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An Economic Analysis of Volume and Price Behaviour of Vegetables in the Republic of Trinidad and Tobago

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Authors' contributions

This work was carried out in collaboration between all authors. Authors BM and GK looked for relevant articles and designed the methodology. Author BM along with authors GK and JC made the data collection and analysis by joining efforts with other authors. Authors GK, WG and DS interpreted the results and verified the draft. The final draft and conclusion were established based on several discussions between all authors. All authors read and gave their final approval of the version to be published.

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ABSTRACT

Aims: This study was aimed to examine the behaviour and pattern of fluctuations in market volume and prices of 21 major vegetables consumed in Trinidad and Tobago.
Study Design: The study used monthly data for a period of 10 years from 2006 to 2015 obtained from the National Agricultural Marketing and Development Corporation (NAMDEVCO) to

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investigate fluctuations in market volume and prices of the selected vegetables. Growth trend and seasonality were worked out using linear and lag models.
Methodology: The seasonal indices were worked out by using ratio to moving average decomposition method which was followed by the evaluation of seasonality. Besides, the nature of relationship between market volume and prices was analysed using a lag-linear model.
Results: The results revealed that the seasonality was high (38.71 per cent) in the arrival of large melongene and low (11.79 per cent) in medium sweet peppers arrival to the market. However, the seasonality in price was more (53.68 per cent) in christophene arrival, while it was less (11.96 per cent) in green plantains. The results of lagged linear models indicated that past prices and volumes were important factors that determine the current prices and the marketed volumes in many vegetables.
Conclusion: The study found significant importance to trend in market arrivals and price behaviour of vegetable crops both over the years and across the months, also confirming a negative relationship between market arrivals and prices over the years. Thus, indicating imperfection in marketing of vegetables in the wholesale market, as the traders used the previous week price as guide for setting the current price of the vegetable.

Keywords: Vegetables; price index; volume index; seasonality; growth rate; Trinidad and Tobago.

1. INTRODUCTION

Trinidad and Tobago's agriculture sector is considered economically small, but socially imperial. The domestic consumption of the country exceeds in-land production and only a few essential fruits, vegetables and root crops are produced in any significant quantity. Therefore, the agricultural sector's contribution to the country's oil based GDP has been minute over the last decade. In Trinidad and Tobago, vegetables are very essential for the nutritional security of the people, as it can be considered a staple in the country's daily dietary cuisines. In order to meet its demand, fruits and vegetables were imported from other island nations and western countries. Fruits and vegetables were the second largest commodities imported by the Republic of Trinidad and Tobago, and the highest in terms of proportion of total food import values, according to data from the Central Statistical Office (CSO) for 2011 [1]. Thus, the prices of vegetables and the volumes of their arrival are the major determinants of consumer food choices and, in turn, dietary quality.

Vegetables were chosen for this study as, supported by a statement from Caribbean Agricultural Research & Development Institute [2], they are very essential for the nutritional security of the peoples of the Caribbean. Accordingly, the Governments of the Region have identified them as part of the 'Regional Food Basket' and for which efforts are dedicated towards achieving 'food sovereignty'. Vegetables such as tomato, cabbage, and pumpkins have achieved great popularity overtime, as they are easy to grow and are known for their health benefits, for example they are a good source for vitamins A and C [3]. Nevertheless, the price and availability of vegetables throughout the year determined to be critical factors in achieving food sovereignty [4]. Thus, the current study was carried out in the High income Caribbean nation, the Republic of Trinidad and Tobago to gain insights into the behaviour and pattern of fluctuations of market arrivals and prices of a selected array of vegetable produces. The data collected from the NAMDEVCO was used (i) to examine the pattern of market arrivals and prices of selected vegetable crops in terms of the degree of seasonality in Trinidad and Tobago; and (ii) to analyse relationships between market volume and prices, both over the years and across months.

2. MATERIALS AND METHODS

The data for a period of 10 years from 2006 to 2015 were obtained from the NAMDEVCO, Trinidad and Tobago (Figs. 1 and 2). Fig. 1 illustrate the market volume of the selected 21 vegetables, whereby cucumbers (coloured in the lower yellow section) and pumpkins (coloured in the middle dark blue colour) show to have the largest in market volumes. In the case of Bodi beans, 2015 shows the highest price, seim beans and melongene (small, medium, and large) show very little variations in price between 2014 and 2015, cucumbers show 2014 having the highest price, etc. (Fig. 2) The study analysed the behaviour and pattern of

fluctuations in prices and arrivals of 12 major vegetables as 22 items, viz., bodi beans, seim beans, cucumber, melongene (small-S), melongene (medium-M), melongene (large-L), ochro, plantain (green), plantain (ripe), pumpkin, sweet pepper (small-S), sweet pepper (medium-M), sweet pepper (large-L), tomato (small-S), tomato (medium-M), tomato (large-L), caraillie (bitter gourd) (small-S), caraillie (medium-M), caraillie (large-L), squash and christophene consumed in Trinidad and Tobago. The data collected were compiled and subjected to descriptive and functional analyses such as seasonal indices, besides regression analysis, following Kumar et al. [5] and Senthil Kumar et al. [6]. The computation procedure of these analytical tools is described in the following section:

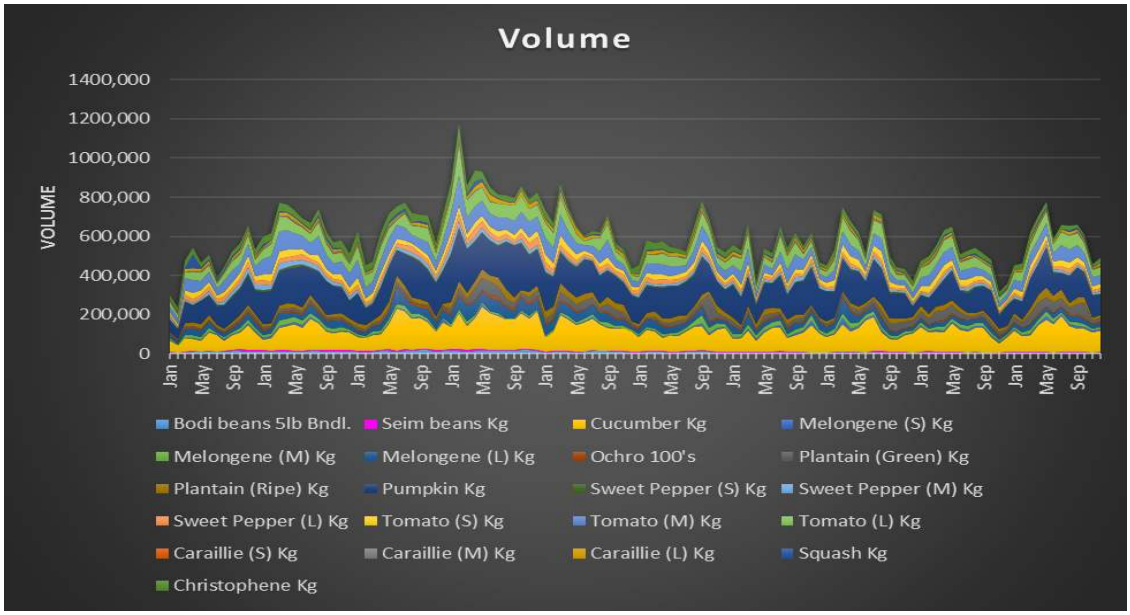

Fig. 1. Volume arrival of vegetables to market

Fig. 2. Cluster of the average annual prices for selected vegetables

2.1 Growth Rate of Vegetables

This was computed using the annual trend in the arrivals volumes and prices of commodities. A linear trend line was used, and will have similar equations as follows:

$$Y_t = \beta_0 + \beta_t + \mu_t$$

where,

Y_t = Monthly volumes / price
t = Time period
U_i = Random errors
β_0 = Intercept
β_t = Regression coefficient in time 't'

From this equation, the linear growth rate was derived using the following formula;

$$Linear\ growth\ rate\ (LGR) = \frac{\beta_t}{\overline{y}}\ x\ 100$$

where,

β_t = Regression coefficient
$\overline{y}$ = Arithmetic mean

2.2 Analysis of Seasonality

The seasonal indices were worked out by using ratio to moving average decomposition method. Seasonality in prices and market arrivals was estimated as follows.

$$Si = \left[\frac{(Ih - Il)}{Il}\right] * 100$$

where,

Ih = highest value of seasonal index
Il = lowest value of seasonal index

2.3 Lag-linear Model

The nature of relationship between market arrivals and prices of vegetables was analysed using lag-linear model. This is further explained using the following notation:

$$P_t = f\left(P_{t-1}, Y_t\right)$$

where,

P_t = current price,
P_{t-1} = lagged price; and
Y_t = current arrivals of selected vegetables markets

To explain the seasonal relationship between market volume and prices of the selected vegetables, data from NAMDEVCO within a ten years span of monthly data, from 2005 to 2015 were subjected to multiple regression analysis. This is used when lagged values of the dependent variable among its explanatory variables. This model is illustrated in the following formula:

$$P_t = \beta_0 + \beta_1 P_{t-1} + \beta_2 Y_t + \varepsilon_t$$

where,

P_t = Price of vegetable (TTD) in $(t)^{th}$ month;
P_{t-1} = Price of vegetable (TTD) in $(t-1)^{th}$ month
Y_t = Current market volume of vegetable; and
ϵ_t = Random term

2.4 Karl Pearson Correlation Coefficient

The Karl Pearson correlation coefficient was calculated to estimate the strength of the relationship between market arrivals and prices. This is a measure of the linear correlation between two variables, x_i (market volume) and y_i (current vegetable price), which is calculated using the following formula:

$$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2}\sqrt{\sum_{i=1}^{n}(y_i - \bar{y})^2}}$$

where,

n = number of observations
x_i = market volume data for vegetables
y_i = current market price

3. RESULTS AND DISCUSSION

3.1 Trends and Patterns in the Volume and Price Behaviour of Selected Vegetables

Linear growth analysis was carried out to examine the trend and pattern market arrival volumes and prices of selected vegetables and the results are presented in Tables 1 and 2. Initial analysis indicated that the general trend of market volumes of the selected vegetables was negatively monotonous in nature, showing a relatively high negative beta, and thus, indicating that the market volumes decreased over time. These results could be due to the changing dietary habits of the population as reported by

the PAHO [7] Survey of Panamerican steps chronic non-communicable disease risk factor for Trinidad and Tobago in the year of 2011, which found that 90% of adults did not consume the daily recommended five servings-a-day of fruits and vegetables a day although their abundance in the country. However, there are few exceptions. Crops such as cucumber, melongene (both small and medium), and Caraillie (bitter gourd - both small and medium) show a positive gradient, suggesting an increase in market volumes as time elapse. Likewise, as expected, all the selected vegetables show a general slightly positive trend for price over the ten-year span, as the beta is between zero and one.

3.1.1 Trend analysis

The results indicated that although ochro is the highest priced vegetable in the market over the past ten years, the highest increase in price was noticed for seim beans (approximately $0.0929 per year). Also, in spite of having the largest increase in the volume market arrivals of 226.26 kg per year, the study found that green plantains had the least price increase with an average of $0.008. Notably, the market volume arrival of many vegetables had been found to be decreasing significantly over the years. This decreasing trend could be either due to the shifting dietary behaviour or raising prices vis-à-vis meat products [8].

Table 1. Trends and patterns of prices and volumes

Name of crop	Trend for	Coefficient	Constant	R^2	Linear growth rate
Bodi beans	Price	0.090	19.369	0.249	0.364
	S.E	0.014	1.005		
	Volume	-70.857	14046.937	0.375	-0.726
	S.E	8.426	587.431		
Seim beans	Price	0.093	8.056	0.558	0.679
	S.E	0.008	0.531		
	Volume	-29.920	6693.537	0.262	-0.613
	S.E	4.627	322.558		
Cucumber	Price	0.026	4.033	0.145	0.464
	S.E	0.006	0.406		
	Volume	58.181	108987.491	0.003	0.052
	S.E	101.754	7093.778		
Melongene (S)	Price	0.043	2.874	0.399	0.784
	S.E	0.005	0.337		
	Volume	48.580	4303.750	0.138	0.671
	S.E	11.183	779.635		
Plantain (Ripe)	Price	0.015	8.149	0.084	0.165
	S.E	0.005	0.317		
	Volume	20.872	21389.773	0.006	0.092
	S.E	25.810	1799.353		
Pumpkin	Price	0.015	2.190	0.158	0.489
	S.E	0.003	0.225		
	Volume	-235.700	157739.394	0.038	-0.164
	S.E	109.885	7660.613		
Sweet pepper (S)	Price	0.051	6.903	0.215	0.510
	S.E	0.009	0.624		
	Volume	-14.665	7420.301	0.038	-0.224
	S.E	5.557	387.424		
Sweet pepper (M)	Price	0.063	8.754	0.234	0.502
	S.E	0.011	0.735		
	Volume	-68.942	19059.352	0.194	-0.463
	S.E	12.921	900.779		
Caraillie (S)	Price	0.0157	4.5459	0.0855	0.2855
	S.E	0.0047	0.3296		
	Volume	8.3058	1943.6184	0.0575	0.3396
	S.E	3.0956	215.8095		

Name of crop	Trend for	Coefficient	Constant	R^2	Linear growth rate
Caraillie (M)	Price	0.0258	5.7685	0.1736	0.3521
	S.E	0.0052	0.3614		
	Volume	0.8832	4648.6082	0.0003	0.0188
	S.E	5.0799	354.1430		
Caraillie (L)	Price	0.0360	7.0055	0.2345	0.3924
	S.E	0.0060	0.4176		
	Volume	-40.4931	13897.4183	0.0748	-0.3537
	S.E	13.1087	913.8735		
Melongene (M)	Price	0.059	3.992	0.465	0.778
	S.E	0.006	0.405		
	Volume	18.592	14249.573	0.012	0.121
	S.E	15.355	1070.474		
Melongene (L)	Price	0.073	5.070	0.522	0.771
	S.E	0.006	0.450		
	Volume	-126.290	39876.888	0.076	-0.392
	S.E	40.412	2817.333		
Ochro	Price	0.075	17.193	0.147	0.346
	S.E	0.017	1.163		
	Volume	-18.829	9261.504	0.063	-0.232
	S.E	6.684	465.982		
Plantain (Green)	Price	0.008	8.360	0.027	0.088
	S.E	0.004	0.301		
	Volume	226.262	10315.424	0.176	0.943
	S.E	45.130	3146.251		
Sweet pepper (L)	Price	0.0718	10.7807	0.2409	0.4747
	S.E	0.0117	0.8182		
	Volume	-88.6243	24872.8751	0.1999	-0.4542
	S.E	16.3233	1137.9743		
Tomato (S)	Price	0.0509	7.3487	0.1519	0.4875
	S.E	0.0111	0.7711		
	Volume	-10.3370	27248.3676	0.0022	-0.0388
	S.E	20.0459	1397.4947		
Tomato (M)	Price	0.0647	9.1940	0.1936	0.4933
	S.E	0.0122	0.8471		
	Volume	-207.0088	70228.9013	0.1235	-0.3587
	S.E	50.7680	3539.2856		
Tomato (L)	Price	0.0769	11.0889	0.2211	0.4883
	S.E	0.0133	0.9258		
	Volume	-42.7921	54659.2394	0.0055	-0.0822
	S.E	52.7648	3678.4904		
Christophene	Price	0.0551	9.3266	0.0887	0.4356
	S.E	0.0163	1.1345		
	Volume	-114.4982	33802.8934	0.1289	-0.4260
	S.E	27.4067	1910.6519		
Squash	Price	0.0608	3.9127	0.5837	0.8014
	S.E	0.0047	0.3297		
	Volume	-59.3271	9497.3034	0.0859	-1.0042
	S.E	17.8173	1242.1284		

3.1.2 Pattern analysis

The pattern of market arrivals and price behaviour of the selected vegetable crops over the period 2006-2015 was examined using the mean value and the coefficient of variation for each of the twelve months (Table 2). Small tomatoes and green plantains have the lowest coefficient of variation (CV) for market arrival and price respectively, which implies that there is low dispersion. Conversely, the highest CV in market volume and price were noticed for squash and christophene.

3.2 Seasonality in Arrivals and Prices of Vegetables

The phenomenon of the inverse relationship between market volumes and prices was well noticed. Nevertheless, factors such as the availability of cold storage facilities, enhanced opportunities for export, value-addition through agro-processing, availability of new poly house technologies, etc. not only weaken this negative relationship but may even turn it positive [9]. Thus, market volume rises as its market price increases, *ceteris-paribus*. Further, with the increase in market volumes, the market price of the commodity declines, *ceteris-paribus*, creating a 'Cobweb' effect. In other words, it is expected that market volume to be an increasing function of price, while the market price is expected to be the decreasing function of market volume [10]. This inter-relationship between market volumes and price of the selected vegetables were studied by seasonal indices. Seasonal indices of price and market volumes were estimated using ratio to moving average method (Table 3).

The study found that seasonal fluctuations existed both in market arrivals as well as prices of tomato across the markets. The results showed that christophene had the highest seasonal price of 53.68%, where the prices in latter seven months of the year have the greatest seasonal influence. Green plantains, *per contra,* were the least with 11.96%, as seasonality only impacts price in the first and last quarter of the year. Similarly, the vegetable with the highest seasonality of market volume was melongene (38.71%). The study revealed that seasonal market volume was highest during the months of March and April, while it was least in the month of December. On the other hand, the vegetable with least seasonal variation in market volume is medium sweet pepper (11.79%). This indicated that seasonality factors influenced little on medium sweet peppers as compared to the other selected vegetables.

3.3 Relationship between Prices and Market Arrivals Selected Vegetables

In order to understand the relationship that existed between market arrival volumes and price, regression equations were estimated (Table 4). The seasonal relationship between the market volume, current market price and lagged market price (t-1) of the selected vegetables were based on monthly data for a period of ten years (2005-2015). A multiple regression model was used to analyze the relationship between current price, lagged price and the market arrival of vegetables.

Table 2. Measures of variations in volumes and prices

Vegetables	Measures of variations in volumes				Measures of variations in prices			
	Max	Min	Mean/ Average	CV	Max	Min	Mean/ Average	CV
Bodi beans	20662.00	3666.00	9760.11	0.58	41.03	9.96	24.83	0.53
Seim beans	12487.56	1483.31	4883.40	0.58	23.28	6.29	13.68	0.55
Cucumber	215659.21	34308.00	112507.44	0.56	16.68	1.99	5.61	0.58
Melongene (S)	34107.12	576.07	7242.82	0.67	12.67	1.65	5.46	0.59
Melongene (M)	41392.35	4613.10	15374.36	0.57	16.10	2.41	7.55	0.57
Melongene (L)	87677.57	9597.71	32236.35	0.61	19.89	3.30	9.50	0.57
Ochro	19080.00	3942.00	8134.87	0.55	42.67	9.98	21.74	0.55
Plantain (Green)	135485.11	2236.24	24004.26	0.75	12.24	5.03	8.83	0.52
Plantain (Ripe)	50093.15	2968.82	22652.51	0.59	14.06	4.21	9.05	0.52
Pumpkin	268348.24	47809.14	143479.54	0.54	9.64	1.29	3.11	0.59
Sweet pepper (S)	15023.24	2041.20	6533.09	0.55	19.92	3.19	9.98	0.57
Sweet pepper (M)	30469.63	5588.35	14888.39	0.56	24.45	4.84	12.58	0.56
Sweet pepper (L)	44216.41	6506.90	19511.10	0.56	28.24	6.30	15.13	0.55
Tomato (S)	51034.05	12346.54	26622.98	0.54	24.66	3.92	10.43	0.59
Tomato (M)	148756.49	24716.64	57704.87	0.56	28.99	5.33	13.11	0.57
Tomato (L)	160228.75	19180.48	52070.32	0.57	32.84	6.96	15.74	0.56
Caraillie (S)	5223.22	217.73	2446.12	0.61	14.97	1.65	5.50	0.56
Caraillie (M)	9176.37	485.35	4702.04	0.58	18.28	3.67	7.33	0.54
Caraillie (L)	29933.48	1508.22	11447.59	0.59	22.30	3.63	9.19	0.54
Squash	70503.84	136.08	5908.02	0.98	16.43	2.30	7.60	0.56
Christophene	78835.14	5617.84	26875.75	0.58	33.83	3.16	12.66	0.62

Table 3. Seasonal indices

Vegetables	Price index	Volume index
Bodi beans	23.0382	17.7794
Seim beans	18.6846	25.2795
Cucumber	35.0941	26.1074
Melongene (S)	25.1968	25.0104
Melongene (M)	20.3739	14.2471
Melongene (L)	18.4894	38.7107
Ochro	27.0312	18.9092
Plantain (Green)	11.9759	35.0109
Plantain (Ripe)	15.7890	34.8711
Pumpkin	20.0982	16.5247
Sweet pepper (S)	21.0383	18.3169
Sweet pepper (M)	20.1124	11.7930
Sweet pepper (L)	15.0887	15.7659
Tomato (S)	50.3687	35.8028
Tomato (M)	37.7452	24.8223
Tomato (L)	34.5421	22.4660
Caraillie (S)	19.0515	18.7050
Caraillie (M)	15.4010	19.2505
Caraillie (L)	13.2853	21.0467
Squash	14.0156	33.6643
Christophene	53.6826	33.3714

In general, the regression analysis showed that the lagged price for each vegetable had a positive and significant relationship with current prices, and negative, but mostly significant with market arrivals. The results connote that the lagged price of all the vegetables explained higher variations when compared to current market volumes, thus indicating that the lagged price of the selected vegetables is an important factor in determining the current price than the market arrivals. For example, as could be seen from Table 4 that seim beans had the largest R^2 (0.811), indicating that 81.10% of the variations in current prices of seim beans were explained by lag price and volume of the said crop. Furthermore, the regression outlines, assuming everything else is constant, that a one dollar increase in the previous month's price (lag price) might result in an average $0.67 change in current price of seim beans, and thus indicating a positive relationship between the two variables. Likewise*, ceterus paribus*, a one unit increase in current market arrival volume might result in an average reduction of $0.314 in current price of bodi beans.

Table 4. Relationship between prices and arrivals volume of selected vegetables

Vegetables	Coefficients			
	Lag price	Volume	Constant	R^2
Bodi beans	0.467 (0.078)	-0.314 (0)	18.109 (0.0780)	0.413
t-statistic	6.205	-4.173	7.133	
Seim beans	0.660 (0.048)	-0.351 (0)	8.412 (1.024)	0.811
t-statistic	13.704	-7.286	8.216	
Cucumber	0.275 (0.078)	-0.438 (0)	7.158 (0.766)	0.298
t-statistic	3.505	-5.586	9.341	
Melongene (S)	0.657 (0.072)	-0.320 (0)	2.047 (0.454)	0.432
t-statistic	9.059	-0.439	4.506	
Melongene (M)	0.710 (0.065)	-0.111 (0)	3.131 (0.721)	0.510
t-statistic	10.915	-1.703	4.340	
Melongene (L)	0.632 (0.061)	-0.304 (0)	5.760 (0.845)	0.606
t-statistic	10.369	-4.989	6.819	
Ochro	0.637 (0.064)	-0.270 (0)	13.757 (2.139)	0.539
t-statistic	9.937	-4.209	6.432	
Plantain (Green)	0.807 (0.055)	-0.980 (0)	1.925 (0.499)	0.646
t-statistic	14.554	-1.772	3.909	
Plantain (Ripe)	0.770 (0.057)	-0.173 (0)	2.845 (0.580)	0.627
t-statistic	13.570	-3.057	4.909	
Pumpkin	0.664 (0.062)	-0.281 (0)	2.347 (0.3669)	0.551
t-statistic	10.631	-4.503	6.366	
Sweet pepper (S)	0.540 (0.074)	-0.228 (0)	7.292 (1.305)	0.412
t-statistic	7.295	-3.082	5.589	
Sweet pepper (M)	0.506 (0.068)	-0.367 (0)	10.855 (1.430)	0.521
t-statistic	7.370	-5.352	7.589	
Sweet pepper (L)	0.539 (0.065)	-0.382 (0)	12.592 (1.550)	0.540
t-statistic	8.287	-5.869	8.124	

Vegetables	Coefficients			
	Lag price	Volume	Constant	R^2
Tomato (S)	0.527 (0.062)	-0.434 (0)	11.970 (1.362)	0.610
t-statistic	8.618	-7.097	8.786	
Tomato (M)	0.480 (0.064)	-0.457 (0)	13.489 (1.478)	0.602
t-statistic	7.610	-7.242	9.124	
Tomato (L)	0.598 (0.064)	-0.328 (0)	11.226 (1.574)	0.553
t-statistic	9.388	-5.155	7.132	
Caraillie (S)	0.505 (0.080)	-0.028 (0)	2.858 (0.550)	0.255
t-statistic	6.303	-0.354	5.196	
Caraillie (M)	0.544 (0.074)	-0.231 (0)	4.615 (0.702)	0.360
t-statistic	7.313	-3.108	6.570	
Caraillie (L)	0.535 (0.069)	-0.331 (0)	6.253 (0.817)	0.446
t-statistic	7.671	-4.745	7.653	
Squash	0.340 (0.087)	-0.171 (0)	5.269 (0.755)	0.166
t-statistic	3.940	-1.987	6.980	
Christophene	0.492 (0.062)	-0.446 (0)	13.496 (1.553)	0.650
t-statistic	7.878	-7.145	8.690	

Figures in parentheses indicate standard errors

4. CONCLUSION

The study found that there were significant changes in the trend in market arrivals and price behaviour of vegetable crops both over the years and across the months, with seim beans having the highest increase in price, while green plantains had the least price increase although with the highest increase in market arrivals. Similarly, pumpkin seemed to have the least increase in market arrivals. Likewise, small tomatoes and green plantains had the lowest CV of market arrival and price, respectively, implying that there were low dispersions. The lagged price for each vegetable had a positive and significant correlation with current prices, and negative, but mostly significant with market arrivals. Also, the study has confirmed the negative relationship between market arrivals and prices over the years. This indicates imperfection in marketing of vegetables in the wholesale market, as the traders used the previous week price as guide for setting the current price of the vegetable, instead of current market arrival and demand.

It could be concluded from the study that government should focus some attention to improve the current market information system to become more efficient and effective, whereby making the information easier to access, disseminate more up to date and timely market information on the regular basis so as to make proper production and marketing decisions. Furthermore, market infrastructure facilities like warehousing, transportation, processing, etc should be promoted more which would help the growers to store their excess produce during production and eliminate the seasonality in market arrivals of vegetables and minimize the price volatility of the vegetables [11]. Some other implications of the study could be assessing impact of pests and disease in determining and understanding whether or not there is a relationship between price and market volume, seasonality of the selected vegetables and the various diseases that affect them, and how disease management policies may be implemented as to safeguard consumer welfare and protect producers from potential risks [12].

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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