Part I
Notes on Expenditure Elasticities in Africa

1 Demand Analysis - Summary

The marketing and supply concerns have been ignored for the current stage of the study. The study of demand encompasses the household surveys in Tanzania and UK - inspecting the income elasticities of chosen commodities. The analysis focuses on Engel curves for the commodities and temporarily avoids the time-series analysis of incomes and prices.

2 Cross Section Analysis

If a population is observed for a sufficiently long time, then we can understand the effects of changing incomes, price variations on their choices. A significant degree of demand analysis from panel data comes out of the Slutsky equation approach (e.g. the well-known AIDS model - a particular version of the Rotterdam model). With no time-series data, on the other hand, one relies on price-variations within the cross-section and interpretations of commodity-elasticities (instead of effects of changing income on a monitored household).

By adding more parameters to the semi-logarithmic model, one runs the risk of overfitting. It is easy, in other words, to stress on transient parameters in a given cross-sectional snapshot. The calibration of a cost-function and imposition of general conditions on the demand equations can get around some of these problems.

3 A brief survey of household consumption models

3.1 Analysis by Prais-Houthakker

Houthakker attributes the popularity of Engel curves to the idea of equivalence scales (i.e. how different households achieve same level of living standard). Although Houthakker's Engel fitting would now be considered unashamedly pragmatic [6], his research was influential in popularising the use of income and expenditure elasticities in cross-sectional analyses [22].

The simplest Engel curves are set up with the Woking-Leser model hitherto used in the study:

$$w_i = \beta \cdot log\ x_i + \alpha \tag{1}$$

Here, budget share total expenditure $x = \sum p_i q_i$, budget share$w_i = p_i q_i / x$ while α, β are regression coefficients.

A noticeable shortcoming with the Woking-Leser model is that no commodity specific information is used in the semi-logarithmic equation. The current study attempts to enhance this model with household and geographic parameters.

3.2 Cost Function and the Gorman Model

The Gorman approach considers a more general Engel curve: $w_i = \sum_{r \epsilon R} a_{ir}(p) \Phi_r(ln(x))$ (R is a finite set and $\Phi_r(\cdot)$ are general functions). For these to be consistent, one arrives at the cost function: $\frac{\partial\ ln\ c(u,p)}{\partial\ ln\ p_i} = \sum_{r \epsilon R} a_{ir}(p) \Phi_r\{ln\ c(u,p)\}$ (where u =utility, p =price). Gorman derives following restrictions on $\Phi_n(\cdot)$:

$$w_i = a_i(p) + b_i(p) ln\ x + d_i(p) \sum_{m=1}^{M} \gamma_m(p) (ln\ x)^m \tag{2}$$

$$w_i = a_i(p) + b_i(p) \sum_{\sigma_m \epsilon S_-} \mu_m(p) x^{\sigma_m} + d_i(p) \sum_{\sigma_m \epsilon S_+}^{M} \theta_m(p) x^{\sigma_m} \tag{3}$$

Here, S is a finite set of elements σ_i, S_- its negative elements and S_+positive ($m = 1$ leads us back to Working-Leser form). $\sum a_i(p) = 1$ and $\sum b_i(p) = 0$. Gorman model combines "demographic scaling" and "demographic translating"[21].

A significant amount of research has been done in scaling of the individual model (through the analysis of the so-called cost-of-children problem). Muellbauer has enhanced the model by considering every household a multiple of unit a^h (individual). One considers a multiplicative index $m(a^h, u^h)$such that:

$$c^h(u^h, p, a^h) = m(a^h, u^h) \cdot c(u^h, p) \tag{4}$$

Here, $c(u^h, p)$ is the cost-function for every household. The budget share $w_i^h$is independent of a^h:

$$w_i^h = \frac{ln\ c(u^h, p)}{\partial\ ln\ p_i} \tag{5}$$

With derivatives with respect to a^h, Muellbauer further uses the above equation (and PIGLOG functions) to study the Barten's model for cost-of-having-children [19].

3.3 Testing Spatial Variation

An analysis of expensive vs non-expensive food items was done by Prais and Houthakker (1955)[22]. This has been employed for LSMS data in the current study. To address spatial variations, Deaton use the following model for a cluster-based analysis:

$$ln\ q_{Gic} = \alpha_G^0 + \beta_G^0 ln\ x_{ic} + \gamma_G^0 \cdot z_{ic} + \sum_{H=1}^{5} \theta_{GH} ln\ p_{Hc} + (f_{Gc} + u_{Gic}^0) \tag{6}$$

$$ln\ v_{Gic} = \alpha_G^1 + \beta_G^1\ ln\ x_{ic} + \gamma_G^1 \cdot z_{ic} + \sum_{H=1}^{5} \psi_{GH} ln\ p_{Hc} + u_{Gic}^1 \tag{7}$$

Here, quantity of good G consumed by cluster c is q_{Gic}, the associated unit-value is v_{Gic}, total expenditure is x_{Gic}, a vector of household demographic characteristics is z_{Gic}. Two error terms used consist of i) a cluster-specific random effect f_{Gc}along with the error $u_{Gic}^0$and ii) idiosyncratic erroru_{Gic}^1. The computation of variance-covariance vectors$u^0$and$u^1$is used to derive cluster effects e.g. inter-cluster variances and covariances for the separable goods.

4 Current Analysis

4.1 Current Model

The form [6]currently used in the study is:

$$ln\ q_i^h = \alpha_i + \beta\ ln\ x^h + \gamma_i\ ln\ n^h + u_i \tag{8}$$

Attempts to improve the regression were made by considering asset-ownership and number of young members in addition to total size of the household n^h(note that the prices are assumed constant during the snapshot of the recorded week). The clustering effect was not found significant for cheaper commodities. Also, as expected, the size of the household (i.e. number of family members) is a more significant indicator of consumption of commodities like sugar than for fruits or meat.

Further enhancements, with a Gorman form and weak separable tests are yet to follow.

4.2 Measuring Price

From LSMS data, prices are calculated by dividing expense by the quantity (this is the method used by Prais and Houthakker - which ignores price-indices) [22].

It is found inferred prices do vary quite a bit amongst different commodities. However, this variation is significantly lower for subsistence sugar (or beans) - the price for which don't vary as much as they do for meat. In a fashion similar to Prais - Houthakker [22](who visit the price variation of Tea to find that for a given income households of smaller size buy more expensive varieties of tea in the UK), the quality and quantity elasticities were derived based on classification of commodities according to price (inferred).

4.3 Income Elasticities of commodities

Prais-Houthakker model the combination of quantity vs quality as : $dq_i = p_i \delta p_i + k_i \delta k_i$ (change in quality - indicated by price and change in quantity indicated by quantity). This leads to :

$$\frac{x}{q_i}\frac{\partial q_i}{\partial x} = \frac{x}{k_i}\frac{\partial k_i}{\partial x} + \frac{x}{p_i}\frac{\partial p_i}{\partial x} \tag{9}$$

Prais-Houthakker derive quantity elasticity as difference between expenditure elasticity and the quality elasticity. The quality-adjustment to the quantity can provide more insight in the factors affecting expensive consumption ([4],[7]). Analyzing the tea-consumption in the UK, for example, Prais-Houthakker find small-size families spending proportionately higher on expensive tea varieties. The quality elasticities obtained in a similar fashion for alcohol, fruits and meat in Tanzania, show significant differences in quality elasticities across income groups.

5 Future Work

The current study notes elasticity differences between expensive and less-expensive varieties - leaving us with quality-elasticities. However, at this point, a correlation of these elasticities with perceived conspicuous consumption, although methodical, is a rather subjective exercise. This is intended to be improved with a more robust utility-theory based approach (research by Ireland[14]).

Towards that goal, I intend to develop methods to test separability in the context of conspicuous consumption - instead of assuming weak-separability of different commodity groups. The index prices obtained for these commodity groups are planned to be used for better estimates on expenditure elasticities.

6 Poor Economics - a discussion of development economics issues [2]

There is evidence for "flight to quality" amongst poor[16]. Deaton notes a characteristic drop in consumption of food in developing countries (relative to other commodities)[8]. There are local factors that tend to stand out in developing countries - e.g. funeral expenditures in Swaziland. There is ample evidence to show that other commodities compete with welfare-related commodities (e.g. healthy food or financial investments). Banerjee et al. do not attribute this to temptation - but to lack of health insurance and sufficient cash (letting medicines and maintenance of work become more important than children's education or healthy food).

It is also worth noting that often times consumption on products/services that provide welfare could be less just because the quality of these services is extremely low in developing countries (e.g. education provided by the public sector).

In observed social changes, clustering based on religion or social groups is found significant in consumer behaviour (e.g. In India, muslims are influenced more by other muslims and hindus in the same locality [p118]).

The theory of impatience, despite its appeal, makes less sense for the poor and is considered irrelevant for the current study - since the evidence shows that poor tend to make choices as rational as their richer counterparts. Moderate success of microfinance (despite concerns with credit monitoring and administration)

offers one such instance. Against the intuition, the poor seem to have sufficient hunger for saving methods and go the extra mile to save for future (even though saving is far more stressful for them).

However, one cannot get carried away with the opportunities that poverty can create. Banjerjee et al. also note that it is the lack of regular employment that makes the poor more likely entrepreneurs (even though their success rate is much lower) - not the psychological "drive" as many would perceive.

Part II
A summary of studies on conspicuous consumption

7 Visibility, Status and Congestion

The term "conspicuous consumption" traces its roots back to the treatise "Theory of the Leisure Class" authored by Thorstein Veblen in 1899. At about the same time when Marx endorsed the view of all commodities as products of labour (diamond and corn alike), Veblen sought to explore the psychological basis for consumption among the economic classes. His view of conspicuous consumption may at times appear critical of the "bourgeois" wastefulness [1] - but Veblen doesn't dwell upon the equivalence of labour for exchange of commodities. While he observes the tendency amongst the elite to distance themselves from physical labour - he argues that this tendency has transformed itself into a desire of displaying exploits and has survived in culture from more primitive hunter-gatherer and agrarian societies. This symbolism is inherent in all exchange of goods and services (including devotion and education [2]).

Even when the ideas of conspicous consumption have been revived in works of Ireland[14] or Arrow, Dasgputa [1], the literature has relied on what is considered wasteful - thus modeling conspicuous consumption as the difference between social welfare and market equilibrium. Of particular interest is a model of status-signalling provided by Ireland[14] where consumers attempt to maximise a combined utility of visible (public) and non-visible (private) consumption[3]. The model is of remarkable simplicity but calibrating it involves a sensitivity-parameter of how much visible consumption matters to the consumers. Given the nature of status competitions in society, such a calibration is hardly trivial. A study by Heffetz[12] using this model involved surveying a few hundreds of respondents asking them - quite literally - just how visible every item is for a typical consumer [14].

A survey quantifies a lot of complex interations in what constitutes status competitions in a society. A luxury item - for example - needs to be marketed as a luxury for it to both impart visible signals to others and to improve self-perception of the buyer. In Veblen's original framework, for a product to indicate status it must be rare and superfluous (thus serve as an exploit). That a watch is more noticeable than an insurance policy (and associated with higher income) is not entirely relevant to this framework. Moreover, whether a poor person buying a cheap watch and a richer person buying a watch that is far more expensive (and probably subject to import restrictions) are both instances of conspicuous consumption or not depends on the context that the observer chooses. Cheap watches may or may not constitute conspicuous consumption - depending on the social welfare function. The wide variety of criteria in conscpicous consumption seem to indicate this ambiguity (See Table 2).

The choice of visible and non-visible goods matters more in developing markets where a culture of mass consumerism is only nascent and status competitions aren't driven by economic inequalities alone (whereas in developed markets, firms are quick to turn a conspicuous item into a higher-priced commodity). The context

[1] "Throughout the entire evolution of conspicuous expenditure, whether of goods or of services or human life, runs the obvious implication that in order to effectually mend the consumer's good fame it must be an expenditure of superfluities. In order to be reputable it must be wasteful."[23]

[2] "The adoption of the cap and gown is one of the striking atavistic features of modern college life, and at the same time it marks the fact that these colleges have definitely become leisure-class establishments, either in actual achievement or in aspiration".[23]

[3] The utility function is modeled as $U = (1-a)f(v,w) + af(\hat{v},\hat{w})$. Here $\hat{v},\hat{w}$ are societies' view of the consumption and $a(>0)$ is a parameter indicating how much visible consumption matters to the consumer.

of exploits identified by Veblen is however still relevant in the developing markets[4]. In its original sense, conspiciuous consumption is an ecological concern and plays within the realms of sociology[5]. The research on conspicuous consumption in the developing world has often found that the consumption of visible items (for a certain selected criterion) differs significantly between social classes [6].

In both the developed and developing worlds, conspicuous consmption is driven by scarcity and competition ([13, 9]). If status were imparted by inherited wealth alone, there would be little conspicuous consumption as the consumers would be quick to realise the futility of buying trinkets. In the developed world, where markets have evolved to address the demands of the population, the positional pressures are readily addressed by market forces - thus a preference for visible goods indicates a higher price on them and a higher consumption on visible products always "signals" a higher status (a product with a higher status symbol would automatically carry a higher price). In underdeveloped markets, where information asymmetries are abound, the higher signalling (visible component of combined utility) would not necessarily be achieved with higher spending on visible goods - and other factors start to matter in the combined utility function as is suggested by data from various cross-section expenditure surveys.

8 Visible consumption in the developing world

A rural setting in a developing country more often evokes images of immiserization than competitions for positional consumption. Still, the visual splurge offered by the new economic developments offers new venues of visible consumption. The basket of visible consumption has expanded, a new spirit of individual consumerism has replaced the rural contractual arrangements that were less influenced under nationalist governments. Looking at Tanzania, the spending on marriage and funerals seems high, but it now competes with higher spending on consumer electronics and electricity. The current study views the cross-sectional expenditure data from Tanzania from a visible consumption perspective.

The presence of conspicuous consumption in developing countries has been a recent topic of interest ([18],[15]). Table 2 summarizes the data and methodologies for some of the studies. The studies have been based on a visible basket classified first by Heffetz - where the consumer basket constituents were sorted by a visibility measure based on a survey of 480 respondents. Conducted in US, the respondents were asked how long it took them to notice the consumption for commodities in the US CEX categories (listed in Table 1)[7]. The visibility index computed from survey responses was found to have a significant predictive power for total expenditure elasticity.[8] . Robustness tests (regressions for different quantiles and across multiple demographic categories) reported an all through significance of the Vindex regressor.

A similar survey of visibility of commodities was not conducted by many other studies conducted on

[4]"No class of society, not even the most abjectly poor, forgoes all customary conspicuous consumption[23].

[5]"Increased mobility of the members has also added to the facility with which a "social confirmation" can be attained within the class."[23]

[6]Kaus finds that black ethnic groups spend more on visible commodities than the white ethnic population in South Africa - arguing that status is gained through means other than consumption[17]. Khamis et al find that the Muslims spend less on visible consumption items when compared to Hindus of same economic standing[18].

[7]The exact question was - "Imagine that you meet a new person who lives in a household similar to yours. Imagine that their household is not different from other similar households, except that they like to, and do, spend more than average on [jewelryand watches]. Would you notice this about them, and if so, for how long would you have to have known them, to notice it? Would you notice it almost immediately upon meeting them for the first time, a short while after, a while after, only a long while after, or never?" [12]. Responses were coded from 1 (almost immediately) to 5 (never). The question was repeated for each expenditure category (randomly ordered). A normalized measure was then used as the visibility index.

[8]The utility function is modeled as a combination of a private consumption function and an observable consumption function. Considering the Cobb-Douglas utility function $f(v,w) = \beta_v \cdot f(v,w) + \beta_w ln(w)$ over constraint $y = v + w$ where y is the budget constraint and (v,w) are visible and non-visible good quantities respectively. Instead of the standard Engle curve model : $v = \frac{\beta}{1+\beta} y$ and $w = \frac{1}{1+\beta} y$ (where $\beta = \frac{\beta_v}{\beta_w}$), the authors use the model provided by Ireland et al ([14]). Using an individual's sensitivity to social status signals in the model, they use a utility function $U = (1-a)f(v,w) + af(\hat{v},\hat{w})$ (where $\hat{v},\hat{w}$ are societies' view of the consumption and $a > 0$). Solving for a separating equilibrium, this results in $y = \frac{1+\beta}{a+\beta} + Cv^{-\frac{\beta}{a}} (a > 0)$ where $C = \frac{a}{a+\beta}(\frac{\beta}{1+\beta})^{\frac{\beta}{a}} b^{\frac{a+\beta}{a}}$ (C is derived by considering the utility maximization at lowest income level b as the boundary condition for the utility maximization problem). Elasticities in this model are $e_v = \frac{dv}{dy} \cdot \frac{y}{v} = a((1+\beta)\frac{v}{y} - \beta)^{-1}$.

Tobacco products like cigarettes, cigars, and pipe tobacco
The purchase of new and used motor vehicles such as cars, trucks and vans
Clothing and shoes, not including underwear, undergarments and nightwear
Home furnishings and household items, like furniture, appliances, tools and linen
Jewelry and watches
Computers, games, TVs, video, audio, musical and sports equipments, tapes, CDs
Dining out at restaurants, drive-throughs, etc, excluding alcohol including food at school
Alcoholic beverages for home use
Barbershops, beauty parlors, hair dressers, health clubs, etc.
Alcoholic beverages at restaurants, bars, cafeterias, cafes, etc.
Cable TV, pets and veterinarians, sports, country clubs, movies and concerts
Books, including school books, newspapers and magazines, toys, games and hobbies
Education, from nursery to college, like tuition and other school expenses
Food and nonalcoholic beverages at grocery, specialty, and convenience stores
Rent, or mortgage, or purchase, of their housing
Mobile phone services
Airline fares for out-of-town trips
Lodging away from home on trips and housing for someone away at school
Public transportation, both local and long distance, like buses and trains
Vehicle maintenance, mechanical and electrical repair and replacement
Gasoline and diesel fuel for motor vehicles
Medical care, including health insurance, drugs, dentists, doctors, hospitals etc.
Contributions to churches or other religious organizations and other charities
Laundry and dry cleaning
Home utilities such as electricity, gas, and water; garbage collection
Home telephone services, not including mobile phones
Legal fees, accounting fees, and occupational expenses
Vehicle insurance, like insurance for cars, trucks, and vans
Homeowner's insurance, fire insurance, and property insuranceools and licenses
Life insurance, endowment, annuities, and other death benefits; insurance
Underwear, undergarments, nightwear, and sleeping garments

Table 1: Consumption Categories in CEX ordered by visibility rankings

Authors	Estimation Procedure	Data Sources	Basket constitutents
Kaus[17]	Cross-sectional 2SLS with demographic and time variables	IES(expenditure survey) - visible categories through vindex	Baskets from Charles et al - selecting personal care, cars, jewelry and apparel (including footwear) products
Charles et al[3]	Cross-sectional 2SLS with demographic and time variables	CEX(expenditure survey) - visible categories same through vindex. Despite its visibility, housing has been excluded from the list.	Clothing/Jewelry/Shoes (029) Clothing Services (030) Jewelry and Watches (031) Personal Care (032) Barbershops, Beauty Parlors, and Health Clubs (033) Motor Vehicles (052) Repair, Leasing, Greasing, Washing, Parking, Storage, and Rental Services(054) Reduction of Principal on Vehicle Loan (096) Tires, Tubes, Accessories, and Other Parts (053)
Friehe, Mechtel[10]	Regression with demograpic and time controls	EVS (expenditure survey) - visible categories through vindex. Items that are subsidized e.g. housing, pharmaceuticals or those with no significant visibility are ignored.	Basket from Charles et al, Heffetz (Table 1)
Khamis, Prakash, Siddique[18]	Cross-sectional 2SLS with demographic and time variables	2005 Indian Human Development Survey (IHDS) The commodities were sorted based on a visibility survey conducted in an Indian university.	Personal Transport Footwear Vacations Furniture Social Functions Repairs Clothing Jewelry Recreation Goods
Omori, Smith[20]	Regression with demograpic and time controls	US CEX (expenditure survey)	Clothing (including shoes) from the US CEX categories (Table 1)
Heffetz[12]	Visibility Elasticities estimated through weighted/kernel regression with a Visibility Index (Vindex)	Vindex (surveyed), US CEX (expenditure survey)	Survery of visibility of commodities (See Table 1)
Jaikumar, Sarin[15]	2SLS with Gini-Index as control variable and household assets as instrument for permanent income control (total expenditure)[9]	2005 Indian Human Development Survey (IHDS)[10]	Basket identified by Khamis et al

Table 2: Critieria of Conspicuous Consumption in surveyed literature

the developed world works[12] . Many studies have relied on the basket defined by Charles et al[11][3]. The definition of visible consumption is often adjusted in these studies depending on the socio-cultural context (See Table 2). Omori-Smith ignore all visible consumption categories from the Charles et al study except that of clothing (including shoes)[20]. Friehe-Mechtel used several definitions of the visibility basket to study the robustness of their results[10]. A study of the consumption in South Africa by Kaus chose a basket of products as close as possible to that in the Charles et al study[17].

The need for a survey to measure visibility of items in the basket is however necessary when conducting similar studies in developing world countries[12]. Visibility is a socio-cultural judgment - and the visibility basket from the developed world cannot be translated as such into disparate geographies and cultural environments of the developing world. One can arrive at wrong conclusions on visibile consumption for a consumer group if a visiblity basket was chosen from a different cultural environment. For example, hair-products may be associated with a higher visibility (and promise) in the developed world but in the developing world their purpose could be just utilitarian (poor quality of production, cultural factors etc.). Attributing lower visible consumption based on a low consumption of hair-products would thus be erroneous.

Another practical problem arises in the developing world because of the predominant use of recall method in expenditure survey. A relevant anomaly is the Deaton Paxson paradox([5]) - i.e. the observed decrease in food expenditure per head as household size rises (with constant outlay per head). The likely cause for the paradox is presence of errors correlated with household size in the data that results in possible overestimation of the consumption of recalled items[11]. Caution must therefore be taken (or a correcton applied) when mixing expenditures from recall and diary methods.

The visibility elasticities may not be compared across countries without above considerations but a comparison within the country can provide insights into the effect of certain demographic factors on visible consumption. This has been the central theme for most of the studies surveyed in this note. More than to improve the mesurement of visibility, the studies are interested in identifying the demographic parameters that explain the log-expenditure of visibilty basket as is. The general regression equation for such a study is the following:

$$ln(vis_i) = \beta_0 + \beta_1 \cdot Dem_i + \beta_2 \cdot ln(pInc_i) + \epsilon \tag{10}$$

Here vis_i is the total visible consumption of the household i (accumulated over the chosen visibility basket), Dem_i is a vector of demographic indicators under consideration and $pInc_i$ is the permanent income - proxied by total expenditure. Households with higher total expenditure are far more likely to be those with higher visible expenditure. Thus, total expenditure (on the right side of the equation 10) makes it an endogenous variable for the dependent varaible : $ln(vis_i)$. A different approach is taken by Jaikumar et al who use weights in the basket rather than visible expenditure levels - so that visible expenditure is not subject to the endogeneity problem that arises due to total expenditure being on the right hand side and visible expenditure on left hand side of the equation[15] (The proportion of visible expenditure with respect to the total expenditure could be the same for those with higher total expenditure and lower total expenditure). However, since data on income is often poor or sparse in the developing countries, total expenditure turns out to be the most frequent choice for a proxy of permanent income ($pInc_i$ is a key control parameter for the analysis of visible consumption). In most of the studies, the said endogeneity of total expenditure is resolved by a choice of appropriate instruments - e.g. income, cubic-income, postive-income dummies or occupation codes. These instruments identified by Charles et al.[3] are reported to be quite strong in the studies surveyed as part of this note (Sargan and Wu-Hausman tests confirm endogeneity and the effectiveness of chosen instruments).

[11] Charles et al themselves ignore housing expenses - despite its clear visibility- because of the known housing differences in the US between black and white social groups[3].

[12] Khamis et al[18] ask two key questions to respondents in an online survey conducted in India. First asked them how closely they needed to interact with their neighbour (with similar demographic characteristics) in order to observe above average spending for a list of items (Options were -'1: No Interaction', '2: Occasional Interaction', '3: Friend', '4: Close Friend' or '5: No matter how much one Interacts'). An item where >20% respondents report 1 or 2 was considered a visible item. A second question asked them what they'll expect of the consumption of an item after a sudden 20 percent rise in their neighbor's income '1: Fall', '2: Stay the same', '3: Increase by less than 20 percent', '4: Increase by 20 percent' or '5: Increase by more than 20 percent'. The list of items in these questions attempted to match the consumption categories in the IHDS. An item is associated with higher income if more than 20% of respondents reported 2,3,4 or 5.

Visible Commodity Code	Description
202	Electricity
213	Skin Creams
214	Other personal products (shampoo, razor, cosmetics etc.)
224	Repairs to household and personal items
301	Carpets, rugs
306	Sports & hobby equipment, musical instruments, toys
313	Marriage Ceremony
314	Funeral

Table 3: Visible commodities in LSMS data

Mean Household size	5.27
Mean age of household head	46.36
Average number of rooms per household	3.33
Percentage with houshold head educated secondary or higher	16.14
Mean Total Expenditure (Tanzanian Shillings)	2471122
Percentage Employed in Agriculture	47.76
Total Number of Households	2979

Table 4: Descriptive statistics for LSMS Tanzania 2010

9 LSMS 2010 data on Tanzania

Tanzania has been the first country to be surveyed as part of this study. With recent economic growth and a history of nationalization, the country provides a much desired snapshot of the consumer world of developing sub-Saharan Africa. The data chosen for the preliminary analysis is from the Living Standard Measurement Study (LSMS) conducted by the World Bank. LSMS includes expenditure microdata from about 10,000 households - with many of the expenditure categories of potential visible value. With no verifiable measure of visibility, all expenditure not related to food and utilities is evaluated for potentially visiblity. These chosen cateogries from LSMS are listed in Table 3 - these are meant to include the categories identified by Khamis et al as far as possible[18].

9.1 Preparing the Data

The preparation of the data involved normalizing the data for total expenditures by combining expenditure on items collected through recall and diary methods. The summary statistics are show in Table 4.

Obtaining visible consumption elasticities (using equation 10) from recall method while computing total expenditure (food etc.) based on diary method can result in measurement errors discussed in the previous section (it is argued that larger families are more likely to underestimate their purchases when recalling). When the weekly data is mixed with yearly data - the extrapolation of past week's consumption can further overestimate food costs[13].

The income spectrum is heavily skewed in the developing world. In Tanzania, only around 30% of heads of the recorded households have any reported income. Having two jobs and owning multiple self-owned (small) businesses is not uncommon and the mode of payment is often not in cash. The amount of income recorded for the household is thus frequently based on the person's estimate of the item provided as income. All of these can make the incomes estimates noisy at best. The income levels themselves seem poorly correlated with expenditure levels. One possible way to measure this noise is by observing the variance of income in the same region[14]. Given the sparsity of available income data, however, instruments for age and occupation

[13] To test the significant of this issue, one can test whether the surveyed households are equally likely to overspend in the recorded week

[14] If there are X individuals with $n_i (i \epsilon X)$ sources of income each, then it is safe to assume that workers in the same region and same employment-type have resonably similar incomes. The variance in incomes recorded for the same local group can give an estimate of how noisy the data is due to self-reporting.

codes were chosen for the current study.

10 Methods to measure visible consumption

10.1 Visibility Methods

The direct way of measuring visibility is to find an evidence of visibility in the comomdities. Most studies have relied on their own visibility surveys. In absence of such a survey, the public media can serve as a proxy - a crude way would be to survey the advertisements of items in general interest magazines. Total magazine area spent on a class of commodities can help select the visible commodities[15].

10.2 Threshold Methods

The differences between amounts spent by the lowest and higher percentile of spenders of a particularly commodity are expected to be higher when a commodity is a status-good than when it is of common utility. The illustrations show non-zero log-level expenditure on a few commodities when the lower (let's say θ) percentile of the consumption of the commodity is ignored. Ignoring the bottom θ percentile of the consumption of a visible commodity is equivalent to treating the bottom θ percentile expenditure as non-visible consumption (If we consider $\theta = 10\%$ for electricity, then bottom 10% percentile of the consumption on electricity would be consider non-visible and anything above that level would be considered visible). The plots of log-expenditures are shown with rising θ (starting with the lowest percentile θ that corresponds to lowest non-zero log-level of consumption of the commodity).

For an inferior good, one expects that the consumers from lower and higher quantiles of total expenditure (x-axis) would consume similar amounts of the good (y-axis). For luxury goods, the consumers spending higher expenditure on good would lean towards consumers with higher total expenditure. This does not indicate signaling in any way - but tests only whether a commodity is consumed uniformly amongst those with lower and higher total expenditure outlays (this is more likely to be a measure of popularity of the item than of visibility). Choosing different thresholds (θ) provides a a control on the degree to which a certain commodity can be included in our conspicuous consumption basket. Instead of asking whether marriage spending is visible or not - for example - the test asks if only the richer consumers can afford a significant expenditure on marriage (while varying the degree of visibility attached to spending on marriage).

In the data from Tanzania, while top 56% of consumers show spending on rice, electricity appears to be a luxury when only top 22 % of consumers spend on it. This may not necessarily suggest that a higher consumption of electricity indicates status but a higher θ for electricity certainly indicates its physical scarcity (to use the terminology of Hirsch [13]) - and thus a possible congestion arises for electricity. Since not all scarce objects can be indicative of status we either need some judgment to decide which products may indicate status signaling. A survey accomplishes this by ranking all products as viewed by its respondents.

It must also be noted that visibility is hardly orthogonal to major expenditure categories and the usual arguments of additive utilities cannot hold for visible consumption (If let's say rice and walnut are ranked differently in their perception of visibility in the survey then one can no longer talk about food as an additive component of the final uility*)*. Detailed microdata becomes a necessity for fitting a utility function that has a visible component ([1, 12]).

A similar analysis of Consumer Expenditury Survey (CEX) data from years 2004,2010 and 2014 similarly shows clear differences between expenditure on jewelry and fruits. It is evident that jewelry is not popular amidst the relatively poor and that richer consumers spend a higher portion of their total expenditure on jewelry than on fruits (curve being steeper for jewelry).

10.3 Possible methods for measuring congestion

The threshold-based method above offers no evidence of visibilty of chosen goods. Congestion - a related phenomenon - is subject to demand and supply for a particular commodity and can be measured as the

[15]If the magazines are indeed food magazines - then the ad-occurences are biased - but a general purpose magazine that caters to all sections of society and has a subject matter sufficiently orthognal to all consumpton items considered, can provide a reasonable proxy of visibility.

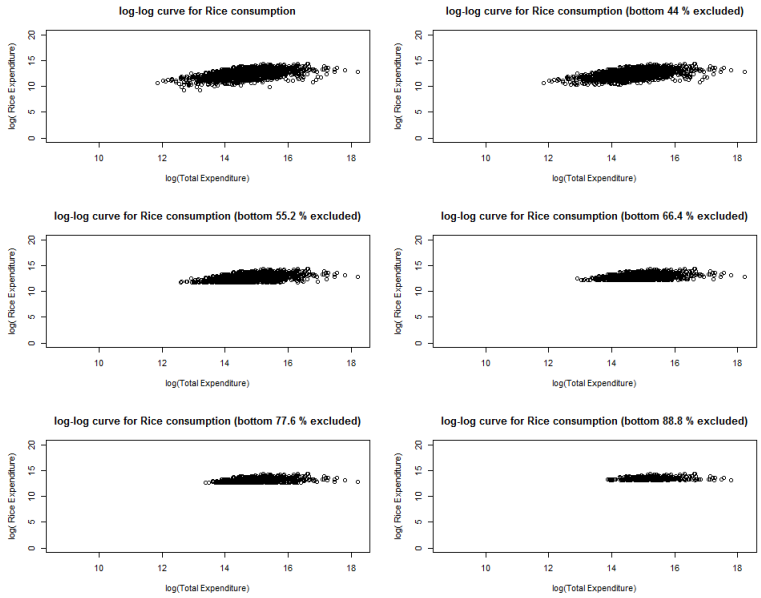

Figure 1: LSMS Tazanania 2010: Percentiles of nonzero consumption of rice

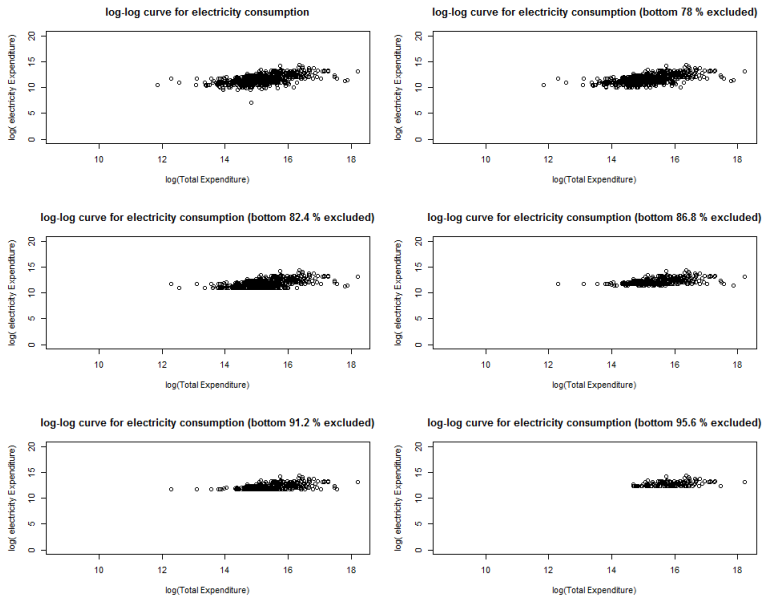

Figure 2: LSMS Tazanania 2010: Percentiles of nonzero consumption of electricity

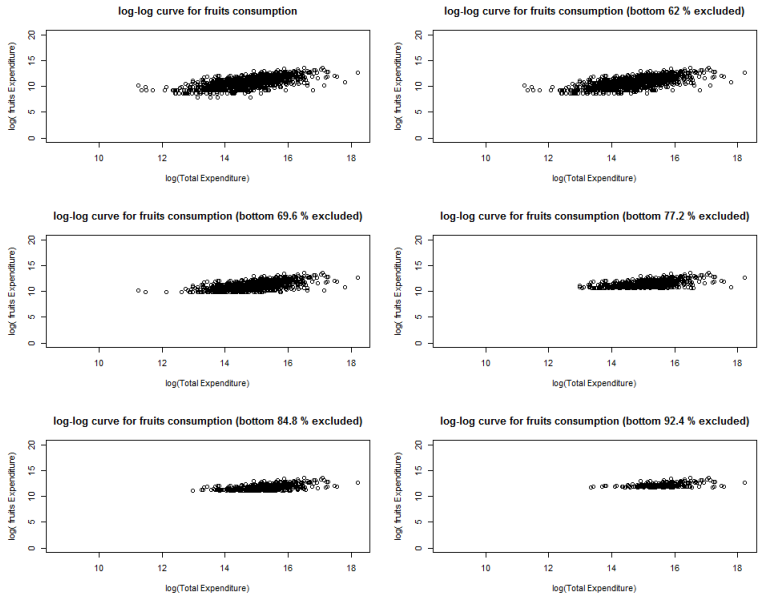

Figure 3: LSMS Tazanania 2010: Percentiles of nonzero consumption of fruits

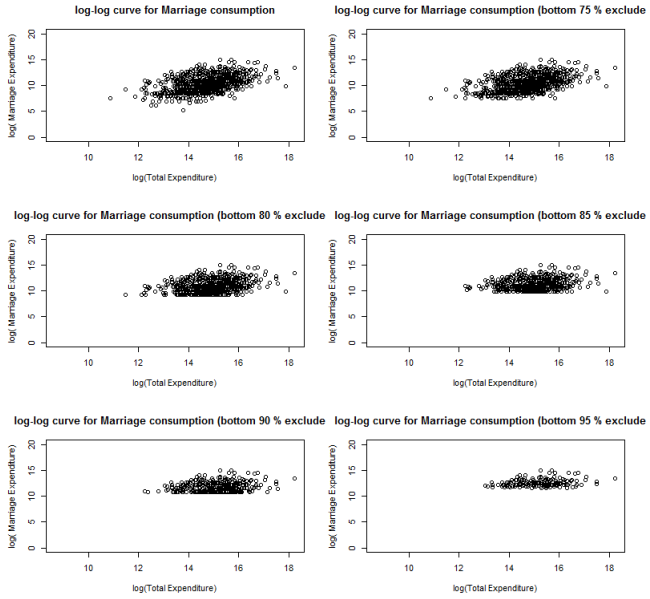

Figure 4: LSMS Tazanania 2010: Percentiles of non-zero expenditure on marriage

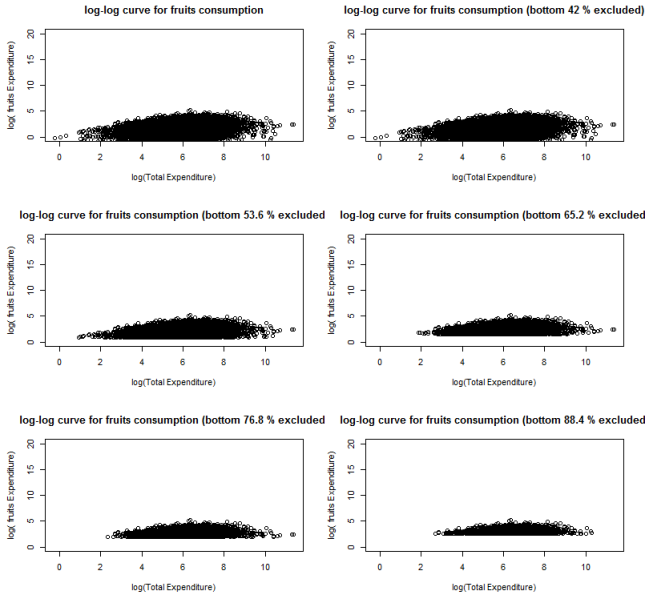

Figure 5: US CEX (2004,2010,2014): Percentiles of non-zero consumption of fruits

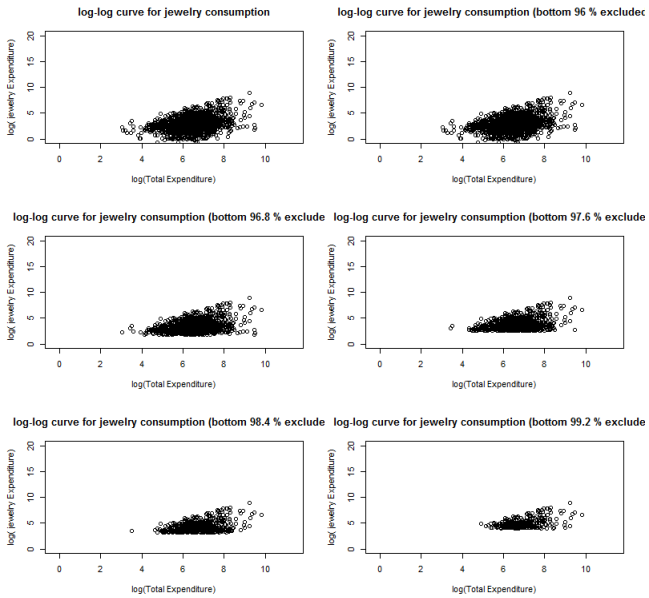

Figure 6: US CEX (2004,2010,2014): Percentiles of non-zero consumption of jewelry

basis for visible consumption. If we were to consider food, a limited supply and overpopulation can cause congestion. For entertainment, censorship and introduction of internet can create congestion. For housing, new constructions and overpopulation can cause congestion. As such, congestion is commodity-specific and a focus on selected items may be the only way to test whether there is disproportiante consumer spending on the commodity. The data from Tanzania so far only seems to point that availability of services in urban and rural area could be serving as status signals.

10.4 Claims to be Tested

10.4.1 Effect of Education Level

One of the claims to be evaluated on the LSMS data is whether education has a significant effect on visible consumption. A data-quality issue in exploring this claim is the presence of NAs in the recorded levels-of-education for nearly 30% of the individuals.

10.4.2 Effect of Immigration

With a significant migration from rural areas, one of the claims to be tested is whether those resident in the community spend less on visible consumption. The control parameter years-of-residence-in-community was not found to be significant for $ln(vis_i)$. Age of the household is in fact slightly more significant indicator of visible consumption. Household-size has a higher significance than both years-of-residence-in-community and age.

10.4.3 Urbanization Effects

One of the surprising aspects of the data is that urbanization doesn't have much effect on visible consumption. This could be because urban-rural differences in Tanzania are not as extreme -most of the country is sparsely populated with little access to basic services and it is likely that the administrative classifications of rural-urban areas do not reflect the consumer markets so well.

To reflect the market-accesibility better, a dummy for accessible markets was created using the distance from the surveyed household location to the closest daily market. One finds the market-acessibility thus calculated is not a significant factor of visible consumption elasticities either. A possible next step is using area dummies to detect any regional disparaties in the visible consumption across the country.

10.4.4 Population density

Population density is a crude measure for crowding in the cities. A urban/rural dummy can be created by classifying districts based on their population densities. This dummy does have significance - which may imply that those in urban areas spend more on visible consumption (possibly because rural areas don't have the means) - but this needs to be better instrumented.

10.4.5 Services as Visible Consumption

One of the interesting observations in the Vindex survey (Heffetz[12]) is the clustering of services and products. It is found that services tend to be less "visible" in the Western consumer world. The clustering might not be as clear-cut in the developing world - where social stratifications are severe and many services are contractual (non-monetary). The socio-cultural barriers might have an effect through access to services.

Towards that claim, English education as a control parameter is found slightly significant in the regression with $ln(vis_i)$ as the depedendent variable. Those who identify themselves as English speakers tend to spend less on visible consumption. With t-values of ~ 1.5, this effect is not extremely significant - but it points to i) fulfilment of status needs through services (education in this case) and ii) the need to include context-specific services in the visibility basket.

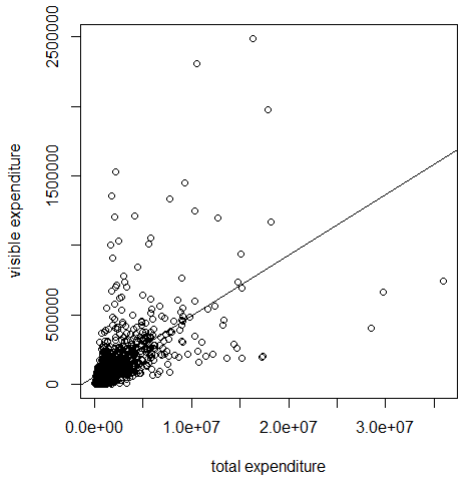

Figure 7: Visible Expenditure vs Total Expenditure for LSMS 2010

11 Analysis of LSMS Data

11.1 Steps in preparing LSMS data (2010)

Following steps were performed before running the regressions on the household consumption data from LSMS 2010.

1. Read weekly diary data from Section K (a table of items with the quantities consumed and cost associated with the item for every household).
   (a) All items that had no cost assciated with them were ignored (not included in total consumption)
   (b) Gift quantities were ignored for consumption (median ratio of gift to total diary consumption was zero - only 132/3828 households had this ratio 1% or higher)
   (c) Weekly diary data was multiplied by 52 (to estimate annual consumption)
      i. Weekly recall items were also multiplied by 52 (to estimate annual consumption)
   (d) Monthly recall items were multiplied by 12 (to estimate annual consumption)
   (e) All expenditure from (c)-(e) above were summed up as total expenditure
2. Obtained Personal Data from Section A,B,C and J files
   (a) Section C_CB was read to obtain market-facilitycode and gauge the accessibility of a market in every district. The closest accessible market could be either within the district or outside the district at a given distance. If a market was within the the district or less than 10 kms away it was deemed "accessible". Urban/rural classifications based on population density could be inserted at this stage (population density in not available in LSMS).
   (b) Read section B and C files
   (c) Calculated age of member by subtracting YOB (year-of-birth) from 2010 (survey year)
   (d) Read section J for housing data (total house rent, number of primary/secondary rooms)
3. Obtained income data from Section E (currently ignored for analysis for it being sparse). Here, the recorded pay frequency was in hours, days, weeks, months, fortnights, months, quarter, half year or year - while the mandatory fields corresponding to all of these units were i) number of hours worked per week ii) number of weeks worked per month and iii) number of months worked in an year .

(a) When pay was on a per-hour basis, the number of hours worked per week (provided) was multiplied with the number of weeks worked per month (provided). This product was then multiplied with the number of months worked per year (provided) to estimate the annual income.

(b) When pay was per-day, a 10 hour working day was assumed to obtain the effective number of work-days per week (based on the number of hours worked per week). This was then mutliplied with the number of weeks worked per month in the year and then further multiplied with the number of months worked in an year to obtain the estimated annual income.

(c) When pay was per week, the number of weeks worked per month was multiplied with the number of months worked per year.

(d) When pay was in fortnights, then twice the number of months worked in an year was used to calculate the total income received over the year.

(e) When pay was per-month, then the multiplication factor was just the number of months worked per year

(f) When pay was per-quarter, then the effective number of quarters were inferred from the number of months worked per year (number_of_months/3) and multiplied with the number of months worked per year to obtain the estimated annual income.

(g) For self-employed income, the work-months in an year was similarly used to compute total income from self-employment in the year

(h) All members less than 5 year old were ignored from the income data

(i) For wage workers:

i. summed up wages into column yearly pay
ii. summed up values under "other forms of payment"
iii. sum up values as secondary of payment (for wage-workers)
iv. only primary job was used to identify the employer type of the individual
v. added other wages from secondary job by summing up yearly-income from all sources into the yearly income

4. Ignored bad data

(a) Ignored 5 households with exceedingly high expenditure on marriage (more than reported annual income)

(b) Ignored households in the income table but with zero income (number of households with income data thus ignored were under 2%)

5. Merged all data

(a) Set education expense of houses with education expenses= NA as zero

(b) Summed up educational expense and total house rent from personal data into total expenditure (both weren't a part of diary data)

(c) Obtained personids of the house-heads and the following variables for household-head: education-level, age, years in community, language, occupation

(d) Obtained visible expenditure by summing up expenditure on visible items

(e) Merged all data into one table

11.2 Analysis and Discussion

Food is a significant portion of total spending overall [16] - those in the non-agrarian professions spend about as much of their total on food as those in agrarian occupations [17]. The other half of the expenditure is spent on housing, education and energy requirements as well as various household products.

[16] 50% of those surveyed spend 60% or higher of their total expenditure on food.

[17] The median ratio of food-expenditure to total expenditure for agrarian occupation households is 60% while for non-agrarian occupations the median is 57%. Around 54% of the total surveyed households were in agrarian occupations.

While a commodity for private consumption (e.g. skincream or hobby-equipment in the LSMS data) might have an appeal for everyone - whether it is associated with high-income or not is a social psychological concern and cannot be assessed from the household survey by itself. In the absence of a visibility survey (asking the respondents how much they notice a product and whether they associate the product with high-income or not), one may still continue the discussion of the potential conspicuous value of items by looking at how scarce the item is (based on the percentile of consumers of the commodity). This is akin to repeating the analysis of visible expenditure with a given commodity as the only constituent of the visibility basket. The percentile of consumers using a given commodity and the slope of $log(commodity - expenditure)$ vs $log(total - expenditure)$ can tell us if richer sections of society spend higher on a certain commodity and if the poorer sections of society consume the chosen commodity at all (the commodities chosen in the Table 5 are those where this slope is significant). The effects (elasticities) of income and other individual household variables on the consumption of individual commodities can thus be studied until a visibility survey is available. The regression based on data prepared from the last step attempts to calculate the coefficients of the following equation:

$$ln(vis_i) = \beta_0 + \beta_1 \cdot Dem_i + \beta_2 \cdot ln(pInc_i) + \epsilon \tag{11}$$

Here vis_i is the total visible consumption of the household i (consumption of the a chosen commodity such as electricity, sports equipment), Dem_i is a vector of demographic indicators under consideration and $pInc_i$ is the permanent income - proxied by total expenditure - which has been instrumented using age, $cubic(age)$, $occupation$, $highest\_education$ level , $ln(highest\_education)$, $cubic(highest\_education)$ [18].

Table 5 summarizes the results obtained by running regressions on several commodity-categories. The coefficients for variables - household-size and english-literacy - are significant and increase after instrumentation while age, region are both low and unaffected by instrumentation. Since it is difficult to draw conclusions on the effects of particular social conditions on consumption of a commodity that is used by 10% or less of the total consumers, a column in the Table 5 also suggests the percentile of consumers using the commodity (electricity for example is used amongst those having top 93% of total expenditure). The usage of commodities such as skincream and other-personal-products (shampoos, razors etc.) are widespread compared with sports or hobby equipments and electricity. For commodities that are rare and consumed only amongst the rich (those with higher total expenditure) the effect of English literacy is significant (even thought it is low in coefficient value). Similarly, hsize has a significant effect on educational expense and personal products.

Whether variables like possession of sports/hobby equipment or potentially some other determinants of status (e.g. English language) are explained by permanent income or whether permanent income is explained by the status determinants remains to be inspected in further analysis.

11.3 Further Adjustments

Certain variables - occupation, region and educational background (expenses) are to be grouped to represent clusters that can explain the regional and social concerns better. Data on population density can be used to i) identify urban settlements better and ii) explore the combined effect of population density and region dummies.

11.3.1 Occupation rank

Other than the sparsity of available income data, the motivation behind grouping occupations is the predominance of the informal sector in Tanzania. A few occupations in the survey are neither well defined nor are truly an indicator of total income. The presence of categories like unpaid-family-work and of individuals with no-primary-job getting a significant income from their secondary occupations makes the task of associating the primary occupation of the household head with her income rather difficult (i.e. occupation - which is available for all household heads cannot be used as a proxy of household income - which is not available for all households). Grouping the occupations into fewer categories than in the survey (by putting paid/unpaid

[18] All 2sls regressions involved involved performing three diagnostic tests provided by the function ivreg of package AER in R. These tests are - i) a weak instrument test ii) a Wu-Hausman test for endogeneity and iii) a Sargan test for validity of instruments.

family work and agriculture under the same category for example) may allow for the smoothening of the effect of individual occupations and possibly serve as a proxy of socio-economic classes in the country.

11.3.2 Region, Population Density and Price bands

Identification of regions/district as industrial or with high population density can help test the argument that if two groups A and B with same level of disparity in income amidst them ($income_A > income_B$) would exhibit differences in their visible consumption if they lived in areas of different levels of population density (effect of congestion on a specific commodity while keeping income constant).

Effect of price changes do not matter in a cross-sectional study - but disparity in prices of commodities is sure to affect consumption across commodities. A price band can be used to see if low price bands (places where food and basic amenities are cheap) enourage or discourage expenditure on positional goods.

Part III
A Behavioural Model for Status Utility

12 Utility and Status

The concept of status is rather non-trivial and has characteristics of feedback (status may yield income through social barriers and but may requires income for signaling as well). The Ireland model used in the literature treats status-signaling as purchasing of visible and non-visible goods[14]. In the Ireland model, the combined utility for every consumer is $U = F(f(v, w), s)$ where $f(v, w)$ is the private utility of the consumer and status s is assumed to be an increasing function of inference of others - $s = f(v, g(v))$ - with v denoting visual consumption and w - the consumption that is not directly observable. Every consumer thus optimizes the combined private and visible utility. A practical consideration in the model is the separation between visible and non-visible consumption - a boundary that requies a socio-culutral judgment and has been drawn using consumer surveys in the literature.

What research in the developing markets further points out is that the parameter of combined utilty in a simplified model - $(U = (1 - a) \cdot f(v, w) + a \cdot f(v, g(v))$ - can vary for different sections of society. A slight adjustment of the model may be to another parameter that indicates once social class. This is more relevant in the developing world because social status is yielded through social barriers in many developing countries. Sections of society that are endowed with a higher status capital are in less of a need to purchase the commodities of visible consumption.

In the analysis of LSMS data on Tanzania so far, urban/rural differences have signficance in the consumption of scarce commodities. There are two ways to incoporate this into a model of signaling - one is to consider these household characteristics as a class of the consumers - and the other is to consider these characteristics as part of visible consumption. For example, English literacy seems to have correlation with the consumption of certain scarce products in Tanzania and may indicate that people with access to English spend less on visible commodities. In the model that is to be developed, English literacy (along with urban residence and other characterstics significant for consumption of scarce commodities) would be seen as status capital.

Status capital cannot be quanitified as easily and remains a binary parameter in the model - uses as dummies that are found to have significant association with consumption of scarce commodities. The utility function in Ireland model can be thus viewed as $f(h(v, z), w)$ where v, w are the visible and non-visible consumption quantities (respectively) - and h is a function of a a discrete variable z that denotes the social characteristic and v - the visible consumption.

Notice that one needs to be careful while drawing conclusions based on consumption of commodities that are themselves selected based on the percentiles consumption levels. The threshold method that we use to select scarce commodities (that are likely to be visible) - considers items that i) are accessible by no more than 50% of the consumers and ii) have their expenditure rising with permanent income. These are - by definition - items that the rich are more likely to afford. We cannot select items that the only richer section of society indulges in and claim that people spending on these selected items indicate higher status. Such

Commodity	Significant Variables	NonConsumer Percentile	Variables significant after lnpinc instrumentation
carpetsrugs	lnpinc (4.72), age(-.11), hsize(-.45), housingstatus(.6), highest_educ(-.3), english(3.14)	78	lnpinc(4.9), age(-.12),hsize(-.56), highest_educ(-.30), english(3.15)
educexpense	lnpinc(3.84), age(.09), hsize(2.1), housingstatus(-.92), occupation(-.18)	35	lnpinc(4.5),age(.1), hsize(2.01), housingstatus(-.95), occupation(-.24)
electricity	lnpinc(4.27), age(0.06), hsize(-.49), housingstatus(.87), occupation(.37), isrural(-5.8), highest_educ(.47), region(.17), english(3.06), is_resident (-1.72)	78	Chosen instruments (occupation, ln_highest_educ) did not demonstrate endogeneity of lnpinc
houserent	lnpinc(2.03), age(-0.04), housingstatus(.23), roomsnum(.27)	84	lnpinc(1.83), housingstatus(.2)
personal items repair	lnpinc(.84), highest_educ(.07), region(-.05)	96	lnpinc(.82), highest_educ(.08), region(-.05)
personal products	lnpinc(3.45), hsize(-.52), roomsnum(.45), years_community(-.07)	37	lnpinc(3.42), hsize(-.55), roomsnum(.59), years_community(-.07)
skin cream	lnpinc(2.15), age(-.04), hsize(.21), isrural(1.48), region(-.12), years_community(-.03)	12	lnpinc(1.29), age(-.04), hsize(.4), region(-.1), years_community(-.03)
funeral costs	lnpinc(2.74), region(-.14), roomsnum(.61)	54	lnpinc(2.89), region(-.14), roomsnum(.62)
marriage costs	lnpinc(3.29), region(-.03), english(1.98), roomsnum(.66), years_community(-.05)	75	lnpinc(3.0), region(-.03), english(2.2), roomsnum(.68), years_community(-.06)
sports and hobby equipment	lnpinc(1.22), age(-.04), housingstatus(.45), region(-.06), english(1.6)	93	lnpinc(1.44), age(-.06), housingstatus(.50), region(-.08), english(1.7)

Table 5: Results from regression over selected variables

a claim is only a restatement of the high permanent income and says nothing more substantial than that the richer population sections signal higher status. It would be a fallacy to associate visible consumption with household characteristics by only associating household characteristics with permanent income. The threshold method that we only measures the "scarcity" of the item (e.g. electricity is more scarce than food) - not status per se. Indeed scarcity itself has an indirect effect on status competitions which cannot be denied - but this effect is not verified by the threshold method of classifying items itself.

13 Status Value through Experiments

13.1 Status and Consumption as games

Games have been used in the literature in the developing countries to gauge motivations of the participating consumers. [19]. While the visibility surveys ([18, 12]) attempt to study how consumption on certain commodities may signal status, the goal of the proposed game is to characterise environments under which the perceptions of a higher-status may develop. The game attempts to emulate i) the consumer market and ii) the mechanism through which status may be assigned within a group of consumers. It therefore relies on participants playing the dual role of a consumer and status-observer.

The activities of purchasing and assigning status are separate in the game. Since a simulated purchase performed by the participants in the game (given a list of commodities, prices and outlay) is quite likely to deviate from their real world purchases and their real needs, the participants are instead asked what additional items they would purchase for a given a basket of commodities that they already possess (using a cumulative voting scheme that emulates selection of commodities in a market - see section 13.2 for details). The second part of the game emulates status assignment - where participants assign a score of status and effectiveness each to 3 (or more) other participants in the game by looking at the quantities of the item categories purchased by the latter. The judgment of status in the real world does not involve direct observance of prices and thus it is only the quantity of the identified items consumed or already possessed that matters in the status-assignment part of the game. The end-goal of the game is to purchase a basket most desired by others - the winner achieves this goal by purchasing commodities of her choice that are most desirable by everyone and are indicative of a rank higher than everyone else in the game.

13.2 Purchasing Mechanism

It is difficult for players to conduct a "simulated shopping" in a way that truly represents their needs. Hence, instead of asking the respondent how they'll spend the given outlay of a 1000 dollars over a set of commodities, they are asked how they would spend the additional 100 dollars for a given 1000 dollars of outlay (or more) value of items that they already have stocked up. The "stock" items can be chosen by the players as a first step in the game and is intended to match their own consumption pattern. While the "stock" is made of non-positional items, the particpants choose 3 items from a mix of non-positional items and positional items - given the 10% extra outlay. Since all participants cannot be assumed to be equally numerate, the game uses a scheme similar to cumulative voting - where 10 virtual coins are provided to the participant and the participant is asked to distribute the coins amongst a set of available items (both positional and non-positional). The provided outlay in the game (number of coins) may vary for participants - in proportion to the income distribution that is observed in the relevant consumption surveys (e.g. LSMS for Tanzania).

In summary the following steps are taken in the game:

1. Choose a stock basket that is closest to one's own consumption pattern (no more than 5 basket classifications are provided to choose from)

2. Acknowledge the real-life constraint (see Section 13.2.2)

3. Use the given additional outlay (10 or less virtual coins) to purchase and add (positional and well as non-positional items) to the strictly non-positional stock baskset that was selected in the step 1[20]

[19] A study by Sophie Clot studies the effect high and low effort work on consumption by conducting an experiment at the payment office where some amount of pay is distirbuted for low-effort work and some for high-effort work.

[20] It is necessary to estimate the price of products and services for the purchasing game to emulate the market.

4. Provide a score (1..5) on effectiveness and status to 3 other participants whose total outlay and the choice of items purchased (along with number of coins used for every item) is also known

13.2.1 Mixes in the Consumer Basket

While the basket for every consumer can be varied to model urban/rural differences or the distance /accessibility of the particular commodity classes, the game ensures that all participants have reasonably similar consumer universe. Consequently, no category is intended to be completely removed from the basket (i.e. all baskets have the same set of categories). Following are the categories for which the positional/non-positional variants are sought:

1. Food - Fruits, Meat, Baked Goods or Nuts/Cereals and Pulses, Milk (minor items such as salt and spices are not included), Tea, Soda/ Beer and Wine
2. Household products (Detergent, Electronics)
3. Personal Products (Clothes, Shoes, Makeup)
4. Housheold services (House refurbishments) and Energy (electrcity/kerosene)
5. Savings for future Asset purchase
6. Entertainment/Dining Out/Travel/Travel Abroad
7. Health
8. Education (School/University)

13.2.2 Constraints and Assets

The game attempts to meaure status and consumption with respect to high asset ownership, social class or familial responsibility. Since players choose between physical needs and positional needs in the game, a different circumstance is likely to affect their choice and hence their perceived status. The game presents a precondition to the player - indicating high asset ownership, a chosen social class or a familial liability. For example, to test a participant's choice between food and electricity, the game can present a large family as a constraint, and record the choice between spending more on food vs installing electricity. The game thus measures indirect effects of reward or constraints on status by allowing participants to gauge the suitability of a participants's choice in the status game in the presence of constraints (familial) or rewards (asset-related).

Notice that the constraint variable is only planned to be binary in the current scheme i.e. it is either a reward or a liability (when present). The two values are expected to have an opposite affect on the purchase of new items. Admittedly, the binary values of constraints vs rewards circumvent the difficulty in comparisons between disparate needs of the consumers - e.g. a large family, senior member or a social event (e.g. marriage/funelal). While a multivalued variable (if adopted) can potentially provide better insights into the relative effects of these several types constraints, the goal of the current exercise is to test for a direct effect of constraints on status (rather than relative effect of the constraints).

13.3 Status ranking

The status-ranking activity involves a student assigning a status score by looking at i) what the other participant with a given income level does with the extra outlay and ii) what the participant already possesses. In the ranking scheme, the participants provide a score on effectiveness as well as status to all the other (3 or more) participants observed. Notice that in presence of constraints specified in section 13.2.2, regardless of whether one is selfish or not, a participant would tend to penalise someone else who she thinks is going to be more selfish than herself. Since the game provides a way to penalize selfishness by status ranks, the participants are discouraged from indicating status through overspending on positional items. The penalty for not caring for a sick parent may be huge in the society but so can be the penalty for being stingy. Similarly, while some may want to indicate wealth by buying a watch they may also fear disrespect for not taking care of a sick family member. The scores on effectiveness and status are thus not only a way to discourage the

consumer from limiting the unrealistic purchases in the simulated purchasing part of the game, they also track the effect of the externalities such as sickness or age (measured through the binary variable discussed in section 13.2.2).

While consumers try to maximise their utility by purchasing more items for a given limited outlay - they also manage their prestige by letting others have a better opinion of themselves. The status game can thus be seen as an enhanced version of the survey that asks people to imagine a neighbour who spends more than them on a chosen commodity (used in [18, 12]). The proposed game attempts to measure how consumers might act given a certain circumstances while both status and welfare (effectiveness score can be seen as a proxy of concern for others) become part of the payoff function in the game.

13.4 Welfare and Status competitions

The solution of this game for a set of rational players remains a pending exercise in this study. The key motivation for the analysis at this point is that fundamentally all social welfare concerns are concerns of Pareto optimality. Moreover, the payoff function for effectiveness in the game is meant to be a proxy for welfare.

With Pareto optimality in mind, more spending on education, health seems desirable - but it may be become distant for consumers due to their immediate needs - whether positional or non-positional. A comparison with what is observed in consumption data versus what is observed about positional consumption in games can provide some insight into the social status that can influence the desired welfare equilibrium.

13.5 Survey Questionnaire

You have 10,000 (or 100) to spend today. What are the objects that you would purchase if you were to enter the market today? Please take a look at the constraints that might affect your consumption. Try choosing the smartest way possible - the prices. You would also need to compare 2 other candidates as part of this game (as others would rate you). Try being close to your real circumstances. Unrealistic values may disqualify you from the game.

14 Policy implications

The data anlaysis discussion so far leans towards permitting status competitions rather than attempting to tax or control them. This is in line with the suggestions offered by Robert H Frank [9] favouring a non-monetary market of stauses only so that status games (which are a necessity) do not overlap with the market for real goods. Due to structural reasons of the modern economy, advertising efforts can turn a social scarcity into a physical scarcity (to use the Hirsch's terminology[13]). A profit-driven industry and the advertising pursued by the companies tend to increase the status competition for a commodity. Instead of letting status competitions modify the distribution of that physical goods (and thus do little do avoid the problem of physical scrarcities in the developing countries), policy can attempt to provide status-games in a world of non-necessity items - in some ways to diffuse the status competitions in the society.

In poor and non-pecuniary societies, the desire to become rich or the benefit of inheriting money and education is often less reachable. Status and money translate into social securities in unstructured societies. These may well be detected in the countries in Africa - but limited data on household characteristics in Tanzania (related to ethnicity or religion) have prevented us from this analysis for Tanzania.

The question that one needs to ask in the context of Tanzania (or another developing country) is whether the expenditure (as Priais Houthakker performed for expensive and cheap tea for class) - is actually more desirable from than higher classes spending on housing and education. This is the goal of the experiment. If the answer is indeed the former, then it makes sense to limit the status competitions (possibly by introducing brand differentiation) through policy to support status competitions on non-essential items.Attaching glamour to education, healthcare and food items or can help consumers prioritize their needs.

Despite cultural differences it is remarkable that the trends in development on private and public consumption are governed by the same forces in both the developing and the developed world. The colonial institutions followed a slow decay than destruction retaining a lot of their character and becoming part of the status games of society. The difference between private and public consumption has been a reminiscence of

this wide disparities in physical possessions (education, housing, food and health) of the past era. Post-war industrial developments were far better at improving private consumption than they were about public consumption - which was higher when labour was cheaper and the capital and power was limited to the very few. In absence of the new power exercised by corporations that work with local institutions, public consumption cannot improve.

Part IV
Status competitions under different price bands

15 Price Differences

The literature has not used panel data analysis in the context of conspicuous consumption. While an influence of rising prices can complicate the analysis of visible consumption indicators, the insights from demand elasticities are essential to understanding the relative effect of status-related consumption against other commodities. Higher price of food items may suppress consumption on food - but one cannot answer whether an increase in price of food suppresses its consumption more than it suppresses consumption of non-food items or not - without an estimation of demand elasticities. Such details of consumption patterns are basket-dependent and are not accessible without a record of prices of all types of items in the basket. Unfortnately, a lack of prices for non-food items in the LSMS prevent this much desired time-series analysis.

Even though an analysis on non-food prices is inaccessbile with the unavailability of price data in most consumption surveys (e.g. LSMS), a time-series analysis based on food prices alone can provide insights into the pressures on food consumption. Using historical prices on calorie consumption in India, Deaton and Jean Dreze point out that the overall calorie consumption has declined while the total outlay has increased in India ([8]). The change in positional value of food - determined by price differentiation in the market and scarcity - can potentialy help explain some of this decline. While such a decline is reported to be less in the case of sub-Saharan African countries than in India, the regional differences within the country could be explained by the change of food's position in the consumer universe (i.e. the so-called "Sen argument"[8]).

16 Regional differences

If a scarcity is widespread, it is less likely to be perceived as a scarcity and thus may possibly cause a downward pressure on necessities. The effect of population density and scarcity of the food items can explain any regional differences in the plain demand of food. The analysis in the previous chapter inspects the effect of region on consumption - where the high-price regions are detected using food prices. The question that we wish to answer is whether someone living in a high food-price area spends less on certain visible items or not. Further analysis of the effect of region and migration can provide more insights in the expenditure on status-signaling goods.

16.1 Observations from LSMS Food data

In certain areas - prices for food vary a lot more than they do in others. This is a phenomenon that varies from commodity to commodity. For example, the prices for onions and sugar don't vary so much by area code as they do for meat and chicken). The regions Dar-es-salaam, Mbeya mwanza, Mjini/Magharini unguja stand out for higher prices for multiple items.

On the other hand, some items have more price-differences overall than others - rice (husked), maize(grain), sweet potatoes, irish potatoes, groundnuts(shelled), goat meat, chicken and canned milk corresond to numerous (>4) region-codes where they're reportedly sold in different prices ranges. While it is tempting to claim that price differences in the market indicate that there is more price-differentiation and possibly more competition - one needs to consider the overall scarcity of the commodity (the percentiles of the commodity expenditure which we judge using the threshold method) as well as the preference for the item amongst the rich (measure by higher expenditure with income) for the item to be considered a status-signaling item.

Part V
Questions

1. How to incorporate weights in the surveyed tables?
2. How to account for combination of recall + diary?
3. Why are homeowners so low (84% spend on houserent)?
4. Would it worthwhile to run this analysis on a few more developed countries?
5. How would one fit a utility curve without price data?
6. Does endogeneity mean anything in absence of instruments?
7. This is similar to claiming a similar cluster of visibility. The visibility scale can thus be inferred based on the distance from a definitely visible commodity. The model that we choose considers all commodities (even status) as tradeable and thus modeled as capital.

Part VI
APPENDIX

```
itemsWithPrice=unique(hh[!is.na(hh$lwp) & hh$lwp>0,]$item)
hhWithPrices=hh[is.element(hh$item,itemsWithPrice),]
hhWithPrices$factor<-as.integer(hhWithPrices$lwp_unit==1)+as.integer(hhWithPrices$lwp_unit==2)/1000.0+as
hhWithPrices$q<-hhWithPrices$factor*hhWithPrices$lwp
hhWithPrices$price<-hhWithPrices$cost/hhWithPrices$q
hhWithPrices=hhWithPrices[!is.na(hhWithPrices$price),]
plot(hhWithPrices[hhWithPrices$item==10110,]$price) # example
nPrices<-ddply(hhWithPrices,.(item),summarize,n=length(price),mean_price=mean(price),sd_price=sd(price))
nPrices<-nPrices[nPrices$n>100,]
ohs<-ohs[!is.na(ohs$region),]
hhReducedWithPrices<-data.frame(hhid=hhWithPrices$hhid,item=hhWithPrices$item,q=hhWithPrices$q,price=hhW
ohs$areacode<-paste(as.character(10^ceiling(log10(max(ohs$region)))+ohs$region),as.character(10^ceiling(
ohs$areacode<-as.integer(ohs$areacode)
m<-merge(ohs,hhReducedWithPrices)
v<-m[m$item==10601,];plot(v$areacode,v$price) # example
```

```
cjdat<-read.dta('../lsms/TZNPS2COMDTA/COMSEC_CJ.dta',convert.factors = FALSE)
cj <- get_translated_frame(dat=cjdat, names=ohs_seccj_columns_lsms_2010(),
m=ohs_seccj_mapping_lsms_2010())
cj$areacode<-area_code(cj,c("region","district","ward","ea"))
d<-(ddply(cj,.(areacode,item),summarize,mprice=mean(price)))
cjt<-cj[cj$item==103,];cjt<-cjt[!is.na(cjt$price) & cjt$price>0,];plot(cjt$r,cjt$price);View(cjt)
# example
x=cjt[cjt$price<=max(cjt$price) & cjt$price > 10000,];paste(unique(cjt$item),unique(x$region),sep=",
```

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