### Mc210200672

**Analysis**

**Linear Regression Analysis**

**For Final Project Economics**

**Step # 01: Selection of Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent Variable** | **Independent Variables** | **Year under Consideration** | **Analysis Technique** | **Data Analysis Software** | **Data Collection Source** |
| GDP  (Gross Domestic Product) | * Consumer Price Index (CPI) * Interest Rate Spread (IRS) * Gross Fixed Capital Formation (GFCF) | 2011 - 2015 | Regression | MS-Excel | WDI  (World Development Indicators) |

**Step # 02: Model Specification**

GDP = β0 + β1 CPI + β2 IRS + β3 GFCF + ε

Simplify:

GDP = Gross Domestic Product i.e. Economic Growth

CPI = Consumer Price Index

IRS = Interest Rate Spread

GFCF = Gross Fixed Capital Formation

ε = Error

**Step # 03: Data Analysis**

1. **Summary of GDP and CPI:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SUMMARY OUTPUT** | | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| ***Regression Statistics*** | |  |  |  |  |  |  |  |
| Multiple R | 0.9778984 |  |  |  |  |  |  |  |
| **R Square** | **0.9562854** |  |  |  |  |  |  |  |
| Adjusted R Square | 0.9417138 |  |  |  |  |  |  |  |
| Standard Error | 0.2075353 |  |  |  |  |  |  |  |
| Observations | 5 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| **ANOVA** | |  |  |  |  |  |  |  |
|  | *Df* | *SS* | *MS* | *F* | ***Significance F*** |  |  |  |
| Regression | 1 | 2.8266094 | 2.8266094 | 65.62688 | **0.003931183** |  |  |  |
| Residual | 3 | 0.1292127 | 0.0430709 |  |  |  |  |  |
| Total | 4 | 2.9558221 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | ***Coefficients*** | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
| **Intercept** | **-4.0066656** | 0.9941179 | -4.030373 | 0.027459 | -7.170392534 | -0.84293872 | -7.17039253 | -0.8429387 |
| **CPI** | **0.061316** | 0.0075689 | 8.1010421 | 0.003931 | 0.037228371 | 0.08540362 | 0.03722837 | 0.08540362 |

1. **Summary of GDP and IRS:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SUMMARY OUTPUT** | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| ***Regression Statistics*** | |  |  |  |  |  |  |  |
| Multiple R | 0.9897354 |  |  |  |  |  |  |  |
| **R Square** | **0.9795762** |  |  |  |  |  |  |  |
| Adjusted R Square | 0.9727682 |  |  |  |  |  |  |  |
| Standard Error | 0.1418558 |  |  |  |  |  |  |  |
| Observations | 5 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| **ANOVA** |  |  |  |  |  |  |  |  |
|  | *Df* | *SS* | *MS* | *F* | ***Significance F*** |  |  |  |
| Regression | 1 | 2.895452859 | 2.8954529 | 143.887149 | **0.001246457** |  |  |  |
| Residual | 3 | 0.060369245 | 0.0201231 |  |  |  |  |  |
| Total | 4 | 2.955822104 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | ***Coefficients*** | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
| **Intercept** | **9.2341048** | 0.439981158 | 20.987501 | 0.00023662 | 7.833888397 | 10.63432122 | 7.833888 | 10.6343212 |
| **IRS** | **-1.0363925** | 0.086399903 | -11.9953 | 0.00124646 | -1.31135555 | -0.76142944 | -1.31136 | -0.76142944 |

1. **Summary of GDP and GFCF:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SUMMARY OUTPUT** | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| ***Regression Statistics*** | |  |  |  |  |  |  |  |
| Multiple R | 0.6591 |  |  |  |  |  |  |  |
| **R Square** | **0.4344** |  |  |  |  |  |  |  |
| Adjusted R Square | 0.2459 |  |  |  |  |  |  |  |
| Standard Error | 0.7465 |  |  |  |  |  |  |  |
| Observations | 5 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| **ANOVA** |  |  |  |  |  |  |  |  |
|  | *Df* | *SS* | *MS* | *F* | ***Significance F*** |  |  |  |
| Regression | 1 | 1.284 | 1.284 | 2.304 | **0.226327** |  |  |  |
| Residual | 3 | 1.67182 | 0.55727 |  |  |  |  |  |
| Total | 4 | 2.95582 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | ***Coefficients*** | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
| **Intercept** | **-8.8963** | 8.51021 | -1.04537 | 0.373 | -35.9796 | 18.187 | -35.98 | 18.18699 |
| **GFCF** | **0.9706** | 0.63941 | 1.51792 | 0.226 | -1.06432 | 3.0055 | -1.0643 | 3.005455 |

**Step # 04: Interpretation of the Results**

1. **Interpret GDP and CPI**

1. **a** = -4.006 (**Intercept coefficient**)
2. **Slope coefficient**

**b**= 0.061 (**Coefficient of Consumer Price Index**)

b = 0.061 means that -4 percent decrease in consumer price index 0.061 percent increase in gross domestic product on average. It showed the coefficient of “a” negative of -4.006 but positive to the CPI coefficients of the independent variables in this regression value with all the dependent variables.

Regression equation is **y = a + bx**

GDP = -4.006 + 0.061

1. **R square** = 0.956 R square value explains the value of variance in the dependent variable as GDP that has been explained by the independent variables predictors. The independent variables, which included the consumer price index, interest rate spread and gross fixed capital formation for R square 0.956 of the impact on the percentage of CPI.
2. **Model Significance (as per prob (F- Statistic) =** 65.62 (0.003) means that result are not significance as p value of F = 0.003 is greater than the value of 0.05 independent variables were not significantly improved. So we can infer that there is significance relationship among the dependent and independent variables. Graph is describing the relationship between dependent and independent variables GDP and CPI.
3. **Interpret GDP and IRS**
4. **a =** 9.234 **(Intercept Coefficient)**
5. **Slope Coefficient**

**b =** -1.036 (**Interest Rate Spread**)

b = -1.036 means that 9 percent increase in interest rate spread brings -1.036 percent increase in gross domestic product, on average.

Regression equation is **y = a + bx**

GDP = 9.234 – 1.036

1. **R square =** 0.979 the coefficient of determine R square indicate the 0.979 of change is explained by the independent variable in dependent variable.
2. **Model Significance** (as per **Prob (F-statistic)**) = 143.89 (0.001) means that the results are significant as p-value of F = 0.001 is less than 0.05 at significance level. So we can infer that there is signification relationship among the dependent and independent variables. Graph shows the relationship between GDP and IRS.
3. **Interpret GDP and GFCF**
4. **a =** -8.896 **(Intercept Coefficient)**
5. **Slope Coefficient**

**b =** 0.971 (**Gross Fixed Capital Formation**)

b = 0.971 means that -8 percent decrease in gross fixed capital formation brings 0.971 percent decrease in gross domestic product, on average.

Regression equation is **y = a + bx**

GDP = -8.896 + 0.971

1. **R square =** 0.434 R-square shows the total variance of all independent variables on dependent variable. The coefficient of determination R square indicates the 0.434 of change is explained by the independent variable in dependent variable.
2. **Model Significance** (as per **Prob (F - statistic)**) = 2.304 (0.226) means that results are not significant as p-value of F = 0.226 is greater than 0.05 at significance level. So we infer that there is no signification relationship among the dependent and independent variables. Graph shows the relationship between gross domestic product and gross fixed capital formation.