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# Crude Oil Price and Inflation in Pakistan

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**Abstract**
Economy of Pakistan has witnessed several inflationary episodes and voluminous literature has been presented in this regard but no specific attention has been given to the impact of crude oil prices on inflation in Pakistan. This research is particularly aimed to determine the existence and intensity of relation between crude oil price and inflation in Pakistan. Moreover the study also investigates other determinants of inflation in Pakistan. Effects of crude oil price on GDP deflator have been analyzed using time series data from 1979 to 2012. For long run and short run results Johansen Co-integration techniques have been employed for estimation. The study concludes that Money Supply, Crude Oil Price, Exchange Rate, Interest rate and Indirect taxes have positive while real GDP has negative impact on inflation during the study period.

**Keyword:** Pakistan, Oil prices, inflation, exchange rate, interest rate, indirect taxes

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**I. Introduction**

One of the most important issues in the economy of Pakistan is rising inflation rate which has been 14%, 23%, 13%, 18% and 10% in last 5 years. Single digit inflation is somehow desirable for the economy but double digit inflation in country like Pakistan where real GDP growth is comparatively quite low can be disastrous in long run if not controlled, as it results in low saving, low growth, low real return on investment, etc. There have been several factors contributing to inflation. Along with determining possible factors behind accelerating inflation this study particularly focuses on impacts of increase in crude oil price on inflation. Oil price shock contemporaneously affects every micro unit of typical oil importing under developed economy with the inflation it brings and especially an economy like Pakistan where oil is one of the major energy resources and around 61% of oil is imported to meet country requirements.

Crude oil price has significant impacts on almost every sector of the economy. But in terms of consumption of petroleum products by economic groups two major groups transportation and power generation have been identified that use 47% and 43% of total oil consumption. Almost 62.4% of electricity in Pakistan is thermal (Economic Survey of Pakistan, 2013-14). Above stated factors make economy of Pakistan very sensitive to crude oil price fluctuations. On the other hand natural gas price had also been linked with crude oil price which exacerbated the overall impact of crude price fluctuation. (Note that gas price has been delinked with petrol price since 2012 and to the date of this research is delinked). Moreover the country's government faces a circular debt problem where losses are occurring due to non-paying consumers and state owned enterprises and cannot pay power-generating companies who in turn cannot pay gas suppliers. On the other hand domestic oil refineries have also been running below capacity thus constraining the supply of oil and other fuels. In such circumstances any increase in oil price is perceived vulnerable for the economy.

**II. Literature Review**

Numerous studies have been conducted to identify the determinants of inflation all over the world but due to variation in economic environment different variables have been identified for different economies. The references given here are few of studies that have been conducted to identify the determinants of inflation in Pakistan and few studies which investigate the oil price impact on inflation in different countries. Despite of heavy reliance on oil in Pakistan no study is aimed to particularly emphasize the impact of crude oil price shock on the prices in Pakistan.

Khan at el, (1995) investigated the macroeconomics detriments of high inflation. They quantify and identify the responsible factors for inflation in Pakistan. The key factors identified by this study are: (a) supply shock (deviation of total availability of goods from its normal trend); (b) monetary policy shocks (use of cash balance or credit creation to finance budget deficit); (c) tax policy shocks (sales and excise duties); (d) external shocks (effect of exchange rates); (e) pricing policy shocks (procurement price of wheat, cotton, and sugar and the administered prices of fuel, gas, and electricity); and (f) expectations. Khan and Mohammad (1996) estimated an overall inflation equation along with CPI food price inflation and CPI non-food price inflation equations. The study is based on time series data covering the period from 1971 to 1995. The study concludes that the money supply positive relation with both type of inflation in Pakistan due to loss monetary policy. The also conclude that there exist a stable long-run equilibrium relationship between inflation, money supply (M2 definition), import price, and real GDP. Bhattacharya and Bhattacharya (2001) attempted to study the transmission mechanism of an increase in petroleum prices on the prices of other commodities and output a case study for India. The empirical result of this paper show that a bidirectional causality between oil and non-oil inflation in India.

On the relationship of oil prices and its impact on inflation Blanc and Menzie (2004) estimated the effects of oil prices changes on inflation in USA, UK, France, Germany, and Japan. The study employs Augment Phillips Curve frame work and suggests that oil prices increase have a modest effect on inflation in USA, Japan and Europe. Chow and Yan (2004) used time series data from 1954-2002 and applied an error correction model to explain the inflation rate in China during this period. The study concluded that change in M2/real output and the deviation in the previous period of log price level to be the determinants of inflation in China .Agha and Muhammad (2006) investigated the long-run relationship between inflation and fiscal indicators in Pakistan using time series data from 1973 to 2003. Johansen co integration and Vector Error Correction was applied for analysis and results suggest that in the long-run inflation related to fiscal imbalances and sources of financing fiscal deficit, real GDP and exchange rate.

Qayyum (2006) investigated the linkage between money supply growth and inflation in Pakistan. Author used time series data from 1960-2005 and quantity theory of money to determine the variables. The results indicate a positive impact of money supply growth on real GDP growth and inflation. Author tried to prove that inflation in Pakistan is a pure monetary phenomenon and money supply growth at first-round affects real GDP growth and at the second round it affects inflation in Pakistan. Kemal (2006) investigated the connection between inflation in Pakistan and increases in money supply and supported quantity theory of money. It concluded that inflation is just a monetary phenomenon in Pakistan. Moreover money supply does not have contemporaneous influence on the price levels rather the impact of money supply on inflation has a considerable lag of about 9 months. Malik (2006) used Near-VAR approach to model inflation, real GDP gap and reserve money. Results show that inflation is caused by monetary expansion but the effect of monetary policy transmits into inflation with a lag of half year.

On the relationship between oil prices and trade commodity Baffes (2007) investigated the effect of crude oil prices on the prices of 35 internationally traded primary commodities during 1960–2005. The Study finds that the pass-through of crude oil price changes to the overall non-energy commodity index is 0.16. The prices of precious metals and food group also exhibited a strong response to crude oil price. Another work done by Cavallo (2008) and examined the impact of rising oil prices on core inflation over the last decade for four economies: the U.S., the euro area, Canada, and the U.K. and found some evidence that rising oil prices have had a positive and significant effect on core inflation in the euro area, but found no systematic evidence that rising oil prices have had a significant impact on core inflation in the U.S., Canada, or in the U.K.

Khan and Gill (2010) have adopted time series data from 1971 to 2005 and employed Ordinary least square method for analysis of determinants of inflation in Pakistan using different price indicators i.e. CPI, WPI, SPI and GDP Deflator. The explanatory variables that are budget deficit, exchange rate, wheat support price, Imports, Support price of sugarcane and cotton and money supply are found to be directly affecting all the price indicators while interest rate is indirectly related to all the explained variables in Pakistan. Bashir et al. (2011) and others used time series data from 1972-2010 and applied Johansen Co-integration and Vector Error Correction to investigate determinants of inflation in Pakistan. Granger causality test has also been used to observe causal relationship. The findings of the study reveals that money supply, gross domestic product, imports and government expenditures has positive while government revenues has a negative influence on CPI in Pakistan. In the light of previous literature we see there are less work is available on the relation of oil prices and inflation. But in the case of Pakistan no work is available.

**III. Model Methodology and Estimations**

The current study investigate the impact of crude oil price on inflation in case of Pakistan as well as other macroeconomic variables that may affect inflation direct and indirect. For that purpose impact of real GDP, money supply, crude oil price, exchange rate, and weighted average rate of return on deposits, Indirect taxes and unemployment has been observed on GDP deflator as given in the function form:

$$GDPD_t = F(\ GDPR, M2, COP, EXC, WARRD, INDT) \qquad (1)$$

Taking log on both side of equation 1 and then we get econometric model in the form of equation with expected signs as below

$$LGDPD_t = \alpha + \beta 1LGDPRi + \beta 2LM2i + \beta 3LCOPi + \beta 4LEXCHi + \beta 5LWARRDi + \beta 6LINDTi + \mu i \qquad \textbf{(2)}$$

LGDPD = Log of GDP Deflator index based on 2001 prices
LGDPR = Log of Real Gross Domestic Product (-)
LM2 = Log of Broad Money Supply M2 (+)
LCOP = Log of international Crude Oil Price (+)
LEXCH = Log of exchange Rate (PKR Rs. to US $) (+)
LWARRD = Log of Weighted Average Rate of Return on Deposits (+)
LINDT = Log of Indirect Taxes (Sales Tax, Custom Duties etc.) (+)

Time series data for the period from 1980 to 2012 has been used for analysis. Log – log model has been employed to have price elasticity with respect to real gross domestic product, money supply, international crude oil price, and foreign exchange rate, weighted average rate of return on deposits, indirect taxes and unemployment. Handbook of

statistics on Pakistan Economy 2010 and IFS 2012 data base has been used as data source. Crude oil price has been taken in US dollar per barrel to avoid exchange rate impact in conversion to Pak rupee.

**IV. Methodology**

Engle and Granger (1987) discussed that, if a set of economic series is not stationary at I(0) then there may be exist some linear combination of the variables that is stationary at I(1). Now in this model, all the variables are non-stationary at their level but stationary in their 1st difference, this leads us to apply Johansen co-integration technique. In econometric analysis, two variables are co-integrated if they have a long-run relationship between them [Johansen 1991, 1995]. Pesaran and Smith, (1999) and Pesaran et al., (2000) suggested to apply co-integration test on the set of variables which contain possibly a mixture of I(0) and I(1). The general form of the vector error correction model is as follows:

$$Z\aleph_t = \sum_{i=1}^{p-1} \theta\aleph_{t-1} + \alpha_\circ + \eta_t$$

This can also be written in standard form as:

$$\Delta\aleph_t = \sum_{i=1}^{p-1} \prod_i \Delta\aleph_{t-k} - \partial\aleph_{t-k} + \alpha_1 + \varepsilon_t$$

Where

$$\prod_i = -I + \partial_1 + \partial_2 + ..... + \partial_t$$

$$i = 1,2,3,...k-1 \text{ and } \partial = I - \partial_1 - \partial_2 - ....\partial_k$$

Where $p$ represents total number of variables considered in the model. The matrix $\prod$ captures the long run relationship between the $p$-variables. Now for the Johansen Test we apply the Trace test, which is based on the evaluation of $H_\circ(r)$ against the null hypothesis of $H_\circ(r+1)$, where $r$ indicates number of co-integrating vectors.

The co-integration test provides an analytical statistical framework for investigating the long run relationship among economic variables in the model. Having established the relationship among the variables, remain weather in the short-run changes of variables we use the following specification of the model.

$$LGDPD_t = \gamma + \alpha\eta_{t-i} + \sum_{i=0}^{p} \beta_{LGDPR} \Delta LGDPR_{t-i} + \sum_{i=0}^{p} \beta_{LM2} \Delta LM2_{t-i} + \sum_{i=0}^{p} \beta_{LCOP} \Delta LCOP_{t-i}$$

$$\sum_{i=0}^{p} \beta_{LEXCH} \Delta LEXCH_{t-i} + \sum_{i=0}^{p} \beta_{LWARRD} \Delta LWARRD_{t-i} \sum_{i=0}^{p} \beta_{LINDT} \Delta LINDT_{t-i} + u_t$$

Where $v_t$ the error is term and $\alpha$ is short run speed of adjustment,

Johansen and Juselius (1990) provide critical values for the two statistics. The statistical distribution depends on the number of non-stationary components in the model. To determine the non-stationary components, it is necessary to choose the lag length for the VAR portion of the model. To overcome this problem, this work determines the optimal lag length using Akaike's Information Criterion (AIC) and Schwartz Bayesian Criterion (SBC)[1]. The lowest values of AIC and SBC are used to select the lags and give the most desirable results.

**V. Empirical Results**

Analysis is done in three phases. In the first phase Augmented Dickey Fuller test has been employed to test the stationary of data (unit root values are reported in Table 1) and in the second phase Ordinary Least Squares method and in third phase co-integration methods have been employed to determine the impact of crude oil price on inflation as well as to identify other variables affecting inflation in Pakistan. The descriptive statistics are shown in

[1] The distribution of the test statistic is sensitive to the order of lag used. If the lag order is used less than the true lag, then the regression estimates will be biased and the residual terms will be serially correlated. If the order of lag used exceeds the true order, the power of the test is reduced.

appendix A**.** Estimated ordinary least squares (OLS) regression results of the inflation models are reported in Table 2 while results of Johanson Co-integration test are reported in table 3.

**Table -1**
**Unit Root Test**

| | Level | | First Difference | |
|---|---|---|---|---|
| | Intercept | trend & Intercept | Intercept | Trend & Intercept |
| LOG(GDPD) | 1.12 | -2.09 | -3.16 | -3.41 |
| LOG(GDPR) | 2.60 | 2.36 | -3.72 | -4.13 |
| LOG(M2) | -0.48 | -3.56 | -4.03 | -3.98 |
| LOG(COP) | -0.15 | -1.65 | -5.99 | -5.28 |
| LOG(INDT) | -5.18 | -5.08 | -5.44 | -3.97 |
| LOG(EXCH) | -2.11 | -1.75 | -4.73 | -5.04 |
| LOG(WARRD) | -2.14 | -2.78 | -3.46 | -3.42 |

To test the order of integration of variables of the model, the Augmented Dickey Fuller Test for unit root has been employed in this study. The ADF tests results are shown in Table I which confirm that all variables, that is, the Real Gross Domestic Product (GDPR), Broad Money Supply (M2), Crude Oil Price (COP), Indirect Taxes (INDT), Exchange Rate (EXCH), and Weighted Average Rate of Return on Deposits (WARRD) are stationary at first difference. Thus, all series are integrated of order one i.e. I(1).

**Table-2**
**Lag Length Selection**

| **Lags** | **Akaike Information Criteria** | **Schwartz Bayesian Criteria** | **Log Likelihood** |
|---|---|---|---|
| 0 | -1.5964 | -1.3742 | 32.9373 |
| 1 | -9.9905* | -8.6574* | 204.8351 |
| 2 | -8.0280 | -7.5839 | 230.4908 |
| **Short-run Diagnostic Test-Statistics**<br>Serial Correlation LM, F = 1.98(0.159)<br>ARCH Test: 0.273(0.605)<br>Normality J-B Value = 0.0437(0.968)<br>Heteroscedasticity Test, F = 0.518(0.892)<br>Ramsey RESET Test, F = 0.948(0.339) | | | |

After analyzed the order of cointegration next step to move to words Optimal lag length is selected at 1st lag, using Akakie's information criterion (AIC) and Schwartz criterion (SIC) as shown in Table-2.

**Table-3**
**Johansen's Multiple Co-integration Test Results**

| Hypotheses | Trace-Test | 0.05 critical value | Inst-Value | Hypotheses | Max-Eigen Statistic | 0.05 critical value | Inst-Value |
|---|---|---|---|---|---|---|---|
| R = 0 | 210.5320 | 125.6154 | 0.0000 | R = 0 | 64.08885 | 46.23142 | 0.0003 |
| R ≤ 1 | 146.4432 | 95.75366 | 0.0000 | R = 1 | 47.95048 | 40.07757 | 0.0053 |
| R ≤ 2 | 98.49271 | 69.81889 | 0.0001 | R = 2 | 36.24012 | 33.87687 | 0.0256 |
| R ≤ 3 | 62.25259 | 47.85613 | 0.0013 | R = 3 | 29.06967 | 27.58434 | 0.0320 |
| R ≤ 4* | 33.18292 | 29.79707 | 0.0196 | R = 4 | 21.62251 | 21.13162 | 0.0426 |
| R ≤ 5 | 11.56041 | 15.49471 | 0.1793 | R = 5 | 10.95218 | 14.26460 | 0.1566 |

In the third phase, the study attempts to find number of co-integrated equations using trace statistics and maximum eigenvalue statistics. According to probabilities reported in tables 3 the analysis rejects the null hypothesis that there

is no co-integrated vector (None), there is at most 1 co-integrated vector (At most 1), there are at most 2 co-integrated vectors (At most 2), there are 3 co-integrated vectors (At most 3) and also there are at most 4 co-integrated vectors (At most 4). Conclusively there are 5 co-integrated vectors in long run results which represent high association between endogenous and exogenous variables used in the study.

**Table- 4**
**Long Run Coefficient**

| Dependent Variable = GDP Deflator | | | | |
|---|---|---|---|---|
| Variables | Coefficient | Standard Error | t-Statistic | Prob. |
| C | 6.5547 | 1.8929 | 3.4626 | 0.0021 |
| LOG(GDPR) | -0.9030 | 0.1931 | -4.6760 | 0.0001 |
| LOG(M2) | 0.6458 | 0.0919 | 7.0252 | 0.0000 |
| LOG(COP) | 0.1065 | 0.0208 | 5.1055 | 0.0000 |
| LOG(INDT) | 0.2059 | 0.0863 | 2.3858 | 0.0257 |
| LOG(WARRD) | 0.0806 | 0.0142 | 5.6610 | 0.0000 |
| LOG(EXCH) | 0.5005 | 0.0806 | 6.2096 | 0.0000 |
| R-Squared .987 R-Bar-Squared .971<br>DW-statistic 1.7178 F-Stat. 280.728[.000]<br>AIC =- 3.9824 SBC = -3.654 | | | | |

Estimated regression coefficients possess the correct predetermined signs. Moreover they are statistically significant at the 1 percent level except indirect taxes in the equation which is significant at 5%. Explanatory power of the model represented by Adjusted R2 is 99% and D.W statistics of 1.72 indicates the absence of serial correlation problem.

Negative sign of Real GDP indicates an inverse relationship between inflation and real GDP that is, an increase in real output leads to a decline in general price level of the economy that has been measured here using GDP deflator index both in short and long run. The long run coefficient having negative sign suggests that 10 percent increase in real GDP leads to 90 percent decrease in GDP deflator index on the average. Price elasticity with respect to output or real GDP is - 0.90. Broad money supply M2 has positive sign in both short and long run signaling direct relationship between inflation and money supply. It indicates that an increase in money supply leads to a surge in the inflation. The long coefficient having positive sign suggests that 10 percent increase in Money Supply leads to 65 percent increase in GDP deflator index on the average. Price elasticity with respect to broad money supply is 0.65.The result is in accordance with quantity theory of money that an increase in money supply tends to boost general price level in the economy.

COP possesses a positive sign signaling a direct positive relationship between crude oil price and inflation. The long run coefficient having positive sign suggests that 10 percent increase in COP leads to 1 percent increase in GDP deflator index on the average. Price elasticity with respect to crude oil price is - 0.10. Oil being 2$^{nd}$ major source of energy has influences on almost every sector of the economy; either it is agriculture (use of tractors, harvesters, threasures etc), manufacturing (directly and indirectly via electricity as electricity is produced by oil and gas) or services (transportation). As the prices in international market increase it contemporaneously affects local prices as almost 61% of oil is imported to meet energy requirements of Pakistan. In the short run impact of international crude oil price shock is minimized or somehow controlled in Pakistan because the government of Pakistan controls the prices of energy while in the long run downward movement in government-administered oil prices are seldom observed which leads to a persistent increase in general price level.

Exchange rate also enters with a positive sign indicating positive relationship between exchange rate and inflation. The coefficient having positive sign suggests that 10 percent increase in exchange rate leads to 5 percent increase in GDP deflator index on the average. Price elasticity with respect to exchange rate is - 0.50.As Pakistan has always

run a negative trade balance (except for 2 years in the history) which refers to more imports then exports. Our Imports usually comprise on Oil, machinery and production inputs. In case of increase in exchange rate not only imports become pricy but also local prices increase due to use of these imported goods in production process which leads to a so called imported inflation in economy.

Similarly interest rate enters with a positive sign. The coefficient having positive sign suggests that 10 percent increase in interest rate leads to 0.8 percent increase in GDP deflator index on the average. Price elasticity with respect interest rate is - 0.08. As interest rate rises, cost of production also increases and this increase is transferred to final consumers from producers/ entrepreneurs and ultimately inflation increases.

Indirect taxes (sales taxes, excise duties, levis, etc) has a significant positive influence on inflation in Pakistan. The coefficient having positive sign suggests that 10 percent increase in exchange rate leads to 2.1 percent increase in GDP deflator index on the average. Price elasticity with respect to exchange rate is - 0.21.

**Table-5**
**Short Run Results**

| **Dependent Variable:** | | | |
|---|---|---|---|
| **Variable** | Coefficient | T-Statistic | Inst-values |
| C | 2.0154 | 0.8489 | 0.4040 |
| DLOG(GDPR) | -0.4526 | 1.9744 | 0.0452 |
| DLOG(M2) | 0.4612 | 3.4060 | 0.0017 |
| DLOG(COP) | 0.1624 | 1.3132 | 0.1912 |
| DLOG(INDT) | 0.5214 | 1.5289 | 0.1188 |
| DLOG(WARRD) | 0.2030 | 0.4397 | 0.6639 |
| DLOG(EXCH) | 0.1412 | 2.6437 | 0.0256 |
| **$Ecm_{t-1}$** | -0.3201 | -3.0940 | 0.0048 |
| R-squared = 0.85391<br>Adjusted R-squared = 0.83456<br>Akaike info criterion = -2.9657<br>Schwarz criterion = -2.584157<br>F-statistic = 724.42512<br>Prob(F-statistic) = 0.00324<br>Durbin-Watson stat = 1.5124 | | | |

Table 5 reports the short-run coefficient estimates obtained from the ECM version of ARDL model. Short-run diagnostic test-statistics are shown in table 2 bottom part. The ECM coefficient shows how slowly variables return to equilibrium and it should have a statistically significant coefficient with negative sign (Bannerjee et al., 1998). The error correction term **$ecm_{t-1}$**, which measures the speed of adjustment to restore equilibrium in the dynamic model, appears with negative sign and is statistically significant at 5 percent level, The coefficient of **$ecm_{t-1}$** is equal to (-.3201) for short run model and implies that any deviation from the long-term is corrected by 32 percent over each year in financial sector's performance. The lag length of short run model is selected on the basis of Schwartz Bayesian Criterion.

**VI. Conclusion & Policy Recommendations**

The analysis of data from 1979-2012 suggests that increase in money supply, crude oil price, exchange rate, interest rate, and indirect taxes accelerates inflation while increase in real gross domestic product leads to a downward movement in general price level in short and long span of time. Moreover, Pakistan is quick responsive to international crude oil price change as the economy is mainly dependent on oil and gas and demand for petroleum and its products is inelastic in Pakistan due to scarcity of other energy resources and so is not negatively affected with international crude oil price fluctuations. Following policy insinuation are presented in this regard: Optimal mix of energy resources is required to reduce the pressure on oil & gas. Substitution of oil and gas with other energy resources is required in this regard. Increase in crude oil price quickly reflects in an increase in cost of production because industrial sector heavily relies on electricity which is produced by oil and gas. Solution to this problem lies in effective water resource management and increasing hyderl electricity production capacity. Natural gas prices should remain de-linked with petrol prices and Govt. should take back the right of price fixing of petroleum and its

products from refineries and oil marketing companies. Effective measures to control exchange rate are also required as Pakistan highly depends on imports of petroleum, petroleum products, machinery and etc. Strictly controlled money supply or money supply in accordance with real output is also required.

**Appendix 1**
**Descriptive Statistics**

| | LOG(GDPD) | LOG(GDPR) | LOG(M2) | LOG(COP) | DLOG(INDT) | LOG(EXCH) | LOG(WARRD) |
|---|---|---|---|---|---|---|---|
| Mean | 4.1452 | 14.886 | 13.580 | 3.3094 | 0.1204 | 3.5104 | 1.5882 |
| Median | 4.2006 | 14.923 | 13.687 | 3.2042 | 0.1085 | 3.5884 | 1.8098 |
| Maximum | 5.4675 | 15.546 | 15.569 | 4.5751 | 0.3355 | 4.4284 | 2.1747 |
| Minimum | 3.0214 | 14.122 | 11.558 | 2.5703 | -0.0131 | 2.3571 | -0.0511 |
| Std. Dev. | 0.7204 | 0.4196 | 1.2229 | 0.5509 | 0.0710 | 0.6093 | 0.5626 |
| Skewness | 0.0585 | -0.1255 | -0.0167 | 0.8212 | 0.7491 | -0.2845 | -1.5729 |
| Kurtosis | 1.8114 | 1.9875 | 1.8074 | 2.6377 | 4.0245 | 1.7554 | 4.5115 |
| Jarque-Bera | 1.7831 | 1.3602 | 1.7791 | 3.5359 | 4.1172 | 2.3408 | 15.227 |
| Probability | 0.4100 | 0.5065 | 0.4108 | 0.1706 | 0.1276 | 0.3102 | 0.0004 |
| Sum | 124.35 | 446.58 | 407.404 | 99.283 | 3.6143 | 105.311 | 47.648 |
| Sum Sq. Dev. | 15.053 | 5.1068 | 43.3698 | 8.8015 | 0.1464 | 10.7661 | 9.1790 |
| Observations | 30 | 30 | 30 | 30 | 30 | 30 | 30 |

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