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Crude oil import of India from its major oil trade partner countries: An empirical evidence using panel data analysis

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Abstract
Considering United Arab Emirates, Nigeria, Kuwait, Saudi Arabia, Iran, Iraq, Venezuela, Malaysia, Mexico, Qatar, Brazil for the time period 2000 to 2014 as the major crude oil trading partner of India effort has been made in this study to estimate crude oil import function of India using identified macroeconomic factors viz. GDP per capita, crude oil consumption and production and FDI of respective countries. Using fixed effect model of panel data analysis in terms of pooled OLS using country specific dummy and their interaction with macroeconomic factors, allowing intercept and slope coefficient to vary across countries we estimated the crude oil import function for India. Our findings show that UAE remained relatively most preferred nation than Saudi, Iraq, Iran and Malaysia for India in terms of import of crude oil; controlling all other factors except GDP per capita. UAE remained relatively and significantly least preferred nation for India than Nigeria, Iran, Mexico, and Venezuela to import crude oil. GDP per capita play important role in predicting crude oil import of India with UAE being relatively most preferred nation than Venezuela, and Kuwait other things remaining constant. We suggest that macroeconomic planners, policy makers, and crude oil import companies need to take judicious decisions in implementing oil import policies and import of crude oil from these major import partner of India.

Keywords: crude oil, GDP per capita, FDI, trade, panel data

1. Introduction
Crude oil is regarded as the most critical energy source globally. Aviation and motor gasoline, naphtha, kerosene, jet fuel, distillate fuel oil, residual fuel oil, liquefied petroleum gas, lubricants, paraffin wax, petroleum coke, asphalt and other products are obtained from the processing of crude oil. Furthermore, these byproducts are used as feedstock for the manufacture of petrochemicals such as plastics, polystyrene, polyethylene, and many other products that are used in our daily lives. Crude oil hence forms the basis for a whole spectrum of industries ranging from automobiles to pharmaceuticals. The price movements in crude oil therefore directly affect the prices of lubricants, petrochemicals, fertilizers, paints, transportation costs, and have a direct bearing on our economy. As a result, oil prices and their volatility have substantial impact on exchange rate, industrial production, and the economy. Additionally, exchange rate also impacts the oil prices especially for oil exporting and importing nation.
Therefore, global crude oil production and consumption gap continue rising day by day. In India crude oil consumption also increasing but production of crude is very less i.e. India is depending on its import partner countries for crude oil. All most all the countries depend on crude oil. This is why prices of oil matter to almost every economy. The crude oil price of the Indian basket was around USD108 per barrel during late May 2014. The same price stood around 56 per cent lower, at around USD 48 per barrel just after three years. India's dependence on crude oil import has been rising continuously. India imported around 82.1 per cent of its total consumption of crude oil during 2016-17. Indian's real GDP has been growing by 5-10% per year. Oil consumption is strongly linked to economic growth. Petroleum has no large scale substitute, so as countries improve and install more wide-ranging transportation systems, oil demand increases. Since 2005, India has been responsible for 20 per cent of incremental global oil demand increase. India imports the great bulk of its crude oil, and 65% which come from the Middle East.
The Indian economy is at a serious stage of expansion. During 2014-15, the growth rate of Gross Domestic Product (GDP) at constant prices is estimated to have increased by 7.3 per cent. The revival in growth of the industrial sector and softening of international prices of crude oil led to increase in demand for petroleum products by 4.15% during April-March, 2014-15 over the same period last year. The crude oil production for the year 2014-15 is decreasing of about 0.87% against last year. Oil imports during August, 2015 was 42.59 per cent lower than oil imports conforming period last year. Oil imports during April-August, 2015-16 were esteemed at USD 41502.37 million which was 38.79 per cent lower than the oil imports of USD 67805.81 million in the agreeing period last year.
So Indian economy depends on its GDP which depends on crude oil price, so crude price is most important while India import from different countries are concerned and those countries economy also depend on crude oil price, production, import and export. So far as India crude oil import from different countries is concerned, 80% crude oil is imported by India and only 20% crude oil is domestically produced by

Indian PSUs companies like ONGC, OIL and other private players. Crude oil in India is refined and processed by different PSUs companies like IOCL, BPCL, HPCL and private players like Reliance and Essar. Indian is one of the major importer of crude oil in the world. Mainly from Middle East India importing crude oil. Besides now India is also importing crude oil from Latin America, Africa and Asia-Pacific also.

Thus in line with this effort has been made to study India's crude oil trade relationship with its major crude oil import partners and to study determinants of crude oil import by India from its major trading partner countries.

The remaining part of the paper is as follows. We conducted a literature review keeping in mind the objective of the study which shows that crude oil import function of India has rarely been studied by scholar, which has been presented in section 2. Considering major 11 oil trade partner country of India for the time period 2000 to 2014, we used fixed effect panel data model, which is described in section 3. India's oil trade relationship has been examined in section 4 followed by result and discussion in section 5. The conclusion and policy suggestion being most important part of this study has been presented in section 6.

2. Literature Review

Crude oil is the most indispensable commodity and also the most traded product which influences an economy. About 35 percent of the world's primary energy consumption is met by oil, followed by coal at 25 percent and natural gas at 21 percent (EIA, 2013). The abundance of natural resources, particularly crude oil, has been often described as a blessing to many nations since its presence is said to spur economic growth, by encouraging investment, both foreign and domestic for the economic exploitation of the natural resource (Riman, Akpan & Effiong, 2013) [16]. However, the consequences of oil price increase impacts differently amongst countries. Ceteris Paribus, oil price increase generally is considered to have a positive impact for oil exporting countries and a negative impact for oil importing countries, while the converse should be expected when the oil price decreases. Riman, *et al.*, (2013) [16] noted that shortfall on oil revenue occasioned by fluctuations in international oil prices had often led to deficit in the Nigeria's budget. Such deficits were usually financed by external commercial or internal borrowings or through downward adjustments in sectorial budgetary outlay and expenditure allocations, thereby negatively impacting the country's economic growth (Riman, *et al.*, 2013) [16].

Smith (2009) [17] opined that oil market is well driven by the factor of demand and supply and market fundamentals, which influence the oil price due to which market sometimes faces shocks and these shocks whether in long run or short run not only affects the price volatility of oil but also creates an imbalance in the economy. Hamilton (2008) [9] explored three broad ways to understand the crude oil price scenario, the first being the statistical investigation of the basic correlations in historical data, second how oil prices should behave over the time and third understanding the demand and supply factor. Tang, Wu & Zhang's (2010) [18] investigated the short-term and long-term effects of Oil Price Shocks on the Chinese Economy uses a structural VAR approach to understand and quantify the nature and extent of the impact of oil prices on China's Economy. They observed that an oil-price increase negatively affects output and investment, but positively affects inflation rate and interest rate.

Bhanumurthy, Das & Bose (2012) [1] explored the impact of transmission of international crude oil prices and domestic oil price pass-through policy (Administered Prices) on major macroeconomic variables in India using a macroeconomic policy simulation model. They observed that given the current policy, one-time oil shock has adverse impact on growth and inflation in the year of shock and is mitigated slowly over time and the oil shock and with current partial pass-through regime, a 10 percent rise in oil prices result in a 0.6 percent fall in growth while in the full pass-through situation, it can reduce the growth by 0.9 percent. Jimenez-Rodriguez and Sanchez (2005) [10] have a view that oil consumption is affected indirectly through its positive relationship with disposable income. The magnitude of this effect is in turn stronger the more the shock is perceived to be long-lasting.

It is widely accepted that fluctuations in the price of oil have significant effects on the macroeconomic indicators of a country. Due to the fact that oil is an important input for various key industries, the fluctuations in prices indeed have significant repercussion. According to Hamilton (1983) [7], oil price increases seem to be one of the main cause of recessions in USA prior to 1972. Using a vector auto regression (VAR) framework Hamilton (1983, 1996) [7, 8] found a strong causal and negative correlation between oil price change and real U.S. GNP growth from 1948 to 1980, i.e. whenever the oil price increased, the US GNP reduced. The study of Mork & Olson (1994) [14] opined that any oil price change regardless of direction causes some costly resource allocation. Thus, if oil price upturns result in the reallocation of resources an investment from other sectors to the oil industry, price downturns exerted an opposite effect.

Analysis of the industry-level effects of oil price changes warrants understanding of the oil price transmission mechanisms. Lee & Ni (2002) [13] estimating the effects of exogenous oil price shocks using U.S. industry-level data found that oil price shocks act mainly as supply shocks for oil-intensive industries, such as petroleum refineries, and as demand shocks for other industries. Cobo-Reyes, *et al.*, (2005) [3], observing the relationship between oil price shocks, industrial production and stock returns using a Markov switching model observed that the oil price has a negative and statistically significant effect on both industrial production and stock returns but find stronger effect on stock returns than industrial production.

Eksi, *et al.*, (2011) [5] reexamining the relationship between oil prices and industrial production in selected OECD countries, using a VAR and causality approach explored that there is a statistically significant short-term causality relation from crude prices to industrial production for all examined OECD countries except France. They also observed a long run oil price to industrial production causality for U.S. Fukunaga, *et al.*, (2009) [6] studying the effect of Oil price changes on industry-level production and prices on U.S. and Japan and using VAR models observed that unexpected disruptions of oil supply leading to oil price shocks act mainly as negative

supply shocks for oil intensive industries (petroleum companies) and act mainly as negative demand shocks for less oil-intensive industries.

Sharma (2012) studied the relationship between the economic growth and crude oil price and further brought relationship between crude oil price with inflation rate and how the monetary measures of central bank of India helped to control the impact of crude oil price on Indian economy. His study included the government policies to control the crude imports. Nair (2012) observed increasing import bill of India which has majorly increased due to high demand of crude oil along with gold. Koyama (2011) [12] explored the effects of sudden oil price shocks and how oil producing countries deal with the problem also and how these world shocks affects world economy as well as national economy. Grant (2006) [11] have a view that the major reason for increase in oil price is the globally growing economies that have huge demand for oil but the supply side of the oil producing countries are weak as they are not able to keep up the pace with the rapidly growing demand worldwide.

Most of the scholars have studied the oil price change and its impact on macroeconomic variables. Few of them have also analyzed the crude oil market and demand and supply gap of crude oil. Studies on import of crude oil from various trade partner countries have rarely been observed in the literature. This study attempted to bridge this gap by estimating crude oil import function for India.

3. Research Methodology and Data

In this study we have consider 11 import partner countries of India viz. United Arab Emirates, Nigeria, Kuwait, Saudi Arabia, Iran, Iraq, Venezuela, Malaysia, Mexico, Qatar, Brazil for the time period 2000 to 2014 to estimate crude oil import function of India using identified macroeconomic factors. We consider crude oil import (Yit) by India from different countries as a dependent variable and GDP per capita (X2it) of those countries, crude oil consumption (X3it) and production (X5it) of those countries and FDI (X4it) of those countries as independent variables. We generated dummy variables for each countries and within these countries UAE we considered as a base country with which other country are compared. Then, we generated interaction dummy through multiplication of dummy variable with independent variables.

We used fixed effect model of panel data analysis in terms of pooled OLS using country specific dummy and their interaction with macroeconomic factors to allow intercept and slope coefficient to vary across countries. Thus estimating the panel data models effort has been made to establish the relationship between crude oil import by India from its partner countries and its determinants. In this study all the variables are taken in their real terms. The econometric specification of the model is shown in Eq.1.

$$\begin{aligned} Y_{it} &= \alpha_1 + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \alpha_5 D_{5i} + \alpha_6 D_{6i} + \alpha_7 D_{7i} + \alpha_8 D_{8i} + \alpha_9 D_{9i} \\ &+ \alpha_{10} D_{10i} + \alpha_{11} D_{11i} + \alpha_{12} D_{12i} + \beta_2 X_{2it} + \beta_3 X_{3it} + \gamma_1 (D_{2i} X_{2it}) + \gamma_2 (D_{2i} X_{3it}) \\ &+ \gamma_3 (D_{2i} X_{4it}) + \gamma_4 (D_{2i} X_{5it}) + \gamma_5 (D_{3i} X_{2it}) + \gamma_6 (D_{3i} X_{3it}) + \gamma_7 (D_{3i} X_{4it}) \\ &+ \gamma_8 (D_{3i} X_{5it}) + \gamma_9 (D_{4i} X_{2it}) + \gamma_{10} (D_{4i} X_{3it}) + \gamma_{11} (D_{4i} X_{4it}) + \gamma_{12} (D_{4i} X_{5it}) \\ &+ \gamma_{13} (D_{5i} X_{2it}) + \gamma_{14} (D_{5i} X_{3it}) + \gamma_{15} (D_{5i} X_{4it}) + \gamma_{16} (D_{5i} X_{5it}) + \gamma_{17} (D_{6i} X_{2it}) \\ &+ \gamma_{18} (D_{6i} X_{3it}) + \gamma_{19} (D_{6i} X_{4it}) + \gamma_{20} (D_{6i} X_{5it}) + \gamma_{21} (D_{7i} X_{2it}) + \gamma_{22} (D_{7i} X_{3it}) \\ &+ \gamma_{23} (D_{7i} X_{4it}) + \gamma_{24} (D_{7i} X_{5it}) + \gamma_{25} (D_{8i} X_{2it}) + \gamma_{26} (D_{8i} X_{3it}) + \gamma_{27} (D_{8i} X_{4it}) \\ &+ \gamma_{28} (D_{8i} X_{5it}) + \gamma_{29} (D_{9i} X_{2it}) + \gamma_{30} (D_{9i} X_{3it}) + \gamma_{31} (D_{9i} X_{4it}) + \gamma_{32} (D_{9i} X_{5it}) \\ &+ \gamma_{33} (D_{10i} X_{2it}) + \gamma_{34} (D_{10i} X_{3it}) + \gamma_{35} (D_{10i} X_{4it}) + \gamma_{36} (D_{10i} X_{5it}) + \gamma_{37} (D_{11i} X_{2it}) \\ &+ \gamma_{38} (D_{11i} X_{3it}) + \gamma_{39} (D_{11i} X_{4it}) + \gamma_{40} (D_{11i} X_{5it}) + \gamma_{41} (D_{12i} X_{2it}) + \gamma_{42} (D_{12i} X_{3it}) \\ &+ \gamma_{43} (D_{12i} X_{4it}) + \gamma_{44} (D_{12i} X_{5it}) + u_{it} \end{aligned} \quad ..(1)$$

Here, the γ's are the differential slope coefficients, just as $\alpha's$ are the differential intercepts. The variables and their sources are given in Table 1.

Table 1: Variables used in the Study

Variables	Time Period	Data Source
Crude Oil Import	2000 to 2014	Reuters
GDP per Capita	2000 to 2014	World Data Bank
Crude oil Production	2000 to 2014	BP Statistics 2015
Crude oil Consumption	2000 to 2014	BP Statistics 2015
FDI	2000 to 2014	World Data Bank

***Source*:** Compiled by authors

Crude oil imports by India from different countries dependent on countries GDP per capita, crude oil production, crude oil consumption, and FDI as shown in Table 1.

4. India's trade relation with its selected partner countries

This section analyses India's trade relation with 11 selected trade partner countries viz. United Arab Emirates, Nigeria, Kuwait, Saudi Arabia, Iran, Iraq, Venezuela, Malaysia, Mexico, Qatar, Brazil.

The UAE is an extremely established country with a high level of human development and is one of the wealthiest countries in the Middle East. It is also one of the world's wildest growing countries. The UAE's oil reserves are the seventh – largest in the world, while natural gas reserves are the world's seventeenth – largest. The GDP of UAE for 2014 was $419 billion. This reflects the rich natural resources in the UAE, which has 10% of total oil world supply. The estimated GDP of UAE is $641.9 billion and the estimated GDP per capita is $67,000 in 2015. In 2015 export and import by UAE accounted for $323.8 billion and $248.2 billion. The major export partners of UAE are Japan, Iran, India, South Korea, China, Singapore and Thailand as observed in Fig.1.

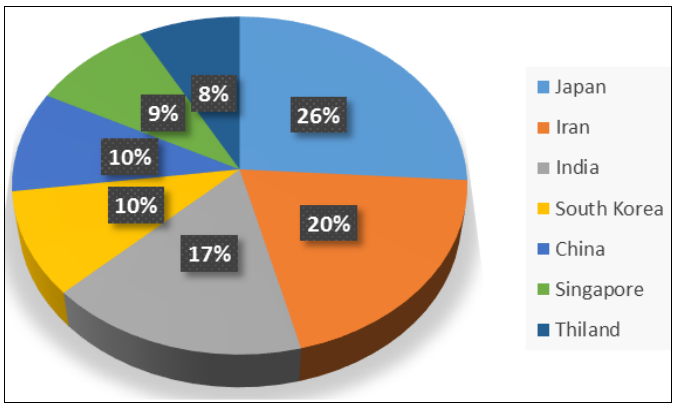

Fig 1: Export Partners of UAE (Source: Compiled by authors from The World Fact Book)

UAE is India's third largest trading partner for the year 2014-15 after China and US. Moreover, UAE is the second largest export terminus of India with an amount of over US$ 33 billion for the year 2014-15. For UAE, India is the largest trading companion for the year 2014 with an amount of over US$ 28 billion (non-oil trade).

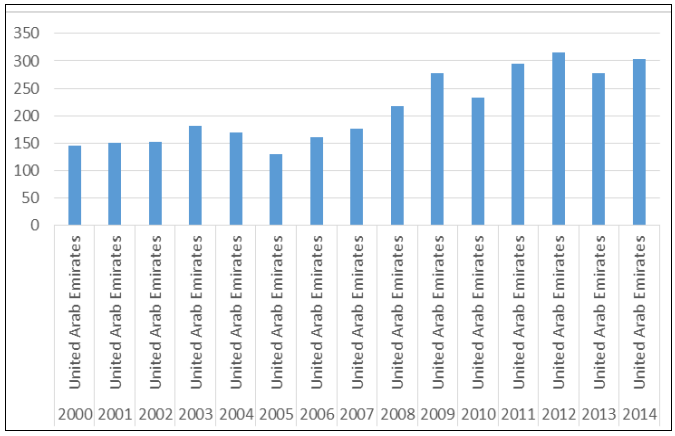

Fig 2: Crude Oil Import by India from UAE ('000 barrels per day) (Source: Compiled by authors from Reuters.com)

According to Government of India figure, in FY 2014-15, trade between India and UAE crossed US$59bn, with Indian exports wealth US$33.3bn to the UAE and US$26bn worth of UAE's exports to India, thus making UAE India's one of the top trade partner. Indian capitalists and traders have contributed significantly to the economic fabric of UAE (see Fig. 2).

Nigeria has arrived a period of leisurelier economic growth on the back of the weak oil price environment. While around 90% of Nigeria's economy is external of oil production. The low oil price environment to maintain strong Nigeria drove GDP to decelerate in Q4 to levels last seen in 1999. Despite the uncertainties generated by the volatility in oil prices and the substantial drop in government income, the Nigerian economy will continue to grow, even if oil prices fall to $35/bbl. long term.

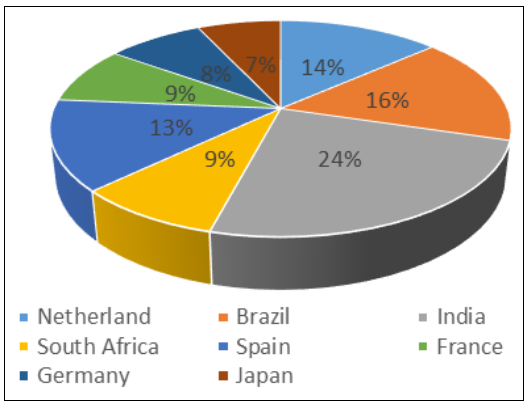

Fig 3: Export Partners of Nigeria (Source: Compiled by authors from The World Fact Book)

India is the largest trading partner of Nigeria. India owned/operated companies are the 2nd largest employer in Nigeria after the Federal Republic of Nigeria. The bilateral trade during the year 2014-15 decreased by2% from US$16.764 billion in 2013-14 to US$16.364 billion in 2014-15. India's exports to Nigeria recorded marginal increase through from US$2667.83 million in 2013-14 to US$2681.34 million in 2014-15. India's imports decreased by 2% from US$14,098.38 million in 2013-14 to US$13,682.72 million in the year 2014-15. Crude and petroleum products form the large chunk of India's imports. India's import of crude and petroleum products in 2014-15 was worth US$13.532 billion as against US$13.959 billion recorded in the previous year. In the recent year Nigeria has become one of the main bases of crude for India, India imports around 8% to 12% of its crude necessities from Nigeria (see Fig.4).

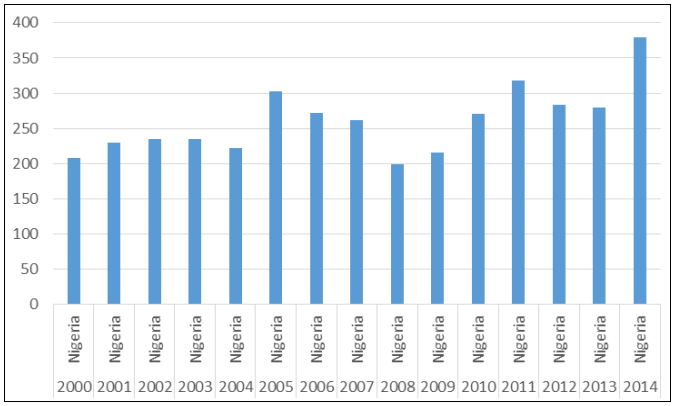

Fig 4: Crude Oil Import by India from Nigeria ('000 barrels per day) (Source: compiled by authors from Reuters.com)

The small Middle East country of Kuwait, a self-governing Arab Emirates holds 10% of the world's proven oil reserves. Kuwait also make a plan to increase oil production to 4 million barrels per day by 2020. Petroleum accounts for over half of GDP, 94% of export revenue, and 90% of government income. In 2015, Kuwait for the first time in fifteen years, realized a budget deficit after decades of high oil. In 2016, it is

expected that real GDP of Kuwait will rise gradually from 1.2% in 2016 to an average of 2.7% in 2018-2020.

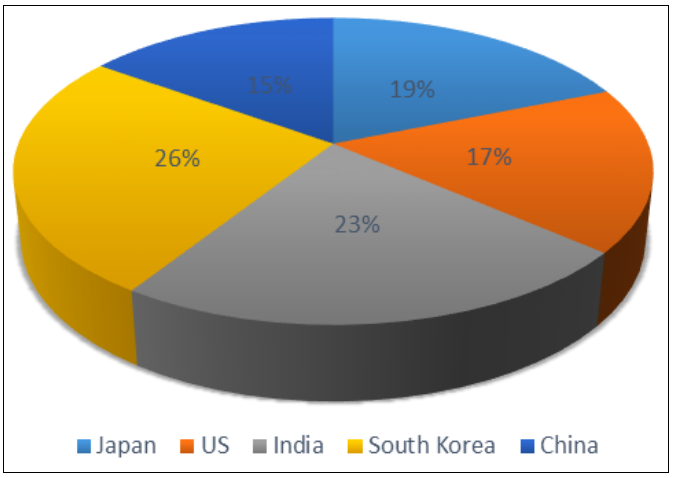

Fig 5: Exports Partners of Kuwait (Source: Compiled by authors from The World Fact Book)

Kuwait's growth prospects are closely linked to the price of oil, and this poses substantial downside threats as OPEC and non-OPEC producers' battle for market share. It is expected that Kuwait economy to see uncertain growth over 2016 and 2017, forecasting real GDP growth of 1.5% and 1.2%, respectively, from -1.6% in 2015. After a long period of stagnation, the Kuwait investment outlook appears to be improving.

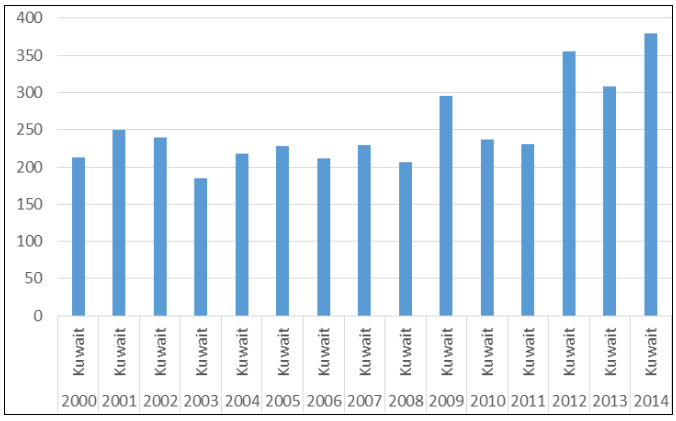

Fig 6: Crude Oil Import by India from Kuwait ('000 barrels per day) (Source: Compiled by authors from Reuters.com)

Indo-Kuwaiti crude oil trade relations stood important dimension in bilateral trade between both countries. Kuwait is one of the major trade partner of India and India has been maintaining as top ten trading partners of Kuwait. India's reliable fourth largest exporter of crude oil is Kuwait. Kuwait stood seventh largest oil exporter to India during 2015-16. India meets about 5.5% of its energy needs from Kuwait. During 2015-16, total bilateral trade between India and Kuwait has been observed to be US$ 6.2 billion, which stood at US$ 5.95 billion during 2016-17. During 2014, India imported around 380 thousand barrels per day of crude from Kuwait which is highest in the history since 2000 (see Fig.6).

Since discovery of petroleum in 1938, Saudi Arabia has become the world's largest oil producer and exporter, controlling the world's second leading oil reserves, and the sixth leading gas reserves. The Gross Domestic Product in Saudi Arabia expanded by 3.60% in the September quarter of 2015 over the same quarter of the previous year, as compared to an upwardly revised 4.55% growth in the preceding quarter. GDP Annual Growth Rate in Saudi Arabia averaged 5.04% from 1969 until 2015.

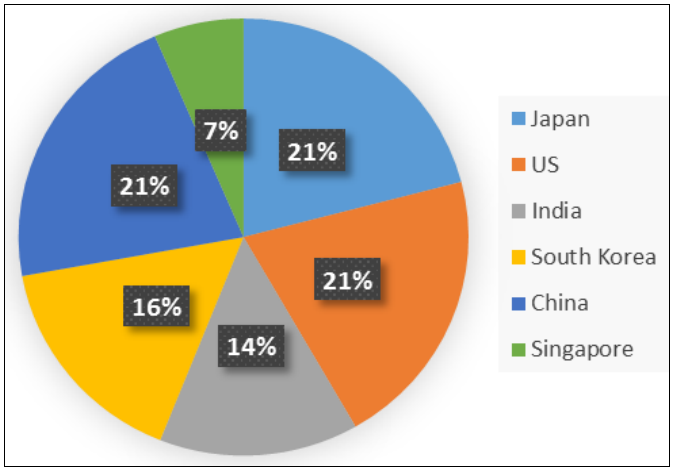

Fig 7: Export Partners of Saudi Arabia (Source: Compiled by authors from The World Fact Book)

The 2014-2015 collapse in oil prices has slashed the Kingdom's main source of revenue which makes 77%-88% of its total income.

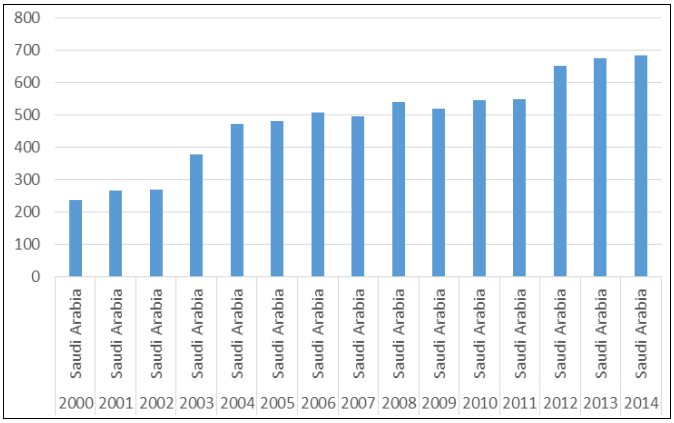

Fig 8: Crude Oil Import by India from Saudi Arabia ('000 barrels per day) (Source: Compiled by authors from Reuters.com)

During 2014, India imported around 685 thousand barrels per day of crude from Saudi Arabia which is highest in the history since 2000 (see Fig.8).

Iran holds the world's fourth-largest proved crude oil reserves and the world's second largest natural gas reserves. In 2015 Iran has an estimated 158 billion barrels of proved crude oil reserves, representing almost 10% of the world's crude oil reserves and 13% of reserves held by the OPEC.

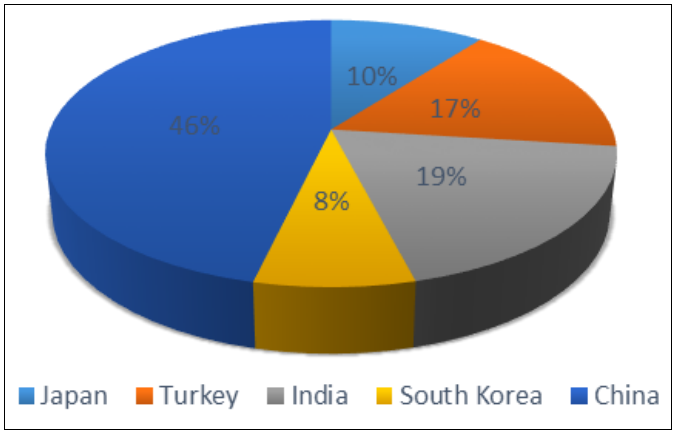

Fig 9: Export Partners of Iran (Source: Compiled by authors from The World Fact Book)

The fiscal balance of Iran government deteriorated due to low oil prices, from a deficit of 1.2 percent of GDP in 2014 to a deficit of 2.7 percent of GDP in 2015. Similarly, Iran's current account surplus is estimated to have deteriorated from a surplus of 3.8 percent of GDP in 2014 to a surplus of 0.6 percent of GDP in 2015 due to the fall in oil exports. In 2015 estimated GDP (Purchasing power parity) is $1.382 trillion and GDP per capita is $17,800. GDP real growth rate for Iran in 2015 is 0.8%. Inflation rate of Iran in 2015 estimated 15.3%. Exports partner of Iran are Japan, India, Turkey, South Korea and China.

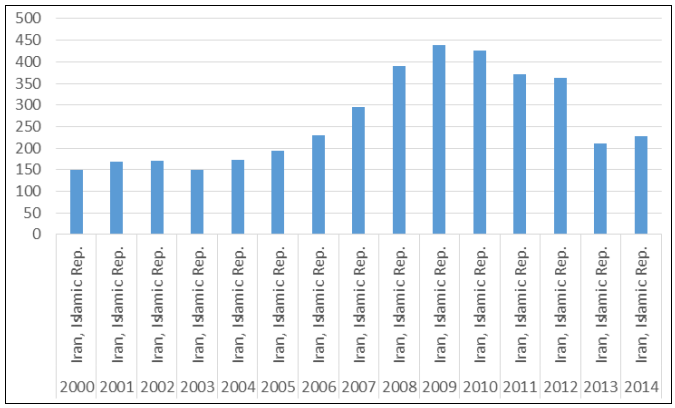

Fig 10: Crude Oil Import by India from Iran ('000 barrels per day) (Source: Compiled by authors from Reuters.com)

During 2009, India imported around 438 thousand barrels per day of crude from Iran which is highest in the history since 2000 to 2014. Since then India's crude oil import declined and reached to 228 thousand barrels per day during 2014 (see Fig.10).

Iraq has the world's fifth largest reserves of oil and gas, currently producing about 4% of the global oil supply, as the second-biggest producer in OPEC after Saudi Arabia. Oil remains critical to the Iraqi economy, accounting for more than 95% of government revenue and over 90% of export revenue. Iraq exported an average of 2.52 million barrels per day in 2014-15. Iraq is the second largest supplier of crude to India after Saudi Arabia, and ahead of Iran.

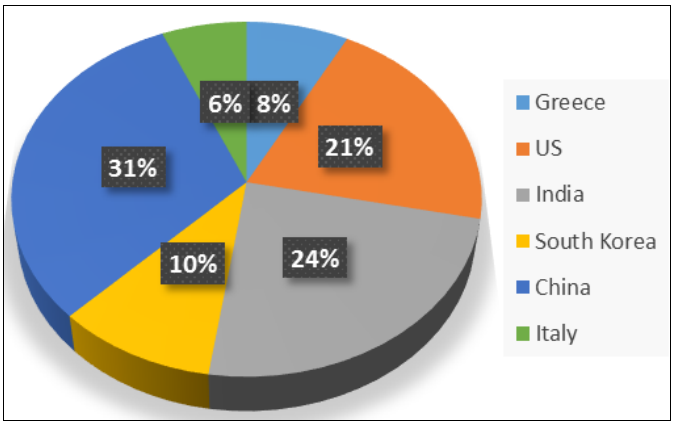

Fig 11: Export Partners of Iraq (Source: Compiled by authors from The World Fact Book)

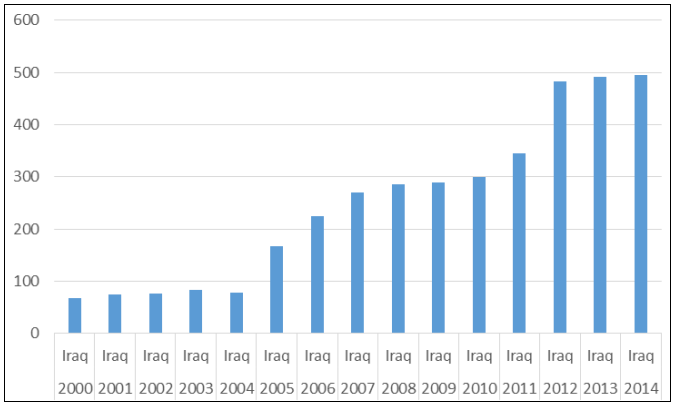

Fig 12: Crude Oil Import by India from Iraq ('000 barrels per day) (Source: Compiled by authors from Reuters.com)

During 2014, India imported around 495 thousand barrels per day of crude from Iraq which is highest in the history since 2000 to 2014. However, during this period India's crude oil import lowest which was 67 thousand barrels per day during 2000 (see Fig.12).

Crude oil represents nearly all of Venezuela's exports and contribute about half of its annual income. Lack of economic diversification leaves Venezuela extremely vulnerable to decline in world oil prices. Venezuela's estimated GDP (purchasing power parity) in 2015 was $491.6 billion and GDP per capita (PPP) was $16,100. Oil comprises 95% of Venezuela's exports and 25% of its GDP. When oil prices are over $100, Venezuelan receives enough margin from exporting oil that the lower volume doesn't harm its economy. When oil price drops significantly below that price level, the country's margins are squeezed to the point where it does not meet it spending, resulting in ballooning debt. The major export partner of Venezuela are US, India, Cuba, China and Singapore.

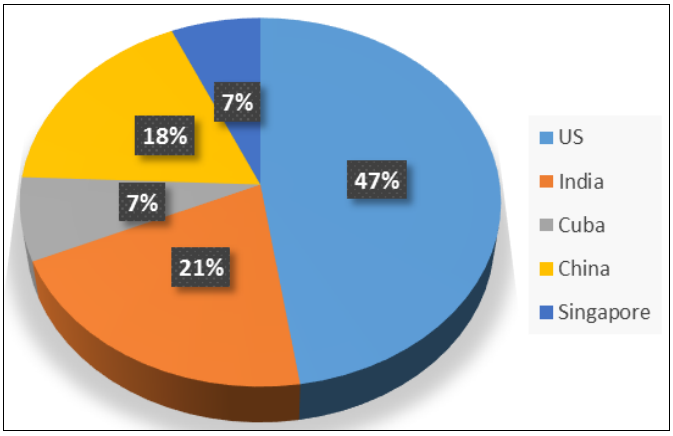

Fig 13: Export Partners of Venezuela (Source: Compiled by authors from The World Fact Book)

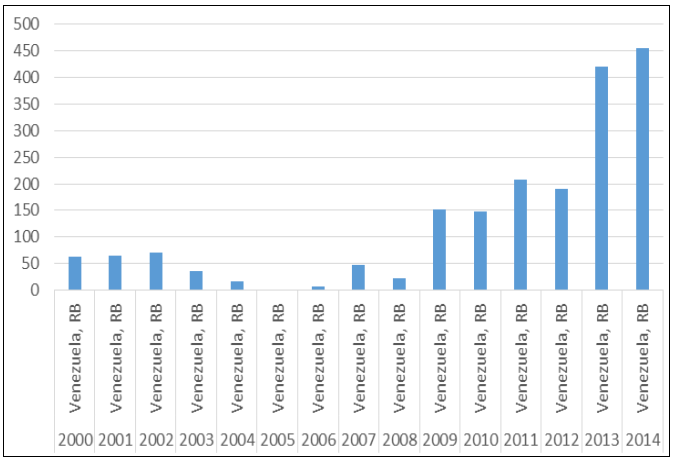

Fig 14: Crude Oil Import by India from Venezuela ('000 barrels per day) (Source: Compiled by authors from Reuters.com)

During 2014, India imported around 456 thousand barrels per day of crude from Venezuela which is highest in the history since 2000 to 2014. However, during this period India's crude oil import stood lowest which was 6 thousand barrels per day during 2006 with no import during 2005. (see Fig.14).

The Malaysian economy remains to record rationally solid despite low energy prices, which adversely impacting the country's energy sector. The broad economic slowdown in Malaysia in 2015 was expected to continue through 2016. Malaysia is Southeast Asia's second largest oil and natural gas producer in Southeast Asia. Malaysia's economy dependent on oil and gas industry. The oil, gas and energy industry contributes over 20% to Malaysia's GDP. Malaysia produces light and sweet crude, called Tapis, which is higher-value products and its price higher than other benchmark. Tapis crude average price in 2015 was US$75. Malaysia became net exporter of crude oil. Malaysia exports sweet crude and imports heavier crude oils from the Middle East for domestic consumption. Primary export destination for Malaysia are Australia, India, Thailand and Japan.

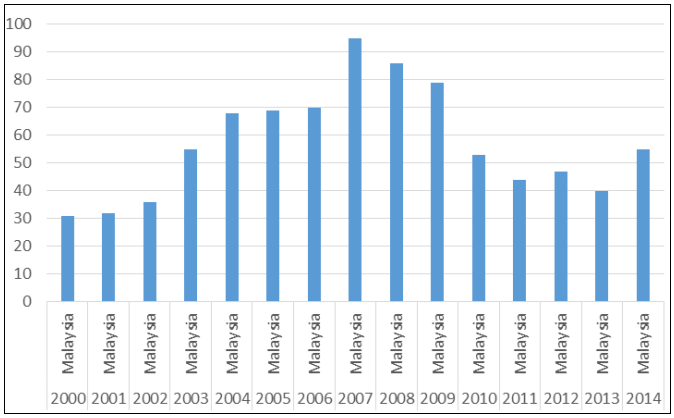

Fig 15: Crude Oil Import by India from Malaysia ('000 barrels per day) (Source: Compiled by authors from Reuters.com)

The bilateral trade between India and Malaysia in 2014-15 stood at US$16.93 (Indian export to Malaysia was worth US$5.8 billion and imports were at US$11.11 billion) as against 13.43 billion in 2013-14. Malaysia is currently the 23rd largest investor in India with FDI inflows of US$732 million in the last 15 years. Malaysia is one of the significant investors in India. During 2007, India imported around 95 thousand barrels per day of crude from Malaysia, which is highest in the history since 2000 to 2014. However, during this period India's crude oil import stood lowest which was 31 thousand barrels per day during 2000. (see Fig.15).

Mexico is quickly becoming an emerging market. Gross Domestic Product (GDP) was $2.2 trillion in 2015. Mexico is the 12th leading exporter in the world. In 2015, 80% of its exports went to the United States. Its largest trade partners are the United States (48%), China (16.6%), and Japan (4.4%).

Mexico is the world's eighth largest producer of oil, at nearly three million barrels per day. This is fewer than Canada, Iran, or Iraq but more than other big exporters such as Kuwait, Brazil, or Nigeria. The negative impact from the collapse in oil prices was greater in Mexico. Mexico public finance depend on more than 30% on oil income. GDP growth in Mexico could decrease by half a point this year due to the drop in oil prices.

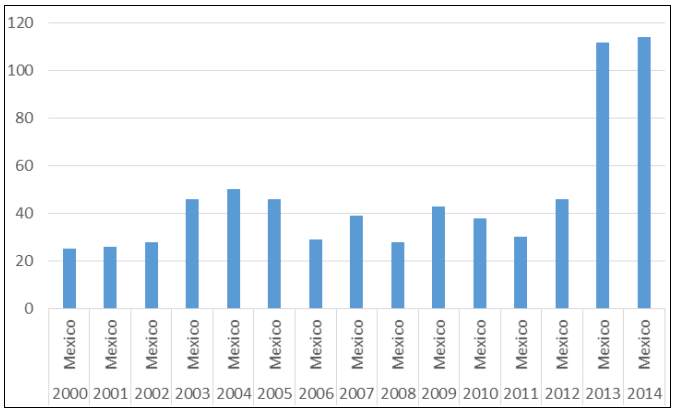

Fig 16: Crude Oil Import by India from Mexico ('000 barrels per day) (Source: Compiled by authors from Reuters.com)

During 2014, India imported around 114.27 thousand barrels per day of crude from Mexico which is highest in the history since 2000 to 2014. However, during this period India's crude oil import stood lowest which was 25 thousand barrels per day during 2000. (see Fig.16).

Qatar Petroleum's profits accounted for 33% to total government revenues in 2015. Qatar is the world's largest exporter of liquefied natural gas and those revenues have allowed the Persian Gulf nation. Qatar, one of the strategic players in the energy market has a growing importance in Indian soil as far as India's energy security is concerned. India not only imports LNG but also imports crude oil and LPG from Qatar. Thus the contribution of Qatar towards India's energy security is greatly important as far as energy mix diversification is concerned.

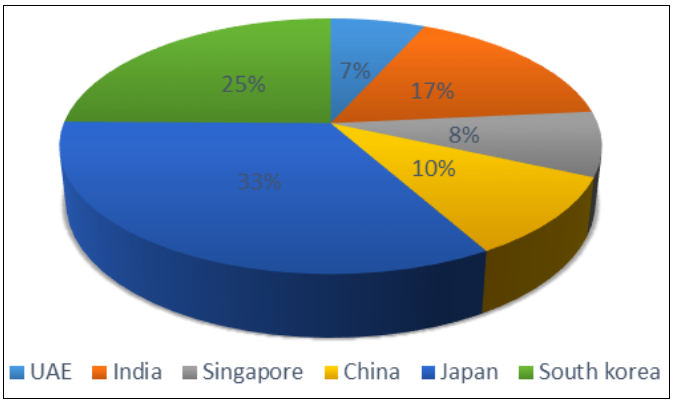

Fig 17: Export Partners of Qatar (Source: Compiled by authors from The World Fact Book)

The import of crude oil from Qatar is increasing gradually, even though the trade volume is small.

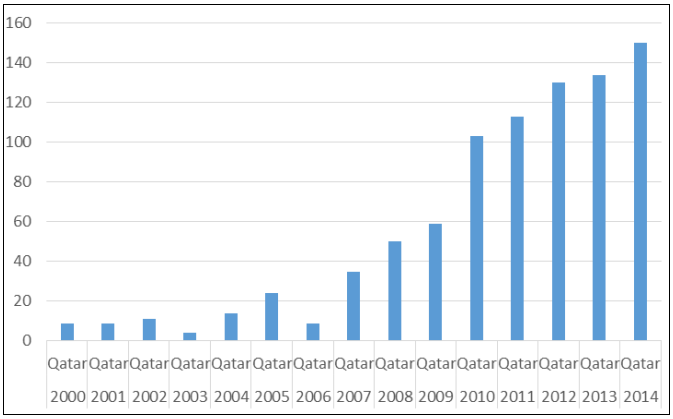

Fig 18: Crude Oil Import by India from Qatar ('000 barrels per day) (Source: Compiled by authors from Reuters.com)

During 2014, India imported around 150 thousand barrels per day of crude from Qatar, which is highest in the history since 2000 to 2014. However, during this period India's crude oil import stood lowest, which was 4 thousand barrels per day during 2003. (see Fig.18).

The deterioration of economic indicators in Brazil led to strong downward pressure and high volatility over 2016 except FDI, which remained strong. Brazil's GDP (PPP) in 2015 was $3.166 trillion and GDP real growth rate is -3% and GDP per capita (PPP) in 2015 is $15,800 trillion. Brazil is the world's 12th largest oil producer, a feature that has helped the country's $2.2 trillion economy become the largest in Latin America. As Brazil is still a net oil importer, the main channel through which lower oil prices affect GDP is likely to be investment. Total investment has declined by 6% on average since early 2015, partly due to developments at petro bras, the public oil producer, which financial records for 10% of total Brazilian investment and almost 2% of GDP.

India and Brazil are amongst the largest democracies of world and major economic players in their respective regions. While Brazil is the sixth largest economy of the world and fifth largest country in size, India is the eleventh largest economy and seventh largest country in world. Together the two nations contribute about 8.5% to the world's GDP. Brazil is one of the most significant trading partners of India in the entire region. In the year 2014, India became the 7th biggest exporter to Brazil and 8th biggest importer from Brazil. Brazil's share in India export market was about 2.6% whereas Brazil's share in India imports is about 1.3%. Crude-Diesel formed a huge share in bilateral trade, close to 50 percent.

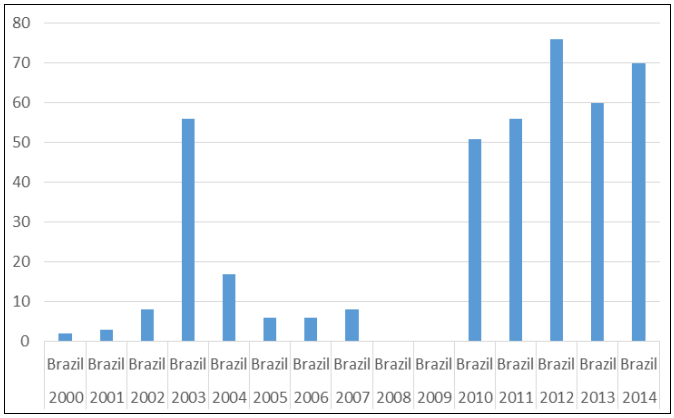

Fig 19: Crude Oil Import by India from Brazil ('000 barrels per day) (Source: Compiled by authors from Reuters.com)

During 2012, India imported around 76 thousand barrels per day of crude from Brazil, which is highest in the history since 2000 to 2014. However, during this period India's crude oil import stood lowest, which was 2 thousand barrels per day during 2000 followed by zero import during 2008 and 2009 (see Fig.19).

5. Result and Discussion

Table 28 shows the estimation result of crude oil import dependent on different independent variables.

Table 2: Estimation of crude oil import (Y_{it})

Crude oil import (Y_{it})	Coefficient	Std. Err.	T	P>|t|
GDP per capita (X_{2it})	-0.0020366	0.003497	-0.58	0.561
Crude oil consumption (X_{3it})	0.3722974	0.376063	0.99	0.324
Real FDI (X_{4it})	-3.01E-09	1.98E-09	-1.52	0.132
Crude oil production (X_{5it})	-0.0272548	0.101549	-0.27	0.789
Nigeria (D_{2i})	-373.9946	243.7487	-1.53	0.128
Venezuela (D_{3i})	18.20161	273.8833	0.07	0.947
Saudi (D_{4i})	-699.2379	229.1929	-3.05	0.003
Kuwait (D_{5i})	81.0044	184.6453	0.44	0.662
Iraq (D_{6i})	-569.9692	198.4461	-2.87	0.005
Iran (D_{7i})	-850.9502	225.3768	-3.78	0.000
Mexico (D_{8i})	-87.91768	426.7677	-0.21	0.837
Malaysia (D_{9i})	-609.5213	354.9599	-1.72	0.089
Qatar (D_{10i})	-121.9487	359.2606	-0.34	0.735
Egypt (D_{11i})	-146.9424	376.9554	-0.39	0.697
Brazil (D_{12i})	-303.9987	255.7261	-1.19	0.237
(D_{2i})*(X_{2it})	0.1196369	0.05532	2.16	0.033
(D_{3i})*(X_{2it})	-0.0654406	0.035295	-1.85	0.066
(D_{4i})*(X_{2it})	-0.0505664	0.032957	-1.53	0.128
(D_{5i})*(X_{2it})	-0.0076888	0.004498	-1.71	0.09
(D_{6i})*(X_{2it})	0.0894329	0.094011	0.95	0.343
(D_{7i})*(X_{2it})	0.1534598	0.069428	2.21	0.029
(D_{8i})*(X_{2it})	0.0812188	0.046735	1.74	0.085
(D_{9i})*(X_{2it})	0.0250334	0.051762	0.48	0.63
(D_{10i})*(X_{2it})	-0.00081	0.007987	-0.1	0.919
(D_{11i})*(X_{2it})	-0.1085631	0.240142	-0.45	0.652
(D_{12i})*(X_{2it})	0.0128925	0.100175	0.13	0.898
(D_{2i})*(X_{4it})	1.47E-09	3.16E-09	0.47	0.642
(D_{3i})*(X_{4it})	6.44E-08	1.91E-08	3.38	0.001
(D_{4i})*(X_{4it})	5.05E-09	2.11E-09	2.39	0.019
(D_{5i})*(X_{4it})	-1.37E-08	1.47E-08	-0.94	0.352
(D_{6i})*(X_{4it})	5.12E-08	2.53E-08	2.03	0.045
(D_{7i})*(X_{4it})	-1.94E-09	9.25E-09	-0.21	0.834
(D_{8i})*(X_{4it})	3.41E-09	2.35E-09	1.45	0.15
(D_{9i})*(X_{4it})	2.03E-09	3.72E-09	0.55	0.586
(D_{10i})*(X_{4it})	1.20E-09	3.60E-09	0.33	0.739
(D_{11i})*(X_{4it})	5.54E-10	4.89E-09	0.11	0.91
(D_{12i})*(X_{4it})	1.43E-09	2.91E-09	0.49	0.625
(D_{2i})*(X_{5it})	0.1039079	0.130709	0.79	0.428
(D_{3i})*(X_{5it})	-0.1711749	0.115943	-1.48	0.142
(D_{4i})*(X_{5it})	0.132436	0.103943	1.27	0.205
(D_{5i})*(X_{5it})	0.1194656	0.11446	1.04	0.299
(D_{6i})*(X_{5it})	-0.0381945	0.115917	-0.33	0.742
(D_{7i})*(X_{5it})	0.1159769	0.108294	1.07	0.286
(D_{8i})*(X_{5it})	0.0194444	0.107259	0.18	0.856
(D_{9i})*(X_{5it})	0.5279739	0.358206	1.47	0.143
(D_{10i})*(X_{5it})	0.1202782	0.163459	0.74	0.463
(D_{11i})*(X_{5it})	0.1755829	0.422694	0.42	0.679
(D_{12i})*(X_{5it})	-0.0375354	0.173825	-0.22	0.829
(D_{2i})*(X_{3it})	0.33387	0.571106	0.58	0.56
(D_{3i})*(X_{3it})	0.9750142	0.50388	1.94	0.055
(D_{4i})*(X_{3it})	-0.096757	0.38788	-0.25	0.803
(D_{5i})*(X_{3it})	-0.2022136	0.444484	-0.45	0.65
(D_{6i})*(X_{3it})	0.5917383	0.461153	1.28	0.202
(D_{7i})*(X_{3it})	-0.3164855	0.39794	-0.8	0.428
(D_{8i})*(X_{3it})	-0.7015294	0.431731	-1.62	0.107
(D_{9i})*(X_{3it})	-0.3584384	0.544447	-0.66	0.512
(D_{10i})*(X_{3it})	-0.0849398	0.726255	-0.12	0.907
(D_{11i})*(X_{3it})	-0.2560516	0.527389	-0.49	0.628
(D_{12i})*(X_{3it})	-0.2657273	0.388146	-0.68	0.495
_cons	170.8973	152.8072	1.12	0.266
Number of obs.	179			
F(59, 119)	61.670			
Prob. > F	0.0000			
R-squared	0.9683			
Adj. R-squared	0.9526			
Root MSE	33.847			

***Source*:** Authors derivation

Here in this case UAE is taken as a bench-marking country. Regression result shows that keeping impact of GDP per capita, crude oil consumption, real FDI, crude oil production constant, crude oil import by India from Saudi as compared to import from UAE declined significantly less by 699.24 thousand barrels per day at 5% level of significance. Controlling impact of GDP per capita, crude oil consumption, real FDI, crude oil production, we can observe from regression result that India imports crude oil significantly less by 569.97 thousand barrels per day from Iraq as compared to UAE at 5% level of significance. In absence of impact of GDP per capita, crude oil consumption, real FDI, crude oil production and holding those as constant, we observe that India imports crude oil from Iran significantly less by 850.95 thousand barrels per day as compared to import from UAE at 1% level of significance. Similarly, in absence of impact of GDP per capita, crude oil consumption, real FDI, crude oil production, the results show the fact that India imports crude oil significantly less by 609.52 thousand barrels per day from Malaysia as compared to UAE at 10% level of significance. Therefore, UAE remained relatively most preferred nation than Saudi, Iraq, Iran and Malaysia for India in terms of import of crude oil other things remaining constant.

Keeping crude oil consumption, real FDI and crude oil production constant, India imports more of 0.12 thousand barrels of crude oil per day from Nigeria as compare to import from UAE with increasing GDP per capita of 1USD at 5% level of significance. Therefore, if we consider GDP per capita then UAE remained relatively least preferred nation than Nigeria for India in terms of import of crude oil other things remaining constant. In absence of impact of crude oil consumption, real FDI and crude oil production, the regression results brought the fact that India imports less of 0.065 thousand barrels of crude oil per day from Venezuela as compared to import from UAE with increasing GDP per capita of 1USD at 10% level of significance. Therefore, if we consider GDP per capita then UAE remained relatively most preferred nation than Venezuela for India in terms of import of crude oil other things remaining constant. Keeping crude oil consumption, real FDI and crude oil production constant, India imports less of 0.008 thousand barrels of crude oil per day from Kuwait as compare to UAE with increasing GDP per capita of 1USD at 10% level of significance. Therefore, if we consider GDP per capita then UAE remained relatively most preferred nation than Kuwait for India in terms of import of crude oil other things remaining constant.

Keeping crude oil consumption, real FDI and crude oil production constant, India imports more of 0.15 thousand barrels of crude oil per day from Iran as compare to import from UAE with increasing GDP per capita of 1USD at 5% level of significance. Therefore, if we consider GDP per capita then UAE remained relatively least preferred nation than Iran for India in terms of import of crude oil other things remaining constant. Keeping crude oil consumption, real FDI and crude oil production constant, India imports more of 0.08 thousand barrels of crude oil per day from Mexico as compare to import from UAE with increasing GDP per capita of 1USD at 10% level of significance. Therefore, if we consider GDP per capita then UAE remained relatively least preferred nation than

Mexico for India in terms of import of crude oil other things remaining constant. Keeping real FDI, GDP per capita and crude oil production constant, India imports more of 0.98 thousand barrels of crude oil per day from Venezuela as compare to import from UAE with increasing crude oil consumption of 1000 barrels per day at 10% level of significance. Therefore, if we consider GDP per capita then UAE remained relatively least preferred nation than Venezuela for India in terms of import of crude oil other things remaining constant.

6. Conclusion and Policy Suggestion

In this study United Arab Emirates, Nigeria, Kuwait, Saudi Arabia, Iran, Iraq, Venezuela, Malaysia, Mexico, Qatar, Brazil for the time period 2000 to 2014 are considered to estimate crude oil import function of India using identified macroeconomic factors viz. GDP per capita, crude oil consumption and production and FDI of respective countries. Using fixed effect model of panel data analysis in terms of pooled OLS using country specific dummy and their interaction with macroeconomic factors, allowing intercept and slope coefficient to vary across countries we estimated the crude oil import function for India.

Our findings show that UAE remained relatively most preferred nation than Saudi, Iraq, Iran and Malaysia for India in terms of import of crude oil other things remaining constant. Also our results suggest that controlling all other factors except GDP per capita UAE remained relatively and significantly least preferred nation for India than Nigeria, Iran, Mexico, and Venezuela to import crude oil. Similarly, the fact that GDP per capita play important role in predicting crude oil import of India with UAE being relatively most preferred nation than Venezuela, and Kuwait other things remaining constant.

Therefore, keeping these result in mind macroeconomic planners, policy makers, and crude oil import companies need to take judicious decisions in implementing oil import policies and import of crude oil from these major import partner of India.

7. References

1. Bhanumurthy NR, Das S, Bose S. Oil Price Shock, Pass-through Policy and its Impact on India. National Institute of Public Finance and Policy. Working. 2012-99.
2. BP Statistical Review of World Energy. 2015. (http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html)
3. Cobo-Reyes R, Quiros GP. The effect of oil price on industrial production and on stock returns. *Departamento de Teoría e Historia Económica*. Universidad de Granada. The Papers. 2005.
4. EIA. India – Analysis. U.S Energy Information Administration. 2013. [Retrieved from http://www.eia.gov/countries/cab.cfm?fips=IN]
5. Eksi IH, Izgi BB, Senturk M. Reconsidering the Relationship between Oil Prices and Industrial Production: Testing for Cointegration in some of the OECD Countries. 2011.
6. Fukunaga I, Hirakata N, Sudo N. The Effects of Oil Price Changes on the Industry-Level Production and Prices in the U.S. and Japan. IMES Discussion Paper Series. 2009, 24.
7. Hamilton J. Oil and the Macro economy since World War II. Journal of Political Economy. 1983, 2.
8. Hamilton J. This is What Happened to Oil Price Relationship. Journal of Monetary Economics. 1996; 2:215-220.
9. Hamilton JD. Understanding Crude Oil Prices, Working Paper 14492, National Bureau of Economic Research. 2008. http://www.nber.org/papers/w14492.
10. Jimenez-Rodriguez R, Sanchez M. Oil price shocks and real GDP growth: empirical evidence for some OECD countries. Applied Economics. 2005; 37(2):201-228.
11. Kenneth Grant DO. Understanding Today's Crude Oil Price and Product Marketing. 2006.
12. Koyama K. Rising Crude Oil Prices and their impact on World Economy. 2011.
13. Lee K, Ni S. On the Dynamic Effects of Oil Price Shocks: A Study Using Industry Level Data, Journal of Monetary Economics. 2002; 49:823-852.
14. Mork KA, Olson MHT. Macroeconomic Responses to Oil Price Increase and Decreases in Seven OECD Countries. Energy Journal. 1994; 15(4):19-35
15. Reuters (http://in.reuters.com/article/india-crude-import-idINL4E8IU4HI20120806)
16. Riman HB, Akpan ES, Offiong AI. Asymmetric Effect of Oil Price Shocks on Exchange Rate Volatility and Domestic Investment in Nigeria. British Journal of Economics, Management & Trade. 2013; 3(4):513-532.
17. Smith JL. World Oil: Market or Mayhem? Journal of Economic Perspectives. 2009; 23:145-164.
18. Tang W, Wu L, Zhang Z. Oil price shocks and their short- and long-term effects on the Chinese economy. Energy Economics. Elsevier. 2010.
19. The World Fact Book, Central Intelligence Agency, Office of Public Affairs Washington, D.C. 2005.
20. World Bank. (n.d.) World Development Indicators. http://data.worldbank.org/data-catalog/world-development-indicators.