MACROECONOMIC ANALYTICAL REPORT OF CLUSTERS OF ECONOMIES

➢ **WEST AFRICA**

➢ **SOUTHERN AFRICA**

➢ **EAST AFRICA CORRIDORS**

TABLE OF CONTENT

EXECUTIVE SUMMARY

We receive our data and present them using models in the form of time series, which are sequences of dated variables standing for economic indicators such as GDP for different years.

In discussing economies, we mostly refer to a specific country or group of countries within a particular geographic location. Performing the collected data is key to economic activity within a country. Economists and policymakers play a vital role in every economy using GDP as a measure of total production value, with one of the most important factors being 'inflation'. Inflation is mostly assessed using the Consumer Price Index (CPI), which serves as a track for the changes in prices of goods purchased by households. Economics and finance constantly develop as new evidence and observations shape our understanding of how the economy is running, develop relationships and behaviour patterns. This demands constant analysis and updates in generating solutions to fixing challenges of our society for the better livelihood of the people with respect to the economy. It is our hope that we give our best services with the application of the highest openness and true and fair view of economic and financial performance. Thank you.

LEAD CONSULTANT
Ing. Emmanuel Kweku A. Sakyi
Msc, BA (Hons), BA, BA

METADATA

DATA INDICATORS

- Inflation, consumer prices (annual %); Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.

- GDP per capita (current US$); GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars (Source WorldBank, 2024).

- Modelling Software Used Jmulti
- GRETL
- Source of Data: World Bank Data Bank, 2024

THE WEST AFRICAN CORRIDORS

A Cluster of West African Countries are examined for their socioeconomic (economic performances which makes the social life of the people better or worse).

The countries examined are: Burkina Faso, Côte D'Ivoire, Ghana, Nigeria and Senegal.

NIGERIA
VAR ANALYSIS

UNIVARIATE TIME SERIES (ARIMA)

Model 9: ARMAX, using observations 2003-2022 (T = 20)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	−0.0408274	0.883302	−0.04622	0.9631	
phi_1	−0.622718	0.263206	−2.366	0.0180	**
theta_1	1.00000	0.174534	5.730	<0.0001	***
GDP_PER_CAPITA_CURRENT_USD_2	0.00530963	0.00276227	1.922	0.0546	*

Mean dependent var	0.298530	S.D. dependent var	3.712453
Mean of innovations	−0.028513	S.D. of innovations	3.166340
R-squared	0.280195	Adjusted R-squared	0.195512
Log-likelihood	−52.29613	Akaike criterion	114.5923
Schwarz criterion	119.5709	Hannan-Quinn	115.5641

		Real	Imaginary	Modulus	Frequency
AR					
	Root 1	-1.6059	0.0000	1.6059	0.5000
MA					
	Root 1	-1.0000	0.0000	1.0000	0.5000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags      loglik    p(LR)       AIC         BIC         HQC

   1    -53.66393             5.396564*   5.545782*   5.428948*
   2    -53.22149  0.34687    5.449665    5.648622    5.492844
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)
Log-likelihood = -53.221487
Determinant of covariance matrix = 9.3076439
AIC = 5.4497

BIC = 5.6486
HQC = 5.4928
Portmanteau test: LB(5) = 4.73286, df = 3 [0.1924]

Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	8.52411	5.55498	1.534	0.1433	
INFLATION_CPI_1	0.456970	0.236408	1.933	0.0701	*
INFLATION_CPI_2	−0.195233	0.228247	−0.8554	0.4042	
GDP_PER_CAPITA_CURRENT_USD_2	0.000363203	0.00112316	0.3234	0.7504	

Mean dependent var	12.59912	S.D. dependent var	3.519523
Sum squared resid	195.4605	S.E. of regression	3.390823
R-squared	0.211028	Adjusted R-squared	0.071798
F(3, 17)	1.515680	P-value(F)	0.246453
rho	0.132397	Durbin-Watson	1.612196

F-tests of zero restrictions:
All lags of INFLATION_CPIF(2, 17) =   2.2618 [0.1346]
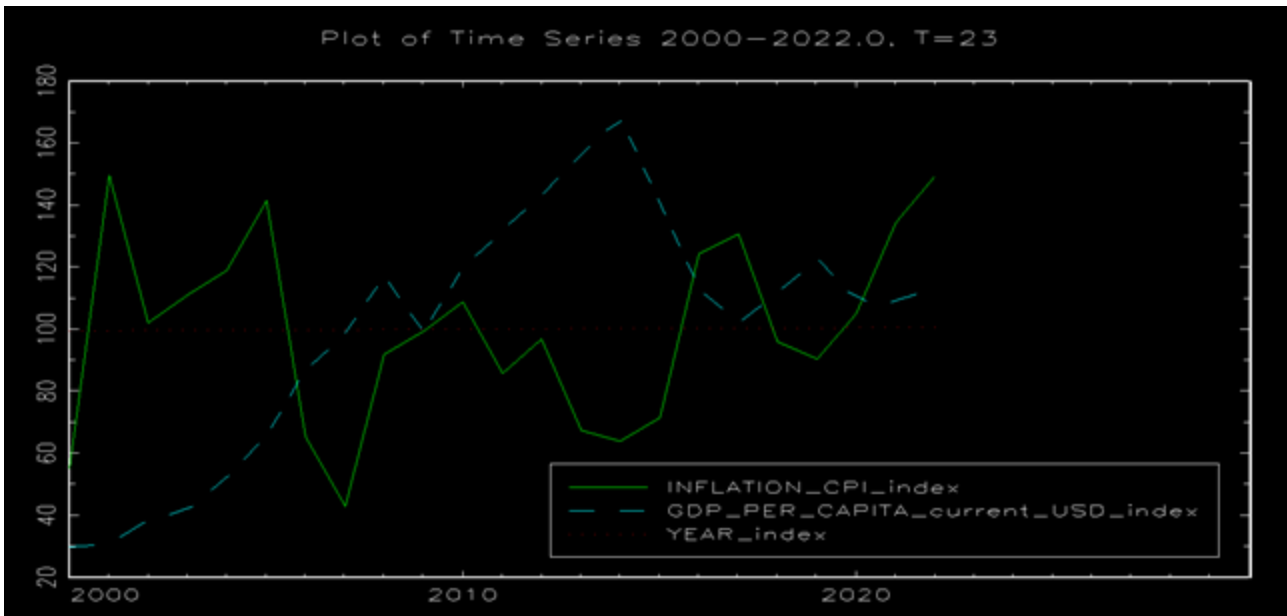All vars, lag 2   F(1, 17) = 0.73164 [0.4042]

For the system as a whole
Null hypothesis: the longest lag is 1
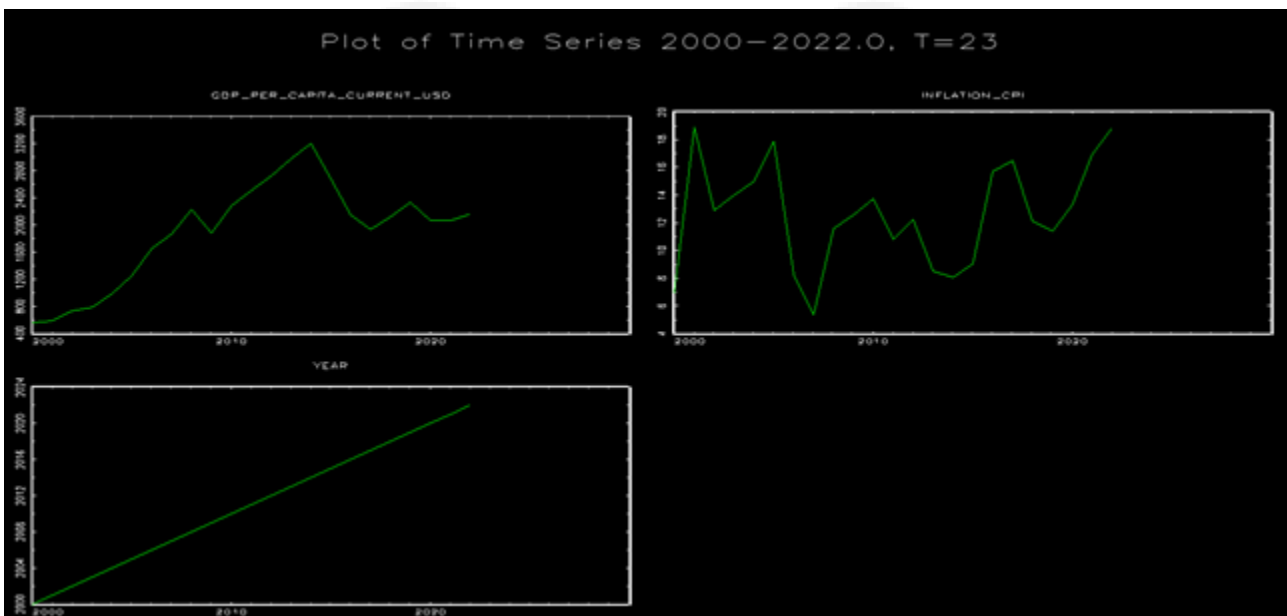Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 0.88488 [0.3469]

NIGERIA TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

GHANA
VAR ANALYSIS

UNIVARIATE TIME SERIES (ARIMA)

Model 9: ARMAX, using observations 2003-2022 (T = 20)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	−0.0408274	0.883302	−0.04622	0.9631	
phi_1	−0.622718	0.263206	−2.366	0.0180	**
theta_1	1.00000	0.174534	5.730	<0.0001	***
GDP_PER_CAPITA_CURRENT_USD_2	0.00530963	0.00276227	1.922	0.0546	*

Mean dependent var	0.298530	S.D. dependent var	3.712453
Mean of innovations	−0.028513	S.D. of innovations	3.166340
R-squared	0.280195	Adjusted R-squared	0.195512
Log-likelihood	−52.29613	Akaike criterion	114.5923
Schwarz criterion	119.5709	Hannan-Quinn	115.5641

		Real	Imaginary	Modulus	Frequency
AR					
	Root 1	-1.6059	0.0000	1.6059	0.5000
MA					
	Root 1	-1.0000	0.0000	1.0000	0.5000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags      loglik    p(LR)       AIC         BIC         HQC

  1     -53.66393             5.396564*   5.545782*   5.428948*
  2     -53.22149  0.34687    5.449665    5.648622    5.492844
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)
Log-likelihood = -53.221487
Determinant of covariance matrix = 9.3076439
AIC = 5.4497
BIC = 5.6486

HQC = 5.4928
Portmanteau test: LB(5) = 4.73286, df = 3 [0.1924]

Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	8.52411	5.55498	1.534	0.1433	
INFLATION_CPI_1	0.456970	0.236408	1.933	0.0701	*
INFLATION_CPI_2	−0.195233	0.228247	−0.8554	0.4042	
GDP_PER_CAPITA_CURRENT_USD_2	0.000363203	0.00112316	0.3234	0.7504	

Mean dependent var	12.59912	S.D. dependent var	3.519523
Sum squared resid	195.4605	S.E. of regression	3.390823
R-squared	0.211028	Adjusted R-squared	0.071798
F(3, 17)	1.515680	P-value(F)	0.246453
rho	0.132397	Durbin-Watson	1.612196

F-tests of zero restrictions:
All lags of INFLATION_CPIF(2, 17) =   2.2618 [0.1346]
All vars, lag 2   F(1, 17) = 0.73164 [0.4042]

For the system as a whole
Null hypothesis: the longest lag is 1
Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 0.88488 [0.3469]UNIVARIATE (ARIMA)

Model 2: ARMAX, using observations 2003-2022 (T = 20)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	−0.155589	0.962735	−0.1616	0.8716	
phi_1	0.166638	0.355740	0.4684	0.6395	
theta_1	−1.00000	0.151929	−6.582	<0.0001	***
GDP_PER_CAPITA_CURRENT_USD_2	0.000964881	0.00779590	0.1238	0.9015	

Mean dependent var	1.094748	S.D. dependent var	7.949720
Mean of innovations	−0.111173	S.D. of innovations	6.410547
R-squared	0.014663	Adjusted R-squared	-0.101259
Log-likelihood	−66.90115	Akaike criterion	143.8023
Schwarz criterion	148.7810	Hannan-Quinn	144.7742

		Real	*Imaginary*	*Modulus*	*Frequency*
AR					
	Root 1	6.0010	0.0000	6.0010	0.0000
MA					
	Root 1	1.0000	0.0000	1.0000	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags      loglik    p(LR)      AIC          BIC          HQC

  1      -68.14710           6.775914*    6.925132*    6.808298*
  2      -67.81402  0.41439  6.839430     7.038387     6.882609
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)
Log-likelihood = -67.814019
Determinant of covariance matrix = 37.360011
AIC = 6.8394
BIC = 7.0384
HQC = 6.8826
Portmanteau test: LB(5) = 7.22069, df = 3 [0.0652]

Equation 1: INFLATION_CPI

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	14.7185	7.11328	2.069	0.0541	*
INFLATION_CPI_1	−0.155341	0.222297	−0.6988	0.4941	
INFLATION_CPI_2	0.150973	0.203958	0.7402	0.4693	
GDP_PER_CAPITA_CURRENT_USD_2	−0.000397193	0.00275572	−0.1441	0.8871	

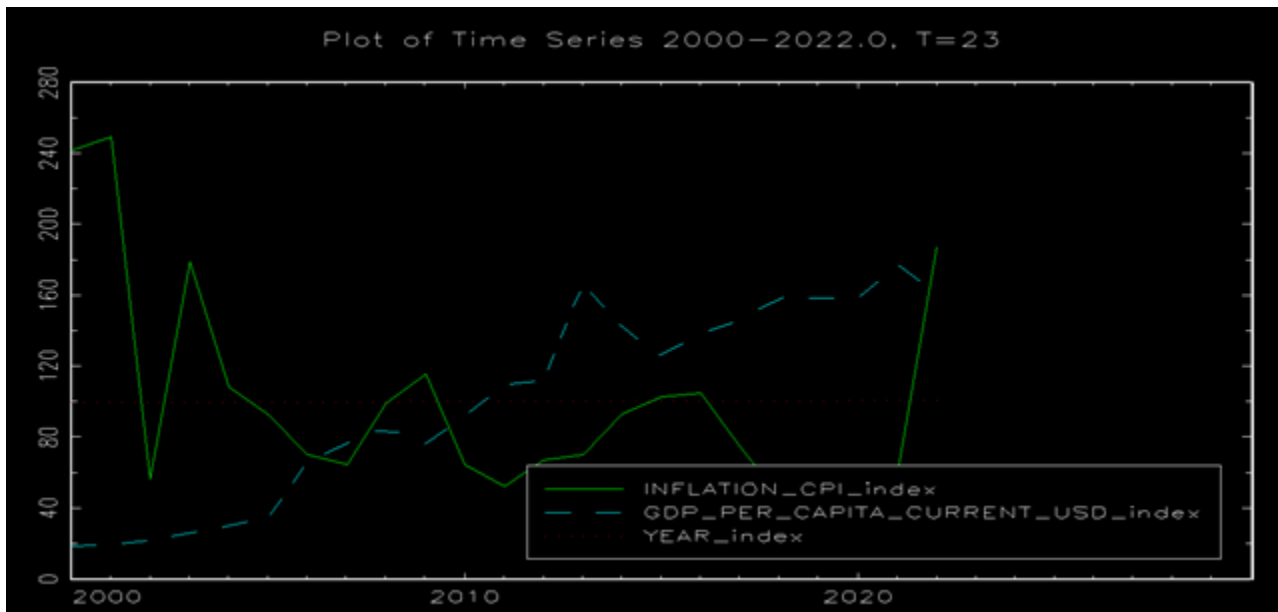| Mean dependent var	14.36276	S.D. dependent var	6.444249
Sum squared resid	784.5602	S.E. of regression	6.793423
R-squared	0.055392	Adjusted R-squared	-0.111304
F(3, 17)	0.332293	P-value(F)	0.802117
rho	0.255071	Durbin-Watson	1.269154

F-tests of zero restrictions:
All lags of INFLATION_CPI F(2, 17) = 0.42616 [0.6598]
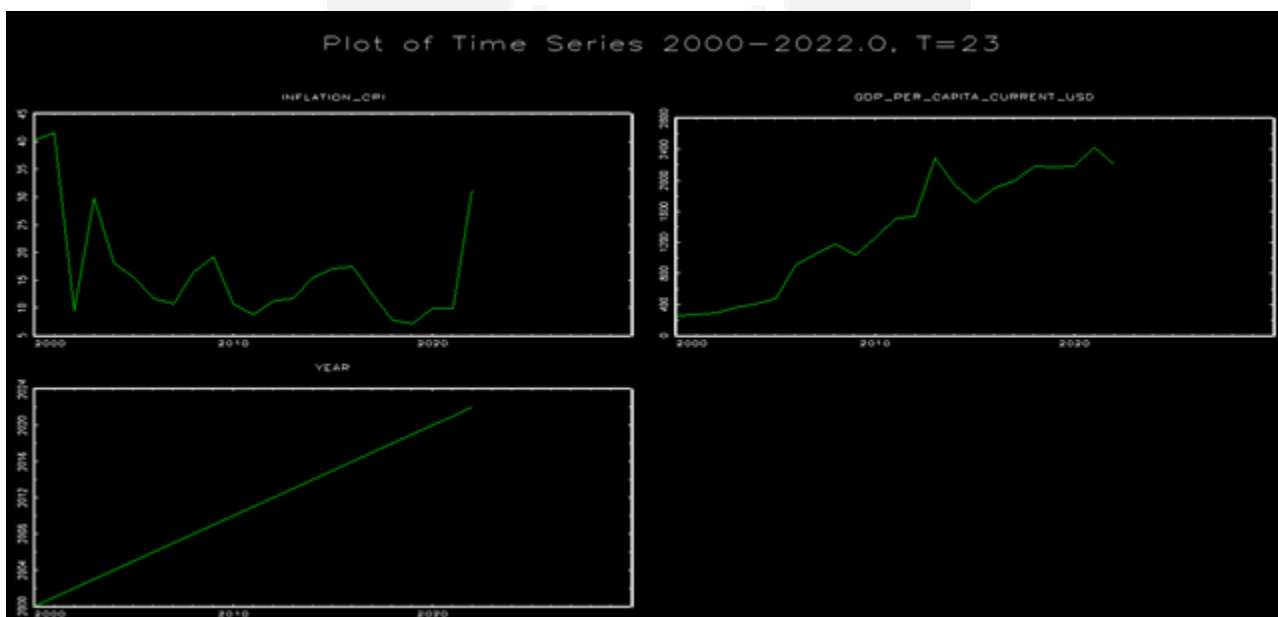All vars, lag 2   F(1, 17) = 0.54792 [0.4693]

For the system as a whole

Null hypothesis: the longest lag is 1
Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 0.666162 [0.4144]

TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

COTE D'IVOIRE
VAR ANALYSIS

UNIVARIATE (ARIMA)

Model 1: ARMAX, using observations 2003-2022 (T = 20)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	*Std. Error*	*z*	*p-value*	
const	−0.0700741	0.377273	−0.1857	0.8526	
phi_1	0.140030	0.256580	0.5458	0.5852	
theta_1	−0.999997	0.180079	−5.553	<0.0001	***
GDP_PER_CAPITA_CURRENT_USD_2	0.000319080	0.00520251	0.06133	0.9511	

Mean dependent var	0.109945	S.D. dependent var	2.423193
Mean of innovations	−0.092046	S.D. of innovations	1.821463
R-squared	0.040028	Adjusted R-squared	-0.072910
Log-likelihood	−41.76054	Akaike criterion	93.52109
Schwarz criterion	98.49975	Hannan-Quinn	94.49297

		Real	*Imaginary*	*Modulus*	*Frequency*
AR					
	Root 1	7.1413	0.0000	7.1413	0.0000
MA					
	Root 1	1.0000	0.0000	1.0000	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags      loglik    p(LR)       AIC         BIC         HQC

   1     -41.86640             4.272991*   4.422208*   4.305375*
   2     -41.86088  0.91628    4.367703    4.566659    4.410881
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)
Log-likelihood = -41.929798
Determinant of covariance matrix = 3.1754108
AIC = 4.3743

BIC = 4.5732
HQC = 4.4174
Portmanteau test: LB(5) = 2.74413, df = 3 [0.4328]

Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	2.28251	3.14149	0.7266	0.4774	
INFLATION_CPI _1	0.122357	0.279341	0.4380	0.6669	
INFLATION_CPI _2	0.0614737	0.311890	0.1971	0.8461	
GDP_PER_CAPIT A_CURRENT_US D	−0.00023285 3	0.00130105	−0.1790	0.8601	

Mean dependent var	2.265934	S.D. dependent var	1.855025
Sum squared resid	66.68363	S.E. of regression	1.980547
R-squared	0.031076	Adjusted R-squared	-0.139911
F(3, 17)	0.181746	P-value(F)	0.907318
rho	−0.021870	Durbin-Watson	1.908254

F-tests of zero restrictions:
All lags of INFLATION_CPIF(2, 17) = 0.10173 [0.9038]
All vars, lag 2   F(1, 17) = 0.038849 [0.8461]

For the system as a whole
Null hypothesis: the longest lag is 1
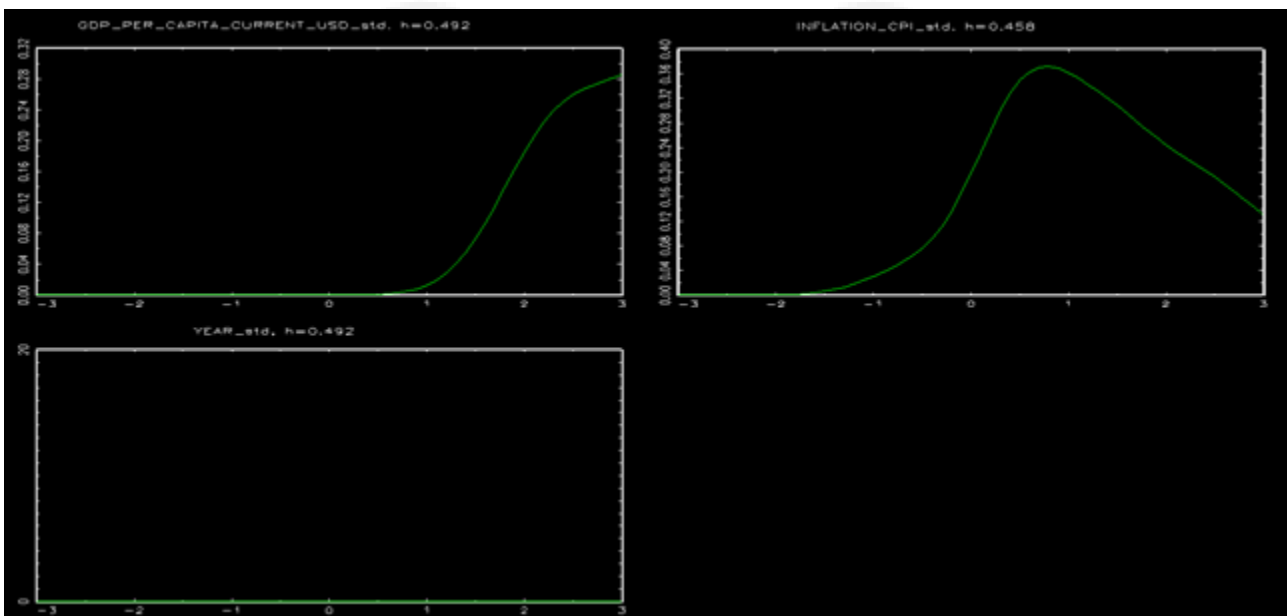Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 0.0479349 [0.8267]

TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

SENEGAL
VAR ANALYSIS

UNIVARIATE (ARIMA)

Model 1: ARMAX, using observations 2001-2022 (T = 22)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	−0.0578841	0.235772	−0.2455	0.8061	
phi_1	0.275933	0.286565	0.9629	0.3356	
theta_1	−0.999999	0.173692	−5.757	<0.0001	***
GDP_PER_CAPITA_CURRENT_USD	0.00361345	0.00512896	0.7045	0.4811	

Mean dependent var	0.407493	S.D. dependent var	3.117461
Mean of innovations	−0.168690	S.D. of innovations	2.534980
R-squared	0.071291	Adjusted R-squared	-0.026468
Log-likelihood	−52.98149	Akaike criterion	115.9630
Schwarz criterion	121.4182	Hannan-Quinn	117.2481

		Real	Imaginary	Modulus	Frequency
AR					
	Root 1	3.6241	0.0000	3.6241	0.0000
MA					
	Root 1	1.0000	0.0000	1.0000	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags      loglik    p(LR)       AIC         BIC         HQC

   1     -50.01387             5.048940*   5.198158*   5.081324*
   2     -49.67296   0.40896   5.111711    5.310667    5.154889
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)
Log-likelihood = -49.672962
Determinant of covariance matrix = 6.6384682

AIC = 5.1117
BIC = 5.3107
HQC = 5.1549
Portmanteau test: LB(5) = 0.747999, df = 3 [0.8619]Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	0.673929	2.92050	0.2308	0.8203	
INFLATION_CPI_1	0.275631	0.312651	0.8816	0.3903	
INFLATION_CPI_2	−0.229540	0.306460	−0.7490	0.4641	
GDP_PER_CAPITA_CURRENT_USD_2	0.00104625	0.00227925	0.4590	0.6520	

Mean dependent var	2.008493	S.D. dependent var	2.734186
Sum squared resid	139.4078	S.E. of regression	2.863645
R-squared	0.067603	Adjusted R-squared	-0.096938
F(3, 17)	0.410857	P-value(F)	0.747279
rho	0.022021	Durbin-Watson	1.575011

F-tests of zero restrictions:
All lags of INFLATION_CPIF(2, 17) = 0.57681 [0.5723]
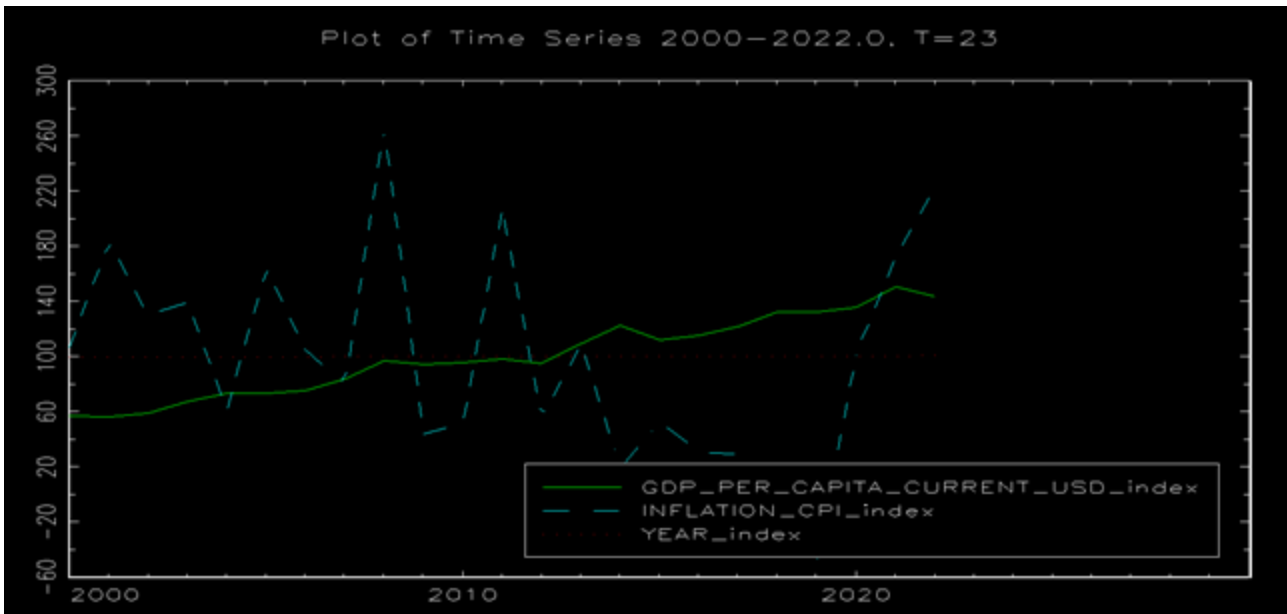All vars, lag 2   F(1, 17) = 0.56101 [0.4641]

For the system as a whole
Null hypothesis: the longest lag is 1
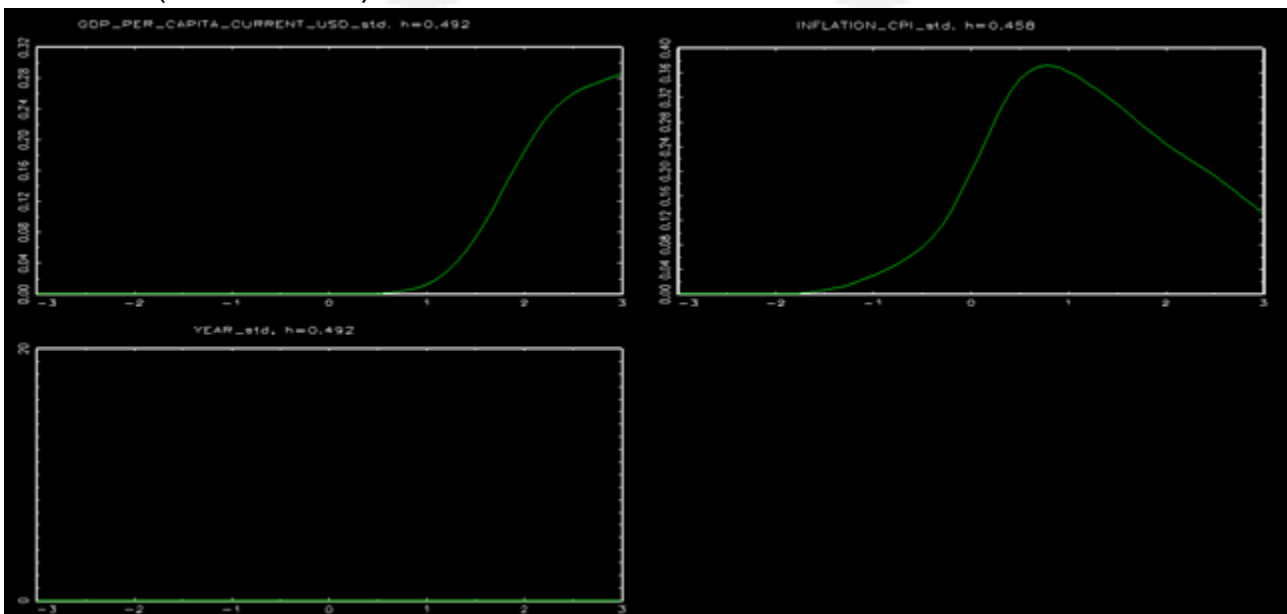Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 0.681819 [0.4090]

TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

BURKINA FASO
VAR ANALYSIS

UNIVARIATE (ARIMA)

Model 1: ARMAX, using observations 2003-2022 (T = 20)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	0.394154	0.426097	0.9250	0.3549	
phi_1	0.116825	0.315907	0.3698	0.7115	
theta_1	−0.999987	0.162655	−6.148	<0.0001	***
GDP_PER_CAPITA_CURRENT_USD_2	−0.0112967	0.0138109	−0.8180	0.4134	

Mean dependent var	0.605727	S.D. dependent var	4.919326
Mean of innovations	−0.008447	S.D. of innovations	3.823872
R-squared	0.038897	Adjusted R-squared	-0.074173
Log-likelihood	−56.61507	Akaike criterion	123.2301
Schwarz criterion	128.2088	Hannan-Quinn	124.2020

		Real	Imaginary	Modulus	Frequency
AR					
	Root 1	8.5598	0.0000	8.5598	0.0000
MA					
	Root 1	1.0000	0.0000	1.0000	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags      loglik    p(LR)       AIC         BIC         HQC

  1     -57.86756              5.796911*   5.946128*   5.829295*
  2     -57.47081  0.37304     5.854363    6.053320    5.897542
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)
Log-likelihood = -57.470814
Determinant of covariance matrix = 13.950758
AIC = 5.8544

BIC = 6.0533
HQC = 5.8975
Portmanteau test: LB(5) = 0.12936, df = 3 [0.9881]

Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	3.37290	3.68984	0.9141	0.3734	
INFLATION_CPI_1	−0.0450552	0.341231	−0.1320	0.8965	
INFLATION_CPI_2	−0.266151	0.328946	−0.8091	0.4296	
GDP_PER_CAPITA_CURRENT_USD_2	−0.000444967	0.00532022	−0.08364	0.9343	

Mean dependent var	2.518310	S.D. dependent var	3.901135
Sum squared resid	292.9659	S.E. of regression	4.151300
R-squared	0.037490	Adjusted R-squared	-0.132365
F(3, 17)	0.220718	P-value(F)	0.880663
rho	−0.005209	Durbin-Watson	1.514882

F-tests of zero restrictions:
All lags of INFLATION_CPIF(2, 17) = 0.32794 [0.7249]
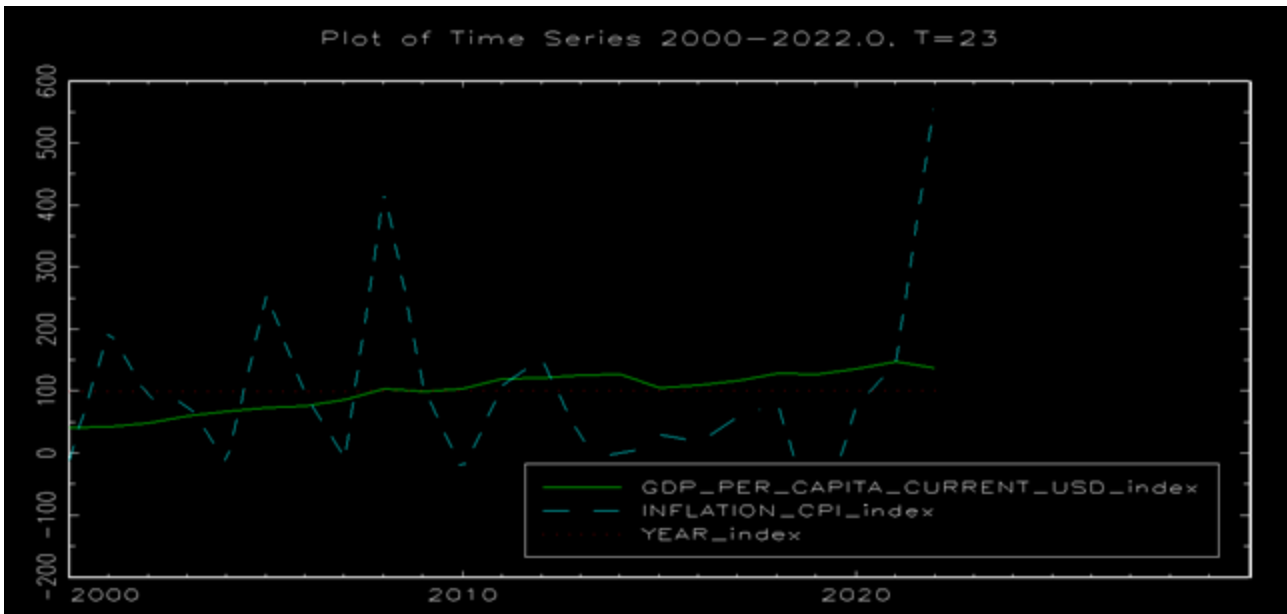All vars, lag 2   F(1, 17) = 0.65465 [0.4296]

For the system as a whole
Null hypothesis: the longest lag is 1
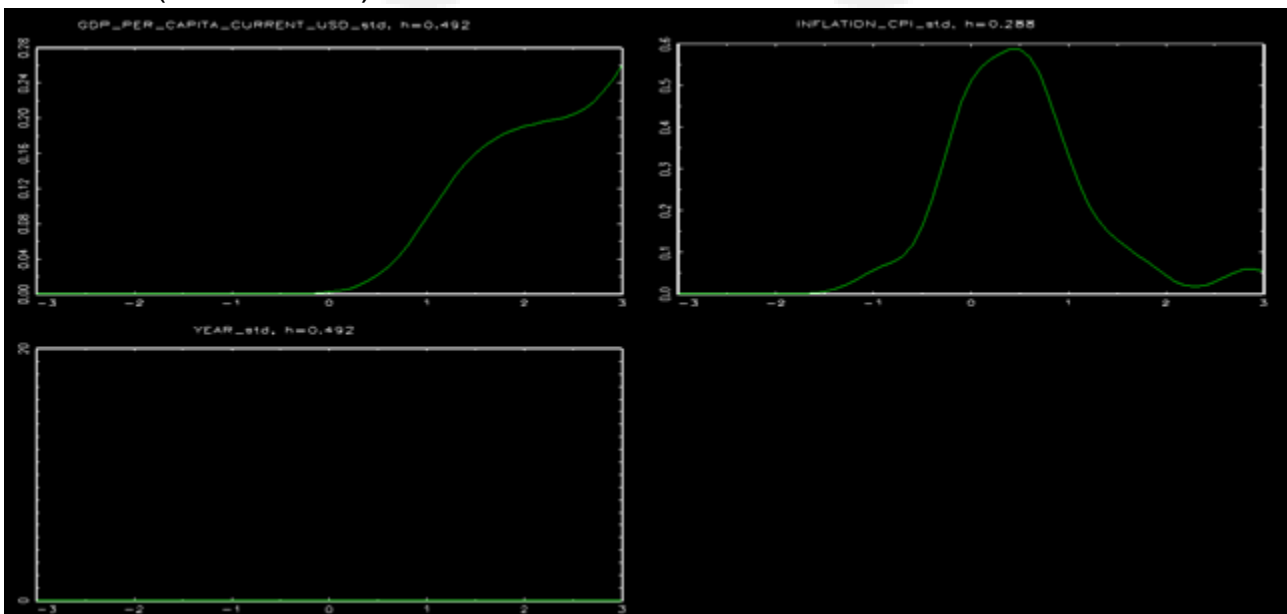Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 0.793501 [0.3730]

TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

THE SOUTHERN AFRICA CORRIDORS

A Cluster of Southern Africa Countries are examined for their socioeconomic (economic performances which makes the social life of the people better or worse).
The countries examined are: Botswana, Lesotho, Malawi, South Africa and Zambia.

BOTSWANA
VAR ANALYSIS

UNIVARIATE (ARIMA)

Model 1: ARMAX, using observations 2001-2022 (T = 22)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	−0.220451	0.403036	−0.5470	0.5844	
phi_1	−0.165280	0.475806	−0.3474	0.7283	
theta_1	−0.188526	0.475258	−0.3967	0.6916	
GDP_PER_CAPITA_CURRENT_USD	0.00156908	0.000827971	1.895	0.0581	*

Mean dependent var	0.139276	S.D. dependent var	2.740690
Mean of innovations	−0.017093	S.D. of innovations	2.378638
R-squared	0.442071	Adjusted R-squared	0.383342
Log-likelihood	−50.34289	Akaike criterion	110.6858
Schwarz criterion	116.1410	Hannan-Quinn	111.9709

		Real	Imaginary	Modulus	Frequency
AR					
	Root 1	-6.0503	0.0000	6.0503	0.5000
MA					
	Root 1	5.3043	0.0000	5.3043	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags      loglik    p(LR)      AIC        BIC        HQC

   1     -47.44193            4.803994*  4.953211*  4.836378*
   2     -47.42238  0.84323   4.897369   5.096326   4.940548
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)

Log-likelihood = -47.422379
Determinant of covariance matrix = 5.3577281
AIC = 4.8974
BIC = 5.0963
HQC = 4.9405
Portmanteau test: LB(5) = 1.61472, df = 3 [0.6561]

Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	8.26263	4.25971	1.940	0.0692	*
INFLATION_CPI_1	0.420594	0.260656	1.614	0.1250	
INFLATION_CPI_2	0.0444211	0.249530	0.1780	0.8608	
GDP_PER_CAPITA_CURRENT_USD_2	−0.000825565	0.000550069	−1.501	0.1517	

Mean dependent var	6.731900	S.D. dependent var	3.148779
Sum squared resid	112.5123	S.E. of regression	2.572619
R-squared	0.432605	Adjusted R-squared	0.332476
F(3, 17)	4.320497	P-value(F)	0.019460
rho	0.013353	Durbin-Watson	1.742960

F-tests of zero restrictions:
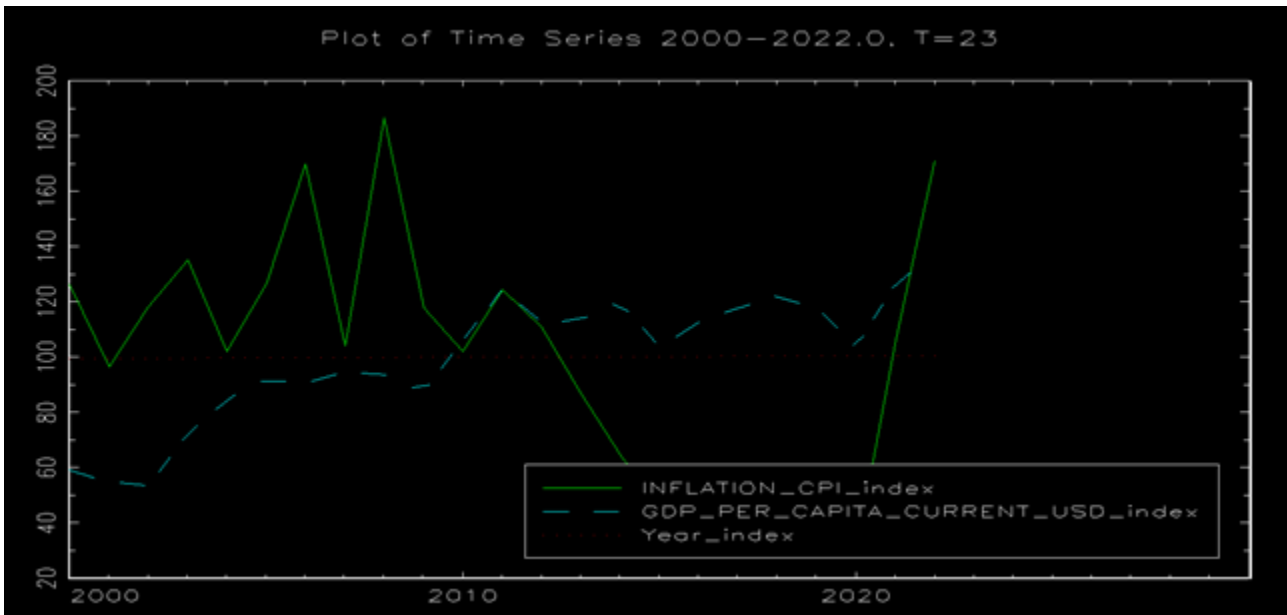All lags of INFLATION_CPIF(2, 17) =   1.8797 [0.1830]
All vars, lag 2   F(1, 17) = 0.031691 [0.8608]

For the system as a wholeNull hypothesis: the longest lag is 1
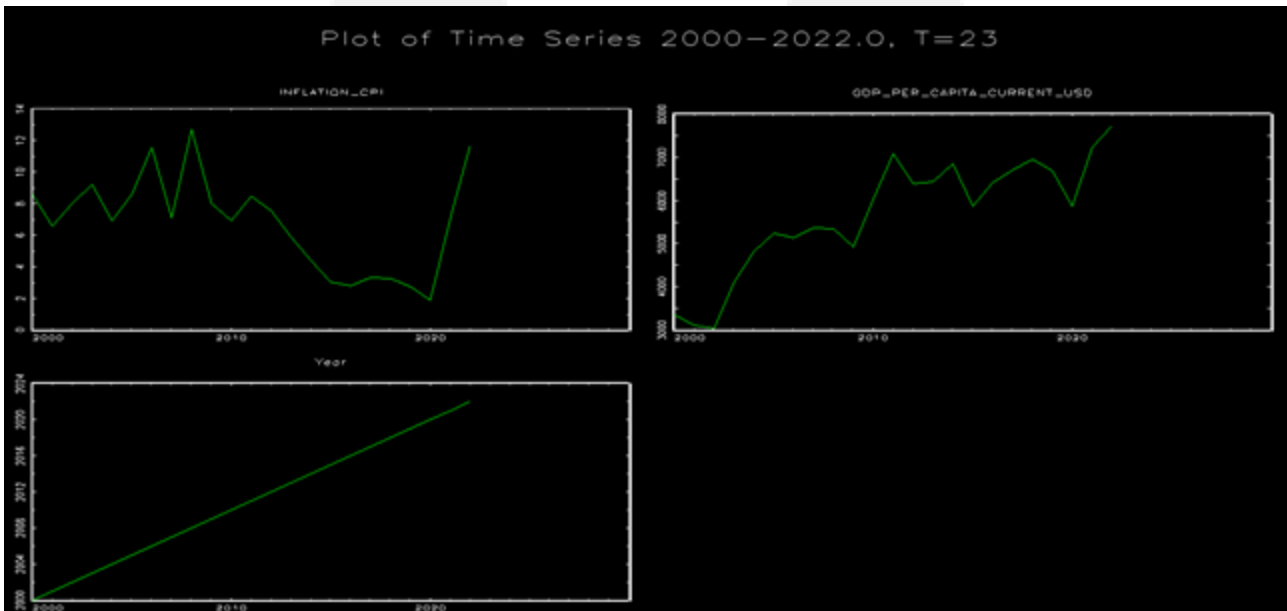Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 0.039111 [0.8432]

TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

LESOTHO
VAR ANALYSIS

UNIVARIATE (ARIMA)

Model 1: ARMAX, using observations 2003-2022 (T = 20)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	−0.118492	0.637555	−0.1859	0.8526	
phi_1	0.228349	0.354228	0.6446	0.5192	
theta_1	−1.00000	0.178630	−5.598	<0.0001	***
GDP_PER_CAPITA_CURRENT_USD_2	−0.00736535	0.0136545	−0.5394	0.5896	

Mean dependent var	−1.277039	S.D. dependent var	9.689676
Mean of innovations	−2.291348	S.D. of innovations	8.102415
R-squared	0.006382	Adjusted R-squared	-0.110515
Log-likelihood	−71.52572	Akaike criterion	153.0514
Schwarz criterion	158.0301	Hannan-Quinn	154.0233

		Real	Imaginary	Modulus	Frequency
AR					
	Root 1	4.3793	0.0000	4.3793	0.0000
MA					
	Root 1	1.0000	0.0000	1.0000	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2
The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags       loglik   p(LR)       AIC         BIC         HQC

   1     -72.47067             7.187683*   7.336900*   7.220067*
   2     -72.00143  0.33267    7.238231    7.437188    7.281410
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)Log-likelihood = -72.001427
Determinant of covariance matrix = 55.667791
AIC = 7.2382
BIC = 7.4372
HQC = 7.2814
Portmanteau test: LB(5) = 3.13837, df = 3 [0.3708]

Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	18.4632	7.50116	2.461	0.0248	**
INFLATION_CPI_1	−0.286419	0.214410	−1.336	0.1992	
INFLATION_CPI_2	−0.190486	0.216106	−0.8814	0.3904	
GDP_PER_CAPITA_CURRENT_USD_2	−0.0114973	0.00728991	−1.577	0.1332	

Mean dependent var	5.679123	S.D. dependent var	8.427164
Sum squared resid	1169.024	S.E. of regression	8.292532
R-squared	0.176942	Adjusted R-squared	0.031697
F(3, 17)	1.218227	P-value(F)	0.333447
rho	0.272732	Durbin-Watson	1.146443

F-tests of zero restrictions:
All lags of INFLATION_CPIF(2, 17) =   1.0541 [0.3702]
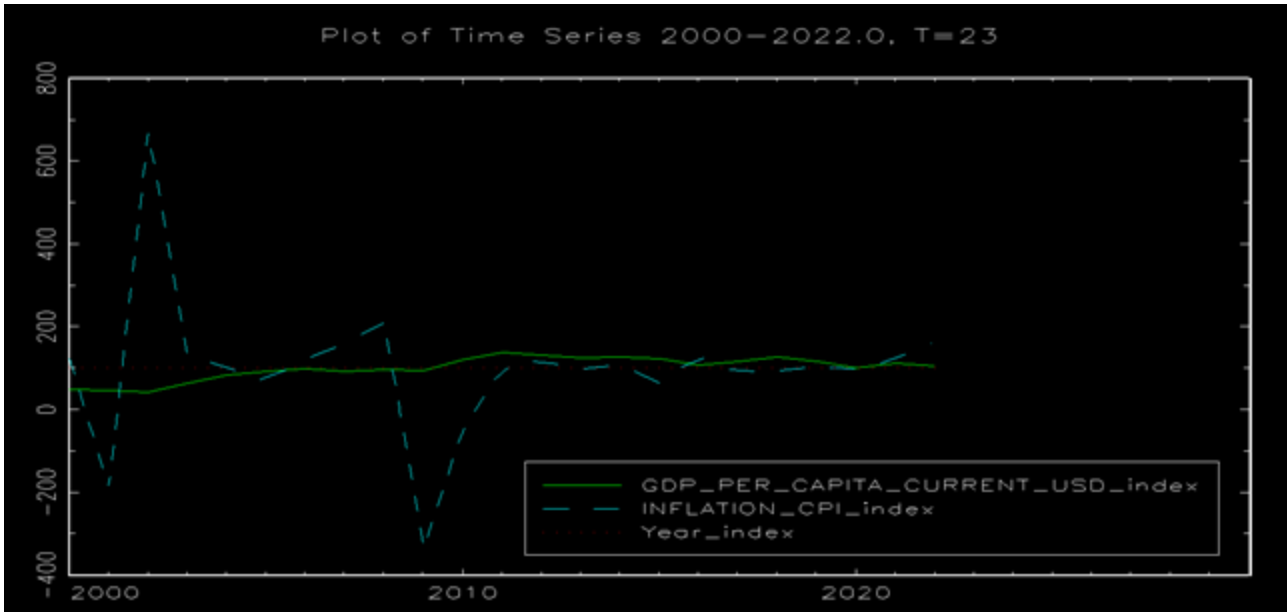All vars, lag 2   F(1, 17) = 0.77695 [0.3904]

For the system as a whole
Null hypothesis: the longest lag is 1
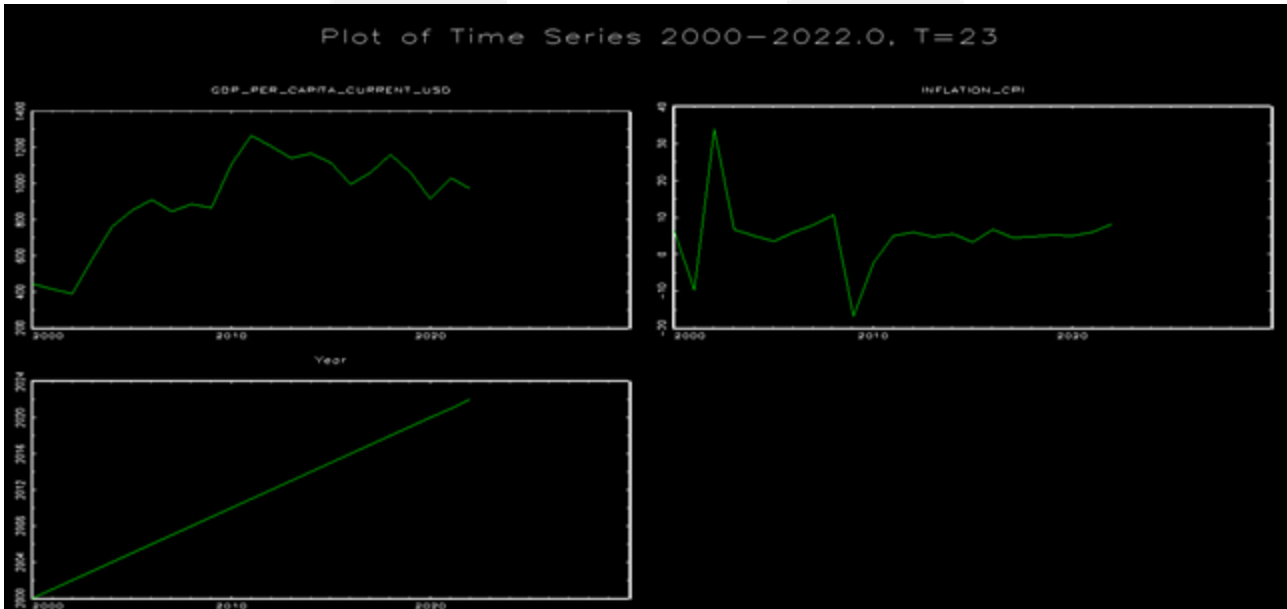Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 0.938479 [0.3327]

TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

MALAWI
VAR ANALYSIS

UNIVARIATE (ARIMA)

Model 1: ARMAX, using observations 2001-2022 (T = 22)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	0.367059	1.24730	0.2943	0.7685	
phi_1	0.344365	0.814455	0.4228	0.6724	
theta_1	−0.167934	0.848256	−0.1980	0.8431	
GDP_PER_CAPITA_CURRENT_USD	−0.0372777	0.0141548	−2.634	0.0084	***

Mean dependent var	−0.392160	S.D. dependent var	5.695688
Mean of innovations	0.083621	S.D. of innovations	4.575674
R-squared	0.633341	Adjusted R-squared	0.594745
Log-likelihood	−64.69108	Akaike criterion	139.3822
Schwarz criterion	144.8374	Hannan-Quinn	140.6673

		Real	Imaginary	Modulus	Frequency
AR					
	Root 1	2.9039	0.0000	2.9039	0.0000
MA					
	Root 1	5.9547	0.0000	5.9547	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

```
lags      loglik    p(LR)      AIC        BIC        HQC

  1     -58.55558            5.862436*  6.011654*  5.894820*
  2     -58.46051  0.66281   5.948620   6.147577   5.991799
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)
Log-likelihood = -58.460515
Determinant of covariance matrix = 15.329683
AIC = 5.9486

BIC = 6.1476HQC = 5.9918
Portmanteau test: LB(5) = 13.6201, df = 3 [0.0035]
Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	−4.41106	6.49355	−0.6793	0.5061	
INFLATION_CPI _1	0.715805	0.250104	2.862	0.0108	**
INFLATION_CPI _2	−0.104639	0.266113	−0.3932	0.6990	
GDP_PER_CAPIT A_CURRENT_US D_2	0.0197997	0.0100383	1.972	0.0651	*

Mean dependent var	13.97268	S.D. dependent var	6.260951
Sum squared resid	321.9233	S.E. of regression	4.351628
R-squared	0.589378	Adjusted R-squared	0.516916
F(3, 17)	8.133545	P-value(F)	0.001413
rho	−0.053752	Durbin-Watson	1.918419

F-tests of zero restrictions:All lags of INFLATION_CPIF(2, 17) =   8.7112 [0.0025]
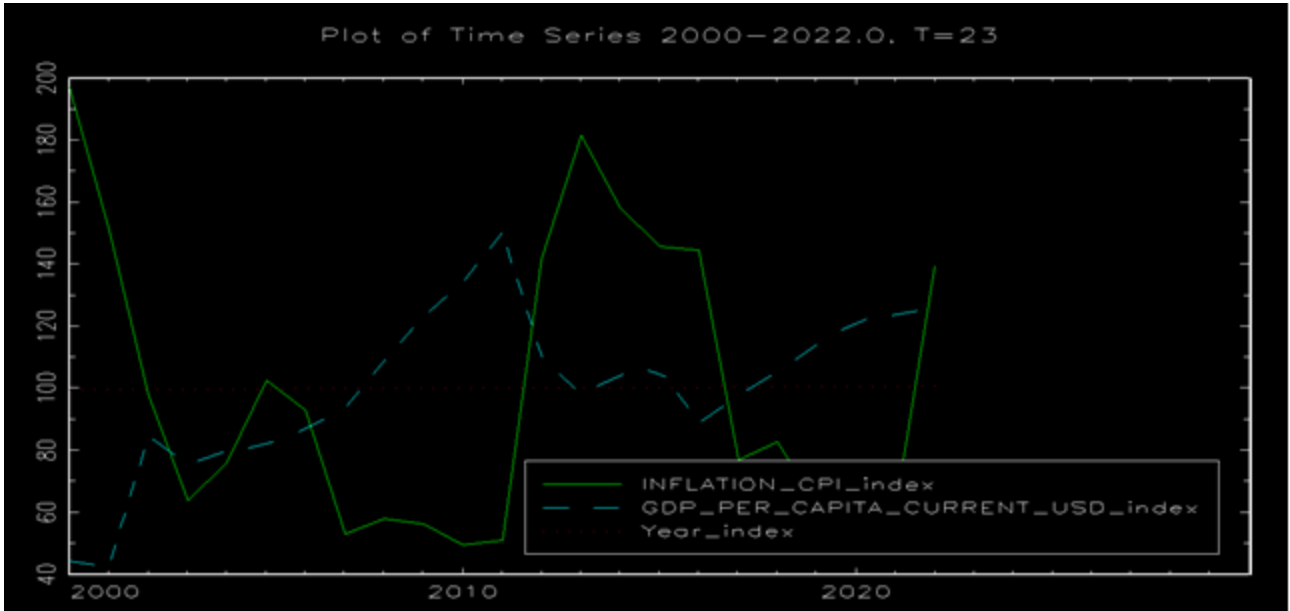All vars, lag 2   F(1, 17) = 0.15462 [0.6990]

For the system as a whole
Null hypothesis: the longest lag is 1
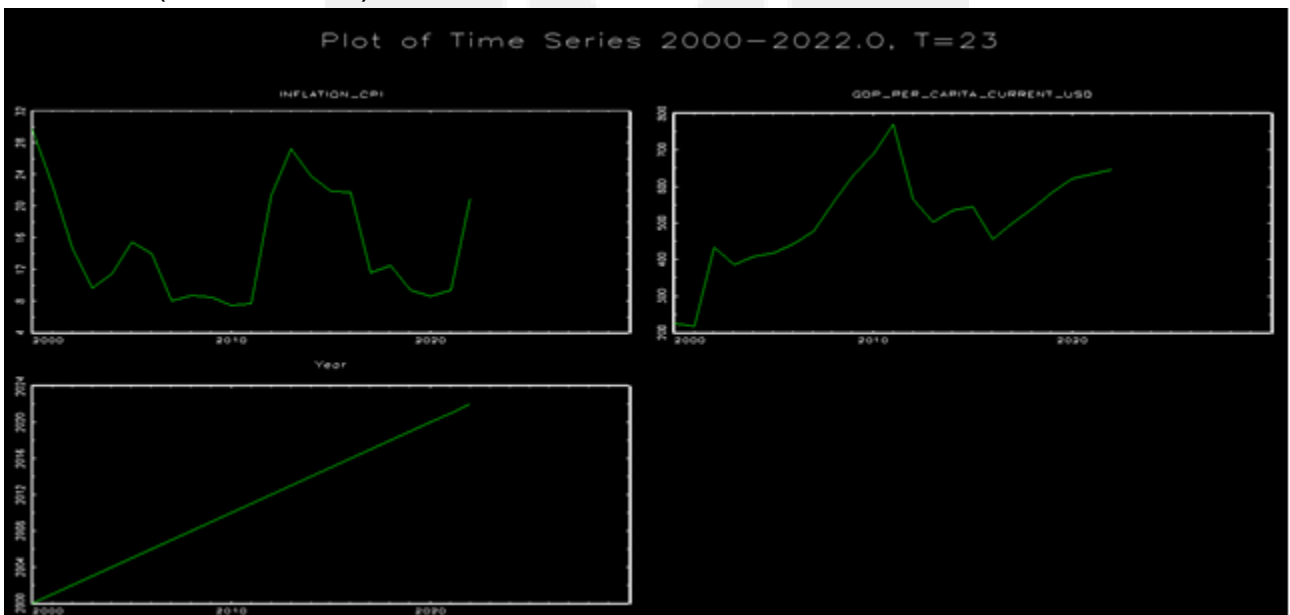Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 0.190134 [0.6628]

TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

SOUTH AFRICA
VAR ANALYSIS

UNIVARIATE (ARIMA)

Model 1: ARMAX, using observations 2001-2022 (T = 22)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	0.119288	0.155414	0.7676	0.4428	
phi_1	0.514247	0.238099	2.160	0.0308	**
theta_1	−1.00000	0.126483	−7.906	<0.0001	***
GDP_PER_CAPITA_CURRENT_USD	−0.000727537	0.000627301	−1.160	0.2461	

Mean dependent var	0.077308	S.D. dependent var	2.578298
Mean of innovations	0.098178	S.D. of innovations	2.028111
R-squared	0.218121	Adjusted R-squared	0.135818
Log-likelihood	−47.81625	Akaike criterion	105.6325
Schwarz criterion	111.0877	Hannan-Quinn	106.9176

		Real	Imaginary	Modulus	Frequency
AR					
	Root 1	1.9446	0.0000	1.9446	0.0000
MA					
	Root 1	1.0000	0.0000	1.0000	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags      loglik    p(LR)       AIC         BIC         HQC

   1     -45.24170             4.594448    4.743665    4.626832
   2     -42.41461  0.01741    4.420439*   4.619395*   4.463617*
```

Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	3.83703	2.20618	1.739	0.1001	
INFLATION_CPI _1	0.544949	0.211837	2.572	0.0198	**
INFLATION_CPI _2	−0.491536	0.214470	−2.292	0.0349	**
GDP_PER_CAPIT A_CURRENT_US D_2	0.000186929	0.000277390	0.6739	0.5094	

Mean dependent var	5.227602	S.D. dependent var	2.347494
Sum squared resid	69.83474	S.E. of regression	2.026802
R-squared	0.366374	Adjusted R-squared	0.254558
F(3, 17)	3.276575	P-value(F)	0.046612
rho	−0.143266	Durbin-Watson	1.961455

F-tests of zero restrictions:
All lags of INFLATION_CPIF(2, 17) =   4.3165 [0.0305]
All vars, lag 2   F(1, 17) =   5.2526 [0.0349]

For the system as a whole
Null hypothesis: the longest lag is 1
Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 5.65419 [0.0174]

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)
Log-likelihood = -42.414605
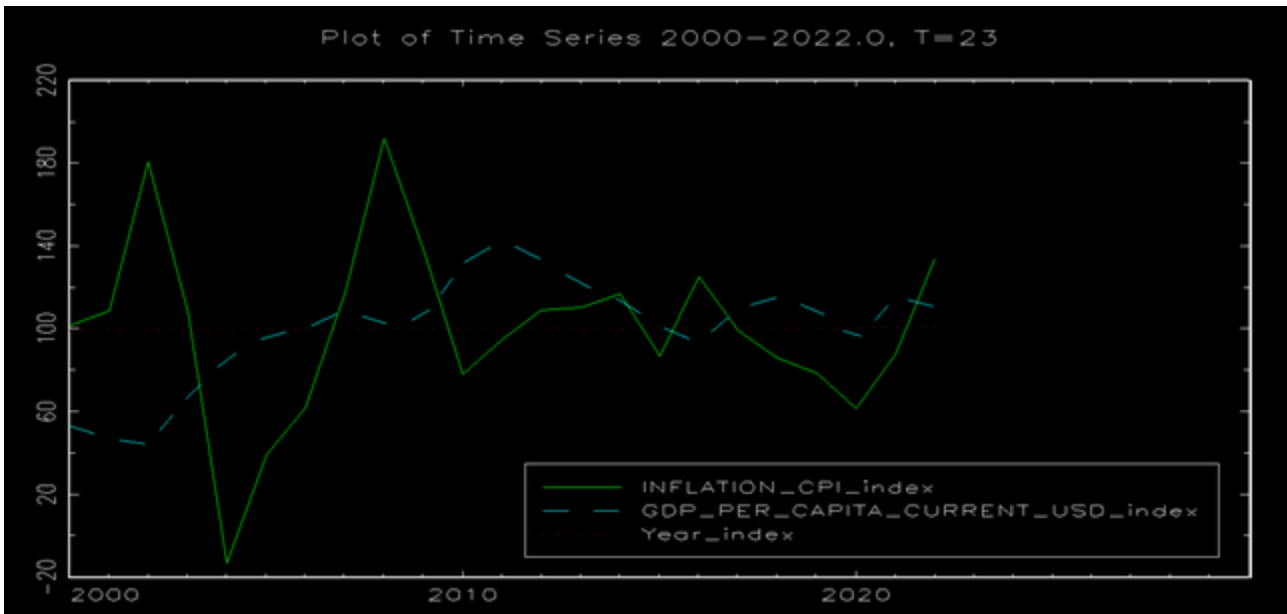Determinant of covariance matrix = 3.3254638
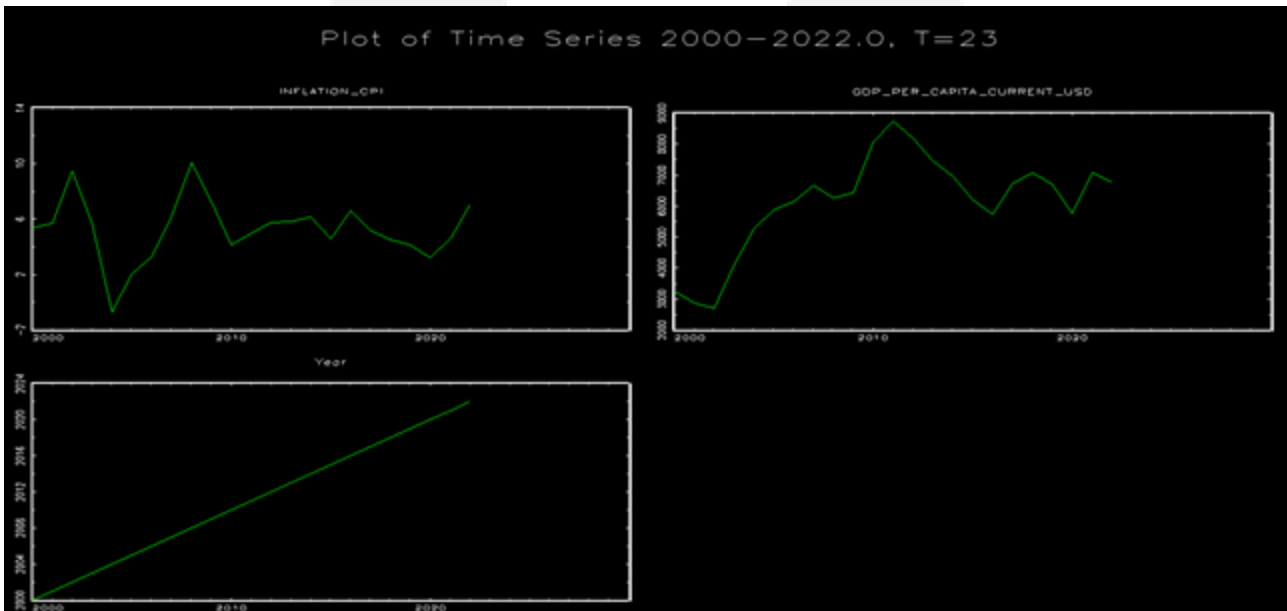AIC = 4.4204
BIC = 4.6194
HQC = 4.4636
Portmanteau test: LB(5) = 8.01074, df = 3 [0.0458]

TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

ZAMBIA
VAR ANALYSIS

UNIVARIATE (ARIMA)

Model 1: ARMAX, using observations 2003-2022 (T = 20)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	−0.597831	0.823662	−0.7258	0.4679	
phi_1	0.238617	0.738638	0.3231	0.7467	
theta_1	−0.485184	0.756038	−0.6417	0.5210	
GDP_PER_CAPITA_CURRENT_USD_2	0.00447247	0.00794596	0.5629	0.5735	

Mean dependent var	−0.562007	S.D. dependent var	5.280823
Mean of innovations	−0.056165	S.D. of innovations	4.794885
R-squared	0.272868	Adjusted R-squared	0.187323
Log-likelihood	−59.77024	Akaike criterion	129.5405
Schwarz criterion	134.5191	Hannan-Quinn	130.5124

		Real	Imaginary	Modulus	Frequency
AR					
	Root 1	4.1908	0.0000	4.1908	0.0000
MA					
	Root 1	2.0611	0.0000	2.0611	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags      loglik    p(LR)       AIC         BIC         HQC

   1    -60.53655              6.051100*   6.200317*   6.083484*
   2    -60.52875  0.90060     6.145595    6.344551    6.188773
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)
Log-likelihood = -60.528745
Determinant of covariance matrix = 18.667151

AIC = 6.1456
BIC = 6.3446
HQC = 6.1888
Portmanteau test: LB(5) = 4.73061, df = 3 [0.1926]

Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	9.64500	14.1026	0.6839	0.5032	
INFLATION_CPI_1	0.455065	0.287959	1.580	0.1325	
INFLATION_CPI_2	−0.0501794	0.446447	−0.1124	0.9118	
GDP_PER_CAPITA_CURRENT_USD_2	−0.00213543	0.00639862	−0.3337	0.7427	

Mean dependent var	12.46124	S.D. dependent var	5.494531
Sum squared resid	392.0102	S.E. of regression	4.802023
R-squared	0.350759	Adjusted R-squared	0.236187
F(3, 17)	3.061471	P-value(F)	0.056382
rho	−0.029284	Durbin-Watson	1.904312

F-tests of zero restrictions:
All lags of INFLATION_CPIF(2, 17) =   1.2619 [0.3083]
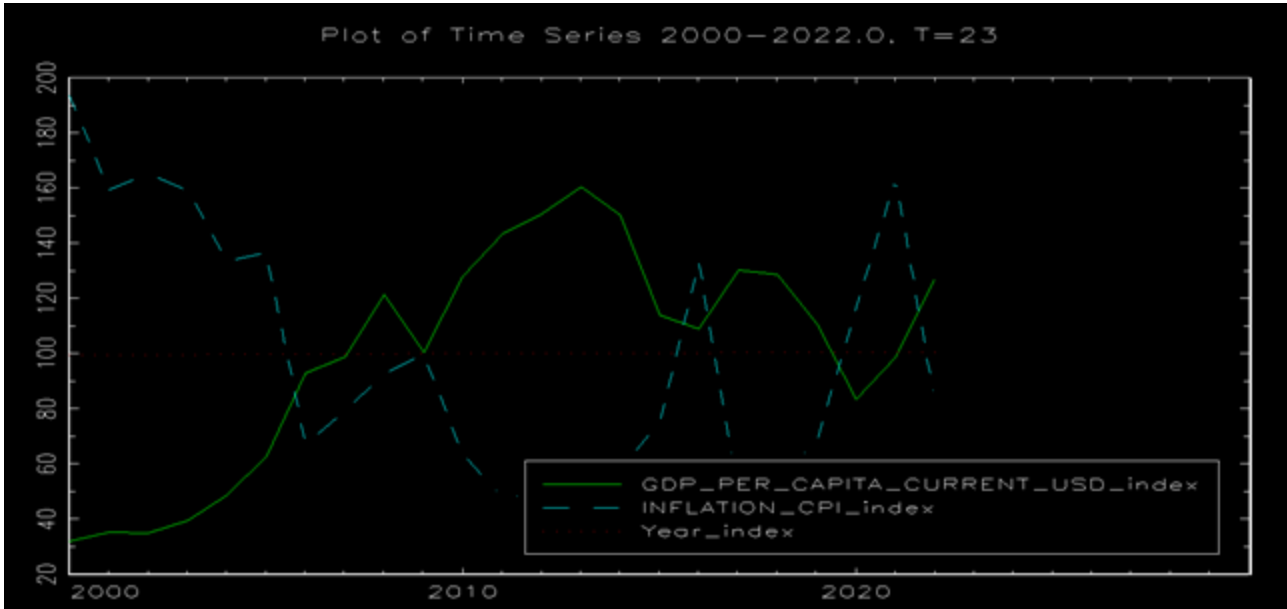All vars, lag 2   F(1, 17) = 0.012633 [0.9118]

For the system as a whole
Null hypothesis: the longest lag is 1
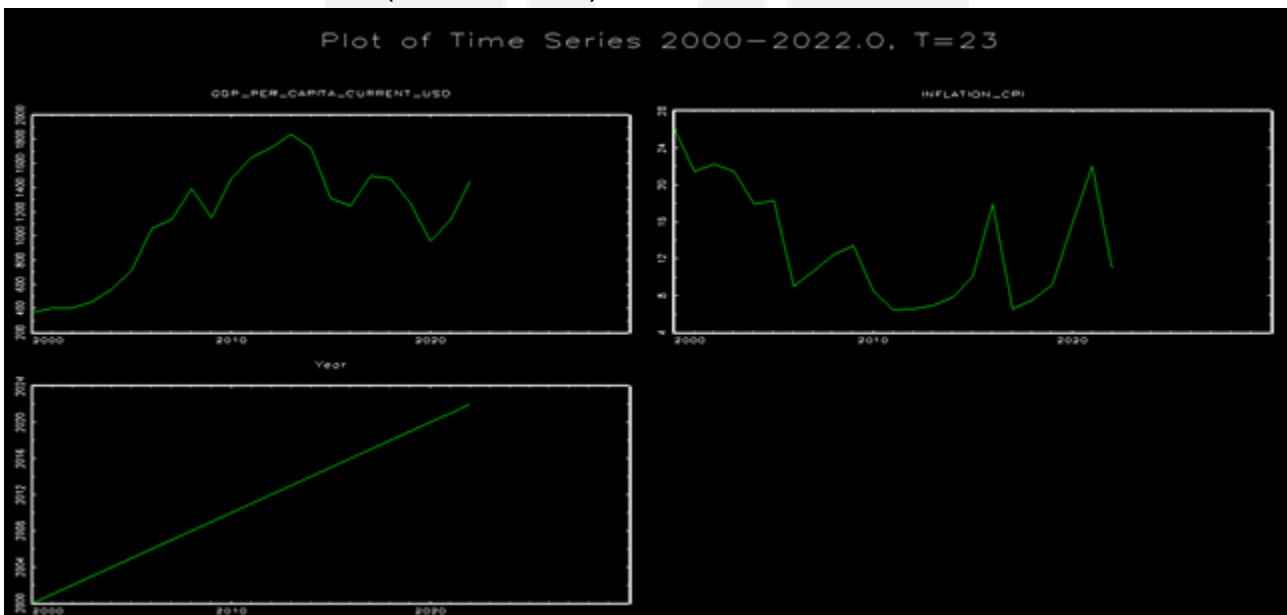Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 0.0155998 [0.9006]

ZAMBIA, TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

ZAMBIA, GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

THE EAST AFRICA CORRIDORS

A Cluster of East Africa Countries are examined for their socioeconomic (economic performances which makes the social life of the people better or worse).
The countries examined are: Kenya, Mauritius, Rwanda, Tanzania, Uganda.

KENYA
VAR ANALYSIS

UNIVARIATE (ARIMA)

KENYA

UNIVARIATE (ARIMA)

Model 1: ARMAX, using observations 2001-2022 (T = 22)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	*Std. Error*	*z*	*p-value*	
const	1.30442	1.24801	1.045	0.2959	
phi_1	0.115727	0.215356	0.5374	0.5910	
theta_1	−0.999987	0.148299	−6.743	<0.0001	***
GDP_PER_CAPIT A_CURRENT_US D	−0.0174680	0.0143967	−1.213	0.2250	

Mean dependent var	−0.105598	S.D. dependent var	6.478321
Mean of innovations	0.172431	S.D. of innovations	4.549378
R-squared	0.148070	Adjusted R-squared	0.058393
Log-likelihood	−66.00345	Akaike criterion	142.0069
Schwarz criterion	147.4621	Hannan-Quinn	143.2920

		Real	*Imaginary*	*Modulus*	*Frequency*
AR					
	Root 1	8.6410	0.0000	8.6410	0.0000
MA					
	Root 1	1.0000	0.0000	1.0000	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags      loglik   p(LR)     AIC         BIC        HQC 1    -61.72829
6.164599*    6.313816*    6.196983*
   2     -61.70477  0.82832    6.257597    6.456554    6.300776
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)
Log-likelihood = -61.704772
Determinant of covariance matrix = 20.879501
AIC = 6.2576
BIC = 6.4566
HQC = 6.3008
Portmanteau test: LB(5) = 2.0181, df = 3 [0.5687]

Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	12.6263	4.56777	2.764	0.0133	**
INFLATION_CPI_1	0.0570148	0.234676	0.2430	0.8110	
INFLATION_CPI_2	−0.0454052	0.232576	−0.1952	0.8475	
GDP_PER_CAPITA_CURRENT_USD_2	−0.00364268	0.00229627	−1.586	0.1311	

Mean dependent var	8.730524	S.D. dependent var	5.103298
Sum squared resid	438.4695	S.E. of regression	5.078614
R-squared	0.158203	Adjusted R-squared	0.009650
F(3, 17)	1.064961	P-value(F)	0.390010
rho	−0.121657	Durbin-Watson	2.045855

F-tests of zero restrictions:
All lags of INFLATION_CPIF(2, 17) = 0.045182 [0.9559]
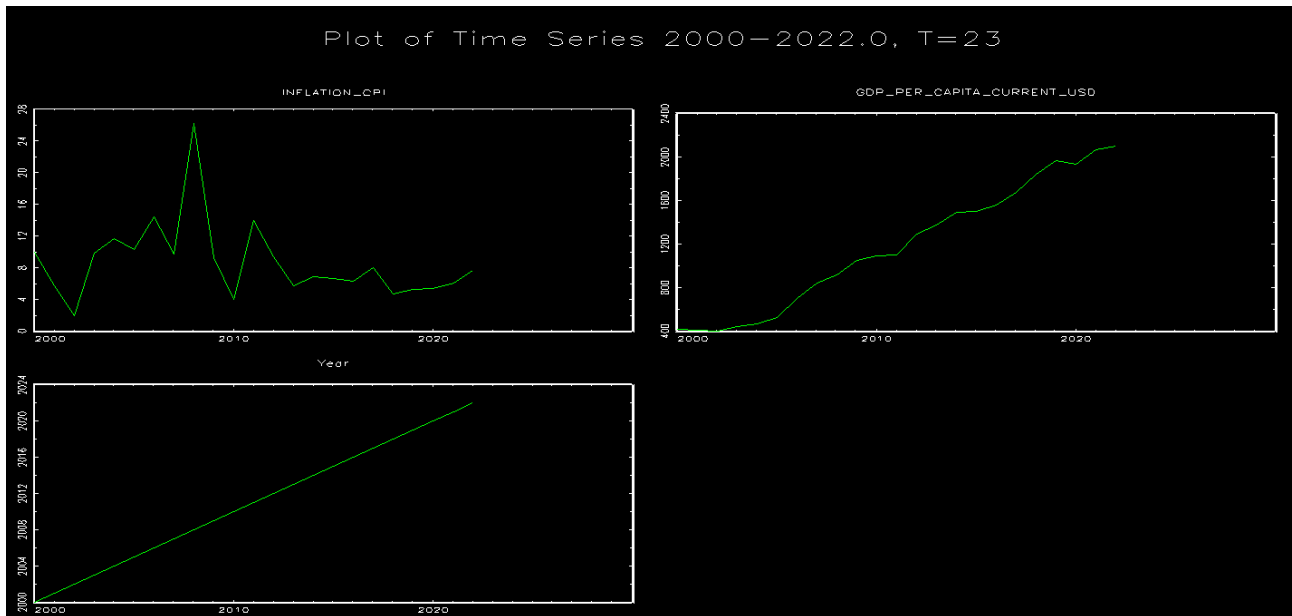All vars, lag 2   F(1, 17) = 0.038114 [0.8475]

For the system as a whole
Null hypothesis: the longest lag is 1
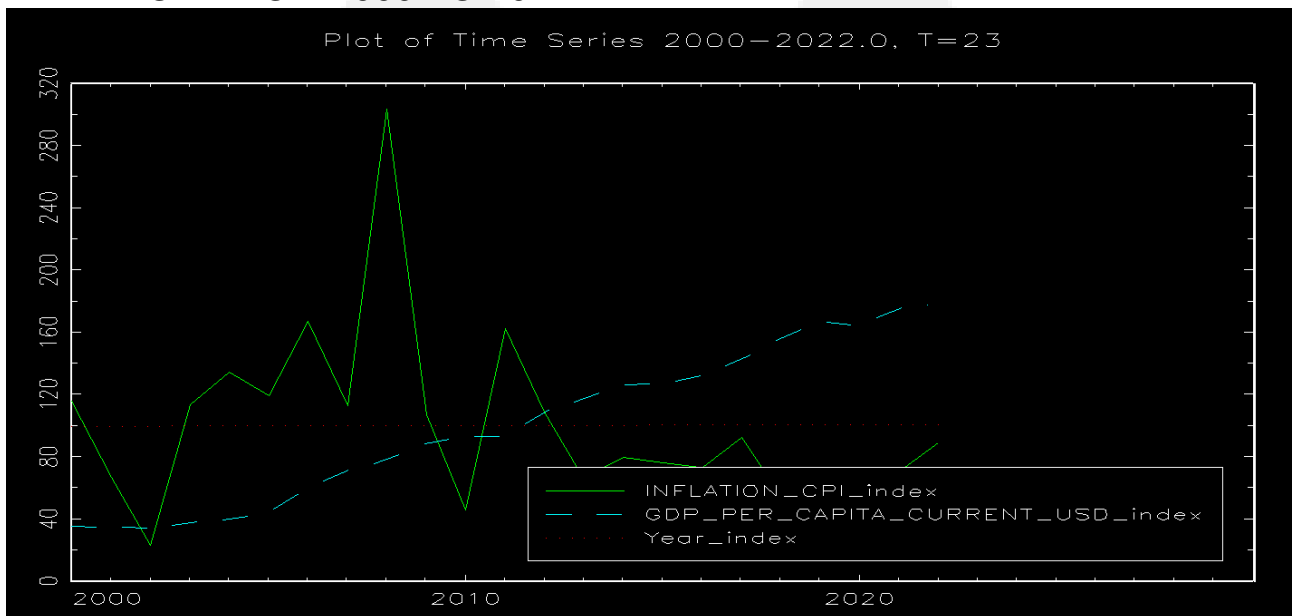Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 0.047029 [0.8283]

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

MAURITIUS
VAR ANALYSIS

UNIVARIATE (ARIMA)

		Real	*Imaginary*	*Modulus*	*Frequency*
AR					
	Root 1	1.2574	0.0000	1.2574	0.0000
MA					
	Root 1	1.0000	0.0000	1.0000	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags      loglik     p(LR)       AIC         BIC         HQC

  1      -48.20859             4.877008*   5.026226*   4.909392*
  2      -47.47635  0.22622    4.902510    5.101467    4.945689
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)
Log-likelihood = -47.476354Model 1: ARMAX, using observations 2001-2022 (T = 22)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	*Std. Error*	*z*	*p-value*	
const	−0.134685	0.337405	−0.3992	0.6898	
phi_1	0.795281	0.271879	2.925	0.0034	***
theta_1	−1.00000	0.123210	−8.116	<0.0001	***
GDP_PER_CAPITA_CURRENT_USD	0.000840485	0.000855818	0.9821	0.3261	

Mean dependent var	0.298839	S.D. dependent var	2.828577
Mean of innovations	−0.097402	S.D. of innovations	2.495553
R-squared	0.273832	Adjusted R-squared	0.197393
Log-likelihood	−51.96350	Akaike criterion	113.9270
Schwarz criterion	119.3822	Hannan-Quinn	115.2121

Determinant of covariance matrix = 5.3853398

AIC = 4.9025
BIC = 5.1015
HQC = 4.9457
Portmanteau test: LB(5) = 1.64292, df = 3 [0.6497]

Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	8.37706	3.55846	2.354	0.0309	**
INFLATION_CPI_1	0.334177	0.311790	1.072	0.2988	
INFLATION_CPI_2	−0.301763	0.272330	−1.108	0.2833	
GDP_PER_CAPITA_CURRENT_USD_2	−0.000499477	0.000300044	−1.665	0.1143	

Mean dependent var	4.618148	S.D. dependent var	2.899227
Sum squared resid	113.0921	S.E. of regression	2.579240
R-squared	0.327274	Adjusted R-squared	0.208558
F(3, 17)	2.756776	P-value(F)	0.074292
rho	0.071997	Durbin-Watson	1.550242

F-tests of zero restrictions:
All lags of INFLATION_CPIF(2, 17) = 0.90633 [0.4227]
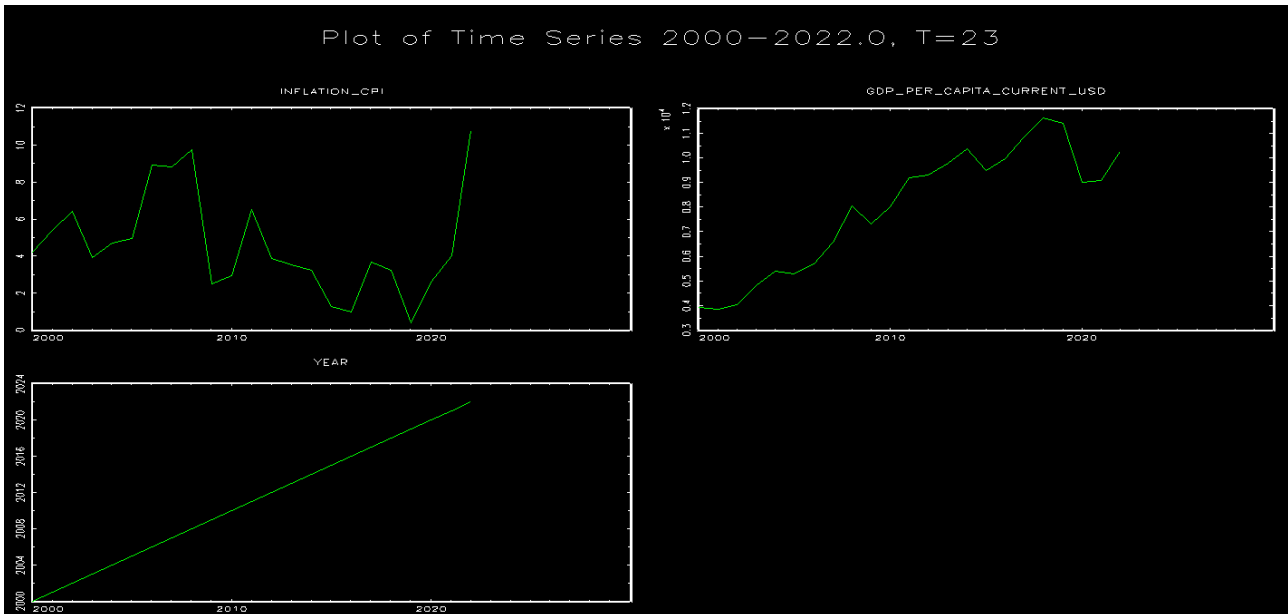All vars, lag 2   F(1, 17) = 1.2278 [0.2833]

For the system as a whole
Null hypothesis: the longest lag is 1
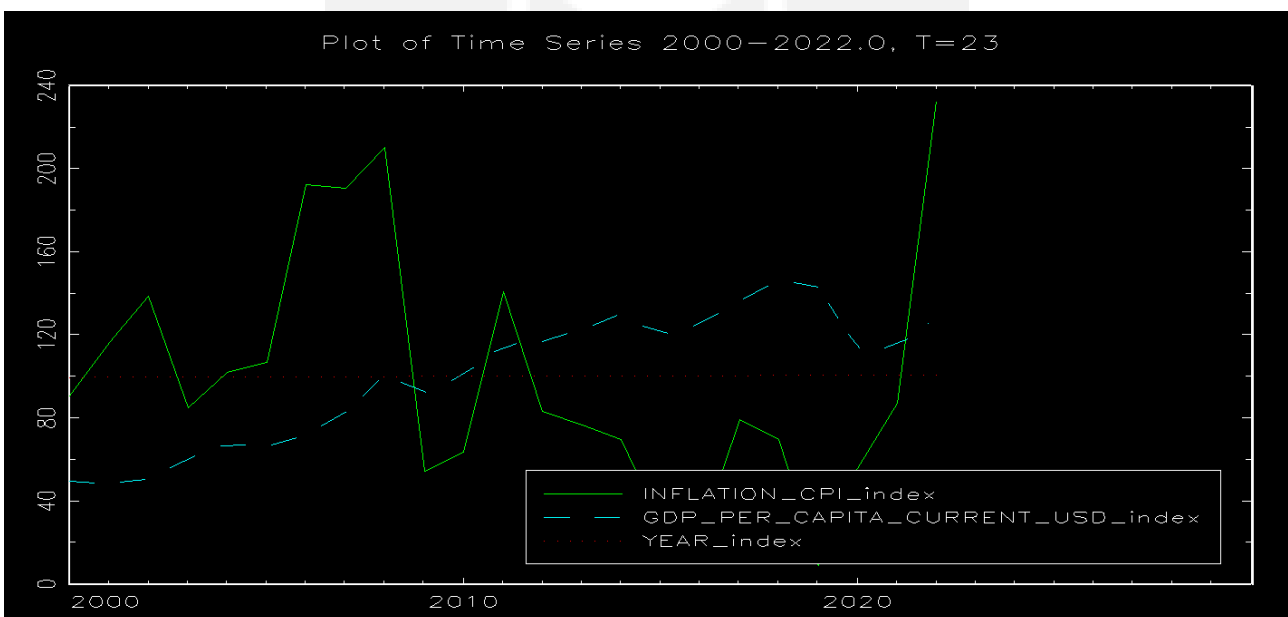Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 1.46447 [0.2262]

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

RWANDA
VAR ANALYSIS

UNIVARIATE (ARIMA)

Model 1: ARMAX, using observations 2001-2022 (T = 22)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	−0.399699	0.834929	−0.4787	0.6321	
phi_1	0.154093	0.310342	0.4965	0.6195	
theta_1	−1.00000	0.151292	−6.610	<0.0001	***
GDP_PER_CAPITA_CURRENT_USD	0.0126085	0.0260934	0.4832	0.6289	

Mean dependent var	0.626804	S.D. dependent var	6.747121
Mean of innovations	0.375610	S.D. of innovations	5.028529
R-squared	0.034299	Adjusted R-squared	-0.067354
Log-likelihood	−68.16973	Akaike criterion	146.3395
Schwarz criterion	151.7947	Hannan-Quinn	147.6245

		Real	Imaginary	Modulus	Frequency
AR					
	Root 1	6.4896	0.0000	6.4896	0.0000
MA					
	Root 1	1.0000	0.0000	1.0000	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags      loglik    p(LR)      AIC         BIC         HQC

  1     -62.91383            6.277507*   6.426725*   6.309891* 2    -62.60854  0.43457
6.343670    6.542627    6.386849
```

VAR system, lag order 2

OLS estimates, observations 2002-2022 (T = 21)

Log-likelihood = -62.608539

Determinant of covariance matrix = 22.756276

AIC = 6.3437

BIC = 6.5426

HQC = 6.3868

Portmanteau test: LB(5) = 0.580882, df = 3 [0.9008]Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	12.9110	4.56968	2.825	0.0117	**
INFLATION_CPI_1	−0.0631495	0.275397	−0.2293	0.8214	
INFLATION_CPI_2	−0.196288	0.277169	−0.7082	0.4884	
GDP_PER_CAPITA_CURRENT_USD_2	−0.00783752	0.00586649	−1.336	0.1992	

Mean dependent var	6.981161	S.D. dependent var	5.186945
Sum squared resid	477.8818	S.E. of regression	5.301952
R-squared	0.111889	Adjusted R-squared	-0.044837
F(3, 17)	0.713917	P-value(F)	0.557083
rho	−0.119771	Durbin-Watson	1.685781

F-tests of zero restrictions:

All lags of INFLATION_CPIF(2, 17) = 0.31698 [0.7326]
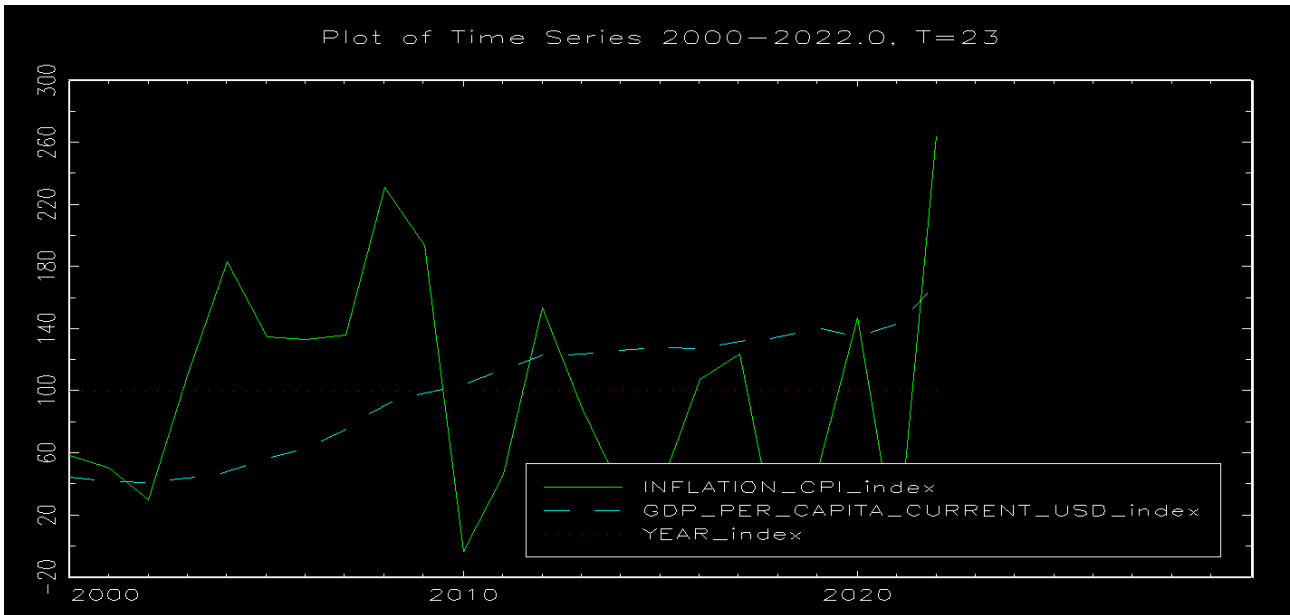
All vars, lag 2   F(1, 17) = 0.50153 [0.4884]

For the system as a whole

Null hypothesis: the longest lag is 1
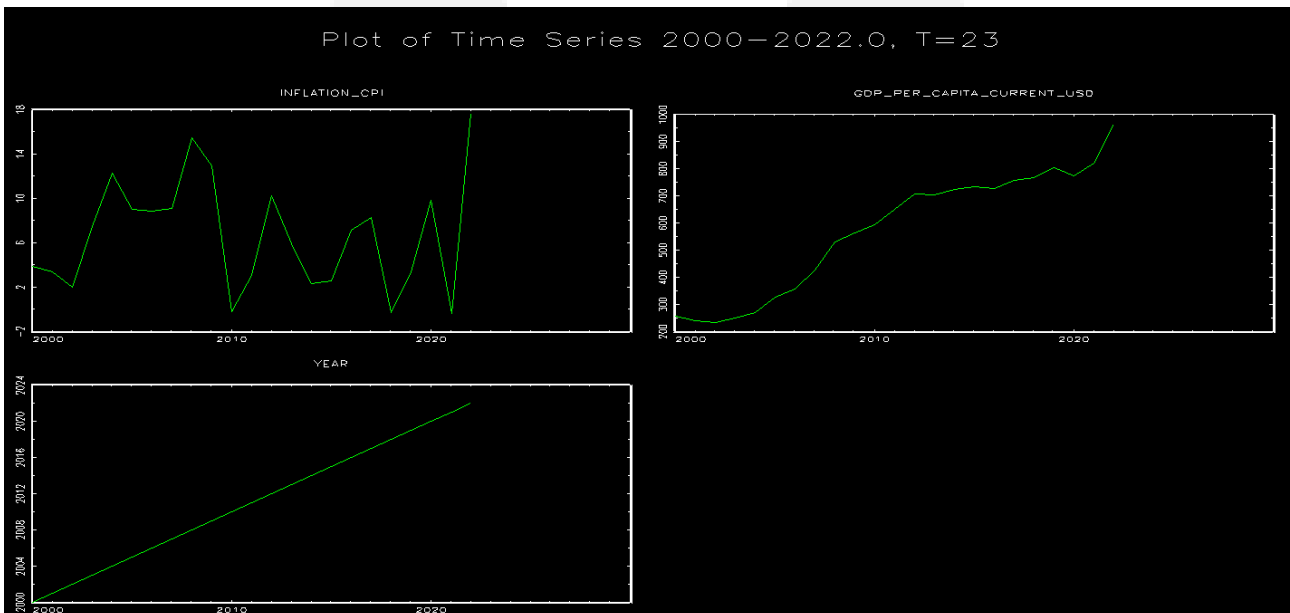
Alternative hypothesis: the longest lag is 2

Likelihood ratio test: Chi-square(1) = 0.610575 [0.4346]

TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

TANZANIA
VAR ANALYSIS

UNIVARIATE (ARIMA)

Model 1: ARMAX, using observations 2001-2022 (T = 22)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	−0.241877	0.618515	−0.3911	0.6958	
phi_1	0.271708	0.623785	0.4356	0.6631	
theta_1	−0.612270	0.532981	−1.149	0.2507	
GDP_PER_CAPITA_CURRENT_USD	0.00435003	0.0140411	0.3098	0.7567	

Mean dependent var	−0.071531	S.D. dependent var	2.943226
Mean of innovations	0.005365	S.D. of innovations	2.710404
R-squared	0.354625	Adjusted R-squared	0.286691
Log-likelihood	−53.24409	Akaike criterion	116.4882
Schwarz criterion	121.9434	Hannan-Quinn	117.7733

		Real	Imaginary	Modulus	Frequency
AR					
	Root 1	3.6804	0.0000	3.6804	0.0000
MA					
	Root 1	1.6333	0.0000	1.6333	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) valuesof the respective information
criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags       loglik    p(LR)       AIC         BIC         HQC

   1     -49.37736            4.988320*   5.137537*   5.020704*
   2     -49.37684  0.97428   5.083509    5.282465    5.126687
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)
Log-likelihood = -49.37684
Determinant of covariance matrix = 6.4538648
AIC = 5.0835
BIC = 5.2825
HQC = 5.1267
Portmanteau test: LB(5) = 5.25759, df = 3 [0.1539]

Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	5.00045	2.55012	1.961	0.0665	*
INFLATION_CPI_1	0.562494	0.237536	2.368	0.0300	**
INFLATION_CPI_2	0.00691472	0.238341	0.02901	0.9772	
GDP_PER_CAPITA_CURRENT_USD_2	−0.00295343	0.00253691	−1.164	0.2604	

Mean dependent var	6.683586	S.D. dependent var	3.391770
Sum squared resid	135.5312	S.E. of regression	2.823548
R-squared	0.410944	Adjusted R-squared	0.306993
F(3, 17)	3.953249	P-value(F)	0.026220
rho	−0.018500	Durbin-Watson	2.019711

F-tests of zero restrictions:
All lags of INFLATION_CPI $F(2, 17) = 4.4175$ [0.0285]
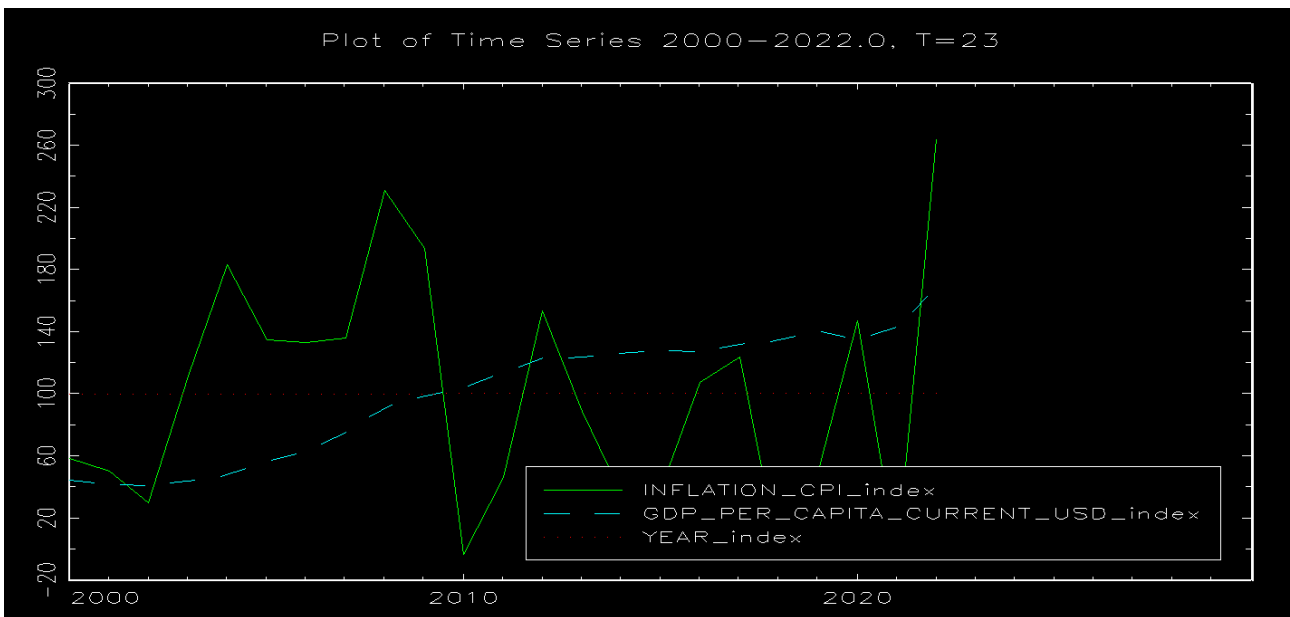All vars, lag 2 $F(1, 17) = 0.00084169$ [0.9772]
For the system as a whole
Null hypothesis: the longest lag is 1
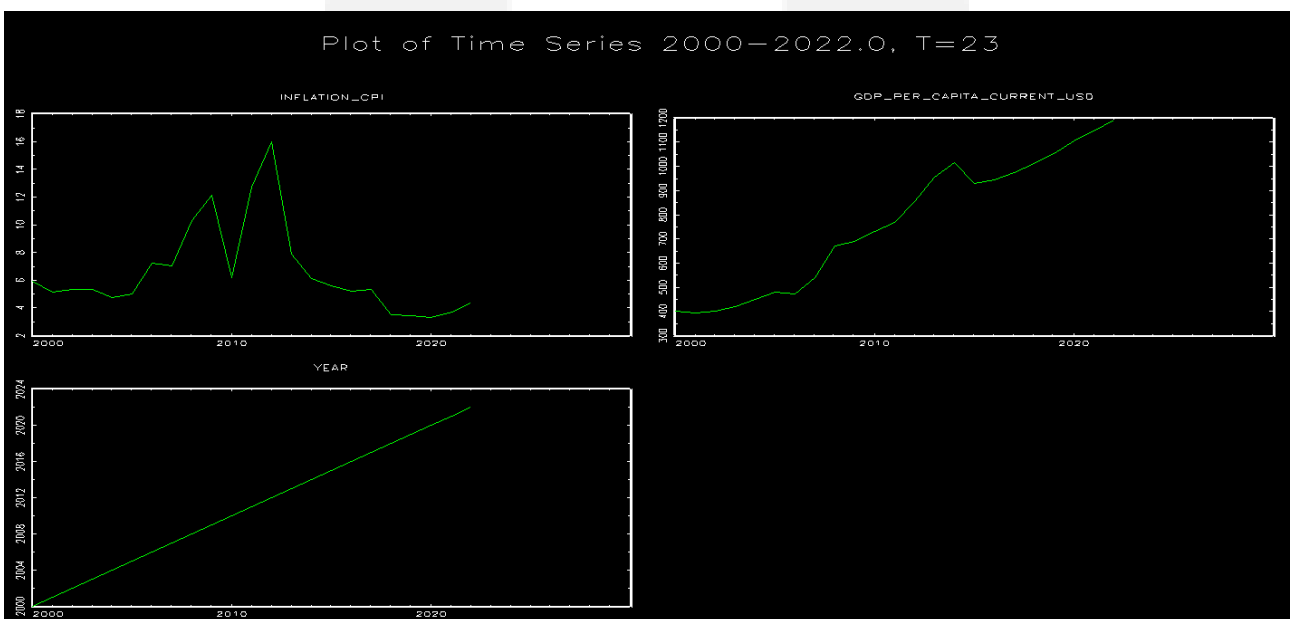Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 0.00103971 [0.9743]

TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

MODELLING SOFTWARE USED JMULTI

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

UGANDA
VAR ANALYSIS

UNIVARIATE (ARIMA)

Model 1: ARMAX, using observations 2001-2022 (T = 22)
Dependent variable: (1-L) INFLATION_CPI
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	−0.508678	0.310147	−1.640	0.1010	
phi_1	0.167510	0.226221	0.7405	0.4590	
theta_1	−1.00000	0.173108	−5.777	<0.0001	***
GDP_PER_CAPITA_CURRENT_USD	0.0136994	0.00779162	1.758	0.0787	*

Mean dependent var	0.172899	S.D. dependent var	5.028522
Mean of innovations	0.575298	S.D. of innovations	3.755440
R-squared	0.225340	Adjusted R-squared	0.143797
Log-likelihood	−61.73448	Akaike criterion	133.4690
Schwarz criterion	138.9242	Hannan-Quinn	134.7540

		Real	Imaginary	Modulus	Frequency
AR					
	Root 1	5.9698	0.0000	5.9698	0.0000
MA					
	Root 1	1.0000	0.0000	1.0000	0.0000

MULTIVARIATE TIME SERIES
(VAR LAG SELECTION AND VECTOR AUTOREGRESSION)

```
VAR system, maximum lag order 2

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags      loglik     p(LR)      AIC         BIC         HQC

  1     -58.62216             5.868777*   6.017995*   5.901161*
  2     -58.43236   0.53782   5.945939    6.144896    5.989118
```

VAR system, lag order 2
OLS estimates, observations 2002-2022 (T = 21)
Log-likelihood = -58.432363
Determinant of covariance matrix = 15.288637
AIC = 5.9459

BIC = 6.1449
HQC = 5.9891
Portmanteau test: LB(5) = 2.27038, df = 3 [0.5182]

Equation 1: INFLATION_CPI

	Coefficient	Std. Error	t-ratio	p-value	
const	5.14819	2.86061	1.800	0.0897	*
INFLATION_CPI_1	0.229563	0.236949	0.9688	0.3462	
INFLATION_CPI_2	0.135515	0.243359	0.5569	0.5849	
GDP_PER_CAPITA_CURRENT_USD_2	−0.00162972	0.00376871	−0.4324	0.6709	

Mean dependent var	6.427819	S.D. dependent var	4.224394
Sum squared resid	321.0614	S.E. of regression	4.345798
R-squared	0.100442	Adjusted R-squared	-0.058304
F(3, 17)	0.632721	P-value(F)	0.603970
rho	−0.139170	Durbin-Watson	2.145452

F-tests of zero restrictions:
All lags of INFLATION_CPIF(2, 17) = 0.89266 [0.4279]
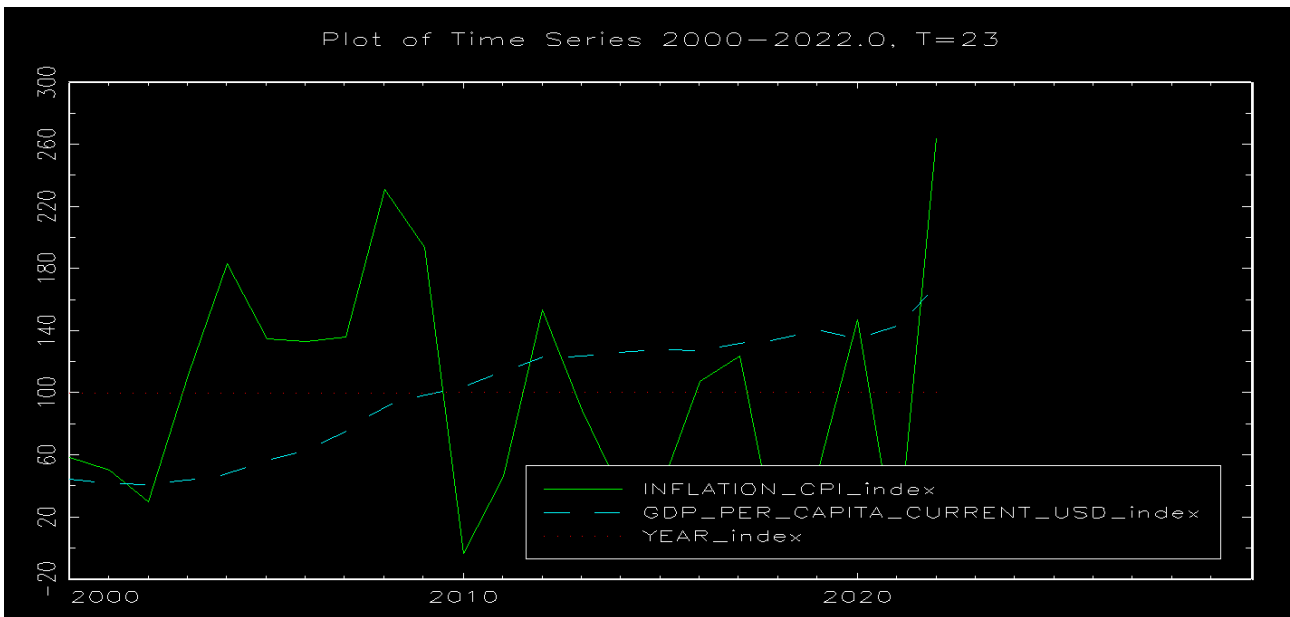All vars, lag 2   F(1, 17) = 0.31008 [0.5849]

For the system as a whole
Null hypothesis: the longest lag is 1
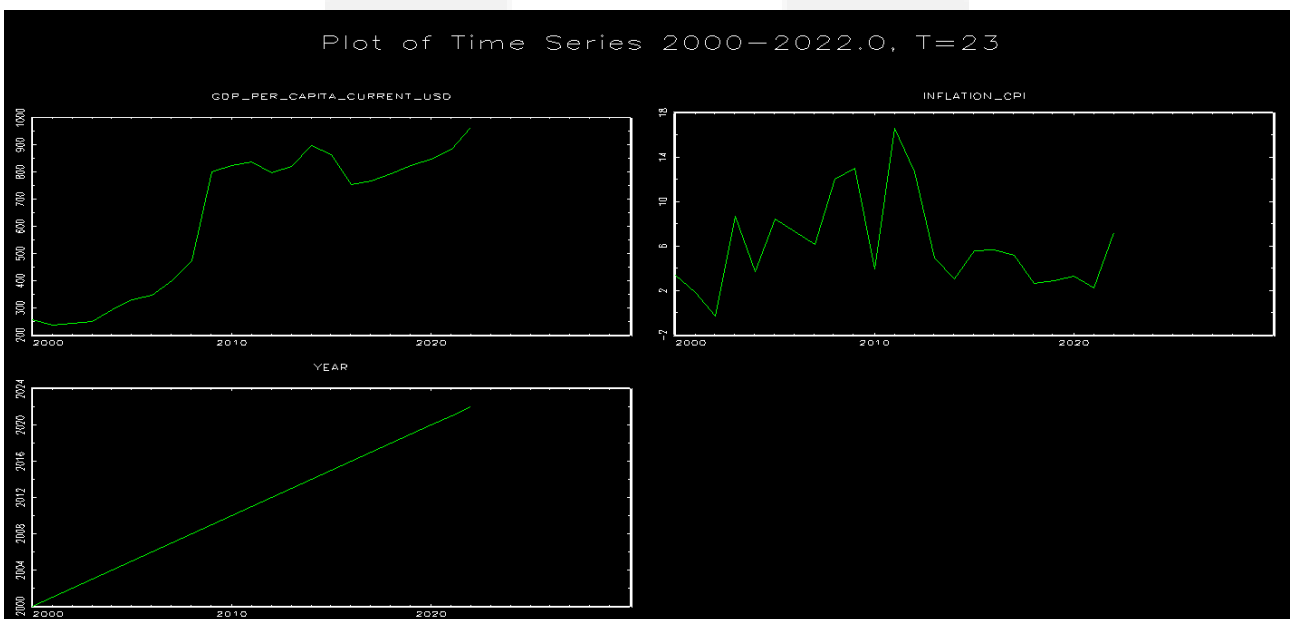Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(1) = 0.379591 [0.5378]

TIME SERIES ANALYSIS OF GDP PER CAPITA_CURRENT US$ AND INFLATION FROM 2000 TO 2022

TIME SERIES INDEXED, MEAN= 100
MODELLING SOFTWARE USED JMULTI

GDP PER CAPITA (CURRENT US$) AND INFLATION, CONSUMER PRICES (ANNUAL %)

MODELLING SOFTWARE USED JMULTI

OUTPUT IMPACT MEASURE AND ITS CONTRIBUTION TOWARDS DEVELOPMENT

An output impact is what drives us into revenue. Businesses in turn use the revenue for payment of expenditure (which includes goods and services). This study looks at value added impact, which is a more precise measure of economic impact analysis. The reason is that value added impact (VAI) analysis estimates the incremental value of gross regional product (GRP) which is similar to that of gross domestic product (GDP). The impact evaluates the increase in local employee wages plus local business profits (taking note that, it is not total revenue in seeking the output impact). On a concise note, the labour impact approach which gives us the payment made to total indigenous employees in various forms such as wages and salaries. We have to know that increases in salary take place either due to employment for the new job, job pay raises and increases in hours per employee per day. This aspect of the measure is about economic impact on personal incomes, and thus not business revenue. Another way of measuring the economic impact is the use of employment impact (the assessment of an increase in the number of total employees in a particular area. Thus, money measurement terms i.e. GDP is substituted with the number of jobs in a particular area.

For long-run analysis, consumption decisions are key to economic growth and development.

Adapting policymakers go by the following principles already in place, but not limited to those briefly stated:

- The psychological law of consumption; as income increases, consumption increases but not by as much as the increase in income, thus the marginal propensity to consume (MPC) from the origin of Keynes..
- Taking note of the average propensity to consume (APC), interest rate on consumption (which is a dichotomy for people who have the classical approach).
- Also is the Kuznet's paradox, the consumer behaviour evolving around the concepts of Modigliani, Robert Hall and Random-Walk (per their postulate, which puts emphasis on ' taking the constant that 'influences consumers to follow to believe that permanent-income hypothesis and have rational expectations, then unexpected policy changes influences consumption).

SUMMARY

The Nigerian economy has through the past 40 years used its oil sector as its main source of revenue. Through the use of the ordinary least square regression method (OLS, thus time series analysis), some have been able to deduce that crude oil consumption and export have been a positive impact on the Nigerian economy. This is not different from the main sources of revenue for Botswana, Lesotho and South Africa, having the mining sector as the major revenue generating sector for decades, also with that of Uganda for the production of coffee being the leading revenue generation system. However, economies such as Ghana, Senegal, Burkina Faso, Côte D'Ivoire, Kenya, Rwanda, Mauritius, Tanzania etc. possess different attributes (mixed economies). In that these a variety of products have contributed in different volumes ie Gold, sawn wood (timber), cocoa and recently crude, agriculture, tourism, textiles amongst others such as tea and cigarette production. Nonetheless, the agricultural sector of Nigeria is viable such that there is good production for world consumption of yam and cassava tubers. The same is the case of South Africa, which manages one of the largest financial institutions in the Sub African region.

THANK YOU