)	(0.37)	(0.15)	(0.12)	(0.50)	

Note: This table shows the sample-wide median elasticity of food demand (quantity consumed) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.49.

Table SMC.21: Nutrient intake elasticities with respect to food prices and total household expenditures for Q1 consumers (with per capita expenditures less than \$1.90 per day) in Malawi

	Food Group												Eggs	Dairy	Oils	Tea	SoftDrink	OtherFood	Exp.
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Dairy	Oils	Tea	SoftDrink	OtherFood	Exp.
Kcal	0.04 (0.05)	-0.38*** (0.07)	-0.02 (0.03)	-0.09** (0.04)	-0.06** (0.02)	-0.08** (0.03)	-0.02 (0.02)	0.00 (0.04)	-0.06 (0.03)	-0.02 (0.04)	-0.03 (0.05)	-0.02 (0.07)	-0.04 (0.07)	-0.02 (0.02)	0.00 (0.03)	-0.00 (0.01)	-0.00 (0.01)	-0.02** (0.08)	0.86** (0.08)
Protein	0.04 (0.04)	-0.43*** (0.07)	-0.03 (0.02)	-0.08** (0.04)	-0.03 (0.03)	-0.12** (0.04)	-0.01 (0.02)	-0.07 (0.04)	0.02 (0.03)	-0.03 (0.04)	-0.06 (0.05)	-0.02 (0.08)	-0.07 (0.08)	0.01 (0.05)	0.00 (0.03)	-0.01 (0.01)	-0.02** (0.08)	0.97** (0.08)	
Fat	0.15* (0.07)	-0.39*** (0.08)	-0.13** (0.05)	0.00 (0.04)	0.06 (0.04)	-0.03 (0.05)	-0.09** (0.03)	-0.00 (0.03)	-0.02 (0.03)	-0.02 (0.03)	-0.02 (0.06)	-0.12 (0.10)	-0.02 (0.04)	-0.02 (0.06)	-0.15** (0.04)	-0.01 (0.01)	-0.02 (0.04)	-0.04** (0.11)	1.32** (0.11)
Carbohydrates	0.02 (0.05)	-0.37*** (0.07)	-0.01 (0.03)	-0.09** (0.04)	-0.09** (0.03)	-0.09** (0.02)	-0.01 (0.02)	-0.06 (0.04)	-0.01 (0.03)	-0.06 (0.04)	-0.01 (0.05)	-0.02 (0.07)	-0.01 (0.07)	-0.02 (0.05)	-0.02 (0.03)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.07)	0.79** (0.07)
Iron	0.05 (0.05)	-0.36*** (0.07)	-0.05 (0.03)	-0.14** (0.03)	-0.06 (0.02)	-0.14** (0.02)	-0.03 (0.02)	-0.12** (0.02)	-0.02 (0.02)	-0.11* (0.02)	0.02 (0.03)	-0.01 (0.03)	-0.02 (0.03)	-0.02 (0.02)	-0.03 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.02** (0.09)	0.87** (0.09)
Zinc	0.04 (0.04)	-0.42*** (0.07)	0.00 (0.02)	-0.07* (0.04)	-0.04* (0.03)	-0.10** (0.02)	-0.01 (0.02)	-0.07 (0.04)	-0.01 (0.03)	-0.07 (0.03)	-0.01 (0.05)	-0.03 (0.07)	-0.04 (0.06)	-0.03 (0.06)	-0.09* (0.04)	0.01 (0.01)	0.00 (0.01)	-0.01 (0.08)	0.88** (0.08)
Vitamin A	0.14* (0.07)	-0.32*** (0.07)	-0.12** (0.05)	-0.04 (0.05)	-0.23* (0.04)	0.04 (0.04)	-0.00 (0.04)	-0.12 (0.04)	-0.06* (0.03)	-0.12 (0.07)	0.02 (0.04)	-0.00 (0.04)	-0.04 (0.08)	-0.03 (0.06)	-0.08* (0.03)	-0.01 (0.01)	0.03 (0.01)	-0.02* (0.12)	0.97** (0.12)
Total Folate	0.02 (0.05)	-0.36*** (0.07)	-0.04 (0.03)	-0.08 (0.04)	-0.13** (0.03)	-0.03 (0.05)	-0.16** (0.05)	-0.02 (0.05)	-0.12* (0.05)	-0.02 (0.06)	0.01 (0.04)	-0.04 (0.06)	-0.01 (0.10)	-0.02 (0.05)	-0.02 (0.02)	0.02 (0.01)	-0.02 (0.01)	-0.02* (0.11)	0.87** (0.11)

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 18) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.46.

Table SMC.22: Nutrient intake elasticities with respect to food prices and total household expenditures for Q2 consumers (with per capita expenditures between \$1.90 and \$3.20 per day) in Malawi

	Food Group											Exp.						
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Dairy	Oils	Tea	SoftDrink	OtherFood
Kcal	-0.04 (0.04)	-0.24*** (0.05)	-0.02 (0.02)	-0.05 (0.03)	-0.07** (0.01)	-0.08*** (0.03)	-0.06* (0.01)	0.00 (0.01)	-0.06 (0.02)	-0.01 (0.04)	0.05 (0.02)	0.03 (0.07)	-0.01 (0.04)	-0.04 (0.03)	-0.00 (0.03)	0.02 (0.00)	-0.00 (0.02)	-0.01** (0.07)
Protein	-0.02 (0.04)	-0.28*** (0.06)	-0.03 (0.02)	-0.05 (0.03)	-0.06* (0.02)	-0.03* (0.04)	-0.08* (0.02)	0.01 (0.01)	-0.05 (0.02)	0.01 (0.03)	0.03 (0.02)	0.02 (0.09)	-0.02 (0.02)	-0.06 (0.03)	0.02 (0.01)	0.01 (0.01)	-0.01** (0.08)	0.96** (0.08)
Fat	0.05 (0.05)	-0.23*** (0.07)	-0.08* (0.04)	-0.03 (0.04)	0.05 (0.03)	0.02 (0.03)	0.00 (0.05)	-0.06* (0.03)	0.03 (0.03)	-0.03 (0.03)	0.09 (0.02)	-0.05 (0.09)	-0.03 (0.02)	-0.15** (0.03)	-0.18** (0.04)	0.01 (0.01)	-0.04** (0.04)	1.35** (0.12)
Carbohydrates	-0.06 (0.04)	-0.24*** (0.06)	-0.00 (0.02)	-0.05 (0.03)	-0.07** (0.02)	-0.10** (0.02)	-0.07** (0.03)	0.01 (0.01)	-0.07* (0.03)	-0.01 (0.02)	0.04 (0.03)	-0.01 (0.02)	-0.02 (0.02)	-0.02 (0.03)	0.02 (0.01)	-0.00 (0.02)	-0.01 (0.02)	0.74** (0.07)
Iron	-0.02 (0.04)	-0.24*** (0.05)	-0.03 (0.03)	-0.10** (0.03)	-0.12** (0.02)	-0.04* (0.02)	-0.09* (0.03)	-0.00 (0.01)	-0.09* (0.02)	-0.01 (0.02)	-0.08* (0.01)	0.01 (0.02)	-0.02 (0.02)	-0.01 (0.01)	0.02 (0.01)	0.00 (0.01)	-0.02** (0.03)	0.89** (0.08)
Zinc	-0.03 (0.03)	-0.27*** (0.06)	0.01 (0.02)	-0.03 (0.03)	-0.06* (0.02)	-0.04* (0.01)	-0.06* (0.03)	0.01 (0.02)	-0.06 (0.03)	0.01 (0.02)	0.02 (0.04)	-0.04 (0.07)	-0.03 (0.07)	-0.08* (0.07)	0.02 (0.01)	0.01 (0.01)	-0.01** (0.07)	0.82** (0.07)
Vitamin A	0.06 (0.05)	-0.22*** (0.05)	-0.06 (0.04)	-0.10* (0.04)	-0.18** (0.04)	0.02 (0.03)	0.02 (0.03)	-0.04 (0.04)	-0.06 (0.06)	-0.04 (0.06)	-0.06 (0.06)	0.01 (0.07)	0.09 (0.09)	-0.06 (0.04)	-0.14** (0.05)	-0.01 (0.03)	-0.03** (0.01)	1.01** (0.10)
Total Folate	-0.03 (0.04)	-0.24*** (0.05)	-0.05 (0.03)	-0.10** (0.04)	-0.10** (0.03)	-0.04* (0.02)	-0.12* (0.05)	0.00 (0.02)	-0.10* (0.04)	-0.01 (0.02)	0.09 (0.06)	0.05 (0.09)	0.01 (0.03)	-0.02 (0.02)	0.01 (0.01)	0.02 (0.01)	-0.01* (0.01)	0.90** (0.09)

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 18) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.46.

Table SMC.23. Nutrient intake elasticities with respect to food prices and total household expenditures for Q3 consumers (with per capita expenditures between \$3.20 and \$5.50 per day) in Malawi

	Food Group										Exp.								
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Dairy	Oils	Tea	SoftDrink	OtherFood	
Kcal	-0.12** (0.04)	-0.11 (0.06)	-0.01 (0.02)	-0.07* (0.03)	-0.05 (0.01)	-0.08** (0.03)	-0.03 (0.01)	0.02 (0.02)	-0.05 (0.03)	-0.02 (0.02)	0.10 (0.05)	0.12*	0.10 (0.09)	-0.01 (0.02)	0.00 (0.02)	0.04 (0.01)	-0.01* (0.00)	0.81** (0.08)	
Protein	-0.08* (0.04)	-0.13 (0.07)	-0.03 (0.02)	-0.08* (0.03)	-0.04 (0.04)	-0.03* (0.02)	-0.03 (0.02)	0.03 (0.03)	-0.04 (0.02)	0.01 (0.02)	0.09 (0.07)	0.12 (0.11)	-0.03 (0.07)	-0.04 (0.03)	0.02 (0.02)	0.02 (0.01)	-0.01 (0.01)	0.97** (0.11)	
Fat	0.04 (0.05)	0.10 (0.07)	-0.05 (0.04)	-0.05 (0.05)	-0.04 (0.04)	0.03 (0.05)	0.04 (0.03)	-0.03 (0.06)	0.04 (0.05)	-0.05 (0.03)	0.17 (0.10)	0.05 (0.05)	-0.03 (0.03)	0.14** (0.15)	-0.18** (0.04)	0.02 (0.04)	0.07 (0.01)	-0.04** (0.01)	1.34** (0.14)
Carbohydrates	-0.14** (0.04)	-0.11 (0.07)	0.00 (0.02)	-0.07 (0.04)	-0.06 (0.03)	-0.11** (0.02)	-0.04 (0.02)	0.03* (0.03)	-0.04 (0.02)	-0.07* (0.03)	-0.02 (0.02)	0.12* (0.08)	-0.02 (0.05)	0.10 (0.08)	-0.01 (0.02)	-0.03 (0.02)	0.00 (0.01)	-0.00 (0.03)	0.68** (0.08)
Iron	-0.08 (0.04)	-0.13* (0.06)	-0.02 (0.03)	-0.12* (0.04)	-0.02 (0.04)	-0.08* (0.03)	-0.05** (0.02)	-0.04 (0.02)	-0.04 (0.02)	0.03 (0.02)	-0.06 (0.01)	0.12 (0.15*)	-0.02 (0.02)	0.12 (0.12)	-0.02 (0.02)	0.03 (0.01)	-0.01 (0.01)	-0.01 (0.01)	0.92** (0.10)
Zinc	-0.09* (0.04)	-0.11 (0.07)	0.02 (0.02)	-0.07 (0.04)	-0.04 (0.03)	-0.04** (0.01)	-0.02 (0.04)	0.04* (0.04)	-0.02 (0.02)	0.04* (0.03)	-0.04 (0.02)	0.14 (0.10)	-0.03 (0.06)	0.14 (0.06)	-0.03 (0.02)	0.03 (0.01)	0.02 (0.01)	-0.00 (0.01)	0.79** (0.10)
Vitamin A	-0.02 (0.05)	-0.13* (0.06)	-0.08* (0.04)	-0.08* (0.05)	-0.13* (0.05)	0.01 (0.03)	0.01 (0.03)	0.04 (0.05)	0.04 (0.05)	0.04 (0.02)	-0.02 (0.07)	-0.02 (0.03)	0.16 (0.08)	0.03 (0.11)	-0.09* (0.04)	-0.17** (0.04)	-0.00 (0.01)	-0.04** (0.01)	1.05** (0.11)
Total Folate	-0.09 (0.04)	-0.13 (0.06)	-0.05 (0.03)	-0.12* (0.04)	-0.06 (0.04)	-0.05** (0.02)	-0.07 (0.02)	0.06 (0.06)	-0.05** (0.02)	0.02 (0.02)	-0.08 (0.02)	-0.02 (0.02)	0.18* (0.11)	-0.01 (0.01)	0.14 (0.01)	0.01 (0.01)	0.04 (0.01)	-0.01 (0.01)	0.93** (0.11)

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 18) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.46.

Table SMC.24: Nutrient intake elasticities with respect to food prices and total household expenditures for Q4 consumers (with per capita expenditures greater than \$5.50 per day) in Malawi

	Food Group																		Exp.
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Dairy	Oils	Tea	SoftDrink	OtherFood	Exp.
Kcal	-0.28** (0.08)	0.12 (0.11)	0.01 (0.05)	-0.12** (0.06)	-0.03 (0.03)	-0.09** (0.06)	0.03 (0.03)	0.06* (0.06)	-0.06 (0.03)	-0.04 (0.05)	0.29** (0.03)	0.23 (0.03)	-0.01 (0.14)	-0.03 (0.03)	-0.01 (0.03)	0.02 (0.01)	0.09* (0.01)	-0.01 (0.05)	0.84** (0.12)
Protein	-0.21** (0.06)	0.13 (0.11)	-0.01 (0.04)	-0.16** (0.05)	-0.01 (0.02)	-0.04 (0.07)	0.06 (0.03)	0.07* (0.03)	-0.01 (0.05)	-0.01 (0.03)	0.24** (0.11)	0.31 (0.17)	-0.04 (0.03)	-0.01 (0.03)	0.04 (0.03)	0.02* (0.01)	0.07 (0.01)	0.01 (0.04)	1.03** (0.14)
Fat	-0.18* (0.08)	0.09 (0.08)	-0.00 (0.05)	-0.11 (0.06)	-0.03 (0.07)	0.04 (0.04)	0.10 (0.09)	0.00 (0.04)	0.04 (0.04)	-0.04 (0.07)	0.34* (0.13)	-0.07* (0.19)	0.22 (0.04)	-0.02 (0.04)	-0.11 (0.06)	-0.16** (0.06)	0.04** (0.01)	-0.04** (0.06)	1.30** (0.17)
Carbohydrates	-0.31** (0.09)	0.12 (0.12)	0.01 (0.05)	-0.12 (0.07)	-0.03 (0.06)	-0.13** (0.03)	0.00 (0.06)	0.07* (0.03)	-0.08 (0.06)	-0.04 (0.04)	0.30** (0.10)	0.22 (0.13)	-0.00 (0.04)	-0.02 (0.05)	0.02 (0.03)	0.02 (0.01)	0.09 (0.05)	-0.00 (0.01)	0.69** (0.12)
Iron	-0.19** (0.07)	0.10 (0.10)	-0.01 (0.05)	-0.19** (0.06)	-0.03 (0.07)	-0.08** (0.03)	0.05 (0.07)	0.08* (0.03)	-0.01 (0.07)	-0.01 (0.04)	0.29* (0.12)	0.29 (0.17)	-0.03 (0.04)	-0.02 (0.03)	0.03 (0.03)	0.07 (0.01)	0.07 (0.05)	0.00 (0.01)	1.03** (0.14)
Zinc	-0.24** (0.07)	0.18 (0.12)	0.03 (0.05)	-0.15** (0.06)	-0.01 (0.02)	-0.05* (0.07)	0.07 (0.03)	0.08* (0.03)	-0.02 (0.06)	0.00 (0.04)	0.23* (0.11)	0.34* (0.16)	-0.04 (0.03)	-0.00 (0.03)	0.04 (0.01)	0.03* (0.01)	0.06 (0.05)	0.01 (0.01)	0.82** (0.14)
Vitamin A	-0.16* (0.08)	0.03 (0.06)	-0.05 (0.08)	-0.13** (0.08)	-0.08 (0.06)	-0.01 (0.08)	0.08 (0.04)	0.00 (0.07)	0.02 (0.04)	0.02 (0.04)	-0.03 (0.11)	0.11 (0.16)	0.35** (0.05)	0.01 (0.05)	-0.11 (0.06)	0.02 (0.02)	0.14* (0.06)	-0.05** (0.02)	1.08** (0.15)
Total Folate	-0.20** (0.07)	0.11 (0.10)	-0.04 (0.05)	-0.17* (0.07)	-0.00 (0.06)	-0.08** (0.03)	0.01 (0.09)	0.06 (0.04)	-0.02 (0.08)	0.06 (0.04)	-0.05 (0.12)	0.34** (0.16)	-0.01 (0.05)	0.02 (0.03)	0.00 (0.01)	0.02 (0.05)	0.00 (0.01)	0.06 (0.01)	1.07** (0.14)

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 18) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.16.

Table SMC.25: Nutrient intake elasticities with respect to food prices and total household expenditures for Q1 consumers (with per capita expenditures less than \$1.90 per day) in Niger

	Food Group											Exp.							
	Rice	Millet	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Oils	Coffee	SoftDrink	OtherFood
Kcal	-0.00 (0.14)	-0.86*** (0.20)	-0.21** (0.05)	0.04 (0.03)	0.08 (0.07)	-0.06 (0.08)	-0.10 (0.05)	-0.03 (0.05)	0.00 (0.05)	-0.00 (0.03)	-0.04 (0.13)	0.06 (0.06)	-0.03 (0.06)	-0.03 (0.07)	-0.02 (0.05)	-0.02 (0.05)	-0.01 (0.03)	-0.01 (0.05)	-0.14** (0.25)
Protein	0.03 (0.17)	-0.84*** (0.23)	-0.22** (0.05)	0.02 (0.03)	0.05 (0.07)	-0.03 (0.11)	-0.23* (0.05)	-0.03 (0.05)	0.06 (0.05)	0.01 (0.04)	-0.04 (0.14)	0.05 (0.05)	-0.12 (0.06)	0.06 (0.07)	-0.02 (0.06)	-0.02 (0.07)	-0.02 (0.05)	-0.23** (0.24)	1.23** (0.24)
Fat	0.28 (0.16)	-0.64** (0.19)	-0.16** (0.04)	0.05 (0.03)	0.01 (0.04)	-0.05 (0.05)	-0.08 (0.09)	-0.07 (0.04)	-0.07 (0.05)	-0.07 (0.05)	-0.07* (0.03)	-0.03 (0.09)	0.10 (0.04)	-0.09 (0.09)	-0.01 (0.05)	-0.06 (0.06)	-0.06 (0.02)	-0.01 (0.04)	1.21** (0.21)
Carbohydrates	-0.08 (0.16)	-0.92** (0.23)	-0.21** (0.06)	0.04 (0.03)	0.10 (0.06)	-0.06 (0.07)	-0.07 (0.09)	-0.02 (0.06)	0.01 (0.06)	-0.02 (0.03)	0.01 (0.14)	-0.04 (0.06)	0.05 (0.07)	-0.00 (0.03)	0.04 (0.08)	-0.09 (0.06)	-0.01 (0.03)	-0.16** (0.29)	1.12** (0.29)
Iron	0.04 (0.17)	-0.98** (0.21)	-0.14** (0.04)	0.03 (0.03)	0.06 (0.05)	-0.04 (0.06)	-0.04 (0.06)	-0.04 (0.07)	-0.01 (0.05)	-0.07 (0.04)	-0.01 (0.10)	0.01 (0.14)	-0.05 (0.05)	-0.07 (0.06)	-0.00 (0.02)	0.12* (0.06)	-0.04 (0.02)	-0.02 (0.05)	-0.42** (0.23)
Zinc	-0.05 (0.18)	-0.93** (0.24)	-0.17** (0.05)	0.03 (0.03)	0.10 (0.07)	-0.04 (0.10)	-0.10 (0.05)	-0.02 (0.05)	0.02 (0.05)	0.00 (0.05)	-0.06 (0.16)	0.06 (0.06)	-0.05 (0.06)	-0.03 (0.07)	-0.12 (0.07)	0.03 (0.05)	-0.03 (0.05)	0.00 (0.06)	-0.19** (0.27)
Vitamin A	0.677* (0.24)	-0.49 (0.30)	-0.09* (0.05)	-0.05 (0.04)	0.09* (0.05)	-0.10 (0.08)	-0.08 (0.06)	-0.02 (0.06)	0.04 (0.06)	-0.02 (0.11)	-0.10 (0.09)	0.05 (0.04)	-0.06 (0.12)	-0.02 (0.06)	-0.08 (0.07)	-0.03 (0.10)	-0.01 (0.04)	-0.11 (0.06)	1.13** (0.26)
Total Folate	0.04 (0.21)	-0.82** (0.26)	-0.16** (0.06)	0.00 (0.04)	0.08 (0.06)	-0.03 (0.08)	-0.24 (0.14)	-0.04 (0.06)	-0.00 (0.04)	-0.00 (0.06)	-0.00 (0.17)	0.09 (0.08)	-0.16 (0.08)	0.04 (0.07)	0.01 (0.06)	-0.04 (0.03)	-0.03 (0.06)	-0.16* (0.28)	

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.47.

Table SMC.26: Nutrient intake elasticities with respect to food prices and total household expenditures for Q2 consumers (with per capita expenditures between \$1.90 and \$3.20 per day) in Niger

	Rice	Millet	Wheat	Cassava	Roots	Sugar	Philes	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Oils	Coffee	SoftDrink	Exp.	
Keal	-0.18 (0.15)	-0.84** (0.17)	-0.25** (0.09)	0.04 (0.02)	0.02 (0.03)	-0.00 (0.05)	-0.11* (0.04)	-0.01 (0.05)	-0.08 (0.04)	0.04 (0.02)	-0.00 (0.04)	0.06 (0.11)	-0.00 (0.04)	-0.08 (0.05)	0.00 (0.05)	-0.03 (0.05)	0.00 (0.03)	-0.01 (0.03)	-0.07 (0.04)	0.99** (0.20)
Protein	-0.16 (0.14)	-0.80** (0.18)	-0.26** (0.04)	0.04 (0.03)	-0.02 (0.06)	0.00 (0.04)	-0.22** (0.06)	-0.03 (0.04)	-0.04 (0.05)	0.05* (0.02)	-0.00 (0.04)	0.06 (0.12)	-0.05 (0.05)	0.02 (0.06)	-0.09 (0.05)	0.01 (0.05)	-0.00 (0.02)	-0.04 (0.04)	-0.13** (0.03)	1.09** (0.19)
Fat	0.32 (0.18)	-0.65** (0.19)	-0.20** (0.09)	0.02 (0.02)	-0.04 (0.04)	0.03 (0.04)	-0.10 (0.05)	-0.06 (0.04)	-0.04 (0.04)	-0.04 (0.02)	0.01 (0.04)	0.09 (0.09)	-0.09* (0.08)	-0.00 (0.04)	-0.00 (0.04)	-0.00 (0.05)	-0.01 (0.02)	-0.01 (0.02)	-0.10** (0.03)	1.15** (0.18)
Carbohydrates	-0.32 (0.18)	-0.90** (0.20)	-0.26** (0.04)	0.04 (0.03)	0.05 (0.06)	-0.01 (0.06)	-0.09 (0.04)	0.00 (0.05)	-0.11* (0.05)	0.05* (0.02)	-0.00 (0.05)	0.05 (0.12)	0.03 (0.05)	0.02 (0.06)	-0.08 (0.05)	0.00 (0.06)	-0.01 (0.02)	-0.01 (0.04)	-0.06 (0.04)	0.92** (0.22)
Iron	0.05 (0.19)	-0.95** (0.20)	-0.14** (0.04)	0.03 (0.02)	0.00 (0.04)	-0.01 (0.04)	-0.05 (0.03)	-0.01 (0.04)	0.07 (0.04)	0.05* (0.06)	0.01 (0.06)	-0.01 (0.05)	0.01 (0.13)	-0.06 (0.05)	0.01 (0.05)	-0.06 (0.05)	0.01 (0.05)	-0.02 (0.02)	-0.01 (0.04)	-0.39** (0.21)
Zinc	-0.29 (0.19)	-0.94** (0.22)	-0.21** (0.04)	0.04 (0.03)	0.03 (0.04)	0.01 (0.07)	-0.12 (0.07)	-0.02 (0.06)	-0.12* (0.06)	0.05* (0.03)	-0.04 (0.05)	0.09 (0.15)	-0.04 (0.05)	-0.04 (0.06)	0.00 (0.07)	0.01 (0.06)	-0.10 (0.06)	-0.01 (0.05)	-0.01 (0.04)	-0.08 (0.04)
Vitamin A	0.84** (0.26)	-0.78** (0.30)	-0.09 (0.05)	0.06 (0.04)	-0.08 (0.05)	-0.04 (0.07)	-0.01 (0.06)	-0.05 (0.05)	-0.01 (0.07)	0.10 (0.05)	-0.08** (0.05)	0.07 (0.08)	-0.10 (0.12)	-0.21** (0.06)	-0.00 (0.06)	-0.01 (0.06)	-0.02 (0.05)	-0.01 (0.05)	-0.13 (0.07)	1.40** (0.20)
Total Folate	-0.21 (0.18)	-0.87** (0.25)	-0.14** (0.05)	0.03 (0.04)	0.01 (0.05)	-0.01 (0.06)	-0.26** (0.07)	-0.04 (0.06)	-0.15** (0.06)	0.05 (0.03)	-0.02 (0.06)	0.09 (0.18)	-0.09 (0.06)	0.02 (0.06)	-0.10 (0.06)	0.00 (0.06)	-0.01 (0.06)	-0.07 (0.05)	-0.02 (0.05)	0.85** (0.25)

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.47.

Table SMC.27: Nutrient intake elasticities with respect to food prices and total household expenditures for Q3 consumers (with per capita expenditures between \$3.20 and \$5.50 per day) in Niger

	Rice	Millet	Wheat	Cassava	Roots	Sugar	Phases	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Oils	Coffee	SoftDrink	OtherFood	Exp.
Keal	-0.37 (0.22)	-0.85** (0.22)	-0.27** (0.05)	0.04 (0.03)	-0.02 (0.04)	0.04 (0.05)	-0.13** (0.05)	-0.04 (0.06)	-0.17** (0.08)	0.07* (0.03)	0.02 (0.07)	0.08 (0.19)	0.03 (0.07)	-0.09 (0.03)	-0.01 (0.07)	0.00 (0.07)	-0.04 (0.05)	0.01 (0.05)	0.87** (0.27)	
Protein	-0.28 (0.18)	-0.67** (0.22)	-0.19** (0.07)	0.04 (0.04)	-0.07 (0.07)	0.05 (0.13)	-0.20** (0.06)	-0.14 (0.12)	-0.15 (0.08)	0.05 (0.03)	-0.00 (0.12)	0.11 (0.31)	-0.00 (0.10)	-0.03 (0.05)	-0.10 (0.10)	-0.01 (0.07)	-0.02 (0.03)	-0.02 (0.04)	0.58* (0.39)	
Fat	0.18 (0.19)	-0.61** (0.18)	-0.18** (0.05)	0.00 (0.04)	-0.08 (0.08)	0.10 (0.05)	-0.12** (0.05)	-0.09 (0.07)	-0.00 (0.08)	-0.04 (0.03)	0.13 (0.17)	-0.04 (0.08)	-0.01 (0.03)	-0.04 (0.07)	-0.01 (0.03)	-0.01 (0.05)	-0.12** (0.02)	-0.01 (0.05)	1.06* (0.26)	
Carbohydrates	-0.52* (0.26)	-0.95** (0.26)	-0.31** (0.05)	0.05 (0.04)	0.00 (0.09)	0.03 (0.05)	-0.11* (0.05)	0.00 (0.05)	-0.23** (0.08)	0.09* (0.04)	0.03 (0.07)	0.06 (0.17)	0.03 (0.07)	0.06 (0.03)	0.00 (0.07)	-0.08 (0.09)	0.02 (0.02)	-0.05 (0.05)	0.81** (0.26)	
Iron	-0.10 (0.28)	-0.94** (0.26)	-0.16** (0.05)	0.04 (0.03)	-0.03 (0.05)	0.03 (0.10)	-0.06 (0.06)	-0.03 (0.06)	-0.05 (0.06)	0.05 (0.04)	0.09 (0.20)	-0.05 (0.08)	-0.01 (0.03)	-0.01 (0.07)	-0.07 (0.08)	-0.06 (0.03)	-0.01 (0.02)	-0.01 (0.04)	-0.27** (0.29)	
Zinc	-0.46 (0.24)	-0.91** (0.27)	-0.19** (0.07)	0.06 (0.04)	-0.02 (0.07)	0.07 (0.13)	-0.13* (0.06)	-0.10 (0.11)	-0.24* (0.10)	0.07 (0.04)	0.14 (0.31)	-0.04 (0.11)	-0.01 (0.05)	-0.01 (0.10)	-0.10 (0.09)	-0.01 (0.07)	-0.01 (0.05)	-0.02 (0.05)	0.76 (0.40)	
Vitamin A	0.64** (0.23)	-1.13** (0.34)	-0.07 (0.05)	0.08 (0.05)	-0.06 (0.06)	-0.01 (0.06)	-0.07 (0.06)	-0.08 (0.11)	-0.07* (0.05)	0.11 (0.03)	-0.16 (0.07)	0.04 (0.15)	-0.15 (0.08)	-0.05 (0.03)	-0.15 (0.08)	-0.00 (0.09)	-0.05 (0.02)	-0.01 (0.11)	1.42** (0.20)	
Total Folate	-0.41 (0.22)	-0.93** (0.31)	-0.11 (0.07)	0.04 (0.05)	-0.04 (0.08)	0.03 (0.15)	-0.27** (0.07)	-0.13 (0.12)	-0.26** (0.09)	0.06 (0.04)	-0.00 (0.13)	0.13 (0.34)	-0.03 (0.11)	-0.01 (0.05)	-0.11 (0.10)	-0.03 (0.09)	-0.01 (0.08)	-0.10 (0.06)	0.69 (0.42)	

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.47.

Table SMC.28: Nutrient intake elasticities with respect to food prices and total household expenditures for Q4 consumers (with per capita expenditures greater than \$5.50 per day) in Niger

		Food Group												Exp.							
		Rice	Millet	Wheat	Cassava	Roots	Sugars	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Oils	Coffee	SoftDrink	OtherFood	
Keal	-0.52 (0.30)	-0.73 (1.10)	-0.29 (0.33)	0.04 (0.15)	-0.02 (0.45)	0.02 (0.67)	-0.23 (0.33)	0.07 (0.51)	-0.26 (0.31)	0.05 (0.26)	0.09 (0.53)	0.17 (1.38)	-0.01 (0.64)	0.16 (0.65)	-0.01 (0.31)	-0.02 (0.65)	0.05 (0.14)	-0.14 (0.35)	0.08 (0.19)	0.80 (1.56)	
Protein	-0.63* (0.32)	-0.79* (0.31)	-0.29* (0.08)	0.06 (0.05)	-0.19* (0.15)	0.10 (0.09)	-0.32** (0.11)	-0.05 (0.12)	-0.31** (0.12)	0.12* (0.05)	-0.05 (0.13)	0.16 (0.30)	-0.11 (0.13)	-0.06 (0.06)	-0.07 (0.11)	-0.11 (0.11)	-0.01 (0.11)	0.01 (0.03)	-0.14* (0.09)	0.14* (0.07)	0.94** (0.32)
Fat	0.48 (0.38)	-0.57 (0.33)	-0.22** (0.07)	-0.06 (0.05)	-0.15** (0.10)	0.19 (0.08)	-0.22** (0.06)	-0.02 (0.13)	0.17 (0.10)	-0.02 (0.11)	-0.09 (0.10)	0.10 (0.15)	-0.09 (0.10)	-0.09 (0.10)	-0.02 (0.10)	-0.25 (0.11)	-0.04 (0.03)	-0.07 (0.03)	-0.23** (0.07)	1.13** (0.21)	
Carbohydrates	-0.80 (0.77)	-0.75 (1.42)	-0.31 (0.42)	0.07 (0.20)	0.06 (0.59)	-0.06 (0.87)	-0.21 (0.42)	0.13 (0.66)	-0.39 (0.40)	0.05 (0.34)	0.17 (0.70)	0.21 (1.78)	0.25 (0.83)	0.00 (0.24)	0.25 (0.84)	0.05 (0.18)	0.16 (0.41)	-0.01 (0.18)	-0.17 (0.46)	0.16 (0.25)	0.06 (2.01)
Iron	-0.65 (0.51)	-1.08* (0.47)	-0.19 (0.11)	0.07 (0.09)	-0.11 (0.11)	0.11 (0.10)	-0.18 (0.09)	-0.01 (0.11)	-0.38 (0.22)	0.20* (0.09)	0.11 (0.09)	0.24 (0.35)	0.11 (0.18)	-0.08 (0.13)	-0.14 (0.19)	-0.08 (0.11)	-0.07 (0.11)	-0.04 (0.11)	-0.07 (0.08)	-0.07 (0.11)	0.53 (0.42)
Zinc	-0.82* (0.32)	-1.08** (0.40)	-0.27** (0.10)	0.08 (0.06)	-0.13 (0.08)	0.13 (0.17)	-0.23* (0.10)	-0.04 (0.11)	-0.15* (0.16)	-0.45** (0.07)	0.13 (0.18)	-0.08 (0.35)	0.21 (0.16)	-0.05 (0.12)	-0.09 (0.15)	0.02 (0.06)	0.01 (0.10)	-0.12 (0.03)	0.16 (0.08)	0.80* (0.38)	
Vitamin A	1.11* (0.34)	-0.94* (0.46)	-0.14 (0.09)	-0.04 (0.06)	-0.07 (0.09)	0.11 (0.12)	-0.11 (0.09)	-0.06 (0.07)	-0.06 (0.14)	0.47** (0.14)	-0.11* (0.10)	0.08 (0.16)	-0.17 (0.10)	-0.06 (0.10)	-0.38** (0.04)	-0.19 (0.08)	-0.04 (0.19)	-0.02 (0.03)	-0.27** (0.07)	1.35** (0.16)	
Total Folate	-0.85* (0.31)	-0.92* (0.46)	-0.14 (0.12)	0.02 (0.08)	-0.25 (0.16)	0.06 (0.15)	-0.62** (0.18)	-0.08 (0.09)	-0.45* (0.22)	0.21* (0.20)	0.09 (0.20)	0.31 (0.32)	0.08 (0.16)	-0.13 (0.17)	-0.02 (0.16)	0.05 (0.05)	-0.27 (0.15)	0.17 (0.10)	0.55 (0.45)		

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.47.

Table SMC.29: Nutrient intake elasticities with respect to food prices and total household expenditures for Q1 consumers (with per capita expenditures less than \$1.90 per day) in Uganda

	Food Group	Exp.																			
		Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Fats	Coffee	SoftDrink	OtherFood	
Kcal	0.12** (0.04)	-0.12** (0.04)	-0.16** (0.03)	-0.15** (0.04)	-0.22** (0.04)	-0.00 (0.03)	-0.15** (0.03)	-0.07** (0.02)	-0.07** (0.03)	0.00 (0.02)	0.01 (0.02)	0.02 (0.02)	0.17** (0.03)	0.04 (0.03)	0.05 (0.03)	-0.11** (0.03)	-0.00 (0.03)	-0.04 (0.03)	-0.01** (0.03)	1.03** (0.08)	
Protein	0.01 (0.03)	-0.09** (0.02)	-0.16** (0.02)	0.00 (0.04)	-0.07** (0.03)	0.01 (0.04)	-0.28** (0.01)	-0.12** (0.02)	-0.06** (0.01)	0.03 (0.02)	-0.01 (0.04)	0.01 (0.04)	0.16** (0.07)	0.05* (0.07)	-0.21** (0.02)	0.01 (0.03)	0.01 (0.03)	0.01 (0.03)	0.01 (0.03)	-0.01** (0.03)	1.11** (0.07)
Carbohydrates	0.12** (0.09)	-0.22** (0.08)	-0.16** (0.05)	-0.19** (0.07)	-0.21** (0.08)	-0.13** (0.08)	-0.16** (0.08)	-0.14** (0.05)	-0.14** (0.09)	-0.09 (0.05)	-0.09 (0.05)	0.05 (0.05)	0.44** (0.17)	0.02 (0.17)	0.21** (0.07)	0.04 (0.06)	-0.01 (0.06)	-0.04 (0.06)	-0.03** (0.02)	-0.03** (0.012)	1.08** (0.20)
Iron	-0.06 (0.04)	-0.07** (0.03)	-0.09** (0.02)	-0.13** (0.03)	-0.13** (0.03)	-0.13** (0.03)	-0.13** (0.03)	-0.13** (0.03)	-0.13** (0.03)	-0.05* (0.03)	-0.05* (0.03)	-0.05* (0.03)	-0.35** (0.05)	-0.02 (0.05)	-0.02 (0.05)	0.06 (0.05)	0.01 (0.05)	0.01 (0.05)	0.06 (0.05)	-0.02** (0.05)	0.85** (0.06)
Zinc	0.05 (0.02)	-0.15** (0.02)	-0.13** (0.02)	-0.10** (0.03)	-0.11** (0.02)	-0.11** (0.01)	-0.29** (0.01)	-0.15** (0.02)	-0.15** (0.01)	-0.03 (0.02)	-0.03 (0.01)	-0.03 (0.01)	-0.10** (0.04)	-0.03* (0.04)	-0.10** (0.03)	0.02 (0.02)	0.02 (0.02)	0.04 (0.02)	-0.04* (0.01)	0.01 (0.01)	-0.01** (0.01)
Vitamin A	0.18 (0.10)	0.10 (0.09)	-0.13** (0.06)	-0.15 (0.09)	-0.38** (0.11)	-0.14 (0.09)	0.01 (0.09)	0.09 (0.09)	-0.02 (0.10)	0.08 (0.06)	0.16 (0.20)	0.54** (0.20)	-0.02 (0.08)	0.25** (0.08)	-0.41** (0.08)	-0.01 (0.10)	-0.04 (0.09)	-0.04 (0.10)	-0.04 (0.14)	-0.04 (0.14)	1.02** (0.24)
Total Folate	0.01 (0.03)	-0.08** (0.02)	-0.11** (0.03)	-0.07** (0.02)	-0.11** (0.02)	-0.16** (0.02)	0.04** (0.02)	-0.40** (0.02)	-0.21** (0.01)	-0.09** (0.03)	-0.04** (0.02)	0.01 (0.04)	0.13** (0.04)	0.02 (0.04)	0.01 (0.03)	0.02 (0.02)	0.01 (0.02)	0.02 (0.01)	0.01 (0.01)	-0.01** (0.01)	

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.48.

Table SMC.30: Nutrient intake elasticities with respect to food prices and total household expenditures for Q2 consumers (with per capita expenditures between \$1.90 and \$3.20 per day) in Uganda

	Food Group												Exp.						
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Fats	Coffee	SoftDrink	OtherFood
Kcal	0.04 (0.03)	-0.07* (0.03)	-0.08** (0.02)	-0.12** (0.04)	-0.13** (0.02)	0.01 (0.04)	-0.17** (0.02)	-0.12** (0.01)	0.04 (0.03)	0.02 (0.05)	0.02 (0.02)	0.11* (0.03)	0.03 (0.05)	-0.00 (0.02)	-0.13** (0.03)	0.01 (0.02)	0.04 (0.03)	-0.02** (0.03)	0.92** (0.07)
Protein	-0.04 (0.02)	-0.05 (0.03)	-0.10** (0.02)	-0.02 (0.03)	-0.02 (0.03)	-0.01 (0.03)	-0.26** (0.02)	-0.17** (0.01)	-0.02 (0.02)	0.03* (0.01)	0.05 (0.03)	0.03* (0.01)	0.09* (0.04)	0.09* (0.04)	-0.22** (0.03)	-0.01 (0.02)	0.04 (0.01)	-0.00 (0.00)	0.98** (0.05)
Fat	0.05 (0.06)	0.08 (0.04)	-0.03 (0.06)	-0.14* (0.07)	-0.03 (0.06)	-0.14* (0.07)	-0.13* (0.05)	-0.23** (0.03)	0.16* (0.07)	0.03 (0.04)	0.04 (0.10)	0.23** (0.10)	0.01 (0.05)	-0.01 (0.04)	-0.32** (0.05)	0.02 (0.05)	-0.07 (0.07)	-0.04** (0.09)	0.99** (0.13)
Carbohydrates	0.04* (0.02)	-0.17** (0.03)	-0.11** (0.02)	-0.12** (0.04)	-0.16** (0.03)	-0.16** (0.03)	-0.02 (0.02)	-0.16** (0.01)	-0.04** (0.02)	-0.07** (0.01)	0.01 (0.02)	0.01 (0.04)	0.02 (0.04)	0.03 (0.04)	-0.05** (0.02)	-0.01 (0.02)	0.04 (0.01)	-0.00 (0.00)	0.85** (0.05)
Iron	-0.05* (0.02)	-0.06** (0.01)	-0.06** (0.02)	-0.09** (0.02)	-0.09** (0.01)	-0.10** (0.02)	-0.04* (0.02)	-0.28** (0.01)	-0.12** (0.01)	-0.25** (0.02)	0.01 (0.01)	0.12** (0.01)	0.01 (0.01)	0.07* (0.01)	-0.03* (0.01)	0.01 (0.01)	0.00 (0.01)	0.11** (0.03)	-0.01** (0.00)
Zinc	-0.03 (0.02)	-0.10** (0.02)	-0.08** (0.02)	-0.07** (0.02)	-0.06* (0.01)	-0.07** (0.01)	-0.25** (0.01)	-0.19** (0.01)	-0.03 (0.02)	-0.25** (0.01)	-0.00 (0.02)	-0.19** (0.01)	-0.00 (0.02)	-0.03 (0.01)	-0.05** (0.01)	-0.04** (0.01)	-0.03 (0.01)	0.00 (0.01)	0.04 (0.01)
Vitamin A	0.11 (0.07)	0.15* (0.07)	0.02 (0.05)	-0.15* (0.07)	-0.24** (0.08)	0.02 (0.08)	-0.15* (0.06)	-0.15* (0.04)	-0.01 (0.09)	-0.05 (0.16)	0.11 (0.12)	0.03 (0.07)	0.05 (0.06)	0.30* (0.07)	-0.02 (0.12)	0.01 (0.07)	-0.41** (0.06)	0.02 (0.02)	0.10 (0.02)
Total Folate	-0.04 (0.02)	-0.04 (0.02)	-0.06** (0.03)	-0.07** (0.02)	-0.10** (0.01)	0.01 (0.01)	-0.37** (0.02)	-0.27** (0.01)	-0.08** (0.02)	-0.00 (0.04)	0.11** (0.01)	0.07* (0.02)	0.07* (0.04)	-0.02 (0.02)	-0.02 (0.02)	-0.01 (0.01)	0.05 (0.01)	0.00 (0.00)	0.82** (0.04)

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.48.

Table SMC.31: Nutrient intake elasticities with respect to food prices and total household expenditures for Q3 consumers (with per capita expenditures between \$3.20 and \$5.50 per day) in Uganda

	Food Group																		Exp.
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Fats	Coffee	SoftDrink	OtherFood
Keal	-0.01 (0.03)	-0.02 (0.03)	-0.11** (0.04)	-0.08 (0.03)	-0.19** (0.04)	-0.02 (0.03)	-0.17** (0.04)	0.08* (0.03)	-0.17** (0.03)	-0.02 (0.03)	0.02 (0.02)	0.01 (0.02)	0.05 (0.02)	-0.03 (0.02)	-0.04 (0.02)	-0.13** (0.03)	0.01 (0.01)	0.09 (0.01)	-0.02** (0.01)
Protein	-0.08** (0.03)	-0.01 (0.03)	-0.05* (0.04)	-0.06 (0.03)	0.01 (0.03)	-0.04* (0.03)	-0.23** (0.02)	-0.21** (0.02)	0.01 (0.01)	0.04* (0.02)	0.06 (0.02)	0.03 (0.02)	0.04* (0.04)	-0.02 (0.02)	-0.22** (0.03)	-0.02 (0.02)	-0.03** (0.01)	-0.05 (0.01)	0.05 (0.01)
Fat	0.01 (0.06)	0.10 (0.06)	0.06 (0.06)	-0.15* (0.04)	-0.05 (0.06)	0.12 (0.06)	-0.23** (0.06)	-0.30** (0.06)	0.02 (0.03)	0.25** (0.08)	0.02 (0.05)	0.01 (0.05)	0.11 (0.08)	-0.03 (0.08)	-0.13** (0.13)	0.01 (0.05)	-0.05 (0.05)	0.14 (0.05)	-0.05** (0.01)
Carbohydrates	-0.01 (0.02)	-0.13** (0.03)	-0.07** (0.02)	-0.09* (0.04)	-0.13** (0.04)	-0.05** (0.01)	-0.13** (0.02)	-0.05** (0.01)	-0.02 (0.02)	0.02 (0.02)	-0.01 (0.02)	-0.00 (0.02)	0.04 (0.04)	-0.06** (0.04)	-0.00 (0.04)	-0.00 (0.02)	0.07 (0.01)	-0.01** (0.01)	0.79** (0.06)
Iron	-0.08** (0.02)	-0.03 (0.02)	-0.06** (0.02)	-0.08** (0.03)	-0.07** (0.03)	-0.05** (0.01)	-0.07** (0.02)	-0.05** (0.01)	-0.27** (0.02)	-0.17** (0.02)	-0.20** (0.02)	0.03 (0.02)	0.15** (0.01)	0.03 (0.03)	0.07** (0.03)	-0.04* (0.02)	0.01 (0.01)	-0.01 (0.01)	0.81** (0.04)
Zinc	-0.07** (0.02)	-0.04* (0.02)	-0.07* (0.03)	-0.04 (0.03)	-0.03* (0.01)	-0.20** (0.02)	-0.22** (0.01)	-0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.05* (0.04)	-0.06** (0.03)	-0.02 (0.02)	-0.03** (0.01)	-0.02 (0.02)	-0.03** (0.01)	0.90** (0.04)
Vitamin A	0.07 (0.08)	0.19** (0.07)	0.07 (0.05)	-0.15* (0.07)	-0.12 (0.08)	0.14 (0.08)	-0.20** (0.07)	-0.08 (0.04)	0.14 (0.10)	0.00 (0.06)	0.20* (0.17)	0.15 (0.11)	-0.02 (0.07)	-0.01 (0.06)	-0.05 (0.06)	-0.38** (0.08)	0.05* (0.07)	0.20 (0.11)	-0.07** (0.01)
Total Folate	-0.09** (0.03)	-0.01 (0.02)	-0.02 (0.03)	-0.08** (0.03)	-0.02 (0.02)	-0.08** (0.01)	-0.02 (0.02)	-0.32** (0.01)	-0.34** (0.03)	-0.02 (0.02)	0.03 (0.02)	0.18** (0.04)	0.02 (0.02)	0.08** (0.03)	-0.05* (0.02)	0.03 (0.01)	0.10** (0.01)	-0.00 (0.00)	0.80** (0.05)

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.48.

Table SMC.32: Nutrient intake elasticities with respect to food prices and total household expenditures for Q4 consumers (with per capita expenditures greater than \$5.50 per day) in Uganda

	Food Group	Exp.																		
		Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Fats	Coffee	SoftDrink	OtherFood
Kcal																				
	-0.05 (0.05)	0.03 (0.04)	0.06 (0.04)	-0.11 (0.06)	-0.02 (0.04)	0.03 (0.05)	-0.23** (0.05)	-0.22** (0.05)	0.13** (0.04)	0.02 (0.08)	-0.03 (0.04)	-0.06 (0.04)	0.02 (0.04)	-0.02 (0.04)	-0.12** (0.04)	0.02* (0.04)	0.13 (0.01)	-0.03** (0.01)	0.64** (0.10)	
Protein	-0.11** (0.04)	0.03 (0.04)	0.00 (0.04)	-0.10 (0.06)	0.03 (0.05)	-0.07** (0.03)	-0.22** (0.03)	0.07* (0.02)	-0.22** (0.03)	0.06 (0.06)	-0.05 (0.06)	0.06 (0.06)	0.02 (0.03)	-0.25** (0.03)	-0.03 (0.05)	-0.07** (0.03)	-0.00 (0.01)	0.03 (0.01)	0.01** (0.00)	0.83** (0.07)
Carbohydrates	-0.03 (0.10)	0.12 (0.08)	0.17* (0.07)	-0.17 (0.09)	0.04 (0.10)	-0.22** (0.08)	-0.37** (0.06)	-0.39** (0.10)	0.36** (0.10)	0.04 (0.10)	0.01 (0.16)	-0.03 (0.11)	-0.06 (0.11)	-0.01 (0.07)	-0.12 (0.07)	-0.12 (0.08)	0.22 (0.02)	-0.06** (0.01)	0.52** (0.17)	
Fat	-0.03 (0.04)	0.12 (0.05)	0.00 (0.05)	-0.17 (0.06)	0.04 (0.06)	-0.22** (0.02)	-0.37** (0.02)	-0.39** (0.03)	0.36** (0.02)	0.01 (0.06)	-0.03 (0.06)	-0.03 (0.06)	-0.01 (0.05)	-0.01 (0.05)	-0.12 (0.05)	-0.27** (0.05)	0.06** (0.04)	0.22 (0.02)	-0.06** (0.01)	0.52** (0.17)
Iron	-0.11** (0.03)	0.02 (0.03)	0.00 (0.03)	-0.07 (0.04)	-0.03 (0.04)	-0.02 (0.04)	-0.08** (0.02)	-0.26** (0.02)	-0.20** (0.02)	0.05* (0.02)	0.19* (0.02)	-0.05 (0.02)	-0.05 (0.02)	0.02 (0.01)	-0.05 (0.01)	-0.05 (0.01)	0.20** (0.01)	0.00 (0.00)	-0.01 (0.00)	0.76** (0.06)
Zinc	-0.11** (0.03)	-0.02 (0.04)	-0.00 (0.03)	-0.08 (0.05)	-0.02 (0.05)	-0.07** (0.05)	-0.16** (0.02)	-0.23** (0.03)	0.03 (0.02)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	-0.02 (0.03)	-0.02 (0.03)	-0.10** (0.03)	-0.01 (0.03)	-0.06** (0.03)	-0.00 (0.00)	0.03 (0.00)	0.01** (0.00)
Vitamin A	0.10 (0.12)	0.27* (0.11)	0.19* (0.08)	-0.17 (0.11)	0.02 (0.11)	0.32** (0.11)	-0.44** (0.12)	-0.19** (0.07)	0.33* (0.14)	-0.04 (0.22)	-0.15 (0.15)	-0.04 (0.09)	-0.07 (0.10)	-0.05 (0.10)	-0.23* (0.11)	-0.31** (0.11)	0.08** (0.11)	0.35* (0.16)	-0.09** (0.16)	0.38 (0.23)
Total Folate	-0.12** (0.04)	0.02 (0.04)	0.06 (0.04)	-0.10* (0.05)	-0.02 (0.05)	-0.06* (0.03)	-0.31** (0.03)	-0.37** (0.02)	-0.07* (0.04)	0.07* (0.03)	0.26** (0.03)	-0.07* (0.03)	0.07* (0.03)	-0.26** (0.03)	-0.07* (0.03)	0.05 (0.04)	-0.08** (0.03)	0.00 (0.02)	0.14** (0.01)	0.00 (0.00)

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column).

For a list of items in each food group, see Table SMC.48.

Table SMC.33: Nutrient intake elasticities with respect to food prices and total household expenditures for Q1 consumers (with per capita expenditures less than \$1.90 per day) in Tanzania

		Food Group												Exp.							
		Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Dairy	Fats	Coffee	SoftDrink	OtherFood		
Kcal	-0.01 (0.10)	-0.30** (0.12)	-0.11* (0.05)	-0.15* (0.07)	-0.12* (0.05)	0.04 (0.03)	-0.10* (0.05)	-0.09 (0.06)	-0.12** (0.04)	0.04 (0.04)	-0.00 (0.09)	-0.08 (0.03)	-0.01 (0.04)	0.05 (0.08)	0.07 (0.03)	-0.02 (0.02)	0.01 (0.01)	-0.02 (0.02)	0.01 (0.01)	1.08** (0.14)	
Protein	-0.06 (0.09)	-0.25* (0.11)	-0.10* (0.05)	-0.01 (0.07)	-0.16** (0.05)	-0.07* (0.04)	-0.20** (0.07)	-0.16* (0.04)	-0.09* (0.08)	0.03 (0.04)	-0.06 (0.09)	-0.03 (0.02)	-0.06 (0.04)	0.05 (0.09)	-0.05* (0.02)	0.02* (0.01)	-0.02* (0.02)	0.01 (0.01)	1.13** (0.14)		
Fat	0.06 (0.12)	-0.34* (0.16)	0.00 (0.06)	0.11 (0.11)	0.05 (0.06)	-0.02 (0.04)	-0.24** (0.07)	-0.23** (0.10)	-0.20** (0.06)	0.03 (0.05)	-0.15 (0.11)	-0.04 (0.14)	-0.04 (0.04)	-0.05 (0.05)	-0.00 (0.10)	-0.01 (0.05)	-0.16** (0.05)	0.01 (0.02)	0.01 (0.02)	1.23** (0.23)	
Carbohydrates	-0.00 (0.12)	-0.30* (0.12)	-0.13* (0.05)	-0.21* (0.09)	-0.13* (0.06)	-0.13* (0.04)	-0.06 (0.05)	-0.04 (0.07)	-0.04 (0.04)	-0.04 (0.05)	-0.11* (0.11)	0.04 (0.10)	0.02 (0.10)	-0.09 (0.03)	0.01 (0.05)	0.08 (0.08)	0.09 (0.02)	-0.03 (0.01)	0.00 (0.01)	1.03** (0.17)	
Iron	0.01 (0.10)	-0.32** (0.12)	-0.11* (0.05)	-0.12 (0.07)	-0.11* (0.06)	-0.12 (0.05)	-0.16** (0.06)	-0.08* (0.06)	-0.15** (0.05)	-0.10 (0.04)	-0.13** (0.04)	0.05 (0.09)	-0.02 (0.04)	-0.02 (0.04)	-0.13 (0.09)	-0.01 (0.04)	0.06 (0.08)	0.12 (0.02)	-0.03 (0.01)	0.01 (0.01)	1.00** (0.13)
Zinc	-0.03 (0.09)	-0.30* (0.12)	-0.10* (0.04)	-0.06 (0.07)	-0.15** (0.05)	-0.05 (0.03)	-0.14** (0.05)	-0.14* (0.06)	-0.14* (0.04)	-0.14* (0.04)	-0.11** (0.04)	0.05 (0.08)	-0.04 (0.08)	-0.04 (0.04)	-0.04 (0.08)	-0.10 (0.09)	-0.02 (0.02)	-0.02 (0.01)	-0.02 (0.01)	1.08** (0.14)	
Vitamin A	-0.07 (0.11)	-0.25** (0.09)	0.11 (0.07)	0.05 (0.07)	-0.10 (0.06)	0.09 (0.06)	-0.47** (0.10)	-0.17** (0.10)	-0.08 (0.06)	-0.05 (0.05)	-0.32** (0.10)	-0.08 (0.08)	0.05 (0.10)	-0.14 (0.08)	0.05 (0.07)	-0.15* (0.05)	-0.14 (0.07)	0.01 (0.09)	0.06** (0.03)	1.23** (0.16)	
Total Folate	0.03 (0.12)	-0.27** (0.10)	0.03 (0.07)	-0.13 (0.09)	-0.33** (0.08)	-0.19** (0.05)	-0.40** (0.08)	-0.13 (0.07)	-0.20** (0.06)	-0.03 (0.06)	-0.05 (0.06)	0.06 (0.09)	-0.03 (0.05)	0.13 (0.09)	-0.05 (0.03)	0.01 (0.02)	0.13 (0.02)	-0.10** (0.03)	0.00 (0.01)	0.04** (0.01)	

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.49.

Table SMC.34: Nutrient intake elasticities with respect to food prices and total household expenditures for Q2 consumers (with per capita expenditures between \$1.90 and \$3.20 per day) in Tanzania

	Food Group																		Exp.		
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Fats	Coffee	SoftDrink	OtherFood		
Kcal	-0.07 (0.09)	-0.24* (0.10)	-0.06 (0.04)	-0.09 (0.06)	-0.11* (0.03)	-0.01 (0.04)	-0.04 (0.05)	-0.06 (0.05)	-0.10** (0.03)	0.02 (0.03)	0.00 (0.03)	-0.07 (0.08)	-0.01 (0.09)	0.04 (0.09)	-0.01 (0.03)	0.04 (0.04)	-0.02 (0.01)	0.01 (0.01)	-0.00 (0.02)	0.00 (0.01)	0.97** (0.14)
Protein	-0.12 (0.09)	-0.17 (0.10)	-0.04 (0.04)	-0.01 (0.07)	-0.13** (0.05)	0.02 (0.03)	-0.11* (0.05)	-0.10 (0.06)	-0.06 (0.03)	-0.01 (0.03)	-0.09 (0.08)	-0.04 (0.10)	-0.05 (0.03)	-0.05 (0.09)	-0.02 (0.03)	-0.02* (0.04)	-0.04* (0.02)	-0.00 (0.01)	0.01 (0.01)	0.01 (0.02)	1.06** (0.14)
Fat	-0.05 (0.11)	-0.15 (0.12)	0.02 (0.05)	0.05 (0.09)	-0.02 (0.06)	-0.03 (0.06)	-0.16** (0.06)	-0.19* (0.08)	-0.15** (0.05)	-0.04 (0.05)	-0.14 (0.11)	-0.14 (0.14)	-0.04 (0.05)	-0.06 (0.04)	-0.07 (0.05)	-0.02 (0.04)	-0.02 (0.03)	-0.01 (0.03)	0.00 (0.01)	1.17** (0.19)	
Carbohydrates	-0.06 (0.10)	-0.27** (0.10)	-0.08 (0.05)	-0.14* (0.07)	-0.14** (0.05)	-0.00 (0.03)	-0.00 (0.04)	-0.03 (0.06)	-0.10** (0.03)	0.04 (0.03)	0.04 (0.08)	-0.09 (0.09)	0.04 (0.09)	0.01 (0.09)	0.02 (0.05)	0.08 (0.05)	-0.00 (0.01)	-0.00 (0.02)	-0.00 (0.01)	0.91** (0.15)	
Iron	-0.03 (0.08)	-0.27** (0.10)	-0.04 (0.04)	-0.10 (0.06)	-0.17** (0.05)	0.03 (0.03)	-0.07 (0.04)	-0.07 (0.05)	-0.11** (0.03)	0.02 (0.03)	0.01 (0.03)	-0.11 (0.08)	0.02 (0.08)	0.01 (0.09)	0.10 (0.09)	-0.01 (0.02)	0.02 (0.01)	-0.01 (0.01)	0.00 (0.01)	0.91** (0.13)	
Zinc	-0.09 (0.09)	-0.22 (0.11)	-0.05 (0.04)	-0.04 (0.07)	-0.13* (0.05)	-0.00 (0.03)	-0.07 (0.04)	-0.09 (0.06)	-0.10** (0.03)	0.02 (0.03)	-0.05 (0.06)	-0.06 (0.09)	-0.05 (0.09)	-0.06 (0.08)	-0.02 (0.04)	-0.03* (0.10)	-0.02 (0.01)	-0.02 (0.02)	-0.00 (0.01)	0.09** (0.16)	
Vitamin A	-0.14 (0.08)	-0.12 (0.06)	0.08 (0.05)	0.00 (0.05)	-0.03 (0.05)	0.07 (0.05)	-0.31** (0.08)	-0.12** (0.04)	-0.28** (0.07)	-0.06 (0.04)	0.06 (0.08)	-0.08 (0.09)	-0.08 (0.09)	-0.08 (0.08)	-0.12 (0.05)	0.04 (0.05)	0.03 (0.05)	-0.01 (0.02)	0.03 (0.02)	1.07** (0.11)	
Total Folate	-0.06 (0.09)	-0.18** (0.07)	0.02 (0.05)	-0.08 (0.06)	-0.27** (0.04)	-0.14** (0.07)	-0.19* (0.05)	-0.09 (0.04)	-0.16** (0.04)	-0.05 (0.04)	-0.02 (0.04)	-0.05 (0.08)	-0.02 (0.07)	-0.03 (0.07)	-0.01 (0.04)	-0.03* (0.03)	0.07 (0.07)	-0.08** (0.03)	0.00 (0.02)	0.04** (0.01)	

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column).

For a list of items in each food group, see Table SMC.49.

Table SMC.35: Nutrient intake elasticities with respect to food prices and total household expenditures for Q3 consumers (with per capita expenditures between \$3.20 and \$5.50 per day) in Tanzania

	Food Group													Exp.				
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Dairy	Fats	Coffee	SoftDrink	OtherFood
Kcal	-0.11 (0.14)	-0.16 (0.12)	-0.02 (0.05)	-0.10 (0.08)	-0.09 (0.07)	-0.02 (0.03)	-0.01 (0.05)	-0.03 (0.08)	-0.09* (0.04)	0.01 (0.04)	-0.01 (0.14)	-0.05 (0.14)	-0.02 (0.14)	-0.03 (0.05)	-0.02 (0.12)	-0.02 (0.02)	-0.01 (0.01)	-0.00 (0.03)
Protein	-0.16 (0.14)	-0.07 (0.11)	-0.01 (0.05)	-0.02 (0.09)	-0.09 (0.07)	-0.00 (0.04)	-0.03 (0.07)	-0.04 (0.09)	-0.06 (0.04)	-0.04 (0.04)	-0.15 (0.15)	-0.01 (0.15)	-0.12 (0.15)	-0.12* (0.04)	-0.12 (0.12)	-0.03 (0.02)	0.00 (0.01)	0.02 (0.03)
Fat	-0.17 (0.15)	-0.00 (0.10)	0.05 (0.05)	0.00 (0.09)	0.01 (0.04)	-0.01 (0.06)	-0.12 (0.07)	-0.09 (0.09)	-0.12* (0.05)	-0.12* (0.05)	-0.13 (0.13)	0.01 (0.17)	-0.08* (0.17)	-0.13 (0.17)	-0.04 (0.05)	-0.04* (0.04)	-0.04* (0.03)	-0.02 (0.01)
Carbohydrates	-0.07 (0.16)	-0.22 (0.13)	-0.04 (0.06)	-0.15 (0.09)	-0.11 (0.07)	-0.02 (0.08)	-0.03 (0.05)	-0.01 (0.09)	-0.10* (0.05)	-0.10* (0.05)	0.04 (0.15)	0.04 (0.15)	-0.08 (0.04)	0.00 (0.06)	0.00 (0.13)	0.00 (0.02)	0.00 (0.01)	0.78** (0.20)
Iron	-0.06 (0.12)	-0.19 (0.12)	-0.00 (0.04)	-0.12 (0.08)	-0.15* (0.06)	0.01 (0.03)	0.02 (0.05)	-0.02 (0.07)	-0.10* (0.04)	-0.10* (0.04)	-0.01 (0.03)	0.03 (0.03)	-0.09 (0.13)	-0.03 (0.13)	-0.02 (0.06)	-0.02 (0.01)	0.01 (0.01)	0.00 (0.01)
Zinc	-0.13 (0.16)	-0.12 (0.13)	-0.01 (0.05)	-0.05 (0.10)	-0.09 (0.07)	-0.02 (0.03)	-0.03 (0.07)	-0.09 (0.09)	-0.02 (0.05)	-0.09 (0.05)	-0.02 (0.15)	-0.09 (0.04)	-0.05 (0.16)	-0.03 (0.05)	-0.05 (0.14)	-0.07 (0.02)	0.02 (0.01)	0.91** (0.22)
Vitamin A	-0.24* (0.10)	-0.02 (0.07)	0.07 (0.06)	-0.06 (0.06)	-0.02 (0.05)	0.06 (0.06)	-0.20* (0.05)	-0.06 (0.09)	-0.26** (0.04)	-0.06 (0.04)	-0.04 (0.07)	-0.09 (0.06)	-0.05 (0.06)	-0.04 (0.05)	-0.04 (0.06)	-0.06* (0.02)	-0.04 (0.02)	0.93** (0.12)
Total Folate	-0.12 (0.11)	-0.09 (0.07)	0.04 (0.06)	-0.07 (0.07)	-0.23** (0.06)	0.11* (0.04)	0.03 (0.06)	-0.04 (0.04)	-0.13* (0.04)	-0.07 (0.04)	-0.10 (0.10)	0.00 (0.03)	-0.02 (0.04)	-0.06 (0.03)	-0.01 (0.04)	-0.05 (0.03)	0.00 (0.02)	0.04** (0.01)

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.49.

Table SMC.36: Nutrient intake elasticities with respect to food prices and total household expenditures for Q4 consumers (with per capita expenditures greater than \$5.50 per day) in Tanzania

	Food Group												Exp.							
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	BedMeat	Poultry	Eggs	Fish	Dairy	Fats	Coffee	SoftDrink	OtherFood	
Kcal	-0.09 (0.28)	-0.09 (0.15)	0.03 (0.08)	-0.17 (0.13)	-0.02 (0.10)	-0.01 (0.04)	0.04 (0.10)	0.03 (0.06)	-0.11 (0.07)	0.01 (0.07)	-0.02 (0.06)	-0.00 (0.05)	-0.04 (0.08)	-0.06 (0.07)	-0.11 (0.18)	0.04 (0.04)	0.01 (0.02)	0.01 (0.05)	-0.01 (0.01)	0.85* (0.35)
Protein	-0.19 (0.26)	0.03 (0.13)	0.03 (0.07)	-0.07 (0.13)	-0.01 (0.10)	-0.02 (0.04)	0.06 (0.14)	0.04 (0.16)	-0.07 (0.06)	-0.08 (0.05)	-0.23 (0.23)	0.03 (0.24)	-0.10 (0.08)	-0.10 (0.06)	-0.25 (0.18)	-0.02 (0.18)	0.02 (0.02)	0.00 (0.03)	0.02 (0.05)	1.06** (0.35)
Fat	-0.31 (0.21)	0.14 (0.10)	0.09 (0.07)	-0.08 (0.11)	-0.01 (0.07)	0.02 (0.06)	-0.07 (0.10)	-0.07 (0.13)	-0.10 (0.07)	-0.12* (0.05)	-0.08 (0.05)	0.03 (0.17)	-0.10 (0.07)	-0.22 (0.20)	-0.17** (0.13)	-0.22 (0.13)	0.06* (0.02)	-0.02 (0.04)	-0.02* (0.02)	1.19* (0.27)
Carbohydrates	0.00 (0.32)	-0.19 (0.18)	0.00 (0.10)	-0.22 (0.14)	-0.03 (0.12)	-0.02 (0.06)	0.08 (0.11)	0.04 (0.18)	-0.11 (0.08)	-0.11 (0.08)	0.06 (0.08)	0.05 (0.08)	-0.02 (0.08)	0.00 (0.08)	-0.02 (0.21)	-0.03 (0.05)	-0.00 (0.02)	-0.00 (0.05)	0.00 (0.02)	0.67 (0.39)
Iron	-0.06 (0.29)	-0.09 (0.16)	0.02 (0.08)	-0.20 (0.13)	-0.07 (0.10)	-0.07 (0.09)	-0.03 (0.11)	0.17 (0.16)	0.06 (0.06)	-0.10 (0.06)	-0.04 (0.06)	-0.04 (0.06)	-0.04 (0.06)	-0.02 (0.06)	-0.03 (0.06)	-0.01 (0.06)	0.00 (0.02)	0.03 (0.02)	-0.01 (0.01)	0.58 (0.36)
Zinc	-0.15 (0.31)	-0.02 (0.17)	0.03 (0.08)	-0.10 (0.15)	-0.01 (0.12)	-0.03 (0.04)	0.01 (0.14)	0.06 (0.18)	-0.10 (0.08)	-0.10 (0.08)	-0.06 (0.06)	-0.15 (0.06)	-0.06 (0.06)	-0.15 (0.28)	0.01 (0.09)	-0.07 (0.07)	-0.03 (0.21)	-0.21 (0.21)	-0.01 (0.04)	0.01 (0.06)
Vitamin A	-0.43* (0.18)	0.13 (0.10)	0.07 (0.08)	-0.16 (0.09)	-0.00 (0.07)	0.07 (0.08)	-0.05 (0.08)	0.01 (0.08)	-0.28** (0.13)	-0.05 (0.08)	-0.01 (0.06)	0.18 (0.06)	-0.01 (0.05)	-0.23** (0.16)	-0.04 (0.10)	0.33 (0.08)	0.10* (0.19)	0.33 (0.03)	0.72** (0.21)	
Total Folate	-0.19 (0.19)	-0.01 (0.10)	0.05 (0.09)	-0.11 (0.10)	0.08 (0.09)	-0.11 (0.10)	0.06 (0.06)	0.36* (0.12)	0.04 (0.06)	-0.13* (0.06)	-0.09 (0.06)	-0.22 (0.17)	0.06 (0.06)	-0.04 (0.06)	-0.09 (0.13)	-0.10 (0.06)	-0.02 (0.04)	0.00 (0.02)	0.02 (0.02)	0.63* (0.28)

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.49.

Table SMC.37: Nutrient intake elasticities with respect to food prices and total household expenditures for Q1 consumers (with per capita expenditures less than \$1.90 per day) in Nigeria

	Food Group												Exp.							
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Dairy	Oils	Coffee	SoftDrink	OtherFood		
Kcal	-0.17** (0.04)	-0.03 (0.03)	-0.08 (0.13)	-0.08** (0.05)	-0.14** (0.02)	-0.05** (0.02)	-0.09** (0.03)	-0.00 (0.03)	-0.07** (0.03)	-0.04 (0.04)	-0.09 (0.04)	-0.00 (0.04)	-0.03 (0.03)	-0.06 (0.04)	0.04 (0.04)	-0.11** (0.02)	0.00 (0.02)	0.02 (0.01)	0.98** (0.10)	
Protein	-0.14** (0.04)	-0.06 (0.04)	-0.11 (0.15)	-0.04 (0.05)	-0.06 (0.02)	-0.11** (0.02)	-0.06** (0.03)	-0.02 (0.03)	-0.12** (0.05)	-0.04 (0.08)	-0.14 (0.08)	-0.00 (0.04)	-0.03 (0.03)	-0.07 (0.03)	0.03 (0.03)	-0.04** (0.03)	0.05** (0.02)	-0.00 (0.02)	1.05** (0.10)	
Fat	-0.06* (0.03)	0.02 (0.06)	-0.04 (0.01)	-0.07* (0.03)	-0.02 (0.01)	-0.02 (0.02)	-0.06** (0.01)	-0.01 (0.01)	-0.06** (0.02)	-0.01 (0.02)	-0.08* (0.02)	-0.00 (0.01)	-0.01 (0.02)	-0.06* (0.02)	-0.35** (0.02)	0.03* (0.02)	-0.03 (0.02)	-0.01 (0.01)	0.75** (0.06)	
Carbohydrates	-0.21** (0.05)	-0.04 (0.04)	-0.08 (0.14)	-0.10** (0.03)	-0.17** (0.06)	-0.05* (0.02)	-0.10** (0.03)	0.00 (0.02)	-0.07** (0.05)	-0.05 (0.08)	-0.10 (0.05)	-0.05 (0.05)	-0.05 (0.05)	-0.04 (0.05)	-0.04 (0.05)	-0.05** (0.01)	0.07** (0.02)	0.01 (0.02)	1.03** (0.11)	
Iron	-0.14** (0.04)	-0.02 (0.05)	-0.06 (0.18)	-0.06 (0.02)	-0.05 (0.07)	-0.12 (0.03)	-0.05 (0.03)	-0.04 (0.03)	-0.09** (0.04)	-0.04 (0.05)	-0.14** (0.04)	-0.08 (0.05)	-0.05 (0.05)	-0.08 (0.05)	-0.01 (0.05)	-0.06 (0.05)	-0.04** (0.01)	0.06** (0.01)	0.01 (0.02)	1.05** (0.13)
Zinc	-0.16** (0.04)	-0.11** (0.04)	-0.08 (0.11)	-0.08** (0.02)	-0.13** (0.05)	-0.13** (0.02)	-0.13** (0.02)	-0.03 (0.02)	-0.02 (0.02)	-0.01 (0.03)	-0.08** (0.04)	-0.02 (0.04)	-0.03 (0.04)	-0.03 (0.04)	-0.05 (0.04)	-0.04 (0.04)	-0.04** (0.01)	0.06** (0.02)	0.01 (0.01)	1.06** (0.10)
Vitamin A	-0.08** (0.03)	0.04* (0.02)	0.00 (0.03)	-0.06** (0.02)	-0.09** (0.03)	0.00 (0.01)	-0.04* (0.01)	0.03** (0.01)	-0.04* (0.02)	0.09** (0.02)	-0.06** (0.03)	-0.11** (0.03)	0.04* (0.03)	0.02* (0.02)	-0.51** (0.02)	0.07** (0.03)	-0.05** (0.01)	-0.03** (0.02)	0.58** (0.04)	
Total Folate	-0.14** (0.03)	-0.10** (0.04)	-0.08 (0.11)	-0.06** (0.02)	-0.11* (0.05)	-0.06** (0.02)	-0.04* (0.03)	-0.15** (0.02)	-0.02 (0.03)	-0.13** (0.04)	-0.06 (0.04)	-0.14* (0.05)	0.01 (0.05)	-0.05 (0.05)	-0.03 (0.04)	-0.03** (0.01)	0.05** (0.02)	-0.01 (0.01)	0.94** (0.10)	

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.50.

Table SMC.38: Nutrient intake elasticities with respect to food prices and total household expenditures for Q2 consumers (with per capita expenditures between \$1.90 and \$3.20 per day) in Nigeria

	Food Group	Exp.																				
		Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Oils	Coffee	SoftDrink	OtherFood		
Kcal	-0.13** (0.03)	-0.07** (0.02)	-0.08 (0.07)	-0.10** (0.02)	-0.02 (0.04)	-0.10** (0.01)	-0.02 (0.01)	-0.10** (0.02)	-0.02 (0.01)	-0.04** (0.03)	0.01 (0.04)	-0.02 (0.04)	-0.04 (0.03)	-0.02 (0.03)	-0.02 (0.01)	-0.02 (0.01)	-0.09** (0.01)	0.05** (0.01)	0.01 (0.01)	0.01 (0.01)	0.91** (0.08)	
Protein	-0.13** (0.02)	-0.08** (0.02)	-0.10 (0.08)	-0.08** (0.01)	-0.03 (0.04)	-0.12** (0.01)	0.00 (0.02)	-0.07** (0.02)	0.01 (0.02)	-0.07 (0.03)	0.03 (0.04)	-0.05 (0.03)	-0.05 (0.03)	-0.05 (0.02)	-0.05 (0.02)	-0.05 (0.02)	-0.02* (0.02)	0.05** (0.02)	0.00 (0.02)	0.02* (0.02)	0.98** (0.09)	
Fat	-0.03 (0.02)	-0.01 (0.02)	-0.04** (0.03)	-0.01 (0.01)	-0.05 (0.03)	-0.00 (0.01)	-0.05** (0.01)	-0.00 (0.01)	-0.06** (0.01)	0.01 (0.01)	-0.00 (0.02)	-0.06 (0.03)	-0.06* (0.03)	-0.05* (0.03)	-0.05* (0.02)	-0.05* (0.02)	-0.03* (0.02)	-0.03* (0.02)	-0.01 (0.01)	-0.00 (0.01)	0.75** (0.05)	
Carbohydrates	-0.17** (0.03)	-0.08** (0.03)	-0.09 (0.08)	-0.13** (0.02)	-0.12** (0.05)	-0.03* (0.01)	-0.11** (0.02)	-0.11** (0.02)	-0.13 (0.02)	-0.03 (0.02)	0.01 (0.03)	-0.01 (0.02)	-0.02 (0.03)	-0.07 (0.03)	-0.07 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.02* (0.02)	0.06** (0.02)	0.02 (0.02)	0.01 (0.01)	0.95** (0.09)
Iron	-0.09** (0.03)	-0.08** (0.03)	-0.08** (0.03)	-0.11 (0.11)	-0.09** (0.02)	-0.05 (0.06)	-0.01 (0.01)	-0.10** (0.02)	-0.01 (0.02)	-0.08** (0.02)	0.01 (0.04)	-0.05 (0.04)	-0.02 (0.05)	-0.05 (0.05)	-0.02 (0.05)	-0.03 (0.05)	-0.02 (0.04)	-0.02* (0.04)	0.07** (0.02)	-0.02* (0.02)	0.00 (0.02)	0.96** (0.12)
Zinc	-0.14** (0.02)	-0.10** (0.02)	-0.09 (0.06)	-0.11** (0.01)	-0.09* (0.04)	-0.02 (0.01)	-0.13** (0.02)	-0.02 (0.01)	-0.13** (0.02)	0.00 (0.01)	-0.05** (0.03)	0.02 (0.01)	-0.05 (0.03)	-0.05 (0.04)	-0.05 (0.04)	-0.01 (0.04)	-0.02 (0.02)	-0.02* (0.02)	0.05** (0.01)	0.01 (0.01)	0.01 (0.01)	0.98** (0.08)
Vitamin A	-0.02 (0.03)	0.02 (0.01)	0.03 (0.03)	-0.04** (0.01)	-0.07* (0.03)	0.01 (0.01)	-0.03 (0.02)	-0.04** (0.01)	-0.01 (0.02)	-0.08** (0.01)	0.00 (0.02)	-0.08* (0.02)	-0.09* (0.03)	-0.04** (0.02)	-0.04** (0.02)	-0.04* (0.02)	-0.54** (0.01)	0.02 (0.02)	-0.04** (0.02)	-0.01 (0.01)	0.59** (0.04)	
Total Folate	-0.11** (0.02)	-0.09** (0.03)	-0.10 (0.06)	-0.12** (0.02)	-0.08 (0.04)	-0.03* (0.01)	-0.10** (0.02)	-0.15** (0.02)	-0.01 (0.02)	-0.09** (0.03)	-0.15** (0.04)	-0.01 (0.02)	-0.06 (0.03)	-0.02 (0.03)	-0.02 (0.03)	-0.02 (0.03)	-0.05** (0.02)	-0.05** (0.02)	0.01 (0.01)	0.01 (0.01)	0.89** (0.09)	

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table [SMC.50](#).

Table SMC.39: Nutrient intake elasticities with respect to food prices and total household expenditures for Q3 consumers (with per capita expenditures between \$3.20 and \$5.50 per day) in Nigeria

	Food Group												Eggs	Fish	Dairy	Oils	Coffee	SofaDrink	Other
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry							
Keal	-0.10** (0.03)	-0.08* (0.03)	-0.06 (0.06)	-0.13** (0.02)	-0.08 (0.06)	-0.01 (0.01)	-0.09** (0.01)	0.04 (0.01)	-0.03 (0.02)	0.03 (0.05)	0.00 (0.05)	0.03 (0.05)	0.02 (0.05)	0.00 (0.06)	-0.01 (0.01)	-0.09** (0.02)	-0.00 (0.02)	0.00 (0.11)	0.89** (0.11)
Protein	-0.12** (0.02)	-0.07* (0.03)	-0.08 (0.06)	-0.11** (0.02)	-0.03 (0.06)	-0.00 (0.01)	-0.10** (0.02)	0.01 (0.02)	-0.04 (0.02)	0.02 (0.05)	-0.06 (0.05)	0.02 (0.05)	0.01 (0.07)	-0.06 (0.01)	-0.01 (0.04)	-0.06 (0.02)	0.00 (0.02)	0.01 (0.11)	0.98** (0.11)
Fat	0.01 (0.02)	-0.01 (0.03)	0.05 (0.03)	-0.04** (0.01)	-0.05 (0.04)	-0.01 (0.01)	-0.03** (0.01)	0.00 (0.02)	-0.08** (0.02)	-0.02 (0.02)	-0.02 (0.02)	-0.02 (0.02)	-0.02 (0.03)	-0.02 (0.04)	-0.06* (0.03)	-0.06* (0.04)	-0.02 (0.02)	-0.04* (0.02)	0.01 (0.06)
Carbohydrates	-0.13** (0.03)	-0.10** (0.04)	-0.10 (0.04)	-0.16** (0.07)	-0.10 (0.07)	-0.01 (0.01)	-0.11** (0.02)	0.05 (0.02)	-0.11** (0.03)	0.05 (0.02)	-0.02 (0.02)	0.04 (0.02)	0.02 (0.02)	0.07 (0.06)	0.01 (0.07)	0.03 (0.04)	0.07 (0.02)	0.00 (0.01)	0.91** (0.13)
Iron	-0.06 (0.03)	-0.11** (0.04)	-0.11** (0.08)	-0.17* (0.02)	-0.01 (0.07)	0.01 (0.01)	-0.15** (0.02)	0.01 (0.02)	-0.11** (0.04)	0.05 (0.02)	-0.05* (0.02)	0.09 (0.02)	0.03 (0.02)	0.12 (0.03)	0.01 (0.06)	0.05 (0.08)	0.00 (0.02)	0.06* (0.02)	-0.02 (0.03)
Zinc	-0.13** (0.02)	-0.07* (0.03)	-0.09 (0.05)	-0.14** (0.01)	-0.08 (0.05)	-0.01 (0.01)	-0.12** (0.02)	0.01 (0.03)	-0.12** (0.02)	0.01 (0.02)	-0.04* (0.02)	0.03 (0.05)	0.02 (0.05)	-0.04* (0.04)	-0.03 (0.06)	-0.02 (0.03)	-0.00 (0.02)	-0.02 (0.01)	0.94** (0.10)
Vitamin A	0.04 (0.03)	0.00 (0.02)	0.09* (0.04)	-0.03 (0.03)	-0.05 (0.02)	-0.02 (0.01)	-0.01 (0.01)	0.04** (0.02)	-0.11** (0.01)	-0.11** (0.02)	-0.03 (0.02)	0.05 (0.03)	-0.07** (0.02)	0.04** (0.03)	-0.07** (0.03)	-0.01 (0.02)	-0.58** (0.02)	0.00 (0.05)	0.60** (0.05)
Total Folate	-0.11** (0.03)	-0.07 (0.04)	-0.09 (0.06)	-0.17** (0.02)	-0.08 (0.07)	-0.02 (0.01)	-0.14** (0.02)	-0.00 (0.03)	-0.07** (0.02)	0.01 (0.06)	-0.07** (0.06)	-0.02 (0.06)	-0.02 (0.07)	0.02 (0.07)	-0.02 (0.04)	0.03 (0.02)	0.01 (0.01)	0.05* (0.02)	0.01 (0.11)

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.50.

Table SMC.40: Nutrient intake elasticities with respect to food prices and total household expenditures for Q4 consumers (with per capita expenditures greater than \$5.50 per day) in Nigeria

	Food Group																		Exp.
	Rice	Maize	Wheat	Cassava	Roots	Sugar	Pulses	Nuts	Vegetables	Fruit	RedMeat	Poultry	Eggs	Fish	Dairy	Oils	Coffee	SoftDrink	OtherFood
Kcal	-0.04 (0.04)	-0.07 (0.05)	0.03 (0.10)	-0.13** (0.02)	-0.10 (0.09)	0.01 (0.02)	-0.08** (0.05)	0.02 (0.03)	-0.02 (0.08)	-0.01 (0.09)	-0.02 (0.02)	-0.01 (0.07)	0.02 (0.03)	-0.01 (0.01)	-0.02 (0.04)	0.01 (0.02)	-0.03 (0.04)	0.01 (0.01)	0.75** (0.19)
Protein	-0.13** (0.04)	-0.04 (0.06)	0.04 (0.10)	-0.13** (0.02)	-0.08 (0.09)	0.02 (0.01)	-0.08** (0.05)	-0.02 (0.02)	-0.01 (0.03)	-0.03 (0.09)	-0.09 (0.02)	-0.05 (0.06)	0.00 (0.02)	-0.12 (0.06)	-0.01 (0.03)	0.01 (0.01)	0.03 (0.02)	0.02 (0.04)	0.85** (0.18)
Fat	0.07* (0.03)	-0.01 (0.03)	0.18** (0.06)	-0.01 (0.02)	-0.05 (0.06)	0.03 (0.01)	-0.01 (0.02)	-0.01 (0.03)	-0.01 (0.08)	-0.08* (0.09)	-0.09* (0.09)	-0.06 (0.05)	-0.06 (0.05)	-0.05 (0.05)	-0.03* (0.04)	-0.02 (0.02)	-0.06* (0.03)	-0.47** (0.03)	0.61** (0.09)
Carbohydrates	-0.08 (0.05)	-0.10 (0.06)	-0.04 (0.12)	-0.18** (0.03)	-0.13 (0.10)	0.00 (0.02)	-0.11** (0.06)	0.03 (0.02)	0.00 (0.04)	0.00 (0.10)	0.03 (0.11)	0.00 (0.11)	0.02 (0.03)	0.02 (0.08)	0.04 (0.03)	-0.01 (0.01)	0.03** (0.03)	0.02 (0.04)	0.77** (0.23)
Iron	-0.02 (0.05)	-0.11 (0.07)	-0.14 (0.12)	-0.20** (0.03)	-0.02 (0.10)	0.02 (0.02)	-0.05 (0.03)	-0.02 (0.03)	-0.02 (0.03)	0.11 (0.10)	0.07 (0.10)	0.11 (0.10)	0.07 (0.10)	0.09 (0.08)	0.04 (0.08)	0.05 (0.04)	0.03 (0.04)	-0.03 (0.03)	0.94** (0.22)
Zinc	-0.12** (0.03)	-0.03 (0.05)	-0.01 (0.10)	-0.16** (0.02)	-0.11 (0.08)	0.00 (0.01)	-0.09** (0.05)	-0.02 (0.03)	-0.02 (0.08)	-0.01 (0.07)	-0.02 (0.07)	-0.06 (0.06)	-0.06 (0.06)	-0.05 (0.06)	-0.04 (0.03)	-0.02 (0.02)	0.02 (0.01)	-0.02 (0.04)	0.80** (0.17)
Vitamin A	0.15** (0.04)	-0.03 (0.03)	0.19** (0.06)	0.01 (0.05)	-0.02 (0.02)	0.04 (0.02)	0.02 (0.02)	0.04* (0.02)	-0.13** (0.02)	-0.06 (0.04)	0.00 (0.04)	-0.02 (0.04)	0.03 (0.05)	-0.03 (0.04)	-0.07* (0.02)	-0.08** (0.03)	-0.05 (0.03)	0.03** (0.02)	0.46** (0.07)
Total Folate	-0.10* (0.04)	-0.03 (0.06)	-0.02 (0.12)	-0.24** (0.03)	-0.12 (0.04)	-0.01 (0.02)	-0.10** (0.04)	-0.03 (0.04)	0.00 (0.04)	-0.03 (0.09)	-0.01 (0.11)	-0.01 (0.11)	-0.02 (0.08)	0.01 (0.03)	-0.03 (0.01)	0.01 (0.03)	0.02 (0.02)	0.01 (0.02)	0.79** (0.21)

Note: This table shows the sample-wide median elasticity of macro- and micro-nutrient intake (quantity demanded) with respect to food prices (columns 1 thru 19) and total household expenditures (the last column). For a list of items in each food group, see Table SMC.50.

Table SMC.41: Average share in total expenditures and unit value, by food group and consumer total expenditure quartile (Malawi)

	Average Share in Total Expenditures				Average Unit Value (MWK/kg)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Rice	0.011	0.021	0.026	0.022	306.507	339.088	372.693	419.358
Maize	0.338	0.256	0.184	0.088	107.728	124.724	139.369	156.795
Wheat	0.018	0.024	0.032	0.033	408.212	444.919	481.809	534.398
Cassava	0.019	0.017	0.011	0.004	79.052	84.189	93.323	100.539
Roots	0.032	0.031	0.026	0.019	76.244	85.688	93.489	107.856
Sugar	0.031	0.042	0.039	0.023	232.329	261.079	283.394	312.479
Pulses	0.063	0.059	0.046	0.025	323.756	355.109	398.133	429.051
Nuts	0.009	0.008	0.007	0.004	852.901	931.380	973.583	1,053.580
Vegetables	0.089	0.068	0.055	0.034	150.961	173.234	195.940	229.132
Fruit	0.021	0.018	0.017	0.012	93.277	102.701	114.427	131.339
RedMeat	0.017	0.037	0.049	0.044	867.089	965.400	1,039.554	1,164.562
Poultry	0.011	0.029	0.043	0.036	887.616	962.782	1,088.685	1,241.915
Eggs	0.010	0.015	0.020	0.016	498.913	554.001	586.303	645.483
Dairy	0.001	0.005	0.013	0.018	887.178	964.654	1,009.831	1,166.918
Oils	0.026	0.032	0.031	0.023	696.881	768.567	831.379	961.203
Tea	0.002	0.004	0.005	0.002	1,830.433	1,959.544	2,016.131	2,218.155
SoftDrink	0.002	0.004	0.010	0.019	416.621	448.536	473.794	507.545
OtherFood	0.022	0.013	0.009	0.006	388.983	438.085	476.786	516.283
Food (total)	0.722	0.682	0.621	0.430	166.363	226.191	278.132	248.676
Non-food	0.278	0.318	0.379	0.570				
N (total)	2763	2290	1736	1300				
N (rural)	2563	1870	1125	434				
N (urban)	200	420	611	866				

Notes: This table shows the mean value of each food group's share in total expenditures (and the non-food numéraire good's share) in columns 1-4 and each food group's mean unit value (and the non-food numéraire good's median unit value) in columns 5-8. Both budget shares and unit values are summarized by per-capita total expenditures quartile. Mean budget shares and unit values are weighted using survey weights. The unit value for total food is also weighted by budget share. Food groups whose names have been shortened are marked with ⁺; The food items contained in each food group are listed in Table SMC.46.

Table SMC.42: Average share in total expenditures and unit value, by food group and consumer total expenditure quartile (Niger)

	Average Share in Total Expenditures				Average Unit Value (FCFA/kg)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Rice	0.044	0.065	0.086	0.084	619.943	567.671	693.850	595.668
Millet	0.306	0.255	0.169	0.101	199.748	253.184	220.344	228.564
Wheat	0.102	0.114	0.115	0.096	502.132	650.978	668.956	774.936
Cassava	0.007	0.008	0.009	0.010	347.700	190.830	220.763	143.940
Roots	0.002	0.004	0.008	0.011	394.866	385.131	400.714	416.912
Sugar	0.012	0.013	0.014	0.015	705.521	528.160	577.127	637.779
Pulses	0.022	0.024	0.025	0.025	487.537	384.868	388.725	394.579
Nuts	0.005	0.005	0.005	0.011	547.933	514.073	589.454	449.734
Vegetables	0.029	0.030	0.032	0.036	285.186	318.864	367.737	370.978
Fruit	0.004	0.005	0.007	0.013	545.007	608.086	603.263	673.877
RedMeat	0.009	0.018	0.029	0.062	4,605.060	5,814.219	7,066.457	6,641.323
Poultry	0.005	0.011	0.019	0.022	1,565.126	1,463.999	2,323.772	1,657.256
Eggs	0.001	0.001	0.002	0.005	3,049.641	2,941.884	3,072.327	3,488.583
Fish	0.001	0.002	0.003	0.006	766.375	884.441	1,086.544	1,495.065
Dairy	0.018	0.023	0.031	0.035	1,241.928	1,319.857	2,060.866	1,512.296
Oils	0.028	0.030	0.032	0.035	983.426	1,034.690	1,023.291	1,012.482
Coffee	0.004	0.004	0.004	0.005	1,498.529	1,823.261	1,806.977	1,690.258
SoftDrink	0.001	0.001	0.002	0.007	967.218	1,101.485	1,135.306	1,158.958
OtherFood	0.049	0.035	0.031	0.035	260.541	329.089	355.092	327.054
Food (total)	0.646	0.648	0.626	0.614	287.342	392.486	620.845	1,076.875
Non-food	0.354	0.352	0.374	0.386				
N (total)	2747	4023	3949	2367				
N (rural)	2177	2700	2140	896				
N (urban)	570	1323	1809	1471				

Notes: This table shows the mean value of each food group's share in total expenditures (and the non-food numéraire good's share) in columns 1-4 and each food group's mean unit value (and the non-food numéraire good's median unit value) in columns 5-8. Both budget shares and unit values are summarized by per-capita total expenditures quartile. Mean budget shares and unit values are weighted using survey weights. The unit value for total food is also weighted by budget share. Food groups whose names have been shortened are marked with [†]; The food items contained in each food group are listed in Table SMC.47.

Table SMC.43: Average share in total expenditures and unit value, by food group and consumer total expenditure quartile (Uganda)

	Average Share in Total Expenditures				Average Unit Value (Ush/kg)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Rice	0.008	0.014	0.015	0.014	2,161.790	2,322.322	2,470.625	2,601.512
Maize	0.076	0.058	0.039	0.019	1,318.455	1,400.177	1,514.690	1,721.361
Wheat	0.040	0.023	0.016	0.009	1,577.497	1,709.052	1,861.234	2,235.266
Cassava	0.082	0.051	0.033	0.011	1,043.369	1,154.466	1,310.100	1,428.040
Roots	0.118	0.116	0.100	0.062	1,182.521	1,345.990	1,506.402	1,716.287
Sugar	0.024	0.026	0.023	0.016	2,725.869	2,819.504	2,891.002	2,973.619
Pulses	0.086	0.065	0.043	0.020	1,879.733	1,887.826	1,916.392	2,190.330
Nuts	0.030	0.028	0.024	0.016	2,284.041	2,457.112	2,634.997	2,948.494
Vegetables	0.056	0.036	0.028	0.017	1,085.187	1,220.480	1,308.991	1,677.607
Fruit	0.016	0.019	0.019	0.015	1,354.964	1,512.094	1,653.149	1,917.954
RedMeat	0.029	0.044	0.050	0.035	5,256.431	5,919.944	6,365.319	6,843.545
Poultry	0.008	0.011	0.012	0.012	5,287.055	6,493.422	7,451.735	8,205.345
Eggs	0.002	0.003	0.003	0.003	5,205.824	5,418.223	5,328.306	5,932.724
Fish	0.024	0.025	0.023	0.016	2,066.671	2,301.457	2,507.731	3,004.500
Dairy	0.016	0.019	0.020	0.017	875.645	942.555	1,003.263	1,165.514
Fats	0.015	0.014	0.012	0.009	3,934.033	4,785.747	5,447.792	7,336.529
Coffee	0.003	0.002	0.002	0.001	2,193.004	2,598.187	2,825.309	3,334.685
SoftDrink	0.001	0.003	0.004	0.006	1,995.697	2,082.537	2,098.779	2,216.920
OtherFood	0.009	0.005	0.003	0.001	747.881	784.755	797.189	841.352
Food (total)	0.643	0.562	0.468	0.300	1,097.135	1,198.445	1,170.235	919.933
Non-food	0.357	0.438	0.532	0.700				
N (total)	5325	3933	3089	2073				
N (rural)	4751	3175	2238	926				
N (urban)	574	758	851	1147				

Notes: This table shows the mean value of each food group's share in total expenditures (and the non-food numéraire good's share) in columns 1-4 and each food group's mean unit value (and the non-food numéraire good's median unit value) in columns 5-8. Both budget shares and unit values are summarized by per-capita total expenditures quartile. Mean budget shares and unit values are weighted using survey weights. The unit value for total food is also weighted by budget share. Food groups whose names have been shortened are marked with [†]; The food items contained in each food group are listed in Table SMC.48.

Table SMC.44: Average share in total expenditures and unit value, by food group and consumer total expenditure quartile (Tanzania)

	Average Share in Total Expenditures				Average Unit Value (TSH/kg)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Rice	0.031	0.055	0.069	0.064	1,228.467	1,274.172	1,323.853	1,371.846
Maize	0.208	0.171	0.123	0.064	595.312	702.856	773.873	866.564
Wheat	0.033	0.031	0.030	0.035	1,489.333	1,563.167	1,604.134	1,634.997
Cassava	0.066	0.040	0.022	0.009	398.402	467.742	521.574	606.245
Roots	0.047	0.048	0.049	0.039	551.436	605.850	666.766	766.607
Sugar	0.020	0.029	0.031	0.026	1,703.119	1,804.091	1,818.215	1,793.095
Pulses	0.066	0.052	0.040	0.025	1,244.628	1,298.853	1,348.238	1,456.047
Nuts	0.021	0.017	0.011	0.008	1,557.738	1,728.052	1,872.843	2,027.661
Vegetables	0.101	0.072	0.058	0.045	933.512	957.894	1,020.581	1,081.338
Fruit	0.019	0.027	0.030	0.031	740.767	774.080	833.018	938.750
RedMeat	0.017	0.038	0.055	0.063	3,679.092	3,925.640	4,203.616	4,627.812
Poultry	0.008	0.018	0.023	0.027	3,831.064	4,315.279	4,605.063	5,054.357
Eggs	0.002	0.003	0.004	0.007	2,579.020	2,768.887	2,699.234	2,676.343
Fish	0.032	0.035	0.033	0.030	2,703.553	2,840.958	3,062.765	3,470.994
Dairy	0.015	0.018	0.022	0.023	847.562	997.622	1,170.759	1,466.053
Fats	0.023	0.025	0.025	0.021	2,549.917	2,765.289	2,840.955	2,900.636
Coffee	0.003	0.004	0.005	0.005	8,918.182	9,480.105	9,581.581	9,812.320
SoftDrink	0.002	0.003	0.003	0.002	437.146	495.446	546.281	617.810
OtherFood	0.011	0.007	0.005	0.004	885.539	858.090	852.038	893.737
Food (total)	0.726	0.692	0.638	0.527	807.798	1,004.543	1,127.184	1,163.662
Non-food	0.274	0.308	0.362	0.473				
N (total)	1508	2668	2872	2148				
N (rural)	1357	2106	1841	831				
N (urban)	151	562	1031	1317				

Notes: This table shows the mean value of each food group's share in total expenditures (and the non-food numéraire good's share) in columns 1-4 and each food group's mean unit value (and the non-food numéraire good's median unit value) in columns 5-8. Both budget shares and unit values are summarized by per-capita total expenditures quartile. Mean budget shares and unit values are weighted using survey weights. The unit value for total food is also weighted by budget share. Food groups whose names have been shortened are marked with [†]; The food items contained in each food group are listed in Table SMC.49.

Table SMC.45: Average share in total expenditures and unit value, by food group and consumer total expenditure quartile (Nigeria)

	Average Share in Total Expenditures				Average Unit Value (NGN/kg)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Rice	0.094	0.088	0.067	0.042	210.598	212.907	214.709	212.501
Maize	0.039	0.028	0.017	0.007	103.846	104.615	105.026	103.606
Wheat	0.122	0.082	0.057	0.036	180.092	186.772	192.078	196.121
Cassava	0.048	0.043	0.034	0.022	114.608	115.193	116.868	117.363
Roots	0.059	0.067	0.064	0.051	104.139	106.523	109.195	115.988
Sugar	0.013	0.011	0.008	0.007	314.046	341.394	359.314	371.265
Pulses	0.049	0.044	0.034	0.023	219.619	227.799	233.515	240.490
Nuts	0.007	0.007	0.006	0.004	441.020	439.037	444.962	445.710
Vegetables	0.072	0.062	0.049	0.037	171.646	172.398	178.463	189.735
Fruit	0.007	0.009	0.012	0.013	113.931	111.529	110.931	112.420
RedMeat	0.041	0.057	0.062	0.049	757.448	769.787	782.080	787.084
Poultry	0.004	0.006	0.012	0.016	793.046	793.691	785.326	782.514
Eggs	0.001	0.002	0.004	0.005	452.005	457.629	464.624	479.729
Fish	0.064	0.066	0.061	0.053	596.452	640.633	674.682	702.611
Dairy	0.009	0.010	0.012	0.016	1,032.546	1,034.263	1,026.712	1,028.114
Oils	0.070	0.053	0.038	0.026	279.591	282.327	284.206	279.287
Coffee	0.002	0.005	0.008	0.010	1,791.513	1,752.238	1,726.166	1,739.829
SoftDrink	0.004	0.007	0.011	0.014	93.587	92.915	92.773	97.915
OtherFood	0.011	0.008	0.005	0.003	278.228	290.249	291.843	284.736
Food (total)	0.716	0.656	0.562	0.435	206.033	218.772	213.702	193.448
Non-food	0.284	0.344	0.438	0.565				
N (total)	6680	8005	7275	4017				
N (rural)	5810	6037	4392	1795				
N (urban)	870	1968	2883	2222				

Notes: This table shows the mean value of each food group's share in total expenditures (and the non-food numéraire good's share) in columns 1-4 and each food group's mean unit value (and the non-food numéraire good's median unit value) in columns 5-8. Both budget shares and unit values are summarized by per-capita total expenditures quartile. Mean budget shares and unit values are weighted using survey weights. The unit value for total food is also weighted by budget share. Food groups whose names have been shortened are marked with [†]; The food items contained in each food group are listed in Table SMC.50.

Table SMC.46: Malawi: Food items contained in each food group

Food Group Name	Food Items Included
Rice	Rice
Maize	Maize ufa mgaiwa (normal flour); maize ufa refined (fine flour); maize ufa madeya (bran flour); maize grain (not as ufa); green maize
Wheat	Sorghum (mapira); bread; buns and scones; biscuits; spaghetti, macaroni, and pasta
Cassava	Cassava tubers; cassava flour
Roots	White sweet potato; orange sweet potato; Irish potato; plantain and cooking banana
Sugar	Sugar; sugar cane
Pulses	White bean; brown bean; pigeon pea (nandolo); soybean flour; ground bean (nzama); cowpea (khobwe)
Nuts	Groundnut flour
Vegetables	Onion; cabbage; nkhwani; Chinese cabbage; gathered wild green leaves; tomato; cucumber; pumpkin; okra/therere
Fruit	Mango; banana; papaya; guava; avocado; wild fruit (masau, malambe, etc.)
Red Meat	Beef; goat; pork
Poultry	Chicken
Eggs	Eggs
Dairy	Fresh milk; powdered milk; margarine (Blue Band)
Fats	Cooking oil
Tea	Tea
Soft Drink	Squash (sobo drink concentrate); fruit juice; freezes (flavored ice); soft drinks (coca-cola, Fanta, Sprite, etc.)
Other Food	Salt; spices; yeast, baking powder and bicarbonate of soda

Note: This table shows how individual food items listed in the Malawi survey are mapped onto food groups. Food items are separated by semicolons.

Table SMC.47: Niger: Food items contained in each food group

Food Group Name	Food Items Included
Rice	Rice
Millet	Millet
Wheat	Wheat flour; sorghum; fonio; other grains; cornstarch; pasta; bread; biscuit; corn fritters; cakes; other pastries (cakes, pastries)
Cassava	Cassava flour (attiéké, gari, tapioca, etc.); cassava tuber
Roots	Yam tuber; potato; taro and cocoyam; sweet potato; other tubers
Sugar	Sugar; honey; confectionery
Pulses	Bean fritters; beans; dry pea; other pulses; peanut butter
Nuts	Bambara groundnut; peanuts in shell; shelled peanuts; groundnut cake; cola nut
Vegetables	Salad (lettuce); fresh onion; fresh okra; fresh tomato; fresh pepper; eggplant; carrot; green bean; cucumber; pea; squash, zucchini; other vegetable; dried tomato; tomato paste; baobab leaves; other leafy vegetables
Fruit	Mango; pineapple; orange; other citrus (mandarin, lemon, grapefruit); sweet banana; watermelon; dates; sugar cane; melon; palmyra/doumier (African fan palm fruit); other fruits
Red Meat	Beef; camel meat; mutton; goat meat; game; other meats
Poultry	Poultry; giblets
Eggs	Eggs
Fish	Fresh fish; smoked fish; stockfish; canned fish; other canned fish products
Dairy	Fresh milk; curd; powdered milk; cheese; yogurt; other dairy products
Oils	Palm oil; peanut oil; cottonseed oil; corn oil; other oils (soy, sheabutter); butter
Coffee	Cocoa/chocolate; coffee in cans; tea bag; other teas
Soft Drink	Fruit juice; juice powder; soft drinks
Other Food	Maggi cube; soumbala (of sorrel); yodo; malahya; salt; pimento; other spices (ginger, garlic, etc.)

Note: This table shows how individual food items listed in the Niger survey are mapped onto food groups. Food items are separated by semicolons.

Table SMC.48: Uganda: Food items contained in each food group

Food Group Name	Food Items Included
Rice	Rice
Maize	Maize (grains); maize (cobs); maize (flour)
Wheat	Bread; millet (flour); sorghum (flour); wheat (flour); chapati; loaf; bun
Cassava	Cassava (dry); cassava (flour)
Roots	Plantains (matooke), bunch; plantains (matooke), cluster; plantains (matooke), heap; plantains (matooke), other units; sweet potatoes (fresh); sweet potatoes (dry); cassava (fresh); cassava (dry/flour); Irish potatoes; sweet potato flour
Sugar	Sugar
Pulses	Beans (fresh); beans (dry)
Nuts	Ground nuts (in shell); ground nut seeds (unshelled); ground nuts (pounded); peas (fresh); simsim; peas (dry); ground nut paste
Vegetables	Onions; tomatoes; cabbages; dodo; other vegetables; green pepper; pumpkins; carrots; eggplant
Fruit	Passion fruits; sweet bananas; mangoes; oranges; other fruits; avocado; pineapple; pawpaw; apples; watermelon
Red Meat	Beef; pork; goat meat; other meat
Poultry	Chicken (local)
Eggs	Eggs
Fish	Fresh fish; dry/smoked fish
Dairy	Fresh milk; infant formula food
Fats	Cooking oil; ghee margarine, butter, etc
Coffee	Coffee; tea
Soft Drink	Soda; other drinks
Other Food	Salt

Note: This table shows how individual food items listed in the Uganda survey are mapped onto food groups. Food items are separated by semicolons.

Table SMC.49: Tanzania: Food items contained in each food group

Food Group Name	Food Items Included
Rice	Rice (paddy); rice (husked)
Maize	Maize (grain); maize (flour)
Wheat	Millet and sorghum (grain); millet and sorghum (flour); wheat, barley grain and other cereals; bread; buns, cakes and biscuits; macaroni and spaghetti; other cereal products
Cassava	Cassava fresh; cassava dry / flour
Roots	Sweet potatoes; yams / cocoyams; Irish potatoes; cooking bananas, plantains; other starches
Sugar	Sugar; sweets; honey, syrups, jams, marmalade, jellies
Pulses	Peas, beans, lentils and other pulses
Nuts	Ground-nuts in shell / shelled; Cashew, almond and other nuts
Vegetables	Onions, tomatoes, carrots and green pepper; spinach, cabbage and other green vegetable; canned, dried and wild vegetables
Fruit	Coconuts (mature / immature); ripe bananas; citrus fruits; mangoes, avocados and other fruits
Red Meat	Goat meat; beef including minced sausage; pork including sausages and bacon
Poultry	Chicken and other poultry
Eggs	Eggs
Fish	Fresh fish and seafood (including dagaa); Dried / salted / canned fish and seafood (incl. dagaa)
Dairy	Fresh milk; Milk products (like cream, cheese, yoghurt, etc); Canned milk / milk powder
Oils	Cooking oil; Butter, margarine, ghee and other fat products
Coffee	Tea dry; Coffee and cocoa
Soft Drink	Sugar-cane; Other raw materials for drinks
Other Food	Salt; other spices

Note: This table shows how individual food items listed in the Tanzania survey are mapped onto food groups. Food items are separated by semicolons.

Table SMC.50: Nigeria: Food items contained in each food group

Food Group Name	Food Items Included
Rice	Rice, local; rice, imported
Maize	Maize; maize flour
Wheat	Guinea corn/sorghum; millet; bread; yam flour; wheat flour; other grains and flour
Cassava	Cassava flour; cassava (roots); gari (white); gari (yellow)
Roots	Yam (roots); cocoyam; plantains; sweet potatoes; potatoes
Sugar	Sugar; honey
Pulses	Soya beans; brown beans; white beans
Nuts	Groundnuts; other nuts/seeds/pulses
Vegetables	Tomatoes; tomato puree (canned); onions; garden eggplant; okra (fresh); okra (dried); pepper; leaves (cocoyam, spinach, etc.); other vegetables
Fruit	Bananas; orange/tangerine; mangoes; avocado; pear; pineapple; other fruits
Red Meat	Beef; mutton; pork; goat; wild game meat; other meat (excl. poultry)
Poultry	Chicken
Eggs	Agricultural eggs; local eggs
Fish	Fish (fresh); fish (frozen); fish (smoked); fish (dried); snails; seafood (lobster, crab, prawns)
Dairy	Fresh milk; milk powder; baby milk powder; tinned milk (unsweetened); other milk products
Oils	Palm oil; butter/margarine; groundnuts oil; other oil and fat
Coffee	Coffee; chocolate drinks (including Milo); tea
Soft Drink	Malt drinks; soft drinks (coca cola, spirit, etc); fruit juice canned/pack
Other Food	Condiments (salt, spices, pepper)

Note: This table shows how individual food items listed in the Nigeria survey are mapped onto food groups. Food items are separated by semicolons.

Table SMC.51: Mapping of food groups into Price Voucher (PV) categories within each country

	Staple Grains	Starchy Staples	Pulses & Nuts	Fruits & Vegetables	Animal-Source Foods
Malawi	Rice; Maize; Wheat & other cereals	Cassava; tubers & starches	Roots, Pulses; Nuts & seeds	Fruits; Vegetables	Red meat; Poultry; Eggs; Dairy
Niger	Rice; Millet; Wheat & other cereals	Cassava; tubers & starches	Roots, Pulses; Nuts & seeds	Fruits; Vegetables	Red meat; Poultry; Eggs; Fish & seafood
Uganda	Rice; Maize; Wheat & other cereals	Cassava; tubers & starches	Roots, Pulses; Nuts & seeds	Fruits; Vegetables	Red meat; Poultry; Eggs; Fish & seafood
Tanzania	Rice; Maize; Wheat & other cereals	Cassava; tubers & starches	Roots, Pulses; Nuts & seeds	Fruits; Vegetables	Red meat; Poultry; Eggs; Fish & seafood; Dairy
Nigeria	Rice; Maize; Wheat & other cereals	Cassava; tubers & starches	Roots, Pulses; Nuts & seeds	Fruits; Vegetables	Red meat; Poultry; Eggs; Fish & seafood; Dairy

Note: This table shows the food groups included in each PV simulation.

Table SMC.52: Summary statistics of baseline per capita kcal daily intake for Malawi households

	Obs.	Mean	Median	Std. dev.	Min	Max
Rice	7922	119.2274	0.0000	197.3364	0	1023
Maize	7922	2129.9597	1988.2274	1145.6306	0	8620
Wheat	7922	113.8472	0.0000	188.1407	0	2242
Cassava	7922	99.3202	0.0000	287.3284	0	4357
Roots	7922	129.7197	86.9400	153.5088	0	1361
Sugar	7922	146.2463	143.9032	120.6446	0	622
Pulses	7922	182.9135	129.3436	198.5998	0	1559
Nuts	7922	18.0835	0.0000	30.3504	0	190
Vegetables	7922	37.1558	22.3493	45.5764	0	386
Fruit	7922	49.5606	19.0341	106.3784	0	1208
Red meat	7922	45.8366	0.0000	81.6096	0	899
Poultry	7922	25.0889	0.0000	48.4482	0	240
Eggs	7922	59.0461	0.0000	139.0362	0	821
Dairy	7922	19.6915	0.0000	52.4833	0	531
Oils	7922	125.4994	96.7551	132.7077	0	657
Tea	7922	0.0000	0.0000	0.0000	0	0
Soft drink	7922	16.6784	0.0000	48.5118	0	557
Other food	7922	0.7978	0.0000	2.9870	0	37
Observations	7922					

Table SMC.53: Summary statistics of baseline per capita kcal daily intake for Niger households

	Obs.	Mean	Median	Std. dev.	Min	Max
Rice	13026	1278.5298	409.5238	29091.6724	0	2064000
Millet	13026	2796.7293	1577.5862	30366.5488	0	3267857
Wheat	13026	1656.3955	704.0816	12085.6825	0	639286
Cassava	13026	186.7228	0.0000	4618.3873	0	496503
Roots	13026	45.5800	0.0000	235.1935	0	11211
Sugar	13026	822.1403	50.7947	70805.5195	0	8067227
Pulses	13026	424.0799	0.0000	7478.2148	0	376979
Nuts	13026	127.7862	0.0000	4690.8573	0	488699
Vegetables	13026	146.8196	28.3956	2358.5554	0	193954
Fruit	13026	61.7323	0.0000	2129.8883	0	187435
Red meat	13026	285.5265	0.0000	7939.9702	0	543182
Poultry	13026	22.9634	0.0000	118.4931	0	7741
Eggs	13026	2.5453	0.0000	15.5948	0	618
Fish	13026	17.7168	0.0000	513.9434	0	49500
Dairy	13026	242.4877	0.0000	6162.6152	0	586905
Oils	13026	812.1010	235.9664	13239.2085	0	786555
Coffee	13026	3.9377	0.0000	78.2401	0	8132
Soft drink	13026	16.9258	0.0000	1209.7699	0	135714
Other food	13026	213.0883	109.4282	1651.0915	0	109615
Observations	13026					

Table SMC.54: Summary statistics of baseline per capita kcal daily intake for Uganda households

	Obs.	Mean	Median	Std. dev.	Min	Max
Rice	14420	76.0405	0.0000	194.5289	0	8571
Maize	14420	450.6351	173.9286	862.9230	0	29615
Wheat	14420	260.3953	0.0000	648.1499	0	10378
Cassava	14420	355.9780	67.6571	1644.9322	0	128821
Roots	14420	362.4900	133.4775	770.6267	0	45768
Sugar	14420	124.6477	79.1414	277.8456	0	20226
Pulses	14420	345.4692	193.2775	479.9681	0	8952
Nuts	14420	415.6451	108.3133	930.9314	0	29160
Vegetables	14420	37.6286	14.8294	59.3462	0	1154
Fruit	14420	57.7958	0.0000	207.1454	0	9806
Red meat	14420	57.5228	0.0000	230.9994	0	25233
Poultry	14420	15.1816	0.0000	60.7547	0	1807
Eggs	14420	28.5533	0.0000	142.1939	0	5091
Fish	14420	127.3542	0.0000	307.1592	0	6584
Dairy	14420	63.3725	0.0000	148.1272	0	3120
Fats	14420	987.9540	273.6190	1952.5758	0	52535
Coffee	14420	0.0806	0.0000	2.2560	0	260
Soft drink	14420	6.2807	0.0000	34.9848	0	1410
Other food	14420	0.0000	0.0000	0.0000	0	0
Observations	14420					

Table SMC.55: Summary statistics of baseline per capita kcal daily intake for Tanzania households

	Obs.	Mean	Median	Std. dev.	Min	Max
Rice	9014	503.0078	340.9524	593.0574	0	7755
Maize	9014	1152.9552	898.7918	1105.0960	0	9309
Wheat	9014	257.7145	82.9838	449.6229	0	7109
Cassava	9014	264.2915	0.0000	623.6213	0	5566
Roots	9014	137.9607	45.7433	242.7711	0	2914
Sugar	9014	152.9688	125.6494	164.9425	0	3046
Pulses	9014	208.1630	136.5714	243.3896	0	1711
Nuts	9014	70.2944	0.0000	190.0052	0	2526
Vegetables	9014	40.9177	33.5641	31.2824	0	234
Fruit	9014	124.6927	38.8094	183.6224	0	1714
Red meat	9014	92.3150	0.0000	170.8937	0	2210
Poultry	9014	24.4277	0.0000	67.4324	0	728
Eggs	9014	27.1022	0.0000	131.5184	0	2904
Fish	9014	61.7844	33.0833	84.8937	0	806
Dairy	9014	57.8227	0.0000	177.9941	0	4239
Fats	9014	171.6015	135.4571	170.4976	0	1506
Coffee	9014	0.3334	0.0093	3.8445	0	192
Soft drink	9014	3.2273	0.0000	14.0783	0	268
Other food	9014	5.5737	0.0000	23.6332	0	430
Observations	9014					

Table SMC.56: Summary statistics of baseline per capita kcal daily intake for Nigeria households

	Obs.	Mean	Median	Std. dev.	Min	Max
Rice	25455	409.1372	344.9495	348.1067	0	3794
Maize	25455	271.2280	0.0000	523.3536	0	4712
Wheat	25455	683.8091	196.2561	1005.9331	0	8079
Cassava	25455	210.9082	95.1146	388.5984	0	4943
Roots	25455	244.6058	148.3044	301.6948	0	2129
Sugar	25455	39.5120	2.8155	67.4650	0	953
Pulses	25455	199.2072	159.5168	209.8822	0	2524
Nuts	25455	28.5793	0.0000	89.4264	0	1604
Vegetables	25455	35.8859	29.1850	30.3195	0	334
Fruit	25455	20.2215	0.0000	44.7210	0	615
Red meat	25455	54.0248	34.1429	67.3298	0	669
Poultry	25455	9.2419	0.0000	35.2929	0	327
Eggs	25455	3.0692	0.0000	9.5261	0	137
Fish	25455	37.6061	23.1460	50.1577	0	570
Dairy	25455	17.1094	0.0000	41.4201	0	632
Oils	25455	379.5125	329.8528	266.4261	0	2124
Coffee	25455	0.7936	0.0000	2.5317	0	37
Soft drink	25455	9.7629	0.0000	29.1550	0	523
Other food	25455	19.0285	12.1992	24.4302	0	225
Observations	25455					