The role of consumer demand in African structural transformation

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Abstract

At the center of structural transformation is the interplay between farm and non-farm income growth in rural economies. Rising agricultural productivity leads to income growth of farmers and agricultural workers, rising consumer demand for goods and services, falling food prices, and lower input prices for processors and manufacturers, among other impacts (Johnston and Mellor 1961). In the Asian Green Revolution, rising consumer demand was an important multiplier for agricultural income growth. However, the relevance of this pathway for Sub-Saharan Africa has been called into question because African consumer goods manufacturers must compete with global manufacturers (Rodrik 2016). Using three rounds of nationally representative panel survey data from Tanzania, we estimate a flexible, utility theoretic demand system for tradable goods, non-tradable services, and food in aggregate. Our analysis confirms that consumer income growth is associated with a rising share of income spent on tradable goods and a falling share on non-tradable

services. The results suggest that consumer expenditure pathways may not serve as a powerful income or employment multiplier in Tanzania.

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1 Overview

Typical models of economy-wide structural change highlight several key pathways through which agricultural productivity growth translates into other types of growth in the economy (Timmer 2002; Barrett, Carter, and Timmer 2010). Through Lewis linkages, agricultural labor and capital are freed up for other, more productive uses as agriculture becomes more productive (Lewis 1954). Johnston and Mellor linkages are comprised of interactions between the agricultural sector and other sectors through both input and output linkages (Johnston and Mellor 1961). Agricultural growth generates surplus income for rural consumers who spend this income locally; supplies raw materials for value addition in other sectors; provides food to nourish agricultural workers; creates demand for industrial output, and earns foreign exchange through production of tradable exports.

Consumer patterns will shape the structural change pathways in African countries. If consumers have a high propensity to consume non-tradable services, and if such services have an elastic supply, then income growth will lead to more employment and higher wages than if consumers instead prefer to consume tradable goods (Kydd et al. 2004). We explore the consumption growth linkages of

African consumers by estimating a stylized demand system for tradable goods, non-tradabe services, and food. We find that rural consumers exhibit a much higher income elasticity of demand for tradable goods than for services.

Analysis of the role of consumer expenditure patterns in economic development processes is part of the structural change literature and the rural non-farm economy literature, both of which address the ways that agricultural productivity growth spills over to other sectors of the economy. The structural change literature is typically focused on employment shifts from agriculture to other sectors and the resulting productivity gains. The rural non-farm economy literature focuses on measuring economic multipliers from farmer income and productivity growth, of which demand for consumer goods is a key component. Both literatures highlight the centrality of agriculture in developing country economies, and both recognize that it is important to differentiate between industry and service sector activities when examining the pathways by which agricultural growth creates growth elsewhere in the economy.

In developing countries, agriculture is almost invariably the largest sector as defined by the share of individuals who participate in it. Therefore agricultural growth results in an income stimulus for the many farm operators and laborers who earn a share of their income from agriculture. Agricultural growth can also lead to food price reductions, which create income stimulus for all consumers, while also dampening the income growth of farmers. Through all of these intertwined pathways, agricultural growth causes growth in other sectors of the economy. The measured magnitude of these multipliers varies (Haggblade, Hazell, and Reardon 2007). Haggblade, Hammer, and Hazell (1991) estimate that technologically induced agricultural income growth of $1.00 generates additional rural economic multipliers of $0.30 to $3.30.

A recent debate about the potential for industrialization in Africa is relevant to the discussion about rural economic multipliers. Industrialization played a critical role in Asian development pathways, and as such, has many proponents in Africa. However, industry's share in African economies and African labor forces tends to be both low and stagnant. The services sector has been the primary re-

cipient of labor exiting agriculture (Rodrik 2016). With open markets, cheaply available manufactured import goods, and global convergence in industry sector productivity, skepticism about the competitiveness of African industry abounds (Rodrik 2016). Also, with industry accounting for such a small share of employment Africa-wide, it is unlikely that growth in industry will result in large multipliers throughout the economy (McMillan, Rodrik, and Verduzco-Gallo 2014).

Therefore, the service sector currently holds the mantle as the most promising alternative sector to agriculture in most African economies. Because service sector activities are not traded over long distances, for the most part, service sector growth must arise from local demand for services. As farmers produce more, they turn in part to the service economy for provision of agricultural inputs, and for downstream contributions to processing, value addition, and commerce. Farmers and agricultural workers, as consumers, will increase their expenditures on non-tradables like home construction, meals in restaurants, bus rides, and haircuts, as agricultural production increases.

This paper seeks to contribute to the debate about agriculture's role in spurring rural economic development in Africa today by measuring the expenditure patterns associated with income growth. We do this by modeling a stylized, flexible form consumer demand model. This demand system uses variation in prices and expenditures to estimate consumer preference patterns for tradable goods, non-tradable services, and food. Our results confirm that consumer income growth is most strongly associated with expenditures on tradable goods much more so than on non-tradable services. We contribute additional skepticism about the role of service sector as an "elevator" sector that can drive African structural change (Rodrik 2016).

2 Model

To guide our framing of service sector activities in rural economies and to inform empirical specification, we develop a generalized agricultural household

model that encompasses both income generation and consumption. In this model, households derive utility from consumption of food (C), non-food goods (G), services (S), a numeraire "other" good (O), and leisure (l, which is the total labor endowment $\bar{L}$ net the labor supplied to economic activities, L) (Equation 1).

$$\max_{F,S,G,L,l} \quad U = \phi(F, S, G, O, l) \tag{1}$$

s.t.

$$F \cdot P^F + S \cdot P^S + G \cdot P^G + O = \pi(L) + R \tag{2}$$

$$L + l \leq \bar{L} \tag{3}$$

$$L \geq 0$$

Households face a full income constraint, as depicted in Equation 2. Household income consists of labor earnings ($\pi(\cdot)$) and non-labor earnings (R). Total expenditures include the total value of consumption (C) of food, services, goods, and "other" items at their respective prices (P^F, P^S, and P^G). In the labor earnings function, we do not differentiate between different types of labor supplied (e.g., self employment as a farmer or with a non-farm enterprise, or wage employment). Labor supplied is subject to a non-negativity constraint, and net returns to labor supplied are assumed to be zero for households that supply no labor (Equation 3).

This model makes some key simplifications. It is static, thus there is no borrowing or saving between periods. For now, we ignore frictions in factor markets that could affect the labor earnings function. Our setup implies that household consumption and production are separable, with households first maximizing their total income and then determining consumption levels (Bardhan and Udry 1999). Households choose the utility maximizing consumption levels for food, services, goods and other items, as well as labor supplied to economic activities and to leisure,

This paper seeks to quantify the elasticity of demand for services and goods with respect to total household expenditures, by estimating $\frac{\delta S^*}{\delta C}$ and $\frac{\delta G^*}{\delta C}$, with S^*

and G^* denoting the consumer's optimum consumption of services and goods, respectively. We are interested in consumers' marginal propensity to consume goods vs services so that we can explore the different local income growth multipliers associated with these consumption patterns, including differences in labor demanded through this marginal consumption.

A second area of interest is to explore possible sources of heterogeneity in consumer preferences. Eventually, this analysis will consider the demand system's implications for the local employment generation effects of income growth in different areas. We will also explore whether consumer preferences are consistent with separability, in the sense that earnings from farm self-employment are assiciated with different demand patterns than earnings from self-employment in a non-farm enterprise or from wage employment.

3 Data

We assemble a household panel dataset using three rounds of the Tanzania National Panel Survey. The Tanzania NPS is part of the LSMS-ISA (Living Standards Measurement Study - Integrated Surveys on Agriculture) dataset. This nationally representative, multi-topic and multi-purpose surveys allow us to construct expenditure variables for non-tradable goods and tradable services, price variables, returns to and investment in farm enterprises, non-farm enterprises, and wage labor market participation. The datasets also include relevant covariates, such as household characteristics.

Using the survey consumption modules, we construct annual expenditure totals for the consumption categories of interest – food, traded goods, non-traded services, and other expenditures. The food expenditures are based on food consumed in the home, so they include households' own production, with each item consumed valued at median local consumer price. Reported quantities of food purchased are also valued at median local consumer price.

Traded goods expenditures include items that are generally considered to be

tradable, though they may or may not be traded everywhere at local prices and given transaction costs. The tradable goods category includes consumer goods such as cigarettes and tobacco, matches, fuel, cleaning items, toiletries and hygiene products, clothing, home furnishings, electronics, equipment, and building materials. Households report total expenditures on these items over a 1 month or 12 month recall period, depending on the item. It is not possible to compute prices for goods based on households' reported information, so community level prices are used to predict spatial price variation, as described below.

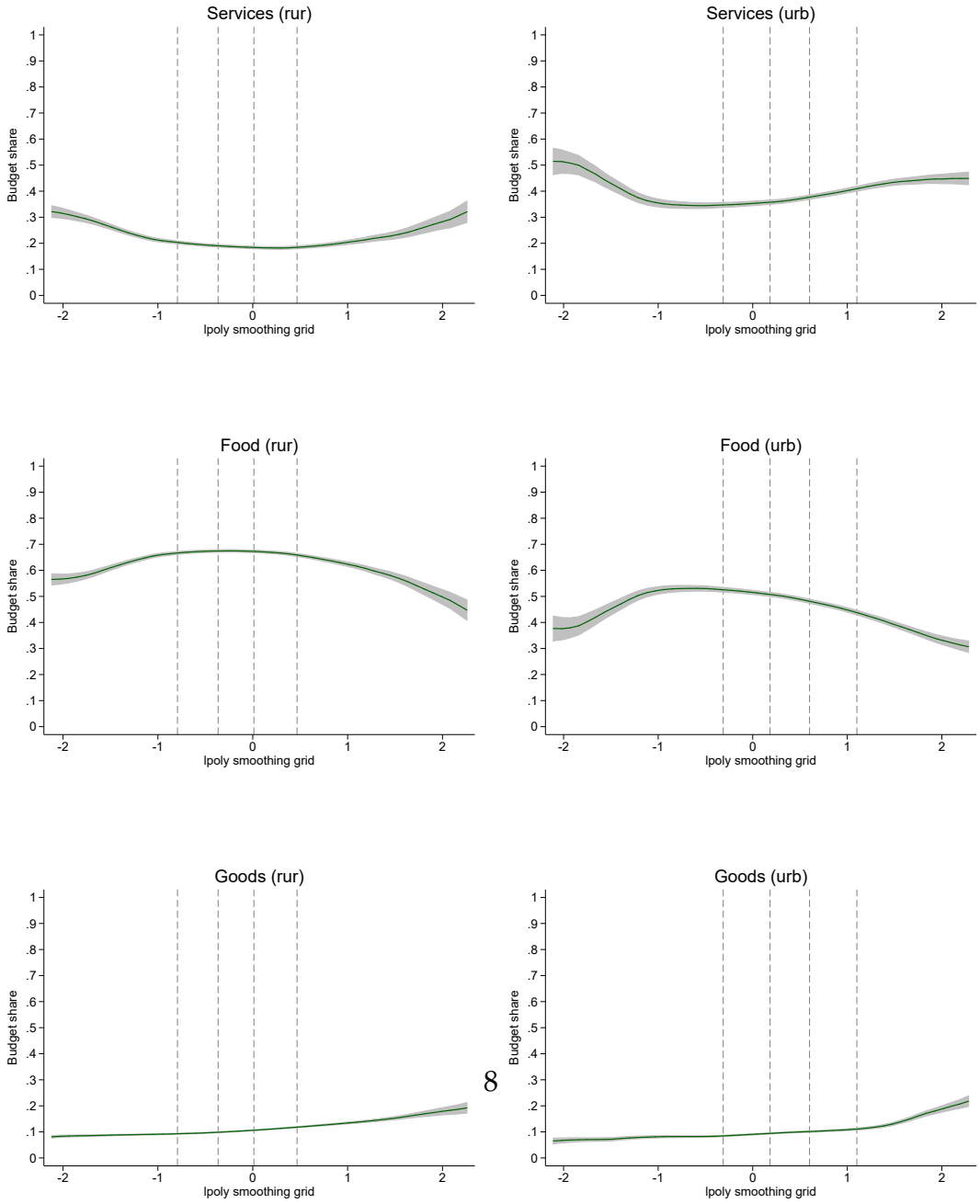
Services expenditures include repairs of household items, transportation, utilities, health and education expenditures, wages paid to servants, and donations made. It also includes expenditures on food consumed outside the home and on a few non-traded goods whose production is local and labor intensive. Such items include charcoal and grass for thatching. We do not include housing expenditures because these are only observed for households that rent their accommodations, a small share of the sample.

A few items are excluded from any expenditure category. These include taxes and theft, which comprise expenditures but not consumption. Following the recommendation of the Tanzanian National Bureau of Statistics, we also exclude funeral and marriage expenses, which tend to be sporadic and lumpy (National Bureau of Statistics Tanzania 2011). Our numeraire, "other" expenditure category includes expenditures on unclassified items.

Figure 1 depicts mean budget shares on services, food, and traded goods conditional on household expenditures for both rural and urban households. For most households, food comprises the largest share of expenditures. As total expenditures rise, households tend to increase the share of services in and decrease the share of food in their expenditures. The mean expenditure share on traded goods is around 10% for urban and rural households across the expenditure distribution.

We generate prices for food and tradable goods at the ward level using the weighted country product dummy method (Deaton and Dupriez 2011; Rao, Shepherd, and Sharma 1990). For each of these two expenditure categories and for each

Figure 1: Each expenditure category's expected budget share conditional on household real expenditures for rural (left) and urban (right) consumers. Services expenditures are in the top row, followed by food (middle row) and traded goods (bottom row). The vertical lines depict break points between quintiles of the real expenditure distribution.



round of the panel, we regress the log of community (ward) level item prices on item (g), ward (i), and survey month (m) fixed effects using the expression in Equation 4. We set the same base ward in each regression – a ward in the the Kinondoni district in Dar es Salaam which contains multiple enumeration areas and therefore lots of price observations. The coefficient on each ward fixed effect (α^i) can be interpreted as the log of the price index for the items included in the regression. We apply budget share weights to each observation based on the average share of that item in total expenditures within the ward.

$$\log(p^i) = \alpha^i + \beta_g + \gamma_m + \varepsilon_g^i \tag{4}$$

Our approach to generating service prices is similar to that for foods and tradable goods. We do not directly observe prices for any service items, nor can we construct them using expenditures and quantities. Instead, we run a regression similar to the one described above in Equation 4 using individual level observed hourly wage rates, ward and survey month fixed effects, and controls for the worker's age, gender, and schooling. Because service sector items tend to be labor intensive, wage rates seem the best proxy for service sector prices.

All prices included in the demand system are expressed in log form. We deflate prices temporally using monthly consumer price indices from Tanzania's National Bureau of Statistics.[1] We use the food and alcohol group CPIs to deflate food prices, the clothing and furniture CPI to deflate good prices, and the utilities, health, transport, communication, recreation, education, and restaurant CPIs to deflate service prices. The CPI categories are weighted using the category weights provided by NBS, as the category expenditure shares are difficult to recreate exactly. We normalize all prices by the base region, base year, and base good price (the CPI for NBS' "other" expenditure category).

We generate a net agricultural income variable which is the gross value of crop and livestock production minus expenditures, which include costs for items such as fertilizer, seed, hired labor, machine rental, and land rental. Household crop

[1] http://www.nbs.go.tz/nbstz/index.php/english/consumer-price-index-cpi

and livestock output that is consumed by the household is valued at local median consumer prices. Net returns to a non-farm enterprise are based on household reported profits from the enterprise (de Mel, McKenzie, and Woodruff 2009). Net returns to wage labor are annualized wage labor earnings for the entire household. Other income includes all sources of non-labor income, such as income from land rental, remittances, or other transfers.

The demographic variables included in the model specification include categorization as urban or rural, the household size in adult equivalents, the land owned by the household, the number of years of education by the household head, and the number of years of education received by the most educated household member.

Table 1 depicts all of the variables included in the analysis, summarized by panel round for all households in the NPS panel. The panel includes all households surveyed across the three rounds of data collection, including households that split off from original round 1 households or followed round 2 households. Households in rounds 2 and 3 share a common panel identifier if they link back to the same round 1 household. The summary statistics in Table 1 use within-round survey weights.

4 Estimation

Documenting the multipliers arising from rural economic growth, and measuring their magnitudes, has been the focus of macro-, meso-, and micro- scale research. Agricultural growth multipliers are typically measured using social accounting matrices and local CGE models (e.g., Haggblade, Hammer, and Hazell (1991); Holden, Taylor, and Hampton (1999); Taylor and Filipski (2014)), economy wide CGE models (e.g., Diao et al. (2007)), or reduced form growth decomposition exercises (e.g., Christiaensen, Demery, and Kuhl (2011); McMillan, Rodrik, and Verduzco-Gallo (2014)).

In order to understand consumers' demand patterns for tradable goods vs

Table 1: Summary statistics of model variables. Prices are logged and normalized by Dar es Salaam prices in round 1 of the survey.

	2008-09	2011-12	2013-14
Log real expenditures	-0.354	-0.131	0.313
	(0.996)	(0.765)	(0.761)
Services expenditures (share tot)	0.239	0.280	0.290
	(0.202)	(0.220)	(0.238)
Food expenditures (share tot)	0.632	0.594	0.573
	(0.196)	(0.200)	(0.211)
Goods expenditures (share tot)	0.0918	0.0980	0.126
	(0.0638)	(0.0678)	(0.0817)
Service prices	1.343	1.621	1.699
	(2.228)	(1.070)	(0.589)
Food prices	-0.270	-0.421	-0.358
	(0.152)	(0.232)	(0.231)
Goods prices	-2.496	-2.596	-2.564
	(0.427)	(0.202)	(0.316)
Urban residing hh	0.249	0.276	0.278
	(0.432)	(0.447)	(0.448)
HH size (adult equiv)	4.831	4.659	3.960
	(2.848)	(2.798)	(2.307)
Land owned by hh (ha)	1.511	1.500	1.326
	(2.110)	(2.135)	(2.225)
Educ of hh head (yrs)	5.978	6.027	6.510
	(4.140)	(4.179)	(4.291)
Max educ by hh member (yrs)	8.684	8.970	9.006
	(3.383)	(3.578)	(3.758)
Observations	5010	5010	5010

non-tradable services, we estimate a demand system that includes services, goods, and food in the home. The omitted consumer category is "other" items that are not included any of those three categories but are part of the expenditures aggregate. Using seemingly unrelated regression, we estimate a linear approximation of the Exact Affline Stone Index (EASI) demand system for services, tradable goods, and food (Lewbel and Pendakur 2009).

The EASI demand system offers a utility theoretic approach to estimating flexible form Hicksian demand curves that are linear in their parameters. The Hicksian demand is the derivative with respect to prices of the cost function that maps prices, household characteristics, and errors onto expenditures for a given utility (u). See Lewbel and Pendakur (2009) for a much more detailed discussion. We estimate a linear approximation of the EASI demand system, with budget share as a function of total expenditures, prices, observable characteristics that are related to preferences, and the household's attained utility.

$$\mathbf{w} = \sum_{r=0}^{r=5} b_r \tilde{y}^r + \mathbf{Cz} + \mathbf{Dz}\tilde{y} + \sum_{l=0}^{L} z_l \mathbf{A_l p} + \mathbf{Bp}\tilde{y} + \tilde{\varepsilon} \tag{5}$$

Equation 5 depicts the system of estimation equations. The vector of budget shares are expressed as $\mathbf{w}$. Total expenditures, $\tilde{y}$, enter the specification as an afline transformation of log nominal expenditures (x) deflated by the Stone price index, which is a budget share weighted price index. The expression for $\tilde{y}$ is then $x - \mathbf{p}'\mathbf{w}$, where $\mathbf{p}$ is a vector of log prices for each good and $\mathbf{w}$ is a vector of expenditure shares. The vector $\mathbf{z}$ contains demographic controls, which in this specification include a dummy that takes the value one for households residing in urban areas, household size, land owned by the household, years of education completed by the household head, and maximum education attained by any household member. The demographic variables are normalized relative to a reference household (i.e., a rural household of median size with median levels of education and land ownership).

We estimate Equation 5 as a linear system using seemingly unrelated regression (SUR), which is a feasible generalized least-squares estimator (Greene 2011).

This allows for cross-equation correlation of errors. This also allows us to impose cross-equation restrictions consistent with consumer utility. For regularity, we impose symmetry in matrices $\mathbf{B}$ and $\mathbf{A_l}$ (for each l), as well as homogeneity and adding up constraints in b_r, $\mathbf{C}$, $\mathbf{D}$, $\mathbf{A_l}$, and $\mathbf{B}$. We estimate the model using a pooled sample of all three rounds of data. In a future iteration, we will exploit the panel features of the survey data by introducing controls for time invariant heterogeneity at the household level, following Meyerhoefer, Ranney, and Sahn (2005).

All of the parameters of the three-equation demand system are depicted in Table 2. Because of the many interactions and higher order polynomials of the demand system, it is difficult to interpret these parameters in this form. Table 3 depicts the partial derivative of each good's budget share with respect to each of the continuous right hand side variables. We calculate the elasticity at each data point in the sample. We bootstrap the standard errors of the elasticity estimates by drawing, for each observation, 100 different parameter vectors from the variance-covariance matrix. We then compute the standard error based on the distribution of elasticity estimates. The marginal effects depicted in Table 3 are evaluated at the means of the rural subsample. Table 4 depicts the same marginal effects for urban households at the means of the urban subsample.

These results suggest that the mean-income household spends an increasing share of its budget on tradable goods as income rises, and a decreasing share on services and food. The food expenditure share decreases more sharply with income growth than does the service expenditure share. For services and goods, a price increase is associated with a decrease in the own expenditure share of that category. Food price increases, however, are associated with an increase in the food expenditure share for a mean-income household, which makes sense given the fact that food is a necessity and comprises about half of all expenditures for Tanzanian consumers. Urban households tend to be more price elastic than rural households. Goods and services appear to be complementary expenditure categories, while food is a substitute to both goods and services.

We next complete distributional analyses. Figure 2 depicts Engel curves for

Table 2: Parameter estimates from the demand model.

	service share	(se)	foodtot share	(se)	goodtr share	(se)
Y	0.056**	0.004	-0.059**	0.005	0.003	0.004
Y squared	0.020**	0.002	-0.055**	0.002	0.022**	0.001
Y cubed	-0.008**	0.001	0.006**	0.001	0.002**	0.001
Y to the 4th	-0.002**	0.000	0.002**	0.000	-0.000	0.000
Y to the 5th	0.000**	0.000	-0.000**	0.000	-0.000	0.000
Urban	0.146**	0.007	-0.127**	0.010	-0.020*	0.009
HH size (adult equiv)	0.014**	0.001	-0.014**	0.002	0.000	0.001
Land owned by hh (ha)	-0.002	0.002	0.000	0.002	0.002	0.002
Educ of hh head (yrs)	0.004**	0.001	-0.004**	0.001	0.001	0.001
Max educ by hh member (yrs)	0.012**	0.001	-0.009**	0.001	-0.003*	0.001
Urban x Y	0.009	0.005	-0.002	0.005	-0.007**	0.002
HH size x Y	0.003**	0.001	-0.007**	0.001	0.005**	0.000
Land x Y	-0.004**	0.001	0.003**	0.001	0.001**	0.000
Educ head x Y	0.001*	0.001	-0.002**	0.001	0.000	0.000
Educ max x Y	-0.002**	0.001	0.002*	0.001	0.000	0.000
Service prices	-0.016**	0.002	0.003	0.002	0.014**	0.001
Food prices	0.003	0.002	0.006	0.004	-0.009**	0.003
Goods prices	0.014**	0.001	-0.009**	0.003	-0.005	0.003
Rural x Service pr	0.009**	0.003	-0.004	0.003	-0.005**	0.001
Rural x Food pr	-0.004	0.003	-0.002	0.004	0.006	0.003
Rural x Goods pr	-0.005**	0.001	0.006	0.003	-0.001	0.003
HH size x Service pr	-0.004**	0.000	0.001**	0.000	0.002**	0.000
HH size x Food pr	0.001**	0.000	-0.000	0.001	-0.001*	0.001
HH size x Goods pr	0.002**	0.000	-0.001*	0.001	-0.001	0.001
Land x Service pr	0.000	0.001	0.000	0.001	-0.001*	0.000
Land x Food pr	0.000	0.001	-0.001	0.001	0.001	0.001
Land x Goods pr	-0.001*	0.000	0.001	0.001	-0.000	0.001
Educ head x Service pr	0.001**	0.000	-0.001**	0.000	0.000	0.000
Educ head x Food pr	-0.001**	0.000	0.002**	0.000	-0.000	0.000
Educ head x Goods pr	0.000	0.000	-0.000	0.000	0.000	0.000
Educ max x Service pr	0.000	0.000	-0.001	0.000	0.001**	0.000
Educ max x Food pr	-0.001	0.000	0.001	0.001	-0.000	0.001
Educ max x Goods pr	0.001**	0.000	-0.000	0.001	-0.000	0.001
Y x Service pr	-0.016**	0.001	0.004**	0.001	0.012**	0.000
Y x Food pr	0.004**	0.001	0.002	0.002	-0.006**	0.002
Y x Goods pr	0.012**	0.000	-0.006**	0.002	-0.006**	0.002
constant	0.246**	0.003	0.680**	0.005	0.074**	0.004

* $p < 0.05$; ** $p < 0.01$

Table 3: Marginal effects on expenditure share evaluated at the means of the data for rural households.

	Services share	Food share	Goods share
Log real expenditures	-0.0108**	-0.0173***	0.0324***
	(0.0033)	(0.0033)	(0.0013)
HH size (adult equiv)	0.0027***	-0.0076***	0.0048***
	(0.0007)	(0.0007)	(0.0003)
Land owned by hh (ha)	0.0003	-0.0013	0.0010***
	(0.0007)	(0.0007)	(0.0003)
Educ of hh head (yrs)	0.0058***	-0.0058***	0.0000
	(0.0004)	(0.0004)	(0.0002)
Max educ by hh member (yrs)	0.0112***	-0.0096***	-0.0016***
	(0.0006)	(0.0006)	(0.0002)
Service prices	-0.0064***	-0.0009	0.0073***
	(0.0013)	(0.0012)	(0.0005)
Food prices	-0.0009	0.0032*	-0.0023
	(0.0012)	(0.0020)	(0.0016)
Goods prices	0.0073***	-0.0023***	-0.0050**
	(0.0005)	(0.0016)	(0.0016)

rural consumers, which trace the expenditure elasticity for each good along the expenditure distribution. Vertical lines depict the break points between rural expenditure quintiles. Figure 3 shows Engel curves for urban consumers, with the vertical lines depicting break points between urban expenditure quintiles.

For consumers in the bottom three quintiles of expenditures, expenditure growth is associated with a declining share of services in household expenditures. Food expenditures decline with income growth for all consumers in the top three quintiles but increase for those in the bottom two. The budget shares of tradable goods increase at all expenditure levels as expenditures increase. The effect gets much larger as income increases. The Engel curves for tradable goods look very

Table 4: Marginal effects on expenditure share evaluated at the means of the data for urban households.

	Services share	Food share	Goods share
Log real expenditures	0.0247***	-0.0827***	0.0482***
	(0.0042)	(0.0042)	(0.0016)
HH size (adult equiv)	0.0053***	-0.0121***	0.0069***
	(0.0008)	(0.0008)	(0.0003)
Land owned by hh (ha)	-0.0019*	0.0002	0.0017***
	(0.0009)	(0.0009)	(0.0003)
Educ of hh head (yrs)	0.0061***	-0.0063***	0.0002
	(0.0005)	(0.0005)	(0.0002)
Max educ by hh member (yrs)	0.0099***	-0.0083***	-0.0016***
	(0.0006)	(0.0006)	(0.0003)
Service prices	-0.0179***	-0.0026	0.0205***
	(0.0020)	(0.0020)	(0.0008)
Food prices	-0.0026	0.0164***	-0.0138***
	(0.0020)	(0.0031)	(0.0024)
Goods prices	0.0205***	-0.0138***	-0.0067**
	(0.0008)	(0.0024)	(0.0024)

similar for urban and rural consumers, though they are higher for urban consumers. At all expenditure levels, there is a greater income elasticity of demand for tradable goods than for non-tradable services.

The Engel curves for non-tradable services are the same for urban and rural consumers, though the budget share elasticity shifts to positive at a lower income level for urban consumers (starting with the second quintile) than it does for rural consumers (starting with the fourth quintile). Demand for services is slightly more dynamic in urban areas than in rural areas.

Figures 4 and 5 shows the budget share semi-elasticity with respect to prices for each of the goods. Own price elasticities are depicted along the diagonal of the

Figure 2: Engel curves for rural households. The curves depict budget share semi elasticity with respect income for services (top), food (middle), and goods (bottom).

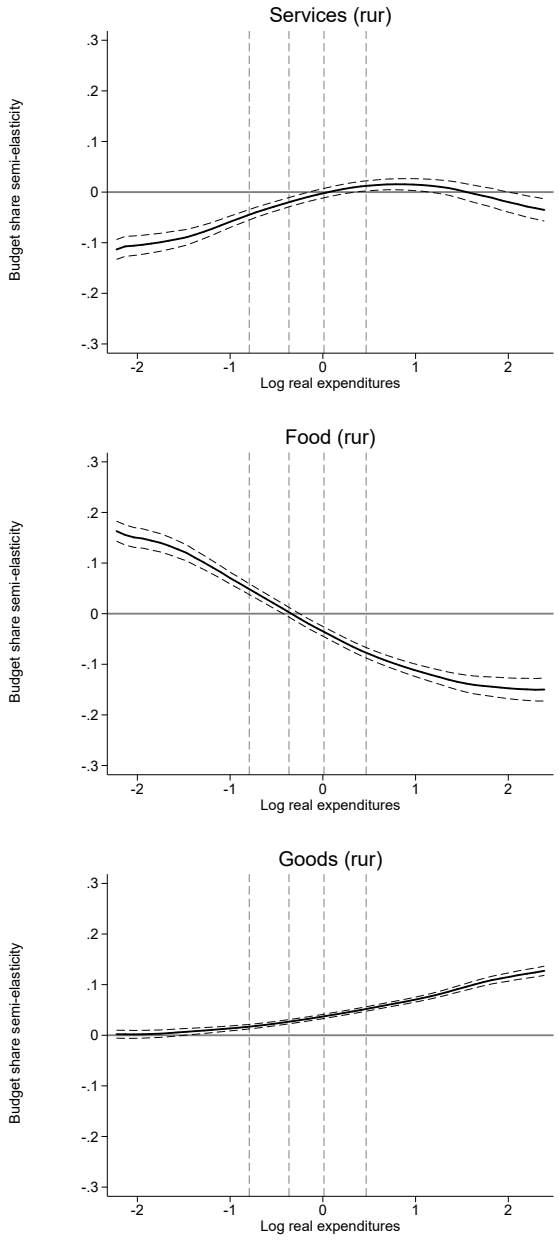
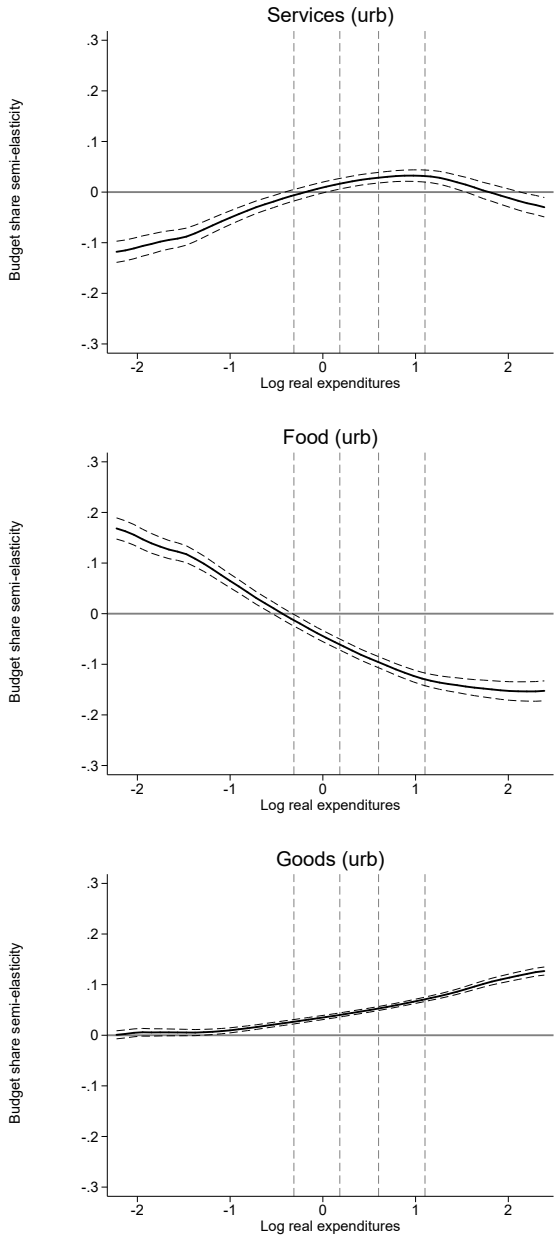


Figure 3: Engel curves for urban households. The curves depict budget share semi elasticity with respect income for services (top), food (middle), and goods (bottom).



figure, and cross-price elasticities are depicted off the diagonal of the figure. Price elasticities are shown for rural households in Figure 4 and for urban households in Figure 5.

Food budget shares for rural consumers are not especially own price elastic, though they become more price elastic at higher expenditure levels. The cross-price elasticity between food and tradable goods or food and services are quite small in magnitude and not different from zero across most of the expenditure distribution. Services and goods seem to serve as complements for each other for consumers at most expenditure levels. Similar own- and cross- price elasticity patterns are observed for both rural and urban consumers.

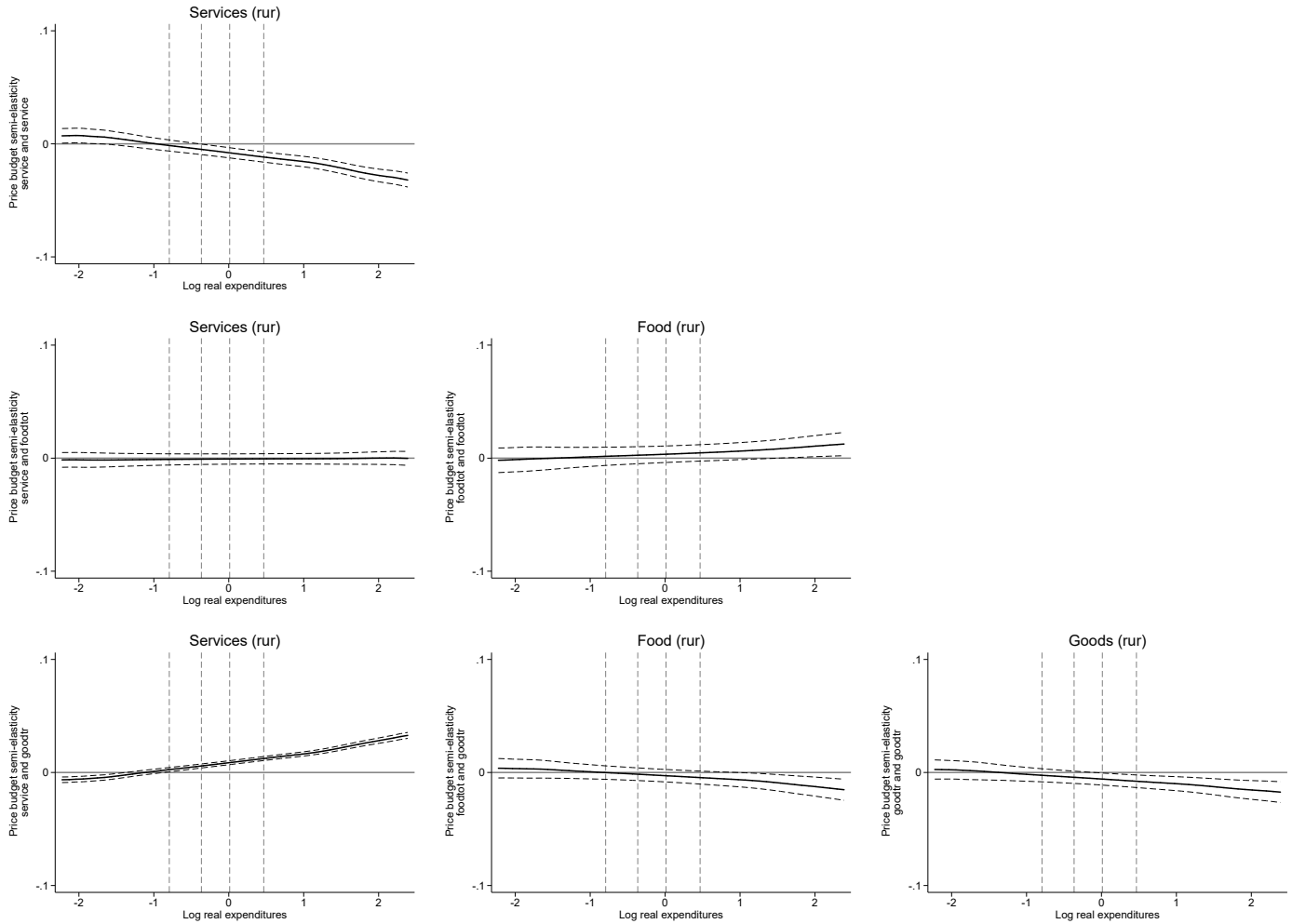


Figure 4: Price elasticity of budget shares for services, food, and goods. Own price elasticities are shown along the diagonal and cross-price elasticities off the diagonal. Rural households are shown here

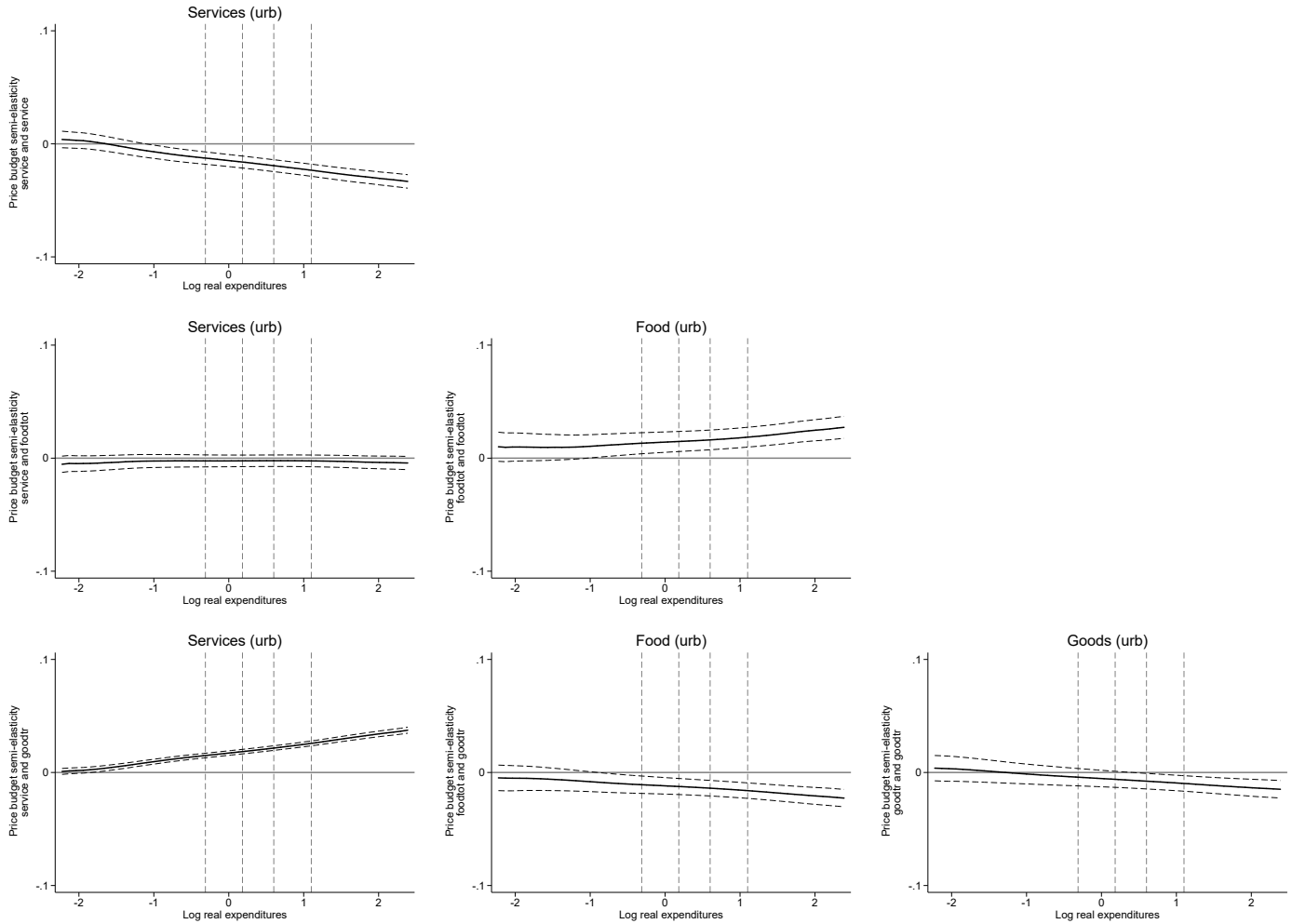


Figure 5: Price elasticity of budget shares for services, food, and goods. Own price elasticities are shown along the diagonal and cross-price elasticities off the diagonal. Urban households are shown here

5 Discussion

Given widespread levels of underemployment in Sub-Saharan Africa, it is informative to examine consumer expenditure patterns, with a view towards the employment-generating effects of those patterns. We find that consumers tend to increase the share of their expenditures on tradable goods as their expenditures increase, while food demand falls sharply and demand for services is somewhat flat.

While the tradable goods category is the most dynamic from a consumer demand perspective, it is the least promising category with regards to employment generation prospects. Altogether, this analysis suggests that the consumer expenditures pathway, by which agricultural productivity growth can translate into income growth in other sectors via increased consumer spending on food and locally produced non-tradable services, is not likely to play a major role in the transformation of economies like Tanzania's.

It is well recognized that agriculture becomes less important in the work force because of the fact that income elasticity of demand for food decreases as income increases. This analysis suggests that the service sector is likely to behave similarly for in rural economies. Given very large levels of employment in the service sector, with service sector self-employment serving as the second largest source of labor demand apart from farming, it is concerning that the service sector could shed labor in the same way that agriculture does as incomes rise. With underemployment as a major policy problem in Sub-Saharan Africa today, such an effect would be worrisome. These results confirm suspicions that the service sector might not be an "elevator" sector driving growth in African economies.

These results also shed light on the possible impacts of direct income transfers, which are becoming an increasingly popular anti-poverty intervention. Given consumers' demand preferences, the prospect for such income transfers to generate large multiplier effects is much lower than it would be if consumers were to exhibit a larger propensity to consume non-tradable services.

It is important to recognize that demand growth for tradable goods will create

some service sector jobs, as commerce is a key sub-sector of employment within the service economy. The size of this employment effect will be explored in ongoing research. Results here focus on the income elasticities of service and good demand for rural households. Future iterations of this research will further flesh out the employment generation effects of consumer demand patterns, and will further explore broader labor market implications.

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