Structure, Conduct and Performance of firms across alternative forms of sugar in Tamil Nadu

Abstract:

An research of market performance revealed that while producers will get a larger percentage of the margin when selling on a wide scale, this percentage will still be higher than for other actors. It was determined that the price difference for ten kilos of sugar would be Rs. 100. Nevertheless, many customers choose to purchase sugar in smaller quantities at retail stores, where the cost is higher than when they buy in bulk. Based on a market performance analysis, the producer is making a significant profit margin, although the price spread for ten kilograms of sugar is just Rs. 90. But in this case, the producer sells in greater quantities, either directly to the wholesaler or through the market, allowing them to earn a large percentage of the profit on their goods. Based on a market performance study, the producer will benefit from a bigger percentage of the profit margin than other players in the chain. Consequently, his production costs will be equivalent to his profit margin, as 20 kilograms of palm sugar can be produced from 60 liters of palmyrah tree sap.

Introduction:

Today the World is conscious about sweeteners due to increasing threat of diabetes, obesity, hypertension and heart diseases and many other related concerns due to high consumption of sugar in food, beverage and confectionary products. Nowadays, many sugar free and synthetic sugar products are abundantly available in food markets. However, it may be unsafe and unhealthy, as there was a possibility to cause side effects (*Asghar, 2019*).Agroindustry played a very important role in supporting the economy and employment generation *(Pakasi, 1998)*. One of the industries that thrive in rural areas was the palm sugar agroindustry, with material of liquid *Borassus flabellifer*. Agroindustry had an ability to absorb labour upto 68 per cent of total workforce available in rural areas *(Aliudin and Cahyadi, 2019*).

Processing industry had a role in economic growth of a region through marketing needs both domestically and abroad (*Rejekiningsih, 2004*). Traditionally, any occasion in India was celebrated with sweets and was customary to "sweeten the mouth" after every meal, any joyous occasion, religious festival and social gathering. Indian religious offerings mostly contain five amrits (elixirs) like milk, curd, ghee (clarified butter), honey and sugar; these indicated the importance of sugar not only as a food item but also as an essential, to Indian way of life. While sugar has of considerable cultural and hedonic relevance in India, nutritionally it provides only "empty" calories (1g of sugar gives 4 k cal). It lacks natural minerals which were present in beetroot or sugarcane.

There was a strong relationship between calorie intake and obesity. In India, the prevalence of obesity was increasing at a rapid pace due to an increase in energy intake owing to increase in purchasing power and availability of high fat, energy-dense foods, along with reduction in the energy expenditure consequent to urbanisation and mechanisation *(Mishra et al., 2013)*. Parallel to the rise in obesity, prevalence of metabolic syndrome and type 2 diabetes mellitus (T2DM) was increasing in India and has reached epidemic proportions. The estimates in 2019 showed that 77 million individuals had diabetes in India, which is expected to rise to over 134 million by 2045 (*Pradeepa and Mohan, 2021*).

Tamil Nadu contributes significantly to nation's jaggery and khandsari sugar export. It also produces palm sugar and coconut sugar. It was an important need to increase the productivity, and the competitiveness at national level. Due to inappropriate marketing structure, lack of guidelines existing in alternate forms of sugar, this study focused on analysing the value chain of alternative forms of sugar, assessing buying behaviour and the major factors influenced consumers to purchase alternate forms of sugar, tracing marketing channels, marketing margin and producer share in consumer's rupee. The study will also contribute to the overall understanding of current status of alternate forms of sugar in value chain activities and will also be helpful to suggest suitable measures for enhancing the efficiency of value chain at the state level. The study will be further useful for all the stakeholders

especially the farmers, entrepreneurs and processors and government institutions for framing suitable policy measures.

Literature Review:

Ayele et al. (2017) revealed that concentration ratio showed a strong oligopoly beef market structure in Ethiopia. Only few traders hold the share of market and also earned more profit than producers. The major considerable changes in barriers to entry were trading license, risk of variation in demand on seasons and prices offered. Price determination was mainly based on negotiation between sellers and buyers but on other hand there were no selling activity on credit basis. However, producer share in consumer price was high as they directly sell to the consumer.

Banson et al. (2018) illustrated that structure, conduct and performance to interact together with influence of survival and growth of agricultural sector through Bayesian Belief Network. By this systematic approach to SCP, there would be improvement in production and allocative efficiency may had greater potential in improving food security, supporting ecosystem and thereby strengthening of agricultural sector in Ghana.Relawati et al. (2018) resulted that oligopoly type of market structure in Indonesian apple market at all levels of marketing channels. Price maker in the market was wholesaler as they hold strong bargaining power with highest concentration ratio.In terms of market performance also wholesaler earnest highest profit. Findings implied that effort was made to increase profit and efficiency, farmers also needed to shorten the marketing channel towards supermarkets. Wholesalers were also needed to reduce the cost through transportation to minimize damage of fruits. Finally, unsold apples were needed to be reduced by agents and retailers.

Bin et al. (2019) revealed that market structure had its negative impact on firm performance whereas firm conduct had positive impact on firm performance. Performance of firm had positive impact based on factors such as manager's experience and expenditure on research & development.Muhaimin et al. (2019) stated that structure of corn market leaded towards the perfect competition and in market behavior purchase price was mainly determined by marketing agencies in village. Market performance analysis revealed that efficiency had been achieved as

average costs were small compared to price difference in market but operational efficiency was proven inefficient due to difference in price spread of various marketing channels.Gebre et al. (2020) indicated that sesame market was strongly oligopolistic type. However, there will be inadequate flow of information; licensing problems for traders and subsequent incompetence to strive with the unlicensed traders were identified as entry and exit barriers in the market. Raj et al. (2020) stated that vegetable market had oligopoly market share and HHI showed that tomato, cabbage, green chilli and cabbage were 1817.92, 6049.47, 3994.08 and 3402.14 indicated a moderate highly concentrated market. The performance of vegetable seed companies considered the most important factor was distribution depth. Ordofa et al. (2021) showed that dairy market in Ethiopia was strong oligopolistic type. The main barriers to entry milk and butter trade were corruption, political equality, education, market capital and transparency respectively. Conduct analysis resulted that to sell dairy products, farmers opted for different market outlets and price setting strategies. The price seller in the market was buyer so it was not competitive. In terms of performance, Channel (Producer – District Retailer - Consumer) showed maximum producer share in the market. Attention to improve the infrastructure in the market, yield increasing technology and training helped to increase production and better marketing of dairy products.

Methodology:

Structure, Conduct and Performance (SCP) of firms

SCP theory postulated if there were faults in the structure of an industry. This affected the conduct of that industry, which in turn affected the performance of the industry. SCP helped enable firms to put in place policy recommendations.

Market Structure

Estimating the numbers, size and spatial distributions of each category of intermediary provides an indication of both the local structure of the market, and the range of alternatives faced by participants in the marketing chain in their buying, selling and hiring functions (*Scarborough and Kydd, 1992*). The following tools were employed to study the market structure.

Concentration ratio

Market concentration is defined as a number and size distribution of sellers and buyers in the market. Other factors, such as the firm's objectives, economics of scale, and assumptions about rival firm's behaviour, were relevant in determining the degree of concentration, the relationship between concentration and behaviour and performance (*Scherer and Ross, 1980*). The Concentration Ratio indicates the relative size of K-large firms in relation to their industry as a whole. It shows whether an industry is dominated by a few large firms or many small firms. Therefore, CRk was used as an indicator of the relative size of firms in relation to the industry as a whole. Normally 4-firm and 8-firm concentration ratios are used conventionally. This assists in determining the market form of the industry (*Wesman, 2005*).

Wesman (2005) pointed out that as market concentration increases, competition and efficiency decrease and chances of collusion and monopoly increase. Therefore, a higher concentration measure represents a higher level of lack of competition. That means, few participants dominate the market. The concentration ratio (market ratio) was calculated using a formula S_i

$$\mathrm{CR} = \sum_{i=1}^{k} \mathrm{Si}$$

Where

CR - concentration ratio

S_i - Percentage share of the i^{th} firm

R - Number of largest firms for which the ratio is going to be calculated

According to Khols and Uhl (1985) market concentration measures the total combined market share of some number of the largest firms. Most widely used was the 4-firm concentration ratio, CR_4, which was the combined market share of the four largest firms in the industry. A CR_4 of greater than or equal to 50% is an indication of strongly oligopolistic industry, CR_4 between 33% and 50% was an indication of weakly oligopolistic industry and less than 33% was un concentrated market. Despite wide application of concentration ratio as a measure of the ratio of

market concentration, there were limitations against the index. The ratio didn't indicate the size distribution ofr firms.

Market Conduct

There were no agreed up on procedures for analysing the element of market conduct. Market conduct refers to the patterns of behaviour that traders follow and how they adjust to changing market conditions. These include price setting behaviour, and buying and selling practices (*Kizito, 2008*). Market price setting behaviour included who set the price and how were price determined? In this study, it covered buying and selling strategy of producers and traders, price formation and place of sold the sugar.

Market performance

Performances depend on conduct of sellers and buyers which intern is strongly influenced by structure of the relevant market (*Purcel, 1979*). A commonly used measure of the performance of a marketing system was the marketing margin or price spread (*Abbott and Mekeham, 1990*). Marketing channel also used to evaluate the performance of the market.

RESULTS AND DISCUSSIONS

Structure-conduct performance (S-C-P) paradigm was the most prominent method of analysing market performance. It assumed that certain market characteristics (such as market concentration and entry barriers) enhance business profitability within the relevant market (*Aleksandrova and Lubys, 2004*). According to SCP model, the way firms were organised in the market structure revealed a lot about how they made conduct decisions, which affected the degree of efficiency and integrity of market performance (*Gebre,et al., 2020*). Hence, structure, conduct and performance of jaggery and khandsari sugar, coconut sugar and palm sugar market were presented and discussed as follow.

Jaggery and Khandsari sugar Market

Structure of jaggery market in the study area was analysed by market concentration and degree of transparency. The results were analysed and were presented in the following sections.

Degree of market concentration

Degree of market concentration was analysed by taking into account all the jaggery and khandsari sugar traders from Chitthode and Pilikalpalayam market. Concentration ratio was calculated by taking annual volume of jaggery and khandsari sugar purchased in 2021 /22.The results indicated in the table of concentration ratio (CR_4) shows about the top four traders in the two markets respectively.

Table 1. Jaggery and Khandsari Sugar Traders Concentration Ratio

Chitthode market				Pilikalpalayam market			
Traders Code	**Quantity Purchased (Kgs)**	**% share of purchase**	**% Cumulative Purchase**	**Traders Code**	**Quantity Purchased (Kgs)**	**% share of purchase**	**% Cumulative Purchase**
TC 001	533	24.91	24.91	TP 001	519	25.31	25.31
TC 002	417	19.86	44.77	TP 002	405	19.76	45.07
TC 003	355	16.91	61.68	TP 003	345	16.82	61.89
TC 004	343	16.34	**78.05**	TP 004	330	16.09	**77.98**
All other traders	461	21.96	100	All other traders	451	22	100
Total	2099	100		Total	2050		

It could be inferred from Table 1 that, concentration ratio (CR_4) from the top four jaggery and khandsari sugar traders in Chitthode and Pilikalpalayam handled about 78.05 per cent and 77.98 per cent of jaggery and khandsari sugar purchased respectively. Both the markets were strongly oligopolistic.

Degree of market transparency

Market transparency describes the extent to which the details of market activity are made public and important information about a market like last sale reports, quotes (physical dealer markets), quotes (electronic market), depth of book (*Williams, 2011*). To function effectively and efficiently, all the markets require a certain level of transaction transparency and market participants could improve, more informed decisions owing to trade transparency.

Table 2. Market Information access and its source for sampled household

Variables	Category	Number of traders (N=20)	Percentage to Total

Access to market information	Yes	18	90
	No	2	10
Total		**20**	**100**
Source of market information	Other traders	6	30
	Personal observation	14	70
Total		**20**	**100**

It could be observed form the above table that, 90 percent of the sample respondents were aware about market information, 10 percent of the sample respondents were not aware about the updated information in the market. However, 70 percent of traders received market information from personal observation and only 30 per cent received information from the other traders. Traders visited markets frequently to know about the demand and supply of the sugar.

Jaggery and khandsari sugar market conduct

The conduct of jaggery and khandsari sugar market was analysed in terms of setting the price in the market, purchasing and selling strategies of producers and traders. The details about the conduct of market was analysed and presented in the following sections.

Conduct of the producers

The method of setting the price in the market is important in jaggery and khandsari sugar trading activity. The table discussed how buyers and sellers act in relation to market structure.

Table 3. Place and Selling strategies in the market

Activities	Strategies	Number of sample households (N=30)	Percentage to Total
Price Setter	Producers	5	16.67
	Buyers	4	13.33
	Negotiations	0	0
	Market	21	70.00
	Total	**30**	**100**
Place of jaggery and khandsari	Farm gate	9	30.00
	Village market	21	70.00

sugar sold	**Total**	**30**	**100**

It could be observed from the above table that, auction system is followed in the market, so that the price is fixed in subsequent weeks. Further, 16.67 per cent of the producers sold sugar to wholesalers, at a lesser price than the market price (for example, 10 kgs cost Rs. 400 which was fixed in the market, producer sold sugar at Rs. 450 to buyer). Here, 13.33 percent of the buyers would be the price setter and they would be the wholesalers or retailers or consumers. Majority (70 per cent) of transaction happened in the village market through auction method. Through farm gate, 30.00 per cent of jaggery and khandsari sugar were sold, as many consumers bought at nominal rate than that of market price or retail price.

Market performance Analysis

Performance of jaggery and khandsari sugar market was analysed by estimating marketing margin, associating marketing costs which took into consideration the marketing channels of production and marketing year. The price spread at various stages in value of jaggery and khandsari sugar was discussed in the following table.

Table 4. Prices at Various stages of Marketing in value chain of Jaggery and Khandsari sugar

S.No	Items	Producer	Wholesaler	Retailer	Consumer
1.	Sale Price	Rs. 500	Rs. 560	Rs. 600	-
2.	Purchase Price	-	Rs. 500	Rs.560	Rs. 600
3.	Price difference	-	Rs. 60	Rs. 40	-
4.	Cost of marketing	-	Rs. 20	Rs. 20	-
5.	Total cost of product	Rs. 38	Rs. 520	Rs. 580	-
6.	Profit Margin	Rs. 12	Rs. 40	Rs. 20	-
7.	Percent of Margin	7.66	7.14	3.33	-

It could be observed from the table 5.20 that, producer would gain higher per cent of margin compared to the other actors however while selling at a larger scale the margin of percentage would be higher. It could be concluded that, Rs.100 would be the price spread for 10 kilograms of sugar, however consumers buying minimum quantity at retail shops the price spread would be higher.

Coconut sugar Market

The structure of coconut sugar market in the study area was analysed from market concentration and degree of transparency. The results were analysed and were presented in the following sections.

Degree of market concentration

Degree of market concentration was analysed by taking all the palm sugar and coconut sugar traders from Kunnathur and Siruvallur market. The concentration ratio was calculated by taking annual volume of jaggery and khandsari sugar purchased in 2021 /22.The results indicated in the table of CR_4 shows about the top four traders in the two markets.

Table 5. Coconut sugar traders' concentration Ratio

Kunnathur market				**Siruvallur market**			
Traders Code	**Quantity Purchased (Kgs)**	**% share of purchase**	**% Cumulative Purchase**	**Traders Code**	**Quantity Purchased (Kgs)**	**% share of purchase**	**% Cumulative Purchase**
TK 001	950	23.57	23.57	TS 001	850	23.68	23.68
TK 002	830	20.60	44.17	TS 002	730	20.33	44.01
TK 003	750	18.61	62.78	TS 003	623	17.35	61.37
TK 004	600	14.89	**77.66**	TS 004	582	16.21	**77.58**
All other traders	900	22.33	100	**All other traders**	805	22.42	100
Total	**4030**	**100**		**Total**	**3590**	**100**	

It could be inferred from the above table that, Concentration ratio (CR_4) from the top four coconut sugar traders in Kunnathur and Siruvallur handled about 77.66 per cent and 77.58 per cent of coconut sugar purchased. Here, both the markets were strongly oligopolistic.

Degree of market transparency

Market transparency describes the extent to which the details of market activity are made public and important information about a market like last sale reports, quotes (physical dealer markets), quotes (electronic market), depth of book (*Williams, 2011*). To function effectively and efficiently, all the markets require a certain level of transaction

transparency and market participants could improve, more informed decisions owing to trade transparency.

Table 6. Market Information access and its source for sampled household

Variables	Category	Number of traders (N=20)	Percent
Access to market information	Yes	20	100
	No	0	0
Source of market information	Other traders	8	40
	Personal observation	12	60
Total		**20**	**100**

It could be observed form the above table that, 100 percent of the sample respondents were aware about market information. However, 70 percent of traders received market information from personal observation and only 40 per cent received information from the other traders. Traders visited markets frequently to know about the demand and supply of the sugar.

Coconut sugar market conduct

The conduct of coconut sugar market was analysed in terms of setting the price in the market, purchasing and selling strategies of producers and traders. The results were analysed and were presented in the following sections.

Conduct of the producers

The method of price setting is important in jaggery and khandsari sugar trading activity discussed how buyers and sellers act in relation to market structure.

Table 7. Place and Selling strategies in the market

Activities	Strategies	Number of sample households (N=30)	Percentage to Total
Price Setter	Producers	5	16.67
	Buyers	2	6.67
	Negotiations	0	0.00
	Market	23	76.67
	Total	**30**	100
Place of coconut	Farm gate	7	23.33

sugar sold	Village market	23	76.67
	Total	**30**	**100**

It could be observed from the above table that, auction system is followed in the market, so that the price is fixed in subsequent weeks. Further, 16.67 per cent of the producers sold sugar to wholesalers; at lesser price than the market price (for example 10 kgs cost Rs. 850 which was fixed in the market, producer sold sugar at Rs. 800 to buyer). Here, 6.67 percent of the buyers would be the price setter and they would be the wholesalers or retailers or consumers. Majority (76.67 per cent) of transaction happened in the village market through auction method. Through farm gate, 23.33 per cent of sugars were sold, as many consumers bought at nominal rate than that of market price or retail price

Conclusion:

Market performance analysis showed that, producer will gain high per cent of margin comparatively with the other actors however while selling at large scale the margin of percentage will be at higher rate. It concluded that, Rs.100 will be price spread for 10 kilograms of sugar, however many consumer buying at retail shops at a minimum quantity where the price will be higher compared with buying at a larger scale. Market performance analysis resulted that, Producer gaining high percent of margin, yet the price spreads is only Rs.90 per10 kg of sugar. However, here the producer sells to the wholesaler directly or through market in higher quantity, so that they can gain with high percent of margin for their product. Market performance analysis concluded that, producer will gain higher percent of margin compared with the actors involved in the chain, hence, his production cost will also equalise with profit, as 60 litres of sap juice from palmyrah tree will give 20 kilogram of palm sugar.

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