

# Demand elasticities and conspicuous consumption in middle-Africa

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## 1 Background

Africa is on track to observe rapid development in the coming decades - but the phenomenal growth prospects of African countries are not without the conflicts and risks faced by countries in Southern and South-East Asia. The proposed study aims to assess the recent growth of African countries (more particularly the countries : Kenya, Ethiopia) in relation to Asian countries - with respect to utility of demand and market efficiency.

The central theme of the project is to quantify a control on spending patterns exercised by societies. In context of Africa, much as anywhere else, social attitudes have an effect on consumer decisions. Despite a possibility of a dramatic change, social attitudes are slow to detect and often change at a differential pace[1]. The study defines the control on these “economic” attitudes as response in consumer demand trends across countries - and intends to separate common consumption patterns across countries from the differences which may be accounted for by social contexts. It is hoped that trends such as gold consumption in India and sports expenditure in the U.S. are evident from such an analysis.

To narrow down its scope, the study focuses on commodities of conspicuous consumption and goods of utility - in order to offer a comparison of demand in countries of similar economic output and consumption levels. The wide scope is limited by a conscious avoidance of psychological analyses. An analysis as by Maslow (i.e. the theory of hierarchy of needs where “physiological” needs are fulfilled later than social needs) or Breckenridge (who classify consumption of goods in terms of pleasure, fantasy and style[2]) is consciously avoided in favour of more measurable parameters of social norms e.g. the classification of consumption as bandwagon or snob type[3] - or other assessments of “wealth rank utility”.

With Engel curves in mind, the product-pairs are chosen in a way that status-related and consumption needs may be differentiated (See Section 3.1). The effect of advertising elasticities would be investigated to find out how well equipped the current state of market in Africa is to address these demands (in comparison to Asia). An essential goal of this activity is to judge how far can the presence of technology and increased access to information (e.g. the speed of reception of demand signals such as the role of spouses, elders etc. in consumer-decisions) can support the efficient market assumptions in the context of middle

Africa.

The demand for visible consumption is of importance to policy. I believe that adjustment and sustenance of these consumption patterns should allow us to gauge the feasibility of economic growth. A future goal would be to delve into economic history to find out why certain patterns have prevailed (e.g. gold consumption in India, sports in the US). However, such a comparison is necessarily beyond the defined scope of this research.

## 2 Conspicuous Consumption

The signaling effect or conspicuous consumption - the so-called Veblen effects - were studied for the first time by Thorstein Veblen in 1899. The current literature is full of studies on items with clear signaling effects (e.g. luxury items [4]). In context of Africa, scarcity of resources is expected to limit the signaling needs in society. However, the literature doesn't appear conclusive on the matter. On one hand, scarce resources are reported to cause consumers to focus on production of goods to meet their most basic needs (Keegan & Green, 1997) [5][6] but on the other, economic inequalities are reported to result in increased signaling needs in society. In more realist terms, it would appear that the sale and consumption of products in developed vs developing countries seems more affected by the difference in levels of reliance on the agriculture sector (Less developed countries generate most of their GNP (70%) through agriculture while developed countries generate theirs primarily through services [7].

Signaling effects ought to be viewed with this difference in mind - while taking into account the rapidly changing economic landscape of Africa. A comparison of advertising elasticity and the changing levels of competition seems necessary for before an Easterlin paradox is talked about in the context of Africa.

A study on cross-commodity demarcation with use of Engel curves (i.e. a visibility index measured through survey) performed by Corneo et al[8] is found relevant in this regard. Another study finds durable goods having high advertising elasticity in the developed world, followed by pharmaceuticals and service goods. Elasticity is thus visited to understand the effect of signaling in chosen countries. Scarcity can be used here as a criterion to assist in the classification of products [9] as signaling or consumption (scarce

consumption goods are expected to have lesser signaling impact).

## 2.1 Signaling as visible consumption

Signaling assumes the medium of visible consumption - which the consumers use to indicate their status in society. The positional effects are known to have a significant impact on welfare. The permanent income estimates could also be used to account for consumption in visible products.

## 3 Measuring Signaling

The preliminary task for measuring the control on consumer trends is identification of a basket of signaling products valid across countries. Signaling products are essentially products that indicate social mobility (i.e. higher social status due to historical/economic reasons). A comparison of supply of products in the country/region vs the demand i.e. the consumption levels guides this identification. Whether the advertising elasticity is sensitive to economic factors for developing economies is the tested as part of this study (to verify if demand is driven by scarcity more than other factors in the developing economies).

### 3.1 Product Pairs

A straightforward way to find the products having signal impact can be through a comparison with a price of the replacement product. An item of luxury, for example, is a product whose replacement value (e.g. price of a fake) would be far less. Signaling products can be replaced easily - but are expected to have a disproportionate spending on the supply side (advertising side) as well as a higher price. A replacement product is neither always a fake and nor even present in the context of signaling (Google Glass may not have a replacement but still exhibits signaling). A comparison with a utilitarian replacement - however - still provides a way to measure the signaling preference in demand. Wherever a replacement is not available, multiplicity of products can be used to highlight the signaling potential of a product as opposed to its competitors.

The matching of these demand biases with the brand management and advertising efforts (relative to other countries) is planned as part of the study. A comparison of sales of items and the effect of advertising of consumption goods vs signaling products in the context of chosen African countries can indicate presence of signaling. Further, the effect of factors such as scarcity, short-term volatility and seasonality of consumption goods as well as the level of industrialization and other economic variables on the identified signaling products can help comment on stable vs transient spending patterns in the societies in African countries.

The first step, however, is comparison of a few product-pairs on different criteria:

1. Bicycles vs Cellphones - Bicycles are chosen since the lower costs of bicycles repairs open the item to informal sector - which is the primary employer in African countries[10].

2. Bus Transport vs Cosmetic services - The signaling effect is likely to be minimal in Transport services. A few additional control parameters to be explored are the level of entrepreneurship, scarcity and average levels of income in the chosen regions.

3. Electronic Utilities vs Jewelry Watches - Functional electronic items may have similar costs of production when compared to chosen luxury items (which are to be measured in relative terms) but may carry far lower signaling impact.

4. Brand Alcohol products vs (cheaper) Entertainment Drugs - Alcohol consumption has increased significantly in Africa. The replacement product would involve less production costs. Hence, the comparison is made with brand products to measure the efficiency of the market.

5. Agricultural Products vs Canned Food Products - This is to assess the impact of level of industrialization in the chosen countries and its effect on signaling.

The equivalent baskets of product-pairs can then be observed in the countries chosen.

Establishing this utilitarian replacement is a judgment issue fraught with problems. When applied to food, utilities or transportation, one cannot come up with a standardized replacement items without taking the geography and culture in consideration. To work-around the problem, we could inspect the underlying criterion that separates the two items (visible vs invisible) across countries - rather than the commodities in the basket themselves. For example, bicycles are hardly a commodity of necessity in the UK - so if we were to compare the conspicuous consumption between Tanzania and the UK, one doesn't look at the difference between bicycles and cellphones in the UK. Instead, to identify the role of informal sector, one could look at the sales of old(used)-phones vs new cellphones. Another example could be in food consumption, where more socially connected societies having more people eating at other people's home could imply visible consumption in luxury food items for African countries - but not as much for the UK (even if visible consumption as a self-image-improving exercise is considered). Heffetz, gives education as another example, where "name-dropping" schools could make education a visible consumption in the developed world.

These are all ad-hoc judgments. The bottom-line is that product pairs need to change in order to address the criterion under consideration (See Section 6 for comparison of Tanzania vs UK) and the consideration is essentially a socio-cultural one. Heffetz instructively notes that "visibility is a sociocultural

rather than physical feature of commodities”[11].<sup>1</sup>

## 4 Data

The data-collection activities are planned as a three-part activity:

### 4.1 Consumption Data

Worldbank provides panel data for consumption (LSMS) - which is being used as part of the current work. The work would be extended to panel data for more countries. The comparison with the UK is was done using the UK Household expenditure survey 2010.

### 4.2 Sales of Product pairs (3.1)

The WHO surveys related to consumption have been used in the literature - particularly related to drug consumption. The consumption panel data from LSMS provides the class of products available to required level of details.

### 4.3 Marketing Expenditure

The marketing expenditure is required only to assess the advertisement elasticity of demand. Since informal sector continues to be the major employer in Africa - over-reliance on accounting variables (R&D, marketing, intangible or advertisement spending) may only have limited scope and implications - but the data available from corporates engaging in marketing efforts in the region would be of definite use in the measure of advertising elasticity. The specific brand related data is not available through LSMS and more research would need to be done to find reliable sales data for the participating companies.

## 5 Theory

Key work in this area comes from Ireland [12] and Frank [13]. Heffetz ([14, 11, 15]) builds a visibility index - while using the model proposed by Ireland where an exogenous signal visibility  $s$  is modeled as the signaling factor that causes a consumer to deviate from the optimal choice he would have made in the absence of signaling (visibility). This “private” utility function  $f(v, w)$  is then considered for a two-commodity world that comprises of a visible product  $V$  and an invisible product  $W$  (whose quantities  $v$  and  $w$  are consumed respectively). The utility function in presence of signals can be represented as:

$$U = F(f(v, w), s) \quad (1)$$

<sup>1</sup>Heffetz builds a visibility index through surveys to measure how visible a product might be. A similar judgment would need to be used for our choice of basket of visible products.

This utility function is assumed to hold for all individuals and reflects all demand characteristics as well as spectators’ inference about status. The signal  $s$  itself is represented in terms of a “spectator inference function”  $-g(v)$ .

$$s = f(v, g(v)) \quad (2)$$

With the convexity assumption  $U = (1 - a) \cdot f(v, w) + a \cdot f(v, g(v))$  (for  $0 < a < 1$ ), a given budget constraint  $w + pv = y$  and an inference function  $h(v) = g(v) + pv$ , the conditions for a signaling equilibrium are derived for a Cobb-Douglas utility function (used by Heffetz). The solution (and the calibration which we seek) largely depends on the choice of  $f(\cdot, \cdot)$ . With the quasi-linear or homothetic choices, the equilibrium conditions result in significant deviation from private utility maximization in the low-income group[12].

## 6 Current Findings

### 6.1 Tanzania at a glance

Consumption from UK (UK Expenditure survey 2010) and Tanzania (Tanzania National Panel Survey 2010) has been compared as the first step. The key task has been that of standardizing consumption and income data. While income and consumption data are available per week for UK, the data for Tanzania is relatively sparse. Only 14% of the total surveyed respondents in Tanzania, for example, are on a kind of wage. The younger profile of the country may partly account for this sparsity of income.

The dependence on agrarian income is also evident from a preliminary analysis of the panel data. About 45% of surveyed households depend on income derived from farms. ~100 households seem to have secondary jobs. The number of individuals who run own their business is close to 10%.

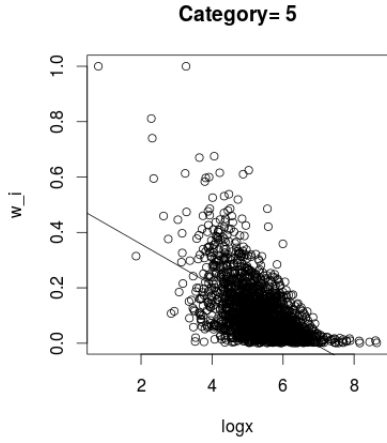
The consumption outside household is not significant for Tanzania. The survey records that only 5% individuals had eaten food outside the household in the past week. This keeps household expenditure a reliable indicator of consumption.

A permanent income perspective is to be explored in order to explain the consumption patterns. The LSMS national panel survey for Tanzania does measure the expected income to be used towards this analysis.

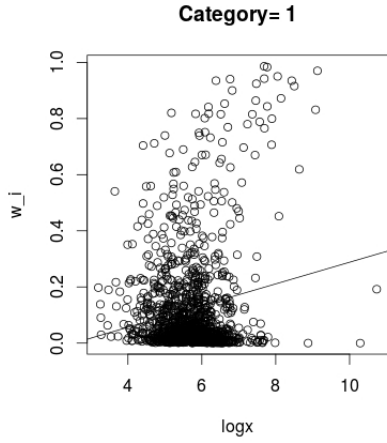
### 6.2 Semi-logarithmic Model

As in Imhoff’s consideration[16], we can assume that prices don’t change for the cross-section in the short-run (a week). This avoids the need for a more dynamic model (AIDS/Rotterdam) by ignoring price-sensitivities and leaves us with the Working and Leser regression  $w_i = \beta \cdot \log x + \alpha$ . This shows (predictably) significant t-values for total expenditure (outlay  $x = \sum p_i q_i$  and budget share  $w_i = \frac{p_i q_i}{x}$ ).

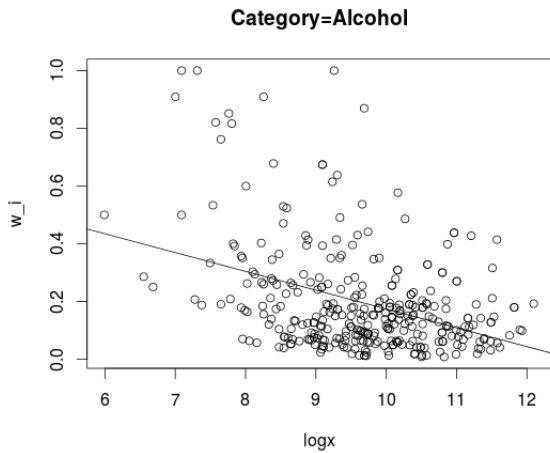
Category 5 is obtained by aggregating consumption on smoking (cigars,cigarettes).



The regression for category “1” (obtained by aggregating housing expenditures) exhibits different results.



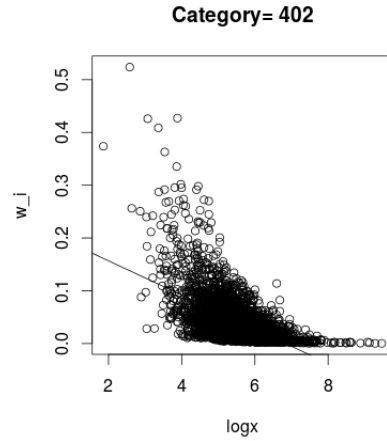
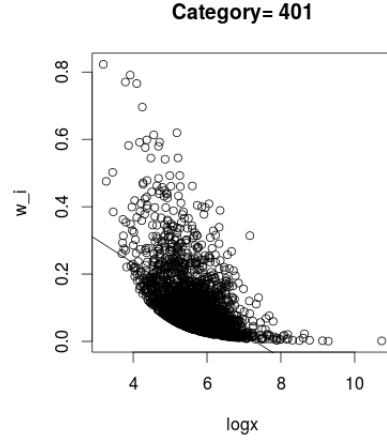
The same data on alcohol consumption in Tanzania exhibits a better regression.



### 6.3 Comparison of expensive vs cheap wines

For the UK consumption data, the price of the commodity is recorded in the diary. This allows for filtering the wines into expensive and cheap category. The

price differences in wines can thus be used to inspect conspicuous consumption (claiming that expensive categories have a signalling influence). A preliminary analysis confirms the intuition that expenditure on expensive alcohol is far to do with higher-income than would be the case in cheaper alcohol (The expensive alcohol is categorized as 401 while cheaper alcohol is categorized as 402). A more detailed analysis of sensitivities is to follow.



### 6.4 AIDS study

Stone’s analysis uses the following equation of price-elasticities:

$$\log(q_i) = \alpha_i + \log(x/P) + \sum_{k \in K} e_{ik}^* \log\left(\frac{p_k}{P}\right) \quad (3)$$

In this time-series study, Stone estimates expenditure elasticities  $-e_i$  from budget survey before introducing a time trend  $\theta_i t$  and taking differences ( $\Delta$ ) to minimize residual correlation [17].

$$\Delta[\log(q_i) - e_i \cdot \log(x/P)] = \theta_i + \sum_{k \in K} e_{ik}^* \Delta \log\left(\frac{p_k}{P}\right) \quad (4)$$

In estimating the AIDS demand equation enhanced by Deaton[18], one could use the geometric price index (as suggested by Deaton) but as modern econometrics packages (such as microEcon library

[19]currently being used in the study) handle non-linear estimation quite well, we don't intend to use a price-index for the study. This is planned to be undertaken at a point when i) time-series data can be obtained for Tanzania (and other chosen countries) and ii) price-variations have been dealt with.

## 7 Key Concerns

### 7.1 Separability

Separability and additivity are usual assumption in aggregation of commodities. Whether a category of visual consumption can be considered "separable" or for utility maximisation or not - remains to be tested in the study. At this point, only a comparison of visible vs invisible products is being considered.

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### 7.2 Quality

Generally, if one can recover systematic price variations (regional, seasonal, product-differentiation-related, quality-related differences), it is possible to obtain reliable estimates of price elasticities from cross-sectional data. However, a simple aggregation is fraught with problems as consumers choose quality as well as quantity [20]. Quality-adjusted price elasticities would this need to be further explored in the study.

Geographical variations are meant to be analyzed in the survey as well. In his study of Cote d'Ivoire, Deaton notes that purchases may not give an accurate picture of the consumption since a lot of consumption in the country (e.g. meat) is produced within the household (a problem particularly significant when notes zero purchases are noted for a significant portion of the data). Such differences because of geographic and income are handled by identifying clusters based on geography. The parameters provided by regressions run within the cluster, follow the regression on the overall data[21]. A geographical clustering may need to be undertaken for Tanzania as well.

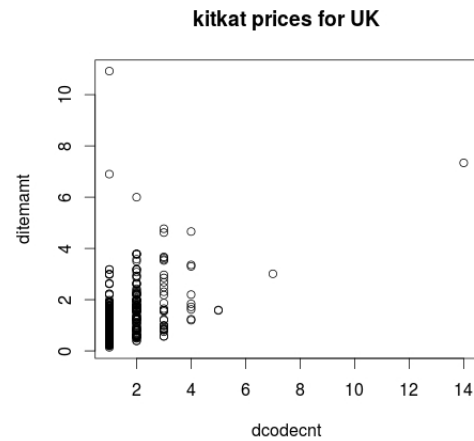
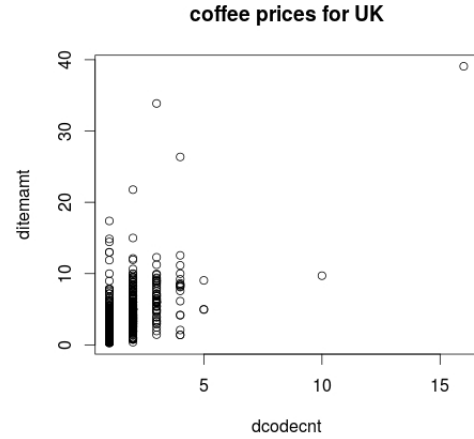
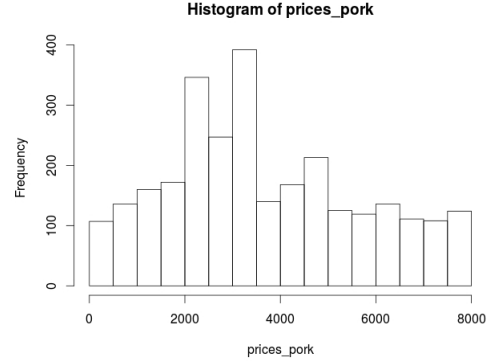
### 7.3 Visibility Measurements

While a few obvious choices of visible (signalling) products can be asserted, one would need to come up with a reliable measure of visibility in the context of the chosen country in order to test the degree to which demand elasticities match up with visibility.

<sup>2</sup>While considering separability of aggregates, one lumps commodities whose prices move together. For example, if prices of two commodities A ( $p_A$ ) and B ( $p_B$ ) are inversely correlated, then grouping them is equivalent to observing( $q_A + q_B$ ) for the aggregate price  $\frac{p_A q_A + p_B q_B}{q_A + q_B}$ . Clearly,  $p_A$  and  $p_B$  varying in opposite directions may i) change aggregate price significantly and ii) cause consumer to change  $q_A$  and  $q_B$  in a way not captured by the model.

### 7.4 Price variations

The price amongst visible commodities varies significantly (see the display of prices of pork). We may use price-based categories or scale prices to a "unit-value" to work around this problem (the latter is employed by Deaton[22]).



## 8 Possible Inclusions

1. Permanent (expected) Income can be explored using the data on assets (Section M) from the LSMS survey. The assets related information can also be used to cluster the households according to their economic position (or propensity to industrial consumption).
2. The significance of age-group needs to be tested

and compared for the chosen data (life cycle models can be possibly explored in this context)

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# Appendix

## Variables in UK Expenditure Survey

Set 3 in the UK expenditure survey provides the income related data. Variable p344 (labeled "Gross normal weekly household income") was considered as income for the analysis.

The consumption data is based on diary entries collected in the survey. The household is identified by "caseno". Variables "ditemcod" "dcodecnt" "ditemamt" are aggregated for amount expended for every commodity (over "persno" "expwk114" "dqualif"). The expenditure thus provides budget share.

The data is joined (merged) over "caseno" (household identification number).

## Variables in Tanzania National Panel Survey

The Section E of the questionnaire describes income related data. The variable "hh\_e06" identifies the type of occupation. hh\_e35 (Yes/No) and hh\_e38 (amount) are concerned with secondary jobs. The variable "hh\_e51", "hh\_e52" and "hh\_e65" are used for recording incomes from self-employment.

The Section F records food consumed out of the households. The variable "hh\_f03" records the value of the consumption outside the household in the past week.

Section K describes the consumption patterns. The itemcode describes the category of item consumed and "hh\_k04" records the expenditure on the entry.