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Analysis of Foreign Trade of Pharmaceutical Products and its Impact on GDP

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ABSTRACT

The ongoing pandemic presents a significant chance for the Indian pharmaceutical industry to show its credentials in production and testing of vaccines and reinforce its fame. Instances of this incorporate the Serum Institute of India (SII), the world's biggest manufacturer of vaccines by volume. The SII effectively launched the natively evolved intra-nasal vaccine, Nasovac for the prevention of H1N1 contaminations and furthermore worked together as an assembling accomplice for the Oxford-AstraZeneca COVID-19 vaccine. Albeit such opportunities of cooperation evidently appear to help the area, it's substitutability with R&D endeavours could possibly challenge the sustainability of the industry. Another appropriate problem relates to the nature of the global value chain, especially the worldwide reliance on China for drug delegate inputs. The Indian Drug administrative authority had as of late featured how 57 dynamic drug fixings (Api's) of antibiotics, vitamins and steroids could go out of stock if there's a prolonged closedown in China.

The coronavirus pandemic and its resultant lockdown badly affected all major sectors of the economy, but it has come as a boon in disguise to the Indian pharmaceutical sector. In the current study, an analysis of exports and imports of pharmaceutical products for a period of 10 years has been conducted and the effect of import and export on the GDP has been analysed.

The study finds that the import and export of pharmaceutical products are increasing from year to year at the same time the trade surplus is also getting boosted up. The study has concluded by saying there is a linear positive correlation between the import and export, import and GDP and the export and GDP of India.

Keywords: COVID – 19, Pharmaceutical Industry, GDP, Import, Export

1. Introduction

India positions third overall for pharmaceutical production by volume and fourteenth by value (IBEF, 2021). The Indian pharmaceutical sector contributes around 2% to India's GDP and around 8% to the nation's overall merchandise exports. The sector has shown strength to numerous economic shocks, and this can be validated by India's more than 18% development in exports of pharmaceuticals during 2020-21, a pandemic hit year, when worldwide result and trade contracted. During the worldwide 2008 recession, the Asian pharmaceutical market was the most un-impacted, with the Indian counterpart having irrelevant effect (Bhatt and Panigrahi 2014). The Ministry of Commerce had revealed that Drugs and Pharmaceuticals is one of the main two ware bunches which enlisted a positive development in April 2020 versus April 2019. The trade surplus of India June 2020 was additionally basically determined by the vigorous execution of pharmaceutical exports.

The worldwide pandemic being both a medical and a financial shock, involves wide-running ramifications contrasted and some other monetary shock, especially with regards to the new ascent in both the price and share of imports by this area from China and a changing political scene. During the 1918 Spanish influenza episode, a portion of the eccentricities of the business had come to the cutting edge. Numerous untested cures created transient benefit for certain organizations, and the degree for utilizing a pandemic to their own monetary benefit by patent medication firms was before long noted. The increases independent of patent privileges, notwithstanding, frequently ended up being transient, as on account of Aspirin during the Spanish influenza, which was stopped utilization after episodes of headache medicine harming surfaced (History.com Editors, 2020).

The ongoing pandemic presents a significant chance for the Indian pharmaceutical industry to show its credentials in production and testing of vaccines and reinforce its fame. Instances of this incorporate the Serum Institute of India (SII), the world's biggest manufacturer of vaccines by volume. The SII effectively launched the natively evolved intra-nasal vaccine, Nasovac for the prevention of H1N1 contaminations and furthermore worked together as an assembling accomplice for the Oxford-AstraZeneca COVID-19 vaccine. Albeit such opportunities of cooperation evidently appear to help the area, it's substitutability with R&D endeavors could possibly challenge the sustainability of the industry. Another appropriate problem relates to the nature of the global value chain, especially the worldwide reliance on China for drug delegate inputs. The Indian Drug administrative authority had as of late featured how 57 dynamic drug fixings (Api's) of antibiotics, vitamins and steroids could go out of stock if there's a prolonged closedown in China.

In the current study, an analysis of exports and imports of pharmaceutical products for a period of 10 years has been conducted and the effect of import and export on the GDP has been analysed.

2. Literature Review

After the substitution of the process patent regime, the conventional producers of the sector confronted many difficulties as it expanded patent terms in consistence with the "The Agreement of Trade-Related

Aspects of Intellectual Property Rights" (TRIPS) arrangement. India doesn't permit licenses on minor alteration of existing items, accordingly forestalling their ever greening. Besides, the nation requires obligatory authorizing in the event that the patent doesn't work in India or the subsequent item has over the top costs **(Dhar and Joseph, 2019).**

Alongside the good arrangements as per the World Trade Organization (WTO) system, it is additionally contended that to extend the export market, the business ought to take on techniques to work together with multinationals in R&D fabricating as well as in promoting new licensed items and working on the principles of creation. The contention is borne out on the lines of specialization of the Indian business and is reinforced by the way that a significant level of the turnover of Indian organizations is spent on further developing the showcasing organizations **(Lalitha, 2002).**

As far as firm-explicit benefits, the R&D endeavours are considered one of the excellent variables, and in this specific situation, R&D endeavours associated with any change in the process innovation is more important than the presentation of new items. On the other front, generics which are somewhat less escalated in R&D can supplement the deals esteem alongside protected drugs by Multi-National Corporations (MNCs) in the pharma trade bushel, and government impetuses are contended for in this unique situation. Accomplishing this complementarity requires arrangement of right motivators and an emphasis of R&D use (**Aggarwal, 2004).** Moreover, albeit key government strategies were the principal factors answerable for change of the Indian business from a merchant of medications to a development driven practical maker and wholesaler of value sedates, the constraints of low efficiency and low R&D power proceed **(Pradhan, 2006).**

After the pandemic, while falling disposable incomes because of an economic shock could unfavourably influence the sector, it can well affect generics sales since lower salaries might prompt patients to buy more nonexclusive medications **(Mishuk, et al., 2018)**. However, it is important to comprehend the channels through which the external impacts can be communicated into the centre of the very industry to lessen the seriousness of effect from any such shocks.

3. Research Design

Objectives of Study

- To identify the relationship between import and exports of pharmaceutical products.
- To identify the relationship between exports of pharmaceutical products and GDP.
- To identify the relationship between exports of pharmaceutical products and GDP.

Scope of Study

The coronavirus pandemic and its resultant lockdown badly affected all major sectors of the economy, but it has come as a boon in disguise to the Indian pharmaceutical sector. Though some part of pharmaceutical business was affected such as supply chain and import of active pharmaceutical ingredients from China, Covid-19 has provided some opportunities in the pharmaceutical sector, especially India. In the current study, an analysis of exports and imports of pharmaceutical products for a period of 10 years has been conducted. The study also

examines the effect of import and export on the GDP of India.

Hypothesis of Study

H1: There exists a relation between the import and the export of pharmaceutical products

H2: There exists a relation between the export of pharmaceutical products and GDP.

H3: There exists a relation between the import of pharmaceutical products and GDP.

Sources of Data

The data collection is purely based on secondary data, collected from the websites of Ministry of Commerce and Industry, world bank etc.

Period of Study

The data of 10 years from 2010-2011 to 2020- 2021 has been collected and analysed in this study.

Plan of Analysis

Descriptive and Correlational research designs are used to conduct the study.

Statistical tools such as Descriptive statistics, ANOVA and Regression analysis have been used in this study.

4. Analysis of Data

EXPORT		*IMPORT*		*GDP*	
Mean	8528945.417	Mean	1215303.722	Mean	1161266720
Standard Error	948136.2413	Standard Error	110093.6423	Standard Error	63720636.08
Median	8496417.98	Median	1112855.63	Median	1183884300
Mode	#N/A	Mode	#N/A	Mode	#N/A
Standard Deviation	2998270.055	Standard Deviation	348146.6655	Standard Deviation	201502344
Sample Variance	8.98962E+12	Sample Variance	1.21206E+11	Sample Variance	4.06032E+16
Kurtosis	0.395050805	Kurtosis	-0.011243452	Kurtosis	-1.306626417
Skewness	0.555660209	Skewness	0.959959306	Skewness	-0.013835415
Range	10292153.13	Range	1080321.41	Range	583293900
Minimum	4081685.87	Minimum	813114.2	Minimum	873632900
Maximum	14373839	Maximum	1893435.61	Maximum	1456926800
Sum	85289454.17	Sum	12153037.22	Sum	11612667200
Count	10	Count	10	Count	10

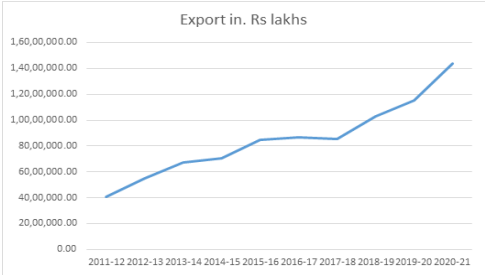
Interpretation

By analysing the summary statistics of 10 year exports and imports of pharmaceutical products and the 10 year's GDP, it can be interpreted as the Mean export value as Rs. 8528945.417 lakh crores, Mean import value as Rs. 1215303.722 lakh crores and the mean GDP value is Rs. 1161266720 lakh crore. Exports lies in a range of 10292153.13 with minimum value of 4081685.87 and maximum of 14373839. Imports of Pharmaceutical products lies in a range of 1080321.41 with a minimum of 813114.2 and maximum of 1893435.61. GDP of India for the 10 years lies in a range of 583293900 with a minimum of 873632900 and maximum of 1456926800. Exports and imports are positively skewed but the GDP has a slight negative skewness with a value of -0.013835415.

Interpretation

From the above table, it is visible that the surplus for pharmaceutical products trade are going up except in the year of 2016-2017 compared with the previous year with a slight margin. The exports are very much higher than the imports every year. In the year of 2020-21 pharmaceutical products have contributed the ever higher rate of more than 1% of GDP.

Graph 1



Interpretation:

From the above graph, the upward linear trend of the exports of pharmaceutical products can be seen.

Graph 2

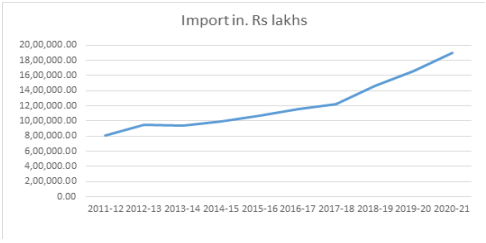


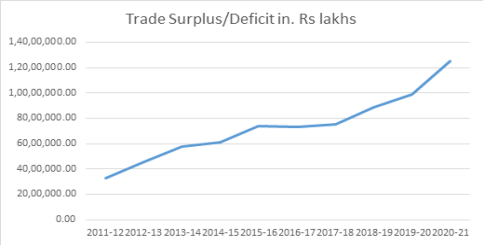
TABLE Showing Trade Surplus/Deficit

Year	Export in. Rs lacs	Import in. Rs lacs	Trade Surplus/Deficit	%of GDP
2011-12	4,081,685.87	813,114.20	3,268,571.67	0.374136
2012-13	5,477,366.87	952,244.92	4,525,121.95	0.491166
2013-14	6,740,371.23	937,138.95	5,803,232.28	0.592084
2014-15	7,081,510.40	996,129.16	6,085,381.24	0.578037
2015-16	8,448,106.41	1,074,208.22	7,373,898.19	0.648569
2016-17	8,544,729.55	1,224,113.29	7,320,616.26	0.594776
2017-18	8,670,548.95	1,151,503.04	7,519,045.91	0.572026
2018-19	10,323,992.70	1,458,113.31	8,865,879.39	0.633127
2019-20	11,547,303.19	1,653,036.52	9,894,266.67	0.679119
2020-21	14,373,839.00	1,893,435.61	12,480,403.39	1.002166

Interpretation:

Import of pharmaceutical products also shows a linear upward trend in all the 10 years.

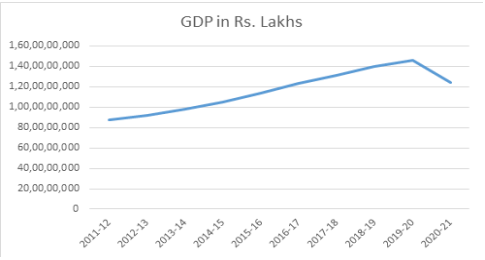
Graph 3



Interpretation:

Trade is in a surplus position every year with a positive linear upward trend in very year in the case of pharmaceutical products

Graph 4



Interpretation:

GDP of India had been moving up with a linear upward motion but it crashed down in the year of 2020-21. There happened a contraction of around 7.3%.

Regression Analysis Between Imports & Exports

H0: There exists no relation between import and export of pharmaceutical products

H1: There exists a relation between the import and the export of pharmaceutical products

Regression Statistics	
Multiple R	0.79443
R Square	0.631119
Adjusted R Square	0.585009
Standard Error	1.3E+08
Observations	10

Interpretation

According to the data, there exists high positive correlation between export and import of pharmaceutical products. As the export increases, import may also increase and vice versa. The r square value is 0.63 and it is in a moderate level and it says the both the variables are defined each other.

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.31E+17	2.31E+17	13.68721	0.006046
Residual	8	1.35E+17	1.68E+16		
Total	9	3.65E+17			

Interpretation

The model says that there exists significance since the value is less than 0.05.

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	7.06E+08	1.3E+08	5.44052	0.000616	4.07E+08	1.01E+09	4.07E+08	1.01E+09
X Variable 1	53.39062	14.43137	3.699623	0.006046	20.11183	86.66942	20.11183	86.66942

Interpretation

The p value is less than 0.05 and the model is significant. The coefficient value is positive and high for the variable Exports i.e., 53.39 which says a high same directional relation with imports. It can be concluded as the null hypothesis is rejected and alternative hypothesis is accepted.

Regression Statistics	
Multiple R	0.794429989
R Square	0.631119007
Adjusted R Square	0.585008883
Standard Error	129807415.4
Observations	10

Regression Analysis Between GDP & Exports

H0: There exists no relation between GDP and export of pharmaceutical products

H1: There exists a relation between the GDP and the export of pharmaceutical products

Interpretation

According to the data, there exists high positive correlation between GDP and export of pharmaceutical products. As the export increases, GDP may also increase and vice versa. The r square value is 0.63 and it is in a moderate level and it says the both the variables are defined each other.

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.30629E+17	2.31E+17	13.68721	0.006046
Residual	8	1.348E+17	1.68E+16		
Total	9	3.65429E+17			

Interpretation

The model says that there exists significance since the value is less than 0.05.

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	705901014.4	129748810	5.44052	0.000616	4.07E+08	1.01E+09	4.07E+08	1.01E+09
X Variable 1	53.39062256	14.43136799	3.699623	0.006046	20.11183	86.66942	20.11183	86.66942

Interpretation

The p value is less than 0.05 and the model is significant. The coefficient value is positive and high for the variable imports i.e., 53.39 which says a high same directional relation with exports. It can be concluded as the null hypothesis is rejected and alternative hypothesis is accepted.

Regression Analysis Between GDP & Imports

H0: There exists no relation between GDP and import of pharmaceutical products

H1: There exists a relation between the GDP and the import of pharmaceutical products

Regression Statistics	
Multiple R	0.788439
R Square	0.621636
Adjusted R Square	0.57434
Standard Error	1.31E+08
Observations	10

Interpretation

According to the data, there exists high positive correlation between GDP and import of pharmaceutical products. As the import increases, GDP may also increase and vice versa. The r square value is 0.62 and it is in a moderate level and it says the both the variables are defined each other.

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.27E+17	2.27E+17	13.14365	0.00673
Residual	8	1.38E+17	1.73E+16		
Total	9	3.65E+17			

Interpretation

The model says that there exists significance since the value is less than 0.05.

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	6.07E+08	1.59E+08	3.827123	0.005038	2.41E+08	9.72E+08	2.41E+08	9.72E+08
X Variable 1	456.3372	125.8716	3.625418	0.00673	166.0768	746.5977	166.0768	746.5977

Interpretation

The p value is less than 0.05 and the model is significant. The coefficient value is positive and high for the variable imports i.e., 456.3372 which says a high same directional relation with imports. It can be concluded as the null hypothesis is rejected and alternative hypothesis is accepted.

5. Conclusion

From the above study, it is observed that the import and export of pharmaceutical products are increasing from year to year at the same time the trade surplus is also getting boosted up. The study can be concluded by saying there is a linear positive correlation between the import and export, import and GDP and the export and GDP of India. As we can see the exports are highly boosted up and also showing an upward trend, it can be interpreted as the pharmaceutical industry is becoming a major contributing industry to the GDP of India.

India incorporates a speedily growing pharmaceutical market that, being the third largest pharmaceutical industry within the world by volume, holds a outstanding place in international health. Over the last 10 years, the Indian pharmacy market has seen increasing domestic and foreign investment. whereas the range of deals fluctuated solely slightly between 2011 and 2019, a substantial increase was confirmed for deals stricken in 2020, as illustrated in Graph1. Between 2019 and 2020, the deal range enlarged by twenty second. This 2020 increase in deal-making activity, seemingly triggered by the Covid-19 pandemic, reveals fascinating info on India's capabilities within the pharmaceutical business.

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