Estimating potential urban demand: a case study of the size of the Ghanaian domestic market for instant *fufu*

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Abstract

Cassava has significant potential to contribute to rural incomes and to meet urban food needs. Understanding urban demand is an important part of developing this market opportunity. In this paper the potential urban demand for instant *fufu* powder was estimated. Methodological difficulties and data inconsistencies restricted the accuracy of the analysis. However, using sensitivity analysis, it was estimated that the true annual potential demand for instant *fufu* powder probably lies in the range of 1,000 to 17,100 metric tonnes. Even the lower limit would represent a substantial new opportunity for Ghanaian food manufacturers, albeit one that would not be easy to exploit. The estimated demand translates to a 2,000 to 34,200 metric tonne derived requirement for fresh roots (*ca.*0.8% to 13.2% of total trade) and substantial demand for plantain, all of which could be supplied by Ghanaian farmers. It is likely that farmers would enjoy substantial added benefits if these markets could be exploited.

Introduction

Marketing of cassava products into new markets has the potential to enhance poor farmers' income and provide employment opportunities. One of the key issues in developing these markets is identifying whether or not demand for certain products exists and assessing the potential market. In the current study, the potential demand for an instant form of a traditional cassava/plantain product called *fufu* was assessed in the major urban markets of Ghana.

A consumer market research company in Ghana analysed various aspects of the Ghanaian market for manufactured cassava-based foods (Research International 2001; Collinson *et al.* 2001). They determined public awareness, consumer attitudes and optimum pricing levels. They did not estimate the market size in this preliminary study. The approach taken to estimate the level of demand was to combine information from the Research International (RI) dataset and the Ghana Living Standards Survey (GLSS) of 1998/99 (Ghana Statistical Services 1998a;b;c; 2000). The RI survey was conducted on the basis of a stratified random sample of people within a range of Living Standard Measure (LSM) categories. In the LSM system, households are graded one to ten (ten denoting the highest living standard) using the responses to a series of questions about household utilities, assets and levels of education. Some of the same questions were asked in GLSS4, a country-wide survey covering all aspects of household assets, consumption, expenditure, income and output. The GLSS4 sample was designed to be nationally representative, and so inferences about the characteristics of the national population can be drawn by using weights and multipliers.

The intention of the analysis described in this paper is to use the GLSS4 data to estimate the total number of households in the RI survey areas (Accra, Tema, Kumasi and Sekondi/Takoradi) that fall into the relevant range of LSMs. From this and from data collected by RI on consumers' intentions to purchase, the potential size of the Ghanaian market for instant *fufu* was estimated.

Approach

Before conducting its survey, RI judged that middle class consumers were the most likely potential purchasers of the packaged cassava-based foods. Consequently, RI stated their intention to stratify its sample to include 49% in LSM groups 5 and 6, and 51% in LSM groups 7 and 8. In the event, a few households fell into groups 4 and below, while numerous households fell into groups 9 and 10. In effect, the sample became a random selection of households within affluent areas of Accra, Tema, Sekondi/Takoradi and Kumasi. This was useful, because it did not restrict the sample.

On close inspection, the relevant parts of the GLSS4 and RI datasets were not as good a match as had been hoped for. This had the effect of restricting the number of key variables that could be used to link the two datasets. The search for the key variables started with an examination of the RI dataset to establish which of the LSM questions had the greatest influence on determining whether a household fell within the RI sample or not. The following variables emerged (note that the total sample size was 350 households):

- Flush toilet in home? (328 yes, 22 no)
- Electricity in home? (342 yes, 8 no)
- Deep freezer or fridge in home? (321 yes, 29 no)
- Main source of water? (333 internally piped, 13 rain tanks, 4 other)

These variables were then cross-checked with the GLSS4 questionnaire to see whether the questions asked in the RI and GLS surveys were compatible. In the event, "electricity in home?" had to be abandoned because the GLSS4 survey did not cover this issue.

At this stage, criteria were needed for deciding whether a GLSS4 sample household could be considered to fall within the category of households sampled by RI (in effect, LSM groups 5 to 10). In the absence of a more sophisticated alternative, a method of scoring and aggregation was used. A household scored one point if it had a flush toilet, another point if it had a fridge or freezer, and a third point if it had internally piped water. Households scoring two or above were tentatively assumed to be in the LSM 5 to 10 category.

To give some credibility to this somewhat arbitrary categorisation, the RI dataset was subjected to the same criteria. The results tended to support the system of categorisation: 302 of the 350 RI survey households had an aggregate points score of three, a further 41 scored two points, yet only 7 scored just one point and none scored zero. Excluding households in the GLSS4 dataset that scored one is therefore on the prudent side of cautiousness: It is possible that some of these households would in reality fall into the LSM 5 to 10 group, but the total number is likely to be small. Their exclusion may well result in a conservative estimate of the potential market size.

There is a theoretical problem with the methodology. Just because a random sample of households in the affluent areas covered by the RI survey returned a large number of households that scored three points, there is no guarantee that a similar pattern could not be found in samples where the affluence of the area is not taken into account. The assumed match between the RI and GLSS4 datasets could therefore be spurious. However, common sense suggests that in a developing country such as Ghana, amenities such as flush toilets, fridges and piped water denote high standards of living and would not be found in the great majority of poor households (broadly, LSM groups 1 to 4).

Results

After applying the relevant weights and multiplier to the GLSS4 data, the following estimates (rounded to the nearest thousand) of households falling into the LSM 5 to 10 category were made:

Table 1. Estimated number of LSM 5 to 10 households in urban centres of Ghana.

Centre	No. of households	Average household size
Accra	91,000	3.49
Tema	108,000	4.22
Kumasi	113,000	3.66
Sekondi/Takoradi	12,000	3.95
Ghana	424,000	4.09
Source: Authors' estimations using GLSS4 dataset		

After trying the instant *fufu* during the RI product placement trial, an overwhelming proportion of participating consumers claimed that they would either probably or definitely buy the product if it was sold at a reasonable price (Table 2).

Table 2. Consumers likeliness to buy instant *fufu*.

Centre	Would definitely not buy	Would probably not buy	Not sure	Would probably buy	Would definitely buy	Sum
	%	%	%	%	%	%
Accra	0	2	0	21	77	100
Tema	0	0	8	38	54	100
Kumasi	2	8	4	26	60	100
Sekondi/Takoradi	0	0	4	26	70	100
Source: Authors' estimations using RI dataset						

Table 3 gives an indication of the frequency with which consumers from the different centres would buy instant *fufu*.

Table 3. How often would consumers buy instant *fufu*?

Centre	Two times a week	Once a week	Once a fortnight	Once a month	Never	Sum
	%	%	%	%	%	%
Accra	17	64	13	6	0	100
Tema	19	31	8	42	0	100
Kumasi	54	30	6	8	2	100
Sekondi/Takoradi	28	54	11	7	0	100
Source: Authors' estimations using RI dataset						

Although the smallest proportion of interviewees claiming that they would probably or definitely buy instant *fufu* came from Kumasi, the reported frequency with which these same people would buy *fufu* was substantially greater than claimed in the other urban centres. This perhaps indicates that people from Kumasi, who are generally Ashantis, are large but discerning consumers of *fufu*. Table 4 gives the results of converting the claimed frequencies into a weighted average number of packets purchased per week. Weights used merely reflected the frequencies reported in Table 3 and were used to estimate the number of packets consumed per week.

Table 4. Claimed purchase intentions: weighted average number of instant *fufu* packets purchased per week by urban centre.

	Weighted average number of packets purchased per week
Accra	1.1
Tema	0.8
Kumasi	1.4
Sekondi/Takoradi	1.2
Source: Authors' estimations using RI dataset	

Assuming that the weight of a packet of instant *fufu* is 1kg (the pack weight used in the RI placement trial) and that the actual proportion of all LSM 5 to 10 consumers in the four urban centres that *would in reality* buy instant *fufu* is accurately reflected in the RI categories "would probably" and "would definitely" buy, then the following estimates of potential annual demand apply (Table 5; figures rounded to nearest 100 tonnes).

Table 5. Estimated potential annual demand for instant *fufu* by urban centre.

	Tonnes per annum
Accra	4,900
Tema	4,300
Kumasi	7,200
Sekondi/Takoradi	700
Total	17,100
Source: Authors' estimations using GLSS4 and RI datasets	

It is possible that trial participants over claimed their purchase intentions. In this light, the 17,100 tonne estimate probably serves as an upper limit to potential demand. Table 6 gives a range of figures for estimated potential annual demand, incorporating various degrees of overclaim. For instance, 75% overclaim means that only 25% of those who claimed that they would either "probably" or "definitely" buy instant *fufu* actually do so, and that they only buy a quarter of the quantity they claimed they would.

Table 6. Sensitivity analysis for potential demand for instant *fufu* using different levels of overclaim.

	Level of overclaim			
	0%	25%	50%	75%
Potential demand in 4 urban centres (tonnes)	17,100	9,700	4,300	1,000
Source: Authors' estimations using GLSS4 and RI datasets				

An overclaim of 75% would be an unexpectedly large rate, whereas 0% would be extraordinarily low. We can therefore state that, providing our estimates of the number of Ghanaian households that fall into the LSM 5 to 10 category is accurate, the true potential market size for instant *fufu* probably lies between 1,000 and 17,600 tonnes per annum.

Discussion

Although the sensitivity analysis in the previous section describes a large range in which the true market potential probably lies, the point of the exercise was to establish whether there is significant potential demand for instant *fufu* and therefore a substantial derived demand for cassava roots for processing into cassava flour. Taking the smallest estimate of 1,000 tonnes and assuming that cassava flour constitutes 40% of the instant *fufu* powder, the equivalent demand for cassava roots would be approximately 2,000 tonnes a year (assuming a 20% conversion of fresh roots to cassava flour). Most of the manufacturers currently use 40% cassava starch in their instant *fufu* mixes. One of the aims of research is to convince manufacturers that they can replace the imported cassava starch with domestically produced cassava flour, thereby benefiting Ghana's balance of payments and providing market opportunities for Ghanaian farmers. At 17,100 tonnes of instant *fufu* powder consumed per year, the equivalent demand for cassava roots would be about 34,200 tonnes. Credible estimates of the total quantity of cassava that is traded in Ghana are hard to come by. However, by taking GLSS4 information on the value of cassava sold during the survey year (1998/99) and dividing it by the average price of cassava for that year (also generated by GLSS4) one arrives at a figure of 260,000 metric tonnes of cassava traded per annum (fresh root equivalent, rounded to the nearest 10,000 tonnes). Assuming this to be a reasonably accurate estimate, the potential increase in demand for cassava roots generated by the exploitation of the domestic instant *fufu* market lies between 0.8% and 13.2%.

Clearly, if 17,100 tonnes of instant *fufu* could be supplied to the market, this would represent a large opportunity both for food manufacturers and cassava farmers in production areas that could supply cassava roots cost effectively and reliably. Because instant *fufu* contains a large proportion of plantain flour (approximately 60%), there would also be an opportunity for similarly capable plantain farmers. Even the lowest estimate of potential demand represents a modest, but significant opportunity for Ghana's food manufacturing industry. Although accurate figures for the industry's current maximum output are not available, we estimate that 1,000 tonnes represents an increase of two thirds over current maximum output. This assumes that all current manufacturing capacity is devoted to instant *fufu* production, whereas in reality, a substantial

portion is devoted to producing other foods such as *kokonte* (100% fermented *kokonte* flour) and *banku* (1:1 cassava to maize flour).

In practice, sales of instant *fufu* and other cassava-based foods will be influenced by the effectiveness of promotional campaigns. A minority of RI respondents (39%) were aware of at least one of the manufactured cassava food products. Other factors will also influence the degree to which market potential will be realised. The quality of the products and the degree to which they live up to consumers' organoleptic requirements will have a significant influence on sales. Similarly, product pricing will have a major impact. The RI respondents who tried the instant *fufu* during the product placement trial were asked whether they would buy the product *assuming* that the price was "right".

This analysis has concentrated on the domestic market. However, to date, the export market has absorbed an estimated 95% of manufactured cassava food output, yet almost certainly still holds unrealised potential. Export marketing requires very little effort because the manufactured cassava products tend to sell themselves to expatriate West-Africans. In this light, the business risk of expanding output diminishes somewhat and investments look more promising.

In this paper one approach to estimating urban demand for a new food product has been demonstrated. It is suggested that the estimation of potential demand for a new food product is an important step in developing a new market opportunity for rural producers and agro-enterprises.

Acknowledgements

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