



Impact of Crude Oil Prices on Inflation in India

Vansh Nigam

Student, The Shri Ram School, Mousari.

Abstract

This research paper aims to examine the dynamic relationship between crude oil prices and inflation in India by exploring their interconnected implications and mechanisms for economic stability. Crude oil plays a very important role in the global economy due to its influence on production, transportation and energy prices. The research paper uses both theoretical and statistical techniques to prove that crude oil price has a direct impact on inflation. Statistical techniques such as linear regression analysis, correlation analysis and Durbin Watson Test have been used. Analysis by statistics has been done on data from 2008 to 2023. These 15 years were taken in order to place special emphasis on oil price shocks due to the 2008 financial crisis and the Russia Ukraine war of 2020. These two historical events formed the theoretical backbone of the paper. Case studies and historical analysis have also been performed on these two events. In the research paper, theoretical techniques such as cost push inflation have been used to analyse the impact of crude oil price on inflation.

Foundational techniques such as calculation of inflation have also been explained and taught through the paper. The research paper also analyses the implications of an increase in oil prices on the Indian Economy. Multiple long term and short term mitigation strategies have also been discussed in the paper which can further be used by economists and policy makers for the greater good of humanity.

Key words :

Crude oil prices, CPI , WPI, inflation.

1.1 Introduction

Inflation is defined as the long-term increase in the general price level of goods and services in an economy. Oil Price shocks have influenced global economic dynamics and inflation since a very long time. They particularly have a large effect on developing nations such as India. As a net importer of oil, India sources over 80% of its crude oil from foreign markets making it vulnerable to global oil price fluctuations. Changes in Oil price trickle down through key macroeconomic factors such as GDP growth, exchange rates and inflation. It also affects the running of businesses and industries. Historically periods of sharp oil price increases have posed challenges to India's growth story with policymakers adjusting monetary and fiscal policies to maintain economic equilibrium. This paper focuses on the impact of oil price shock on inflation in India.

1.2 Research Objectives

The research objectives for the paper are provided below-

- To examine the relationship between oil prices and inflation in India which is an oil importing economy
- To assess the implications of oil price increases on oil importing economies such as India
- To use statistical frameworks to prove that oil price shocks have an impact on inflation
- To use cost push inflation and other theoretical frameworks to prove that oil price shocks have an impact on inflation
- To explore potential mitigation strategies that can be used by policymakers to counter oil price shocks

1.3 Hypothesis

This study aims to assess the impact of oil price shocks on inflation. The analysis explores the multifaceted ways in which oil price shocks affect inflation considering the Indian Economic landscape. By examining both theoretical frameworks and empirical evidence, it seeks to provide insights into the mechanisms driving these interactions and their implications for policymakers and economic stakeholders. This study can conclude in either of two hypothesis and aims to accept the alternate hypothesis. The two hypotheses are-

- Null Hypothesis-*There is no association between Crude Oil Average (\$/bbl) and Rate Of Inflation in India (in percent)*
- Alternative Hypothesis-*There is an association between Crude Oil Average (\$/bbl) and Rate Of Inflation in India (in percent)*

1.4 Calculation Of Inflation

Inflation is generally measured using the Consumer Price Index(CPI) . Consumer Price Index measures the changes in the price of a basket of consumer goods and services.

$$\text{Inflation Rate} = \frac{\text{CPI in Current Period} - \text{CPI in Previous Period}}{\text{CPI in Previous Period}} \times 100$$

This reflects the cost of living for an average household in India. Using these values we can calculate inflation in India in 2023 as :

$$\text{Inflation Rate of 2023} = 184.1 - 174.7 / 174.7 \times 100$$

$$= 5.38\%$$

Inflation in India was thus 5.38%

Inflation can also be calculated using the Wholesale Price Index(WPI). Wholesale price Index measures the changes in the price of a basket of wholesale goods and services.

$$\text{Inflation Rate}(\%) = \frac{\text{WPI}_{\text{current}} - \text{WPI}_{\text{previous}}}{\text{WPI}_{\text{previous}}} \times 100$$

$$\text{Inflation rate of 2023} = 146.7 - 138.5 / 138.5 \times 100$$

$$= 5.92\%$$

The rate of inflation is thus 5.92%

In order to calculate inflation, the formula using CPI is used as it reflects a change in price level of end consumer goods and services.

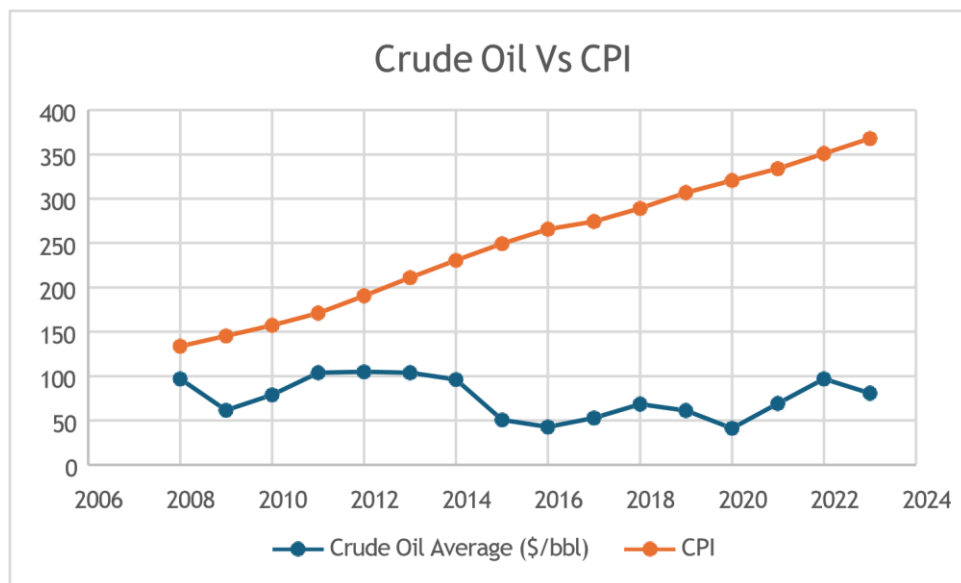


Figure 1.1(Crude oil prices vs CPI)

Figure 1.1 shows trend of crude oil prices and inflation in India as measured by CPI. It can be seen that there is a fluctuation in crude oil prices whereas CPI has registered an upward trend. This indicates that there are multiple factors that effect inflation in India. But, in this paper we restrict our analysis to effect of change in crude oil prices on inflation in India.

1.5 Theoretical Framework

Cost Push Inflation is an economic theory that links oil price and inflation. Inflation is the measure of the rate of price increases in an economy for goods and services. If a company's production costs rise, the company's management might try to recover those costs from consumers. If the company's management does not do so then their profits will fall. Oil is a key input in production processes, especially in energy intensive industries such as manufacturing, agriculture and transportation. With an increase in oil prices, production costs may rise. Due to this, the general price level of goods may increase. Higher oil prices also increase fuel costs which leads to high distribution and transportation costs. India imports 80% of its oil. Industries such as plastics, chemicals and textiles face increased production costs. For example, India's cement and steel industry saw production costs surge in 2022 which caused higher infrastructure costs and also led to an increase in the price of real estate. Oil is also used in fertilizers, irrigation and farm machinery. Rising fuel costs have increased agricultural production expenses which have led to higher food prices. In 2022, fertilizer prices in India increased by over 30% due to rising crude oil costs. This has led to higher wheat and rice prices.

Higher cost push inflation can increase India's trade deficit which can lead to depreciation of the rupee. A weaker rupee can increase the import bill and make imports more expensive, which can contribute to inflation across multiple sectors. Cost push inflation can also lead to a rise in electricity and power costs. This can increase production and day-to-day costs. Governments in order to tide over inflation also put higher tariffs on power over industries and households. This increases the cost of setting up industries. Another economic theory is that of

demand-pull inflation. Demand pull inflation is used to describe a phenomenon that occurs when consumer demand outpaces the available supply of consumer goods. Due to this, there is an overall increase in the cost of living. Demand pull inflation can occur due to a multitude of factors. It can be because of a growing economy where consumers have more money to spend thus, they spend it and the demand for goods and services increases. A sudden rise in exports can also lead to demand pull inflation as this can lead to devaluation of the currency. If the government gives out welfare schemes more frequently, then demand pull inflation can also take place as there is more money supply in the economy. When oil prices rise, oil exporting countries generally earn surplus revenue which boosts government expenditure and higher wages. This leads to increased consumer spending and thus demand- pull inflation takes place. The surge in demand for goods and services can spread to the trading partners of these countries. Governments also respond to oil shocks by increasing oil subsidies and fiscal spending thus raising overall demand. India does the same during oil shocks and thus public spending increases. Higher government expenditure raises demand for goods thus worsening inflation. Higher oil prices also boost demand for Indian exports such as IT services, pharmaceuticals and construction materials from middle eastern countries. This creates inflationary pressure on domestic markets. For example, During the 2008 oil price surge, Indian exporters saw higher demand from Gulf nations which led to demand pull inflation. When oil prices rise, Indian companies also increase infrastructure spending to maintain economic growth. This leads to high demand for raw materials and loans. As oil prices rise, businesses may also pass on costs to consumers thus increasing demand pull inflation. For example, in 2018 oil prices in India surged by 20% leading to higher wages in transportation and logistics sector. When demand pull inflation fully sets in, it is very difficult to control and it requires aggressive monetary tightening. Central banks may increase interest rates to reduce demand pull inflation which may lead to slower GDP growth. The last economic theory is that of monetary transmission mechanism. This refers to the process through which monetary policy decisions such as changes in interest rates may affect inflation and aggregate output. It essentially refers to the role that central banks play in reducing oil price shocks. It works through channels such as Interest rate channel, credit channel, exchange rate channel and inflation expectations channel. In oil price increases, central banks first tighten credit supply to prevent excess lending which could reduce the amount of money the economy has and thus prevent cost push inflation.

Demand Pull Inflation	Cost Push Inflation
There is a rise in Price level because of excess demand of goods and services in the market	There is a rise in price level because of increasing production costs.
It is caused by monetary and real factors	It is caused by monopolistic groups of society and increase in prices of primary inputs of production
Can be countered by monetary and fiscal Measures	Can be countered by administrative control on price rise and income policy

Increasing oil prices lead to depreciation of domestic currency as well. To counter depreciation of currency, central bank sell foreign exchange reserves to stabilize currency value during oil price shocks. Rising interest rates also attract foreign investment thus strengthening the currency. Central banks also work towards changing the psychology of investors and consumers in markets. This is through communicating inflation control policies and forward guidance to reassure markets. Aggressive rate hikes is also done to send a message.

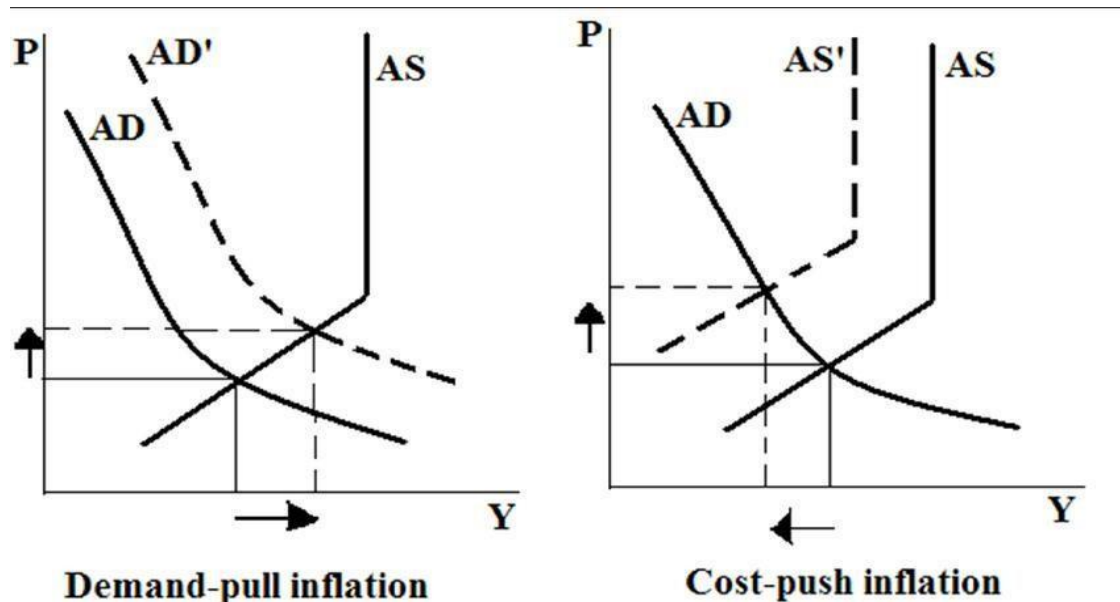


Figure 1.2 (by Zscusana Baschini)

1.6 Historical Framework

Oil Prices are inherently volatile. WTI generally ranged between \$17 to \$20 from 1948 to 1970. Political, economic and other changes have consistently rocked the oil landscape since 1970, with sharper and more frequent volatility in the past five decades. In the 22 years since January 1998, oil prices increased from \$10 per barrel in 1998 to a peak of more than \$145 in July 2008. In 1990, oil price increased from \$17 per barrel to 36\$ per barrel. This was in response to the Iraqi invasion of Kuwait on August 2, 1990. This led to a seven-month occupation of Kuwait which ended due to American military intervention. The invasion took place as Iran owed Kuwait \$14 billion. Iran wanted oil producing countries such as Kuwait and Saudi Arabia to reduce oil production in order to increase global oil prices. This would increase financial revenue for Iraq as oil was its most dominant industry. Kuwait however continued high levels of oil production, this kept oil prices low and therefore kept Iraqi oil revenue low. Hussein thus accused Kuwait of economic warfare and claimed that it was illegally extracting oil from Iraqi oil fields. Iraq then launched a full-scale invasion of the small country. Iraq's military captured Kuwait in 2 days and occupied it. This led to an embargo on Iraqi and Kuwaiti oil by the United Nations. At the time, Kuwait and Iraq accounted for about 9% of the total oil production at the time. It is estimated that they both

produced about 4.3 million barrels of oil every day. The loss of so much oil was catastrophic for the global economy and this sent the oil market into a panic. It caused oil prices to more than double. Oil serves as a primary input for transportation, manufacturing and electricity generation. This sudden increase in oil prices led to cost push inflation as discussed in 1.5. It led to an increase in the general price level of goods and services throughout the world. In the transportation industry, higher fuel prices led to increased freight and carriage costs. This led to increased production costs which further resulted in more expensive consumer goods. Oil exporting countries, however, benefited from demand pull inflation as discussed in 1.5. Rising revenues increased government expenditure leading to rapid industrial and urban development in these countries. The excess liquidity in these economies further increased inflation through excess demand which led to a mix of cost push and demand-pull inflation. Global economies, however, took various measures to combat the oil crisis. In order to bring stability to the oil market, Saudi Arabia and other OPEC countries increased production. They did so to increase the overall supply of oil in the market and thus keep prices steady. By 1991, oil prices decreased to \$20 per barrel. Central banks of various developed countries also intervened. The American Federal Reserve and European Central Bank tightened monetary policies to reduce inflation. They also hiked interest rates, however this slowed economic growth and led to a recession in the early 1990's in multiple developed economies. India was highly dependent on oil and faced the brunt of the Gulf War. Oil imports accounted for a significant share of India's foreign exchange spending. The Iraq Kuwait war caused a sudden spike in India's Import bill which led to Indian foreign exchange reserves falling to less than \$ 1 billion. This could only cover only two weeks of imports. Inflation in India surged due to this and reached 13% by mid-1991. This was because of fuel price hikes and higher food prices due to increased agricultural costs. The Indian Government driven by political goals also spent heavily on fuel subsidies. This worsened the economic crisis. Higher global interest rates also increased borrowing costs for India making getting loans very difficult. To address the economic crisis India sought loans from the IMF however the IMF only agreed to give out loans if India liberalized. India's 1991 liberalization policy included the denationalization of multiple industries. It also included the lifting of trade barriers. This was done to attract foreign investment. The reserve bank of India devalued the Indian Rupee to boost exports and they also adopted policies which specifically targeted inflation to manage such oil shocks better. The government also reduced the previously introduced fuel subsidies to boost revenue for oil companies and control the fiscal trade deficit. Tax reforms were also introduced by the government to boost revenue. Tax brackets for multiple income groups were introduced. India also increased investment in renewable energy and nuclear energy to diversify its energy sources and spend less on oil imports. A lot of countries, both developed and developing constructed strategic oil reserves in order to tide over a crisis such as this in the future. Countries also increased investments in renewable energy with electric energy being the primary focus. The 2022 Russia Ukraine war which began with the invasion of Ukraine had a lasting impact on the global economy. The war triggered supply chain disruptions, energy crisis and food shortages all throughout the world. Russia is the world's second largest producer of natural gas and oil and a key supplier to Europe. In 2021, Russia produced 762 bcm of natural gas and exported about 210 bcm via pipelines. The western world which included USA and Europe imposed sanctions on Russia which created a global energy price shock. Oil price skyrocketed going from \$70 per barrel in 2021 to \$130 per barrel in 2022. Europe which was heavily dependent on Russian gas faced a severe energy crisis that led to power shortages and

gas price spikes. Higher fuel costs led to cost push inflation throughout the world as energy is a primary input in production and transportation. Global inflation rates hit multi decade highs which American inflation peaking at 9.1% in June 2022. Developing economies were particularly hit the hardest with countries such as Sri Lanka experiencing an economic crisis. The world also faced a food crisis due to this war. Ukraine has often been considered to be the “bread basket” of Europe due to its food production. Ukraine and Russia together accounted for about 30% of global wheat exports and 80% of sunflower oil exports. The war disrupted global grain shipments and led to wheat prices surging over 60%. Global food shortages were also caused especially in Africa and South Asia due to rising food costs.

The European Union faced near recession and global GDP growth shrunk to 3.1%. This war had an adverse affect on the Indian economy. Due to oil prices surging to \$120 per barrel,

India’s import bill increased substantially. This worsened the current account deficit. India’s inflation also reached 7.8% which was above the RBI’s fixed tolerance rate of 6%. The Indian Rupee depreciated to a record low of 83 rupee per USD which was because of higher import bills and capital outflows due to rising American Interest rates. Sensex also fell over 15% in the first half of 2022 due to the withdrawal of \$30 billion by foreign investors. In response to this crisis, the Indian government took multiple measures. India is an agricultural surplus nation and in order to reduce wheat prices, India restricted wheat exports. India also bought Russian oil at discounted prices and defied western sanctions. This reduced India’s import bill. The government also further increased its investments in renewable energy sources to reduce oil dependency. RBI also increased interest rates to 6.5% to reduce inflation. Investments were also made by the RBI in forex markets to stabilize the Rupee. India also increased military spending after the invasion in order to strengthen military preparedness among rising geopolitical tensions. This meant lesser spending in other economic areas. Due to the war, India was also able to strengthen its energy ties with Russia and India also emerged as an alternative exporting hub for oil as India engaged in reenter pot trade and exported Russian oil to western countries. European countries also diversified their energy sources and invested more and more into renewable energy sources.

1.7 Literature Review

Hamilton(1983) placed emphasis on the role of oil price shocks as an influencing factor for economic recessions emphasizing it’s effect on inflation.

Blanchard and Gali(2007) examined oil price shocks arguing that their inflationary effects depend on whether an economy imports most of its oil or produces it domestically. They argued that for oil exporting economies, the inflation which arises is demand pull inflation which does not have a huge economic impact whereas oil importing economies such as India experience cost push inflation whose effects can be felt all throughout the country.

Killian’s(2008) research further supports this. He differentiated between demand pull inflation and cost push inflation.

Narayan (2010) investigated oil importing economies such as India and found a strong positive correlation between crude oil prices and inflation emphasizing the country's vulnerability to oil price volatility.

Chowdhary (2011) further demonstrated how exchange rates are dependent on oil prices. Multiple research papers also focused on providing solutions to the problem.

Apergis and Payne(2010) stressed the importance of investing in renewable energy to reduce reliance on crude oil thus stabilizing long term inflation.

Strategic use of petroleum reserves and tax reforms were recommended by Kojima(2016) as they could provide immediate relief during oil crisis.

1.8 Research Methodology

- Study is based on secondary data .
- Time period of study is 2008-09 to 2023-24.
- The first key statistical technique used was correlation. Pearson's correlation was performed to determine if there is correlation between variables Crude Oil Average (\$/bbl) and Rate Of Inflation(in percent).The next research technique used was a linear regression model. This was done so to examine the influence of oil price shocks on inflation. For it, we took Oil prices as the dependent variable and inflation as the independent variable. Lastly, a Durbin Watson test was also conducted.
- Along with this , descriptive statistics and diagrams are also used to analyse and interpret results .

1.9 Statistical Output

The study first collected data on two variables which are Crude Oil Average(\$/bbl) and Rate of Inflation (in percent).This information has been summarized in table 1.1 and has been taken over a period of 15 years.

<u>Year</u>	<u>Crude Oil Average (\$/bbl)</u>	<u>Rate of Inflation(in percent)</u>
<u>2008-2009</u>	<u>96.99</u>	<u>8.35</u>
<u>2009-2010</u>	<u>61.76</u>	<u>10.88</u>
<u>2010-2011</u>	<u>79.04</u>	<u>11.99</u>
<u>2011-2012</u>	<u>104.01</u>	<u>8.91</u>
<u>2012-2013</u>	<u>105.01</u>	<u>9.48</u>

<u>2013-2014</u>	<u>104.08</u>	<u>10.02</u>
<u>2014-2015</u>	<u>96.24</u>	<u>6.67</u>
<u>2015-2016</u>	<u>50.75</u>	<u>4.91</u>
<u>2016-2017</u>	<u>42.81</u>	<u>4.95</u>
<u>2017-2018</u>	<u>52.81</u>	<u>3.33</u>
<u>2018-2019</u>	<u>68.35</u>	<u>3.94</u>
<u>2019-2020</u>	<u>61.41</u>	<u>3.73</u>
<u>2020-2021</u>	<u>41.26</u>	<u>6.62</u>
<u>2021-2022</u>	<u>69.07</u>	<u>5.13</u>
<u>2022-2023</u>	<u>97.10</u>	<u>6.7</u>
<u>2023-2024</u>	<u>80.76</u>	<u>5.65</u>

Table 1.1

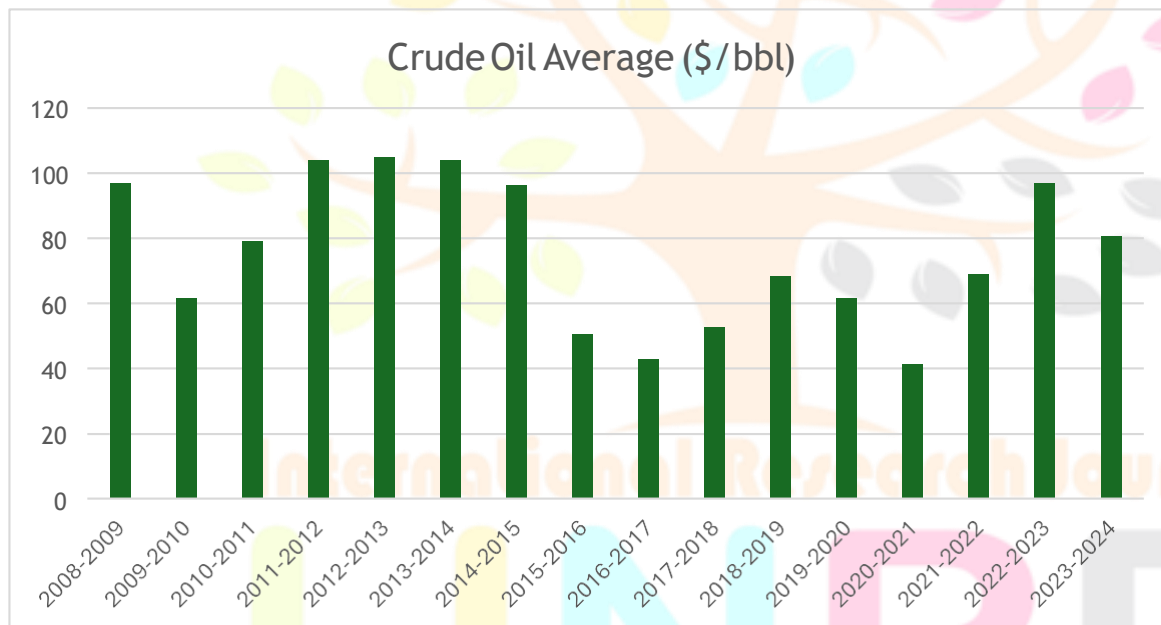


Figure 1.3(Crude Oil prices)

From table 1.1 we can calculate some standard values related to measures of central tendency and deviation. These values have been represented in table 1.2.

Measures of Central Tendency and Deviation	Crude Oil Average(\$/bbl)	Rate of Inflation(in percent)
Mean	75.72	6.95
Std.Deviation	22.73	2.69
Minimum Value	41.26	3.33
Maximum Value	105.01	11.99

Table 1.2

Pearson's correlation was performed to determine if there is correlation between variables Crude Oil Average (\$/bbl) and Rate Of Inflation(in percent).This information is given in table 1.3.

Variable	R	R ²	p
Crude Oil Average and Rate of Inflation(In percent)	0.53	0.28	0.036

Table 1.3

Strength of correlation can be classified on the basis of information given in table 1.4

Amount of Correlation(R)	Strength of the correlation
0.0<0.1	No correlation
0.1<0.3	Low Correlation
0.3<0.5	Medium correlation
0.5<0.7	High Correlation
0.7<1	Very High Correlation

Table 1.4

The R value is used to indicate the amount of correlation. A correlation of 0.53 indicates a high positive correlation between the two variables. This means that in India, as oil prices increase, inflation tends to rise as well. As p value is less than 0.5 we can accept the alternative hypothesis. Figure 1.4 is a scatter plot diagram which further displays the relation between these variables.

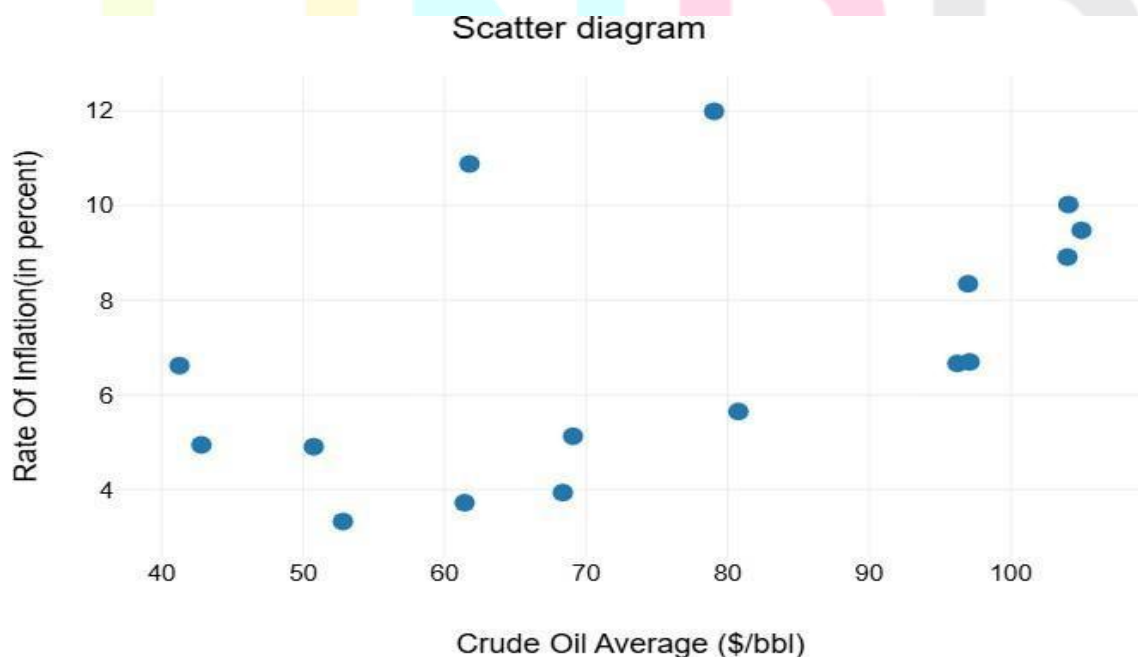


Figure 1.4

Next, a linear regression model was performed. For it, oil price has been treated as the independent variable and inflation has been treated as the dependent variable.

The regression model showed that the variable Crude Oil Average (\$/bbl.) explained 27.67% of the variation in Rate Of Inflation(in percent).This is indicated by R^2 . An ANOVA was used to test whether this value was significantly different from zero. Using the present sample, it was found that the effect was different from zero. Table 1.5 summarizes the findings from this model.

Independent Variable	Dependent Variable		Unstandardized Coefficients	Standardized Coefficients		R2
Crude Oil Average(\$/bbl)	Variable of Rate of Inflation(in percent)	Model	b	t	p	0.28
		Constant	2.24	1.06	0.008	
		Crude Oil Average	0.06	2.31	0.036	

Table 1.5

Model	Df	F	p
Regression	1	5.35	0.034

Table 1.6

The regression model gives us the following equation

$$\text{Rate Of Inflation} = 2.24 + 0.06 * \text{Crude Oil Average} (\$/\text{bbl})$$

From the equation we observe that when all independent variables are zero, the value of the variable Rate Of Inflation(in percent) is 2.24. If the value of the variable Crude Oil Average (\$/bbl.) changes by one unit, the value of the variable Rate of Inflation (in percent) changes by 0.06.

From table 1.5 and 1.6 we can understand the significance of the p value. The calculated regression coefficients refer to the sample used for the calculation of the regression analysis; therefore, it is of interest whether the individual coefficients only deviate from zero by chance or whether they also deviate from zero in the population. To test this, the null hypothesis is made for each coefficient that is equal to zero in the population. The standard error now indicates how much the respective coefficient will scatter on average when the regression analysis is

calculated for a further sample. The test statistic t is then calculated from the standard error and the coefficient. The p value for the coefficient of crude oil average(\$/bbl) is 0.036. This is less than the 0.05 level of significance, thus, with a 95% confidence level, the null hypothesis that oil price shocks have no significant impact on rate of inflation cannot be accepted and instead the alternative hypotheses can be accepted. As a result of the findings, it is justifiable to conclude that oil price has a positive impact on India's inflation.

A Durbin Watson test was also conducted to prove the alternate hypothesis. The Durbin-Watson (DW) test is a statistical test used to detect the presence of autocorrelation (serial correlation) in the residuals of a regression analysis. Autocorrelation occurs when residuals (errors) in a regression model are not independent but instead correlated with one another. Information about it is given in table 1.7.

Autocorrelation	DW Statistic	p
0.43	1.11	0.04

Table 1.7

The DW statistic of 1.11 indicates positive correlation. This is because if $DW > 2$ then there is positive autocorrelation. The autocorrelation of 0.43 further supports this. The P value of 0.04 is less than 0.05. Due to this we can positively reject the Null Hypothesis and accept the alternate hypothesis as it can be assumed that there is autocorrelation of the residual. Autocorrelation of 0.43 indicates a moderate positive correlation between consecutive residuals in the regression model. Positive autocorrelation means that residuals (errors) at one point are likely to have the same sign as the residuals at the next time point.

1.10 Implications

Crude oil is a primary input for fuels like gasoline, diesel and jet fuel. An increase in crude oil price will directly lead to an increase in transportation and energy costs. It will lead to inflation as oil prices explain 28% of inflation as explained in 1.7. These costs will lead to an increase in production costs due to which the prices of consumer goods will also go up. High fuel prices can trigger a domino effect across the Indian economy. They would have an adverse impact on personal vehicle owners. Personal vehicle owners would be forced to stretch their monthly budgets to accommodate escalating fuel costs. This would decrease overall spending in the economy. India's automotive sector which employs millions of people in the country faces the risk of declining vehicle sales as fuel prices surge. This could send shockwaves across multiple industries and the extensive network of small scale industries which provide inputs to large scale industries. Moreover, the surge in oil prices could also widen India's current account deficit (CAD), which measures the difference between the value of goods and services a country exports and imports. High oil prices have also led to the Indian government accelerating its push to renewable

energy sources. The government plans to create 500GW of renewable energy capacity in order to decrease oil dependency. India is also building its own strategic oil reserves and increasing its capacity to hold 90-100 days' worth of crude oil. Oil crisis' in recent years has led to currency depreciation. To combat this, India has also started trading with multiple countries using local currencies.

1.11 Mitigation Strategies

Policy makers can adapt either short term or long-term strategies to enhance resilience to oil price shocks. Short term strategies include release of oil from strategic reserves to stabilize supply and cushion price spikes during crises by the Indian Government. The government can also temporarily subsidize fuel subsidies or enhance price controls that can protect consumers and industries from sudden cost increases how this may strain public finances. Central banks may also hike interest rates in order to decrease inflation. They may also intervene in foreign exchange markets to stabilize currency value and reduce the depreciation of the rupee. This would help reduce the cost of oil imports for India. The Indian government can also consider lowering excise duties or other fuel related taxes to soften the impact of rising oil prices on businesses and the average consumer. This could however reduce government revenue and is unsustainable for long conflicts such as the Russia Ukraine war. Long term strategies include energy diversification. The government can incentivize private bodies to invest in renewable energy sources and nuclear energy to reduce dependence on fossil fuels. This would make it so that a country can get oil from multiple sources hence it would promote energy security and sustainability. Indian Oil companies can also invest in the development of domestic oil resources. This can be through exploration and production of domestic oil reserves. This would enhance self-sufficiency and reduce exposure to global oil market fluctuations. Investing in innovative technologies such as hydrogen fuel, advanced energy storage and renewable energy solutions can provide sustainable and long term alternatives to oil.

1.12 Limitations

The paper has encountered a few limitations which are –

- Statistical analysis has only been done on data for last 16 years.
- The research paper focuses only on India
- The paper only focuses on the impact of oil prices on Inflation which is generally caused due to multiple economic factors.

1.13 Conclusion

The research has successfully demonstrated the significant impact of crude oil price fluctuations on inflation in India using both theoretical and empirical evidence. Cost Push Inflation was used to demonstrate how an increase in oil prices further increases the general price level of goods and services thereby leading to an increase in inflation. Statistical analysis, including correlation and regression models, revealed that changes in crude oil prices explain a substantial proportion of inflation variability, highlighting the interconnected nature of energy costs and broader economic stability. The correlation between the two variables was found to be 0.53 with it indicating a highly positive relationship between oil prices and inflation. The value of R^2 came out to be 0.28. This was used to show how oil price shocks explain 28% of the increase in inflation. An ANOVA was also used to test whether these values were significantly different from zero. The Regression model also gave us an equation through which we observed that when all independent variables are zero, the value of the variable Rate Of Inflation(in percent) is 2.24. If the value of the variable Crude Oil Average (\$/bbl) changes by one unit, the value of the variable Rate Of Inflation (in percent) changes by 0.06. The P value for the coefficient of crude oil average was 0.036. This was less than the 0.05 confidence level. Due to this the alternate hypothesis could be proven. The DW statistic of 1.11 indicated positive correlation as it was less than 2. An autocorrelation of 0.43 further supported this. The findings further explore the critical implications faced by oil-importing economies like India, where over 80% of crude oil is sourced externally, making the economy highly vulnerable to global oil price shocks. The resulting inflationary pressures can ripple through key economic indicators such as GDP, exchange rates, and trade deficits, complicating policy responses. To counter these effects, the paper explored a range of mitigation strategies. Short-term measures such as strategic petroleum reserves, subsidies, and tax adjustments provide immediate relief. Long-term strategies, including energy diversification, domestic resource development, and investments in renewable energy, offer sustainable solutions to reduce dependency on imported oil and enhance resilience against future shocks.

1.14 Bibliography

- Toni, M. (n.d.). *An analysis of the relationship between oil prices and inflation in oil- dependent economies: With special reference to Oman.* Retrieved from https://www.researchgate.net/publication/379055282_An_Analysis_Of_The_Relationship_Between_Oil_Prices_And_Inflation_In_Oil-Dependent_Economies_With_Special_Reference_To_OMAN#:~:text=Research%20presented%20found%20that%20increasing,would%20observe%20the%20increasing%20prices
- Bipartisan Policy Center. (n.d.). *How is inflation measured?* Retrieved from <https://bipartisanpolicy.org/explainer/inflation-measurement/>
- India Today. (2023, September 19). *Rising crude oil prices: Impact on India's petrol, diesel demand, and inflation.* Retrieved from

- <https://www.indiatoday.in/business/story/rising-crude-oil-prices-impact-on-india-petrol-diesel-demand-inflation-2437559-2023-09-19>
- Anyars, S. I. (n.d.). *The impact of oil price changes on inflation and disaggregated inflation: Insights from Ghana*. Retrieved from <https://www.rbi.org.in/scripts/PublicationsView.aspx?id=22511>
- Cerra, V., & Saxena, S. C. (2002). Growth dynamics: The myth of economic recovery. IMF Staff Papers, 49(3), 1–26. Retrieved from <https://www.imf.org/external/pubs/ft/staffp/2002/03/pdf/cerra.pdf>
- Archer, L., & Others. (1990). The first oil war: Implications of the Gulf crisis in the oil market. Oxford Institute for Energy Studies. Retrieved from <https://oxfordenergy.org/wpcms/wp-content/uploads/2010/11/SP1-TheFirstOil-WarImplicationsoftheGulfCrisisintheOilMarket-LArcheretal-1990.pdf>
- *Demand-Pull Inflation, Cost-Push Inflation, and the Price-Wage Spiral* ResearchGate. Retrieved from [https://www.researchgate.net/figure/Demand-Pull-Inflation-Cost-Push-](https://www.researchgate.net/figure/Demand-Pull-Inflation-Cost-Push-Inflation-and-the-Price-Wage-Spiral-Source-Authors_fig19_320987078)
- [Inflation-and-the-Price-Wage-Spiral-Source-Authors_fig19_320987078](https://www.researchgate.net/figure/Demand-Pull-Inflation-Cost-Push-Inflation-and-the-Price-Wage-Spiral-Source-Authors_fig19_320987078)

