

Praxis Business School

**Assignment No- 1**

*Comparison and relation between petroleum prices and food prices*

*A report*

*Submitted to*

**Professor Sayantani Roy Choudhury**

*In partial fulfilment of the requirements of the course*

**Quantitative Techniques II**

On 24.02.22

By

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**Comparison and relation between petroleum prices with food prices**

**ABSTRACT**

Oil is the fundamental commodity for all nations in the world. Hence, the fluctuation in the price of the commodity has alarmed policy makers as it can lead to extreme issues, for example, food price inflation. The impacts of oil prices on food prices have stayed a subject of discussion. Therefore, this study means to reveal some insight into the impacts of oil prices on food prices in India. The regression and hypothesis approach was used and the results show that the price of petrol has a slight effect on food prices.

**INTRODUCTION**

The fluctuation of oil prices in the world has merited serious attention from policy makers. This fluctuation appears to threaten the economy all over the world. Oil is perceived to be one of the main commodities used in generating economic activities.

Therefore, any increase in the price can cause an alarming economic condition. The exorbitant increase in the price of oil may drag the economy into recession.

A higher price of oil can lead to the inevitability of higher prices of goods, including that of agricultural products. Oil is not the main resource in the industrial sector only but also in the agricultural sector. The sector requires oil to operate machinery and to transport agricultural products, namely food, to consumers. Therefore, an increase in the price of oil can affect food prices. Thus this study aims to examine the effects of petroleum prices on food prices in India.

India resides in villages as 70% of its population resides in the rural region. Therefore, it can be said that the Indian economy is an agrarian economy. Hence, through this report, we provide a statistical methodology to estimate the impact of oil price uncertainty on food prices in India.

**DATA COLLECTION AND METHODOLOGY**

For the analysis of relation between petrol and food prices(inflation), linear trend mathematical models are used. The methods we used are:

I. Bi-variate Regression

II. Time Series

III. F-Test

IV. ANOVA

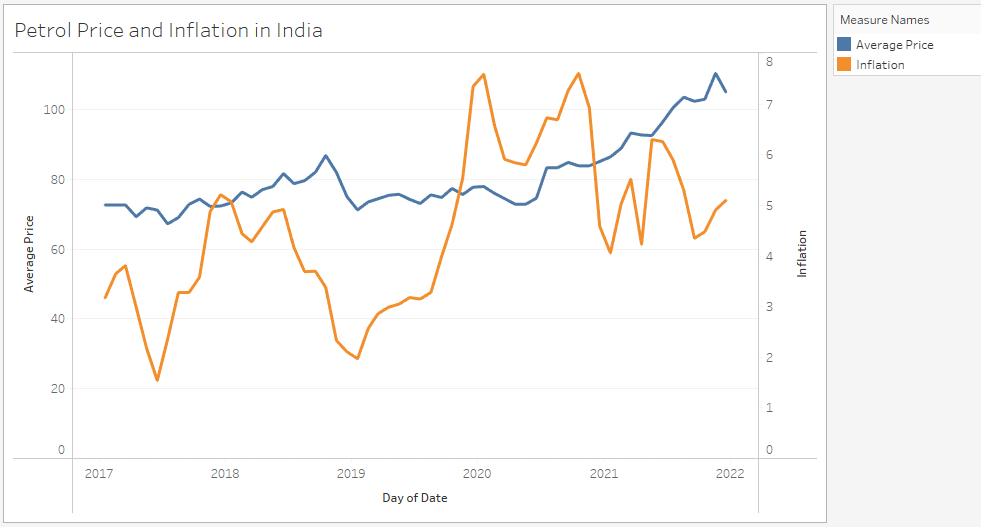
We got the data for the petrol price change and inflation from the following websites:

1. <https://www.indiabudget.gov.in/economicsurvey/doc/vol2chapter/echap05_vol2.pdf>
2. <https://in.investing.com/economic-calendar/indian-cpi-973>
3. <https://www.ppac.gov.in/WriteReadData/userfiles/file/PP_7_b_PS_oil_prices(H).pdf>

**DATA DESCRIPTION**

Consumer price changes in India can be very volatile due to dependence on energy imports, the uncertain impact of monsoon rains on its large farm sector, difficulties transporting food items to market because of its poor roads and infrastructure and high fiscal deficit. Therefore, several factors affecting inflation we will be analysing the effect of petrol prices on food inflation.

For statistical analysis, we have considered the petrol prices of 4 import mega cities as these cities are having the highest fluctuations in petrol prices as well as the highest prices of petrol in the country. And for further analysis, we have taken the average price of petrol of the four cities and the corresponding inflation rate for the same time of the year. The below graph showcases the fluctuations in the petrol prices and inflation rate over 5 years in India:



For the petrol price data, we have taken the secondary data directly from the website. The below table showcases the fluctuations in petrol prices over 5 years in India:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Petrol Price(₹ Per Litre) | | | | | |
| **Date** | **Delhi** | **Mumbai** | **Chennai** | **Kolkata** | **Average Price** |
| Jan-17 | 70.60 | 76.91 | 70.07 | 73.13 | 72.68 |
| Feb-17 | 70.60 | 76.91 | 70.07 | 73.13 | 72.68 |
| Mar-17 | 70.60 | 76.91 | 70.07 | 73.13 | 72.68 |
| Apr-17 | 66.29 | 72.66 | 69.28 | 68.97 | 69.30 |
| May-17 | 68.09 | 77.46 | 71.17 | 70.68 | 71.85 |
| Jun-17 | 66.91 | 78.44 | 69.93 | 69.52 | 71.20 |
| Jul-17 | 63.09 | 74.30 | 65.46 | 66.14 | 67.25 |
| Aug-17 | 65.40 | 74.56 | 67.71 | 68.56 | 69.06 |
| Sep-17 | 69.26 | 78.38 | 71.78 | 72.02 | 72.86 |
| Oct-17 | 70.76 | 79.87 | 73.36 | 73.50 | 74.37 |
| Nov-17 | 69.14 | 76.25 | 71.65 | 71.90 | 72.24 |
| Dec-17 | 69.22 | 76.52 | 71.74 | 71.98 | 72.37 |
| Jan-18 | 69.97 | 77.87 | 72.53 | 72.72 | 73.27 |
| Feb-18 | 73.05 | 80.91 | 75.77 | 75.74 | 76.37 |
| Mar-18 | 71.57 | 79.45 | 74.21 | 74.32 | 74.89 |
| Apr-18 | 73.73 | 81.59 | 76.48 | 76.44 | 77.06 |
| May-18 | 74.63 | 82.48 | 77.43 | 77.32 | 77.97 |
| Jun-18 | 78.29 | 86.10 | 81.28 | 80.92 | 81.65 |
| Jul-18 | 75.55 | 82.94 | 78.40 | 78.23 | 78.78 |
| Aug-18 | 76.31 | 83.76 | 79.26 | 79.20 | 79.63 |
| Sep-18 | 78.68 | 86.09 | 81.75 | 81.60 | 82.03 |
| Oct-18 | 83.73 | 91.08 | 87.05 | 85.53 | 86.85 |
| Nov-18 | 79.37 | 84.86 | 82.46 | 81.25 | 81.99 |
| Dec-18 | 72.53 | 78.09 | 75.26 | 74.55 | 75.11 |
| Jan-19 | 68.65 | 74.30 | 71.22 | 70.78 | 71.24 |
| Feb-19 | 70.94 | 76.57 | 73.64 | 73.04 | 73.55 |
| Mar-19 | 71.81 | 77.44 | 74.57 | 73.90 | 74.43 |
| Apr-19 | 72.86 | 78.43 | 75.62 | 74.88 | 75.45 |
| May-19 | 73.13 | 78.70 | 75.90 | 75.15 | 75.72 |
| Jun-19 | 71.62 | 77.28 | 74.39 | 73.74 | 74.26 |
| Jul-19 | 70.44 | 76.11 | 73.15 | 72.67 | 73.09 |
| Aug-19 | 72.80 | 78.42 | 75.60 | 75.44 | 75.57 |
| Sep-19 | 72.01 | 77.67 | 74.80 | 74.71 | 74.80 |
| Oct-19 | 74.61 | 80.21 | 77.50 | 77.23 | 77.39 |
| Nov-19 | 72.86 | 78.51 | 75.69 | 75.55 | 75.65 |
| Dec-19 | 74.91 | 80.59 | 77.91 | 77.61 | 77.76 |
| Jan-20 | 75.14 | 80.79 | 78.12 | 77.79 | 77.96 |
| Feb-20 | 73.19 | 78.83 | 76.03 | 75.85 | 75.98 |
| Mar-20 | 71.71 | 77.40 | 74.51 | 74.38 | 74.50 |
| Apr-20 | 69.59 | 76.31 | 72.28 | 73.30 | 72.87 |
| May-20 | 69.59 | 76.31 | 72.28 | 73.30 | 72.87 |
| Jun-20 | 71.26 | 78.32 | 75.54 | 73.30 | 74.61 |
| Jul-20 | 80.43 | 87.19 | 83.63 | 82.10 | 83.34 |
| Aug-20 | 80.43 | 87.19 | 83.63 | 82.05 | 83.33 |
| Sep-20 | 82.08 | 88.73 | 85.04 | 83.57 | 84.86 |
| Oct-20 | 81.06 | 87.74 | 84.14 | 82.59 | 83.88 |
| Nov-20 | 81.06 | 87.74 | 84.14 | 82.59 | 83.88 |
| Dec-20 | 82.34 | 89.02 | 85.31 | 83.87 | 85.14 |
| Jan-21 | 83.71 | 90.34 | 86.51 | 85.19 | 86.44 |
| Feb-21 | 86.30 | 92.86 | 88.82 | 87.69 | 88.92 |
| Mar-21 | 91.17 | 97.57 | 93.11 | 91.35 | 93.30 |
| Apr-21 | 90.56 | 96.98 | 92.58 | 90.77 | 92.72 |
| May-21 | 90.40 | 96.83 | 92.43 | 90.62 | 92.57 |
| Jun-21 | 94.49 | 100.72 | 95.99 | 94.50 | 96.43 |
| Jul-21 | 98.81 | 104.90 | 99.80 | 98.64 | 100.54 |
| Aug-21 | 101.84 | 107.83 | 102.49 | 102.08 | 103.56 |
| Sep-21 | 101.34 | 107.39 | 99.08 | 101.72 | 102.38 |
| Oct-21 | 101.89 | 107.95 | 99.58 | 102.47 | 102.97 |
| Nov-21 | 109.69 | 115.50 | 106.35 | 110.15 | 110.42 |
| Dec-21 | 103.97 | 109.98 | 101.40 | 104.67 | 105.01 |

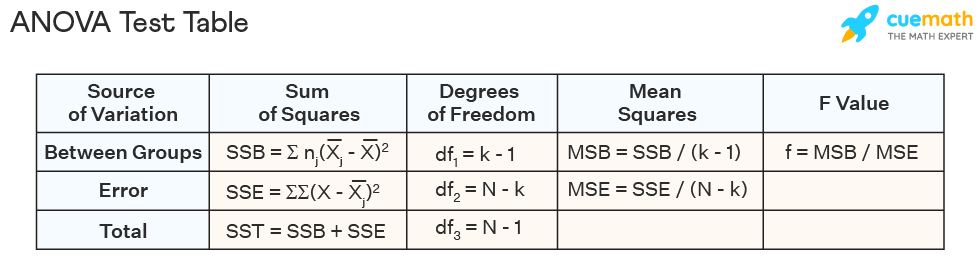
As for the inflation data, we have taken the secondary data directly from the website and tried to find its relation with petrol prices. The below table showcases the fluctuations in inflation over 5 years in India:

|  |  |  |
| --- | --- | --- |
| **Date** | **Petrol Price(₹/Litre)** | **Inflation** |
| Jan-17 | 72.68 | 3.17 |
| Feb-17 | 72.68 | 3.65 |
| Mar-17 | 72.68 | 3.81 |
| Apr-17 | 69.30 | 2.99 |
| May-17 | 71.85 | 2.18 |
| Jun-17 | 71.20 | 1.54 |
| Jul-17 | 67.25 | 2.36 |
| Aug-17 | 69.06 | 3.28 |
| Sep-17 | 72.86 | 3.28 |
| Oct-17 | 74.37 | 3.58 |
| Nov-17 | 72.24 | 4.88 |
| Dec-17 | 72.37 | 5.21 |
| Jan-18 | 73.27 | 5.07 |
| Feb-18 | 76.37 | 4.44 |
| Mar-18 | 74.89 | 4.28 |
| Apr-18 | 77.06 | 4.58 |
| May-18 | 77.97 | 4.87 |
| Jun-18 | 81.65 | 4.92 |
| Jul-18 | 78.78 | 4.17 |
| Aug-18 | 79.63 | 3.69 |
| Sep-18 | 82.03 | 3.7 |
| Oct-18 | 86.85 | 3.38 |
| Nov-18 | 81.99 | 2.33 |
| Dec-18 | 75.11 | 2.11 |
| Jan-19 | 71.24 | 1.97 |
| Feb-19 | 73.55 | 2.57 |
| Mar-19 | 74.43 | 2.86 |
| Apr-19 | 75.45 | 2.99 |
| May-19 | 75.72 | 3.05 |
| Jun-19 | 74.26 | 3.18 |
| Jul-19 | 73.09 | 3.15 |
| Aug-19 | 75.57 | 3.28 |
| Sep-19 | 74.80 | 3.99 |
| Oct-19 | 77.39 | 4.62 |
| Nov-19 | 75.65 | 5.54 |
| Dec-19 | 77.76 | 7.35 |
| Jan-20 | 77.96 | 7.59 |
| Feb-20 | 75.98 | 6.58 |
| Mar-20 | 74.50 | 5.91 |
| Apr-20 | 72.87 | 5.84 |
| May-20 | 72.87 | 5.80 |
| Jun-20 | 74.61 | 6.23 |
| Jul-20 | 83.34 | 6.73 |
| Aug-20 | 83.33 | 6.69 |
| Sep-20 | 84.86 | 7.27 |
| Oct-20 | 83.88 | 7.61 |
| Nov-20 | 83.88 | 6.93 |
| Dec-20 | 85.14 | 4.59 |
| Jan-21 | 86.44 | 4.06 |
| Feb-21 | 88.92 | 5.03 |
| Mar-21 | 93.30 | 5.52 |
| Apr-21 | 92.72 | 4.23 |
| May-21 | 92.57 | 6.30 |
| Jun-21 | 96.43 | 6.26 |
| Jul-21 | 100.54 | 5.90 |
| Aug-21 | 103.56 | 5.30 |
| Sep-21 | 102.38 | 4.35 |
| Oct-21 | 102.97 | 4.48 |
| Nov-21 | 110.42 | 4.91 |
| Dec-21 | 105.01 | 5.10 |

**DATA ANALYSIS**

**ANOVA**

Analysis of variables or ANOVA is used to test a hypothesis concerning the mean of two or more samples. This technique is possible to draw inferences whether the sample has been drawn from a population having the same mean. Hypothesis through F-test is carried out and is tested on the basis of information obtained from the data.



*Hypothesis testing to find whether the mean of the 4 cities are same or not:*

Ho: µDelhi = µMumbai = µChennai = µKolkata (The mean of petrol prices is equal for all cities).

H1: At Least one of the µ is different (The mean of petrol price is different for at least one city).

Applying One-Way ANOVA, we got **N=48, K=4**.

The SSB (sum of squares between group columns) we got is **320.6032**.

And the SSW (sum of squares within the group column) we got is **2372.225**.

SST (sum of squares of the total group column) we got is **2692.829**.

MSB and MSW we got is **106.8677** and **53.91421**.

Calculated Value of F is **1.982181** (Level of confidence taken was **95%**)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Anova: Single Factor |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| SUMMARY |  |  |  |  |  |  |
| *Groups* | *Count* | *Sum* | *Average* | *Variance* |  |  |
| Delhi | 12 | 1154.17 | 96.18083 | 62.49552 |  |  |
| Mumbai | 12 | 1228.85 | 102.4042 | 58.50104 |  |  |
| Chennai | 12 | 1158.14 | 96.51167 | 35.12816 |  |  |
| Kolkata | 12 | 1159.85 | 96.65417 | 59.53214 |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |
| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
| Between Groups | 320.6032 | 3 | 106.8677 | 1.982181 | 0.130517 | 2.816466 |
| Within Groups | 2372.225 | 44 | 53.91421 |  |  |  |
|  |  |  |  |  |  |  |
| Total | 2692.829 | 47 |  |  |  |  |

**Therefore,**

| Calculated value| < |Table Value|

Thus, mean of petrol prices is equal for all four cities.

**F-TEST**

The F-distribution is generated by drawing two samples from the same normal population; it is used to test the hypothesis whether two samples come from populations with the same variance. Here, we need to have two samples (one of size *n*1 and one of size *n*2) and the sample variance from each. If the two variances are very close to being equal the two samples could easily be from populations with equal variances. Because the F-statistic is the ratio of two sample variances, when the two sample variances are close to equal, the F-score is close to one.

*Hypothesis testing to find whether the variances of the 4 cities are same or not:*

1)

Ho: σDelhi = σMumbai (The population variance for both the cities are equal).

H1: σDelhi <> σMumbai (The population variance for both the cities are different).

|  |  |  |
| --- | --- | --- |
| F-Test Two-Sample for Variances |  |  |
|  |  |  |
|  | *Delhi* | *Mumbai* |
| Mean | 96.18083333 | 102.4041667 |
| Variance | 62.49551742 | 58.5010447 |
| Observations | 12 | 12 |
| df | 11 | 11 |
| F | 1.068280366 |  |
| P(F<=f) one-tail | 0.457368931 |  |
| F Critical one-tail | 2.81793047 |  |

**Therefore,**

| Calculated value| < |Table Value|

Thus, variance of petrol prices is equal for Delhi and Mumbai.

2)

Ho: σDelhi = σKolkata (The population variance for both the cities are equal).

H1: σDelhi <> σKolkata (The population variance for both the cities are different).

|  |  |  |
| --- | --- | --- |
| F-Test Two-Sample for Variances |  |  |
|  |  |  |
|  | *Delhi* | *Kolkata* |
| Mean | 96.18083333 | 96.65416667 |
| Variance | 62.49551742 | 59.53213561 |
| Observations | 12 | 12 |
| df | 11 | 11 |
| F | 1.049777852 |  |
| P(F<=f) one-tail | 0.468616976 |  |
| F Critical one-tail | 2.81793047 |  |

**Therefore,**

| Calculated value| < |Table Value|

Thus, variance of petrol prices is equal for Delhi and Kolkata.

3)

Ho: σDelhi = σChennai (The population variance for both the cities are equal).

H1: σDelhi <> σChennai (The population variance for both the cities are different).

|  |  |  |
| --- | --- | --- |
| F-Test Two-Sample for Variances |  |  |
|  |  |  |
|  | *Delhi* | *Chennai* |
| Mean | 96.18083333 | 96.51166667 |
| Variance | 62.49551742 | 35.12816061 |
| Observations | 12 | 12 |
| df | 11 | 11 |
| F | 1.779071729 |  |
| P(F<=f) one-tail | 0.176778476 |  |
| F Critical one-tail | 2.81793047 |  |

**Therefore,**

| Calculated value| < |Table Value|

Thus, variance of petrol prices is equal for Delhi and Chennai.

4)

Ho: σMumbai = σKolkata (The population variance for both the cities are equal).

H1: σMumbai <> σKolkata (The population variance for both the cities are different).

|  |  |  |
| --- | --- | --- |
| F-Test Two-Sample for Variances |  |  |
|  |  |  |
|  | *Mumbai* | *Kolkata* |
| Mean | 102.4041667 | 96.65416667 |
| Variance | 58.5010447 | 59.53213561 |
| Observations | 12 | 12 |
| df | 11 | 11 |
| F | 0.982680095 |  |
| P(F<=f) one-tail | 0.488702231 |  |
| F Critical one-tail | 2.81793047 |  |

**Therefore,**

| Calculated value| < |Table Value|

Thus, variance of petrol prices is equal for Mumbai and Kolkata.

5)

Ho: σMumbai = σChennai (The population variance for both the cities are equal).

H1: σMumbai <> σChennai (The population variance for both the cities are different).

|  |  |  |
| --- | --- | --- |
| F-Test Two-Sample for Variances |  |  |
|  |  |  |
|  | *Mumbai* | *Chennai* |
| Mean | 102.4041667 | 96.51166667 |
| Variance | 58.5010447 | 35.12816061 |
| Observations | 12 | 12 |
| df | 11 | 11 |
| F | 1.665360317 |  |
| P(F<=f) one-tail | 0.205391812 |  |
| F Critical one-tail | 2.81793047 |  |

**Therefore,**

| Calculated value| < |Table Value|

Thus, variance of petrol prices is equal for Mumbai and Chennai.

6)

Ho: σChennai = σKolkata (The population variance for both the cities are equal).

H1: σChennai <> σKolkata (The population variance for both the cities are different).

|  |  |  |
| --- | --- | --- |
| F-Test Two-Sample for Variances |  |  |
|  |  |  |
|  | *Chennai* | *Kolkata* |
| Mean | 96.51166667 | 96.65416667 |
| Variance | 35.12816061 | 59.53213561 |
| Observations | 12 | 12 |
| df | 11 | 11 |
| F | 0.59007056 |  |
| P(F<=f) one-tail | 0.197555563 |  |
| F Critical one-tail | 2.81793047 |  |

**Therefore,**

| Calculated value| < |Table Value|

Thus, variance of petrol prices is equal for Chennai and Kolkata.

Finally, based on all the F-Tests we can conclude that the population variances on petrol prices for all four cities are equal.

**Regression**

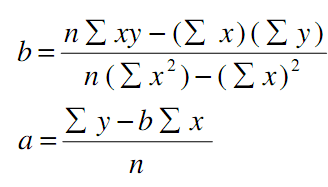
Regression analysis is **a reliable method of identifying which variables have an impact on the topic of interest**. The process of performing a regression allows you to confidently determine which factors matter most, which factors can be ignored, and how these factors influence each other. Hence we can say that the two objectives of regression are:

* To estimate the effect of the independent variable on the dependent variable.
* To predict the values of the dependent variable for individuals for whom some information concerning the independent variable is available.

A regression equation can be used to predict the values of ‘y’, if the value of ‘x’ is given and both ‘y’ and ‘x’ are the two sets of measures of a sample size of ‘n’. The formulae for the regression equation would be



where,



**Time Series:**

Time series analysis is used in statistics to **help organizations understand the underlying causes of trends or systemic patterns over time**. Using data visualizations, business users can see seasonal trends and dig deeper into why these trends occur.

In our research question, we have taken the petrol price of 365 days for the average of 4 mega cities as the petrol price of India and tried to analyse the underlying trend and seasonality in it.

The Hyperlink to the data set for Time Series Analysis: [Data - Set](../Desktop/Q.T%20Project%20New.xlsx)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SUMMARY OUTPUT | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| *Regression Statistics* | |  |  |  |  |  |  |  |
| Multiple R | 0.9243 |  |  |  |  |  |  |  |
| R Square | 0.8543 |  |  |  |  |  |  |  |
| Adjusted R Square | 0.8539 |  |  |  |  |  |  |  |
| Standard Error | 2.3447 |  |  |  |  |  |  |  |
| Observations | 365 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |  |  |
|  | *df* | *SS* | *MS* | *F* | *Significance F* |  |  |  |
| Regression | 1 | 11702.2153 | 11702.2153 | 2128.6071 | 0.0000 |  |  |  |
| Residual | 363 | 1995.6262 | 5.4976 |  |  |  |  |  |
| Total | 364 | 13697.8415 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
| Intercept | 88.5688 | 0.2460 | 360.0956 | 0.0000 | 88.0851 | 89.0525 | 88.0851 | 89.0525 |
| Time | 0.0537 | 0.0012 | 46.1368 | 0.0000 | 0.0514 | 0.0560 | 0.0514 | 0.0560 |

*Time Series Regression Equation:*

Trend = 0.054 \* Time + 88.57

*Analysis of the Time Series Data:*

* The actual value of petrol price is almost equal to its predicted value for a given date.
* The regression equation helps in further analysis and prediction of petrol price for future data on the basis of the calculated trend from the original data.

**Bi-Variate Regression**

In our report we have computed bi-variate regression to study the influence of petrol price over inflation in India. For studying the dependency minutely, we have computed the regression for different time periods.

*Bi-variate regression for petrol price and inflation from 2017-2019:*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SUMMARY OUTPUT | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| *Regression Statistics* | |  |  |  |  |  |  |  |
| Multiple R | 0.2866 |  |  |  |  |  |  |  |
| R Square | 0.0821 |  |  |  |  |  |  |  |
| Adjusted R Square | 0.0551 |  |  |  |  |  |  |  |
| Standard Error | 1.1499 |  |  |  |  |  |  |  |
| Observations | 36 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |  |  |
|  | *df* | *SS* | *MS* | *F* | *Significance F* |  |  |  |
| Regression | 1 | 4.0232 | 4.0232 | 3.0424 | 0.0901 |  |  |  |
| Residual | 34 | 44.9599 | 1.3224 |  |  |  |  |  |
| Total | 35 | 48.9831 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
| Intercept | -2.6982 | 3.6544 | -0.7383 | 0.5654 | -10.1247 | 4.7284 | -10.1247 | 4.7284 |
| Petrol Price(₹/Litre) | 0.0848 | 0.0486 | 1.7443 | 0.0901 | -0.0140 | 0.1836 | -0.0140 | 0.1836 |

*Analysis of the Data:*

* P - value of the Intercept and the Petrol Price(₹/Litre) is **greater than 0.05**. Therefore, we can conclude that there is no influence of Petrol Price(₹/Litre) over Inflation.

*Bi-variate regression for petrol price and inflation from 2017-2020:*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SUMMARY OUTPUT | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| *Regression Statistics* | |  |  |  |  |  |  |  |
| Multiple R | 0.4737 |  |  |  |  |  |  |  |
| R Square | 0.2244 |  |  |  |  |  |  |  |
| Adjusted R Square | 0.2075 |  |  |  |  |  |  |  |
| Standard Error | 1.4721 |  |  |  |  |  |  |  |
| Observations | 48 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |  |  |
|  | *df* | *SS* | *MS* | *F* | *Significance F* |  |  |  |
| Regression | 1 | 28.8330 | 28.8330 | 13.3055 | 0.0007 |  |  |  |
| Residual | 46 | 99.6815 | 2.1670 |  |  |  |  |  |
| Total | 47 | 128.5145 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
| Intercept | -8.4999 | 3.5348 | -2.4046 | 0.0203 | -15.6151 | -1.3847 | -15.6151 | -1.3847 |
| Petrol Price(₹/Litre) | 0.1690 | 0.0463 | 3.6477 | 0.0007 | 0.0757 | 0.2622 | 0.0757 | 0.2622 |

*Regression equation:*

Inflation = 0.169 \* Petrol Price(₹/Litre) – 8.499

*Analysis of the Data:*

* P - value of the Intercept and the Petrol Price(₹/Litre) is **less than 0.05**. Therefore, we can conclude that there is some influence of Petrol Price(₹/Litre) over Inflation.
* The association between **Inflation** and **Petrol Price(₹/Litre)** is positive and weak as the co-efficient of the independent variable i.e. Petrol Price(₹/Litre) is positive but very small. Therefore, it can be concluded that with **1-unit** increase in price of petrol per litre, the inflation rate will increase by **0.169** times.
* The intercept of **-8.499** becomes significant when independent variable (Petrol Price(₹/Litre)) doesn’t affect the dependent variable (Inflation) i.e. if the price of petrol per litre becomes 0 then the inflation rate in India will be -8.499.

*Bi-variate regression for petrol price and inflation from 2017-2021:*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SUMMARY OUTPUT | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| *Regression Statistics* | |  |  |  |  |  |  |  |
| Multiple R | 0.3539 |  |  |  |  |  |  |  |
| R Square | 0.1253 |  |  |  |  |  |  |  |
| Adjusted R Square | 0.1102 |  |  |  |  |  |  |  |
| Standard Error | 1.4550 |  |  |  |  |  |  |  |
| Observations | 60 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |  |  |
|  | *df* | *SS* | *MS* | *F* | *Significance F* |  |  |  |
| Regression | 1 | 17.5821 | 17.5821 | 8.3051 | 0.0055 |  |  |  |
| Residual | 58 | 122.7870 | 2.1170 |  |  |  |  |  |
| Total | 59 | 140.3691 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
| Intercept | 0.2119 | 1.5068 | 0.1406 | 0.8887 | -2.8044 | 3.2281 | -2.8044 | 3.2281 |
| Petrol Price(₹/Litre) | 0.0535 | 0.0186 | 2.8819 | 0.0055 | 0.0163 | 0.0907 | 0.0163 | 0.0907 |

*Regression equation:*

Inflation = 0.056 \* Petrol Price(₹/Litre)

*Analysis of the Data:*

* P - value of the Petrol Price(₹/Litre) is **less than 0.05**. Therefore, we can conclude that there is some influence of Petrol Price(₹/Litre) over Inflation.
* The association between **Inflation** and **Petrol Price(₹/Litre)** is positive and weak as the co-efficient of the independent variable i.e. Petrol Price(₹/Litre) is positive but very small. Therefore, it can be concluded that with **1-unit** increase in price of petrol per Litre, the inflation rate will increase by **0.056** times.
* The intercept becomes significant when independent variable (Petrol Price(₹/Litre)) doesn’t affect the dependent variable (Inflation). But since the P - value of intercept is greater than 0.05 therefore we can say that the intercept has no influence over Inflation, therefore, it is not included in the regression equation.

**CONCLUSION**

Food inflation has remained stubborn in recent years. There are several factors affecting this food inflation. Some of the proximate factors are rising agricultural cost of production, changing MSPs, increases in droughts and floods in recent years, continuous rise in petrol prices, etc.

From our report, we can conclude that the rise in petrol prices is influencing the rising food inflation in the country to some extent as on the basis of the regression we can conclude that there is a weak association between petrol prices and inflation therefore although we can say that petrol prices affect inflation but other factors are more predominant in the food inflation than the rise in petrol prices.