AN ANALYSIS OF THE MARKET POWER OF SWEET POTATO TRADERS IN KENYA: A CASE OF RACHUONYO SOUTH DISTRICT AND ITS KEY MARKET OUTLETS

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ABSTRACT

Despite the potential of sweet potato in helping to meet Kenya's food needs and poverty reduction through income generation, many people in the sweet potato growing regions still live below a dollar a day. This is evidenced by the high poverty index of 77% in Rachuonyo region which is among the leading sweet producing areas in Kenya. Thus, the study examined sweet potato market power with the view of determining if a particular category of traders exercised some monopoly powers to their advantage at the expense of other trading partners. Out of 166 commercial farmers, fifty five wholesalers and an infinite number of retailers, one hundred and sixteen commercial farmers were selected using simple random sampling technique while 384 retailers were purposively selected. The 55 wholesalers were also included in the sample. Primary data were collected using questionnaires while secondary data were from respondents' records. Lerner indices showed that wholesalers exercised more monopoly powers (LI = 0.804325) followed by the farmers (LI = 0.546577) and the retailers (LI = 0.486227). Concentration ratios also showed that wholesalers exercised more market power in the industry. However, the mean four firm concentration ratio of 13.60% suggests general lack of effective competition among the sweet potato sellers in the industry. Therefore, there is need to strengthen competition by pursuing measures aimed at minimizing or reducing barriers to entry into the sweet potato wholesale market.

Keywords: Kenya, Sweet Potatoes, Traders, Crops Analysis.
JEL Classifications: A11, D4, F16, G14, L11.

1. INTRODUCTION

Sweet potato is one of the mankind's high yielding crops with higher food value and total production per unit area than other staple food crops such as sorghum, maize, millet and rice. It is the world's seventh most important food crop after, wheat, rice, maize, barley, and cassava (FAO, 2002, Nungo et al, 2007). In nutritional terms, sweet potato, particularly the yellow-fleshed varieties are good sources of vitamin A (300 micrograms/100 grams, fresh weight) (Woolfe, 1992). A comparison with other food crops shows that it yields more calories

per unit area than maize and nearly as much as cassava, while its protein yields is far higher than the latter (FAO, 1997). On worldwide scale, the economic importance of sweet potato among all food crops is exceeded only by cereals (wheat, rice, maize and barley) (Opiyo, 2011). Although the crop is grown in more than 100 countries around the globe, about 90% is produced in Asia with just below 5% in Africa (Woolfe, 1992). Sweet potato serves as a staple diet in many parts of Uganda, Nigeria, Rwanda, Tanzania, Angola, Burundi and Kenya (Nungo *et al*, 2007). China is the world's largest producer with an annual harvest of 100 million tones. Uganda, Nigeria, Indonesia and Vietnam, which follow china in production each harvests about 2.5 million tons of Sweet potatoes annually (FAO, 2002).

Sweet potato can adapt to a wide range of agro-ecological conditions and performs well in low-input agriculture. It is mostly grown at mid-elevations ranging from 800 to 200m above sea level. Africa's production is concentrated in east Africa, particularly around the great Lakes region (Gebson et al, 1997). Sweet potato presence and adaptation to tropical areas where per capita incomes are generally low and its nutritional value makes it an important component in food production and consumption (Woolfe, 1992). It is increasingly becoming an important food security and famine relief crop during seasons of crop failure (CIP, 1998, Kokech, 2009). About 2.5 million ha in Africa are under sweet potato with a total production of about 11 million tons (Ateka, 2004). Kenya is the seventh largest African sweet potato producer with an average yield of 8.2 tons/ha (FAO, 2003) against a potential of 50 tons/ha (FAO, 2002). With the falling proportion of arable land per household due to population pressure, there is need to increase sweet potato yields to meet the current demand for food and to provide sufficient market information to potential sweet potato producers as a means to investment in the sweet potato industry. This, through trickledown effects, may help in reducing poverty at the local level. The main sweet potato producing regions in Kenya are South Nyanza, around Lake Victoria region particularly Rachuonyo south district; western; eastern and some parts of central and coastal regions (MOA, 1992, 1999; ROSPOGO, 2012).

In Kenya, sweet potato is grown in continuous cycle with one planting season overlapping with another. Piecemeal harvesting of tubers commonly extends the crop's season (Kapinga et al, 1995). Sweet potato is largely grown for its tuberous storage roots, which are generally steamed or boiled (Carey et al, 1997). The roots provide energy, proteins, vitamins A (particularly in orange fleshed sweet potato varieties), B_1 and B_2, ascorbic acid and folic acid in diets. Other important nutrients in sweet potato roots are calcium, phosphorous, sodium, iron and potassium (Woolfe, 1992) Young sweet potato leaves are also consumed as vegetables in some countries and are rich in vitamins A, B_1, B_2, proteins and iron (Woolfe,1992). Generally, the storage roots of sweet potato and foliage are also important supplementary fodder inlivestock production. Hence, Sweet potato plays an important role in ensuring food security, especially during droughts in large parts of Africa and is seen as an important ingredient in animal feed industries (CIP, 1998).

Despite the potential of sweet potato in helping to meet Kenya's food needs and reduce poverty levels through income generation, many people in the sweet potato growing regions still live below a dollar a day.This is evidenced by the high poverty levels in the major sweet potato growing regions such as Kuria and Rachuonyo, which have poverty levels of 79% and 77% respectively (GOK, 2003, 2010). According Rachuonyo South District development plan 2003 – 2009, cited by Jiang & Srivana (2012), household income per capita in the region is between US $ 70 – 75. This observation was further supported by the National Poverty Strategy Paper (NPSP) cited by Kokech (2009), which indicates that 59% of the South Rachuonyo district populace live below a dollar a day. Lack of concrete market information on sweet potato market power has been supported by Andea(2012) who asserted that sweet potato is an "orphaned" crop, one that has been given little research attention and promotion. CIP (2009) in its working paper also indicated that lack of information on the sweet potato market structure and performance constraints the development of the sweet potato industry in the sub-Saharan Africa, and recommended that more market research be conducted in this industry. It is on this

basis that the study sought to examine sweet potato market power in the region. This study was guided by the theory of industrial organizations.

2. LITERATURE REVIEW

Stoft (2002) defines market power as the ability to profitably alter prices away from competitive levels. The European Union on the other hand defines Market Power as equivalent to the concept of dominance (Twomey *et al*, 2005). An undertaking is defined as having significant market power if, alone or jointly with others, it has 'the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers (OJ, 2002, cited in Twomey, *ibid*). There are, however, a number of variants of this definition. Most definitions include the requirement that the exercise of market power be profitable. According to Twomey *et al* (2005), If this was not the case, for example, a company with a single large base-load plant that shuts off its plant and that has no other market positions could be defined as exercising substantial market power (in terms of ability to wangle the market price) even though this strategy would be completely unprofitable for the company. In order to fully determine whether an action is profitable, one would engage in a very arduous exercise of knowing a complete portfolio position of the company. As such, most market power indices based on company conduct classically rely on the assumption of rationality. If we assume companies are profit-maximizing, we can then assume that the observed company conduct which alters prices is profitable for the company (Twomey et al, 2005). Such cases can be used as prima facie evidence for the existence of market power to a given extent.

Significant market power could typically be due to the existence of dominant sellers and/or stringent supply conditions. Some market power situations may arise when transportation constraints create sequestered geographic markets in which the market players can only minimally participate. This could be in densely populated market centres and in geographically remote areas. In such circumstances, the existing sellers face little competition and have the potential to exercise market power, as well as having the obvious consequence of extracting substantial profits from the market in such regions. Economists have argued that market power include not only wealth transfers between buyers and sellers but also influences operational and investment efficiency. This matter is of particular importance to policy makers since the effects of market power can substantially eat into the benefits of other market participants in the marketingsystem. In California for instance, it was observed that very high prices in wholesale markets could induce a flurry of investment and contracting that could precipitate market collapse and financial distress of power companies (Joskow, 2008). In the context of this study, one would be tempted to think that a significant proportion of the returns from sweet potato related activities go to the other market intermediaries (wholesalers and retailers) and not to the farmers. The study thus, sought to clear the air on this information gap.

A number of techniques of detecting market power have been identified and grouped by Twomey *et al* (2005) as ex ante – looking for the potential for market power – and those that are applied ex-post – usually looking for the actual exercise of market power. The ex-ante techniques include: Herfindahl- Hirschman Index (HHI), Lerner index and the Gini coefficients. In a competitive market, price-taking companies should bid at marginal cost (Puller, 2000), Short and Swan (2002), Fabra and Toro (2003), Evans and Green (2005), and Twomey, (2005). Thus, the comparison of the sellers' offer prices with their marginal costs is an important measure in determining the exercise of market power in sweet potato industry. According to Twomey, 2005, if a company is frequently bidding in prices well in excess of marginal cost (whether it is setting the system price or not), it may well be exercising market power, which according to Twomey *ibid,* can be well estimated using Lerner Index or price cost margin.

3. MATERIALS AND METHOD

3.1 STUDY AREA

This study focused on Rachuonyo south district where sweet potato production, processing and marketing were common. The district is in the southern Nyanza region of Kenya. It was curved out of Rachuonyo district which lies between longitudes 34°25 and 35°0 East and latitudes 0°15 and 0°45 south. Sweet potato related activities in the district were concentrated in Kabondo division, which covered about 141.5 km^2 (GOK, 2008). Sweet potatoes produced in the region were being sold locally in the district and to other market outlets such as Ahero town, Nakuru town and Nairobi city.

3.2 RESEARCH DESIGN AND SAMPLING PROCEDURES

Thestudy adopted exploratory research design.Exploratory design helped in gaining an insight into the sweet potato market. The sampling frame was a list of 166 farmers; 55 wholesalers and an infinite number of retailers (ROSPOGO, 2012). A total of 116 farmers, fifty five (55) wholesalers and 384 retailers were sampled. All the 55 wholesalers were interviewed and individual farmers selected using simple random sampling technique while the retailers were purposively selected

3.3 DATA ANALYSIS AND PRESENTATION TECHNIQUES

This study adopted some of the ex-ante techniques as these would give an insight into the suspicion that some market participants exercised significant market powers that could lead to exploitation of the existing market opportunities at the expense of others. The techniques adopted include: Lerner indices, Gini coefficients and Concentration ratios. The results were presented using tables and Lorenz curves.

4. RESULTS AND DISCUSSIONS

Table 1 shows that out of the 555 anticipated respondents, only 421 responded to the research questions. This gave a response rate ranging between 71.09% to 87.07% with a mean response rate of 81.15%. The mean response rate was considered appropriate as it conforms to the views of Jonson & Owens (2003) who asserted that a response rate of 80% is a de facto standard.

Table 1. Response Rate

Category of Respondents	Total No.	Sample	Respondents	Response rate (%)
Farmers	166	116	101	87.07
Retailers	Infinite	384	273	71.09
Wholesalers	55	55	47	85.45
Total		555	421	
Mean				81.15

Source: Field survey data, 2013

Table 2 shows that the wholesale market Lerner index was the highest (*LI* = 0.804325) followed by the farm level market (*LI* = 0.546577) and the retail level market (LI = 0.486227). According to Paolo (2012), the theoretical values of Lerner index range between 0 and 1, where Zero (0) depicts perfect competition while one (1) implies monopoly situation. The study showed that none of the computed Lerner indices fell outside the outlined theoretical values.

However, it appears that the wholesalers exercised more market power followed by the farmers and retailers respectively. The Herfindal- Hirschman (HHI) indices computed for the various market levels also varied, with the Wholesale market having (HHI = 0.02625), followed by the Farm level market (HHI = 0.01212) and lastly the Retail market (HHI = 0.00468). In the views of Owen *et al* (2005), HHI is close to zero where there are a large number of equal-size firms; and "1.0" under monopoly. It therefore appears that although the HHI values are largely below one (1), more market powers were depicted in the Wholesale market, followed by the Farm level and finally the Retail market.

Gini coefficients however, revealed conflicting results on the market power exercised by the various market participants. At the Wholesale level, the Gini index was 0.261949 which was slightly lower than the Farm level Gini index (GINI = 0.26759). Retail Gini index was the highest (GINI = 0.293700). The conflicting findings are not unique as this had been recognized by McElligott and Stuart (2007) that there are a number of measures of market power and it is possible that the different measures would yield different results. However, Udell *et al* (2005) indicated that Lerner index is the most consistent indicator of market power across different indices. Juxtaposing the findings with Udell *et al* (2005) assertion, it appears that the wholesalers had more market power than the other two marketing agents.

Table 2: Herfindal Hirschman indices, Gini coefficients and Lerner indices for the farm, retail and wholesale markets

	Market power indices		
Category of respondent	HHI	GINI	LI
Farmers	0.01212	0.26759	0.546577
Wholesalers	0.02625	0.261949	0.804325
Retailers	0.00468	0.293700	0.486227
Mean Index	0.01435	0.274413	0.612376

Source: Computed From Survey Data, 2013

Clarkson and LeRoy (1982), observed that besides Gini coefficient (G), inequalities in a market can be demonstrated using Lorenz curves. If a Lorenz curve coincides with the diagonal line, there exists even distribution of market shares. However, the degree of inequality can be judged by the extent to which the Lorenz curve deviates from the diagonal. The greater the degree of inequality, the greater the bend and the closer to the bottom horizontal axis the Lorenz curve will be. The extreme case of perfect inequality would be represented by the congruence of the Lorenz curve with the bottom horizontal and right hand vertical axes (Byaruhanga, 2002). Figure 1 shows Lorenz curves for the sweet potato market at the Farm, Retail and Whole sale levels. The curves give relative visual variability in the sales of sweet potato at different channel levels. It can be seen that the deviation of the wholesale market Lorenz curve from the diagonal line is the greatest, followed by Farm level market and finally the Retail market. This further suggests that the wholesale marketexhibits more market power than the farm and retail level markets.

According to neoclassical economists, a market with one large firm and several small ones is more likely to perform as a monopoly in the long run than a market with a few firms of roughly equal sizes (Ferguson and Glenys (1994), cited in Odondo, 2007). To assess the same situation in the sweet potato subsector, four and eight firm concentration ratios were determined for the largest and smallest sweet potato sellers and the results are presented in Table 3.

Figure 1: Lorenz Curves For The Sweet Potato Sellers
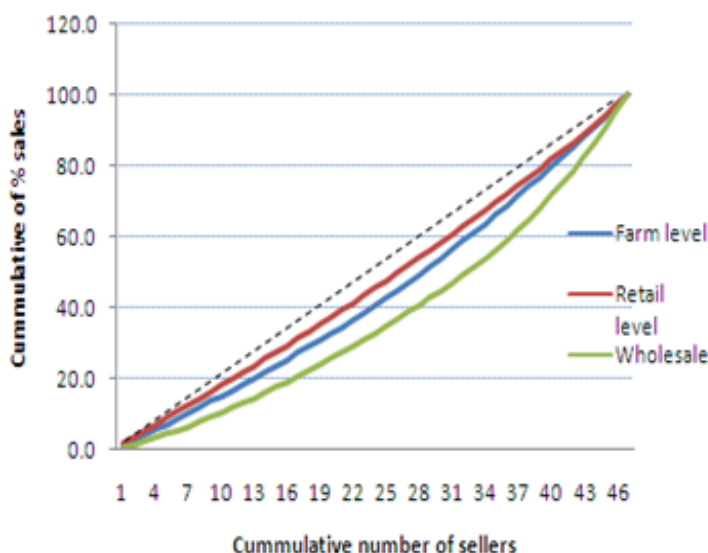
Source: Drawn From Survey Data, 2013

Table 3 Distribution of Four and Eight sellers' Concentration Ratios

Category of respondents	1st Smallest four & Eight sellers		1st largest Four & Eight Sellers	
	CR$_4$ (%)	CR$_8$ (%)	CR$_4$ (%)	CR$_8$ (%)
Farmers	5.8	12.1	12.0	23.2
Retailers	7.1	14.4	11.2	20.9
Wholesalers	3.4	7.9	17.6	32.1
Mean of the CRs	5.43	11.47	13.60	25.40

Source: Computed From Survey Data, 2013

Table 3 shows the extent to which a relatively small number of large and small sweet potato sellers dominate the sweet potato industry. CR$_4$ represents concentration ratio of four sellers which cuts across the farm, retail and wholesale levels, pooled together as an industry while CR$_8$ represents concentration ratio of eight sellers grouped as an industry. As shown in Table 4.2, the first smallest four sellers had an average concentration ratio of 5.43% while the first smallest eight sellers had a mean concentration ratio of 11.47%. The first four and eight largest sellers had a mean concentration ratio of 13.60% and 25.40% respectively. Although among the three levels, the wholesalers appear to exercise more market power in the industry, the results suggest general lack of effective competition among the sweet potato sellers in the industry. This is depicted by the mean concentration ratio of 13.60% given by the first four largest sellers, which is below 40% mark required for an effective competition to exist (Bain, 1989). On the other hand, the mean concentration ratio of 25.40% of the first eight largest sellers lies below Chamberlin's (1933) critical value of 70%, thus suggests absence of extensive barriers to entry into the sweet potato industry.

In the foregoing discussion, it appears that sweet potato wholesale market is less contestable compared to the farm and retail markets. From priory reasoning, contestability is a measure of the extent to which a market is open to new entry. Markets that are less contestable have participants with the ability to wangle the market price (i.e. price makers) to their advantage (Massimiliano, 2010).

5. CONCLUSION

Based on the results, it can be concluded that sweet potato wholesale market was less contestable compared to the farm and retail markets. This suggests that the sweet potato market

was imperfectly competitive. Therefore, there was need to strengthen competition by pursuing measures aimed at minimizing or reducing barriers to entry into the sweet potato wholesale market. Such measures may include but not limitedto reducing costs of business permits to potential sweet potato wholesalers.

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