

Oil Inflation And Its Impact On Growth Of Indian Economy



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

DEHRADUN

DISSERTATION

ON

“OIL INFLATION AND ITS IMPACT ON GROWTH OF INDIAN ECONOMY”

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DECLARATION

I, **Ila Rattan**, certify that this project entitled “**Oil Inflation and Its Impact On Growth Of Indian Economy**” has been undertaken as a part of the course curriculum of the academic program at **University of Petroleum and Energy Studies** for the batch of MBA (Energy Trading) 2012-2014.

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21st April, 2014



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BONAFIDE CERTIFICATE

This is to certify that Ms. Ila Rattan, student of University of Petroleum and Energy Studies, Dehradun, pursuing MBA (Energy Trading) has successfully completed her dissertation project. As a part of her curriculum, the project report entitled, "Oil Inflation and Its Impact on Growth of Indian Economy" submitted by the student to the undersigned is an authentic record of her original work which he has carried out under my supervision and guidance. This Dissertation has not been submitted anywhere else for degree purpose.

I wish her all the best.


Dr. R. Jayaraj

Assistant Professor

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University of Petroleum and Energy Studies

Page | 3 of the report submitted by Ila Rattan of UPES

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EXECUTIVE SUMMARY

This study is about the relationship between the imported inflation and growth rate of Indian economy. It examines the inflation in prices of imported crude and studies how the growth rate of the Indian economy is affected by the same. The model used to determine the relationship between growth rate and inflation of the Indian economy is “Dynamic Ordinary Least Square” model.

As a matter of fact, crude oil is the most essential commodity and also the most traded product which influences an economy. Petroleum known as “liquid gold” is an extract of crude oil and is compared to gold because it is an exhaustible resource and also of its economic value.

In India the change in the price of crude oil has been a major cause for the rise in inflation rate as it greatly affects the prices of essential commodities and adversely affecting the common man.

As a matter of fact, India is not self-sufficient in the production of petroleum. It remains one of the largest importer from the OPEC countries. The Indian economy has entered a period characterized by slow growth & high inflation. The government’s decision to hike the prices of petrol, diesel & LPG was inevitable, given the sharp increase in international prices of crude & India’s dependence on imports to meet much of its consumption.

The rate of inflation increased to 12.91% on August 2nd 2008 mainly due to increased oil prices as oil is an universal input that directly & indirectly enters into the cost of production of every other commodity.

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Chapter 1 : Introduction

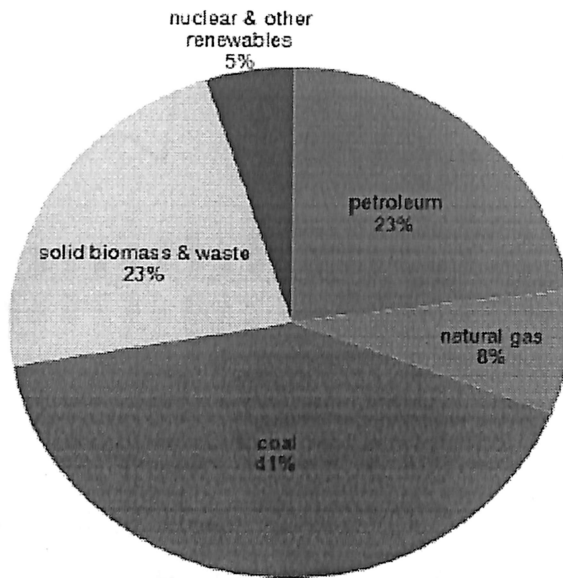
Crude oil is a naturally-occurring substance found in certain rock formations in the earth and this is mixture of mud & organic material is rich in hydrogen & carbon. Over millions of years this layer of organic rich mud becomes buried thousands of feet deep in the earth and temperature of the earth becomes hotter as you go deeper in to the earth. The combination of increasing temperature & pressure on the organic mixture causes change in to crude oil

Fossil fuels are likely to continue to supply much of the energy world-wide despite fears of peaking oil. Given its importance in the transportation and industrial sectors, oil remains a dominant energy source. It is, however, not merely the dominance of oil and gas in the energy basket but its steadily rising price during the past few years that is a cause of concern. More so for developing economies like India. The unprecedented rise in the price of international crude since the late 1990s requires closer examination of its macroeconomic consequences -- particularly for developing countries which are net importers of crude and petro products. The rise reversed the sequel to the 1974 and 1979 oil shocks. Their aftermath had been significant decline in the international price of crude, and prices remained stable until 1998. But they took a different turn thereafter -- rising continuously, and at a faster rate.

Over 70% of India's crude oil requirements are imported and the figure may well reach 85% by the end of the decade. By 2030 India's consumption of petroleum products may quadruple. The impact of rising oil prices on the Indian economy is, therefore, a matter of grave concern. In 1973, GDP fell by 0.3% and inflation was up at 20.2%; in 1979 the corresponding figures were 5.2% and 17.1%. The GDP grew by 1.3% in 1990, while inflation topped 14%.

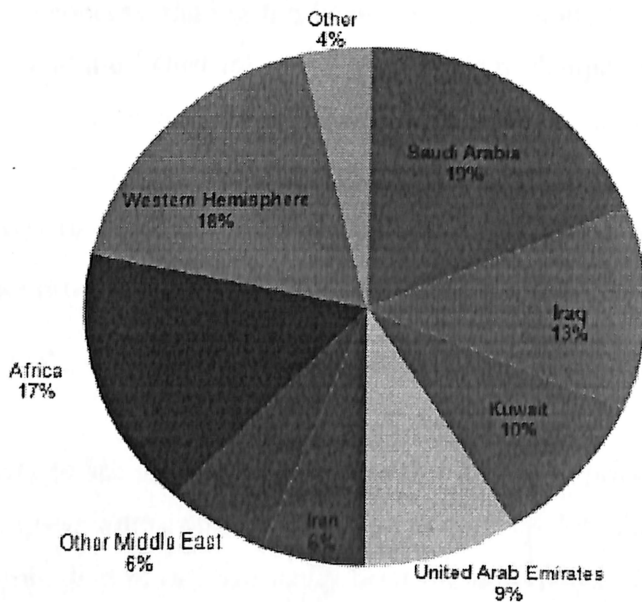
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Total energy consumption in India, 2011



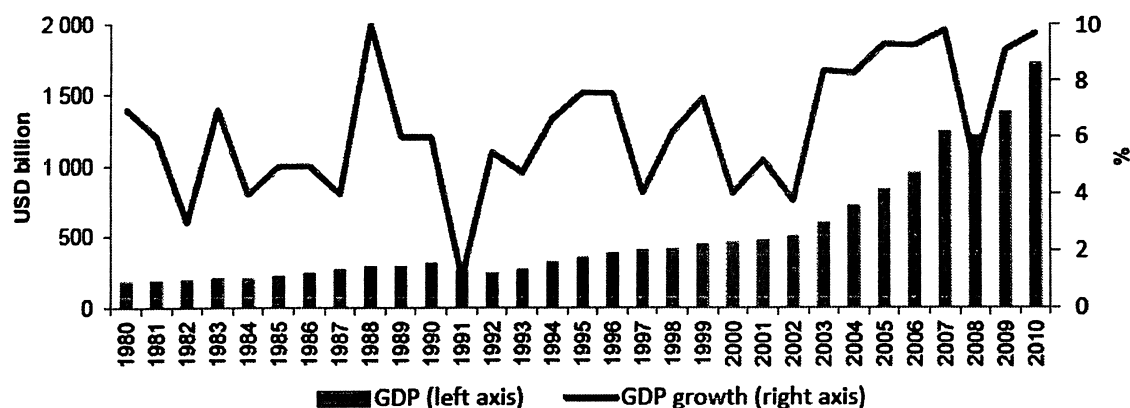
Source: U.S. Energy Information Administration, International Energy Statistics

India crude oil imports by source, 2012



Source: U.S. Energy Information Administration, International Energy Statistics, Lloyd's List Intelligence.

Figure 1 • India's economic growth (1980-2010)



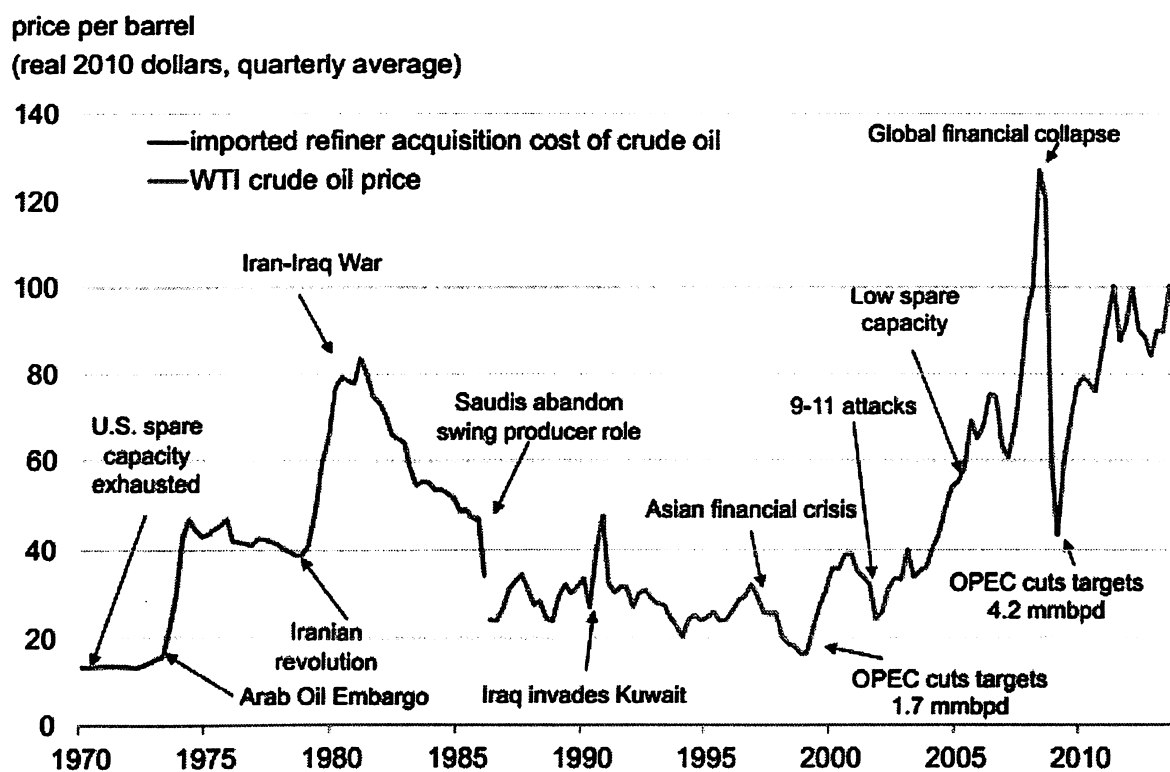
Source: WDI, 2012.

The choice facing policy makers is hard in the face of continually rising crude oil prices and our increasing reliance on crude oil imports in the foreseeable future. Insulating domestic prices against such increases has adverse implications for government finances and development of the petroleum sector, according to the study. The findings have shown that in case the Government restricts the pass through of world price increase to the domestic economy, it stands a very high risk of jeopardising the fiscal position. The deteriorating fiscal deficit would lead to a contraction of the economy risking the health of the economy for future growth. A weakened petroleum sector and the industrial sector would lead to dampening of investment sentiment and this could lead to a very negative situation for a growing economy like India. If the international price rise is allowed to pass through, though there would be increase in the price level, this does not necessarily signal an unsustainable situation from an economic perspective. The more realistic energy pricing would lead to better use of resources and a market for alternative energy.

1.1 Factors affecting crude oil prices

It's easy to see given all the factors that affect the price of oil, any shock to the system can, and has, caused large swings in the price of crude. A lot of the world's oil supply is located in parts of the globe that have historically been prone to political instability. All of this contributes to the volatility and the ultimate price we pay for oil.

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Sources: U.S. Energy Information Administration, Thomson Reuters

1.1.1 Production: The Organization of Petroleum Exporting Countries (OPEC) consortium is responsible for 40 percent of the world's oil production. The oil that OPEC exports represents 60 percent of all of the oil traded on international markets. Due to the sheer size of OPEC's crude supply market share, its actions and even its statements can, and do, have an effect on world oil prices. OPEC production cuts generally lead to price increases.

1.1.2 Supply: The non-OPEC suppliers represent 60 percent of the world's oil supply. While as a group they're 50 percent larger than OPEC, non-OPEC producers have virtually no spare capacity. They're referred to as "Price Takers." That is, they respond to market prices rather than attempting to manipulate them, as OPEC does.

As a result, non-OPEC suppliers generally produce at or near full capacity. Any production lapse generally has the effect on increasing oil supplies. It also gives OPEC the ability to further manipulate world supplies.

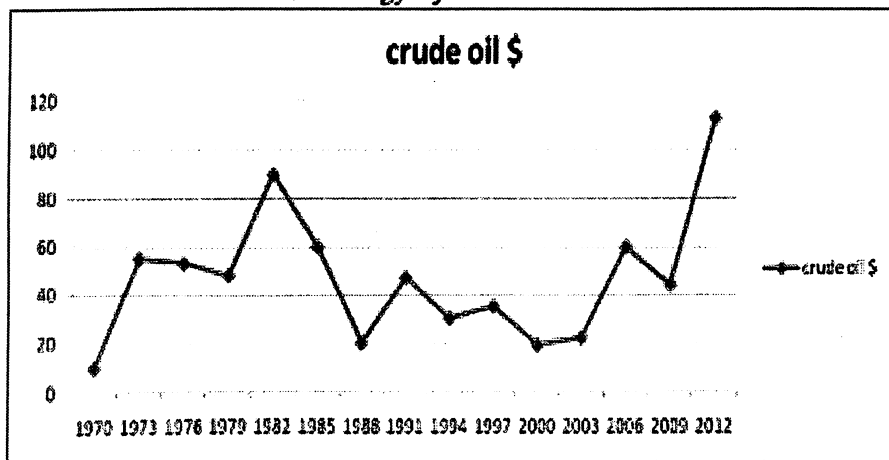
- 1.1.3 **Global oil inventories:** Global oil inventories balance supply and demand. If production exceeds demand, excess supplies can be stored. The reverse is also true. When consumption exceeds demand, inventories can be tapped to meet the incremental demand. Without getting too detailed, the relationship between oil prices and oil inventories allows for corrections in either direction. If market makers notice an inventory build, spot oil prices will likely drop in response to balance demand with supply. Conversely, if oil futures rise in relation to the current spot price for oil, the impetus to store oil will increase.
- 1.1.4 **Financial markets:** Oil brokers don't just sell physical oil. They also trade contracts for its future delivery, commonly known as "futures". Some customers, like airlines, purchase futures to hedge against future oil price increases that could have adverse effects on their ability to operate profitably. Oil producers often sell oil futures contracts in order to lock in a price for a specific period of time.
- 1.1.5 **Demand:** The Organization of Economic Cooperation and Development (OECD) is made up of the United States, most of Europe, Japan and other advanced countries. The OECD is responsible for 53 percent of the world's demand for oil. While they consume more oil than non-OECD countries, their rate of growth is much slower. During 2000 to 2010, OECD demand actually went down, while non-OECD demand exploded by 40 percent.
- 1.1.6 **Non-OECD demand:** China, Saudi Arabia and India together had the largest growth in crude consumption among non-OECD countries for the last decade. The rate at which oil consumption rises in any given country has a direct relationship to its rate of economic growth. So it comes as no surprise that for China and India, at least, their use of crude is skyrocketing compared to the United States'.

Developing countries also typically have more manufacturing-related industries, which tends to support higher crude consumption rates.

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1.1.7 Spot market: Crude oil is traded globally, and the many different "streams" of crude oil tend to move in lockstep with each other regarding prices. At the refinery, these streams are processed to make the products we use: gasoline, diesel fuel, heating oil, lubricants, jet fuel and various other petroleum products. Turn on any financial channel on TV and you'll hear the talking heads quoting the price of crude. But what really matters is the price we pay for the end products. The price of both crude and the finished products are affected by events that have the wherewithal to disrupt the flow of both crude and finished products. These events include hurricanes, geopolitical events, massive oil leaks, terrorist acts, etc. Since both supply and demand are relatively inelastic, any of the above events, or the perceived risk of them, can lead to higher price volatility, especially in the futures market.

Source: U.S. Energy Information Administration.



1.2 What is the relationship between oil prices and inflation?

The price of oil and inflation are often seen as being connected within a cause and effect framework. As oil prices move up or down, inflation follows in the same direction. The reason why this happens may be that oil is a major input in the economy - it is used in critical activities such as fueling transportation or goods made with petroleum products - and if the costs of intermediate input rise, so should the cost of end output. For instance, if the price of oil rises, then it will cost more to make plastic, and a plastics company will then pass on some or all of this cost to the consumer, which raises prices and thus inflation.

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With respect to the role of oil price changes in the economy, more and more studies show that there is a nonlinear relationship between oil prices and economic variables. Nearly all of the empirical analyses have found asymmetric economic responses to oil price changes. The asymmetry question has influenced much of the research such as Mork et al. (1994), Hamilton (1996), Cuñado and Pérez de Gracia (2005), and so on. They find that no significant relationship exists between oil-economy by using only oil price change as variable. Thus, all studies after 1990 began to include a separate negative and positive oil price changes variables as an alternative specification.

To provide a further insight, according to the historical statistics, the direct relationship between oil price and inflation was evident in the 1970s, when the cost of oil rose from a nominal price of \$3 before the 1973 oil crisis to close \$40 during the 1979 oil crisis. This helped cause the consumer price index (CPI), a key measure of inflation, to more than double from 41.101 in January 1972 to 86.30 by the end of 1980. However, this relationship between oil and inflation started to deteriorate after the 1980s. During the 1990's Gulf War (oil crisis), crude prices doubled in six months from around \$20 to around \$40, but CPI remained relatively stable, growing from 134.6 in January 1991 to 137.9 in December 1991. In this relationship, it is even more noticeable

The Consumer Price Index (CPI) is compiled by the Bureau of Labor Statistics. Consumer Price Index is based upon 1982 (base of 100). For example, the CPI of 158 indicates 58% inflation since 1982. The commonly quoted inflation rate of say 3% is actually the change in the Consumer Price Index from a year earlier during the oil price hike from 1999 to 2008, in which the monthly average nominal price of oil started rising from the recent low point (\$11.32) in January 1999 to \$109.05 in April 2008. During this same period, the CPI rose from 164.30 in January 1999 to 214.82 in April 2008.

Judging by the data, obviously, it seems that the strong correlation between oil prices and inflation contains some degree of nonlinearity, which is consistent with prior research mentioned above. As a matter of fact, the effects of oil price changes on inflation rates may be comparatively tiny in the long run, but they could be significant over relatively short periods. Most importantly, the effects of a given change in the price of oil may vary over time. In order to capture the more accurate transmission of oil price changes to CPI inflation.

1.3 Relationship Between Economic Growth And Oil Prices

There are a number of evidences to support bidirectional or unidirectional causality between energy consumption and economic growth. Despite the expanding literature on the study of causal relationships between energy consumption and economic growth, to the best of the author's knowledge, there have been some studies specifically addressing causal relationship between oil consumption and economic growth. The direction of causality between oil consumption and economic growth has significant policy implications for countries, enjoying implicit generous subsidies for energy. On the other hand, if unidirectional causality runs from energy consumption to income, reducing energy consumption. Numerous studies have been conducted to examine the relationship between energy consumption and economic growth; the overall findings show that there is a strong relationship between energy consumption and economic growth.

The impact of an oil price shock on GDP is known to be a straightforward, classic supply-side effect. An oil price increase results in an increase in cost of production, hindering productivity and output growth and eventually leading to a fall in GDP. However, this occurs with varying degrees across countries with different economic characteristics. The CPI-oil price relationship indicates an inflationary pressure stemming from increased oil prices, creating an inflationary shock.

Extensive research has identified the macroeconomic implications of oil price shocks since the 1970s. A key catalyst into this area of research was the oil price shocks from 1973 and 1974. One of the earliest and most influential studies identified the negative relationship between oil prices and macroeconomic indicators by demonstrating that almost all the recessions in the United States after World War II had been preceded by an oil price increase (Hamilton, 1983). Several other studies by the same author reaffirmed this theory amongst other arguments that had been raised (Hamilton, 1996; 2004). Other studies also found a negative impact of oil prices on macroeconomic indicators. In the United States, the relationship was found to be negative and relatively stable (Gisser and Goodwin, 1986). For various other countries studied, the results

were mixed but mostly reinforced evidence that the 1973 oil price shocks had a substantial impact on macroeconomic indicators (Burbridge and Harrison, 1984).

Several oil-importing countries also showed that their economies are negatively impacted by oil price hikes and that the shocks accounted for a large proportion of volatility (Jiménez-Rodríguez and Sánchez, 2005). Country studies that have been conducted also indicate similar results in general. Data for New Zealand confirms a direct link between oil price shocks and economic growth, with oil price shocks also being a major source of volatility in growth. Indirect links between oil price and inflation and real exchange rates were also established for the country (Gounder and Bartleet, 2007). A negative casual relationship between oil price shocks and economic output was also identified for Greece (Papapetrou, 2001).

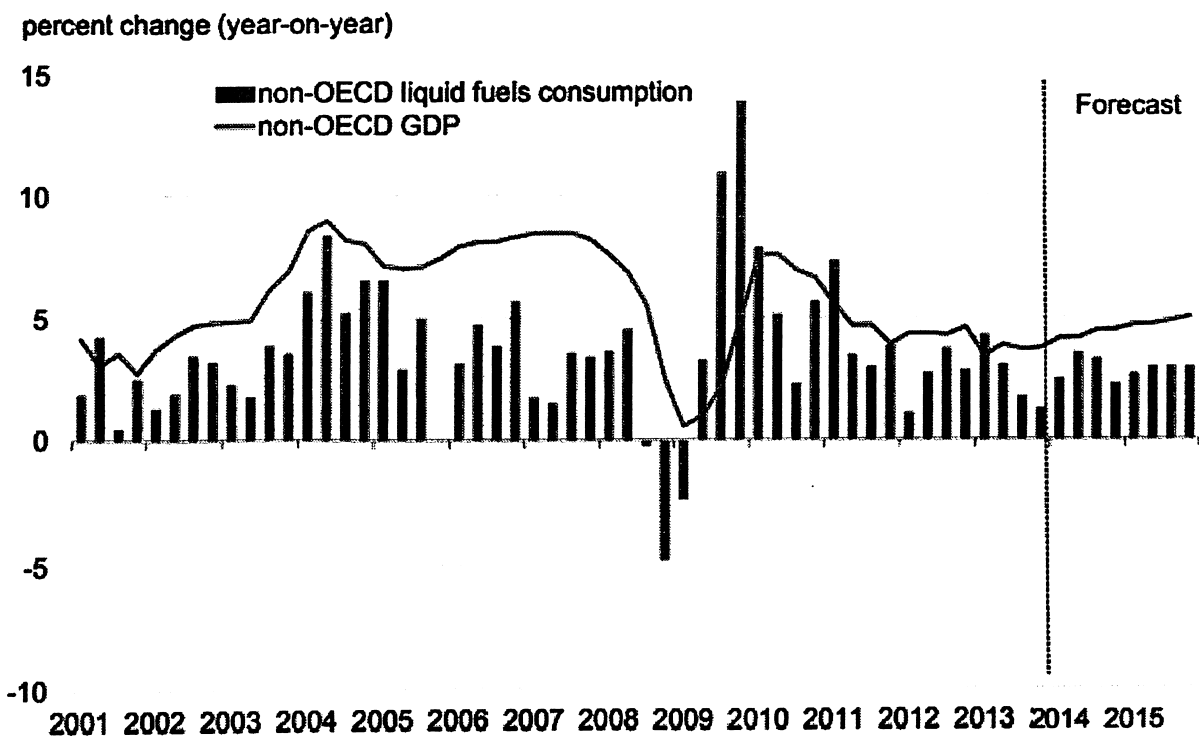
However, further examination of oil price shocks has raised other arguments. Structural breaks in the data after 1986 indicated a changing, unstable oil price-macroeconomic relationship (Hooker, 1996). There is a wide belief that there has been a declining oil price-macroeconomic relationship (Mork et al., 1989, 1994; Abeysinghe, 2001).

A country study on Singapore also indicated a declining relationship, with oil price shocks only having a marginal impact on macroeconomic indicators (Chang and Wong, 2003). Reasons for the diminishing impact of oil prices have been attributed to decreases in real wage rigidities, increased credibility of monetary policy and a decrease in the share of oil in consumption and in production (Blanchard and Gali, 2007).

The impact of the 1979 oil price shocks were found to be smaller than the shocks in 1973 for most countries that were analyzed (Burbridge and Harrison, 1984). This led to other arguments arising to account for the stagflation that followed the oil price shocks. Increases in industrial commodity prices and exogenous changes in monetary policies were presented as reasons for the stagflation instead (Barsky and Kilian, 2002; 2004). Thus, one explanation for the absence of stagflation and increased resilience against oil price shocks in recent years would be due to a monetary policy regime that places emphasis on price stability (Kilian, 2010).

Apart from differing views on the impact of oil price shocks, an asymmetric relationship has also been identified, with increases in oil prices affecting GDP almost twice the amount that decreases in oil prices do (Ferderer, 1996).

A similar asymmetric relationship was also established in the United States and Europe (Lardic and Mignon, 2006) and for several Asian countries (Cunado and Gracia, 2005).



1.4 Impact On India's GDP And Inflation

India's crude oil import bill may cross USD100 billion if the global price stays firm at USD 100-USD 120 a barrel. If that happens, it will upset the delicate fiscal balance, expand deficit, increase the subsidy bill that continues to bloat after year and fuel inflationary expectations. Rising crude oil prices will impact inflation whether the government absorbs the burden or passes it to the consumer by increasing prices of petroleum products. If the government acts as a buffer, the oil subsidy bill will rise and affect fiscal deficit. This will indirectly fan inflation. The recent strengthening of crude oil prices could impact economic growth momentum in the country for the current fiscal. The main factors that would be responsible for economic growth moderation in 2011-12 would be crude oil prices and RBI's tightening of monetary policy in response to oil prices. Rising crude price will lead higher inflation and higher inflation attracts

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monetary tightening. Monetary tightening would lead to a squeeze on aggregate demand, impacting economic growth. There will be an impact on the price level and on inflation. Its magnitude will depend on the degree of monetary tightening and the extent to which consumers seek to offset the decline in their real incomes through higher wage increases, and producers seek to restore profit margins.

Chapter 2 : Literature review

This thesis aims to analyze empirically the relationship between oil and the level of growth in economic output (or income) from a number of different angles. The thesis begins by investigating oil demand; in particular, the relationship between oil consumption and income (as well as prices) across six regions of the world by applying the Structural Time Series Modeling (STSM) technique. Furthermore, the estimates are used to produce different forecast scenarios of oil demand for each of the regions up to 2030. The thesis also investigates the co-movements and causality relationship between oil prices and GDP of non-OECD countries, grouped depending on whether a country is a net oil exporter or net oil importer using both time-series and panel data models. The results suggest that there is a long-run co-integrating relationship between oil prices and GDP and that oil prices 'Granger-causes' GDP for the group of net oil exporting countries but fails to 'Granger-cause' GDP for the net oil importing countries. This implies that oil prices have a strong influence on economic output of net oil exporting countries with little or no influence on the economic output of net oil importing countries.

Finally, the research considers the resource curse hypothesis debate by employing recently developed heterogeneous panel analysis to investigate the long-term effect of oil abundance on economic growth. It is concluded that oil as a resource, cannot be attributed to the poor economic performance of most oil rich countries, but perhaps might have come about by weak institutional base and oil price volatility which usually has an adverse effect on long-term economic performance. (Suleiman, October, 2013)

This paper discusses the effects of recent energy price changes on developing countries. It reviews the transmission channels between energy prices and growth and distribution in developing countries based on the most recent literature; employs a Computable General Equilibrium (CGE) model to identify the most vulnerable countries; and presents three brief country case studies analyzing policy responses to oil shocks in more detail (Nigeria, Malawi and Ghana). (Anciaes).

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This paper reviews how oil prices affect the macro-economy and assesses quantitatively the extent to which the economies of OECD and developing countries remain vulnerable to a sustained period of higher oil prices. It summarizes the findings of a quantitative exercise carried out by the IEA in collaboration with the OECD Economics Department and with the assistance of the International Monetary Fund (IMF) Research Department. According to the results of a quantitative exercise carried out by the IEA in collaboration with the OECD Economics Department and with the assistance of the International Monetary Fund Research Department, a sustained \$10 per barrel increase in oil prices from \$25 to \$35 would result in the OECD as a whole losing 0.4% of GDP in the first and second years of higher prices. Inflation would rise by half a percentage point and unemployment would also increase. The OECD imported more than half its oil needs in 2003 at a cost of over \$260 billion – 20% more than in 2001. Euro-zone countries, which are highly dependent on oil imports, would suffer most in the short term, their GDP dropping by 0.5% and inflation rising by 0.5% in 2004. The United States would suffer the least, with GDP falling by 0.3%, largely because indigenous production meets a bigger share of its oil needs. Japan's GDP would fall 0.4%, with its relatively low oil intensity compensating to some extent for its almost total dependence on imported oil. In all OECD regions, these losses start to diminish in the following three years as global trade in non-oil goods and services recovers. This analysis assumes constant exchange rates. (Analysis of the impact of high crude prices on global economy, 2004)

This paper segments monthly data into three periods based on historical oil events. The central purpose is to examine the relationship between real oil price changes and the inflation rates in the framework of Mork's (1989) asymmetrical model. We find: (1) a majority of countries support long-run asymmetric responses of inflation rates to real oil price increases and decreases, but they are nearly in linear relation in the three shorter periods; (2) the immediate responses of inflation to real oil price changes are mainly larger than that of lagged periods, and the cumulative impact of real oil price increase is in general larger than the cumulative impact of real oil price decrease; (3) the direction of causality from real oil price changes to the inflation is nearly unmistakable in both asymmetrical and linear cases, and it is particularly significant in a co-integration relationship; and (4) the responses of inflation rates to oil price changes are

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generally higher in Period I (pre-1986:12) than in Period II (1987:01-1998:12) or in Period III (post-1999:01), which is in accord with actual observation (Bwo-Nung Huang).

This paper reinvestigates the relationship between the price of oil and real economic activity, focusing on the role of uncertainty about oil prices. To do so, the authors utilize an internally consistent simultaneous equations framework that accommodates an independent role for the effects of oil price volatility and jointly estimates all parameters of interest. They found that volatility in oil prices has had a negative and statistically significant effect on real economic activity. They also found that accounting for the effects of oil price volatility tends to exacerbate the negative dynamic response of real economic activity to an unfavorable oil price shock, while dampening the response to a favorable oil price shock. Their results provide another explanation of why the sharp oil price declines of 1985 failed to produce rapid output growth, as well as why the sustained, but steady, recent oil price increases have not yet been accompanied by a recession. (Oil Price Uncertainty, 2007; James Hamilton, 2007)

The paper examines whether energy fuels economic growth or vice versa in the Indian context. Utilizing Granger causality test, the study suggests that it is the economic growth that fuels more demand for both crude oil and electricity consumption and it is the only growth of coal consumption that causes economic growth. When influence of different components of energy on major two components of economic growth is tried with same causality test, none of the components of energy found to be significantly influencing the components of economic growth viz. private consumption and private investment. In contrast, the out of sample forecasts in the variance decomposition analysis of VAR suggests that there is a bi-directional influence between electricity consumption and economic growth but an unidirectional influence from GDP growth to natural gas consumption. Therefore, the study yields mixed and contradictory result as compared to the previous studies in the Indian context. However, on the basis of application of two econometric tools, the study with little more conviction could suggest for reducing oil and natural gas consumption for achieving higher rate of economic growth in the economy. (Mallick)

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In this study, the relationship between the consumer price index and the fuel oil price index in Turkey was examined in the time interval monthly data of 2005-2010 using the Vector Error Correction Model. Study results revealed that a 1% increase in fuel oil prices caused the consumer price index to rise by 1.26% with an approximate one year lag. Moreover, the change in fuel oil prices was found to be the one-way Granger cause for changes in the consumer price index. (Tuncay Çelik, 2011)

This paper examines the economic consequences of oil shocks across a set of industrialized economies over time. First, it shows that knowing the underlying reason for a change in oil prices is crucial to determine the economic repercussions and the appropriate monetary policy reaction. For oil demand shocks driven by global economic activity, all economies experience a temporary increase in real GDP following an oil price increase, while for oil-specific demand shocks all economies experience a temporary decline in real GDP. The effects of exogenous oil supply shocks are, however, very different across countries when oil prices increase. Whereas net oil- and energy importing economies all face a permanent fall in economic activity following an adverse supply shock, the impact is insignificant or even positive for net energy exporters. Second, the pass-through to inflation turns out to differ considerably across oil-importing economies and strongly depends on the existence of second-round effects via increasing wages. Third, it investigates how the dynamic effects have changed over time. This paper documents a much less elastic oil demand curve since the mid 1980s, which seriously distorts inter-temporal comparisons. However, it demonstrates that economies which improved their net energy position the most over time became relatively less vulnerable to oil shocks compared to other economies (Christiane Baumeister G. P.).

Crude oil has become an integral part of the Ghanaian economy. This makes the growth of the Ghanaian economy vulnerable to fluctuations in the world price of crude oil, especially when the

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country still depends largely on imported crude oil to meet her crude oil needs. This study therefore employed the ARDL approach to co-integration to examine the relationship between crude oil price and Ghana's economic growth using annual data set from 1967 to 2011. Unlike previous studies on crude oil price economic growth relationship for Ghana, this study controlled for the effect of fiscal policy in the relationship. The results of the study indicated the existence of a long run relationship between crude oil price and economic growth in Ghana. Also, the study revealed that oil price increases had a negative impact on economic growth in both the short run and long run and this was reinforced by increases in government expenditure in response to the oil price in the form of fuel subsidies. The policy implications are that fuel subsidies should be removed and the country should consider alternative sources of energy such as Compressed Natural Gas (CNG), Liquefied Petroleum Gas (LPG), or Ethanol (Fuel made from sugar cane) which are cheaper relative to crude oil price. (CRUDE OIL PRICE AND ECONOMIC GROWTH: THE CASE OF GHANA)

Crude oil is one of the highest demanded commodities in the entire world so fluctuations in crude oil price can make serious impact on the growth of any economy. The objective of this paper is to assess the impact of crude oil price fluctuations on economy through the different macro-economic indicators. This paper employs correlation matrix and regression model to articulate the relationship between the different macro-economic components of Indian economy. In an empirical dataset covering twenty years, it detects that these variables are highly sensitive to the fluctuation of crude oil prices. Hamilton's 1983 showed in his work that oil prices increased and thereby reduced US output growth between 1948 and 1980. Hamilton's results have been confirmed and extended by a number of other researchers. Mork, Olsen and Mysen (1994) confirmed the asymmetry in effects for other OECD countries. In comparison with the other countries, oil price increases seem to slow down economic growth in the U.S. to a great extent, even if this country is less dependent on imported oil than countries like Germany, France, and Japan. Barsky and Kilian (2002) have reported that an oil price shock is inflationary for the price of gross output. There is evidence of sharp changes in the CPI inflation rate following major oil price changes. Jin (2008), sharp increase in the international oil price and violent fluctuation of the exchange rate are generally regarded as factors discouraging economic

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growth. He submitted that oil price increase, all other things being equal, should be considered positive in oil exporting countries and negative in oil importing countries. Olomola and Adejumo (2006) examined the effects of oil price shocks on output, inflation, real exchange rate and money supply in Nigeria with in a VAR framework. They found no substantial role of oil price shocks in explaining movements in output and inflation, but on the long run money supply and real exchange rate are significantly affected following a shock to oil prices. Sadorsky (1999) studied the relationship between shocks that occurred in oil prices in the U.S.A. and the stock exchange. The results of the study using the data from 1947-1996, where the VAR and GARCH analyses were applied and interest rate and industrial production output were included, revealed that oil-price volatility had a negative effect on stock prices. Papapetrou (2001) in his study investigated the dynamic relationship between oil price shocks, the stock exchange (stock prices) and economic activities (interest rate and work force) in Greece. His research discovered that oil price shocks negatively impacted the stock, seeing as they negatively affected output and employment growth. (Himanshu Jain)

This paper assesses empirically the effects of oil price shocks on the real economic activity of the main industrialized countries. Multivariate VAR analysis is carried out using both linear and non-linear models. The latter category includes three approaches employed in the literature, namely, the asymmetric, scaled and net specifications. We find evidence of a non-linear impact of oil prices on real GDP. In particular, oil price increases are found to have an impact on GDP growth of a larger magnitude than that of oil price declines, with the latter being statistically insignificant in most cases. Among oil importing countries, oil price increases are found to have a negative impact on economic activity in all cases but Japan. Moreover, the effect of oil shocks on GDP growth differs between the two oil exporting countries in our sample, with oil price increases affecting the UK negatively and Norway positively (Rebeca Jiménez-Rodríguez).

This paper attempts to study the transmission mechanism of an increase in petroleum prices on the prices of other commodities and output in India. The paper also examines the nature and the extent of 'feedback' in such a transmission mechanism and obtains evidence of bidirectional

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causality between oil and non-oil inflation in India. Theoretical research generally concluded that oil price shocks lead to substantial increase in wages and prices and decrease in real output [Bruno 1982; Bruno and Sachs 1982]. Empirical studies based on a vector auto regression (VAR) framework corroborated these results [Hamilton 1983], but the impact was observed to be sharply different across countries, even among the developed ones [Burbidge and Harrison 1984]. Subsequent research, however, provided evidence that oil prices no longer caused macroeconomic fluctuations in the US economy and inferred that the causal relationship between oil prices and macroeconomic performance, while robust for the post 1973 period, weakened considerably thereafter and failed to capture the dynamics of business cycles in the post 1979-80 period [Hooker 1996]. Hamilton (1996), however, challenged Hooker's findings. For OECD countries, Cristini (1998) observed strong correlation between macroeconomic activity and price of oil. (KAUSHIK BHATTACHARYA)

The U.S.A and Sweden were chosen to compare their GDP sensitiveness to oil price volatility. The reason is that the U.S.A remains as the largest economy and consumes 25% of the oil produced in the world and is the most oil dependent among developed countries according to the EIA. Sweden on the contrary energy efficient and consumes relatively less oil per capita than many developed countries, it is also believed to be one of the most progressive countries in developing and using renewable energy resources and therefore less sensitive. The bivariate results does not show a pattern of negative correlations for Sweden between GDP growth and real oil price increases, however the U.S.A showed to be more sensitive to oil price increases. (Aarón González, 2009)

In the backdrop of recent developments in global commodity prices, this study provides analytical and empirical perspectives on imported inflation in the Indian context.

Sources and commodity-wise trends in imported inflation are analyzed during the last four decades. Empirical analysis suggests that at the global level, export of inflation from oil

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exporting countries is significantly higher than that of industrial and non-oil developing countries including Asia. At the same time, despite low domestic inflation, export of inflation from industrial countries is significantly higher than that of non-oil developing countries. Inflation in India is positively influenced by import price, capital flows and exchange rate. Based on a non-parametric approach, import price inflation on an average accounts for about 1 to 2 percentage points increase in domestic inflation. Within the framework of the vector error correction and cointegration model, about 5 percentage points increase in import prices contribute to 1 to 1.5 percentage points increase in domestic prices. In terms of variance decomposition analysis, capital flows have a greater impact on domestic inflation, deriving from the former's association with exchange rate and import prices. (Janak Raj, 2008)

The study examined the impact of increase of petroleum prices in the Nigerian economy. The methodology is empirical econometric analysis approach. Variable used for analysis were inflation rate and petroleum prices in Nigeria. These variables were considered appropriate indicators of petroleum products and inflation rate responses. The main tool of analysis was a multiple regression model which examines the relationship between petroleum prices and inflation in Nigeria from 1990-2011. Data on the variables were used to estimate parameters of the model through the OLS techniques. Estimates of model parameters were evaluated based on relevant statistics from the regression. The results shows positive relationship exists between PMS, AGO and inflation. PMS had more effect on inflation, while negative relationship exists between inflation and DPK. However, the overall effect showed increase in petroleum product price increase the rate of inflation in Nigeria (Bobai).

The purpose of this paper is to investigate whether economic world growth can be explained by changes in the oil price. We will also investigate if there are any differences in oil price effects on economic growth between different countries and group of countries. A possible reason for these differences was oil exports/imports countries. For the oil importer countries, oil price increase and economic growth are negatively correlated while all things being equal, the relation is positively correlated for oil exporter countries. The data used in this paper covers the G-7

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group, OPEC countries in addition to Russia, China and India. The main findings may be summarized as follows: Our use of Granger causality-tests allows us to conclude that the interaction between oil price changes and economic growth is not proved for the most countries but for the G-7 group where, a unidirectional relation from oil price to gross domestic product is proven. (Ghalayini, 2011)

The purpose of this paper is to examine crude oil price movements and their impact on South Africa. A useful starting point is to understand the factors that have played a prominent role in influencing oil pricing. For this reason, I begin by focusing on OPEC producing countries and the challenges these countries face with supply management. After considering domestic oil pricing and accounting for fluctuations in crude oil price movements, I examine the domestic impact of oil price changes on the South African economy. (Nkomo)

The cross-section distribution of U.S. import prices exhibits some of the fat-tailed characteristics that are well documented for the cross-section distribution of U.S. consumer prices. This suggests that limited-influence estimators of core import price inflation might outperform headline or traditional measures of core import price inflation. We examine whether limited influence estimators of core import price inflation help forecast overall import price inflation. They do not. However, limited influence estimators of core import price inflation do seem to have some predictive power for headline consumer price inflation in the medium term. (Janet Koech, november 2012)

This paper explores the reasons for that growth and the implications for petroleum markets in the United States. World oil prices have been rising since 2004, driven in part by the increases in China's demand for crude oil and refined petroleum products. Those increases were most prominent for the light petroleum products—gasoline and diesel—that are used primarily for

transportation. Over the next five years, the pace of growth in China's demand for oil in general, and for transportation fuels in particular, could be a key factor contributing to further increases in the prices for crude oil and refined petroleum products. In the United States, those price increases could affect the demand for petroleum and influence the investment decisions of U.S. refiners. (China's Growing Demand for Oil and Its Impact on U.S. Petroleum Markets, 2006)

This article tries to study and analyze the impact of the oil price and inflation rate on the macro economic variables and especially Iran economic growth. For doing so, Johansen-Juselius co-integration method was employed for investigation the long term relationship among model variables for period of 1971-2007. The results show a co integration relationship among variables of inflation rate, oil world price and economic growth. In addition the results of this research show that increase of oil price in the world markets has had significant and positive effect on Iran economic growth in the studied period and there is a reverse relationship between inflation rate and Iran economic variables. (Asgari, 2013)

The aim of this paper is to investigate the effect of oil price to the GDP and other macroeconomics variable such as inflation and exchange rate. Quarterly time series data between 1999 Q1 and 2011 Q4 are employed in this paper. The data used are Indonesia's gross domestic product, world's oil price, Indonesia's inflation, and Indonesia's real exchange rate. In addition, this paper also emphasizes to examine the effect of oil price to GDP and macro-economic variable when Indonesia experiences as a net oil exporter country and as a net oil importer country. Most of previous studies show the positive relationship between oil price and macroeconomic variables in the oil exporter countries and negative relationship in the oil importer countries.

Using VECM methodology, the findings reveal that higher oil price leads to higher GDP in the short run but insignificant. The result for the influence of oil price in inflation and exchange rate is also insignificant in the short run. In the long run, higher oil price will contribute to higher GDP. On the other when Indonesia experience as a net oil importer country, the the effect of higher oil price will contribute to lower GDP than that during period net oil exporter. In addition,

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during period as a net oil importer country, the increase of oil price triggers the increase of inflation and exchange rate but insignificant. (Mulyadi)

This paper examines four major determinants of crude oil prices between 1997 and 2011 using quarterly data namely - demand side: fast-growing demand due to high global economic growth supply side, declining non-OPEC supply and factors relating to the structure of the crude oil market and the coordinated action on the part of crude oil producer. It presents some stylized facts about the recent development of crude oil prices. (Yousef)

This paper attempts to study the impact of crude oil price on the Indian economy by considering Gross Domestic Product (GDP), Index of Industrial Production (IIP) and Wholesale Price Index (WPI) as the relevant variables. Vector Auto Regression (VAR) has been used to analyze the objective since a direct causal relationship could not be established. (Aparna)

This paper compares the economic consequences of several types of oil shocks across a set of industrialized countries that are structurally very diverse with respect to the role of oil and other forms of energy in their economy. It aims at finding considerably different effects across countries, which crucially depend on the underlying source of the oil price shift. (Gert Peersman, 2009)

The purpose of this paper is to empirically examine the impact of oil prices on the macroeconomic variables in Russia using the VAR model. The time span covered by the series is from 1994:Q1 to 2009:Q3, giving 63 observations. The analysis leads to the finding that a 1% increase (decrease) in oil prices contributes to the depreciation (appreciation) of the exchange rate by 0.17% in the long run, whereas it leads to a 0.46% GDP growth (decline). Likewise, we find that in the short run (8 quarters) rising oil prices cause not only the GDP growth and the exchange rate depreciation, but also a marginal increase in inflation rate. (Ito)

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Oil prices have been highly volatile since the end of World War II. The volatility becomes even more serious in recent time. This has implications for the economies of oil exporting countries, particularly oil dependent countries like Nigeria. The paper examined the impact of these fluctuations on macroeconomic of Nigeria. Using VAR, the impact of crude oil price changes on four key macroeconomic variables was examined. The results show that oil prices have significant impact on real GDP, money supply and unemployment. It impact on the fourth variable, consumer price index is not significant. This implies that three key macroeconomic variables in Nigeria are significantly explained by exogenous and the highly volatile variable. Hence, the economy is vulnerable to external shocks. (Gunu Umar)

This paper analyzes the case for the Spanish economy, which is different in many ways from the U.S. economy. The Spanish economy is less flexible in both the labor and goods market, so considering an imperfect competition framework is important. Spain's economy also needs to be modeled as a small open economy that imports oil and has a negligible impact on oil prices and international interest rates. It specifies estimates and simulates a new Keynesian DSGE model of a small open economy hit by three kinds of shocks: productivity, monetary and oil shocks. The monetary authority follows a Taylor rule, adjusting interest rates for the steady state deviations of inflation and output and the difference between domestic and international interest rates. The parameters of the model are estimated using Kalman filter techniques. Finally, the model is simulated in order to obtain impulse response and variance decomposition of the different shocks. (Carlos de Miguel)

Chapter 3 : Objectives

There are various objectives that are kept in mind to make this thesis fruitful. The objective here is to study the impact of Oil Inflation on the economic growth of India. This can be achieved by achieving these objectives which are mentioned as follows:

- To measure the Oil Inflation of India caused due to the increasing Indian basket crude oil prices.
- To analyze the impact of Imported (oil) Inflation on the growth rate of India.

Chapter 4 : Research Methodology

This study has an exploratory approach. The number of observations used in this study are 34, wherein the period starts from 1st quarter of 2005 and ends at 2nd quarter of 2013.

The dependent variable in the study is the “**Real GDP Growth rate**” and the independent variable in the study is “**Imported Inflation of Indian Basket Price**”.

The model used in the study is “**Dynamic Ordinary least Square Model**”.

4.1 Need for research

This research work is done to understand the impact of oil inflation on economic growth of India. Oil and gas industry witnesses frequent ups and downs and hence volatility in oil prices is an issue. Various techniques to test the results of the research work can then be applied so as to generate a reliable statement to conclude the thesis.

4.2 Type of research

The data collected here will be secondary data from the internet from sources like research papers written by industry experts as well as academicians from various universities.

The data will be collected from journals, research papers and also from several theses written by scholars.

Research design is explanatory.

4.3 Source of Data:

- RBI
- IMF
- Indian Oil
- OPEC

Quarterly data will be included in this study from 2005 to 2013.

4.4 Research Model:

$$Gr_{jt} = \beta_0 + \beta_1 Gr_{jt-1} + \beta_2 Infl_{t-1} + U_t$$

Where GR_t = Growth rate

t = time period

j = home country i.e., India

$(t-i)$ = 1 period lag

$Infl$ = Inflation measured from Indian Crude Basket prices as it is considered as import price for crude oil in India

U_t = error at time 't'

β_i = intercept

Oil Inflation = $(\text{Oil Price}^2 - \text{Oil Price}^1) / \text{Oil Price}^1 * 100$

Chapter 5 : Data Analysis

As per Dynamic OLS model, co-integration equation deterministic is constant or intercept (C). Fixed leads or lags are specified by the researcher based on the long run variance estimates such as Akaike Information Criteria (AIC) {maximum lags = 3} and Barlett Kernel, Newery – West fixed bandwidth at 4.

The co-integration equation deterministic i.e., 'C' shows highly significant at 1% (P = 0.0047)

The coefficient sign of imported inflation shows negative which reveals that a high inflation of Indian basket price is negatively affecting the growth rate of India because value of P of inflation shows highly significant at 1% (P = 0.0055).

An adjusted R- squared value shows that the model is highly fit.

The Durbin Wattson results test statistic is 1.703292, i.e., close to 2.

This reveals that there is no auto – correlation in the sample.

Dependent Variable: GDP
Method: Dynamic Least Squares (DOLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFL	-0.000153	5.05E-05	-3.024780	0.0055
C	1.930020	0.623592	3.095006	0.0047
R-squared	0.968733	Mean dependent var		2.028342
Adjusted R-squared	0.963923	S.D. dependent var		7.701519
S.E. of regression	1.462823	Sum squared resid		55.63614
Durbin-Watson stat	1.703292	Long-run variance		0.274545

Chapter 6 : Conclusions

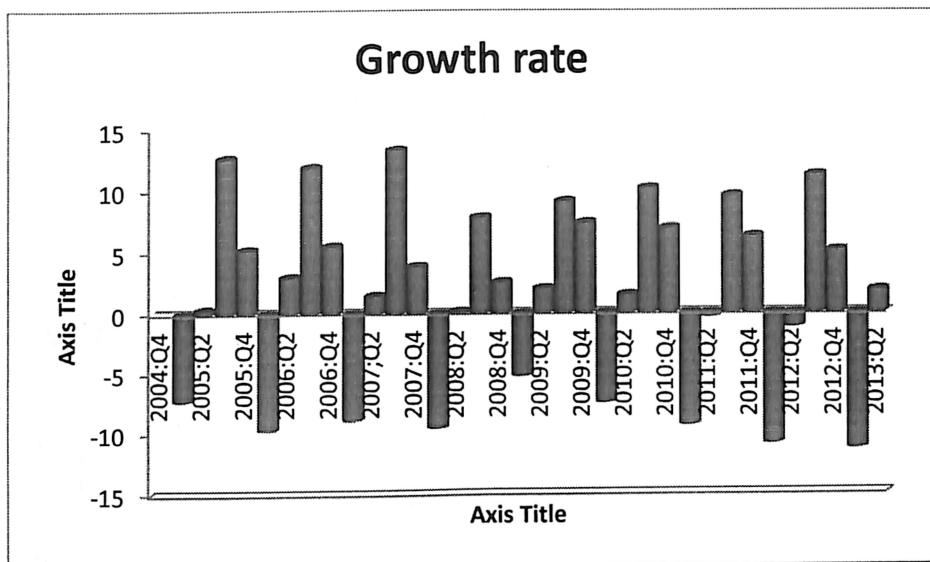
The prices of oil and inflation are often seen as being connected in a cause and effect relationship. As oil prices move up or down, inflation follows in the same direction. The reason why this happens is that oil is a major input in the economy - it is used in critical activities such as fueling transportation and heating homes - and if input costs rise, so should the cost of end products. For example, if the price of oil rises, then it will cost more to make plastic, and a plastics company will then pass on some or all of this cost to the consumer, which raises prices and thus inflation.

Oil price increases can also stifle the growth of the economy through their effect on the supply and demand for goods other than oil. Increases in oil prices can depress the supply of other goods because they increase the costs of producing them. In economics terminology, high oil prices can shift up the supply curve for the goods and services for which oil is an input.

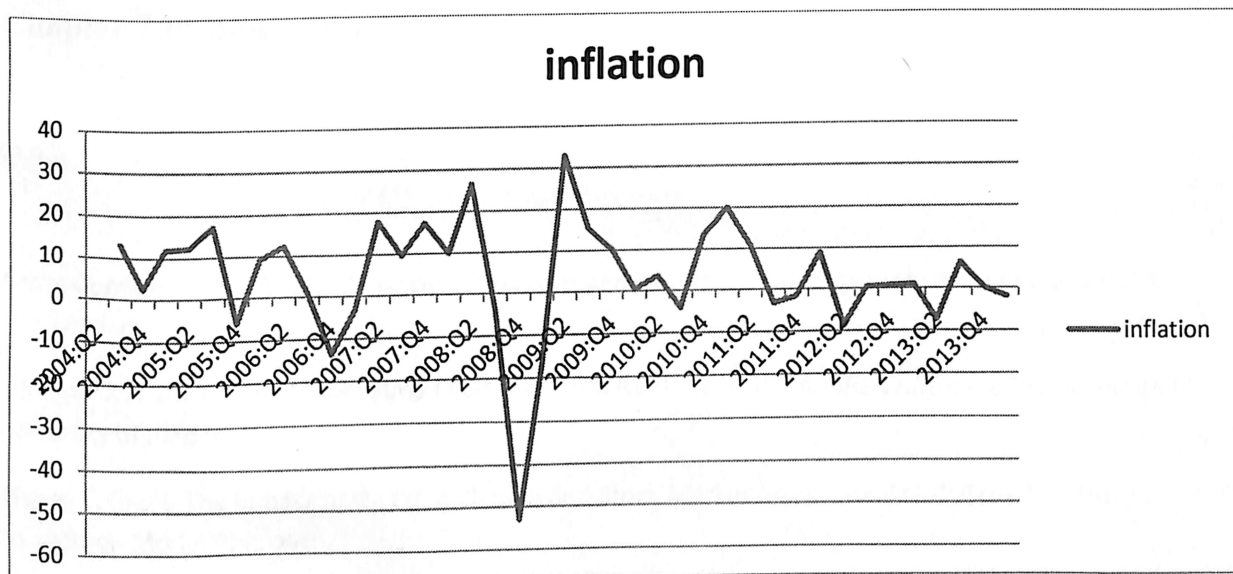
Even though there have been fluctuations in crude price these fluctuations were not observed in related industries because factors influencing the demand for an industry mobilized it towards growth. That is although the crude price had a negative impact on the Indian industry others had a positive impact on it and the Indian economy.

The trend in growth rate of Indian economy in the period 2005 to 2013 is shown in the graph below:

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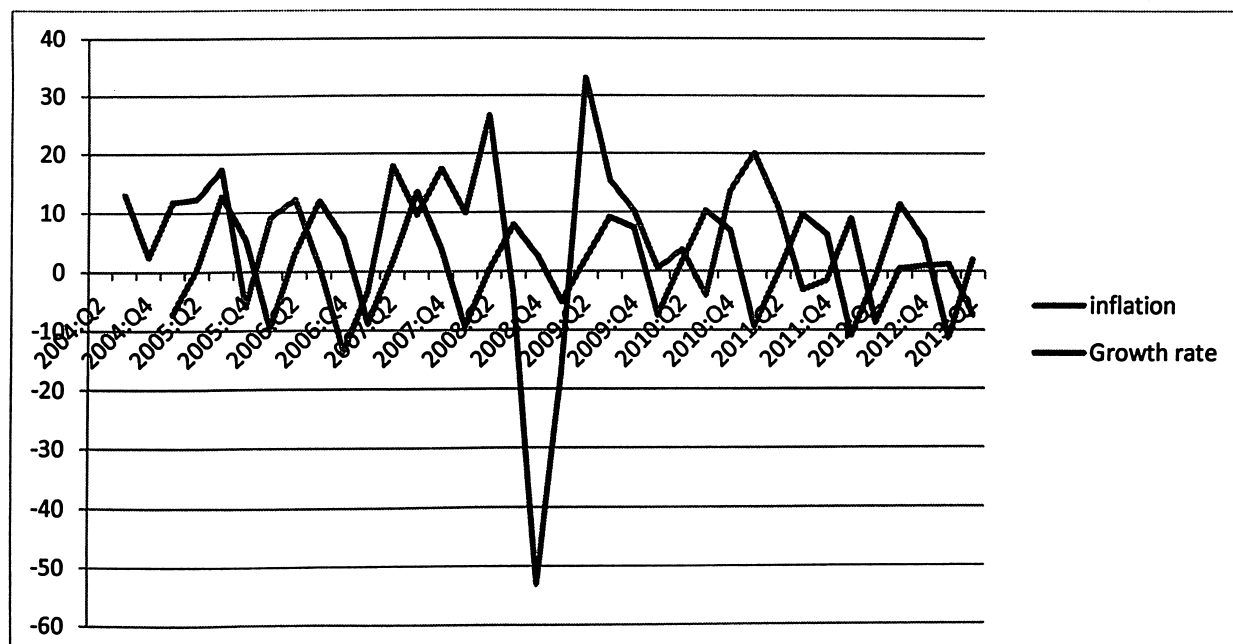


The trend in imported inflation (using prices of Indian Basket) of Indian economy in the period 2005 to 2013 is shown in the graph below:



The relation between imported inflation (of oil) and the growth rate of Indian economy in the period 2005 to 2013 is shown in the graph below:

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