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Staff Paper

SUPERMARKETS AND CONSUMERS IN AFRICA: THE CASE OF NAIROBI, KENYA

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Staff Paper 2005-04 **February 2005**

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Supermarkets and Consumers in Africa: The Case of Nairobi, Kenya

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Abstract: Supermarkets are rapidly penetrating urban food retail in Kenya and spreading well beyond their initial tiny market niche into the food markets of lower-income groups. Having penetrated processed and staple food markets much earlier and faster than fresh foods, they have recently begun to make inroads into the fresh fruits and vegetables category. The important changes in their procurement systems bring significant opportunities and challenges for small farmers, and have implications for agricultural diversification and rural development programmes and policies.

23 pages

Acknowledgements: This publication was made possible through financial support provided by the Rockefeller Foundation, the U.S. Agency for International Development (USAID) via the projects 'Partnerships in Food Industry Development – Fruits and Vegetables' and 'RAISE Assistance for Trade Capacity Building in Relation to the Application of Sanitary and Phytosanitary Measures (SPS)' and the World Bank. For their valuable comments we would like to thank Akinwumi Adesina, Ronald Kopicki, David Soroko, Lawrence Busch and Dave Weatherspoon. Our deepest gratitude goes to all the people in Kenya who are at the heart of the research presented here. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the Rockefeller Foundation, the U.S. Agency for International Development or the World Bank.

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KEY TO ABBREVIATIONS

CBS	Central Bureau of Statistics
COD	Cash On Delivery
COMESA	Common Market for Eastern and Southern Africa
DFID	Department For International Development (UK)
EAC	East African Community
FAO	Food and Agriculture Organization
FC	Factor Cost
FDI	Foreign Direct Investment
FFV	Fresh Fruits and Vegetables
GDP	Gross Domestic Product
GoK	Government of Kenya
HACCP	Hazard Analysis Critical Control Points
HCDA	Horticultural Crop Development Authority
HPHC	Horticultural Product Handling Centre
KACE	Kenya Agricultural Commodity Exchange
MD	Managing Director
MLE	Maximum Likelihood Estimation
MoARD	Ministry of Agriculture and Rural Development
MPV	Marginal Product Value
NGO	Non Governmental Organization
OLS	Ordinary Least Squares
SKU	Stock Keeping Unit
SMS	Short Messaging Services
SMT	Strategic Management Theory
TAV	Traditional African Vegetables
TCT	Transaction Cost Theory
USAID	United States Agency for International Development

SUPERMARKETS AND CONSUMERS IN AFRICA: THE CASE OF NAIROBI

1. Introduction

Over the past decade, supermarkets have emerged as important agents of change in the agri-food systems of developing countries (Reardon et al. 2003); for example the share of supermarkets in domestic retail rose roughly from 15% to 55% on average in Latin America from 1990 to 2002 (Reardon and Berdegue 2002). This emergence could only have taken place in the context of changing behavior of consumers who, in liberalized markets, ultimately decide which retail firms and what products succeed. If the appeal of supermarkets were limited to the higher income segments of the population, little change in retail structures would have been noticed. As we show in this essay for the case of Nairobi, the appeal of supermarkets is much wider with the majority of consumers, not just the rich, changing their shopping behavior both in response to and driving the growth of supermarkets.

Agri-food firms, whether domestic or foreign, who want to sell their products in the emerging markets created by the rise of supermarkets need a good understanding of the dynamic relationship between the consumer and the supermarket. Not withstanding this importance, few studies have analyzed the role of consumers in the rise of supermarkets in emergent markets in detail. Some recent important exceptions include Zhang (2002) for China, Al-Mazrooei et al. (2001) for Oman and Rodriguez (2002) for Argentina. Although supermarkets are also on the rise in Africa in general (Weatherspoon and Reardon 2003), and in Kenya in particular (Neven and Reardon 2004), there have been no such consumer studies in this region.

By analyzing consumers and supermarkets in the Nairobi food market, we address this gap in the literature. This exploratory study aims at shedding light, from the consumer perspective, on the positive feedback loop between consumers giving their dollar vote to supermarkets and supermarkets using it to create more value for consumers. More specifically this research analyses the following research questions: (1) which attributes of retail outlets and the products they sell are important to consumers when deciding where to buy their food?; and (2) which socio-economic and demographic factors affect retail outlet choice and shopping frequency? We focus on food in general as well as on fresh fruits and vegetables (FFV). The latter allows us to assess if consumer behavior is different between the dry foods and fresh foods categories as food perishability is likely an important factor in a country like Kenya where few households have refrigeration.

The essay proceeds as follows. The next section describes the data and methods used in this study. Section 3 describes the rise of supermarkets in Kenya in a broader context. Section 4 then analyses the patterns and determinants of consumer behavior with respect to retail outlet choice and shopping frequency. Section 5 provides the conclusion and implications.

2. Data and Methods

This consumer study is part of a broader study on the rise of supermarkets in Kenya which included primary data collection during a 10-month fieldwork period (March to November 2003, April 2004). The consumer study had two parts.

The first part in the consumer study consisted of consumer focus group research. Eight focus group sessions were conducted in Nairobi. These included four all-female and four all-male sessions with a total of 54 participants from all income categories. Following standard guidelines for focus group research (see e.g., Churchill 1999), we controlled each session for gender and income class so that within a specific session participants were similar in those two respects and they would feel at ease communicating in the group. These focus groups allowed us to get familiar with nature of and the main motivations behind the shopping behavior of Nairobi's citizens with respect to food in general and fresh fruits and vegetables in particular. It also allowed us to understand the vocabulary used by consumers to describe their shopping behavior, thus further facilitating a good design of the survey instrument.

The second part consisted of a consumer survey. The designed survey instrument focused on two sets of comparable questions, one for food and one for FFV. These question sets related to retail outlet choice, shopping frequency, expenditure levels and reasons for retail outlet choice. A set of socio-economic questions were included to obtain the independent variable values. This instrument went through several pre-tests and revisions before a final format was decided upon.

In order to get a good geographic and income-class representation, a stepwise sampling process was implemented. Within each of Nairobi's eight administrative divisions (used as sub-population strata), we selected (within the context of the stratum) the lowest, a middle- and the highest income location. This selection was based on the poverty gap for the location (CBS 2003). The poverty gap measures how much those who are under the poverty line are, on average, below the poverty line. For each selected location, we then conducted a field reconnaissance with the assistance of the location Head (Chief) and composed a list of the estates (i.e., residential neighborhoods demarcated by a high degree of internal socio-demographic similarity). From this list we then made a random selection of 24 estates. Enumerators were assigned a street (usually the main street) in an estate to start from and were free to select a (any) dwelling in the street as the starting point. Subsequent interviews then took place at each 3rd house until a pre-determined number of interviews, relative to the population size of the location, was attained. A similar sampling design was used by Zhang (2002) in China. If a household refused to collaborate or was not home, it was skipped. In order to minimize this replacement method leading to a bias against small households (where all family members work during the day on weekdays), interviews were conducted in the weekend.

A total of 445 valid interviews were conducted in the interviewees' homes during November 2003 by a team of 18 business students from Kenyatta University. Enumerators worked in several rounds of data gathering so that their work could be checked and they could be re-instructed were needed as the survey progressed. Response rates were high, except in the high income estates where enumerators indicated that it was very difficult to get admitted by the house-guards to households. (Zhang (2002) made a similar observation.) This led to an under-representation of the high income households in our sample. In order to correct for this, weights were used where the analysis below describes the population as a whole. These weights are based on a distribution of Nairobi's population over different income-classes estimated from various sources (World Bank 2004, CBS 2002a, Obudho 1997).

3. Supermarkets, Population Dynamics and the Urban Food Market in Kenya

It is important to first give the definition of a supermarket we used in this study as this definition varies from country to country. The terms "self-service store" and "supermarket" are used

interchangeably in Kenya, irrespective of their size, as both have exploded on the retail scene together. Furthermore, supermarket chains have developed different store formats to reach different customer segments. Hypermarkets with large parking areas along the main entry/exit roads in Nairobi and Mombasa mostly attract the high and middle-income consumers. Smaller 'neighborhood' stores in Nairobi's residential areas ('estates') mostly target middle-income consumers. City center stores near busy bus stages mostly attract the middle to low income consumers. Based on the Kenya branch of the international retail auditor AC Nielsen, supermarkets are here defined as "self-service stores handling predominantly food and drug fast moving consumer goods (FMCG) with at least 150m^2 (1,625 sq.ft) of floor space". We defined supermarkets of 15 times this size as hypermarkets (i.e., 2,250m^2 or 24,460 sq.ft). Using these definitions, there are about 209 supermarkets and 16 hypermarkets in Kenya.

At the same time, an estimated 900 to 1,400 smaller self-service shops have entered the retail sector. These shops include mini-supermarkets in smaller towns as well as convenience stores in residential areas and at gas stations. In small towns, the emergence of these mini-supermarkets is just as radical a departure from the traditional shopping experience of consumers as hypermarkets are to consumers in Nairobi. Although this implies that small self-service shops are an important part of the retail revolution taking place in developing countries, this essay focuses on the 225 supermarkets meeting the size criteria above (Neven and Reardon 2004).

In 2003, supermarkets sold US$520 million worth of products of which US$365 million in food – or roughly 20% of the US$1.9 billion urban food market in Kenya (Neven and Reardon 2004). The rest of the urban food market consists of smaller self-service shops which represent 17% of the urban food market, while the remaining 63% of sales comes from traditional retailers. Since 1995, supermarkets (in terms of their aggregated sales) have been growing at an average annual growth rate of 18%, i.e., much faster than aggregated urban income. Consequently supermarkets are increasing their market share vis-à-vis traditional food retailers such as kiosks, greengrocers, over-the-counter shops, market stalls and street hawkers and at current growth rates, supermarkets will become the dominant food retailers by 2011.

The rapid growth of the urban population, due to both overall population growth and urbanization, has been a key driver of the growth of supermarkets since their emergence in the 1960s[1]. Supermarkets are located in urban areas only in Kenya, hence our focus on urban consumers. Between 1989 and 2002, Kenya's population has grown from 21 million to 33 million and is expected to reach 42 million by 2010 (Mungai et al. 2000). In addition, the average urban population growth rate is double that of the overall population growth rate (United Nations, 2002). In 2003, nearly 40% of Kenya's population and half Kenya's households (given smaller household sizes in cities) already lived in urban centers and the rural population, in absolute numbers, has started to decrease. Given currently anticipated growth rates, the urban population is expected to surpass the rural population by 2013. Although the overwhelming majority of the people migrating to and living in Kenya's urban areas are poor, their aggregated demand constitutes the effective demand modern supermarkets, with their low margin - high stock turnover strategy, can thrive on (Pralahad and Hammond 2002).

The effect of urbanization is amplified by a related change in life-style. Relative to rural households, urban households have less time to shop for food and prepare meals (e.g., because of

[1] The urban population is here defined as all people living in urban centers of 10,000 or larger. Based on the 1999 population census (CBS 2002b) and UN growth projections (UN Habitat 2004, UN Population Division 2003) we estimate the urban population in 2002 at 11.9 million or 37% of the overall population.

women working out of the home or men working a migrant labor to provide for their rural family), have higher incomes and are more mobile. At the same time, on-going market and trade liberalization since the mid-1990s increased product variety in the Kenyan market place dramatically and induced a shift from a supplier to a consumer-driven economy. Increasingly, supermarkets, with their broader assortment provided an alternative for traditional retail outlets with limited assortments. The urban population also consists overwhelmingly out of young adults (43% are aged between 15 and 34, CBS2002a) who have embraced a westernized life-style in which supermarkets are the retailer of choice.

Fresh fruits and vegetables (FFV) is a fairly new and, given the high perishability, far more difficult to manage product category for supermarkets in Kenya. Nevertheless, FFV hold great potential for supermarkets looking for growth opportunities because they are an important part of the diet of urban consumers in Kenya who (for vegetables) consume twice the volume of rural consumers (i.e., an estimated annual per capita consumption of 40kg; GoK 1994) and, as they generally have less time and land to produce their own fruits and vegetables, spend 7% of their income on buying fruits and vegetables from urban retailers (CBS 2002a). Although the supermarkets only had a 4% share of the US$364 million urban FFV market in 2003 (that share is 6% in Nairobi), on-going changes in their procurement system in combination with changing consumer habits are expected to increase that share substantially over time (Neven and Reardon 2004). While selling fresh fruits and vegetables in supermarkets in not a rarity, given that overall four out of ten supermarkets sell them to various degrees, it is very much concentrated in the Nairobi hypermarkets of two leading supermarket chains. Produce sections in these hypermarkets (which attract the high-income consumers) can take up 7% of the store's sales floor space and offer over 300 stock keeping units (SKUs) from American pink sweet potatoes to zebra yellow melons (although only 100 or so are available at any given time)[2].

Kenya's supermarket sector has three tiers (Neven and Reardon 2004). The first tier consists of the two clear market leaders and also the leading produce retailers, Uchumi Supermarkets and Nakumatt. These two supermarket chains represent nearly 50% of the supermarket sector in terms of sales. While Uchumi targets consumers from all socio-economic classes, Nakumatt's consumer focus has been mostly on the high-income segment (50% of their customers fall in this category). The second tier consists of the Tusker, Ukwala and Metro Cash 'n Carry chains. These three chains are fiercely competing for the shilling vote of the middle-to-low-income urban consumers. The Top 5 supermarket chains represent 28% of stores and 60% of the sales, indicating a concentrated sector. The supermarkets in the third tier exist of small chains and independent (single-store) supermarkets.

In terms of geographic spread, supermarkets have expanded rapidly although the consensus in the sector is that there still remains much room for growth. In 2003, nearly 60% of the supermarket outlets (and 44% of the supermarket sales) were located outside of Nairobi and essentially every provincial capital in Kenya had one or more supermarkets. However, the top five chains are present in only eight urban centers and only about half the urban centers with a population of more than 25,000 have a supermarket. The country-level supermarket density of 7 supermarkets per million people is still far below that of countries with similar incomes and urbanization rates (such as Central America with double the rate).

The Nairobi food market is an interesting case for several reasons. With a city population of about 2.6 million, it is the largest city in East Africa (and the 12th largest in Africa). Its

[2] For comparison, fresh produce sections in US supermarket chains have on average 634 SKUs (Perosio et al. 2001).

population is growing fast, with a recent study predicting that (mainly through rural-to-urban migration) Nairobi's population will grow to 7.5 million over the next 20 years, i.e. an increase of almost 700 additional inhabitants every single day (African Population and Health Research Centre 2003). Nairobi also leads the rest of the country in several other aspects: (1) Nairobi still accounts for majority (56%) of supermarket sales; (2) in terms of store density, Nairobi is clearly in the lead with 36 supermarkets per million, nearly triple the level of the rest of urban Kenya (comparable to a Central American city, Berdegue et al. 2004); (3) the FFV market share of supermarkets is also the highest in Nairobi (at 6%).

4. Empirical Results and Discussion

4.1 Supermarket Customers and Household Income

Table 1 reports results from the Nairobi consumer survey. In Nairobi, 80% of households buy part of their food from supermarkets on a regular basis, i.e., at least once a month (Table 1). That figure is 60% for the lowest income-group. Households with monthly incomes of less than Ksh15,000 make up 56% of the customers in supermarkets and 36% of their sales. Table 6 also illustrates why the upper-middle and high income classes are a key battleground for the leading chains: although they make up only 15% of the population they represent 44% of the supermarkets' sales. At country level, given the far higher average household income in Nairobi (CBS2002a), low-income consumers are expected to be even more important in terms of the percentage of customers and revenues they represent with regard to supermarkets.

The above findings allow us to estimate the importance of the relatively large high-income Asian Kenyan and Western expatriate segment of the population (about 200,000 in 2003, i.e., 1.7% of the urban population)[3]. While this segment has played an important part in providing a nucleus from which supermarkets have been able to arise (and these segments are still an important part of the customer base, especially for fresh produce), supermarkets have moved well beyond this segment. In 2003, the Asian and expatriate community, which made up an estimated one third of the upper-middle and high income consumers, represented only 15-20% of supermarket sales.

[3] This number is estimated by the author from data on the ethnic distribution of the Kenyan residents (based on the 1999 population census) as received from Corporate Africa (a Nairobi-based financial services firm that also specializes in entrepreneurship education and development, policy analysis and research).

Table 1: The Supermarkets' Customer Base by Income Class in Nairobi, 2003

Income Class	Monthly HH Income	% of the Pop.	# of People in Class	% of Class Shopping in Supermarket	% of Class Buying Fresh Produce in Supermarket	% of HH FFV Expenditure Spend in Supermarket	% of Supermarket Customers from Class	% of Supermarket Sales from Class
Poor	< Ksh5,000	30%	780,000	60%	<1%	<1%	20%	12%
Low	Ksh5-15,000	35%	910,000	85%	15%	5%	36%	24%
Lower Middle	Ksh15-40,000	20%	520,000	93%	15%	5%	22%	20%
Upper Middle	Ksh40-100,000	9%	234,000	93%	30%	15%	11%	19%
High	> Ksh100,000	6%	156,000	>99%	67%	40%	12%	25%
All		**100%**	**2,600,000**	**80%**	**15%**	**6%**	**100%**	**100%**

Note: the self-reported nature of income, the recall-based expenditures, respondents thinking of smaller self-service shops as supermarkets and the low number of observations in the high income category (9) make the data in the table indicative only.
Sources: authors' consumer survey; population data are based on the following secondary data sources: CBS2002a, 2002b, 2002c, World Bank 2004, World Gazetteer (2004), UN Population Division (2003), UN Habitat (2004), and UN Statistics Division (2003).

The Nairobi consumer survey also revealed a sharply different picture with regard to the buying of fresh fruits and vegetables. Only 15% of Nairobi's households get (some of) their FFV from supermarkets. Less then 1% of the households with incomes of less than Ksh5,000 buy fresh produce from supermarkets. Only 15% of the households in the next income-classes (Ksh5,000 to Ksh40,000) buy fresh produce from supermarkets. Because these 15% do not buy all of their fruits and vegetables from the supermarket, only 5% of the total FFV expenditure of households in this income class is spend in supermarkets. Buying FFV from supermarkets becomes more important for the upper-middle and especially the high-income households of which 30% and 67% buy FFV in supermarkets respectively. However, even in the high income class, only 40% of the FFV expenditure goes to supermarkets. In other words, supermarkets do not dominate FFV markets in any income-class at this point in time, although they are getting close with regard to the highest income class.

How can we explain these patterns? Our consumer focus group research in Nairobi's low-income neighborhoods (e.g., Kibera, one of Africa's largest urban slum areas) indicates that most of the residents shop at nearby supermarkets, albeit not so frequent (mostly once a month) and for small values at a time. The low per capita expenditure of low-income consumers is partially off-set by their vast numbers (e.g., Kibera alone has an estimated 800,000 residents). Table 2 ranks the reasons why consumers in Nairobi buy food from supermarkets or from other retail outlets such as kiosks or over-the-counter shops. Traditional shops hold two key advantages over supermarkets, especially for the poor: (1) they are easy to get to, and (2) they provide credit. Especially the convenient location of kiosks, right next to where consumers live, is important as the majority of consumers (70%) shop from home rather than from work. Nearly 90% of those who shop in traditional shops cite location as a reason to shop at traditional retailers, while for nearly 60% of them it is the number one choice criterion. Credit is an important strategic advantage that traditional shops hold over supermarkets because it implies a long term relationship: kiosks or over-the-counter shops provide credit to their regular customers.

Table 2: Reasons for Retail Outlet Choice in Food by Nairobi Consumers

Reasons to Buy Food from Supermarkets (N=338)			Reasons to Buy Food From Other Retail Outlets (N=335)		
Reason	**% of Customers Ranking it as the No. 1 reason**	**% of Customers indicating it as a reason**	**Reason**	**% of Customers Ranking it as the No. 1 reason**	**% of Customers indicating it is a reason**
Low Prices	58%	81%	Easy to Get To	58%	87%
Large Assortment	23%	64%	Credit Available	17%	49%
Easy to Get To	8%	45%	Low Prices	12%	25%
Product Quality	4%	22%	Friendly Service	2%	12%
Easy to Buy Bulk	3%	23%	Packaging	2%	6%
Other Reason	4%	Na	Other Reason	9%	Na
	100%			**100%**	

Source: authors' consumer survey (Nairobi, November 2003).

The two most important incentives for consumers to shop at supermarkets are the lower prices and the large assortment. Table 3 compares prices for a selection of high-turnover processed food items between supermarkets and traditional food retail outlets. Prices in supermarkets are generally lower, albeit with only 3-4% on average. Nevertheless, as in other countries, low prices are single-most important driver behind the fast consumer acceptance of supermarkets in Kenya, especially amongst the more price-sensitive low-income consumers. From the focus group participants in low-income neighborhoods in Nairobi we further learned that they buy mostly easy-to-store bulk goods such as a 2kg bag of sugar or a rod of soap from the supermarket, while for their smaller volume purchases (e.g., 50gr of loose sugar) they go to kiosks who can sell from bulk bags in any quantity the customer wants (or can afford!).

Table 3: Supermarkets vs. Other Retailers Price Comparison for Processed Foods

Selected Basic Processed Foods							
Item	**Price at Super-market (Ksh)**	**Price at Nearest Trad. Retailer (Ksh)**	**Price Difference with Nearest Traditional Retailer:**				
			All Super-markets	**Ukwala**	**Uchumi**	**Nakumatt**	**Tusker**
Loose Tea 100gr	31	32	-4.8%	-6.1%	-4.9%	-3.8%	-0.6%
Sugar 2kg	99	104	-4.7%	-9.0%	-6.4%	-3.2%	-3.3%
Maize Flour 2kg	52	54	-3.7%	-5.2%	-2.0%	+0.7%	-0.8%
Oil 1kg	95	97	-2.7%	-4.3%	-2.8%	-4.1%	-1.8%
Wheat Flour 2kg	64	65	-2.5%	-6.3%	+0.3%	-2.9%	+1.6%
Bread 400gr	20	21	-1.9%	-3.9%	-0.8%	-0.1%	-1.0%
All 6 Items	**361**	**373**	**-3.4%**	**-5.8%**	**-2.8%**	**-2.3%**	**-1.0%**

Source: authors' national supermarket survey (May-July 2003). Traditional retailers are kiosks or over-the-counter groceries.

In FFV retailing, supermarkets have not penetrated the middle and lower income classes to the same extent as they have for food. Table 4 ranks the reasons why consumers in Nairobi buy FFV from traditional shops or supermarkets. Consumers (especially the poor) continue to buy FFV from traditional retailers (mostly open air markets, kiosks and greengrocers) for three main reasons: (1) price, (2) retailer location, and (3) freshness.

Table 4: Reasons for Retail Outlet Choice in Fresh Produce by Nairobi Consumers

Reasons to Buy Fresh Produce from Supermarkets (N=77)			Reasons to Buy Fresh Produce From Other Retail Outlets (N=397)		
Reason	**% of Customers Ranking it as the No. 1 reason**	**% of Customers indicating it as a reason**	**Reason**	**% of Customers Ranking it as the No. 1 reason**	**% of Customers indicating it is a reason**
Freshness	27%	44%	Low price	38%	58%
Quality	18%	31%	Location	29%	57%
Assortment	17%	35%	Freshness	17%	51%
Low price	12%	31%	Assortment	6%	20%
Location	9%	24%	Friendly Service	3%	14%
Other	17%	Na	Other	7%	Na
	100%			**100%**	

Source: authors' consumer survey (Nairobi, November 2003).

Unlike for dry foods, prices for FFV are generally higher in supermarkets because (1) the produce items have a higher value-added (e.g., they are washed, sorted by size and/or quality grade, and so on) and (2) supermarkets apply a higher mark-up to their purchase price in part to cover higher overhead costs relative to traditional retailers (e.g., facility rental costs). For a selection produce items, table 5 compares the price at the supermarket with those at traditional FFV retail outlets. These price comparisons have an important limitation as they do not take differences in quality into account (the quality being generally more consistently higher at supermarkets and greengrocers than at open air markets). With this limitation in mind, two key findings emerge from table 5. First, supermarkets are close to becoming price-competitive with the greengrocers, kiosks and covered market stalls where the middle-to-high income groups traditionally bought their FFV. This implies that with little difference in quality and prices, greengrocers, kiosks and covered markets catering to the higher income groups have been the hardest hit by the introduction of FFV in supermarkets as the latter hold the strategic advantage of being able to offer the convenience of one-stop shopping to their customers.

Table 5: Supermarkets vs. Other Retailers Price Comparison for Fresh Produce

Selected Fresh Fruits & Vegetables					
Item	**Average Price at Supermarket (Ksh/kg)**	**Price Difference (negative. % = lower price in supermarket)**			
		Covered Markets	**Open Air Markets**	**Greengrocer**	**Kiosks (high income residential area)**
Spinach	12	-36%	-5%	-22%	-31%
Kale	15	-14%	+49%	-8%	-33%
Oranges (local)	43	-10%	+88%	-9%	-18%
Cabbage (green)	12	-9%	+89%	0%	-28%
Carrots	24	+1%	+95%	+30%	-35%
Tomatoes	44	+14%	+52%	+10%	+8%
Mango (Ngowe)	56	+17%	+129%	+22%	-5%
Potatoes (Meru)	27	+20%	+160%	n.a.	+8%
Bananas (eating)	50	+41%	+108%	+7%	+71%
All 9 Items	**283**	**+6%**	**+87%**	**+24%**	**-1%**

Note: if prices were not indicated in Ksh per kg, the produce was bought and weighed. Were possible prices were negotiated as to reflect normal buying patterns. Prices reflect differences in quality, sorting and value-adding (e.g., cleaning) which could not be taken into account.
Source: prices for fruits and vegetables were collected in Nairobi on August 14 and November 14, 2003 and April 14, 2004 at the Jogoo Road, Railway and Westlands branches of Uchumi, the covered markets Westlands City Council Market and City Park Market, the open air markets of Wakulima and Kangemi, Zuchini (a high-turnover greengrocer frequented by high-income consumers), and a group of kiosks in Highridge, a high-income residential area. Zuchini, City Park and kiosk prices were collected on April 14, 2004 only.

Second, supermarkets are, relative to the open air markets where the urban poor buy their FFV, substantially higher priced (on average nearly 90%) for most (but not all) produce items. The leading supermarkets chains, who represent 90% of the FFV sold through supermarkets and who did not start selling FFV until recently (Uchumi since 1997, Nakumatt since 2001), at first focused on getting the quality right for the (less price-sensitive) high-income consumers they were targeting. Nevertheless, table 5 shows that price differences are becoming smaller for some key products (tomato, kale) while for spinach supermarkets are already selling at a lower price than any other retailer in Nairobi. Another indication that supermarkets are bridging the price-differential is given by the observation that street hawkers and small shops have started sourcing their FFV from supermarkets like Uchumi (especially in middle-income residential areas). These traditional retailers make their margin by dividing up in smaller quantities and by bringing the produce closer to the consumer (but at a higher price per kg).

Apart from price, retailer location plays a key role in the consumer's decision on where to buy FFV. Even if supermarkets can bring their FFV prices down to the level of the open air markets and the kiosks in the low income neighborhoods, it is unlikely that this will attract large numbers of poor consumers. Because low-income household do not have refrigerators, they are forced to buy perishables (like milk and vegetables) in small quantities at higher frequency (usually daily)[4]. From the focus groups we learned that poor households work with a more or less fixed budget for FFV, e.g., Ksh50 per day. The ubiquitous kiosks are usually within a few

[4] Zhang (2002) found similar results for the case of Shanghai, China.

minutes walking distance, while getting to the far less omni-present supermarkets (especially those selling FFV) often requires a long walk or maybe even a bus ride. Taking a bus for Ksh5 only to buy FFV for Ksh50 will make little economic sense to consumers, especially if it concerns a daily shopping activity. In other countries, supermarket chains developed smaller store formats that can more easily be integrated in residential areas (e.g., superettes in South Africa). Such store formats have not yet sprung up in Kenya (Metro's Lucky 7 trading group comes close but does not yet distribute FFV). However, the smaller supermarkets that Uchumi opened in Nairobi's middle income residential neighborhoods (e.g., Buru Buru) have been very successful in selling FFV. This suggests that the location card may play much less against the supermarket chains in the future in produce retailing.

Table 4 lists freshness as the third key reason for consumers to select traditional retail outlets as their source of FFV. When supermarkets just started selling FFV, they had to go through a learning process with regard to procurement and shelf management. In those early days, shelf management was not optimal in the produce section. Supplies were late, leading to empty shelves or produce was kept on the shelves for too long, leading to an unattractive presentation (less bountiful, less fresh). In contrast, traditional retailers have over the years perfected the art of presenting FFV at their freshest. This involves excellent matching of supply with demand as well as being well-linked to other retailers (most notably street hawkers) to whom less fresh produce could be sold at starkly reduced prices (but not at a complete loss). This phase created a perception in the consumer's mind that FFV sold in supermarkets are less fresh. Although supermarkets only buy the best quality FFV available (in the volumes they need) at any given time (varies throughout the year), stock-outs and keeping the produce too long on the shelves still occurs sporadically (even for high turnover items like bananas).

Nevertheless, the findings of this study reveal that Nairobi consumers feel that supermarkets have made great progress, since freshness is the most frequently no. 1 ranked reason for consumers' buying FFV from supermarkets. The consumer focus groups further revealed that low-income consumers mistrust the presence of refrigeration which they believe allows supermarkets to keep produce beyond their ideal freshness. Traditional retailers, who for the greater part have no refrigeration, cannot 'fool the consumer' because consumers would immediately see it if a retailer kept produce for too long.

4.2 Retail Outlet Choice and Shopping Frequency

In this section we want to assess how household socio-economic factors (such as income, household composition, education, whether there is a maid or not, and so on) influence the following four decisions: (1) whether or not households shop for food at supermarkets at least once a month (Y_1); (2) whether or not households buy FFV at supermarkets at least once a month (Y_2); (3) how frequently households shop for food at supermarkets (Y_3); and (4) how frequently households shop for FFV at supermarkets (Y_4). Since negative dependent variables are not possible and assuming non-linear effects of the independent variables, we modeled the first two decisions as probit models for a binary response (Wooldridge 2000), and the latter two as ordered multinomial logit models with three frequency levels in the dependent variable, 3=high (more than twice a month), 2=low (once or twice a month) and 1=rarely or never (less than once a month) (Greene 2000).

Model (1)	Prob $(Y_1=1\|X) = G(\beta_{01} + X\beta_1)$
Model (2)	Prob $(Y_2=1\|X) = G(\beta_{02} + X\beta_2)$
Model (3)	Prob $(Y_3=1 \|X) = \Lambda(-X\beta_3)$
	Prob $(Y_3=2 \|X) = \Lambda(\kappa_{32}-X\beta_3) - \Lambda(\kappa_{31}-X\beta_3)$
	Prob $(Y_3=3 \|X) = 1 - \Lambda(\kappa_{32}-X\beta_3)$
Model (4)	Prob $(Y_4=1 \|X) = \Lambda(-X_4)$
	Prob $(Y_4=2 \|X) = \Lambda(\kappa_{42}-X\beta_4) - \Lambda(\kappa_{41}-X\beta_4)$
	Prob $(Y_4=3 \|X) = 1 - \Lambda(\kappa_2-X\beta_4)$

The determinant variables (X) included in this analysis here are: (a) whether or not the household owns a motorcycle or car (own_tran); (b) whether or not the household owns a refrigerator (own_refr); (c) whether or not the household has a credit card (has_card); (d) whether or not the household has a maid (has_maid); (e) the per capita income of the household based on income category (8 categories) and household size (pcincome); (f) the education level of the household heads who do the actual shopping (averaged if both wife and husband shop) using four categories: 0=none, 1=primary, 2=secondary, 3=university (educat); (g) the proportion of young family members (under 30) in the household (prpyoung); (h) the age category (6 categories) of the responding household head (agehhead). These variables capture mobility (car or motorcycle ownership), ability to buy larger quantities of fresh food (refrigerator ownership), purchasing power (credit card ownership, per capita income), opportunity cost of time (having a maid or not, demographic variables) and preferences and life-style (education level, demographic variables).

Based on maximum likelihood estimation (MLE), tables 6 and 7 present the probit and logit estimators ($\hat{\beta}_i$) of the different models. Table 6 indicates that the results are as hypothesized, namely, the probability of a household buying food from a supermarket increases as the household has (i) a higher purchasing power, (ii) a higher level of education of the heads of the household, (iii) younger heads of household, (iv) a refrigerator. The impact of car or motorcycle ownership, credit card ownership, whether or not the household has a maid and the proportion of younger household members did not have a significant impact on the probability of the household buying food in the supermarket.

Table 6: Probit Results Retail Outlet Choice Consumers

Independent variables	Model 1 P(Shops at supermarkets) (t-value)	Marginal effect	Model 2 P(Buys FFV in supermarkets) (t-value)	Marginal effect
Owning car or motorcycle	0.277 (0.88)	-	-0.016 (0.06)	-
Owning refrigerator	0.571 (1.87*)	10.7%	1.20 (5.04***)	30.5%
Owning credit card	-0.165 (0.54)	-	0.201 (0.74)	-
Maid help	0.129 (0.53)	-	-0.114 (0.46)	-
Income per capita	0.384 (2.04**)	8.6%	0.171 (1.51)	-
Education	0.242 (2.08**)	5.4%	0.216 (1.91*)	3.8%
Young members proportion	0.064 (0.17)	-	0.881 (1.94*)	15.3%
Age of family head	-0.169 (1.81*)	3.8%	-0.025 (0.23)	-
Constant	0.474 (0.71)	-	-2.87 (3.57)	-
No. of observations	355		354	
(Pseudo) R-square	0.095		0.202	

Notes: * = significant at the 10% level, ** = significant at the 5% level, *** significant at the 1% level.
Marginal effect measured at the mean levels of the determinant variables.
Source: authors' consumer survey.

Table 7: Ordinal Multinomial Logit Results Shopping Frequency Consumers

Independent variables	Model 3 P(Shopping frequency in supermarkets) (s.e)	absolute t value	Model 4 P(Buying FFV frequency in supermarkets) (s.e.)	absolute t value
Owning car or motorcycle	0.361 (0.324)	1.12	0.171 (0.432)	0.40
Owning refrigerator	0.108 (0.32)	3.37***	2.25 (0.425)	5.29***
Owning credit card	-0.983 (0.376)	2.61**	0.261 (0.469)	0.56
Maid help	-0.027 (0.298)	0.09	-0.248 (0.442)	0.56
Income per capita	0.134 (0.153)	0.88	0.106 (0.16)	0.66
Education	0.283 (0.135)	2.10*	0.339 (0.199)	1.70*
Young members proportion	0.669 (0.475)	1.41	1.288 (0.785)	1.64
Age of family head	-0.216 (0.128)	1.68*	-0.151 (0.199)	0.76
No. of observations	320		354	
(Pseudo) R-square	0.0510		0.1597	

Notes: * = significant at the 10% level, ** = significant at the 5% level, *** significant at the 1% level.
Source: authors' consumer survey.

When we look at the probability of a household buying FFV in a supermarket (table 7), a similar picture emerges with, however, the following three differences. First, income per capita is no longer a significant determinant, which is an unexpected result given that table 1 indicated a positive correlation between income and buying FFV from the supermarket. Although we could not identify exactly why, this may in part be explained by realizing that (1) FFV are relatively inexpensive purchases and (2) for some FFV items supermarkets are price and quality competitive as shown above. Second, the proportion of younger household members becomes a significant and positively correlated determinant. This fits the predicted pattern that younger

households are increasingly accustomed to finding (and buying) FFV in supermarkets and consequently are less conservative in their buying behavior with regard to fresh categories such as FFV. The third difference is the starkly increased significance of refrigerator ownership as a determinant of the household's decision to buy FFV from the supermarket. The marginal effect indicates that, for the average household (in terms of the independent variables), having a refrigerator increases the probability that the household buys FFV at the supermarket by 31%.

Shopping frequency at supermarkets increases as refrigerator ownership and education increase, as the (responding) household head is younger and when the household does not have a credit card (table 7). While the first three signs are as hypothesized, the negative relationship between credit card ownership and the frequency of shopping for food is maybe less evident, given that the use of credit cards is encouraged by retailers exactly to smoothen out once-a-month purchases linked to salary payments. One possible explanation is that credit cards represent a greater flexibility in purchasing power, and so the consumer is less likely to limit her or his purchases at any given trip to the supermarket, making additional trips less necessary. Another related explanation is that in Nairobi credit cards can only be used in the larger supermarkets. Because these usually require more time to reach and carry larger assortments, credit cards will lead to consumers going less often to make larger purchases from supermarkets.

Looking across the four models we see that education and refrigerator ownership are consistently significant determinants in the shopping behavior of Nairobi's households with regard to supermarkets. Especially refrigerator ownership, and the storage capacity it represents, appears to be the key driver. Furthermore, in three of the four models, younger households or households with younger decision makers have an increased probability of shopping at supermarkets as well as of doing so more often. Given the recent nature of the strong emergence of supermarkets and produce sections in them (i.e., since the mid-1990s, less than a generation ago), it is more likely that this represents a behavioral shift from one generation to the next rather than a decreasing interest in supermarkets on the part of consumers as they grow older. The focus group finding that for households with children, shopping at the supermarket is seen as an outing for the whole family further strengthens this theory.

5. Conclusions and Implications

This essay has demonstrated that supermarket growth in Kenya is following a pattern similar to that observed in other countries (e.g., Central America). By developing various new store formats and entering smaller towns and residential neighborhoods, supermarkets have rapidly increased their share of the urban food market from a small niche a decade ago to 20% in 2003. Our findings indicate that this market penetration first occurs for processed and dry foods with penetration in the FFV market lagging behind. Very rarely in the recent work on supermarket diffusion in developing countries has consumer-side evidence been brought to bear to explain the variations in trends. The findings here target that gap in the knowledge. Several main findings emerged.

The key finding is that supermarkets are not merely are place where the rich buy their food. Supermarkets have penetrated the markets for the poor: 60% of Nairobi's poor buy some of their food from supermarkets each month while the poorest two thirds of the population already represent 56% of the supermarkets' customer base and 36% of their food sales.

The main reason why the poor buy food from supermarkets is that they are perceived as being cheaper than the traditional retail outlets, at least for dry foods which these consumers

usually buy once a month. Supermarkets derive this competitive advantage from the large volumes they trade, which allows to them to buy direct from manufacturers at discounted prices. For fresh food items, such as FFV, poor consumers still rely heavily on the traditional retail outlets for two main reasons. First, the poor have no refrigeration and therefore need to buy these items in small quantities on a daily basis, making the closer-to-home traditional retail outlets far more convenient. Secondly, FFV are generally more expensive in supermarkets. However, there are signs that the latter may change soon. On the one hand, supermarkets are developing smaller retail formats which can be located closer to where the consumers live. These new store formats may be the precursors in Kenya of the smaller self-service store chains that have succeeded in making in-roads in the low income consumer segment in other developing countries, such as the "superettes" in South Africa (Weatherspoon and Reardon 2002) and the 7-11 stores in Thailand (Feeny et al. 1996). These new stores in residential areas not only provide easier access to end-consumers directly but also indirectly through the smaller, traditional retailers (such as street hawkers) who procure from them (rather than from the farther away wholesale markets). On the other hand, for some FFV items (most notably leafy greens such as spinach and kale) supermarkets are already the price leader. It is likely that more of their FFV items will become price-competitive as supermarkets further increase the efficiency of their FFV procurement system and pass these savings on to their customers in a bid to gain market share.

A number of managerial implications for farms and food firms arise from the foregoing findings. On the one hand, supermarkets create new market opportunities relative to traditional markets. Supermarkets play into the desire of consumers to have a broad assortment of products to choose from (consumerism). Increasingly, for both dry and fresh foods, these are value-added and branded or quality-guaranteed products. The research here further shows that households that have more younger members or younger household heads and that have better educated household heads, are more likely to shop in supermarkets and to do so more frequently. These are households whose shopping behavior is more likely to be influenced by new product introduction or enhanced product attributes, such as food safety standards in the case of FFV. As supermarkets further penetrate the large low income consumer segment, they offer opportunities for their suppliers to develop and market more products in small-volume, low price packs that fit into the fixed-budget driven consumption habits of the lower income consumers.

On the other hand, supermarkets bring additional challenges for their suppliers. Higher quality standards and tougher delivery terms (short order cycle, volume consistency, supplier credit, and so on) must be reconciled with a competitive pressure to constantly lower costs. Supermarkets further intensify competition between agri-food suppliers by providing an attractive, low transaction cost point of entry for foreign producers of agri-food products. For domestic agri-food firms (planning on) supplying supermarkets this almost inevitably implies the need for an increase in the scale and sophistication of operations (production and distribution logistics). This essay has shown that this challenge is coming rapidly for processed foods as this market is becoming dominated by the supermarkets. The fresh produce growers have a good deal more time to make the adjustment – and there is time but also incentive for development programs to either help farmers prepare for the challenges of the supermarket channel, or work hard to develop alternatives for them.

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