

# Variation in Prices of Food Items in Jamaica: An Exploratory Analysis of Pricing Mechanisms of Supermarkets in Kingston

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**Abstract:** The Jamaica Agriculture Market Information System reports wide variations in the price of similar food items across supermarkets in the capital city, Kingston. Possible explanations for this phenomenon are explored in this paper. Our findings indicate that supermarkets that practice price smoothing are more likely to persistently sell food items at the highest price. Likewise, supermarkets that are centrally located are prone to consistently have the highest price for food items. Whether or not farmers who supply food items to the supermarkets and consumers who buy from them are sensitive to price smoothing will provide validation for this practice by supermarkets. This constitutes an area of future study.

**Keywords:** Food items, retail prices, Jamaica, price smoothing, supermarkets.

## 1. INTRODUCTION

Jamaica's economy has recorded low or negative growth for the past decade, largely as a consequence of a heavy public debt burden. The effects of this debt burden have been compounded by shocks to the economy due to the global food, fuel and financial (3F) crisis that began in 2007 and occurrences of extreme weather events and natural disasters like drought and hurricanes. Among other things, these have created concerns for the country's food security and the government, in addressing these concerns, has implemented a number of initiatives to increase domestic food production.

For the two decades preceding the 3F crisis, agricultural production was on a steady decline. The Agricultural Production Index (API) (1996=100) fell by 30% between 1996 and 2007 [1]. The year-on-year API fell further by another 7% in 2008 at the peak of the 3F crisis. However, since 2008, API has been on the increase with the agricultural sector's contribution to real Gross Domestic Product (GDP) ranging between 6.6 and 6.8% compared to 4.8% in 2008 [2, 3]. These are welcome indications that the policies and strategies of the government are beginning to yield dividends.

One of the strategies pursued by the Government of Jamaica (GoJ) to instigate a vibrant agricultural sector is the provision of improved marketing services to farmers, consumers and other stakeholders with the establishment of the Jamaica Agriculture Market Information System (JAMIS). Before JAMIS was establish-

ed in 2009 by the Ministry of Agriculture and Fisheries (MoAF) and the Rural Agricultural Development Authority (RADA), the Agricultural Marketing Information Division (AMID) of MoAF published quarterly and annual island-wide data on farmgate and retail prices for major agricultural commodities. Since its inception, JAMIS has introduced weekly data series on farmgate, urban market, rural market, and retail prices. Prior to the provision of disaggregated data on multiple markets, the existence of wide marketing margins for domestic food crops was identified as a contributing factor to low output and calls were made for mechanisms to be put in place to ensure efficient transmission of price signals to farmers [4]. Since then, in addition to JAMIS, MoAF has implemented projects such as hosting periodic farmers' markets in the capital city of Kingston. This complements JAMIS' reporting of weekly prices on agricultural commodities to ensure timely and efficient transmission of price signals to both farmers and end consumers. However, with price information readily available in the public domain, there still exist very diverse variations in the prices paid by consumers for food products at different supermarkets. This raises interesting questions on marketing practices of retailers and the response of consumers, or lack of it, to divergence in prices for the same agricultural produce across supermarkets in the same locality.

This paper addresses the question of marketing practices of agricultural produce retailers in Kingston, Jamaica, with the aim of establishing if supermarkets engage in price smoothing and whether or not price smoothing is to the benefit or detriment of consumers.

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**Table 1: Supermarkets in Jamaica with Weekly Retail Prices Reported in JAMIS**

Supermarket	Location	Identification Code	Proximity (km)
Empire	Cross Roads	SM1	80.2
Hi-Lo	Cross Roads	SM2	77.6
Mega Mart	Waterloo Road	SM3	57.8
John R Wong	New Kingston	SM4	64.8
Brooklyn	Half Way Tree	SM5	58.3
Hi-Lo	Half Way Tree	SM6	61.5
Empire	Liguanea	SM7	82.2
Michi	Washington Boulevard	SM8	73.1
Shoppers Fair	Washington Boulevard	SM9	100.4
Loshusan	Barbican Road	SM10	72.1
Hi-Lo	Barbican Road	SM11	73.9
Public	Constant Spring	SM12	80.9
Cari-Home	Constant Spring	SM13	85.9
Shoppers Fair	Harbour View	SM14	219.7
Lee's Food	Red Hills Road	SM15	65.4
Price Smart	Red Hills Road	SM16	82.4

## 2. MATERIALS AND METHODS

### 2.1. Data Collection

JAMIS is an online system that provides market information to the public. In addition to providing price information at the farmgate, wholesale and municipal markets, weekly retail prices of agricultural produce at 16 supermarkets (see Table 1) in and around the Kingston Metropolitan Area (KMA) are provided. JAMIS staff collect these prices each Thursday by visiting the supermarkets and recording posted prices for selected food items after which they will review the recorded prices with the produce manager or their designate for validation. JAMIS staff also collect price information for products without displayed prices at this time. Data collected are transmitted to the headquarters soon afterwards and prices for the week are published no later than 10:00 am on Friday [5].

Weekly price data, representing 52 observations, for the 16 supermarkets for the year 2013 were retrieved from JAMIS for selected products. Nine products (calallo, escallion, green banana, gungo peas, green sweet pepper, scotch bonnet pepper, tomato, water melon, and yellow yam), representing staple foods in Jamaica and covering the different food groups, were selected for analysis.

### 2.2. Data Analysis

For each week, the supermarket(s) with the minimum and maximum reported prices for each food item were identified, as well as the respective minimum and maximum prices. Descriptive statistics were used to summarize data and student t-test was applied to establish statistical significance. These were done to determine, for each food item:

- The supermarket(s) that recorded the lowest price for the greatest number of weeks
- The supermarket(s) that recorded the highest price for the greatest number of weeks

Additionally, data were analyzed to identify if proximity of a supermarket to the other supermarkets had an influence on their price. This was done by establishing an approximate distance between pairs of supermarkets using Google Maps. For each supermarket, the sum of the distances between it and the other 15 supermarkets was calculated as a measure of its proximity, with lower figures indicating that the supermarket is centrally located and higher figures suggesting that the supermarket is located at a distance from most other supermarkets. Using graphical display of relative locations of supermarket within a proximity distance of 25 km increments, we observed if supermarkets that are centrally located

**Table 2: Pricing of Food Items by Supermarkets in Kingston, Jamaica (2013)**

Food Item	Supermarket with Most Occurrence of Lowest Price (Number of Weeks)	Supermarket with Most Occurrence of Highest Price (Number of Weeks)	Distance between Supermarkets (KM) <sup>1</sup>
Shredded Callalo (Spinach)	SM16 (11)	SM5 (37)	3.7
Escallion	SM7 (25)	SM2 (21)	4.2
Green Banana	SM16 (22)	SM4 (9)	5.5
Gungo peas	SM7 (40)	SM6 (28)	4.3
Green Sweet Pepper	SM3 & SM14 (8)	SM5 & SM12 (9)	1.3
Scotch Bonnet Pepper	SM1 (11)	SM8 (20)	6.0
Tomato	SM16 (13)	SM15 (13)	1.5
Water Melon	SM16 (18)	SM13 (17)	3.3
Yellow Yam	SM16 (22)	SM13 (17)	3.3

<sup>1</sup>For green sweet pepper, figure represents shortest distance between any pair of supermarkets

were more likely to have recorded the greatest number of weeks with the highest or lowest price, *ceteris paribus*.

### 3. RESULTS

#### 3.1. Retail Price Variation

Apart from green sweet pepper, each food item showed that only one supermarket recorded the lowest or highest price for the most number of weeks in 2013. As shown in Table 2, the fewest number of weeks over which a supermarket recorded the lowest price was eight (green sweet pepper) while the greatest number

of weeks was 40 (gungo peas). Similarly, the fewest number of weeks over which a supermarket recorded the highest price was nine (green sweet pepper) while the greatest number of weeks was 37 (callalo). For all food items, the distance between the supermarket with the most occurrence of lowest price (lowest price supermarket) and that with the most occurrence of highest price (highest price supermarket) ranged from a low of 1.3 km to a high of 6.0 km. The shortest distance of 1.3 km between Mega Mart on Waterloo Road and Brooklyn at Half Way Tree was for green sweet pepper while the longest distance of 6.0 km between Michi on Washington Boulevard and Hi-Lo on Barbican Road was for scotch bonnet pepper.

**Table 3: Variation in Prices of Major Food Items across Supermarkets in Kingston, Jamaica (2013)**

Food Item	Price Spread between Supermarkets with Minimum and Maximum Prices <sup>1</sup>	
	Range (\$/kg)	Mean (\$/kg)
Shredded Callalo (Spinach)	30.80 - 310.80	80.45 <sup>a</sup>
Escallion	77.99 - 448.01	211.42 <sup>c</sup>
Green Banana	39.01 - 134.99	77.70 <sup>a</sup>
Gungo peas	107.98 - 195.75	171.62 <sup>c</sup>
Green Sweet Pepper	70.01 - 644.01	265.41 <sup>d</sup>
Scotch Bonnet Pepper	138.98 - 765.99	287.23 <sup>d</sup>
Tomato	47.76 - 455.31	163.26 <sup>b</sup>
Water Melon	96.8 - 346.40	148.83 <sup>b</sup>
Yellow Yam	46.76 - 243.00	127.21 <sup>b</sup>

<sup>a</sup>Statistically higher than \$50/kg at 1% level

<sup>b</sup>Statistically higher than \$100/kg at 1% level

<sup>c</sup>Statistically higher than \$150/kg at 1% level

<sup>d</sup>Statistically higher than \$200/kg at 1% level

<sup>1</sup>Prices are in Jamaican dollar (J\$). The average exchange rate for 2013 was US\$1=J\$100.77.

The price spread between supermarkets, representing the difference between the supermarket recording the highest price and that recording the lowest price in any specific week, is summarized for the nine food items in Table 3. The annual average of this spread ranged between a low of \$77.70/kg for green banana to a high of \$287.23/kg for scotch bonnet pepper. The mean annual spread is higher than \$50/kg ( $p < 0.001$ ) for callalo and green banana; higher than \$100/kg ( $p < 0.001$ ) for tomato, water melon and yellow yam; higher than \$150/kg ( $p < 0.001$ ) for escallion and gungo peas; and higher than \$200/kg ( $p < 0.001$ ) for green sweet pepper and scotch bonnet pepper.

### 3.2. Price Smoothing

Price smoothing exists when supermarket do not vary retail price of a food item for several weeks in a row, or at the extreme for the whole year. Evidence of price smoothing in 2013 by supermarkets was apparent and is reflected in Figure 1 for both highest price and lowest price supermarkets across food items. Highest price supermarkets were more likely to practise price smoothing than lowest price supermarkets.

### 3.3. Supermarket Proximity

The cumulative distance of a supermarket from all the other 15 supermarkets included in JAMIS is shown

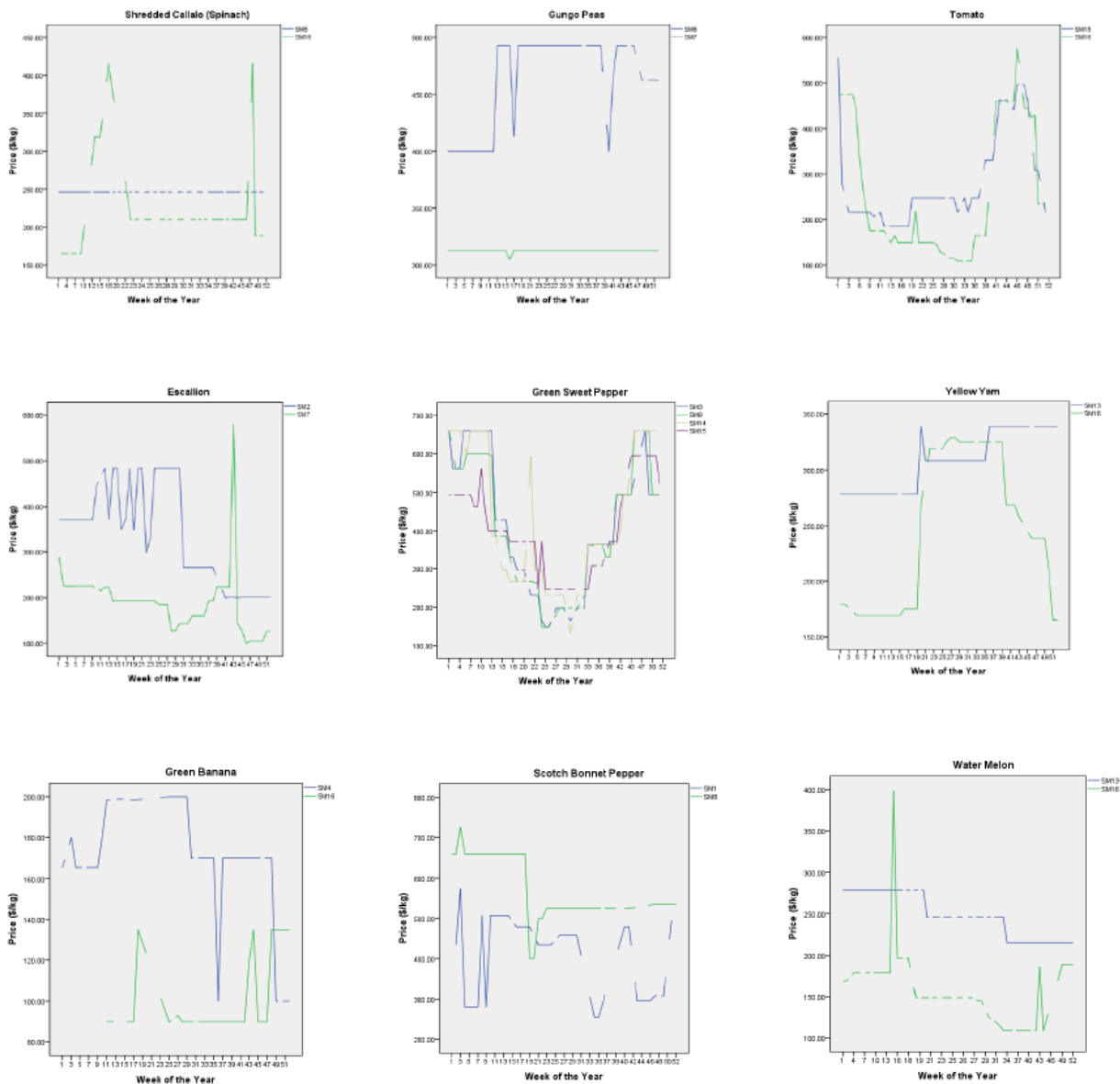
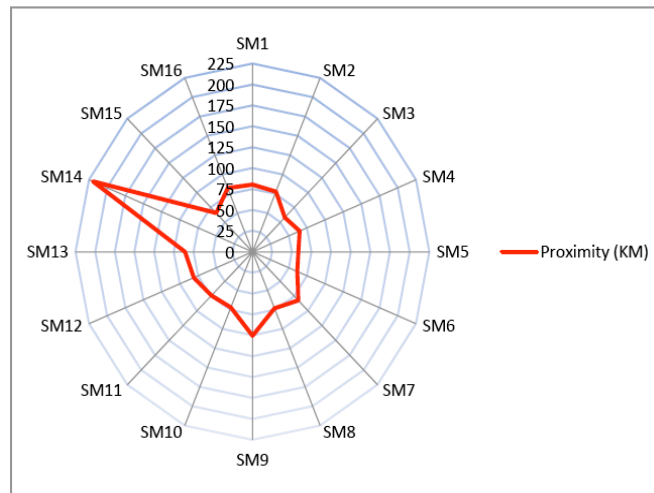


Figure 1: Trends in weekly price for major food items at “lowest price” and “highest price” supermarkets in Kingston, Jamaica (2013).



**Figure 2:** Proximity of supermarkets in Kingston, Jamaica.

in Figure 2. No supermarket is within a 50 km distance from the others. Half (8) of the supermarkets are located within a distance of 75 km from the others and only two are located at a distance beyond 100 km.

#### 4. DISCUSSION

Analysis of weekly retail prices for food items at supermarkets in Kingston, Jamaica, revealed that two supermarkets represented the lowest price supermarket on more than one food item. Price Smart on Red Hills Road was the lowest price supermarket for five food items (calallo, green banana, tomato, water melon and yellow yam) in 2013 and Empire supermarket in Liguanea the lowest price supermarket for two food items (escallion and gungo peas). On the other hand, two supermarkets, Brooklyn in Half Way Tree and Cari-Home at Constant Spring were the highest price supermarket for callalo and green sweet pepper, and water melon and yellow yam, respectively. This shows that a few supermarkets had the lowest price week after week for several food items while several supermarkets had the highest price for one or two food items during the year. Hence, supermarkets with low prices, either by choice or chance, kept prices low on a few items while those with high prices only kept prices high on specific items. Interestingly, there was no cross listing of supermarkets as no supermarket that featured on the lowest price supermarket list featured on the list of highest price supermarkets. This suggests the existence of a factor common to supermarkets on either list or that delineates supermarkets on the two lists.

Two likely factors that determine whether a supermarket will be a lowest price or a highest price super-

market are price smoothing and proximity of supermarkets. Six highest price supermarkets exhibited clear signs of price smoothing compare to three lowest price supermarkets that exhibited same. In the case of proximity, five of the highest price supermarkets as against one of the lowest price supermarkets are located within a 75 km cumulative distance from the other supermarkets. All other supermarkets are located at distances longer than 75 km. The foregoing suggests that higher prices tend to occur with the practice of price smoothing and that centrally located supermarkets tend to charge higher prices.

#### 5. CONCLUSION

Specific supermarkets in Kingston, Jamaica, consistently sell particular food items at the lowest or highest price. Those that sell at highest prices are more likely to employ price smoothing and be centrally located. Therefore, consumers should be wary of lack of price variation on particular food items in a given store for a prolonged period of time as this could mean that they are overpaying for the said food item.

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