

# Gold Export Analysis and Influence to the Economy of Tanzania: Multiple Regression Analysis

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## Abstract

The study on gold export analysis and influence to the economy in Tanzania by using multiple regression reveals that Gold export is a significant variable that can help predict the economy in Tanzania given the model  $GDPGr = (0.09835533 + 0.0925901DGetRate - 0.6579431 DAgric - 9.667063 DGovt - 0.0403376 DimportGR - 0.2272975MANFCTRV + 0.1802873INDSTRV + 0.754735Govre + 2.177404DResvs - 0.0812509Infl + \epsilon)$ . Shapiro Wilk W test, heteroscedasticity, serial correlation were conducted to validate the model. The study reveals that gold export is positively related with economic growth. This means that as gold export increase also economic growth increases and when gold export decreases also economic growth tend to decrease. The results value of  $R^2$  is 81.75% which is significant level to explain about our model. This means that variation in economic growth can be influenced by gold export (growth rate), agricultural growth (agriculture value added), government spending, and Import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation. Therefore the study recommends that the government must make sure that it keep truck of gold export in order to realize better economic growth in Tanzania as indicated in the regression equation. Government must map all gold production for export strategically to benefit more the local economy. Gold export policies should not compromise with the local economy this means to a larger extent money generated from gold export should be ploughed back to the local economy through increasing agriculture investment and other agricultural inputs for better results of GDP in Tanzania. Gold export value should be reflected in the economy with decreased poverty in Tanzania mainly through assisting farmers who account about 80% of the work force in Tanzania and provide agricultural machines and modern tools. Government must enhance good policies to improve the agricultural sector performance which appear to compromise with the GDP given the trend and the negative coefficient in agriculture sector.

**Keywords:** Multiple Regression, Gold Export, Agriculture Sector, Economic Growth

## 1.1 Introduction

Gold is money and valuable resource that can be used and recognized for the settlement of all payments. Gold is a national survivors and this is reflected in the World Bank as Gold reserves. The reserve of so many countries is kept in the form of Gold and those countries with higher Gold reserve have the very high opportunity for developing their country given the reserve amount kept. Gold reserves is also reflected in the financial statement of the World Bank and the IMF. The higher the reserve kept by the individuals, companies, or country the better future and prosperity of their nations. Stability of Gold price and value calls for Gold reserve rather than currency reserve. Government, commercial Banks individuals and companies hold Gold so that it can assist them from economic crisis and recovery, inflation and any uncertainties.

Despite larger deposit of gold in Tanzania its benefit has not been equally distributed among producers and the government and it is observed from statistics that more gold is produced and exported outside the country that do not validate the benefit of gold to domestic economy. Gold production and export is mainly dominated by the foreign companies who enjoy the maximum gold revenue than the domestic economy.

Mwaitete,(2016)'Tanzania is among the world Gold producers and the contribution of gold export is a matter of interest, more money gained from sales of Gold export to a large extent must be ploughed back to domestic economy before its depletion point. The study reveals that there is cointegration between gold export and economic growth given the time period”.

It is also pointed by the Ausman,Mutambatsere and Ndiaye(2012), that “gold companies in Africa enjoy both the tremendous increase in gold production and price” at the expense of the local economy in so many years.

## 1.2 Objectives

The main objective of the study is to examine gold export and influence to the economy in Tanzania by using multiple regression

### Specific Objectives

- To examine the influence of gold export (growth rate), Agricultural growth (agriculture value added), government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation on economic growth (gross domestic product growth rate) in Tanzania

- To assess the relevance of gold export in predicting the economy in Tanzania
- To examine whether gold is significant to explain about the economy or not

### 1.3 Hypothesis

This study is guided by the following hypothesis;

- Agricultural growth (agriculture value added), gold export (growth rate), government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation cannot jointly influence economic growth (gross domestic product growth rate) of Tanzania
- Gold export cannot be relevant to predict the economy in Tanzania
- Gold export cannot be significant to explain about economic growth in Tanzania.

## 2. Literature Review

There is less literature that explain about the influence of gold export and the economy in Africa using a multiple regression analysis to examine the relationship among the named response variable and explanatory variables as indicated in this study. Few studies explains about gold, agriculture and economic growth using regression analysis with experience from Africa mainly Tanzania. This paper uses multiple regression to analyses the relationship among the variable of interest and add more knowledge on the body of literature.

Mwaitete and Rastogi (2016) in their studies on gold they used simple linear regression analysis to validate the relationship between gold and gross domestic product. The authors used two variables to establish their findings and found that the variables are positively related. They never take into consideration of other variables like agricultural growth government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation. The authors are appreciated for developing a critical view on gold export. In this context the researcher of this study uses multiple regression analysis to expand the study and make more informative. Agriculture is another point of consideration to make the study more useful.

Mwaitete(2016) used “granger causality to explain about gold export and economic growth to justify his findings and found that there is short run and long run causality impact.” The author never used a multiple regression model to examine the relationship among more variables. Therefore in the current study the researcher uses more variable to and make more analysis beyond causality. In this context multiple regression shall be used for the purpose of this study.

Neingo and Tholana (2016 ) used “cost curves approach to examine gold price volatility and how it effect revenue, production cost and labor issues were among the focus for his findings in south Africa”. The author never looked at gold export, agriculture and economic growth. Also the author never used a regression analysis for his analysis. The current author uses multiple regression analysis to examine the variable relationship.

Leager and Martin (1992) reveals “the main challenges for restructuring facing gold in south Africa. The authors focused their studies on gold price, productivity and wages to miners. They never used multiple regression analysis.

According to Ilarslan (2017), who used “gold gram sale price and 100 BIST 100 index and monthly closing prices where Pearson correlation analysis and Bayes theorem were used to validate the study”. The author never used variable like gold export, agriculture and economic growth in his analysis.

Natchimuthu. Ram, Hemanth (2017), examines the “presence of leverage effect on the gold price volatility in six Indian cities using Garch Model. The authors examined the impact of US gold price return on the volatility of gold price in India”. In their analysis they never used multiple regression. Also the authors are not talking about gold export mainly from Tanzania that appear to be outside of the scope of their study. But the authors used time series data to justify their findings.

USGS (2013) evidence that Gold has been a great treasure since old times to date despite of being highly demanded for beauty but also is used for essential industrial metal. It is again added by the author that “Gold performs critical functions in computers, communications equipment, spacecraft, jet aircraft engines, and a host of other products. Although gold is important to industry and the arts, it also retains a unique status among all commodities as a long-term store of value. Until recent times, it was considered essentially a monetary”.

Rastogi and Mwaitete(2016) add that “gold as an assets is normally equal to safe heaven and as a medium of exchange. The authors reveals that in India society, gold has been taken as pride for Indian families and gold is identified as an asset that protect one from financial crisis. In India gold has some cultural image and therefore is very valuable. Gold is used to protect families during inflation times and war times where the value of gold is always stable and promising. The authors emphasize that there are strong reasons for why people hold gold that includes security reasons, Gold has capacity even to maintain its value in times of global crisis, people hold gold to build diversified portfolio and also it is used as collateral and security against loans. Therefore gold is very valuable resource”.

The demand for Gold in the world has been growing among nations World Gold Council (2016) and KITCO (2016) reveals the trend and evidencing that the Gold Market have risen and stable over the years. The

demand increase is reflected by central banks, investors, jewelers and technology. As it has been mentioned in the literature Gold provide a stable way for people and government as a store of value and hedge against future currency fluctuations therefore the demand is high

Sindhru (2013) and Elfakhani, Imad and Hind (2009) explain that gold is known from old times of civilization to date where gold demand and value has been growing tremendously. The author reveals that even the world financial crisis has driven back for the return of gold standard and therefore the value of gold is significant to the economy. Authors also add that many western banks in England and USA recognize the importance of Gold and is used as a major reserve asset that why the most rich countries have huge reserve of Gold. The authors focus on gold prices and are appreciated on using regression analysis to validate their study regarding the gold price.

Mwaitete,(2016) “Tanzania Gold export has been tremendously increasing in recent years and drawing attention to Africa and the world that Tanzania is among the key gold producer in Africa after the South Africa and Ghana but the country found itself among the poor nations of the world despite this potential. Gold value is significant to Tanzania economy. Gold value alone can be used in transforming the country with all the infrastructure, technological and other developmental needs without donor aid. The government needs to realize that gold has significant impact in promoting domestic economy. The gold export to the rest of the world must match with the level of poverty in our country. Efforts must be done to increase gold export and ensure local people benefit through investing the gold generated revenue into other strategic areas like support the agriculture sector which is very basic in building our domestic economy.”

Furthermore the author reveals that there is cointegration between gold export and economic growth and therefore care must be taken to exploit more opportunities on gold export.

Gold is one of the natural resources that form part of the wealth of the nation. Natural resources both renewable and non renewable are very important in promoting economic development of the country and poverty alleviation, also it can be a good source of foreign exchange OECD(2011). Natural resources contribute towards government revenue and job creation among people. Therefore the gold deposit is an opportunity for poor nation like Tanzania to exploit this resource for the betterment and prosperity of the nation. When used wisely it can be used to boost other investment like agriculture sector which can in turn assist in poverty alleviation.

### 3. Data and Methodology

The study covers time series data from 1990 to 2014. Multiple regression analysis was applied to validate the study for the named period and the model was developed. Researcher collected data on economic growth (gross domestic product growth rate), agricultural growth (agriculture value added), gold export (growth rate), government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation. Data were collected from the World Bank/IMF and Tanzania ministries. Gold production was available through the Tanzania ministries of energy and the Central bank and it was given in Kilograms and gold price was also obtained from the World Gold Council to examine the annual gold price for each year .All collected variables were treated for stationarity i.e at their first difference and researcher used the stationarity data for predicting the model and analysis.

Researcher examined the variables agricultural growth (agriculture value added), gold export (growth rate), government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation and their influence to economic growth with the time series data for the period 1990-2014. Data Generated assisted the researcher to run the multiple regression analysis to examine the level of influence and significance of the variables in the model. Economic growth or the real GDP growth was identified by the researcher as the dependent variable in this study while agricultural growth (agriculture value added), gold export (growth rate), government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation were identified to be independent variables. Variables were tested to examine the level of significance at 5% decision criteria. The developed model was also tested for heteroscedasticity and serial Correlation. Shapiro Wilk test was also applied to validate the model.

### 4.1 Findings and Discussions

Researcher examined the influence of gold export (growth rate),agricultural growth (agriculture value added), government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation to economic growth (gross domestic product growth rate) of Tanzania through using the following factor that determines economic growth;

- ❖ Agricultural growth (agriculture value added),
- ❖ Gold export (growth rate),
- ❖ Government spending,
- ❖ Import growth rate,

- ❖ Manufacturing value added,
- ❖ Industry Value added,
- ❖ Government revenue,
- ❖ Reserve and
- ❖ Inflation

After the scrutiny of the variables and stationarity consideration, the researcher expressed these variables in the following function to help examine gold export and influence to the economy in Tanzania where nine independent variable were taken for this purpose and one independent variable as shown here bellows;

$$\text{Economic growth (GDPGr)} = f(\text{DGetRate}, \text{DAgric}, \text{DGovt}, \text{DimportGR}, \text{MANFCTRV}, \text{INDSTRV}, \text{DGovRe}, \text{DReSVs}, \text{DInfl}, \varepsilon) \quad (1)$$

**Where;**

- ❖ F = Function of
- ❖ GDPGr = Economic Growth
- ❖ DAgric = Agriculture Value Added
- ❖ DGetRate = Gold Export(Growth Rate)
- ❖ DGovt = Government Expenditure/spending
- ❖ MANFCTRV = Manufacturing
- ❖ INDSTRV= Industry
- ❖ Govre = Government Revenue
- ❖ DReSVs = Reserve
- ❖ DimportGR= Import growth rate
- ❖ Infl = Inflation
- ❖  $\varepsilon$  = error term

The above function could then be expressed in the following equation

$$L_n(\text{GDPGr}) = (\beta_0 + \beta_1 \text{DGetRate} + \beta_2 \text{DAgric} + \beta_3 \text{DGovt} + \beta_4 \text{MANFCTRV} + \beta_5 \text{INDSTRV} + \beta_6 \text{Govre} + \beta_7 \text{Resvs} + \beta_8 \text{DimportGR} + \beta_9 \text{Infl} + \varepsilon) \quad (2)$$

**Where:**

- ❖ F = Function of
- ❖ GDPGr = Economic Growth
- ❖ DAgric = Agriculture Value Added
- ❖ DGetRate = Gold Export(Growth Rate)
- ❖ DGovt = Government Expenditure/spending
- ❖ MANFCTRV = Manufacturing
- ❖ INDSTRV= Industry
- ❖ Govre = Government Revenue
- ❖ DReSVs = Reserve
- ❖ DimportGR= Import growth rate
- ❖ Infl = Inflation
- ❖  $\varepsilon$  = error term
- ❖  $(\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9)$  = Are Coefficients

The above regression equation find out the influence of independent variables for gold export (growth rate), agricultural growth (agriculture value added), government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation to dependent variable namely economic growth (gross domestic product growth rate) of Tanzania as indicated in (1) and (2) above. Collected data in the equation were processed by using Stata for the multiple regression output.

#### 4.2 Model Justification and Results

Economic growth rate was set as dependent variable while the independent variables were, agricultural growth (agriculture value added), gold export (growth rate), government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation. The main objective was to determine whether agricultural growth (agriculture value added), gold export (growth rate), government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation is jointly significant to explain economic growth or not.

When we start from the theory it suggests that the estimated model is good when most of the independent variables are significant to explain the dependent variable. The findings and results from this study shows that out of nine variables at least five variables are significant to explain about the model and therefore a valid model.

**Table 4:1 Regression Output**

. \*(11 variables, 25 observations pasted into data editor)  
 . regress gdpgr dgetrate dagric dgovt dimportgr manfctrv industrv dgovre dresvs dinfl

Source	SS	df	MS			
Model	72.821281	9	8.09125344	Number of obs =	25	
Residual	16.2564923	15	1.08376615	F( 9, 15) =	7.47	
Total	89.0777732	24	3.71157388	Prob > F	= 0.0004	
				R-squared	= 0.8175	
				Adj R-squared	= 0.7080	
				Root MSE	= 1.041	

  

gdpgr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
dgetrate	.0925901	.0196255	4.72	0.000	.0507593	.1344209
dagric	-.6579431	.3640012	-1.81	0.091	-1.433793	.117907
dgovt	-9.667063	1.875821	-5.15	0.000	-13.66528	-5.668845
dimportgr	-.0403376	1.487699	-0.03	0.979	-3.211293	3.130618
manfctrv	-.2272975	.1449771	-1.57	0.138	-.536309	.0817139
industrv	.1802873	.0633433	2.85	0.012	.0452742	.3153004
dgovre	.754735	.2391072	3.16	0.007	.2450902	1.26438
dresvs	2.177404	1.042919	2.09	0.054	-.0455255	4.400334
dinfl	-.0812509	.056264	-1.44	0.169	-.2011747	.0386729
_cons	.0983533	.3094063	0.32	0.755	-.5611306	.7578372

#### 4.2.1 Value of R – Square (R<sup>2</sup>)

The results value of R<sup>2</sup> is 81.75% which is significant level to explain about our model. This means that variation in economic growth can be influenced by agricultural growth (agriculture value added), gold export (growth rate), government spending, Import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation. The value of R<sup>2</sup> in totality represents the nine (9) independent variables where the rest of 18.25% can be explained by other variables.

Therefore based on the results of R<sup>2</sup> reveals that agricultural growth (agriculture value added), gold export (growth rate), government spending, Import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation can influence economic growth together by 81.75% and therefore the model is high and can be used for prediction. This suggests that policy must be developed based on this relationship if we are to develop and achieve desired level of economic growth. The following is the equation that validate relationship and prediction among the dependent and independent variable and therefore jointly significant.

**Table 4:2 The Equation for Predicting Economic Growth**

$$(GDPGr) = (0.09835533 + 0.0925901DGetRate - 0.6579431 DAgric - 9.667063 DGovt - 0.0403376 DimportGR - 0.2272975MANFCTRV + 0.1802873INDSTRV + 0.754735Govre + 2.177404DResvs - 0.0812509Infl + \epsilon)$$

The above equation in the table 4.2 is derived from the table 4.1 for the regression output. It demonstrate the relationship existing between dependent variable and independent variables for time series data for the period 1990 to 2014. It reveals the influence of agricultural growth (agriculture value added), gold export (growth rate), government spending, Import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation in explaining economic growth.

#### 4.2.2 Significance of Gold Export (DGetRate)

The theory suggests that when gold export increases also economic growth increases too and when gold export decreases also economic growth decreases. It is believed from the theory that positive relationship exist between gold export and economic growth. The data on this study reveals the same, given the P- value of 0.000 significant at 5% level. The coefficient is also positive in this way it validate the theory that as any increase in gold export will lead to the increase of economic growth. Therefore gold export is significant when considering economic growth in Tanzania.

#### 4.2.3 Agriculture Value Added (DAgric)

The theory suggests that when agriculture value added increases also economic growth increases too and when agriculture value added decreases also economic growth decreases and other things remaining constant. The theory also demonstrate the positive relationship exist between economic growth and agriculture value added. Based on the coefficient of the DAgric is found to be negative coefficient in our regression table and therefore contradicting the theory and given the P-value of 0.091 the variable indicates that there is trend towards significant level at 5% even though was found to be insignificant.

Special observation on the Variable is that the coefficient value is negative that is contradicting the theory above. Among the contributing to this contradiction and negative coefficient is the general trend in Agriculture

that reveals a negative growth rate in the sector. But in totality the variable is significant based on the t results found on  $R^2$

#### **4.2.4 Government Expenditure (DGov<sub>t</sub>)**

The theory suggests that when government expenditure increases economic growth decreases and when government expenditure decreases also the economic growth increases. The time series data 1990-2014 on this study reveals that named variable Government expenditure has negative coefficient validating our theory and the P- value of 0.000 significant at 5% level and therefore the government expenditure is significant to explain about economic growth in the population.

#### **4.2.6 Import Growth Rate (DimportGR)**

The theory suggests that when import increases economic growth decreases and when import decreases the economic growth increases. It is revealed from the regression table 4.1 that the variable has negative coefficient and therefore it verify our model but the study reveals that the P-value is 0.979 more than 5% significant level, therefore we reject the variable at 5% significant level. The most important about this variable is that it can influence the results about economic growth given the negative coefficient value of our import.

#### **4.2.7 Country Manufacturing of goods and services (MANFCTRV)**

The theory suggests that when manufacturing of goods and services of the country increases also economic growth increases too and when manufacturing of goods and services of the country decreases also the economic growth decreases. The results shows that the coefficient is negative and contradicting the theory of manufacturing in the country and we observe that the P-value is 0.138 more than 5% significant level, the variable fell short to statistical significant. The most important about this variable is that it can influence the results about economic growth given the in the population.

#### **4.2.8 Industrial growth Rate (INDSTRV)**

The theory suggests that when Industrial growth Rate increases economic growth increases too and when Industrial growth Rate decreases also the economic growth decreases and other factors remaining constant. It is revealed from our findings that the coefficient value of industrial growth rate is positive verifying our theory and the P- value is found to be 0.012 which is significant at 5% level and therefore accepted.

#### **4.2.9 Government Revenue (Govre)**

The theory suggests that when government revenue increases economic growth increases too and when government revenue decreases also the economic growth decreases and other factors remaining constant. The time series data 1990-2014 on this study reveals that the coefficient is positive and verify our model and statistically significant at 5% level with P- value of 0.007 and therefore we cannot reject the variable.

#### **4.2.10 Reserve (DResvs)**

The theory suggests that when reserve increases also economic growth increases too and when reserve decreases also economic growth decreases. It is believed from the theory that positive relationship exist between national reserve and economic growth. The data on this study reveals the same on the positive coefficient and it is close to be statistically significant at 5% with P- value of 0.054 significant at 5% level. Based on the coefficient value it validate our theory that as any increase in reserve will lead to the increase of economic growth in Tanzania.

#### **4.2.11 Inflation Rate ( Infl )**

The theory suggests that when inflation rate increases, economic growth decreases too and when inflation rate decreases, economic growth increases so that there is negative relationship between economic growth and Inflation rate. The data on this study reveals the same negative coefficient is observed in our model. The P- value of 0.169 near marginal significant at 5% level. The coefficient is also negative value in this way it validate the theory that as any increase in inflation rate will lead to the decrease in economic growth. Therefore Inflation rate is very significant give P-value and the coefficient to explain economic growth in the population.

### **4.3 Decision on the General Results Based on F- Statistics and P - Value**

In order to examine whether Agricultural growth (agriculture value added), gold export (growth rate), government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation can or cannot jointly influence economic growth (gross domestic product growth rate) of Tanzania, the researcher investigated the F statistics and P-value results. The following hypothesis were used to validate the study based on the F statistics and P value.

#### **Hypothesis:**

**H<sub>0</sub>:** Agricultural growth (agriculture value added), gold export (growth rate), government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation cannot jointly influence economic growth (gross domestic product growth rate) of Tanzania

**H<sub>1</sub>:** Agricultural growth (agriculture value added), gold export (growth rate), government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation jointly influence economic growth (gross domestic product growth rate) of Tanzania

### Decision criteria

Decision criteria on the above hypothesis is that reject the null hypothesis when P value is greater than 5% significant level and F statistics should be above 5% significant level.

### Results

The results from our table demonstrate that F statistics is 7.47 and the P value is 0.0004 .Given this value of P value found to be less than 5% significant level the researcher reject the null hypothesis and accept the alternative hypothesis that agricultural growth (agriculture value added), gold export (growth rate), government spending, import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation jointly influence economic growth (gross domestic product growth rate) of Tanzania

## 4.4 Diagnostic Checking

### 4.4.1 Shapiro Wilk Test

The researcher also looked at the model whether the residual is normal distributed or not. In order to perform for diagnostic checking the researcher created another new variable namely U- variable as a new variable in the work sheet under the following hypothesis;

H<sub>0</sub>: Residual is normally distributed

H<sub>1</sub>: Residual is not normally distributed

### Decision Criteria

Decision criteria on the above hypothesis and the results from Shapiro Wilk W test for normal data is that accept the null hypothesis when P value is more than 5% and reject the null hypothesis when p-value is less than 5% significant level.

**Table 4:3 Shapiro Wilk Test**

Variable	Obs	W	V	z	Prob>z
U	25	0.94619	1.495	0.822	0.20545

Based on the above hypothesis results from Shapiro Wilk W test for normal data shows that the probability is 20.55% which is more than 5% and therefore we cannot the reject the null hypothesis and the researcher conclude that the residual are normally distributed.

### 4.4.2 Heteroscedasticity

The researcher also looked at the model whether the model has heteroscedastic or not under the following hypothesis;

H<sub>0</sub>: Residual are homoscedastic

H<sub>1</sub> : Residual are not heteroscedastic

### Decision Criteria

Decision criteria on the above hypothesis the results from Breusch pagan test for heteroscedastic is that accept the null hypothesis when P value is more than 5% and reject the null hypothesis when p-value is less than 5% significant level.

## 4.4 Breusch Pagan Test Results

. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of gdpgr

chi2(1) = 0.77

Prob > chi2 = 0.3790

Based on the Breusch Pagan test for heteroscedastic indicate that the probability value is 37.90% which is more than 5% significant level and therefore we accept the null hypothesis that residual are homoscedastic.

### 4.4.3 Serial Correlation

The researcher also tested for serial correlation to examine whether there is serial correlation among variables or not. The Durbin Watson test was used to make investigation under the following hypothesis;

H<sub>0</sub>: Residual are not serial correlated

H<sub>1</sub>: Residuals are serial correlated or autocorrelation

### Decision Criteria

Decision criteria on the above hypothesis the results from Durbin Watson test is that accept the null hypothesis when P value is more than 5% and reject the null hypothesis when p-value is less than 5% significant level. The researcher declared first data as time series data from the period 1990 to 2014.

**Table 4: 5 Durbin Watson Test for Autocorrelation**

. estat durbinalt

Durbin's alternative test for autocorrelation

lags( $\rho$ )	chi2	df	Prob > chi2
1	1.954	1	0.1622

H0: no serial correlation

Based on the findings results shows that the probability value (p-Value) is 22.24% more than 5% significant level and therefore we cannot reject the null hypothesis and we conclude that there is no serial correlation.

## 5. Conclusion and Recommendations

### 5.1 Conclusion

The results value of  $R^2$  is 81.75% which is significant level to explain about the proposed model. This means that variation in economic growth can be influenced by gold export (growth rate), agricultural growth (agriculture value added), government spending, Import growth rate, manufacturing value added, Industry Value added, Government revenue, Reserve and inflation. The value of  $R^2$  in totality represents the nine (9) independent variables where the rest of 18.25% can be explained by other variables.

The study reveals that gold export can be used to predict about economic growth in Tanzania given the regression model:  $GDPGr = (0.09835533 + 0.0925901DGetRate - 0.6579431 DAgric - 9.667063 DGovt - 0.0403376 DimportGR - 0.2272975MANFCTRV + 0.1802873INDSTRV + 0.754735Govre + 2.177404DResvs - 0.0812509Infl + \epsilon)$ . The predicted model was assessed using Shapiro Wilk W test, test for heteroscedasticity, test for serial correlation and found to be a valid model for prediction.

The study reveals that gold export is positively related with economic growth. This means that as gold export increase also economic growth increases and when gold export decreases also economic growth tend to decrease. The study also demonstrate that gold export is very significant to explain about the economy in Tanzania given the p- value and its positive coefficient. Therefore government has to be careful on policy decision on how gold can be used to influence the level of economic growth.

### 5.2 Recommendations

Based on the  $R^2$  results and the predicted multiple regression model, the study recommend the following;

- Government must map all gold production for export strategically to benefit local economy.
- The government must make sure that it keep truck of gold export in order to realize better economic growth in Tanzania as indicated in the multiple regression equation.
- Gold export policies should not compromise with the local economy this means to a larger extent money generated from gold export should be ploughed back to the local economy through increasing agriculture investment and tools for better results of GDP and help the country achieve desired results for the Tanzania vision 2025.
- Gold export value should be reflected in the economy with decreased poverty in Tanzania mainly enhancing farmers who account about 80% of the work force in Tanzania with agriculture tools and machines.
- Government must enhance good policies to improve the agricultural sector performance which appear to compromise with the GDP.

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