

INDIA'S IMPORTS OF PETROLEUM PRODUCTS DURING POST-REFORM PERIOD

Ramanjeet Kaur*
Dr. Meenu**

ABSTRACT

The paper has analyzed the growth and structure of petroleum products and its sub-categories imports for the study period 1996-1997 to 2021-2022. The growth rates have been calculated with (i.e., 1996-1997 to 2019-2020) and without (i.e., 1996-1997 to 2021-2022) Covid-19 years. The paper revealed that the overall growth of India's imports and petroleum product imports registered at lower level (i.e., 12.07 % and 13.93 % respectively) for the study period 1996-1997 to 2020-2022 as compared to 1996-1997 to 2019-2020 (i.e., 14.13 % and 14.96 %). Among the nine sub-categories of petroleum product, only the share of LPG imports was high (i.e., more than 40 per cent) in petroleum product imports with and without Covid years due to its wider application in domestic, industrial and transport sectors of economy.

Keywords: Imports, India, Covid-19, Petroleum Products.

Introduction

The oil and gas sector are among the eight core industries in India and plays a major role in influencing decision making for all the other important sections of the economy. India's economic growth is closely related to its energy demand. Therefore, India retained its spot as the third-largest consumer of oil in the world as of 2021 (Oil and Gas Industry Report June, 2022). Growing economy and population growth are the main drivers for oil and gas demand, increasing every year. The suitable supply of crude oil and its products (Liquefied Petroleum Gas, Kerosene, Gasoline and other products) are required for development of domestic, industrial, agriculture and transportation sectors of the economy (Marbuah, 2017 and Soundarapandiyan & Ganesh, 2017).

The Covid-19 pandemic has probably given the biggest blow to the world economy after the great depression of 1930s. This pandemic has significant impact on the world economy, affecting both developing and developed countries (AbdelMaksoud, 2021). The impact of coronavirus pandemic on India had largely disruptive in terms of economic activity as well as a loss of human lives. The actions taken by the Indian Government to prevent the spread of Covid-19 e.g., social distancing, border quarantine and public quarantine, shut down of air, land and sea borders, foreign and national travel

* PhD Research Scholar, Department of Economics, Panjab University, Chandigarh, India.
** Department of Economics, Panjab University, Chandigarh, India.

restrictions, limiting mass gathering, and shutting down of school's shops and restaurants caused a severe slump in the consumption of oil and its products (Jain and Mukherjee, 2022). The complete lockdown across the country slowed down the demand of transport fuels as auto & industrial manufacturing declined and goods & passenger movement fell (Upadhyay, 2021).

Review of Literature

A few studies have been found on imports of petroleum products. **Pitre, V. (1981)** studied the trends of imports in India over the period 1960-61 to 1974-75 and revealed the sub-commodities (at two-digit levels) that Iron and Steel; Non-Electrical Machinery and Cereal and Cereal Preparation had largest proportion of imports in 1974-75 along with Petroleum and Petroleum Products and Fertilizers Manufactured contributed major share in India's total imports. Even the intermediate goods imports were highest in 1972-73 and commodities like Crude Fertilizers; Non-Metallic Ferrous Ores; Petroleum and Petroleum Products had marked up the imports under raw materials. **Goldar and Mukhopadhyay (1990)** estimated the demand function for the major petroleum products and import function for the petroleum in India for the period 1970-86. The result revealed that the import demand for the petroleum and the domestic demand for petroleum products were insignificant to the price changes. Foreign exchange availability and petroleum imports with one year lag are regarded as important determinants of petroleum imports. The paper suggested a need of proper implementation of price administrative measures and adequate measures for energy conservation in order to reduce the petroleum imports in India. **Ghosh (2006)** study confirmed the existence of long run relationships among the consumption of petroleum products and economic growth in India from 1970-71 to 2001-02. Thus, the expansions of new refineries are required to meet the future demand of petroleum products. **Streifel (2006)** studied the trends in global commodity market and prices specifically on metal & minerals and petroleum in India and china since 1990s and found that the developing countries have higher demand for metal and petroleum to meet their requirements. **Wani, Kirmani and Saif (2015)** studied crude oil imports during 2008-2009 to 2014-2015 and found that in India the demand for petroleum related products is increasing at a rapid pace which results in increase in crude oil imports. In case of any increase in crude oil prices a shock or impulse is visible which paves way for strengthening energy efficient mechanisms in order to reduce the dependency on petroleum products.

With this background, the present paper makes an attempt to empirically analyze the growth, and structure of India's import of petroleum products and its sub-categories. The paper has been divided into following sections: Section I) Database and Methodology, Section II) Growth performance of India's imports of petroleum product and its sub-categories for the study period and sub-periods, Section III) Structure of India's imports of petroleum product and its sub-categories, Section IV) India's petroleum product imports during Covid-19 years and Section V) Conclusion.

Section I

Data Sources

Data for India's imports of petroleum product and its sub-categories have been collected from various authenticated government sources for the study period 1996-1997 to 2020-2022 which are as follows: 1) Petroleum Planning and Analysis Cell (PPAC) of Ministry of Petroleum and Natural Gas, 2) World Development Indicators and, 3) Economic Survey of India (various issues).

Methodology

• Growth of India's Imports, Petroleum Products Imports and its Sub-Categories

Growth rates refer to the amount of increase that a specific variable has gained within a specific period and context. In order to find out the Growth Rates of India's imports, petroleum product imports and its sub categories, the Compound Annual Average Growth Rates (CAGR) are worked out. The Growth Rates are calculated by fitting the exponential function of the type:

$$Y_t = ab^t e^u$$

Transforming the above equation into linear form:

$$\log y_t = \log a + t \log b + u \log e$$

Where,

Y_t = value of dependent variable in the year t

T = trend variable

u = disturbance term

a & b = constants

For the estimated value of regression coefficient 'b', the compound growth rate 'r' was calculated as following:

$$r (\%) = (b^{\wedge}-1) \times 100$$

Where, b^{\wedge} = estimated value of b

The Growth rates are calculated for whole of the study period i.e., 1996-1997 to 2019-2020 and also for various sub-periods: 1996-1997 to 2006-2007 and 2007-2008 to 2019-2020 to capture changes before and after crisis, 2014-2015 to 2019-2020 and 2014-2015 to 2021-2022 to capture recent changes. In order to study the impact of Covid-19, the paper also calculated the growth rate including the Covid -19 years i.e., 1996-1997 to 2021-2022.

• **Structure of India's Petroleum Product and its Sub-Categories Imports**

For analyzing the structure, following shares are calculated in the form of percentages at all points of study period (1996-1997 to 2021-2022):

- The shares of imports of petroleum product and its sub -categories in India's imports.
- The share of petroleum product imports and its sub -categories in India's G.D.P.
- The share of sub-categories of petroleum product imports in India's petroleum product imports.

The petroleum products are classified into nine categories identified by Ministry of Petroleum and Natural Gas, Government of India. These are: Liquefied Petroleum Gas (LPG), Naphtha, Petrol/Motor Spirit (MS), Aviation Turbine Fuel (ATF), Superior Kerosene Oil (SKO), High Speed Diesel (HSD), Lube oil (Lubes), fuel oil (Furnace oil) and others (Includes: Paraffin wax, Petroleum Jelly, Propylene, Propane, Special Boiling Point Spirit, Benzene, Pet coke, Toluene, Hexane, Carbon Black Feed Stock, Mineral Turpentine Oil, Poly Isobutene, Aromex, Jute Batching Oil, Sulphur, Solar Oil, Aviation Gas etc). The above-mentioned petroleum product imports are further matched with HS (Harmonized System Classification) codes derived from DGCI&S (given in Annexure1).

Limitations

- Our study is import specific (not based on exports of petroleum products of India), time specific and sector specific, therefore it lacks general applicability.
- This study used the sub-categories of petroleum products given by Ministry of Petroleum and Natural Gas, Government of India.
- Data availability for ATF as sub-category of petroleum product imports is for last 8 years only.

Section II

Growth Rate of India's Imports, Petroleum Product Imports and its Sub-Categories

The compound annual growth rates of India's total imports, petroleum product and its sub-categories for considered study period and sub-periods are shown in **Table 1**. India's total imports increased at the rate of 14.13 per cent, whereas India's petroleum product imports grew at the rate of 14.96 per cent for the study period 1996-1997 to 2019-2020. The growth of total imports of India declined from 16.62 per cent to 4.42 per cent for the sub periods 1996-1997 to 2006-2007 and 2007-2008 to 2019-2020 respectively. The growth rates of India's petroleum product imports also registered a decline (i.e., 28.55 per cent in 1996-1997 to 2006-2007 to 1.89 per cent in 2007-2008 to 2019-2020) due to global financial crisis of 2007-2008 which impacted global trade (Economic survey, 2009 and Shelburne, 2010). During the last six years of the study period, petroleum product imports grew at 11.05 per cent (i.e., increased from 12137.98 US \$ million in 2014-2015 to 17857.48 US \$ million in year 2019-2020) whereas the imports of India grew at rate of 4.02 percent (i.e., raised from 448033 US \$ million in 2014-2015 to 474709.28 US \$ million in year 2019-2020).

The sub-categories of petroleum product imports such as Motor Spirit, HSD and lubes have grown at the rate of 50 percent or more for the study period taken as the whole. The petroleum products such as LPG, naphtha, fuel oil and products categorized under 'other' sub-category have grown at the rates of 18.7 per cent, 11.9 per cent, 39.9 per cent and 33.7 per cent respectively for whole of the study period. The category of MS recorded with the highest growth rate (i.e., 73.1 per cent), whereas SKO imports showed the negative growth rate (-32.8 per cent) for the study period 1996-1997 to 2019-2020. During the sub-period 1996-1997 to 2006-2007, the sub- categories of

SKO, HSD, Lubes and Fuel oil recorded highly positive growth as compared to the sub-categories of LPG, MS, Naphtha and other. During the sub-period 2007-2008 to 2019-2020, the growth of all sub-categories declined abruptly and negative growth was registered by Naphtha, SKO, HSD and Fuel oil. The slow-down in the trade of the economy was mainly due to European sovereign debt crisis in 2008, along with the financial crisis of 2007-2008 and the great depression of 2008 through 2012 (Sarangi 2014, Viswanathan 2010 and Rajesh 2018).

Table 1: Growth rates of India's Imports, Petroleum Products and its Sub-Categories Imports (in %)

Category	1996-1997 to 2019-2020	1996-1997 to 2021-2022	2014-2015 to 2019-2020	2014-2015 to 2021-2022	1996-1997 to 2006-2007	2007-2008 to 2019-2020
Liquefied Petroleum Gas (LPG)	18.70	17.91	8.59	12.01	18.89	11.18
Motor Spirit (MS)	73.10	64.87	13.15	11.65	52.90	0.92
Naphtha	11.99	9.10	3.75	-4.64	54.87	-8.09
Aviation Turbine Fuel (ATF)*	-	-	-9.28	-77.99	-	-
Superior Kerosene Oil (SKO)	-32.84	-28.72	-94.27	-44.69	228.95	-79.51
High Speed Diesel (HSD)	52.90	41.51	67.43	5.04	260.24	-12.38
Lube oil (Lubes)	54.64	47.01	0.58	4.15	289.45	6.83
Fuel oil (Furnace oil)	39.90	36.76	23.56	39.42	285.79	-4.73
Other	33.70	30.31	16.11	9.91	64.23	11.28
Petroleum products imports	14.96	13.93	11.05	11.09	28.55	1.89
Total Imports	14.13	12.07	4.02	-2.97	16.62	4.42

Source: Author's calculations. * ATF import data available from 2014 onwards.

Section III

Structure of India's Imports of Petroleum Product

The structure of India's imports of Petroleum Product has also undergone a significant change with growth and changing structure of Indian economy. To find out leading sub-categories in the India's petroleum product imports, this section is devoted to measure the structure of the India's petroleum product imports for the study period 1996-1997 to 2019-2020. For this purpose, India's total imports, petroleum product imports, share of total imports in India's GDP, share of petroleum product imports in India's GDP and share of petroleum product imports in India's imports are considered for all the years of the study period 1996-1997 to 2019-2020. Further, detailed analyses of the shares of all sub-categories of petroleum product imports are conducted for the whole study period.

Table 2 is showing that total imports of India was continuously increasing for the period 1996-1997 to 2012-2013 whereas it tends to decrease for the last seven years (i.e., 2013-2014 to 2019-2020) except minor fluctuations. The value of imports of petroleum product in India indicated the fluctuating trend throughout the study period (333.45 million dollars in 1996-1997 to 17857.48 million dollars in 2019-2020). The share of India's total imports in GDP continuously registered an increase from 9.96 per cent in 1996-1997 to 26.85 in 2012-2013 except decline in 2009-2010 (21.49 per cent) due to global financial crisis of 2007-2008. The share of petroleum product imports in India's GDP ranged between 0.07 and 1.24 per cent during the study period 1996-1997 to 2019-2020. The share was low in the initial years and during 1998-1999 to 2006-2007 years, the share fluctuated around 0.5 per cent. After which share of petroleum product imports in GDP reached a high of 1.24 and 1.13 percent in 2007-2008 and 2008-2009 respectively. During 2009-2010 to 2019-2020 years, the share of petroleum product imports as percentage of GDP declined and fluctuated between 0.46 and 0.77 percent. In 1996-1997, share of petroleum product imports as percentage of India's import was 0.85 percent. It reached the highest point (6.8 percent) in 1998-1999 after which it gradually started to decline. The share of petroleum product imports in India's import continues to decline gradually till it reached at 4.88 percent in 2006-2007. Further it again increased to 6 percent in 2007-2008 and after that share fluctuated between 2 to 4 percent in the years 2008-2009 to 2019-2020. The share of petroleum product imports was 3.76 per cent in 2019-2020. Thus, the share of petroleum products in India's total import and India's GDP has shown fluctuated trend.

Table 2: India's Imports, Petroleum Product Imports and their share in GDP

Years	India's Imports (US\$ million)	Petroleum Product Imports (US\$ million)	GDP (US\$ million)	(India's Imports/GDP)* 100	(Petroleum Product Imports/GDP)* 100	(Petroleum Product Imports/India's Imports)* 100
1996-97	39133	333.45	392897	9.96	0.08	0.85
1997-98	41484	314.98	415868	9.97	0.07	0.75
1998-99	42389	2895	421351	10.06	0.68	6.82
1999-00	49738	3264	458820	10.84	0.71	6.56
2000-01	49975	2642	468395	10.66	0.56	5.28
2001-02	51413	1511	485441	10.59	0.31	2.93
2002-03	61412	1822	514938	11.92	0.35	2.96
2003-04	78149	2114	607699	12.85	0.34	2.70
2004-05	111517	3278	709149	15.72	0.46	2.93
2005-06	149166	6302	820382	18.18	0.76	4.22
2006-07	185735	9068	940260	19.75	0.96	4.88
2007-08	251654	15126	1216735	20.68	1.24	6.01
2008-09	303696	13557.02	1198895	25.33	1.13	4.46
2009-10	288373	7087.602	1341886	21.49	0.52	2.45
2010-11	369769	12068.33	1675615	22.06	0.72	3.26
2011-12	489319	14188.8	1823050	26.84	0.77	2.89
2012-13	490737	12589.98	1827637	26.85	0.68	2.56
2013-14	450200	12465.8	1856722	24.24	0.67	2.76
2014-15	448033	12137.98	2039127	21.97	0.59	2.70
2015-16	381008	9952.07	2103587	18.11	0.47	2.61
2016-17	384357	10613.77	2294797	16.74	0.46	2.76
2017-18	465581	13636.97	2652754	17.55	0.51	2.92
2018-19	514078	16340.79	2713165	18.94	0.60	3.17
2019-20	474709	17857.48	2869294	16.54	0.62	3.76
2020-21	394436	14770.23	2667687	14.78	0.55	3.74
2021-22 (P)	273894	25240.18	3173397	8.630	0.79	9.21

Source: Economic Survey (various issues), Petroleum Planning and Analysis Cell (Govt. of India).

Structure of Petroleum Product Imports (Sub-Category Wise)

An analysis has been made of the changes in structural composition of Petroleum product imports by measuring the shares of all sub-categories for all the years of the study period, i.e., from 1996-1997 to 2019-2020.

Table 3 provides an analysis of share of sub- categories of petroleum product in India's total imports, total petroleum products imports and GDP. The sub- categories of petroleum product whose share in India's total imports increased are LPG, Lubes and others categories throughout the study period (i.e., 1996-1997 to 2019-2020). The products such SKO and HSD also showed a high share initially but continue to decline for rest of the study period. Some products have shown more fluctuating shares in India's imports as MS, naphtha and fuel oil. There is only one category of petroleum products, i.e., ATF which showed the continuous decline in India's imports during the study period 1996-1997 to 2019-2020. The share of sub-categories of petroleum product imports in India's GDP was initially low for petroleum products such as LPG, Lubes and Other but little improvement observed in last years of the study period. Naphtha's share as percentage of India's GDP continuously increased till the year 2012-

2013 except year 2008-2009, after that it gave the fluctuating shares. The products such as fuel oil, MS, SKO and HSD also showed a high share initially but registered decline during rest of the study period whereas ATF petro-products registered continuous decline in India's imports throughout the study period 1996-1997 to 2019-2020. The structure is analyzed by considering the shares of sub-categories of petroleum product imports in India's petroleum product imports for the study period 1996-1997 to 2019-2020 is explained below:

- **Liquefied Petroleum Gas (LPG with HS code 2711)**

For the years 1996-1997 and 1997-1998, among the nine categories of petroleum product, only the share of LPG imports was high in petroleum product imports. The category of LPG imports in petroleum product imports witnessed a share which fluctuated from 10.36 percent to 30.44 percent during 1998-1999 to 2010-2011. Further, the share of LPG in petroleum product imports continuously recorded at the level which was higher than 39 percent for the rest of the study period. The highest share for LPG imports was 49 percent for 2013-2014 and the lowest share was 10.37 percent for 1998-1999.

- **Motor Spirit (MS with HS code 27100001)**

The category of MS recorded less than 5 percent growth for the study period except for the years 2010-2011, 2011-2012, 2015-2016 and 2019-2020. The highest share for MS imports in petroleum product imports was recorded for 2010-2011 year (i.e., 11.62 percent). The share of MS was highly fluctuated for the study period.

- **Naphtha (HS code 270740)**

The shares in petroleum product imports continuously register an increase from 4.22 percent during 1996-1997 to 40.01 percent for the year 2002-2003. Further, the share of imports remained less than 35 percent for the years 2003-2004 to 2012-2013 whereas its share further declined to less than 10 percent for rest of the years except 2015-2016 (14.69 percent) and 2016-2017 (11.68 percent). The highest percentage share was recorded for 2001-2002 i.e., 47.91 percent and the lowest share was 5.54 percent for 2019-2020.

- **Aviation Turbine Fuel (ATF with HS code 27101920)**

The share of ATF in petroleum product imports was negligible and less than 1.5 percent for last few years of the study period (2014-2015 to 2019-2020).

- **Superior Kerosene Oil (SKO with HS code 27101910)**

The share SKO product in petroleum product imports was recorded at the level which was higher than 20 percent for the years 1998-1999 to 2000-2001 except initial two years of study period. For the years 2001-2002 to 2011-2012, the share of SKO imports was witnessed higher than 8 percent in petroleum product imports except 2001-2002, 2004-2005 and 2011-2012. For last few years, the share declined abruptly and was less than 0.5 percent. The highest percentage share was recorded for 1999-2000 (i.e., 39.09 percent). The share was highly fluctuated and lagging throughout the study period.

- **High Speed Diesel (HSD with HS code 27101930)**

The HSD imports in petroleum product imports had recorded the share of 39.17 percent and 26.17 percent during 1998-1999 and 1999-2000 respectively. The share was less than 16 percent for the rest of the years of the study period. The HSD product imports also showed highly fluctuating and declining share throughout the study period.

- **Lube oil (Lubes with HS code 27101980)**

The shares increased continuously during the period 1998-1999 to 2005-2006 except the years 2002-2003 and 2004-2005. After that, it fluctuated for few years but again increased to 17.03 percent during 2014-2015. The share declined for the years 2015-2016 to 2019-2020 and recovered at 9.43 percent during 2019-2020. The highest share was recorded for 2013-2014 i.e., 17.03 percent and lowest share was 1.20 percent for 1998-1999 except negligible shares during 1996-1997 and 1997-1998.

- **Fuel Oil (Furnace oil with HS code 27101950)**

The share of fuel oil product in petroleum product imports increased from 4.9 percent to 22.11 percent from 1998-1999 to 2002-2003 except initial two years of study period. Further the share was recorded less than 15.94 percent for rest of the years of the study period. The highest share of fuel oil imports was 22.11 percent for the year 2002-2003.

• **Others**

The ninth category of petroleum product imports (i.e., others) recorded more than 4 percent but less than 25 percent share in India's petroleum product imports for the study period except few years (1998-1999, 1999-2000 and 2002-2003). The highest percentage share was recorded for the year 2018-2019 i.e., 25.46 percent and the lowest share was 0.03 percent for 1999-2000.

The analysis of the structure of India's petroleum product imports reveals that among nine petroleum products, LPG was the only product which India was importing with highest share (90.63 percent and 79.97 percent) during initial two years (i.e., 1996-1997 and 1997-1998). During last five years of study period, LPG share in petroleum product imports was recorded between 39 percent to 45 percent whereas the ninth category "other" of petroleum products import share fluctuated between 18 percent to 25 percent. The table reveals that the shares of imports of ATF, SKO, HSD and MS were low, declining and highly fluctuating throughout the study period whereas LPG, lubes and 'other' sub-categories of petroleum product showed the leading and increasing share for given study period. Some of the products such Naphtha and fuel oil gave the fluctuating shares in petroleum product imports in India for the study period.

Table 3: Share of Petroleum Product sub-categories in India's Imports (IM), Petroleum Products Imports (PPI) and GDP (in %)

Years	LPG			MS			Naphtha			ATF			SKO			HSD			Lubes			Fuel oil			Other		
	IM	PPI	GDP	IM	PPI	GDP	IM	PPI	GDP	IM	PPI	GDP	IM	PPI	GDP	IM	PPI	GDP	IM	PPI	GDP	IM	PPI	GDP			
1996-97	0.772	90.631	0.0769	0.002	0.249	0.0002	0.036	4.223	0.0036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.042	4.897	0.0042
1997-98	0.607	79.973	0.0606	0.018	2.394	0.0018	0.035	4.607	0.0035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.089	13.026	0.0099	
1998-99	0.708	10.363	0.0712	0.106	1.554	0.0107	0.743	10.881	0.0748	0.000	0.000	0.000	2.177	31.883	0.2191	2.675	39.171	0.000	0.000	0.000	0.000	0.000	0.000	0.335	4.905	0.0002	
1999-00	0.832	12.684	0.0902	0.000	0.000	0.000	0.909	13.848	0.0985	0.000	0.000	0.000	2.565	39.093	0.2781	1.717	26.164	0.1861	0.137	0.400	6.097	0.0434	0.400	0.002	0.031	0.0002	
2000-01	0.582	11.014	0.0621	0.000	0.000	0.000	1.795	33.952	0.1915	0.000	0.000	0.000	1.043	19.720	0.1112	0.000	0.000	0.000	0.246	10.825	0.0611	0.572	10.825	0.002	1.049	0.1119	
2001-02	0.327	11.118	0.0346	0.000	0.000	0.000	1.408	47.915	0.1491	0.000	0.000	0.000	0.158	5.361	0.0167	0.012	0.397	0.0012	0.239	20.251	0.0630	0.595	0.200	0.200	6.817	0.0212	
2002-03	0.632	21.295	0.0753	0.000	0.000	0.000	1.187	40.011	0.1416	0.000	0.000	0.000	0.270	9.111	0.0322	0.039	1.317	0.0047	0.176	22.119	0.0783	0.656	0.007	0.220	0.0008		
2003-04	0.718	26.537	0.0923	0.000	0.000	0.000	0.801	29.612	0.1030	0.000	0.000	0.000	0.244	9.035	0.0314	0.032	1.183	0.0041	0.273	15.941	0.0555	0.431	0.206	7.616	0.0265		
2004-05	0.895	30.445	0.1407	0.102	3.478	0.0161	0.754	25.656	0.1186	0.000	0.000	0.000	0.088	2.990	0.0138	0.324	11.013	0.0509	0.193	11.409	0.0527	0.335	0.248	8.450	0.0391		
2005-06	1.056	24.992	0.1920	0.196	4.649	0.0357	0.811	19.184	0.1474	0.000	0.000	0.000	0.400	9.473	0.0728	0.292	6.903	0.0530	0.443	10.870	0.0835	0.459	0.568	13.440	0.1032		

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22 (P)
4.488	0.687	0.860	0.571	0.613	0.938	1.141	1.183	1.365	1.329	1.029	1.242	1.256	1.396	1.49	1.836	4.488
48.704	14.300	12.783	24.933	28.746	39.355	39.355	46.095	49.287	49.059	39.406	44.985	42.890	43.928	39.672	49.031	48.704
0.3874	0.1357	0.1778	0.1445	0.2070	0.3063	0.3063	0.3175	0.3309	0.2920	0.1864	0.2081	0.2205	0.2646	0.2469	0.2715	0.3874
0.190	0.112	0.116	0.092	0.380	0.146	0.146	0.033	0.065	0.084	0.170	0.062	0.020	0.087	0.28	0.171	0.190
2.058	3.198	2.596	3.755	11.628	5.047	5.047	1.270	1.986	3.093	6.514	2.256	0.666	2.723	7.598	4.564	2.058
0.0164	0.0231	0.0294	0.0198	0.0638	0.0393	0.0393	0.0087	0.0133	0.0184	0.0308	0.0104	0.0034	0.0164	0.0473	0.0253	0.0164
0.350	1.821	1.252	0.357	0.393	0.413	0.413	0.345	0.218	0.166	0.384	0.323	0.271	0.270	0.208	0.131	0.350
3.798	34.649	28.045	14.520	12.040	14.254	14.254	13.434	7.875	6.134	14.700	11.681	9.244	8.510	5.545	3.509	3.798
0.0302	0.3766	0.3171	0.0767	0.0867	0.1109	0.1109	0.0925	0.0529	0.0365	0.0695	0.0540	0.0475	0.0513	0.0345	0.0194	0.0302
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	0.036	0.043	0.038	0.039	0.009	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.937	1.360	1.539	1.308	1.224	0.250	0.000	0.000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0056	0.0064	0.0071	0.0067	0.0074	0.0016	0.0000	0.0000
0.000	0.502	0.489	0.213	0.292	0.122	0.122	0.000	0.006	0.006	0.006	0.000	0.000	0.000	0.000	0.000	0.000
0.001	13.668	10.961	8.666	8.957	4.206	4.206	0.000	0.237	0.248	0.248	0.000	0.000	0.000	0.000	0.011	0.001
0.0000	0.0992	0.1703	0.1239	0.0458	0.0327	0.0327	0.0000	0.0000	0.0014	0.0012	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.021	0.900	0.724	0.462	0.407	0.224	0.224	0.103	0.016	0.024	0.024	0.114	0.142	0.070	0.341	0.067	0.021
0.226	14.974	16.213	18.787	12.471	7.725	7.725	4.026	0.594	0.893	0.921	4.129	4.836	2.206	9.075	1.796	0.226
0.0018	0.1862	0.1833	0.0992	0.0898	0.0601	0.0601	0.0277	0.0040	0.0053	0.0044	0.0191	0.0249	0.0133	0.0565	0.0099	0.0018
0.987	0.335	0.325	0.254	0.231	0.349	0.349	0.421	0.471	0.461	0.378	0.332	0.400	0.371	0.365	0.418	0.987
10.713	5.580	7.288	10.337	7.082	12.035	12.035	16.422	17.019	17.031	14.458	12.018	13.640	11.686	9.437	11.153	10.713
0.0852	0.0694	0.0824	0.0546	0.0510	0.0937	0.0937	0.1131	0.1143	0.1014	0.0684	0.0556	0.0701	0.0704	0.0587	0.0618	0.0852
1.606	0.740	0.576	0.141	0.143	0.186	0.186	0.158	0.209	0.134	0.095	0.071	0.107	0.135	0.332	0.491	1.606
17.426	12.303	12.894	5.722	4.368	6.426	6.426	6.176	7.568	4.933	3.651	2.576	3.662	4.262	8.846	13.106	17.426
0.1386	0.1530	0.1458	0.0302	0.0315	0.0500	0.0500	0.0425	0.0507	0.0294	0.0173	0.0119	0.0188	0.0257	0.0551	0.0726	0.1386
1.573	0.420	0.412	0.326	0.480	0.318	0.318	0.323	0.434	0.479	0.490	0.575	0.696	0.809	0.736	0.630	1.573
17.074	6.995	9.220	13.279	14.707	10.952	10.952	12.577	15.681	17.683	18.743	20.815	23.753	25.462	19.578	16.830	17.074
0.1358	0.1008	0.1043	0.0701	0.1059	0.0852	0.0852	0.0866	0.1053	0.1053	0.0887	0.0963	0.1221	0.1534	0.1218	0.0832	0.1358

Source: Author's calculations.

Section IV

Impact of Covid-19 on India's Petroleum Products Imports

The coronavirus (Covid-19) pandemic had a huge impact on different sectors of India. India declared its first nationwide lockdown in March 2020 in an attempt to control the situation, which caused the economic to slow down. Consequently, there was a noticeable drop in international trade. India being the major importer of crude oil in the world suffered the huge loss due to collapse of international trade activities in Covid pandemic. The tables 1, 2 and 3 showed impact of Covid-19 on petroleum products imports in India with reference to the years 2020-2021 and 2021-2022. As seen in Table 2, the share of India's total imports in GDP declined from 16.54 per cent in 2019-2020 to 8.63 per cent in 2021-2022. During the post Covid period, the share of petroleum products imports in India's GDP and in India's imports declined to 0.55 per cent and 3.74 per cent in 2020-2021 respectively as compared to 2019-2020. The shares began to revive in the year 2021-2022.

After the lockdown period, the noticeable decline was recorded in growth rate of India's total imports, petroleum product and its sub-categories in the period 1996-1997 to 2021-2022 as compared to 1996-1997 to 2019-2020 as shown in Table 1. The growth of total imports of India declined from 14.13 per cent to 12.07 per cent during the years 1996-1997 to 2019-2020 and 1996-1997 to 2021-2022 respectively. Overall, India's petroleum product imports grew at 13.93 per cent during 1996-1997 to 2021-2022 due to Covid outbreak which impacted the India's petroleum sector. As most of the sub-categories of petroleum product imports except Motor Spirit have grown at the rate of less than 50 percent for the study period 1996-1997 to 2021-2022. The category of Motor Spirit recorded with the highest growth rate (i.e., 64.8 per cent), whereas SKO imports showed the negative growth rate (-28.7 per cent) for the study period 1996-1997 to 2021-2022. During the last eight years of the study period, the growth of MS, HSD and other of sub-categories declined abruptly and negative growth was registered by Naphtha, SKO and ATF. During the sub-period 2015-2015 to 2021-2022, the sub-categories of LPG, Lubes and Fuel oil recorded highly positive growth as compared to the growth rates of sub-period 2014-2015 to 2019-2020. The table 3 regarding the structure of India's petroleum product imports reveals that decline in shares of ATF, SKO, HSD and MS products in India's imports and GDP in 2021-2022 as compared to 2019-2020. As a result of wide spread of Corona-virus, the announcement of travel restriction, ban on flights and people reduced the use of public transport. As a result of complete lockdown, most of the petroleum products such as Motor spirit, Naphtha, Aviation Turbine Fuel, High Speed Diesel, SKO and products under category of 'others' gave the declining shares in petroleum products imports in India in 2021-2022 as compared to 2019-2020. But the imports of LPG, Lubes and Fuel oil increased due to presence of their domestic demand.

Section V

Conclusion

In the light of above discussions, we found that Indian economy led to slow down with the rise of Covid-19 years. The present paper analyses India's petroleum product imports and its various sub-categories by comparing the periods 1996-1997 to 2019-2020 and 1996-1997 to 2021-2022 (impact of Covid-19), which indicates following:

- The decline in overall growth of India's imports (by 2.06%) with Covid years is recorded at higher level as compared to growth of petroleum product imports (by 1.03%).
- With the advent of Covid-19, most of the sub-categories of petroleum product imports except Motor Spirit have grown at the rate of less than 50 percent for the study period 1996-1997 to 2021-2022 whereas Motor Spirit, HSD and lubes have grown at the rate of 50 percent or more without Covid years i.e., 1996-1997 to 2019-2020.
- The highest growth rate was registered by MS which decreased from 73.1 per cent in 1996-1997 to 2019-2020 to 64.8 per cent in 1996-1997 to 2021-2022, whereas SKO imports recorded high negative growth rates during both with and without Covid years study period.
- The imports of ATF, SKO, HSD and MS recorded low and declining shares in India's petroleum product imports whereas LPG, lube oil and 'others' sub-categories experienced the increasing share throughout the study period. Some of the products such as Naphtha and fuel oil registered the fluctuating shares in petroleum product imports of India.
- The imports of sub-categories of petroleum product such as Lubes, Fuel and other have high growth (i.e., more than 30%) and also having high share (i.e., more than 20%) in India's

petroleum product imports whereas MS and HSD sub-categories have high growth but experienced low share (i.e., less than 20%) in petroleum product imports of India. Thus, MS and HSD shares in India's petroleum products have been strongly affected by the pandemic due to significant drop in the fuel demand for transportation and their use in industrial and commercial activities.

- The sub-categories of petroleum products i.e., Naphtha showed low growth (i.e., less than 30%) and are also showing low shares in petroleum products imports whereas LPG recorded with low growth but high share in India's petroleum product imports. Among the nine categories of petroleum product, only the share of LPG imports was high in petroleum product imports with and without Covid years study period due to its wider application in domestic, industrial and transport sectors of economy.
- The unprecedented situation caused by Covid-19 years had affected imports of petroleum products, thus there is a need to focus on New Energy Map of India suggested by Annual report 2020-2021 of Ministry of Petroleum and Natural Gas.

Annexure 1

HS codes	Petroleum Products
2711	Liquefied Petroleum Gas (LPG)
270740	Naphtha
27100001	Petrol/Motor Spirit (MS)
27101920	Aviation Turbine Fuel (ATF)
27101910	Superior Kerosene Oil (SKO)
27101930	High Speed Diesel (HSD)
27101980	Lube oil (Lubes)
27101950	Fuel Oil (Furnace oil)

Source: Export Import Data Bank, Govt. of India

References

1. Economic Survey (2009 and various issues), Ministry of Finance, Govt. of India.
2. Goldar, B., and H. Mukhopadhyay (1990), "India's Petroleum Imports: An Econometric Analysis", *Economic and Political Weekly*, 25(42), 2373–2377.
3. Ghosh, S. (2006), "Future demand of petroleum products in India", *Energy Policy*, 34(15), 2032–2037.
4. Jain, R. and Mukherjee (2022), "Impact of COVID-19 on Indian Petroleum Prices: March- Aug 2020". Retrieved from https://www.researchgate.net/publication/359501758_Impact_of_COVID-19_on_Indian_Petroleum_Prices_March-Aug_2020
5. AbdelMaksoud, K. M., Hathout, H. M., and Albagoury, S. H. (2021), "The socio-economic impact of COVID-19 on the petroleum sector in Egypt: a descriptive analysis", *International Journal of Social Economics*, 49(1), 21-33.
6. Marbuah, G. (2017), "Understanding crude oil import demand behaviour in Africa: The Ghana case", *Journal of African Trade*, 4(1-2), 75-87.
7. Oil and Gas Industry Report (June, 2022) Retrieved from <https://www.ibef.org/industry/oil-gas-india>
8. Pitre, V. (1981), "A Study of Trends in India's Imports, 1960-61 to 1974-75", *Economic & Political Weekly*, 16(19), 851–863.
9. Rajesh, R. (2018), "Assessing the impact of great recession on India's trade in gravity model framework", *Foreign Trade Review*, 53(4), 239-270.
10. Streifel, S. (2006), "Impact of China and India on global commodity markets: focus on metals and minerals and petroleum", *World Investment Report: Development Prospects Group*, World Bank.

11. Shelburne, R. C. (2010), "The global financial crisis and its impact on trade: the world and the European emerging economies", *Discussion Papers Series No. 2010.2*, Switzerland: United Nations Economic Commission for Europe.
12. Sarangi, U. (2014), "Euro Zone Crisis and its Implications for the Indian Economy", *Journal of International Economics*, 5(2), 30-58.
13. Soundarapandiyam, K. and M. Ganesh (2017), "An Analytical View of Crude Oil Prices and Its Impact on Indian Economy", *Journal of Business and Management (IOSR-JBM)*, e-ISSN: 2278-487X, 23–28.
14. Upadhyay, A. (2021, July 24), "Impact of Covid- 19 on Indian Economy", Times of India. Retrieved from <https://timesofindia.indiatimes.com/readersblog/mymusiclife/impact-of-covid-19-on-indian-economy-4-35585/>
15. Viswanathan, K. G. (2010), "The global financial crisis and its impact on India", *Journal of International Business and Law*, 9(41).
16. Wani, F. A., Kirmani, M. M., & Saif, S. M. (2015), "Impact of crude Oil on Indian economy", *International Journal of Modern Management Sciences*, 4(1), 11-26.

