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# Import Concentration of India's Petroleum Products

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***Abstract:*** The present paper makes an attempt to measure the concentration of India's petroleum product imports along with various sub-categories for the time period 1996-97 to 2019-20 by using the concentration ratio index. The finding exhibited that LPG, naphtha, Lubes and other sub-categories are listed among top four product concentrated sub-categories due to the wider application in different sectors of Indian Economy. Overall the country concentration measures depicted that India's import of LPG, Naphtha, Lubes are less concentrated (i.e., diversified) during the last six years of the study period.

***Keywords:*** Product Concentration, Country Concentration, India, Petroleum Products, Imports.

***JEL codes:*** C43, F10, Q4

## 1. INTRODUCTION

Energy is the prerequisite for sustaining economic growth of a country and vital for the sustenance of a modern economy. For any developing economy, an effective strategy for the energy sector is an important element of its overall economic strategy. With rapid economic development, there has been a rampant increase in the energy demand in the country. Crude oil and coal account for nearly two thirds for the total energy demand in India. The growing economy and population growth are the main drivers of crude oil demand increasing every year (Annual Report 2019-2020, Ministry of petroleum and natural gas). Crude oil and petroleum products drive the economy and also are regarded as essential contributors for economic and political development. Today, India has become the third largest energy and oil consumer in the world. India meets majority of its oil demand through imports and purification of crude oil is done in India. India is the third largest consumer of petroleum products, after US and China

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and fourth largest refiner in the world after US, China and Russia with the refining capacity of 249.366 MMT in year 2019-2020 (BP statistical review of world energy, 2018). However, the appropriate supplies of crude oil and its products (Liquefied Petroleum Gas, Kerosene, Gasoline and other products) are necessary for development of India's domestic, industrial, agricultural and transportation sectors (Marbuah, 2017 & Soundarapandiyan and Ganesh, 2017). The refined petroleum products are used as fuel for road and air transportation as well as to generate electricity for houses and to run machinery. It also serves as raw material to make fertilizer to enhance food production and to produce plastic, solvents, polymers and other intermediate goods used in our daily life (PPAC report, 2020). Over the 24 years period, 1996-1997 to 2019-2020, India's imports and petroleum product imports increased at rate of 14.13 per cent and 14.96 per cent respectively. LPG is the only product which accounted for more than 40 per cent share in India's petroleum product imports (Kaur and Meenu, 2022).

## 2. REVIEW OF LITERATURE

The existing literature is based upon product and market concentration measures conducted at national and international level. The limited literature was found on commodity and country concentration of petroleum product imports of India but some of the studies are reviewed to have an idea about the measures of concentration. Erlat and Akyüz (2001) measured the country and commodity concentration of Turkish exports and imports for the time period 1969-1999. The commodity concentration was measured by the Concentration Ratio and found that after 1980 a structural downward shift was observed in country concentration of exports to its trading partners and no such shift was observed in the case of imports. Thus, study concluded that country concentration of imports were more stable than country concentration of exports. Meilak (2008) analyzed the export concentration for goods and services with the help of eight concentration indices for the year 1980-2004. The study exhibited that higher concentration of exports were observed more in the smaller states than in the larger states. Likewise, the higher concentration ratios in the services groups were also existed in small states. Malhotra and Meenu (2010) analyzed the growth, structure and concentration of India's imports for the period 1986-87 to 2009-10. The results of discrete concentration measures (i.e., Concentration Ratio) gave the highest concentration values than summary and CCI measures for India's imports. Mineral products appeared as a commodity among the top four and eight categories in the study. Ipek and Ipek (2018) examined the market structure of the Turkish pharmaceutical sector for the time period 2009-2016 with the help of various market concentration indices and revealed that the pharmaceutical sector had a low concentration in the market during the period. Meenu and Bisht (2018) analyzed the growth, structure and concentration of manufactured

goods exports of India for the time period 1991-1992 to 2013-14. The study showed that total exports of India increased by 18.1 per cent and exports of manufactured goods grew at 16.8 per cent during the study period. It was found under India's manufactured goods exports, CR (4) gave the highest concentration figures than summary and CCI measures.

With this background, the present paper makes an attempt to empirically analyze the concentration of India's import of petroleum products and its sub-categories. The paper discusses database and methodology in the subsequent section followed by results of Concentration of India's petroleum product imports and conclusion.

## 3. DATA SOURCES AND METHODOLOGY

Data for India's imports of petroleum product, its sub-categories and country level data have been collected from Petroleum Planning and Analysis Cell (PPAC, Ministry of Petroleum and Natural Gas) and Export Import Data Bank (Ministry of Commerce and Industry) for estimating product and market concentration. It covered the study period 1996-1997 to 2019-2020.

### 3.1. Concentration of India's Petroleum Product Imports

By Concentration means petroleum product imports are controlled by a small number of leading petroleum products (product concentration) or leading markets (country concentration). The study computed the product and country concentration for sub-categories of petroleum product import of India.

The most popular and simplest index for the measurement of concentration is Concentration Ratio which is used in study. The concentration measure is constructed with the shares of individual elements. The individual elements are taken as the trading partners of India's petroleum products imports in this study for country concentration and number of petroleum products in case of product concentration. Let m denote the number of the trading partners or number of products and $q_{it}$ represents the import from the $i^{th}$ partner country or import of $i^{th}$ product at time t. Then the sum of $q_{it}$ from 1 to m will be $q_t$ and the share of each country/commodity in imports of India for year t, would be expressed as:

$$p_{it} = q_{it}/q_t \quad (1)$$

Where, i = 1,..., m and t = 1,...,T

In this study m is equal to number of products i.e., 9 sub-categories of petroleum product imports undertaken in case of measuring product concentration and T is equal to 24 years. The nine sub-categories of petroleum products import considered in the study are presented in Kaur and Meenu (2022). For calculating country concentration, India's top four concentrated petroleum product imports are considered where; m is

equal to number of countries from which India is importing petroleum products i.e., 73 countries for LPG, 54 countries for Naphtha, 83 countries for Lubes and 64 countries for HSD. As per the time period, number of years of data availability for foresaid products is also different. In case of LPG and Naphtha, the import data are available for 24 years of the study period (i.e., 1996-19967 to 2019-2020) and in case of Lubes and HSD data are available for 14 years (i.e., 2006-2007 to 2019-2020).

Therefore, a value for pit is calculated for each product/country at time t. The concentration measure below is based on $p_{it}$. Concentration Ratio (CR) shows the total share of k products (or countries) which have the largest shares in total petroleum (nine petroleum products) imports of a commodity group. It is denoted by CR (k) and calculated as,

$$CR(k)_t = \sum_{i=1}^{m} p_{it} \quad (2)$$

Where, k<m

The present study computed CR (4) to find top four concentrated sub-categories of India's petroleum product imports and further considered CR (4) petroleum products imports for the analysis of country concentration (Erlat and Abyuz, 2001; Malhotra and Meenu, 2010).

## 4. RESULTS

The present section is devoted to calculate the extent of product and country concentration for India's imports of petroleum product and its sub-categories for the study period 1996-1997 to 2019-2020.

### 4.1. Product Concentration

The Concentration Ratio (CR 4) measures the concentration of top four sub-categories of petroleum product imports are represented in **Table 1**. In case of CR (4), the top four petroleum product imports are LPG, Naphtha, Other and Lubes. CR (4) figures are higher than 0.67 for all the years of the study period and concentration figures are fluctuating between 0.92 and 0.82 for the years 1998-1999 to 2003-2004. During the initial two years of time period, petroleum products imports are highly concentrated with value one for the top four sub-categories. For the years 2004-2005 to 2011-2012, the CR figures fluctuated between 0.78 and 0.67 but concentration values increased and remained more than 0.87 for the period 2012-2013 to 2018-2019. The concentration again dropped to 0.77 in the year 2019-2020 for India's petroleum product imports.

The analysis gave an idea about highly concentrated India's petroleum products imports during first four years of the study period. The concentration showed fluctuations with some declining figures during 2000-2001 to 2011-2012 but remained higher than 85 per cent during 2012-2013 to 2018-2019.

**Table 1: Concentration Figures for India's Petroleum Product Imports**

| *Years* | *CR (4)* | *Years* | *CR (4)* |
|---|---|---|---|
| 1996-1997 | 1.00 | 2008-2009 | 0.69 |
| 1997-1998 | 1.00 | 2009-2010 | 0.71 |
| 1998-1999 | 0.92 | 2010-2011 | 0.67 |
| 1999-2000 | 0.91 | 2011-2012 | 0.76 |
| 2000-2001 | 0.84 | 2012-2013 | 0.88 |
| 2001-2002 | 0.87 | 2013-2014 | 0.89 |
| 2002-2003 | 0.92 | 2014-2015 | 0.89 |
| 2003-2004 | 0.82 | 2015-2016 | 0.87 |
| 2004-2005 | 0.78 | 2016-2017 | 0.89 |
| 2005-2006 | 0.68 | 2017-2018 | 0.89 |
| 2006-2007 | 0.71 | 2018-2019 | 0.89 |
| 2007-2008 | 0.73 | 2019-2020 | 0.77 |

*Source:* Author's calculations.

**Table 2: Frequency and Position- wise Petroleum Product Imports**

| *Products* | *CR (4)* | *Position-wise Number of Years* | | | |
|---|---|---|---|---|---|
| | | *First* | *Second* | *Third* | *Fourth* |
| LPG | 24 | 1996-97 to 1997-98, 2004-05 to 2005-06, 2009-10 to 2019-20 (15) | 02 | 03 | 04 |
| Naphtha | 23 | 2000-01 to 2003-04, 2006-07 to 2008-09 (07) | 03 | 1996-97 to 1999-2000, 2009-10, 2012-13, 2015-16 (07) | 06 |
| Other | 16 | - | 1996-97 to 1997-98, 2000-01, 2010-11, 2014-15 to 2019-20 (10) | 02 | 04 |
| Lubes | 11 | - | 02 | 2011-12, 2014-15, 2016-17 to 2019-20 (06) | 03 |
| HSD | 8 | 01 | 1999-2000, 2007-08 to 2009-10 (04) | 01 | 02 |
| Fuel Oil | 7 | - | 02 | 2003-04 to 2004-05, 2006-07, 2008-09 (04) | 01 |
| SKO | 5 | 01 | 01 | 01 | 2002-03, 2007-08 (02) |
| MS | 2 | - | - | - | 1996-97 to 1997-98 (02) |
| ATF | 0 | - | - | - | - |

*Source:* Author's calculations. LPG= Liquefied Petroleum Gas, HSD= High Speed Diesel, SKO= Superior Kerosene Oil, MS= Motor Spirit, ATF= Aviation Turbine Fuel

**Table 2** shows the frequency of India's import of petroleum product under CR (4). Among the nine categories of petroleum products, LPG, Naphtha, other and Lubes are listed as the top four sub-categories of petroleum product imported in India for 24 years, 23 years, 16 years and 11 years respectively during the study period 1996-1997 to 2019-2020. It also showed the shifts in the position of concentrated commodities listed on the top four positions of petroleum product imports for different years of the study period. The LPG category is registered on first position for maximum fifteen years of the study period which included last eleven years and initial two years of the study period. The import of naphtha product dominated both first position and third position for maximum seven years. The category 'other' of petroleum product imports was at second position for maximum ten years of the study period. The imports of Lubes remained at the third position for maximum six years and last four years of study period. The HSD import was at first position for 1998-1999 whereas it was at fourth position for 2019-2020 and 2004-2005 years of study period. The imports of Fuel oil and SKO remained at third and fourth position for maximum four years and two years respectively. The MS category was only present at the fourth position for two years i.e., 1996-1997 and 1997-1998.

The analysis showed that the LPG imports remained at first position and imports of other category remained at second position. The naphtha and HSD imports demoted to fourth position whereas lubes promoted to third position for last few years of study period. The relative position of the top four commodities kept on shifting for the study period and for last five years, top three position are clearly held by LPG, other and Lubes.

### 4.2. Country Concentration

The country concentration helps to find out the top trading countries/regions which are capturing the maximum share of imports. A country that imports from only one trading partner has a perfectly concentrated trade portfolio. Conversely, a country that trades with a large number of trading partners has more diversified imports.

Table 3 depicted the India's country concentration of top four concentrated sub-categories of petroleum product imports i.e., LPG, Naphtha, Lubes and HSD except ninth category "other" because it is difficult to locate seventeen plus products HS codes to measure country concentration.

Table 3 reveals that during the study period the country concentration of India's LPG imports, CR (4) has decreased from 0.93 to 0.70, which gives an idea about diversified market structure of India's LPG imports. The measure of concentration for India's LPG imports represented the fluctuating figures for the years 1996-1997 to 2001-2002 and decline continuously till 2008-2009. Concentration again increased till the year 2014-

**Table 3: Country Concentration of India's Imports of LPG, Naphtha, Lubes and HSD**

| *Years* | *LPG* | *Naphtha* | *Lubes* | *HSD* |
|---|---|---|---|---|
| 1996-1997 | 0.93 | 0.59 | NA | NA |
| 1997-1998 | 0.89 | 0.65 | NA | NA |
| 1998-1999 | 0.94 | 0.80 | NA | NA |
| 1999-2000 | 0.91 | 0.68 | NA | NA |
| 2000-2001 | 0.84 | 0.83 | NA | NA |
| 2001-2002 | 0.93 | 0.91 | NA | NA |
| 2002-2003 | 0.91 | 0.71 | NA | NA |
| 2003-2004 | 0.89 | 0.77 | NA | NA |
| 2004-2005 | 0.85 | 0.75 | NA | NA |
| 2005-2006 | 0.85 | 0.86 | NA | NA |
| 2006-2007 | 0.78 | 0.90 | 0.54 | 0.77 |
| 2007-2008 | 0.68 | 0.83 | 0.68 | 0.83 |
| 2008-2009 | 0.63 | 0.92 | 0.48 | 0.87 |
| 2009-2010 | 0.76 | 0.76 | 0.57 | 0.75 |
| 2010-2011 | 0.84 | 0.81 | 0.62 | 0.83 |
| 2011-2012 | 0.81 | 0.73 | 0.60 | 0.95 |
| 2012-2013 | 0.84 | 0.82 | 0.55 | 0.97 |
| 2013-2014 | 0.92 | 0.66 | 0.54 | 0.70 |
| 2014-2015 | 0.89 | 0.62 | 0.56 | 0.71 |
| 2015-2016 | 0.82 | 0.67 | 0.49 | 0.86 |
| 2016-2017 | 0.78 | 0.58 | 0.44 | 0.88 |
| 2017-2018 | 0.74 | 0.61 | 0.52 | 0.82 |
| 2018-2019 | 0.71 | 0.74 | 0.52 | 0.88 |
| 2019-2020 | 0.70 | 0.75 | 0.50 | 0.74 |

*Source:* Author's calculations. NA: data not available.

2015 except minor fluctuation and during the last five years the concentration declined for India's LPG imports except minor fluctuations. The highest figure in CR (4) of LPG was 0.94 for year 1998-1999 and 0.63 was lowest for the year 2008-2009. The country concentration of India's Naphtha imports witnessed an increase from 0.59 to 0.92 for the years 1996-1997 to 2001-2002, except minor fluctuations. During 2002-2003 to 2019-2020, the index gives fluctuating concentration figures and it was 0.75 during 2019-2020. The highest figure in CR (4) for Naphtha was 0.92 for year 2008-2009 and 0.58 was lowest for the year 2016-2017. The concentration figures for India's Naphtha imports recorded noticeable decline after global crisis of 2007-2008. The import data of Lubes and HSD are available from year 2006-2007 instead of year 1996-1997 which makes the number of years as 14. Table 3 reveals that concentration figures are more than 0.44 in case of CR (4) for India's Lubes import during the years 2006-2007 to 2019-2020. For the years 2006-2007 to 2010-2011, CR (4) for India's Lubes import showed

continuous increase in figures except the year 2008-2009 and further figures tends to decline continuously except for the years 2014-2015 and 2017-2018. During the year 2007-2008, CR (4) gave the highest concentration figures at 0.68 and lowest in 2016-2017 with 0.44 for Lubes imports. The country concentration of India's HSD imports as per CR (4) figures increased from 0.70 to 0.97 for the years 2006-2007 to 2019-2020, except decline in years 2009-2010, 2013-2014, 2017-2018 and 2019-2020. The highest figure in CR (4) for HSD was 0.97 for year 2012-13 and 0.70 was lowest for the year 2013-14.

**Table 4: Destination-wise Frequency and Position-wise Top Four Countries for India's LPG Imports**

| *Countries* | *CR (4)* | *Position-wise Number of Years* | | | |
|---|---|---|---|---|---|
| | | *First* | *Second* | *Third* | *Fourth* |
| Saudi Arab | 24 | 1996-97 to 2005-06 (10) | 2006-07 to 2013-14, 2015-16 to 2018-19 (12) | 02 | - |
| Kuwait | 14 | - | 1997-98 to 2001-02 (05) | 03 | 2004-05, 2009-10 to 2010-11, 2012-13 to 2014-15 (06) |
| United Arab Emirates (UAE) | 20 | - | 04 | 1998-99 to 1999-2000, 2004-05, 2007-08, 2009-10 to 2013-14, 2015-16 to 2018-19 (13) | 03 |
| Qatar | 16 | 2006-07 to 2019-20 (14) | 02 | - | - |
| Nigeria | 7 | - | - | 01 | 2011-12, 2015-16 to 2019-20 (6) |
| Malaysia | 6 | - | - | 02 | 2002-03 to 2003-04, 2005-06, 2007-08 (04) |
| Baharain IS | 2 | - | 01 | - | 01 |
| Iran | 2 | - | - | - | 02 |
| Yemen Republic | 2 | - | - | 01 | 01 |
| France | 1 | - | - | 01 | - |
| Indonesia | 1 | - | - | - | 01 |
| South Africa | 1 | - | - | 01 | - |

*Source:* Author's calculations.

**Table 5: Destination-wise Frequency and Position-wise Top Four Countries for India's Naphtha Imports**

| *Countries* | *CR (4)* | *Position-wise Number of Years* | | | |
|---|---|---|---|---|---|
| | | *First* | *Second* | *Third* | *Fourth* |
| Denmark | 23 | 1996-97 to 1997-98, 1999-2000, 2003-04 to 2005-06, 2008-09, 2014-15 to 2015-16, 2017-18 to 2019-20 (12 ) | 03 | 06 | 02 |
| Russia | 14 | 02 | 1996-97 to 1997-98, 2009-10 to 2010-11, 2012-13, 2014-15, 2017-18, 2019-20 (08) | 01 | 03 |
| Ukraine | 13 | 2006-07 to 2007-08, 2010-11, 2012-13 to 2013-14 (05) | 04 | 03 | 01 |
| Czech Republic | 12 | - | 02 | 2007-08 to 2008-09, 2010-11 to 2011-12, 2014-15 (05) | 2001-02, 2004-05 to 2006-07, 2012-13 (05) |
| Spain | 4 | - | 01 | 02 | 01 |
| Saudi Arab | 4 | 01 | 2000-01 to 2002-03 (03) | - | - |
| UAE | 4 | 02 | 01 | - | 01 |
| Korea RP | 3 | - | - | 01 | 02 |
| Japan | 3 | - | - | 01 | 02 |
| Australia | 3 | - | - | 01 | 02 |
| Baharain IS | 3 | 01 | 01 | 01 | - |
| China RP | 2 | - | 01 | - | 01 |
| Pakistan IR | 2 | - | - | - | 02 |
| Brazil | 1 | - | - | 01 | - |
| France | 1 | - | - | - | 01 |
| Egypt A Republic | 1 | 01 | - | - | - |
| Germany | 1 | - | - | 01 | - |
| Iran | 1 | - | - | 01 | - |
| Yemen Republic | 1 | - | - | - | 01 |

*Source:* Author's calculations. Korea RP= People's Republic of Korea, China RP= People's Republic of China

**Table 4** and **5** gives the destination-wise frequency of India's LPG and Naphtha imports under CR (4). Here, CR (4) determines the sum of the share of the top four countries of the India's LPG and Naphtha imports for the years 1996-1997 to 2019-

2020. Out of twelve countries which appeared under concentration ratio (4), the countries Saudi Arab, UAE, Qatar and Kuwait maintained their positions in top four import destinations of the India's LPG imports for 24 years, 20 years, 16 years and 14 years respectively. The Qatar has registered with first position for the last fourteen years of the study period. Saudi Arab occupied second position for maximum twelve years whereas it was at first position during initial ten years of the study period. The third position was dominated by UAE for maximum thirteen years. Kuwait registered with fourth position for six years but for the initial five years of study period was at the second position. The comparison of recent and initial years of the study period depicts that Qatar reached the first position, UAE promoted from fourth to second position whereas Saudi Arab demoted to third position and Kuwait to fourth position. Table 5 represented out of nineteen countries, top four positions for import destinations of India's Naphtha imports are captured by Denmark (23 years), Russia (14 years), Ukraine (13 years) and Czech Republic (12 years). Denmark has registered first position for the maximum twelve years and third position for maximum six years of the study period. Russia recorded maximum eight years on second position. Czech Republic occupied fourth position for maximum five years. While comparing the recent and initial years of the study period, the present concentration positions of the countries such as Denmark, Russia and Ukraine remained at first, second and third positions respectively whereas Czech Republic promoted to third position.

**Table 6: Destination-wise Frequency and Position-wise Top Four Countries for India's Lubes Imports**

| *Countries* | *C R (4)* | *Position –wise Number of Years* | | | |
|---|---|---|---|---|---|
| | | *First* | *Second* | *Third* | *Fourth* |
| Korea RP | 12 | 03 | 2010-11 to 2015-16, 2019-20 (07) | 01 | 01 |
| Singapore | 11 | 2006-07, 2008-09 to 2013-14 (07) | 01 | 01 | 02 |
| Germany | 9 | - | 2006-07, 2008-09 to 2009-10 (03) | 2007-08, 2010-11, 2019-20 (03) | 2011-12 to 2012-13, 2017-18 (03) |
| U S A | 9 | - | - | 03 | 2007-08, 2009-10 to 2010-11, 2013-14 to 2015-16 (06) |
| Japan | 7 | 01 | 02 | 2014-15 to 2016-17 (03) | 01 |
| France | 4 | 02 | 01 | 01 | - |
| UAE | 3 | - | - | 02 | 01 |
| Netherland | 1 | 01 | - | - | - |

*Source:* Author's calculations.

**Table 7: Destination-wise Frequency and Position-wise Top Four Countries for India's HSD Imports**

| *Countries* | *CR (4)* | *Position –wise Number of Years* | | | |
|---|---|---|---|---|---|
| | | *First* | *Second* | *Third* | *Fourth* |
| Singapore | 11 | 2006-07 to 2012-13 (07) | 01 | - | 2015-16, 2017-18, 2018-19 (03) |
| UAE | 8 | 2015-16 to 2019-20 (05) | 01 | 01 | 01 |
| Baharain IS | 7 | 01 | 2008-09, 2010-11 to 2011-12, 2014-15 (05) | 01 | 01 |
| Malaysia | 6 | 01 | 2017-18 to 2019-20 (03) | - | 02 |
| China RP | 6 | - | 01 | 2012-13 to 2013-14 and 2016-17 to 2017-18 (04) | 01 |
| Taiwan | 4 | - | 02 | 01 | 01 |
| Indonesia | 3 | - | - | 01 | 02 |
| Oman | 3 | - | 01 | 02 | - |
| Japan | 3 | - | - | 02 | 01 |
| Korea RP | 2 | - | - | 02 | - |
| Norway | 1 | - | 01 | - | - |
| Saudi Arab | 1 | - | - | - | 01 |
| Marshall Island | 1 | - | - | - | 01 |

*Source:* Author's calculations.

Table 6 and **7** exhibited the top four positions for import destinations of India's Lubes and HSD imports during the study period 2006-2007 to 2019-2020. In case of Lubes, the positions are captured by People's Republic of Korea (12 years), Singapore (11 years), Germany (9 years) and USA (9 years) and as per HSD, these are found to be Singapore (11 years), UAE (8 years), Baharain IS (7 years) and Malaysia (6 years). As per imports of Lubes, Singapore and People's Republic of Korea has registered first and second positions for maximum seven years each respectively. USA and Germany registered third position for maximum three years and the fourth position was dominated by USA for maximum six years of the study period. While comparing the recent and initial years of the study period for India's Lubes import, the present concentration positions of the countries such as People's Republic of Korea promoted from fourth to first position whereas Singapore and USA demoted to fourth position and Germany demoted to third position. In case of HSD imports, Singapore has captured first position for the initial seven years of the study period whereas it occupied fourth

position for maximum three years of the study. The second position was dominated by Baharain for maximum five years and third position was occupied by People's Republic of China for four years. Thus, top four countries import destinations of India's HSD imports kept on shifting for the study period. As per HSD imports shown in table 7, Baharain and Malaysia were promoted to second position, UAE promoted from second to first position and Singapore got demoted to fourth position from first position.

## CONCLUSION

Considering the petroleum product sector as one of the most important sectors, the present paper analyses India's petroleum product imports and its various sub-categories for the years 1996-1997 to 2019-2020, which indicates following:

- According to commodity Concentration Ratio (4) measure, the top four sub-categories of petroleum product imported in India during1996-1997 to 2019-2020 were Liquified Petroleum Gas, Naphtha, others and Lubes (Lubricating oil). The relative position of the top four commodities kept on shifting for the study period and for last five years, top three position were clearly held by LPG, others and Lubes.
- India's top four concentrated petroleum product imports exhibited different top four concentrated countries except UAE (commonly appeared in case of LPG and HSD) and Singapore (in case of Lubes and HSD).
- Thus imports of petroleum products are playing significant role in strengthening the base of domestic as well as export market by fulfilling the demand of India's agriculture, manufacturing and transportation sectors. Further working out bilateral trade agreements for concentrated petroleum product imports in case where no such agreement exists is a scope of future research.

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