

To explore the factors that influences the price of Indian natural rubber and to determine the demand of natural rubber in different periods by employing Seasonality Index of price and production

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Abstract

This paper focussed on finding out the major factors that influence the price of Indian natural rubber. The major factor that affected the price of Indian natural rubber was the dumping of natural rubber in the name of import in the domestic market. Similar to the solid block rubber of international natural rubber, the solid block rubber of Indian natural rubber also follows the same trend. The seasonal index of price and production of Indian natural rubber was estimated. In this analysis, the periods are classified into three, i.e., 1986-2001, 2001-2016 and 1986-2016. In the three periods, the seasonality trend is evident in the behavior of price and production. The production is high during October to January in the entire three periods. But during these months, it is evident that the price of natural rubber seems to be low compared to other months.

Keywords: Price, Seasonality Index

1. Introduction

The natural rubber has been experiencing high volatility and instability in prices after integrating the domestic and international markets within the ambit of WTO. (Pareed and Kumaran, 2017). The increased import of natural rubber has led to demand-supply fluctuations, making the price of natural rubber in the domestic market unstable. The yearly average price of natural rubber has demonstrated high volatility over the most recent fifteen years (The Statistics and Planning Department, 2016). The domestic market of natural rubber is exceedingly integrated with the global market and as a corollary; the instability in the international market prices has majorly influenced the prices in the domestic market (Raju, 2016). It is worth to note that the average price in 2016-17 dropped to Rs. 113.06 per kg from 132.57 in 2010-11. (The Statistics and Planning Department, 2017). The International Rubber Consortium (IRCO) Board of Directors meeting and the Annual General Meeting of IRCO's shareholders which was held on 20 and 21 April 2017 expressed concern on the recent fluctuations in prices that have affected natural rubber economy (IRCO, 2017). The price volatility in rubber crop directly impacts the livelihood of lakhs of small and marginal growers involved in the sector. Thus, a close examination in this regard would lead through useful insights to ensure the livelihood protection of rubber growers by way of insurance/price support in consonance with the prevailing norms and policies (Mohanakumar and Kaur, 2016). In this backdrop, the study aims to analyze the factors affecting the price of Indian natural rubber.

2. Literature Review

Pareed and Kumaran (2017), analyse various factors that cause instability in the price of natural rubber and evaluate its impact on the performance of the rubber economy in India. Any fall in price seriously affects the livelihood of small and marginal farmers of Kerala which accounts for over 80% of natural rubber produced in the country. Though India ranks 6th in the world concerning natural rubber production, it is first in the world about productivity. However, the production of natural rubber has been steadily decreasing in the country since 2012. Though many reasons like climate change, high wages etc. can be attributed to this fall, price crash is the main villain. During 2000-2001 the price hit an all-time low of Rs. 30 per Kilogram. Various factors are affecting the price of natural rubber-like demand and supply conditions, export and import, currency fluctuations, crude oil price, synthetic rubber etc. Besides these, there are other reasons like the economic slowdown in most countries, enhanced stock of natural rubber in the global market, and a sharp fall in crude oil prices and the subsequent decline in synthetic rubber prices. Due to low prices, farmers tend to reduce tapping days, reduce the application of manures, and all these have a negative impact on the production sector.

Vinayan, Prasad and Anuradha (2019) analyse the impact of crude oil price fluctuations on the natural rubber industry in India. As crude oil price increases, the price of natural rubber decreases which ultimately affects rubber cultivation in the country. Oil importing industries like India pay a heavy price because of these price fluctuations as synthetic rubber is manufactured from processed crude oil. Very little research has been conducted as the impact of crude oil price fluctuations on the rubber industry in India. The research shows that when the price of crude oil rises, the price of natural rubber follows in tandem and vice versa.

Raju (2016) makes an empirical analysis of the instability in natural rubber prices in India. High volatility in natural rubber price is the result of international trade policies, fluctuations in demand and supply of natural rubber, fluctuations in oil

prices and political changes. The production of natural rubber in India is affected by unfavourable prices. Cultivators naturally neglected their fields which affected productivity. Instability in the international market naturally affects the price in the domestic market. Price stabilization programmes of the government have not succeeded. A farm income stabilization programme is vital for the growth of the natural rubber plantation sector.

Karunakaran (2017) examines the unprecedented volatility in natural rubber prices in recent years and shows how it has reduced the production of natural rubber and led to the falling standard living of the farmers. Kerala accounts for 92% of total rubber produced in the country and any fluctuations in the price will affect the lives of 10 lakh small growers who are dependent on it. Rubber price has fallen from Rs. 245 in 2011 to Rs. 102 in 2016 per K.G. However, the cost of cultivation is steadily increasing, and this has led to a crisis in the rubber sector. This naturally leads to a sharp decline in natural rubber production and productivity. It also results in the lack of confidence among the farmers prompting them to seek other options. It affects their living and the future of their children.

Varkey and Kumar (2013) examine price risk management and access to finance for natural rubber cultivation. The steady fall in the rubber prices since the late 1990s has led to notable changes in agro-management practices as the farmers resorted to cost-saving measures like reduction in fertilization and neglecting the general maintenance of the farms. Several measures have been taken to manage the price risk like the price stabilization fund to alleviate the hardships faced by the farmers. The steady fall in prices has affected new planting and replanting of the crop. The system of paying subsidies for replanting and new planting is not adequate to support the growers.

3.Objectives

- 1.To analyse the factors that influence the price of Indian natural rubber
- 2.To determine the demand for natural rubber over a time period by using SeasonalityIndex of price and production.

4. Materials and Methods

The current paper is descriptive and analytical It is based on secondary data. The data were obtained from The Indian Rubber Statistics (IRS) published by The Statistics and Planning Department, The Rubber Board. The data released by The Rubber Board during the period 1986-2016 were collected and examined for finding the objectives of the study. The factors that influence the price of Indian natural rubber was studied. To determine the demand for natural rubber over a time period, Seasonality Index is used for the study.

5.Results and Discussion

Analysis of influential factors that determine the price of Indian natural rubber

The depending factors regarding the pricing of Indian rubber market are the excess import of natural rubber and the pricing of international market rubber (Pareed and Kumaran, 2017). The dumping of natural rubber in the name of import in order to compromise with the WTO policies and the free trade agreement after the implication of WTO agreement (George, Joseph, and Joseph, 2002). The pricing of international rubber is the second factor behind the instability and fall of domestic natural rubber. Due to the high import of natural rubber, the price of international rubber became an integral factor. An added factor that influences the price of domestic natural rubber is the import and consumption of its substitute, synthetic rubber. (Melba and Shivakumar, 2016).

Excess Import of Natural Rubber

The foremost factor that influenced the price of Indian natural rubber was the excess supply of natural rubber dumping in the name of import in the domestic market. During the pre-liberalized period, Indian trade policy was based on export promotion and import substitution. As a mixed economy, India had given importance to indigenous industrialization, which controlled trade deficit and earned foreign exchange (Nambiar, Mungekar, and Tadas, 1999). Indian economy tried to stabilize the balance of trade through protectionist trade policies. Nevertheless, after the period of liberalization, especially after the agreement of WTO, India's trade policy shifted from the control of domestic policy to international policy. This shift in government policy resulted in the excess import of natural rubber without any restrictions (George, Joseph, and Joseph, 2002). The excess amount of natural rubber severely affected the domestic economy of Indian natural rubber. This can be explained with the help of a table 1.

While going through the entire quantity of import, production and consumption during 1986-2016, it is evident that the excess supply of natural rubber compared to the required quantity was the integral element in the volatility and fall in the price of Indian natural rubber (figure1). When we analyze the entire required amount (deducting production from consumption) of natural rubber during 1986-1991 was only 223961 tonnes of rubber. However, the imported quantity was 252334, i.e., the excess amount (deducting import from the required amount) of rubber was 28373 tonnes. During 1991-1996, the needed quantity of rubber was only 81,930 tonnes, but the amount imported was 112622 tonnes, i.e., the entire excess amount of natural rubber during this period was 30692 tonnes. During 1996-2001, the production was more than consumption. So there exist, the excess quantity of rubber, i.e., 6255 tonnes of natural rubber in the domestic market itself. Then why natural rubber is imported during this period is another severe question while analyzing the influential factors in the price of Indian natural rubber. This particularly reveals that Indian trade policy was shifted from farmers oriented to multinational company-oriented policies. During this period India imported, 110557 tonnes of natural rubber, i.e., the excess amount of natural rubber was in total 116812 tonnes.

After the removal of quantity restrictions of natural rubber in April 2001, in order to compromise with the policy of WTO, India imported 49769 quantity of rubber which was 454.84% increase in the growth rate of import compared to the previous period, i.e., 8970 tonnes during 2000-2001 (Indian Rubber Statistics, 2010) which was not according to the required amount. The direct influence of WTO agreement on Indian natural rubber came into effect on after this policy of April 2001 (Mohankumar, 2014).

During the 2001-2006 period, the entire quantity of natural rubber imported was 238305 tonnes. However, only 64975 tonnes is the required amount. During this period the excess amount was increased to 48.38%, i.e., 173330 tonnes. During 2006-2011, the entire quantity imported was 621777 tonnes. Nevertheless, the required amount was only 195670 tonnes. The excess import during this period was increased to 145.84% compared to the entire previous period (2001-2006), i.e., 426107 tonnes. During 2011-2016, the quantity imported was 1737953 tonnes. The needed amount in domestic market only was 1135565 tonnes. The excess amount again increased to 41.37% compared to the earlier period, i.e., 602388 tonnes.

Table 1:Entire Excess Quantity of Import of Natural Rubber

Year	Entire Production	Entire Consumption	Required Quantity (Production-Consumption)	Entire Import	Excess Import (Import-Required quantity)
1986-1991	1340804	1564765	223961	252334	28373
1991-1996	2174120	2256050	81930	112622	30692
1996-2001	2990970	2984715	6255(excess)	110557	116812
2001-2006	3544775	3609750	64975	238305	173330
2006-2011	4236090	4431760	195670	621777	426107
2011-2016	3798400	4933965	1135565	1737953	602388
1986-2001	6505894	6805530	299636	475513	175877
2001-2016	11579265	12975475	1396210	2598035	1201825

Source: Indian Rubber Statistics, The Rubber Board (Ministry of Commerce and Industry, Government of India)

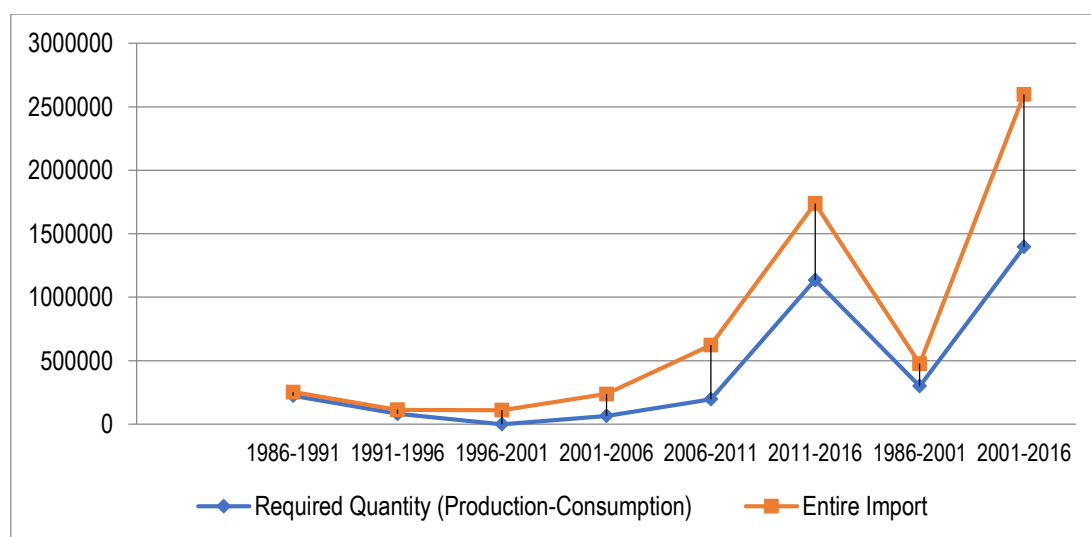


Fig. 1:Required Quantity and Entire Import of NR

While contrasting the entire quantity of natural rubber during the pre-WTO policy (1986-2001) and post-WTO (2001-2016) policy period. The excess import of natural rubber increased from 175877 to 1201825 tonnes, i.e., the growth rate of excess import of natural rubber increased to 583.33%. Due to this excess import of natural rubber in the Indian domestic market, the equilibrium of the market was unbalanced. The excess supply of natural rubber forced the domestic market to fluctuate and lower the price (Raju, 2016). This fluctuation and decline in the price were continued due to the excess import of natural rubber. The volatility and diminishing price phenomenon in Indian domestic market forced the farmers to shift the cropping pattern in order to meet their livelihood (Karunakaran, 2016; Karunakaran, 2017; Mythili, 2006; Mohankumar and Chandy, 2005). This led to the stoppage of tapping days, and the growth rate of tappable rubber without tapping began to increase due to the continuous fall in price (Varkey and Kumar, 2013). This negatively affected the production and export of Indian natural rubber.

Influence of International price of natural rubber over domestic natural rubber market

The production of Indian natural rubber is mainly affected by its price. The price of Indian natural rubber is affected by the highly import of natural rubber. Due to the implementation of WTO policy on natural rubber trading, the international price became an influential factor in determining the price of Indian natural rubber (Vijayakumar, 2019). The price of solid block rubber of Indian and International rubber is compared here to analyze the trend and effectiveness of price of International rubber on the price of domestic Indian rubber.

Comparison of the price of SMR20 (Standard Malaysian Rubber) and ISNR20 (Indian Standard Natural Rubber)

Table 2 and figure 2 discuss the price of SMR20 (Standard Malaysian Rubber) and ISNR20 (Indian Standard Natural Rubber) during 1991-2016. During 2002-2003, the growth rate of the price of SMR20 was 54.59%. During this period, the growth rate of the price of ISNR20 was 31.47%. The rate of growth in the price of SMR20 decreased to more than half, i.e., 25.10% during 2005-2006. In the case of ISNR20, the rate of growth was decline to 21.34%. During 2010-2011. The growth rate of SMR20 was more than doubled compared to 2005-2006, i.e., 66.32%. The similar trend can be evident in ISNR20 too. Here the rate of growth increased to 66.66%. During 2005-2006, the rate of growth of the price of SMR20 became negative, i.e., -11.69%. The same path is followed in the case of ISNR20, too, the growth rate reduced to -12.22%. While comparing, the vivid phases in the first phase (2001-2006), the rate of growth of pricing of SMR20 was 161.84%. This is the highest growth rate among the phases. The same trend can be seen in ISNR20 too. The rate of growth of pricing was 128.17%. In the grade, too, this seems to be the highest rate. A decreasing trend can be seen in the second phase (2006-2011) of SMR20, i.e., 94.67%. The similar trend can be witnessed in ISNR20 too, i.e., the rate of growth of pricing declined to 104.57%. The third phase of (2011-2016) of SMR20 showed a highly negative trend, i.e., the rate of growth was -56.51%. The same trend can be seen in the price of ISNR20 too. The growth rate of pricing during this phase was -50.11%. The below table specifically tells that the instability and fall in the Indian natural rubber are due to the effectiveness of the price of International natural rubber.

Table 2: Comparison of the price of SMR20 (Standard Malaysian Rubber) and ISNR20 (Indian Standard Natural Rubber)

Year	Smr20 International (kuala lumpur)	Annual growth rate	Phases (growth rate)	Isnr20 Domestic (kottayam)	Annual growth rate	Phases (growth rate)
2001-2002	2623		161.84	2819		128.17
2002-2003	4055	54.59		3706	31.47	
2003-2004	4992	23.11		4901	32.25	
2004-2005	5490	9.98		5301	8.16	
2005-2006	6868	25.10		6432	21.34	
2006-2007	9041	31.64	94.67	8787	36.61	104.57
2007-2008	9308	2.95		8817	0.34	
2008-2009	9972	7.13		9692	9.92	
2009-2010	10582	6.12		10786	11.29	
2010-2011	17600	66.32		17976	66.66	
2011-2012	19502	10.81	-56.51	20130	11.98	-50.11
2012-2013	16089	-17.50		16817	-16.46	
2013-2014	13714	-14.76		15643	-6.98	
2014-2015	9604	-29.97		11440	-26.87	
2015-2016	8481	-11.69		10042	-12.22	

Source: Indian Rubber Statistics, The Rubber Board (Ministry of Commerce and Industry, Government of India)

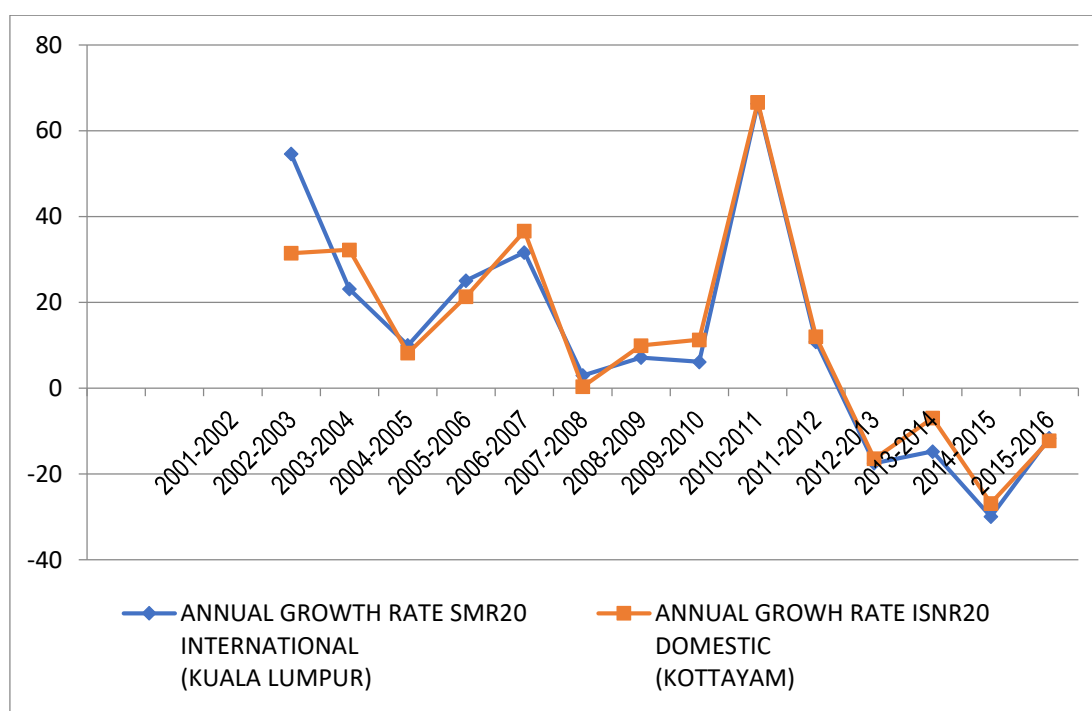


Fig. 2: Comparison of Annual Growth rate of prices of SMR20 and ISNR20

Import and Consumption of Synthetic Rubber and Consumption of Natural Rubber

In order to compromise with the policy of WTO, the import duty of synthetic rubber decreased from 141.5% to 49.43% in 1999. According to the agreement of WTO, the natural rubber and synthetic rubber are considered as industrial products and raw material for rubber products. This way, too, the natural rubber economy affected (Pareed and Kumaran, 2017; Raju, 2016). No preference is given to natural rubber. Up to what extent synthetic rubber is influenced in the Indian natural rubber market, the consumption of both natural rubber and synthetic rubber is to be analysed.

Import of synthetic rubber

Table 3 specifies the import of synthetic rubber during 1991-2016. During 1992-1993, the rate of growth of import of synthetic rubber was 20.79%. During 1995-96, the rate of growth decreased to -2.88%. In 1999-2000, the rate of growth increased to 7.48%. An increasing trend was witnessed in 2005-06; i.e.16.8%. It again increased to 20.17% during 2010-11. The rate of growth became negative during 2015-16 i.e.-12.65%. When we compared to different phases, in the first phase(1991-1996) the rate of growth is 82.95%. In the second phase (1996-2001), the rate of growth was 17.43%. The rate of growth slightly increased to 18.42% in the third phase (2001-2006). During the fourth phase (2006-2011), the rate of growth tremendously increased to 75.60%. In the fifth phase (2011-2016), the rate of growth declined to 7.23%. Before reducing the import duty of synthetic rubber (1991-1999) was 148.78%. After reducing the import duty (1999-2016), the rate of growth of import of synthetic rubber increased to 235.08%.

Table 3:Import of synthetic rubber

Year	Phase	Price per 100 KG	Annual Growth rate	Growth rate (Five Phases)	Growth rate (Two Phases)
1991-92	I	39210		82.95	148.78
1992-93		47362	20.79		
1993-94		64338	35.84		
1994-95		73860	14.80		
1995-96		71735	-2.88		
1996-97	II	91050	26.93	17.43	235.08
1997-98		86389	-5.12		
1998-99		97548	12.92		
1999-00		104842	7.48		
2000-01		106923	1.98		
2001-02	III	111572	4.35	18.42	
2002-03		129902	16.43		
2003-04		173784	33.78		
2004-05		113095	-34.92		
2005-06		132118	16.82		
2006-07	IV	171998	30.19	75.60	
2007-08		195705	13.78		
2008-09		190630	-2.59		
2009-10		250210	31.25		
2010-11		302030	20.71		
2011-12	V	327625	8.47	7.23	
2012-13		329585	0.60		
2013-14		371839	12.82		
2014-15		402170	8.16		
2015-16		351301	-12.65		

Source: Indian Rubber Statistics, The Rubber Board (Ministry of Commerce and Industry, Government of India)

Consumption of natural rubber and synthetic rubber in proportion to end products

Table 4 and figure 3 reflect the consumption of natural rubber and synthetic rubber in accordance with end products during 2015-16. This clears that majority of the products significant share are consumed by natural rubber. At the same time, the synthetic rubber also accounts for a particular share in the natural rubber dependent industries. In the case of automotive tyres and tubes, 60.24% share is occupied by the natural rubber and 35.28% share is consumed by synthetic rubber. Only the rest of the share is occupied by the reclaimed rubber.

In the case of cycle tyres and tubes, 63.90% share is consumed by natural rubber. Only 26.05% share accounts for synthetic rubber. In the case of non-tyre products for natural rubber occupies the major share and a limited share of synthetic rubber can be witnessed during 2015-16. At the same time, coming through the entire natural rubber based on tyre industries during 2015-16, 64% share is occupied by natural rubber and 36% in occupied by synthetic rubber. In non-tyre industries too, the significant share of consumption is occupied by natural rubber, i.e., 67%. While synthetic rubber accounts for 33% during this period.(The Statistics and Planning Department, 2017).

Table 4: The consumption of natural rubber and synthetic rubber in proportion to end products

Products	Natural Rubber	Percentage of Share	Synthetic Rubber	Percentage of Share
Auto tyres and tubes	670900	60.24	392950	35.28
Cycle tyres and tubes	67295	54.04	32435	26.05
Camel Back	45835	55.87	31340	38.2
Foot Wears	63690	57.49	36705	33.13
Belts Hoses	36670	57.02	17700	27.52
Latex Foam	28500	100	0	0
Dipped Goods	42940	100	0	0
Others	38585	38.84	42240	42.52
Total	994415	59.68	553370	33.21

Source: Indian Rubber Statistics, The Rubber Board (Ministry of Commerce and Industry, Government of India)

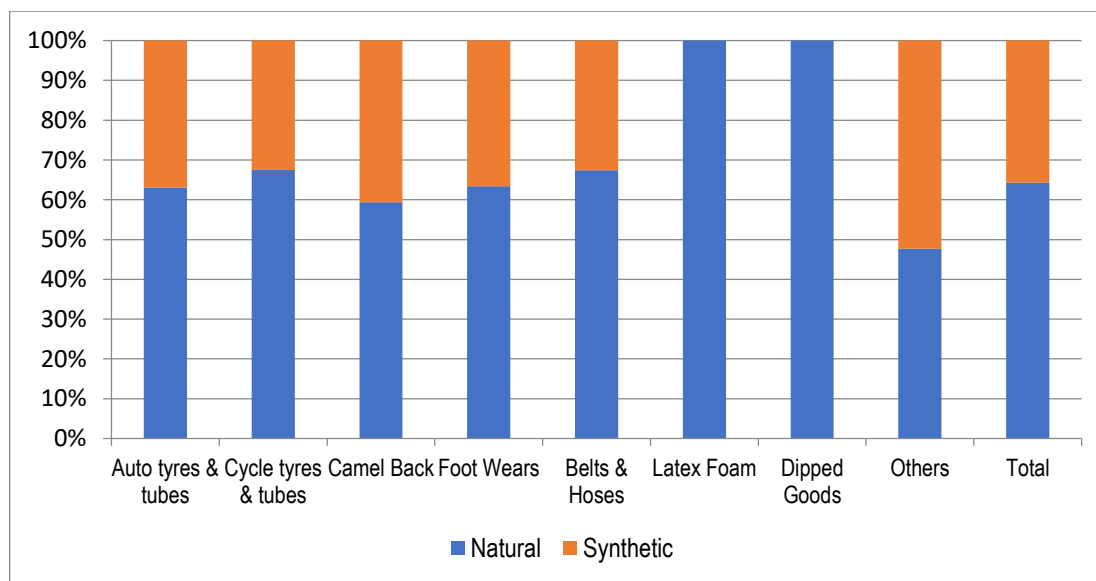


Fig. 3: The consumption of natural rubber and synthetic rubber in proportion to end products

Price of crude oil and International natural rubber price

Price of crude oil is directly related to the price of international natural rubber. When the price of crude oil increases, the consumption of synthetic rubber, the close substitute of natural rubber made by oil will decrease. This led to increases in consumption of natural rubber and led to increasing in the price of natural rubber (Hamilton, 2009; Khin, Mohamed, and Hameed, 2013; Seth, Giridhar, and Krishnaswami, 2016; Vinayan, Prasad, and Anuradha, 2019). This can be described with the help of a table 5.

Table 5: The price of natural rubber in the global market (Bangkok) and the price of crude oil

Year	Bangkok (RSS3/KG in RS)	Growth rate	Growth rate	Oil Price (US\$/BRL)	Growth rate	Growth rate
2000-01	29.58		94.42	24.44		123.08
2001-02	27.93	-5.58		25.02	2.37	
2002-03	39.15	40.17		28.83	15.23	
2003-04	52.78	34.81		38.27	32.74	
2004-05	57.51	8.96		54.52	42.46	
2005-06	74.32	29.23	49.53	65.14	19.48	22.04
2006-07	97.79	31.58		72.39	11.13	
2007-08	96.75	-1.06		97.26	34.36	
2008-09	103.79	7.28		61.67	-36.59	
2009-10	111.13	7.07		79.5	28.91	
2010-11	195.55	75.97	-42.36	111.26	39.95	-52.81
2011-12	209.15	6.95		111.67	0.37	
2012-13	175.76	-15.96		108.66	-2.70	
2013-14	155.25	-11.67		96.22	-11.45	
2014-15	112.71	-27.40		52.5	-45.44	

Sources: Data is based on the calculation of Indian Rubber statistics, The Rubber Board of India and crude oil spot price FOB (dollars per barrel), price of West Texas Intermediate (WTI), Cushing, Oklahoma

The above analysis clear that the price of international rubber and crude oil price are interrelated, which depicts that the price of international natural rubber is influenced by the price of crude oil. The table is comparing the price of RSS3 of international natural rubber and the price of crude oil. During 2001-02, the rate of growth of the price of RSS3 of International rubber was -5.58%. The rate of growth increased to 8.96% during 2004-05. In 2009-10, the rate slightly decreased to 7.07%. During 2014-15, the rate of growth of price showed a decreasing trend. The growth rate of price decreased to -27.40%. In the case of crude oil, the rate of growth of pricing was 2.37% per barrel. It increased to 42.46% during 2004-05. In 2009-10, the rate of growth of pricing saw a negative trend. The growth became highly negative, -45.44%.

While comparing the three different phases, the first phase (2000-2005) saw a highly increasing trend, i.e., 94.42% in the case of pricing of RSS3 of international natural rubber. The similar trend can be seen in oil price too. In the first phase (2000-2005), the rate of growth of price is very high, i.e.123.08%. While coming to the second phase (2005-10), in the case of the price of RSS3 of international natural rubber, the rate of growth decreased to 49.53%. The same trend can be seen in the growth rate of the price of crude oil during the price (2005-06) growth rate decreased to 22.04%. In the third phases, the rate of growth of the price of RSS3 of international natural rubber showed a decreasing trend and negative growth rate. The rate of price growth decreased to -42.36%. The same trend can be seen in the price of crude oil too. In the third phase (2010-15), the rate of growth of the price of crude decreasing became highly negative, -52.81%.

Analysis of seasonal index of price and production of Indian natural rubber

The seasonal index was used to analyse the variation in the price of natural rubber during different seasons. Table 6 discusses the seasonality trend of the price and production of Indian natural rubber during 1986-2016. In this analysis, the periods are classified into three, i.e., 1986-2001, 2001-2016 and 1986-2016. In the three periods, the seasonality trend is evident in the behaviour of price and production. The production is high during October to January in the entire three periods. However, during these months, it is evident that the price of natural rubber seems to be low compared to other months. For example, during December in all the three periods, the production seems to be high, i.e., 148.13, 144.49 and 145.8. Nevertheless, during December in all the three periods, the seasonality of price is low, i.e., 98.67, 96.13 and 96.33 compared to the seasonality of the price of other months. At the same time, the seasonality of production appears to be lower during June, July and August in all the three periods. However, during the same months, the price of natural rubber was at the peak level. The seasonality of the price index of June was 106.59, 103.82 and 104.4 in three periods. From these figures, it is clear that when the domestic supply is high, the price of natural rubber is low and vice versa. When the supply is high, there is no effective system to procure natural rubber to control the price fall. The smallholders occupy the significant share of natural rubber, and they do not have the capacity to store the products for the next high price season. Farmer's supporting systems like Rubber Producer's Societies are not effective in protecting the well being of smallholders. Thus price fall is severely affecting the smallholders. This seasonality behaviour of production and price is only helpful to large estate holders. They have the capacity to store the natural rubber during the price fall and sell it during the price hike.

Table 6: Seasonal index of price and production of Indian natural rubber

SEASONAL INDEX- PRICE OF INDIAN NATURAL RUBBER						
Month	1986-2001		2001-2016		1986-2016	
	Price	Production	Price	Production	Price	Production
APRIL	97.23	82.17	100.28	76.8	99.64	78.73
MAY	103.33	94.65	101.87	80.71	102.17	85.72
JUNE	106.59	73.22	103.82	79.7	104.4	77.37
JULY	103.15	74.68	103.94	82.62	103.77	79.77
AUG	101.66	89.69	101.39	97.52	101.45	94.71
SEP	99.49	112.3	99.75	107.83	99.7	109.44
OCT	98.27	124.64	98.07	118.81	98.11	120.91
NOV	98.6	139.09	95.63	134.11	96.25	135.9
DEC	98.67	148.13	96.13	144.49	96.66	145.8
JAN	97.89	132.45	98.44	133.73	98.33	133.27
FEB	96.91	60.45	99.19	74.54	98.71	69.47
MAR	98.2	68.53	101.5	69.14	100.81	68.92

Source: Indian Rubber Statistics, The Rubber Board (Ministry of Commerce and Industry, Government of India)

Figure 4 is a graph showing trendlines based on the seasonal index of price and production of Indian natural rubber and from this figure we can clearly understand the rate of change in the price based on the production of natural rubber.

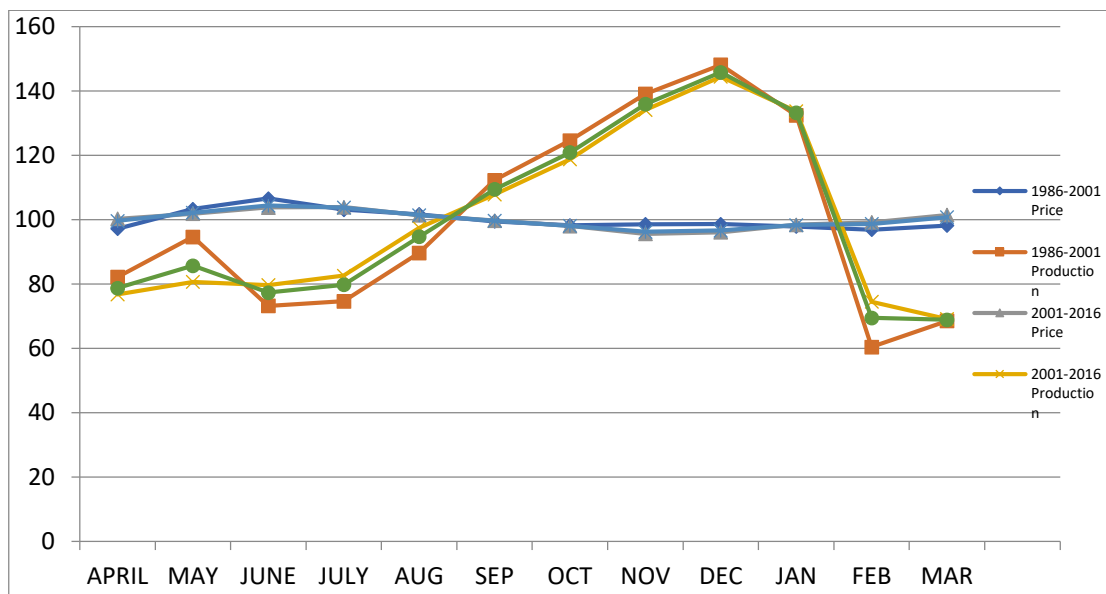


Fig. 4: Seasonal index of price and production of Indian natural rubber

6. Conclusion

The foremost factor that influenced the price of Indian natural rubber was the excess supply of natural rubber dumping in the name of import in the domestic market. While contrasting the entire quantity of natural rubber during the pre-WTO policy (1986-2001) and post-WTO (2001-2016) policy period. The excess import of natural rubber increased from 175877 to 1201825 tonnes, i.e., the growth rate of excess import of natural rubber increased to 583.33%. While comparing with the solid block rubber of International natural rubber, it is clear that a similar trend is followed in the solid block rubber of Indian natural rubber too. The seasonal index of price and production of Indian natural rubber was estimated. In this analysis, the periods were classified into three, i.e., 1986-2001, 2001-2016 and 1986-2016. In the three periods, the seasonality trend was evident in the behaviour of price and production. The production was high from October to January in the entire three periods. But during these months, it was evident that the price of natural rubber seemed to be low compared to other months. When the supply was high, there was no effective system to procure natural rubber to control the price fall. The smallholders occupy a significant share of natural rubber, and they do not have the capacity to store the products for the next high price season. This seasonality behaviour of production and price was only helpful to large estate holders equipped with storage capacity, which could be utilized to stockpile and engage

in arbitrage. This study suggests that the government should adopt a stabilization price for natural rubber to increase production and exports.

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