

## Analysis of Bangladesh Tyre Market for Possible Market Entry: An Investor's Perspective

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### **Abstract:**

**Background:** After the liberation war, the communication sector of Bangladesh always is a rapid growth sector; along with this the total length of roads and the number of registered motor vehicles also increases. Therefore, there is a large amount of aggregate demand for the tyre in Bangladesh though still tyre industry of Bangladesh is mostly dominated by MNCs and demand meets up with import and recycling scrap tyres. Being a faculty member of the business department of a private university, my interest was to find out the new area where newcomer investor can invest. Therefore, we started a study about tyre industry of Bangladesh and surprisingly find out there is no relevant research about it. So we collected primary data from random tyre shops in Dhaka city, use secondary data from different government websites of Bangladesh, talked to market experts.

The purpose of this research article is to evaluate the aggregate demand of tyre and give a brief analysis of Bangladesh tyre market as an investor's perspective. We have found that demand for the tyre in Bangladesh is positively related to GDP from the Transport industry and GDP growth rate, however negatively related to the Inflation rate. The existing market is dominated by Chinese brand and they have the option to eliminate any possible threat to their market share by reducing their price

**Key Word:** MNC; Aggregate demand; Tyre industry; Scrap Tyre; Inflation rate; Market share.

Date of Submission: 16-08-2020

Date of Acceptance: 02-09-2020

### **I. Introduction**

Bangladesh continues to be primarily an agrarian society with 35.3% of the population living in urban centres as of 2018. Total GDP generated in the Country was USD 286 billion (nominal; 2019) and \$11550.46 billion in BDT (PPP;2019). The Country is moving towards Industrialization. During the period between 2012 and 2019, the Average Annual Growth Rate of GDP was 6.6%. Gross National Product in 2018 was BDT 10690.64 billion and Average Annual Inflation Rates of January 2018 is 5.83%.

Despite the repeated disruptions caused by recurring natural disasters, Bangladesh is making significant progress. Bangladesh's economy is expected to grow at 6.8 in the current fiscal year (FY20) while the inflation will remain within 6%, according to Trading Economics Global

The total export in the FY 2017-2018 was \$36.67 billion, while the total import and foreign remittance earnings for the same period were \$44.83 billion and \$12.76 billion respectively.

Although Bangladesh had been on the list of UN Least Developed Countries (LDC) since 1975, the country met the requirements to be recognized as a developing country in March 2018.

Tyre Industry is the support and backbone of the total transport industry in Bangladesh. It is among the most import-dependent industries in Bangladesh. According to a recent report released by TechSci Research, the industry has been set to grow at over 9% CAGR until 2020. The latest budget has also endowed the industry with a tax break to foster local manufacturing. With increasing GNI (Gross National Income) per capita and advancement in urbanization, the industry has been experiencing expansion with improving profitability.

This industry overview addresses the tyre industry from various aspects, including the existing demand trend, supply dynamics, and the overall condition of the industry. The overall demand of the tyre industry can be reflected upon overall growth of the country's income, an increase in the number of roads and highways and the overall transport industry's growth. In the fiscal year 2017-18, the total length of the road is 21127 kilometres and total numbers of registered vehicles are 3797480. (Source: Statistical pocketbook 2018)

In this study, we will be aiming to establish a formula for a better understanding of the nature of the demand of tyre industry and try to find out though there is rapid growth in communication sector but still why does tyre industry mostly import-based?

Our study finds out despite the efforts made by the government of Bangladesh, industrial performance of the tyre industry has been consistently poor in the Country, hampered by numerous constraints. These include the following:

**Cost-Price Squeeze:** In many industries, the cost of production has been rising due to the increasing cost of capital goods, rising cost in wages and salaries and utility prices, etc. The rising cost of production under a situation of depressed selling prices has resulted in a cost-price squeeze and hence in under-utilization of the production capacity, which affects the local tyre industry. Since it is already burdened with the high raw material cost.

**Poor Maintenance:** Due to acute financial constraints, lack of the adequate number of skilled and trained manpower and use of obsolete technology, the plant and pieces of machinery are being inadequately maintained resulting in low production rates and low capacity utilization of the industrial units.

**Input Constraints:** Shortage of raw materials, machinery and spare parts from domestic sources, difficulties in inland transportation and shipping, shortage of local raw-materials supply due to natural calamities interrupted the efficient and proper operation of the industrial units. This was especially felt in the jute and sugar operations.

**Labor Productivity:** It remains low in most of the industries. Overstaffing, the dearth of requisite skill and training, etc., are the major reasons for the low productivity of industrial labour.

**Inadequate Research and Development Activities:** They are negligible in public and private sectors, Industrial enterprises and organizations. There is little access to new process/products and market/trade information. Despite the high demand for large tyres, the big local companies did not make an entry into the sector, as it requires large capital investments and consistent power supply. Almost a decade ago, two big names—Rahim afrooz and Nitol—moved to produce automotive tyres, but their plans fell through for high capital investment requirements and dependence on the import of raw materials.

India's JK Tyre also tried to set up a joint venture to make tyres in Bangladesh. Bangladesh, with the sheer diversity of road profiles and weather conditions, is a challenging country for tyre manufacturers and importers. If the Tyre manufacturing industry is to blossom, dumping of the Chinese and Indian tyres needs to be curbed forthwith. Inverted duty structure needs to be addressed and import of raw materials, be it NR or Synthetic Rubbers, needs to be allowed duty- free to the extent of the domestic deficiency. The industry has presented these primary demands before the Government.

Globally integrated industry, large skilled manpower, verdant NR plantations and a fast-growing economy are enough to give a big boost to the domestic tyre sector provided the bottlenecks (scarcity of raw material – natural rubber, lack of indigenous tyre production units as well as skilled labour, and prolonged political instability) are removed.

## **II. Literature Review**

Today more than ever “sensing the market”, the capability of interpreting, identifying and acting innovative opportunities in markets before than others, becomes crucial for firms (Mason, 2012).

As emphasised by those positions that consider markets not just as static and pre-defined realms, but dynamically and actively shaped by firms (Araujo, 2007; Geiger, Kjellberg and Spencer, 2012), the “market sensing” competence is not only about abstract/learning abilities; rather it is intertwined with the enactment and organizational skills (Foley and Fahy, 2004).

In line with the understanding that “market sensing” is a “performed interpretation” of markets, recent studies converge recognizing that, to face global and complex competition and deliver superior value to customers, organizational integration between the demand and supply chain is particularly relevant (Rainbird, 2004; Jüttner et al., 2007; Piercy, 2009; Esper et al., 2010).

The concept of demand-chain management (DCM) has then been proposed and can be seen as “a new business model aimed at creating value in today” marketplace, and combining the strengths of marketing and supply chain competencies” (Jüttner et al., 2007, p. 377).

Many advantages of the demand-chain management and the integration in the demand-supply chain have been pointed out. On a knowledge management perspective (Esper et al., 2010), for instance, integrating demand focused (effectiveness) and supply focused (efficiency) processes generate higher inter-functional interaction, higher levels of collaboration and market knowledge sharing sustaining superior value creation (Esper et al., 2010; Pagano, 2009).

On a supply chain view, even if conflicts between demand- and supply-oriented functions exist, they are not necessarily dysfunctional; on the contrary, they can be a source of dynamism for the firm (Rainbird, 2004). Moreover, from a market network perspective, the demand-supply integration goes beyond the internal boundaries of the firm and should involve those outside-in and inside out activities that are crucial to shaping customer value. Despite the interest in the relatively new concept of DCM and the emphasis on the benefits of its adoption, little attention has been devoted so far to the managerial challenges of implementing the supply-

demand chain integration. The existing literature that has investigated the interfaces occurring between the two value chains focuses mainly on dyadic relationships but does not deal with the issues associated with the integration of all the areas responsible for supply and demand functions. For instance, driven by the seminal paper of Shapiro (1977), many researchers in the operations management field have explored the aspects that characterize the marketing manufacturing interfaces.

Parente (1998) offers a review of this branch of the literature. Similarly, in the marketing field, many papers followed Ruekert and Walker (1987) and explored how marketing interacts with other functions, like R&D, logistics, engineering and quality management.

### **III. Objective**

Five years ago, the transportation industry and the communication sector was not a rapidly growing sector. After achieving a good position in export of readymade garments, raw materials and other communication regarding this increases, besides that Uber, an international brand has introduced in Bangladesh. Which is very popular now a day, which increases the number of rides used by the residents. Also, there are some mega project like the Padma bridge is going on. So considering all those communication sectors is a rapid growing sector which shows that the demand for tyre also will increase. Broadly our objective of the study is

- To provide market insight of existing tyre industry.
- To develop a market a demand function that properly represents the tyre market in Bangladesh.

Moreover, we have some specific objective:

- Assess the existing market and derive market demand for different types of the tyre.
- Find out the variables affecting the tyre market.
- Explain the demand function.

### **IV. Methodology**

Methodology for the research article consists of data collection and data analysis. The tyre shops for data collection have been selected randomly in Dhaka city. KII was used to interview the tyre shops to identify the tyre requirement for different types of vehicles and In-depth interview was used for market experts.

Data Collection: Most of the data used in the report are secondary data. We have collected the data from the following sources.

- 05tyre shops in Dhaka city.
- Market expert & Tyre industry expert.
- From different websites. The links are given in the reference.

Data analysis was done by a LINEAR REGRESSION MODEL taking the demand for tyre as the dependent variable and other independent variables.

Moreover, the limitation of the research is given below.

- There is hardly any secondary information available on market share and market demand of the tyre industry. Therefore, we had to focus on primary data and insights of market and industry experts.
- The model generated has a lot of limitations. It may be affected by several hidden variables.

Bangladesh tyre market is projected to grow at around 9% CAGR until 2020 on account of rising automobile sales, increasing investments by foreign players, and government support in the form of a reduction in import duties. Segment-wise, two-wheeler tyres dominate the market as the country's two-wheeler fleets exceed other vehicle fleets by a significant margin. On account of the largest population as well as vehicle fleet, Dhaka remains the leading geography witnessing tyre sales across Bangladesh. Despite rising automobile sales, replacement segment continues to dominate the market, holding a significant majority share in tyre sales in the country. Major companies like MRF, Dunlop, CEAT, and Goodyear have been selling their tyres in the country through their exclusive distributors. Over the past few years, Bangladesh has been emerging as another developing country in South East Asia, offering considerable growth opportunities across diverse industry segments including automotive. Several foreign investors are even eyeing Bangladesh as the next important destination over the coming years.

Currently, tyre industry in Bangladesh is largely dependent on imports from other countries like India, China, Japan and Indonesia due to scarcity of raw material (natural rubber), lack of indigenous tyre production units as well as skilled labour, and prolonged political instability.

However, the scenario is expected to witness a paradigm shift in the coming years as several global leading tyre companies intend to set up their manufacturing plants in the country.

CEAT, for instance, has recently established its tyre manufacturing plant in Bangladesh. Besides tyre companies, many automotive players have also voiced intention to commence manufacturing operations in Bangladesh, which in turn would drive investment in the tyre market as well.

Local companies have moved to make tyres for long-haul buses and trucks, a sector that is dominated by imports.

Gazi Tyre, a concern of Gazi Group, is the first to make large tyres for the rapidly growing transport sector and is expected to go into commercial productions on.

At present, four local companies are making light automotive tyres, taking advantage of a surging market that fully relied on imports a decade ago.

These companies—Apex Husain, Gazi Group, Meghna Group and Rupsha Tyre—manufacture tyres for light trucks, minibuses, microbuses, motorcycles, auto-rickshaws and easy bikes.

Some other companies, such as Seraj Cycle, Anwar Group and Update Group, are in the pipeline to make tyres for the local market.

Besides, as mentioned before, Indian CEAT is setting up a factory here to produce tyres for the Bangladesh market.

Demand for tyre has been increasing, driven by the growing urban population and use of motorized vehicles across Bangladesh, industry insiders said.

Monthly demand for motorcycle tyres has increased to 50,000 pieces sin2016, up by over 15percent from the year 2015.

The market size for CNG-run three-wheelers goes up to 60,000 tyres a month.

However, Nosimons and Korimons, locally-made three-wheeler small vehicles that run-in villages across the country, have also driven demand for tyres; nearly 20,000 tyres for these vehicles are old a month.

According to Bangladesh Road Transport Authority, 139,982 motorized vehicles were registered in Dhaka in 2017 alone; the number was 420,384 countrywide.

In 2015, Bangladesh spent around Tk 1,000 Crores to import over 1.5 million pieces of tyres a year mainly from India, Japan and China, according to importers, distributors and sellers. Bangladesh also imports tyres from Vietnam, Thailand and Indonesia.

Husain Tyre that started production in 1996 with three-wheeler scooter tyres now makes more than 10 types, including light ones for small trucks and microbuses.

Importers and sellers said a scarcity of raw materials as an obstacle to producing tyres in Bangladesh.

For model specification we need to define tyre market of Bangladesh. Tyre market in Bangladesh consists of several segments. There are two broad categories:

- a. Catering the need for bicycles and cycle rickshaw. This demand is primarily met through local supply or locally manufactured tyres and tubes.
- b. Mechanized vehicles, the demand of which is almost entirely fulfilled by import.

Production technology for bicycles and cycle rickshaw tyres is different from that for giant tyres and needs a separate production unit. Moreover, distribution networks are different and autonomous from each other.

Based on the above-mentioned reasons, excluding the production of tyres for cycles, a choice had to be made among three hypotheses:

- Production of tyres for passenger cars;
- Production of giant tyres;
- Production of giant and passenger tyres.

Under the technical profile, it is important to note that the technology for the manufacture of passenger tyres is quite different from that of giant tyres since it requires additional special machines and further technology acquisitions.

In general, the unification of the two segments of tyre production has very limited benefits in terms of economies of scale.

Also, demographic trends in Bangladesh, together with persisting low income per capita conditions, will lead to saw underutilization of public services for passengers' transport (instead of private cars).

Finally, strategic choices of GOB on road network development go in the direction of a considerable increase in goods transport by trucks.

Bangladesh is almost totally dependent on import to meet its demand for bus and truck tyres. Major exporters are India, Japan and China, while a total of 16 different tyre manufacturers still export tyres to Bangladesh.

Because of the characteristics of the vehicle pool in Bangladesh, only a few types of tyres for buses and trucks are imported. All of them are of the cross-ply kind and are imported as a complete set (1 tyre + 1 tube + 1 flap).

The only substitute product is the retreaded tyre. No official statistical sources are available on the issue. However, according to the interviews made, it can be estimated that a market share of about 10-15% of the total demand is covered more than 20 retreading firms, which directly retread the tyres brought in by the customer. They do not use the worldwide adopted system of buying used carcasses on the market, inspecting them systematically and retreading them on an industrial basis.

During the field mission, it was noticed that truck/bus owners have the habit of lengthening tyre life as much as possible, keeping them in operation with any reasonable, and sometimes not reasonable, means, often jeopardizing safety.

Amazingly, only a few tyres are retreaded and therefore it is evident that users are not confident about the effectiveness of retreaded tyres.

On the contrary, it is well known that a tyre retreaded according to an updated technology can guarantee the same performance of a new tyre in terms of safety and durability.

**Table no 1 :Import Statistics of Tyres for Buses and Trucks by Country of Origin (value in thousand and % share)**

Countries	2013	%	2014	%	2015	%	2016	%	2017	%
India	2453	55.57%	2268	27.63%	5370	40.53%	6370	63.40%	8797	78.57%
Japan	446	10.10%	1146	13.96%	1843	13.91%	1736	17.28%	994	8.88%
China	0	0.00%	3823	46.58%	4544	34.30%	1386	13.80%	874	7.81%
Indonesia	34	0.77%	35	0.43%	14	0.11%	115	1.14%	274	2.45%
Sri Lanka	0	0.00%	0	0.00%	199	1.50%	0	0.00%	0	0.00%
Singapore	547	12.39%	101	1.23%	169	1.28%	92	0.92%	105	0.94%
Korea R.P.	128	2.90%	168	2.05%	406	3.06%	207	2.06%	69	0.62%
Thai Land	747	16.92%	558	6.80%	664	5.01%	99	0.99%	61	0.54%
Malaysia	58	1.31%	35	0.43%	33	0.25%	0	0.00%	0	0.00%
Germany F.R.	1	0.02%	34	0.41%	0	0.00%	0	0.00%	0	0.00%
Finland	0	0.00%	5	0.06%	0	0.00%	22	0.22%	0	0.00%
UK	0	0.00%	0	0.00%	6	0.05%	19	0.19%	22	0.20%
Belgine-Lux	0	0.00%	21	0.26%	0	0.00%	0	0.00%	0	0.00%
greece	0	0.00%	10	0.12%	0	0.00%	0	0.00%	0	0.00%
USA-Puert.	0	0.00%	3	0.04%	0	0.00%	0	0.00%	0	0.00%

Denmark	0	0.00%	0	0.00%	0	0.00%	1	0.01%	0	0.00%
Total	4414	100.00%	8207	100.00%	13248	100.00%	10047	100.00%	11196	100.00%

### Conditions affecting the demand for tyre:

To correctly estimate the total demand for tyres and its development trends, it is necessary to analyze some elements that can significantly influence such demand.

### Road Network:

While transport acts as a catalyst in the socio-economic development of a country, socio-economic development in return generates demand for transport. Therefore, an adequate and efficient transport system is a basic requirement for both initiating and sustaining economic development.

- Transport facilitates the domestic market expansion by transporting surplus goods and services from production to consumption centres. Similarly, imports and exports are facilitated by efficient transportation.
- The transport system of Bangladesh consists of railway, road, inland water as well as two seaports, international shipping and civil aviation, catering for both domestic and international traffic.
- While railways and inland water transport continue to bear the main burden of long haul traffic, road transport has been assuming an increasingly important role in the movement of short-haul traffic, particularly the manufactured goods and perishables.
- This trend will be further intensified with the expansion of the road network, both arterial and local.
- While infrastructural facilities in Road Sector are provided by the Government, operation in this sub-sector is dominated by the Private Sector.
- Because of the growing importance of the road transport system, a considerable amount of resources has been increasingly allocated during the Third and Fourth Five-Year Plan.
- The above data show that around 2/3 of allocations to the transport sector are earmarked to promote Road Transport. Most of the investments are for construction and maintenance of paved roads and bridges.
- Particular importance was given to the Padma Multipurpose Bridge Project. To support the economic integration of the potentially productive but relatively isolated Southern region of the country with the central markets and energy sources located in the Western part, and to generate economic activity by substantially reducing transport costs across the Padma, the Government has decided to build a multipurpose bridge over the river and has attached a very high priority to this project.
- The end of construction is scheduled for 2020/2021. The Padma Bridge will foster transport by road and starting from 2021, transportation of freight and passengers along this route is expected to grow by around 50%.

**Table no2:Seventh Plan Sectoral Public Investment Allocation (Taka billion)**

Sl. No	Sector	FY16	FY17	FY18	FY19	FY20
1	General Public Services	41.8	30.9	34.9	38.8	43.4
2	Defence	4.2	3.0	3.4	3.8	4.2
3	Public Order and Safety	15.3	18.0	20.3	22.5	25.2
4	Industrial and Economic Services	21.0	29.9	35.2	41.0	25.2
5	Agriculture	59.0	75.2	84.8	94.2	105.6
6	Power and Energy	184.8	191.5	189.9	211.1	236.1
7	Transport and Communication	234.3	278.2	310.5	343.3	385.5
8	Local Government and Rural Development	181.8	212.6	239.6	266.2	297.8
9	Environment and Climate Change	4.8	6.8	7.7	8.6	9.6

10	Housing and Community Amenities	18.9	16.6	18.7	20.8	23.2
11	Health	53.3	64.0	72.2	81.6	92.8
12	Recreation, Culture and Religion	8.3	10.1	11.1	12.3	13.8
13	Education and Technology	121.1	173.7	207.0	230.6	258.3
14	Social Protection	37.5	47.1	53.3	59.4	66.6
<b>Total</b>		<b>970.4</b>	<b>1141.6</b>	<b>1287.8</b>	<b>1431.0</b>	<b>1600.7</b>

According to the 7th five-year plan allocation in Transport and Communication is the highest throughout the 5 years by a substantial amount, which is a direct relation effects tyre industry and its growth to be prosperous and booming. It must be noted that "High Grade" refers to roads having types of cement, concrete or bituminous concrete surface or bituminous surface."Low Grade" refers to roads generally made of stone, brick, gravel or dirt with proper alignment and drainage structure.

All main roads are made of asphalt. Under Neath, there is a layer normally filled in with small pieces of broken breaks. Roads are quite narrow but could allow two lanes running around big towns. Road maintenance is continuous and efficient.

Nevertheless, pits with visible rocks are prevalent. It has been reported that maintenance service is not fast enough to repair the effects of floods. Also, non-asphalted roads are relatively smooth but small rocks are present.

**Segment-wise demand estimation of tyre:**

To understand the evolutionary trends in the use of vehicles and consequently their tyres requirements, it is necessary to analyze quantities and qualities of all mechanized vehicles on the road in Bangladesh.

We were able to get some data of the overall tyre industry from Nitol Motors. However, this is their estimate and they have refused to share how they have reached to this estimate. Therefore, in this study, we derived the demand of tyre from 2013 to 2017 from the number of vehicles registered in Bangladesh (BRTA) and the consumption pattern of different segment of vehicles derived from the local tyre shops through the following table.

**Table no3: Demand for Tyre Calculation**

	No. of vehicles 2013	No. of vehicles 2014	No. of vehicles 2015	No. of vehicles 2016	No. of vehicles 2017	Consumption of Tyre per year	Demand of Tyre 2013	The demand for Tyre 2014	The demand for Tyre 2015	The demand for Tyre 2016	The demand for Tyre 2017
Ambulance	2507	2755	3227	3604	4098	2	5014	5510	6454	7208	8196
Auto Rickshaw	15942	175167	193809	204474	213682	4	63768	700668	775236	817896	854728
Auto Tempo	3318	3646	4726	6039	7631	9	29862	32814	42534	54351	68679
Bus	18991	20869	23179	27014	30775	8	151928	166952	185432	216112	246200
Cargo Van	4453	4893	5289	6306	7715	5	22265	24465	26445	31530	38575
Covered Van	13554	14894	17289	20642	25807	9	121986	134046	155601	185778	232263
Delivery Van	12794	14059	15792	17998	20401	5	63970	70295	78960	89990	102005
Human Hauler	7341	8067	9188	12636	16040	9	66069	72603	82692	113724	144360
Jeep (Hard/Soft)	21370	23484	27047	31917	37334	2	42740	46968	54094	63834	74668
Microbus	52167	57326	62496	68289	73864	2	104334	114652	124992	136578	147728
Minibus	11273	12388	12707	13166	13656	4	45092	49552	50828	52664	54624
Motor Cycle	898746	987633	1216310	1531037	1856636	0.33	296586.18	325918.9	401382.3	505242.2	612689.9

<b>Pick Up (Double/Single Cabin)</b>	51851	56979	67070	78367	91864	5	259255	284895	335350	391835	459320
<b>Private Passenger Car</b>	160802	176705	197723	218006	239953	2	321604	353410	395446	436012	479906
<b>Special Purpose Vehicle</b>	2448	2690	2986	3601	4590	2	4896	5380	5972	7202	9180
<b>Tanker</b>	2252	2475	2797	3183	3501	4	9008	9900	11188	12732	14004
<b>Taxicab</b>	21149	23241	23324	23367	23382	4	84596	92964	93296	93468	93528
<b>Tractor</b>	24826	27281	28970	31505	34282	2	49652	54562	57940	63010	68564
<b>Truck</b>	63700	70000	76294	83525	94851	8	509600	560000	610352	668200	758808
<b>Others</b>	13501	14836	16894	20744	25742	2	27002	29672	33788	41488	51484
<b>Total</b>	140298	169938	200711	240542	282580	88	2279227	313522	352798	398885	451951
	5	8	7	0	4			7	2	4	0

Again, the following table represents the demand for tyres based on the data from Nitol Motors:

**Table 4: Demand of Tyre from Nitol estimate**

Segment	Industry Volume (in 100,000s)			Growth rate	
	2015	2016	2017	2015-16	2016-17
<b>PCR</b>					
Ambulance	0.04	0.05	0.05	8.16%	9.06%
Private Passenger Car	2.88	3.09	3.33	6.57%	7.47%
Pick Up (Double/Single Cabin)	0.77	0.82	0.94	13.73%	14.63%
Jeep(Hard/Soft)	0.43	0.46	0.51	10.70%	11.60%
Microbus	0.86	0.92	0.99	6.41%	7.31%
Taxicab	0.45	0.48	0.49	0.04%	0.94%
<b>TOTAL</b>	<b>5.43</b>	<b>5.82</b>	<b>6.31</b>		
<b>TBB/TBR</b>					
Bus	0.72	0.79	0.88	9.90%	11.10%
Cargo Van	0.12	0.14	0.16	13.86%	15.06%
Covered Van	0.34	0.40	0.47	17.39%	18.59%
Minibus	0.54	0.55	0.56	1.55%	2.75%
Tanker	0.08	0.09	0.10	8.45%	9.65%
Truck	2.28	2.41	2.55	5.60%	6.80%
Delivery Van	0.30	0.33	0.36	8.88%	10.08%
Human Hauler (Leguna)	0.12	0.18	0.26	45.34%	46.54%
<b>TOTAL</b>	<b>4.5</b>	<b>4.89</b>	<b>5.34</b>		
<b>CNG</b>					
Auto Rickshaw	4.53	4.73	4.98	4.53%	5.30%
Auto Tempo	0.34	0.37	0.40	7.33%	8.10%
<b>TOTAL</b>	<b>4.87</b>	<b>5.1</b>	<b>5.38</b>		
Motor Cycle	9.28	11.29	14.12	21.67%	25.00%
<b>SUM TOTAL</b>	<b>24.08</b>	<b>27.09</b>	<b>31.14</b>	<b>12.51%</b>	<b>14.95%</b>

If we compare the two statistics, we see that Nitol did not take into account all the vehicle types registered in Bangladesh as per BRTA. And the demand for tyres still shows similarities to our estimate.

**Hypothesis:**

Considering the dependent variable as the demand for tyre and independent variables to be Inflation Rate, GDP Growth Rate, GDP from Transport Industry we derive the following hypothesizes.

H<sub>0</sub>1: The demand for the tyre is dependent on the inflation rate.

H<sub>A</sub>1: The demand of tyre is not dependent on the inflation rate.

H<sub>0</sub> 2: The demand for the tyre is dependent on the GDP Growth Rate.

H<sub>A</sub>2: The demand of tyre is not dependent on the GDP Growth Rate.

H<sub>0</sub>3: The demand for the tyre is dependent on the GDP from the Transport Industry.

H<sub>A</sub>3: The demand of tyre is not dependent on the GDP from the Transport Industry.

**Regression analysis:**

To test the above hypothesizes, we construct the following table,

Years	The demand for Tyre in million	Inflation Rate %	GDP Growth Rate	GDP from the Transport Industry in BDT Billion
2013	2279227	7.5	6.01	8.051
2014	3135227	7	6.06	8.538
2015	3527982	6.2	6.55	9.048
2016	3988854	5.7	7.1	9.597
2017	4519510	5.7	7.3	10.246

**Result:**

After running a regression analysis the output of the regression analysis is given below,

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.998376
R Square	0.996755
Adjusted R Square	0.98702
Standard Error	97041.76
Observations	5

ANOVA					
	Df	SS	MS	F	Significance F
Regression	3	2.89E+12	9.64E+11	102.3884	0.072490866
Residual	1	9.42E+09	9.42E+09		
Total	4	2.9E+12			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	2136945	3155858	0.677136	0.621074	37962032.1	42235922.11	37962032.1	42235922.1
Inflation Rate %	-477230	208236.8	-2.2917	0.261931	3123130.06	2168669.336	3123130.058	2168669.34
GDP Growth Rate	1032191	400446.5	2.5776	0.235602	6120346.17	4055963.223	6120346.169	4055963.22
GDP from Transport Industry in BDT Billion	1235007	256530.8	4.814266	0.130382	2024525.1	4494539.988	2024525.3	4494539.99

					37		67	
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From the above analysis, we can see that the p-value for all the independent variables are above 0.05, which indicates that we must accept all the null hypotheses. Even at 10% significance level, we would have to accept all the null hypotheses.

From the above statistics, we can derive the regression model,

$$Y = 2136945 - 477230X_1 + 1032191X_2 + 1235007X_3$$

Where Y= Demand for Tyre in Bangladesh in a fiscal year.

X1= Percentage of Inflation in that year.

X2= GDP Growth Rate in that year.

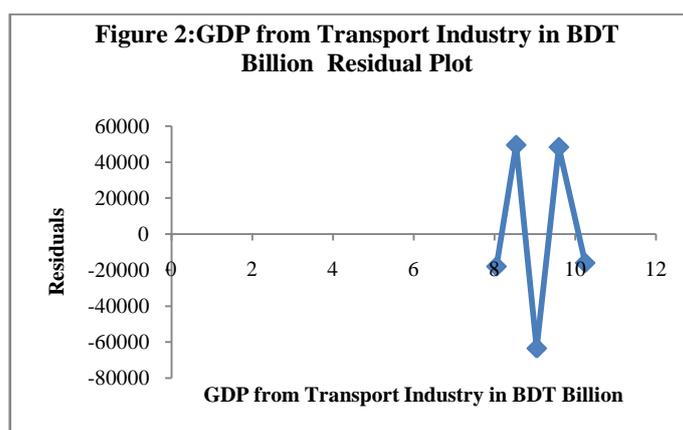
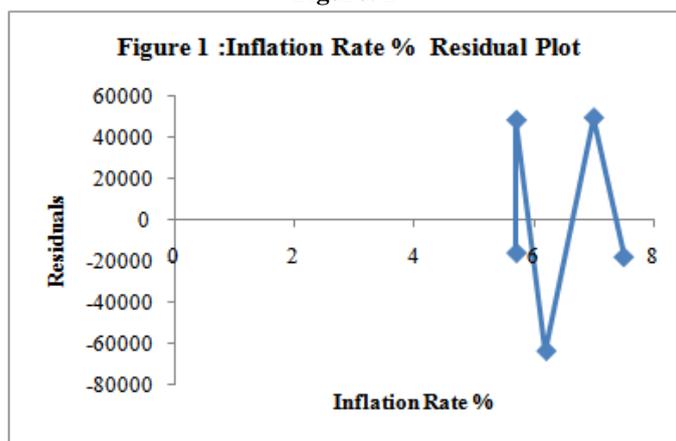
X3= GDP from the Transport Industry in BDT Billion.

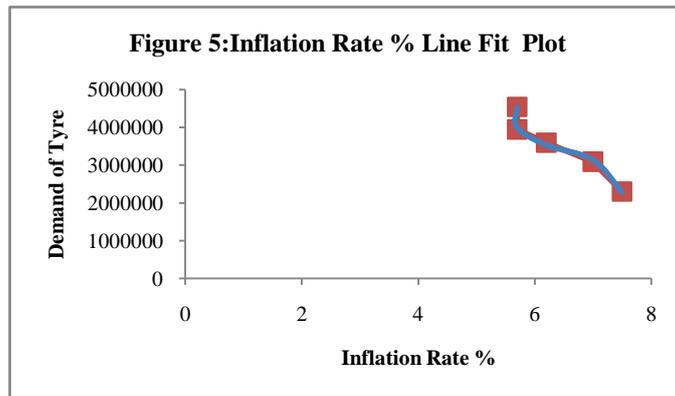
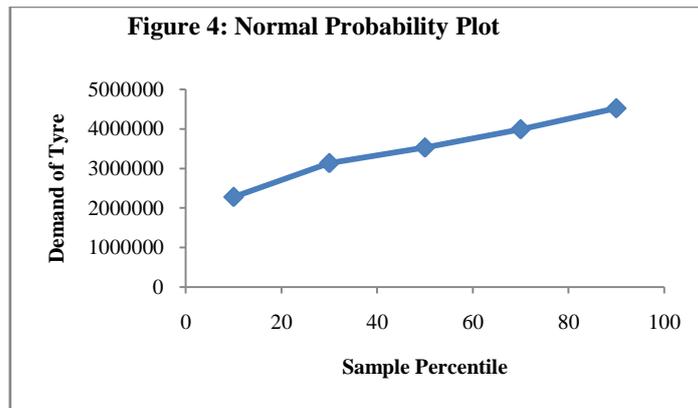
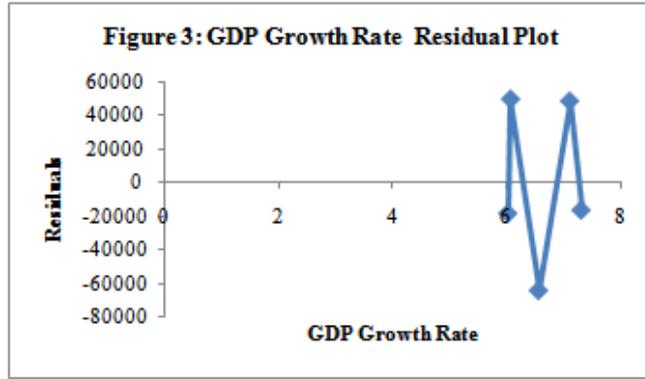
Here, we can see the residual plot of the independent variables representing the model,

### RESIDUAL OUTPUT

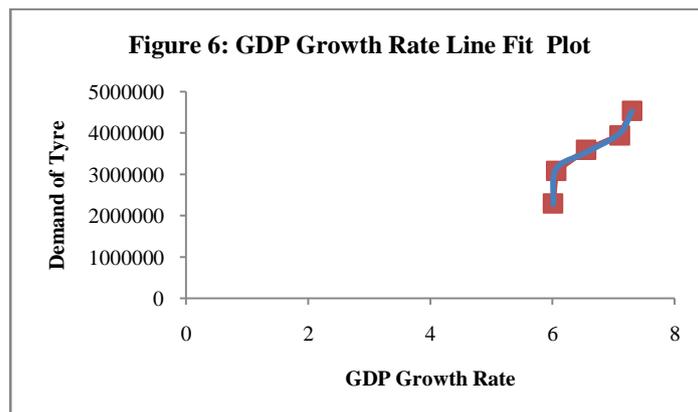
Observation	Predicted Demand of Tyre	Residuals	Standard Residuals
1	2297290	-18063.2	-0.37228
2	3085745	49482.33	1.019815
3	3591609	-63626.5	-1.31132
4	3940538	48316.57	0.995789
5	4535619	-16109.2	-0.33201

Figure: 1

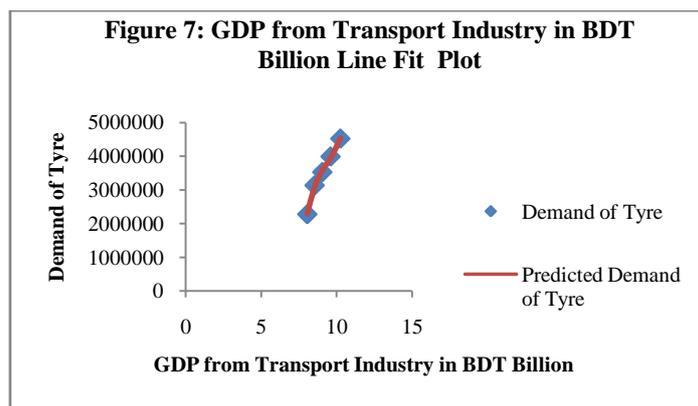




The probability Plot shows a steady line and promises to grow at the current rate. The Line Fit Plot shows the negative relationship between tyre demand and inflation rate. The downward slope is represented by the negative coefficient (-477230).



The Line Fit Plot shows the positive relationship between tyre demand and GDP growth rate. The upward slope is represented by the positive coefficient (1032191).



The Line Fit Plot shows the positive relationship between tyre demand and GDP from the Transport Industry. The upward slope is represented by the positive coefficient (1032191).

#### PROBABILITY OUTPUT

Percentile	Demand of Tyre
10	2279227.18
30	3135226.89
50	3527982.3
70	3988854.21
90	4519509.88

From the model derived from our analysis in the study, we can confidently say that at a given year if we know the inflation rate, GDP growth rate and GDP from Transport Industry we can derive the demand for the tyre in Bangladesh in that particular year.

For example, If at a given year

Inflation Rate=6%

GDP Growth Rate=7%

GDP from Transport Industry in Billion BDT= 11

The Demand of Tyre would be= $2136945-477230*6+1032191*7+1235007*11$   
 $=20083979$

Although, we know and understand that, this model is affected by many other variables, for this particular study we have established the above relationship.

#### V. Discussion

In this model, we can see that,

- The demand for the tyre is positively related to GDP from the Transport Industry and GDP growth rate.
- However, the demand for tyre is negatively related to the inflation rate.
- The negative relationship between tyre demand and the inflation rate is well within expectation. As the inflation rate rises the price of tyre rises causing a decrease in its demand.
- We also see that the R square value of the model is 0.996755, which is very close to 1. It means that our model excellently represents the data provided.

The p-value for GDP growth rate is much higher than the p-value for GDP from the Transport Industry. Which can mean that overall tyre demand has been affected by the increase in purchasing power of the public than the overall increase in the Transport Industry?

Our attempt to create a model that represents the tyre market in Bangladesh has never been approached in any previous studies. Thus we only took the analysis of Nitol to compare our model and found significant similarities in them.

## VI. Findings

The Findings of the study are given as follows:

- The demand for tyre table showed without any doubt that the investment would be profitable in the prevailing market conditions, and under the constraint of a complex technology, requiring costly, imported raw materials and human resources.
- Even if positive, however, the result of such analysis would hardly be likely to change the attitude of the key investor, which, in the proposed financing plan, would be a transnational tire corporation.
- As a final remark, it is strongly recommended to reconsider the investment choice, taking into consideration what has already been anticipated on "new" versus "retreaded" tires.
- It is to be pointed out once again that tires retreaded according to an updated technology can guarantee the same performance of new tires in terms of safety and durability.
- On the other hand, the cost of the investment required for a modern retreading factory of the assumed production capacity can be roughly estimated at 10% of that estimated for the factory to produce new tires.
- Furthermore, it would be relatively easy to find a reputed retreading company willing to supply a turn-key factory, as well as technical support and technical assistance to start-up.

## VII. Conclusion

After doing a thorough analysis of the tyre industry in Bangladesh, we have reached the following conclusion,

- The raw material unavailability constraint must be met. The investors must find a suitable raw material supply source to meet the cost constraint
- The overall costing of the project is above expectations. To compete with the foreign brand the investor must be willing to make sufficient considerations to reduce their profit margins.
- The existing market is dominated by Chinese brands. They have the option to eliminate any possible threat to their market share by reducing their price further.
- The regression model depicted in the above study will help to determine the growth process of tyre market demand for the investor. However, a thorough cost-benefit analysis for the project needs to be completed while competing against the low price Chinese products before any decision is made.

Under these circumstances, we must state this project, not feasible to invest and advise our client to rethink their investment decision.

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Laila Ferdousy. "Analysis of Bangladesh Tyre Market for Possible Market Entry: An Investor's Perspective." *IOSR Journal of Economics and Finance (IOSR-JEF)*, 11(4), 2020, pp. 31-43.