**STATISTICAL PROJECT**

**NAME AND REG NO.**

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**A COMPARATIVE ANALYSIS ON THE RELATION BETWEEN FOOD PRICES AND PETROLEUM PRICES IN KENYA**

**Introduction**

Rising costs in food production has become a major issue globally. Developing countries are increasingly suffering from high food prices as they are affected more than the developed countries. Kenya is categorized under developing countries and most of the households in the country are suffering from high food prices. Poor urban households are mostly affected as they spend majority of their income on food. Some of the effects of high food prices are; reduced food consumption as an increase in food prices leads to greater reduction in food consumption. High food prices can also trigger social unrest especially if the government cuts food and petroleum subsidies during times of rising prices and high unemployment. Additionally, high food prices can lead to vulnerability as vulnerable households are disproportionately affected often coping by reducing meal quantity and quality and cutting non-food expenditures like health and education. Finally high food prices can lead to policy recommendations such as addressing broken food markets which requires inclusive and fair processes to ensure healthy markets, and focusing on key staple foods and improving market access for farmers which can mitigate the impact of rising prices.

Petroleum, after water, is a liquid that humans are most dependent on. It is a source of fuel and is mainly found in many consumer products. It covers both unprocessed crude oil and other products that are made from refined crude oil. It is generally used in many industries such as; in agriculture, it is used in the manufacture of agricultural fertilizers, pesticides and running machines used in agricultural production. In transportation, it is a primary transportation energy source as it is used to produce petrol, diesel and even jet fuel used in automobiles, motorcycles, trucks and ships. It is also used in producing lubricants used in several types of machines. In the chemical industry, petroleum is used to process chemical fertilizers, synthetic fibers, plastics, pesticides and insecticides. There is believed to be a strong link between agricultural commodities and petroleum. For instance, petroleum is used to produce fuel for machines such as tractors and pumps used in the production of agricultural products. It is also used in the manufacture of agricultural fertilizers and pesticides. Additionally, the link between high food prices and petroleum prices is believed to be strong. This is because high petroleum prices not only result to an increase in the cost of living but also the cost of food. Petroleum prices have a fairly large effect on the food sector. For instance, high oil prices result in high prices for gasoline and diesel fuel, it costs more to get agricultural products to the final consumer. Whatever means of transportation is used, the price of fuel will always affect the cost of transportation and high transportation cost generally means higher food prices Farmers also use petroleum fuel to power their tractors, pumps and other machinery. Petroleum is also used in the production of fertilizers and many other farm-level inputs. Thus, an increase in petroleum prices consequently reduces the profits of farmers, food processors and retailers raising consumer food prices.

Before the liberation of the oil sector in Kenya in 1994, the petroleum sector was marked by high direct governmental participation and a low-level private sector involvement (Mecheo and Omiti, 2003). Though after liberation more players gained entry into the sector, the market still had characteristics that fostered the rise and sustenance of a cartel-like behavior. Thus, the government saw the need to have a controlling hand in the sector since investments in the petroleum sector had an impact on the whole economy. The Energy and Petroleum Regulatory Authority (EPRA) was established in 2006 through the Energy Act which laid the foundation of regulations in the petroleum sector in Kenya by putting together all laws relating to energy policies under one regulatory body. EPRA publishes monthly, maximum pump prices of petroleum products in the country. The prices are set based on cost insurance and freight, crude oil prices and transportation costs within the country, retailers’ and wholesalers’ margins and refining fees. The final retail prices also include various government taxes and levies which constitute about 40% of the total retail price.

In Kenya, the transport sector is the largest consumer of petroleum products accounting for approximately 68.7% of the total volume of petroleum fuels followed by aviation and power generation while agriculture accounts for 1.05%. Thus, an increase in fuel prices significantly affects the price of transported food. According to a study conducted in East Africa, a 1% increase in oil prices can lead to an increase in the price of maize by 0.26%. An increase in petroleum prices would lead to an increase in all the associated costs of production, processing and transportation of food products. To account for the increased cost, prices of products will be raised. This change is however limited to the extent to which fuels are used in agriculture. This is because a farm that is not fuel-intensive could have a minimal production cost that is directly affected by the price changes in oil prices as compared to a farm that is fuel-intensive. This shows that although petroleum prices and food prices are somehow correlated, the transmission of oil prices to the changes in food prices is limited.

The country was recently affected by a significant increase in petroleum which led to an increase in the cost of living and consequently high food prices. Petroleum had a significant drop in the early months of 2020 but there was also a significant increase after 2020. In June 2023, the price of gasoline reached a 12-year high due to a tax hike causing concerns for the economy. The price of gasoline jumped 7.4% to Ksh.195.53 per litre in Nairobi. This was caused by changes in finance legislation including a doubling of the Value Added Tax (VAT) on petroleum products to 16%. EPRA also neglected to implement prescribed levy cuts as it retained the Impact Declaration Fee (IDF) and the Railway Development Levy (RDL) at their previous rates leading to overpayment for fuel and illegal levies. This resulted in high prices in petroleum products such as super petrol, diesel and kerosene intensifying the financial burdens for consumers. This resulted to an increase in the cost of living for Kenyans. With Kenya National Bureau of Statistics (KNBS) Consumer Price Index and Inflation Data showing the rise in the cost of living was mainly due to an increase in food prices and non-alcoholic beverages. The country’s agricultural sector is mainly affected by the high cost of petroleum products as diesel and petrol remain key in running farm machinery. Thus, in order to cope with the rising petroleum prices, farmers had to pass these costs to consumers causing the high food prices. Another thing that led to the increase in the price of petroleum products and food prices recently, is the country’s increasing inflation. Inflation is a general rise in the cost of goods and services across an economy. It is associated with a decline in the purchasing power of money making it difficult for households to meet their basic necessities. Thus, the rise in food and petroleum prices accelerates the increase in Kenya’s inflation. Some of the factors that have led to the rise in inflation in Kenya are; fuel shortage brought by the Kenyan government’s failure to reimburse oil companies for subsidies, rising food prices globally and the Russian invasion of Ukraine and its effect on the world’s energy and food market.

While input and transportation costs continue to affect the prices of food, the effect of the price relationship between food and petroleum has proven to be significant. This means that the relationship between petroleum prices and food prices require more investigation. This study aims to investigate the relation between food prices and petroleum prices in Kenya.

**PROBLEM STATEMENT**

With the increase in the cost of living arising in countries across the globe, Kenya is not left behind. The country has been affected, over the past few months, with an increase in the cost of living characterized. This has consequently led to an increase in the cost of food prices which has affected a majority of households in the country. Although households across the country have suffered, poor urban households have been largely affected as they spend a majority of their income on food. Even though the rise in food prices has been caused by a number of reasons, one of the main causes has been due to the increase in food prices. Over the past few months, the relationship between petroleum prices and food prices has been evident as the increase or decrease in petroleum prices has consequently led to an increase or decrease in food prices. Thus, the relationship between food and petroleum has proven to be significant and it requires more investigation. This study aims to investigate the relation between food prices and petroleum prices in Kenya.

**Objectives of the study;**

1. To analyze the relationship between petroleum prices and food prices.
2. To examine the regression relationship between petroleum prices and food prices.
3. To forecast food prices in relation to petroleum prices over the next six months.

**LITERATURE REVIEW**

1. **Price Transmission Mechanisms**

Petroleum prices can have an impact on food prices and their relationship is multifaceted. Changes in petroleum prices can have an influence on the cost of food in various ways. For example; petroleum plays a crucial role in transporting agricultural products from farms to markets. Thus, an increase in petroleum prices leads to an increase in the cost of transporting agricultural commodities like grains, fruits and vegetables. This in turn leads to high food prices due to the added expense of getting agricultural products to consumers. Petroleum is also a key component in the production of fertilizers. Thus, an increase in petroleum prices leads to an increase in the cost of producing fertilizers. Since fertilizers are essential for agricultural production, the high fertilizer costs affect the cost of food production which is in turn passed to consumers through high food prices. Additionally, increased agricultural production in the country, coupled with higher farm income, leads to greater demand for farm machinery. These machines depend on petroleum in order to operate. Thus, higher demand for petroleum can raise both agricultural commodity prices and petroleum prices which leads to higher food prices.

Research by Archit Goel, Dr. Deepika Gerg and Dr. Naresh Sharma (Study on the effect of petroleum price on the price of food items) suggested that when petroleum prices increase, it not only affects the cost of petroleum, but also leads to an increase in the cost of food. The research showed that farmers should not assume that petroleum products will remain affordable and they should look for alternative forms of energy. The study also suggested that fuel has become a scarce resource and countries should develop alternative energies to meet their economic activities. Lucy W. Ngare, Okova W. Derek conducted research to examine price transmission between fuel and food commodities. The research proved that diesel prices have a significant pass-through effect into perishable food.

1. **Biofuel Policies and Food Prices**

Research by Lucy W. Ngare, Okova W. Derek (The effect of fuel prices on food prices in Kenya) evaluated the impact of fuel prices on food prices by analyzing data from petroleum and common food commodities such as maize, beans, cabbage and potatoes. The study identified a unidirectional Granger causality running from petroleum to cabbage and potato prices. There was however no casual relationship with maize and beans prices. The research also showed that there was a long-run price relationship between perishable foods such as cabbages, potatoes and petroleum prices. In order to mitigate the effects of rising petroleum prices, the study recommended a policy of cushioning i.e. introducing a tax relief once the fuel prices reach a certain level.

1. **Vulnerability of food security**

Research by Lucy W. Ngare, Okova W. Derek (The effect of fuel prices on food prices in Kenya) showed that measures such as introducing a tax relief could help stabilize food prices. Such measures are important because poor households in both urban and rural settings are particularly vulnerable to increase in food prices directly affected by rising fuel costs. For instance, in Kenya, an increase in diesel prices resulted in higher prices for perishable food like cabbages and potatoes, which can negatively affect food consumption and investments. Therefore, policies can be put in place to help safeguard vulnerable populations from the adverse effects of fuel price fluctuations on their food security.

1. **Market Integration**

In a study by Brian M. Dillion and Christopher B. Barret, the transmission of global crude oil and maize prices in East Africa, including Kenya was examined. This research found that there is no significant casual relationship between oil and maize prices at the local global market. However, global petroleum prices strongly affect maize prices at sub-national markets through their impact on transport fuel prices. For example, the average price elasticity of local maize with respect to global petroleum prices is 0.26. The research also found that variations in price transmission patterns across countries are attributed to divergence in application of price stabilization policies, public policy failure, incomplete market integration and coinciding domestic shocks. Finally, the research also found that rising transport cost due to oil price increases may have a greater short-term impact on food prices in Africa than rising cost of food grains on local markets. This research showed that there is a relationship between global petroleum and food markets in Kenya emphasizing the role of transport fuel prices in shaping local maize prices.

1. **Policy Implications**

Assessing the effectiveness of policies aimed at mitigating the impact of petroleum price changes on food prices is crucial for sustainable economic development. For instance, developing countries experience a smaller but more persistent and broad-based inflation response to gasoline price shocks compared to advanced economies. While purchasing power of all households decline as fuel prices increase, the impact is progressive. However, this progressivity phases out within 6 months after the shock in advanced economies whereas it persists beyond a year in developing countries. In Kenya, a policy that is important and could be implemented is tax relief once fuel prices reach a certain level to cushion the impact on food prices.

1. **Commodity Price Volatility**

Research by Archit Goel, Dr. Deepika Gerg and Dr. Naresh Sharma (Study on the effect of petroleum price on the price of food items) shows the volatility patterns of petroleum prices and food prices in Kenya and their relationship. Some of the volatility patterns of petroleum and food prices in Kenya are; Fluctuation of petroleum prices in Kenya. These fluctuations impact the country’s economic performance. The volatility of petroleum prices is influenced by both global factors such as international oil prices and local factors such as supply and demand dynamics within Kenya. This has a negative impact on the country’s economic performance since, an increase in oil prices affects inflation, exchange rates and overall economic growth. Food prices have also been rising affecting access to food for many households. The volatile food prices lead to food insecurity. Finally, both petroleum and food prices exhibit upward trends over time due to various factors. Even though petroleum prices are affected by global market dynamics, food prices are affected by local conditions.

**2. METHODOLOGY**

**2.1. Data and data source**

Our study purpose to utilize time series prices data and literature review from relevant documents. The estimation of prices transmission makes use of average monthly retail price data in Nairobi for petroleum, sugar, milk, beans and potato prices over the past one year. We obtained both food and petroleum prices from the Kenya National Bureau of Statistics (KNBS). The analysis focused on sugar, milk, beans and potato prices since they are among the staple foods in the country. The study also focused on low sulphur diesel (automotive gas oil) because it’s the petroleum product that is mainly used in transportation and operation farm machinery. The data used was obtained from Nairobi since it is the capital city of Kenya where most households primarily rely fully on purchases for their foods.

**2.2. Data analysis**

The empirical result indicates that a higher oil price increases food prices. Also higher oil prices volatility yields higher food prices. Moreover, an increase in the oil supply reduces the food prices. The model is based on linear relationship among prices series commodity prices:

Pi, t=alpha (0) +alpha (1)PJ, t+ Ut where Pi, t denotes the retails prices at time t and commodity i, Pj, t denotes the price at time t and commodity j, alpha(0),alpha(1) are parameters to be estimated and Ut is the error term. Commodity prices are usually non-stationary. However, this does not pose a problem as the error term Ut is stationary for this implies that prices changes in commodity i do not drift far apart in the long run from another commodity j or is cointegrated.

Before specification and estimation on of the Error Correction Model (ECM), we require to examine the stationarity of the variables. We purpose to employ Augmented Dickey-Fuller (ADF) test to test the non-stationarity of the prices series. Staionarity means that the means and the variances of a series are constant through time and the auto covariance of the series is not varying (Enders, 2008). Since wrong transformation of data gives biased results, a stationarity test is important to set up the specification and estimation of the correct model (Engle and Granger, 1991).

**2.2.1. Testing for Causality**

We are using several tests to test for causality among economic time series. They include Toda-Yomamoto causality test, Granger causality test and Sims’ test (Madalla, 2005). According to Toda-Yomamoto causality test results, energy prices changes cause the oil and the food prices changes at 5% significance. However, there is no causality from the energy price index to the grains price index. The Granger causality test assumes that the past is the key to the present. Considering two series Yt and Xt, the series Xt fails to Granger cause Yt if a regression of Yt on lagged X’s and lagged Y’s, the coefficients of the latter is zero (Madalla 2005). The Sims’ causality test assumes that the future cannot cause the present so that regressing Y on lagged, current and leaf values of X, if X is to cause Y, then the sum of coefficients of the lead X terms must be statistically equal to zero (Gujarati and Sangeetha, 2007). The Sims’ test assumes that Xt fails to cause Yt in the Granger sense if in a regression of Yt on ,lagged, current, and future X’s ,the latter coefficients are zero (Madalla, 2005).

The error correction mechanism is more stringent as compared to Granger and Sims’ test, because it includes use of loner lags to capture the dynamics of the short-run adjustment towards long-run equilibrium. According to Engle and Granger (1991), the following modified Error Correction Model (ECM) can be used to represent two series that are cointegrated.

Delta Pi, t =beta (0)1+ beta (1) 1Pi, t-1+beta (2)1 Pj, t-1+summation (from k=1 up to k=M1) Yk1Delta Pi t-k+ summation (from h=0 up to h=ni) Sh1Delta Pj, t-h +Ut

Where Delta is the difference operator; M1 and ni are the number of lags; the beta’s, S and Y are parameters to be estimated and Ut is the error term. The error correction mechanism is provided by the sum of the third and fourth terms with their joint coefficient representing the error correction term (Engle and Granger, 1991). The length of the lags is chosen using Akaike Information Criteris (AIC). Following Galotte and Babu (1995), the null hypothesis of causality from diesel to food prices can be tested as follows:

H0=beta (2)1! =0 Sh1=0 h=0, 1,…n

We will conduct a hypothesis in order to determine whether cointegrated price variables drives or leads the other prices in the cointegrated space.

**2.2.2: Testing for cointegration**

Cointegration tests whether there is a statistically linear relationship between different data series (Asche et al, 2004) and tests for more general motion of equilibrium. To investigate whether diesel and food prices are cointegrated our study uses a multivariate approach, based on the Maximum Likelihood Estimation (MLE) of the error correction model developed by Johnansen (1998) and Johnasen and Juselius (1990).

Delta Pt=Summation (from i=1 up to p-1) phi1 Delta Pt-1+GammaPt-1+U+Summationt

Where P denotes the vector of endogenous variables, Phi1 is the matrix of short run coefficients and Gamma the matrix of the long run coefficients, Summationt is the vector of independently normally distributed errors. The matrix Gamma contains the cointegrating vectors and set of loading vectors which determine the weight of the cointegration vectors in each single equation. By means of normalization, the cointegrating vectors can be identified from the estimated Gamma matrix. To determine the number of cointegrating relationship r, the Johansen’s provides two likelihood ratio tests: the trace statistics (TR) and maximum eigenvalues (MAX) test (Johansen and Juselius, 1990). The Trace statistic test the null hypothesis of r cointegrating relations against the alternative of n cointegrating relations, where n is the number of endogenous variables for r=0,1,…,n-1. The maximum eigenvalues statistics tests the null hypothesis of r cointegrating vectors against the alternative of n+1 cointegrating vectors.

**CHAPTER THREE: DATA ANALYSIS AND INTERPRETATION**

**3.1: HYPOTHESIS TESTING**

**T- TESTS**

Ho: Petroleum prices affect sugar prices

Ha: Petroleum prices do not affect sugar prices

|  |  |  |
| --- | --- | --- |
| **t-Test: Paired Two Sample for Means** |  |  |
|  |  |  |
|  | ***Variable 1*** | ***Variable 2*** |
| **Mean** | 199.5638462 | 199.4253846 |
| **Variance** | 416.3965923 | 207.7281936 |
| **Observations** | 13 | 13 |
| **Pearson Correlation** | 0.677407247 |  |
| **Hypothesized Mean Difference** | 0 |  |
| **Df** | 12 |  |
| **t Stat** | 0.03323271 |  |
| **P(T<=t) one-tail** | 0.487017695 |  |
| **t Critical one-tail** | 1.782287556 |  |
| **P(T<=t) two-tail** | 0.974035389 |  |
| **t Critical two-tail** | 2.17881283 |  |

Since the t-calculated=0.974035389 is less than t-tabulated=2.179, we fail to reject Ho and conclude that petroleum prices affect sugar prices.

Ho: Petroleum prices affect beans prices

Ha: Petroleum prices do not affect beans prices

|  |  |  |
| --- | --- | --- |
| **t-Test: Paired Two Sample for Means** |  |  |
|  |  |  |
|  | *Variable 1* | *Variable 2* |
| **Mean** | 185.1653846 | 199.4253846 |
| **Variance** | 17.44396026 | 207.7281936 |
| **Observations** | 13 | 13 |
| **Pearson Correlation** | 0.207867927 |  |
| **Hypothesized Mean Difference** | 0 |  |
| **Df** | 12 |  |
| **t Stat** | -3.634271316 |  |
| **P(T<=t) one-tail** | 0.001711905 |  |
| **t Critical one-tail** | 1.782287556 |  |
| **P(T<=t) two-tail** | 0.003423811 |  |
| **t Critical two-tail** | 2.17881283 |  |

Since the t-calculated=0.003423811 is less than t-tabulated=2.179, we fail to reject Ho and conclude that petroleum prices affect beans prices.

Ho: Petroleum prices affect potato prices

Ha: Petroleum prices do not affect potato prices

|  |  |  |
| --- | --- | --- |
| **t-Test: Paired Two Sample for Means** |  |  |
|  |  |  |
|  | *Variable 1* | *Variable 2* |
| **Mean** | 6640.459231 | 199.4253846 |
| **Variance** | 555670134.2 | 207.7281936 |
| **Observations** | 13 | 13 |
| **Pearson Correlation** | -0.085563856 |  |
| **Hypothesized Mean Difference** | 0 |  |
| **Df** | 12 |  |
| **t Stat** | 0.98513541 |  |
| **P(T<=t) one-tail** | 0.172002213 |  |
| **t Critical one-tail** | 1.782287556 |  |
| **P(T<=t) two-tail** | 0.344004426 |  |
| **t Critical two-tail** | 2.17881283 |  |

Since the t-calculated=0.344004426 is less than the t- tabulated=2.179, we fail to reject Ho and conclude that petroleum prices affect potato prices.

**3.2: REGRESSION**

Petroleum and sugar

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SUMMARY OUTPUT** | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| ***Regression Statistics*** | |  |  |  |  |  |  |  |
| **Multiple R** | 0.677407247 |  |  |  |  |  |  |  |
| **R Square** | 0.458880578 |  |  |  |  |  |  |  |
| **Adjusted R Square** | 0.409687903 |  |  |  |  |  |  |  |
| **Standard Error** | 15.67813591 |  |  |  |  |  |  |  |
| **Observations** | 13 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| **ANOVA** |  |  |  |  |  |  |  |  |
|  | ***Df*** | ***SS*** | ***MS*** | ***F*** | ***Significance F*** |  |  |  |
| **Regression** | 1 | 2292.915706 | 2292.91571 | 9.3282299 | 0.01096465 |  |  |  |
| **Residual** | 11 | 2703.843402 | 245.803946 |  |  |  |  |  |
| **Total** | 12 | 4996.759108 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | ***Coefficients*** | ***Standard Error*** | ***t Stat*** | ***P-value*** | ***Lower 95%*** | ***Upper 95%*** | ***Lower 95.0%*** | ***Upper 95.0%*** |
| **Intercept** | 8.298567475 | 62.77416639 | 0.13219718 | 0.8972155 | -129.866441 | 146.463576 | -129.866441 | 146.463576 |
| **X Variable 1** | 0.959081909 | 0.314019111 | 3.0542151 | 0.0109646 | 0.26793051 | 1.65023331 | 0.26793051 | 1.65023331 |

The multiple R value indicates that there is a strong correlation between petroleum and sugar.

The R-Squared value indicates that 45.9% of the variation in sugar prices is explained by petroleum prices.

From the tabulated analysis, the model produced is;

Sugar= 8.299 + 0.9591\* Petroleum

This shows that if petroleum prices increase by 0.9591, sugar prices will increase by 8.299.

Thus, even though the coefficient for petroleum is 0.9591, it could go to as low as 129.866 to as high as 146.46.

Petroleum and beans

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SUMMARY OUTPUT** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| ***Regression Statistics*** | |  |  |  |  |  |  |  |
| **Multiple R** | 0.2078679 |  |  |  |  |  |  |  |
| **R Square** | 0.0432091 |  |  |  |  |  |  |  |
| **Adjusted R Square** | -0.0437719 |  |  |  |  |  |  |  |
| **Standard Error** | 4.2670266 |  |  |  |  |  |  |  |
| **Observations** | 13 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| **ANOVA** |  |  |  |  |  |  |  |  |
|  | ***Df*** | ***SS*** | ***MS*** | ***F*** | ***Significance F*** |  |  |  |
| **Regression** | 1 | 9.04484865 | 9.0448487 | 0.496765 | 0.495577951 |  |  |  |
| **Residual** | 11 | 200.282674 | 18.207516 |  |  |  |  |  |
| **Total** | 12 | 209.327523 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | ***Coefficients*** | ***Standard Error*** | ***t Stat*** | ***P-value*** | ***Lower 95%*** | ***Upper 95%*** | ***Lower 95.0%*** | ***Upper 95.0%*** |
| **Intercept** | 173.15263 | 17.0848778 | 10.134847 | 6.47E-07 | 135.5490636 | 210.756189 | 135.549064 | 210.756189 |
| **X Variable 1** | 0.0602369 | 0.08546475 | 0.7048153 | 0.495578 | -0.12786978 | 0.24834349 | -0.1278698 | 0.24834349 |

The multiple R value indicates that there is a weak correlation between petroleum and beans.

The R-Squared value indicates that 4.3% of the variation in beans prices is explained by petroleum prices.

From the tabulated analysis, the model produced is;

Beans = 173.15 + 0.06023 \* Petroleum

This shows that if petroleum prices increase by 0.060237, beans prices will increase by 173.15.

Thus, even though the coefficient for petroleum is 0.06024, it could go to as low as 135.55 to as high as 210.76.

Petroleum and potatoes

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SUMMARY OUTPUT** | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| *Regression Statisti****cs*** | |  |  |  |  |  |  |  |
| **Multiple R** | 0.08556386 |  |  |  |  |  |  |  |
| **R Square** | 0.00732117 |  |  |  |  |  |  |  |
| **Adjusted R Square** | -0.08292236 |  |  |  |  |  |  |  |
| **Standard Error** | 24530.5444 |  |  |  |  |  |  |  |
| **Observations** | 13 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| **ANOVA** |  |  |  |  |  |  |  |  |
|  | ***Df*** | ***SS*** | ***MS*** | ***F*** | ***Significance F*** |  |  |  |
| **Regression** | 1 | 48817888.97 | 48817889 | 0.0811269 | 0.781067068 |  |  |  |
| **Residual** | 11 | 6619223721 | 601747611 |  |  |  |  |  |
| **Total** | 12 | 6668041610 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | ***Coefficients*** | ***Standard Error*** | ***t Stat*** | ***P-value*** | ***Lower 95%*** | ***Upper 95%*** | ***Lower 95.0%*** | ***Upper 95.0%*** |
| **Intercept** | 34548.6441 | 98218.59484 | 0.3517526 | 0.7316696 | -181629.0256 | 250726.314 | -181629.03 | 250726.314 |
| **X Variable 1** | -139.942991 | 491.3249766 | -0.2848278 | 0.7810671 | -1221.341973 | 941.455991 | -1221.342 | 941.455991 |

The multiple R value indicates that there is a weak correlation between petroleum and potatoes.

The R-Squared value indicates that 0.7321% of the variation in potatoes prices is explained by petroleum prices.

From the tabulated analysis, the model produced is;

Potatoes = 34548.64 + 139.94 \* Petroleum

This shows that if petroleum prices increase by 139.94, potato prices will increase by 34548.6441.

Thus, even though the coefficient for petroleum is 34548.64, it could go to as low as 181629.03 to as high as 250726.31.

**CHAPTER FOUR: CONCLUSION AND RESULTS**

The project analyses the possible relationship between fuel and food prices in Kenya. The main objective was to examine the price transmission and relation between petroleum and food commodities. Based on the t-test statistics taken and findings from the analysis of data, the study concluded that petroleum prices have a significant pass-through effect on food prices (Beans, Sugar and Potatoes). An increase in Petroleum prices results in an increase in Sugar, Potato and Beans prices by 0.08299%, 345.49% and 1.7315% respectively. However, any change in Petroleum prices will greatly affects one commodity’s price that is Potato, as compared to other food commodities.

Transport contributes a major cost in marketing therefore important for policy targeting during high and increasing food prices. Since the highest contributor to the Petroleum price is taxation, the Kenya government should consider coming up with a policy of cushioning increase in food price by introducing a tax relief once the fuel price hits a certain level. This will ensure petroleum prices do not adversely affect food prices.

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