

Price Formation, Seller Satisfaction and Degree of Competition in the Colombo Tea Auction

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ABSTRACT

Colombo Tea Auction is the main marketing channel to dispose bulk tea in Sri Lanka. This study was carried out to assess the price formation, market concentration, degree of competition among buyers and to examine the sellers' satisfaction at the Colombo Tea Auction. Primary data were collected from tea producers (sellers), brokers and officers of Sri Lanka Tea Board (SLTB). Secondary data were collected from Colombo Brokers Association, SLTB and selected brokering companies. Tea price formation factors, market share and competitiveness of buyers at the auction were analysed using Multiple Linear Regression, four firm Concentration Ratio (CR4) and Herfindahal-Hirshman Index (HHI) respectively. The results revealed that, tea grade, elevation, previous auction price, valuation price and net quantity of the tea lot affected 93.9% for the price formation. Results further revealed that CR4 and HHI were 28% and 370.9 respectively indicating that the public auction is operating on a relatively more competitive scale and also showing a favourable market among stakeholders due to the relatively quick return on investment, transparency and lowering of the risks than the other marketing channels. A few buyers dominate in the auction influencing negatively to the degree of competition. The study suggests that the price given to producers should mainly depend on quality rather than on other contributory factors and for competitive trading. This should be developed as a policy revision by the SLTB and Colombo Tea Trader Association.

KEYWORDS: Colombo tea auction, Market channels, Market concentration

Introduction

The Tea industry in Sri Lanka has always been a vital component of the economy contributing a vital amount to the country's Gross Domestic Product (GDP) and government revenue earnings (SLTB, 2015). It has been the second largest agricultural industry in the country. For the Year 2016, tea represented approximately 2 percent of overall GDP and 12.3 percent of total export earnings (Central Bank of Sri Lanka, 2016). Furthermore, it is also the country's largest employer providing employment both directly and indirectly to over two million people (De Alwis, 2011). In the global tea industry, Sri Lanka is the third largest tea exporting country with 17 percent market share preceded by Kenya and China (Plantation Sector Statistical Pocket Book, 2015).

In Sri Lanka, tea is sold through four major marketing channels namely the Colombo Tea Auction (CTA), private sales, direct sales and forward contracts. A very small volume of tea is marketed via factory sales (SLTB, 2015). More than 95 percent share of the tea with the Ceylon tea logo was marketed through the CTA in 2016 (Annual Report of SLTB, 2016). The CTA is considered as the largest single tea auction centre in the world which handles more than 300 million kilograms of black tea annually. The average price per kilogram of tea in the CTA has increased up to Rs. 466.43 in 2016 as compared to the Rs. 402.07 in year 2015 (Annual Report of SLTB, 2016)

The Colombo Tea Traders Association (CTTA) in conjunction with the Ceylon Chamber of Commerce (CCC) conduct the public auction under the by-laws and conditions of the SLTB. This union ensures a stable, reliable and credible procedure for the sale of tea. The CTA is held twice a week on Tuesdays and Wednesdays in the CCC building. The participants in the auction are the brokering firms and buyers (CTTA Annual Report, 2016). The government has little influence on the price at the auction. Brokers play a vital role in the auction (CTTA Annual Report, 2016). Tea producers offer the tea for sale through brokers and the brokers as auctioneers sell the tea. Eight brokering firms which are members of the Colombo Broker Association (CBA) operating at the Auction sell the tea for the highest bidder (Annual Report of CTTA, 2016).

Price formation (price discovery) at the tea auction is itself a complex process and its outcome is a result of a complex interplay of various factors (Thudugala, 1987). However, the auction system was criticized by various parties claiming that the lowering of prices at the CTA is due to collusion or unfair competition amongst the buyers leading to dissatisfaction among producers (Thudugala, 1987). These factors result in a situation where sellers do not receive a fair price for their processed tea. The CTA is the most efficient and professionally operating tea auction in the world (Annual report of CTTA, 2016). According to founding ideals of the auction system, it closely approximates to a perfect market where prices are determined by supply and demand rather than by individual buyers or sellers (Motha *et. al.*, 2004). However, in practice various imperfections in the world market, notably the domination of the market by a small number of buyers as a result of the existence of a concentrated market share in the hands of a few buyers has led to unfair competition amongst the buyers.

Therefore, specific objectives of this study were to investigate the variables which determine the CTA prices, assess the relationship that exists between the CTA price and those variables that influence it, to find out the degree of competition among buyers and to identify the seller's satisfaction at the CTA. The outcome of this research will help the policy makers to understand the nature of price determination and the influences of the CTA.

Methodology

Data Collection and Analysis

In-depth interviews were held with selected tea managing directors, marketing managers of selected plantation companies and managing directors of brokering firms to collect information on the tea trade, on sellers' satisfaction and the auction mechanism. Secondary data (prices on highest selling ten main grades of tea) were collected from three brokering firms and SLTB from June 2016 to August 2017. Data were analysed using Microsoft Excel software and inferential statistics with the statistical package Minitab 17 version.

Theoretical frame Work

To identify the relationship of the factors that affect the price formation at the CTA, a Multiple Linear Regression model was used as given below.

$$Y = \beta_0 + \beta_1 NQ + \beta_2 PP + \beta_3 VP + \beta_4 B + \beta_5 H + \beta_6 L + \beta_7 BOP + \beta_8 BOP1 + \beta_9 BOPF + \beta_{10} FBOP + \beta_{11} FBOP1 + \beta_{12} FBOPF1 + \beta_{13} OPA + \beta_{14} PEK + \beta_{15} PEK1 + \varepsilon$$

Where, Y is the unit price in rupees per kilogram which is the dependent variable. The Independent variables are namely,

NQ	=	Net Quantity (Kg)
PP	=	Previous Auction Price (Rs)
VP	=	Valuation Price (Rs)
B	=	Broker
H	=	High Elevation
L	=	Low Elevation
BOP	=	Grade BOP
BOP 1	=	Grade BOP1
BOPF	=	Grade BOPF
FBOP	=	Grade FBOP
FBOP1	=	Grade FBOP1
FBOPF1	=	Grade FBOPF1
OPA	=	Grade OPA
PEK	=	Grade PEK
PEK1	=	Grade PEK1
$\beta_0 - \beta_{15}$	=	Coefficients to be estimated
ε	=	Error term

Market Power Concentration

Market concentration is a function of the number of firms in a market and their respective market shares. Herfindahl-Hirschman Index (HHI) a commonly accepted measure of market concentration was used in this study. It is calculated by squaring the market share of each buyer competing in the auction and then summing the resulting numbers. The HHI number can range from close to zero to 10000. The HHI expressed as,

$$HHI = \sum_{i=1}^n (S_i)^2$$

Where, S_i is the market share of i^{th} firm in the market, and n is the number of firms. HHI reflects distribution of the market share, competition, and also adds a proportionately greater weight to the market share of the large firms in accordance with their relative importance in competitive interactions. The HHI approaches zero when a market consists of a large number of firms relatively equal in size. The HHI increases both as the number of buyers in the auction decreases and as the disparity in buying volume between those buyers increases. According to the U. S. department of justice and the Federal Trade Commission, the spectrum of Market concentration as measured by the HHI, is divided into three regions that can be broadly characterized as unconcentrated or competitive (i.e. HHI below 1000), moderately concentrated (i.e. HHI below 1000 to 1800) and highly concentrated (i.e. HHI above 1800) (Anon, 2017).

Market Structure

Market power concentration gives an idea of the degree of market power that firms enjoy in its respective industry and refers to the number of and relative size distribution of buyers /sellers in the market. The market concentration ratio, which measures the percentage of traded volume or share accounted for by a given number of participants. Kohls and Uhl (1985) suggested that a four-firm concentration ratio (CR4), that is the combined market share of the largest four firms. A value of less than or equal to 33 percent is generally indicates a competitive market structure. A concentration ratio of 33 percent to 50 percent indicates a weak and a concentration above 50 percent indicates a strongly oligopsony market structure.

Results and Discussion

In-depth discussions revealed that the CTA has a number of strengths and opportunities to become the major marketing channel for tea. Those were, SLTB registered 719 sellers, 362 buyers and 8 brokers who participated at the public auction in 2016 with high transparency; qualified tea tasters from brokering and buyer companies who check each and every tea lot before entering the auction system and decide on the relevant price relating to the quality; very high competitive rivalry among both buyers and sellers that causes the unconcentrated market; the Ceylon tea logo being the mark of the quality for Sri Lankan tea and the CTA being strictly regulated by the government through the SLTB.

As per the results of the linear regression analysis (Table 1), coefficient represents the implicit price for the change of variables. Grade dust 1 and medium elevation were taken as dummy variables. All the variables were significant in the study. Regression function explained unit price by 93.9 percent of its independent variables. When all other variables are kept constant, with the increase of every additional kilogram of net quantity, unit price of tea decreased by Rs. 0.009, with every additional rupees of previous auction price and valuation price increased unit price of tea increased by Rs. 0.630 and Rs. 0.269.

Table 1: Estimates of the Multiple Linear Regression

Variable	Coefficients	P value
Constant	52.985	0.000
Net Quantity	-0.009	0.000
Previous Auction Price	0.630	0.000
Valuation Price	0.269	0.000
Broker A	10.110	0.000
High Elevation	1.916	0.006
Low Elevation	14.969	0.000
BOP	-4.676	0.000
BOP1	10.965	0.000
BOPF	-3.548	0.001
FBOP	7.136	0.000
FBOP1	3.571	0.023
FBOPF1	8.635	0.000
OPA	-5.147	0.000
PEKOE	2.162	0.005
PEKOE1	12.020	0.000

Note: R-Sq. (adj) = 93.9%

When changing the brokers, the price of the tea increased by Rs. 10.11. With respective to the medium elevation, high elevation and low elevation tea price increased by Rs. 1.92 and Rs. 15.0 respectively.

Compared with the price of dust 1 price of tea, the tea grade BOP, BOPF, OPA and PEKOE1 decreased price by Rs. 4.68, Rs. 3.55, Rs. 5.15 and Rs. 12.0 respectively whilst price of BOP1, FBOP, FBOP1, FBOPF1 and PEKOE increased by Rs. 11.0, Rs. 7.14, Rs. 3.57, Rs. 8.63 and Rs. 2.16 respectively.

In year 2016, the total tea production was decreased by 11 percent of annual tea production as compared to year 2015(Annual report of SLTB, 2016). The bad weather conditions that prevailed throughout the tea growing areas was the main factor that contributed for this decline. The Cost of Production (COP) was dropped by 3.42 percent when compared to 2015. According to the reports of the SLTB, in 2015 the total COP during the year was Rs. 475.31. In 2016 it decreased to Rs. 458.84. Compared to other tea producing countries, COP of Sri Lankan tea is high and identified as the major problem as it reduces the profits (Annual report of SLTB, 2016). Therefore, reduction of COP makes a favourable impact on the industry. It is noted that the regular increment in the COP during the past several years had reduced after 2015. According to the views expressed by sellers and brokers, they discovered that the cost effective new machinery implementations and the product diversification are required to reduce the COP and to increase the quality of products.

During the years 2013 to 2016 (Figure 1) indicate that the quantity sold at the CTA had decreased from 99 percent to 95 percent.

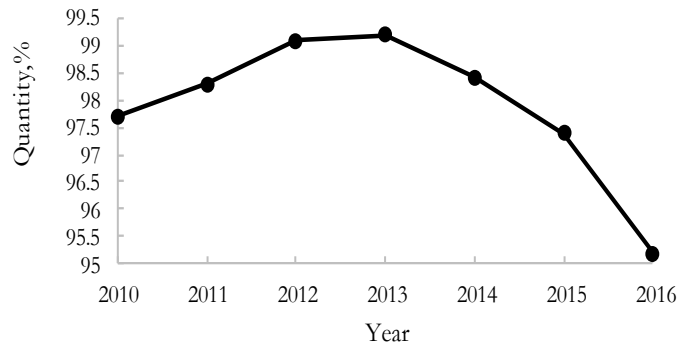


Figure 1. Quantity Sold at the Colombo Tea Auction as a Percentage of the Total Production from Year 2010-2016

However, in 2015 with the price reduction (Figure 2) the quantity sold out of the total production at the CTA also reduced. Results showed that the large price reduction in 2015 made a big impact on the quantity sold in 2016 at the CTA, even though the average price increased to Rs. 466.43.

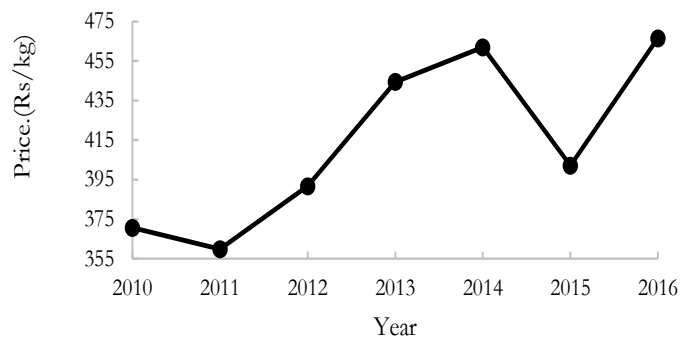


Figure 2. Average Prices at the Colombo Tea Auction (Rupees per Kilogram)

Black tea amount of 296.9 million kg in 2004 (Motha *et al.*, 2004) was sold through the CTA. It was 86.4 percent of the total quantity. After one decade it had increased up to 97.4 percent. The quantity was 317.3 million kg.

Table 2: Volume of Tea Marketed through Various Channels (Mn. kg.)

	Year		
Marketing Channels	2014	2015	2016
Public Auction	332.2	317.3	276.25
Privet Sales	3.2	3.1	2.72
Direct sales	2.07	2	1.87
Total	337.47	322.4	280.84

Source: Sri Lanka Tea Board

In 2014 to 2016, more than 98 percent of made tea were disposed through the CTA (Table 2). In 2014 and 2015, disposal amount was 98.4 percent. But in 2016 it reduced

to 98.3 percent. However, results show that the CTA is the main marketing channel to dispose made tea in Sri Lanka.

Market Structure

Table 3. Quantities Purchased by the Four Major Buyers (2016 Jan - Dec)

Buyer	Quantity (Mn.kg)	Share %
Akbar Brothers	36.393	13.4
Anverally & Sons	16.614	6.1
Empire Teas	12.094	4.4
Unilever Lipton Ceylon	11.172	4.1
Other	196.188	72

Source: Sri Lanka Tea Board

In 2005, top four market share holders were Akbar Brother, Stassen Group, Jafferjee Brothers and Ceylon Tea. After one decade, still Akbar Brother was the number one (Table 3), others were replaced by Anverally & sons, Empire Teas and Unilever Lipton Ceylon.

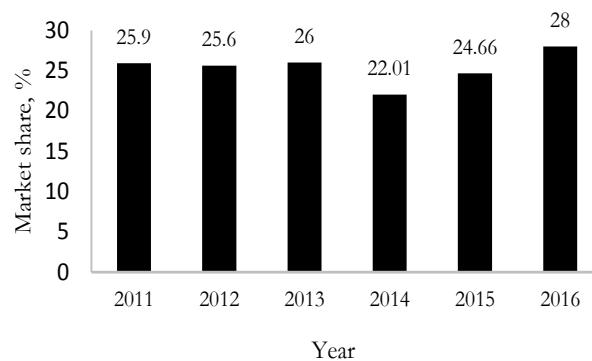


Figure 3. Variation of CR4 Values

In the CTA the total quantity of tea bought by 290 buyers from January to December 2016 was 272,463,654 kg. The quantity bought by the major four buyers was 76,274,477 kg. According to 2005 figures the CR4 value was 33.3 percent of the total purchased. It indicated a weak oligopsony market (Motha *et al.*, 2004), in 2016 the CR4 value was 28 percent of the total purchased (Figure 3). According to CR4 concept, this indicates a Competitive Market Structure (Kohl and Uhl, 1985).

Thus, the HHI market power concentration of the CTA in 2016 was 370.9. It was the highest value for the past five years (Figure 4). From January to December results showed that HHI values varied from 342 to 446.45. The highest HHI value of 446.45 was observed in November (Figure 5). As these values were below 1000 they revealed that the CTA is an unconcentrated or competitive market.

Market Power Concentration

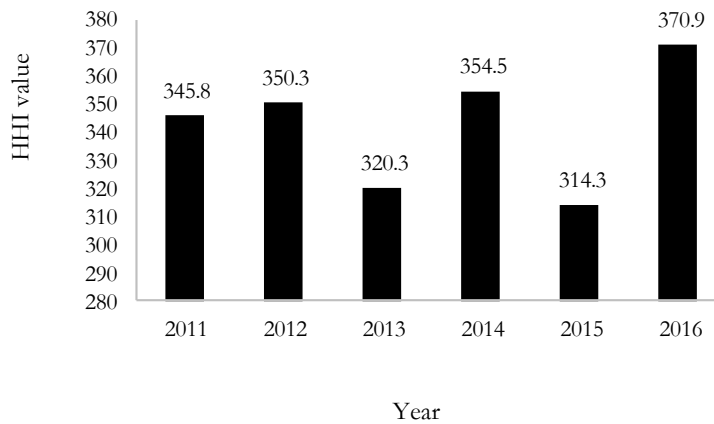


Figure 4. HHI Value Variation (2011-2016)

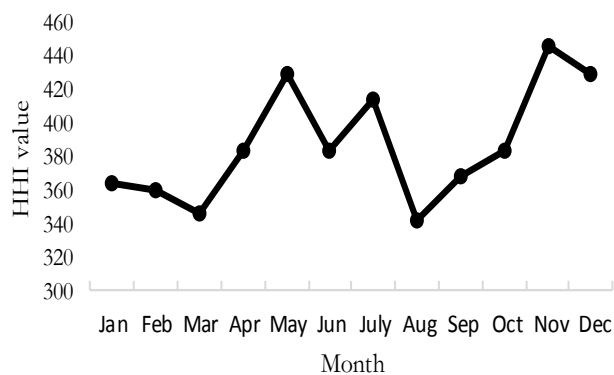


Figure 5. Variation of HHI Value for 2016

At the in-depth discussions, the respondents were asked specifically about the satisfaction of the CTA prices. Most of the sellers felt that the price at the auction is often fair. However, the weather pattern, global market trends, policies, financial stability, selling mark, connections of foreign buyers, interrelationships among buyers, sellers and brokers, experience and knowledge of the tea market, make a big impact on the CTA price.

According to the stakeholders, current threats of the price at the CTA were, adulteration of quality teas which tarnishes the image built over hundreds of years, risk of turning the present buyers' market domain in to an oligopolistic one, inexperienced purchasing of buyers. These may lead to a drop down in price at the market. According to the views expressed by sellers, they prefer to export the tea rather than going to the CTA due to the high price of tea.

Those threats were created due to the quality, quantity and number of buyers and sellers having always been uncertain factors, limited bargaining power of sellers

exporters dictating prices in keeping with the overseas market, new entrants to the market that have moderate impact on the auctioning system as several large companies try to dominate the market. Furthermore, weather patterns, global market trends, and external environmental factors could severely impact on the prices at the CTA.

Conclusions

This study revealed that the market power concentration indicates a competitive market structure. A very high bargaining power of buyers can enhance the competitiveness. To gain a remunerative price for tea, producers can enhance the price by reducing the cost of production by the process of product diversification the introducing cost effective new machinery for harvesting and processing. Improvement of the acceptance of quality certifications can enhance quality of the tea and product standards. Sellers' satisfaction is high regarding CTA. However, sellers preferred to export tea rather than going to the public auction due to the high prices on offer. For competitive trading policy revision, implementation of a code of conduct by SLTB and CTTA to ensure equal buyer participation, controlling market dominance among buyers, suppression of adulteration of quality tea which tarnishes the image built over hundreds of years and determination of prices for producers based mainly on quality rather than many other contributory factors.

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