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Analysis of bean marketing system in urban areas of Kenya

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Abstract The beans industry in Kenya is faced with several problems, most especially shortage, seasonal fluctuations in supply of beans and lack of reliable statistical information. This study was conducted to determine the structure and performance of the beans marketing system in Nairobi metropolitan area in Kenya. Primary and secondary data were used. Primary data were generated from a survey of 102 beans traders using cluster and systematic sampling methods. Majority of the traders were women (60.8 %). 'Rosecoco GLP 2' (Nyayo) variety was the most preferred variety. Other varieties on sale were red haricot, Canadian wonder and *mwitemania* among others. Bean marketing structure approached that of pure competition but lack of capital was a barrier to entry into the wholesale/retail trade. There were no cohesive tactics against established rivals or potential entrants. Stiff competition has resulted in marketing margins that closely approximate the actual marketing costs. The Augmented Dickey-Fuller test (ADFs) showed no significant co-integration for several pairs of markets. Thus market integration had not been fully realized in Nairobi bean markets. This is due to inadequate flow of market information and risk.

Key words: Women, Red haricot, *Phaseolus Vulgaris*

Introduction

Common bean (*Phaseolus vulgaris*) is a major staple food in eastern and southern Africa, where it is recognized as the second most important source of human dietary protein and third most important source of calories (Pachico, 1993). The quantity of beans produced in Kenya is inadequate to meet the needs of the country. The average annual bean imports from Tanzania and Uganda into Kenya are 1500 MT (ECABREN, 2000). With an increasing population and urbanisation, the demand for beans is expected to increase. The current beans deficit in the country suggests an apparent problem of local market failure to stimulate production. Other bean industry problems include seasonal price fluctuations and lack of statistical data on beans marketing. Knowledge of market structure, conduct and performance is vital for the necessary interventions to cope with the steady increase in the demand for beans in the economy. The objective of the study was to de-

termine market structure, conduct and performance in terms of salient parameters.

The industrial organisation theory suggests that market structure determines the behavior (conduct) of firms and that behavior, in turn, determines the various aspects of market performance (Caves, 1971). Market structure is described using concentration ratios, market transparency and the conditions of entry into the market. Bain (1968) gives market conduct, as the patterns of behavior that firms follow in adjusting to the markets in which they sell or buy.

Market performance is evaluated in this study by considering marketing margins and the extent of market integration. Barrett and Li (2002) suggest that market integration might be most usefully defined as tradability or contestability between markets. This implies the transfer of excess demand from one market to another, manifest in the physical flow of the commodity, the transmission of price shocks from one market to another, or both. The physical flow of goods between two markets is, thus, sufficient but not necessary to demonstrate

tradability. According to Fackler and Goodwin (2001), the actions of spatial arbitrageurs will ensure that the prices of a homogeneous good at any two locations will differ by, at most, the cost of transferring the good from the region with the lower price to the region with the higher price. Market integration is determined by co-integration analysis USING Johansen’s model.

Methodology

The study used both primary and secondary data. Primary data resulted from a survey of 102 bean traders interviewed using a pre-tested set of structured questionnaires. Cluster and systematic sampling methods were used to select the respondents in the study area of Nairobi city that is a major consuming region of Kenya.

The study employed descriptive statistics, the structure-conduct-performance (S-C-P) analysis with emphasis on concentration ratio, and co-integration. Concentration ratios were used to assess market structure. Concentration is the proportion of the total industry sales contributed by the *m* largest firms ranked in order of their market share (*m*=2,4,8...). Market conduct involves the analysis of human behavioral patterns in trade.

Marketing efficiency can be decomposed into 2: technical efficiency and economic efficiency (Oladapo *et al.*, 2001). Technical efficiency deals with physical handling of commodities, while economic efficiency points to transmission of prices at various levels within the marketing chain. This paper emphasises economic efficiency assessment by analysing market integration. The extent of market integration was measured by carrying out co-integration of the average monthly prices of beans in 4 markets of Nairobi based on Johansen’s Model. The Johansen’s likelihood- based vector Autoregressive Model is as shown below (Johansen, 1995):

$$X_t = \Pi_1 X_{t-1} + \dots + \Pi_k X_{t-k} + \Phi D_t + \epsilon_t, t = 1 \dots T$$

Where X_t = Matrix of bean prices at a given time;

Π = The coefficient associated with the autoregressive process; and

Φ = The coefficient of the seasonal dummy, D_t .
k = lag length in months
t = time in months.

To test the hypothesis of cointegration, this Model has to be converted into an error correction model (Johansen, 1995). The Model is then estimated using the Ordinary Least Square method (OLS). The test of the hypothesis of co- integration is done using the Augmented Dickey- Fuller (ADF) test. If there is a unit root, then the price series are not cointegrated. However, the null hypothesis of no cointegration is rejected if Π is significantly different from zero.

This co-integration method of data analysis is used as a diagnostic tool despite its limitations and flawed assumptions. The model has been criticised, for it is neither necessary nor sufficient for market efficiency or long-run integration (Fackler, 1995; Barrett, 1996). However, with a prior knowledge of the area in which their study was carried out, some of the limitations of this method were addressed. The other weakness is that the Model emphasises one market variable; the price. This cannot provide sufficient information to explain activities in markets.

The Model is sensitive to duration of the price series but there is short food price time series in developing countries (Dercon, 1995; Baulch, 1997).This weakness is corrected by the analysis of market structure and conduct. Despite the weaknesses of the model, co- integration analysis leads to efficient, consistent and unbiased estimators.

Results

Market structure and conduct. Majority of the traders were women (60.8%). The traders included long distance assemblers/wholesalers, wholesalers, wholesalers/retailers, agents and retailers operating in shops, market stalls and open air. ‘Rosecoco GLP 2’ (Nyayo) variety was the most preferred variety and other varieties on sale were ‘red haricot’, ‘Canadian wonder’ and ‘mwitemania’ among others. Kenya produced

432,000 tonnes of beans in 2001. In 1999, the output was 391,825 tonnes while the estimated annual demand was 430,200 tons. This lead to a deficit of 38,375 tonnes.

The criteria for evaluating market structure was provided by Bain (1968). The classification of an industry is based on the percentage market share of the largest firms. The largest 4 and 8 retailers had a combined market share of 19.29 and 33.92% respectively. This market structure is described as ‘low-moderately concentrated’. In the wholesale trade, the largest 4 and 8 firms controlled 34.76% and 59.84% of the market share, respectively. Accordingly, this market structure is described as ‘moderately concentrated with competitive fringe’. The beans market structure in Nairobi approaches that of pure competition. Each trader is a price taker. Majority of the wholesalers/retailers (87.5%) had an average working capital that exceeds KShs. 10,000, with a maximum amount of Ksh. 1 million. Thus lack of capital is a serious constraint for wholesaler/retailer category of traders. The maximum starting capital for the category was KSh.1.2 million shillings. Market transparency means the information flow, which helps in decision-making within the entire marketing system. Majority of the beans traders (93.2%) relied on two market information sources, namely, through word of mouth from friends/ business colleagues/ relatives, and by trader’s own market. Public information provision is insufficient (Goodhue *et al*, 1998; Ouedraogo *et al*, 1994). The study found out that 40.2% of the traders did not react in any way to new participants in the beans sub-sector. 51% of the traders were willing to encourage new colleagues by advising them. It appears that there is no cohesive tactic directed against established rivals

or potential entrants.

Market performance. The marketing costs contributed 8.91% of the beans selling price while the trader’s share was 4.55%. The marketing margin analysis indicated that a small proportion of the consumer money was accounted for by profits that traders get. The trader’s low share of the retail price is attributed to stiff competition in the beans trade in Nairobi.

Market integration. Market integration was determined in this study by carrying out co-integration analysis, using the average monthly retail bean prices of four markets in the study area, namely, Gikomba, Kangemi, Kibera and Kawangware. The Augmented Dickey –Fuller test confirmed that the price series are not stationary of order 1. The test statistic values were all less than the critical absolute value of - 3.73, except for the case of Kangemi market that had DF and ADF (1) of - 7.87 and -4.36, respectively. The ADF tests were done for the first differences of the price series. The results confirm that cointegration exists except for Gikomba market because test statistics are significant in at least one of the lags. However, we need to subject the data to further analytical procedures in order to be sure about the existence of co-integration and also to test the hypothesis of no co-integration.

A series of model selection procedures were then done to come up with an error correction model matrix. The coefficients that result from the selected models are then tested for their significance using T- statistic. The results are shown in Table 2. The labels X1, X2, X3 and X4 represent Gikomba, Kangemi, Kibera and Kawangware markets, respectively.

Table 1: Marketing margins for selected markets in Nairobi (one 90-Kg bag)

Item	Nyamakima ¹	Nyamakima ²	Gikomba ³	Kawangware ⁴	Kangemi ⁵	
Revenue	2000	2400	2750	2700	2745	
Handling	50	30	20	20	20	
Market tax/ license fee		40	2.50	25	1.75	2
Transport	225	-	70	100	110	
Storage	5	22.5	10	1.0	2.5	
Lodging and meals	15	-	-	-	-	
Pesticides	-	5	-	-	-	
Packaging costs	30	8.30	50	50	50	
Guard	-	0.20	3.73	-	0.80	
						Sorting/
Cleaning	-	-	50	50	50	
Other expenses ⁶	-	2.00	-	-	-	
Total variable costs	365	70.5	228.75	222.75	235.3	
Purchase price	1500	2200	2400	2400	2400	
Total variable costs	365	70.5	228.75	222.75	235.3	
Marketing margin	135	129.5	121.25	77.25	109.7	

¹ Long distance assembler/wholesaler (Busia-Nairobi), ² Wholesaler/retailer, ³ Retailer (stall), ⁴ Retailer (open-air),

⁵ Retailer (shop), ⁶Electricity, telephone etc.

Conclusion

Market concentration ratios showed that the structure of the beans market in Nairobi approaches that of pure competition. Lack of capital is a major barrier to entry into the wholesale/retail business. A major source of market information for traders is by word of mouth from friends/business colleagues/relatives (48.1%) and trader's own market observation (45.1%). There are no cohesive tactics directed against established rivals or potential entrants.

Low marketing margin is an indication of an efficient beans marketing system. Co-integration analysis showed that market integration has not been fully realized in Nairobi bean markets due to the nature of the market information system.

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