ملحق رقم (1)

بيانات الدراسه

obs	CO	EX	G	GDP	IN	I	INF	POP	RMS
1982	6458	0.0013	758.7	795	6666.2	1606.6	27.69	19829	27.4
1983	9445.9	0.0013	879.9	1026	8695	1530.3	31.13	20210	37.67
1984	11073.5	0.0025	1147.8	1262	10727.9	1627	32.45	20530	28.39
1985	15947	0.0025	1474	1703	14487.4	693.1	46.33	20882	17.5584
1986	19362.5	0.0025	1808.1	2831	18757.7	2403	29.04	21085	28.88
1987	32552.5	0.0045	2035.2	4163	33952.4	4728.3	24.98	21290	34.18
1988	41489.9	0.0045	3574.6	6468	43440.2	7162.6	49.14	21724	36.52
1989	74217.3	0.0045	5428.2	9634	78120.9	11000.4	74.08	22394	59.82
1990	101233.1	0.0045	39065.1	15139	102896.1	10266	67.4	23079	39.35
1991	174169.4	0.0045	63923	30974	179187.2	25888.9	123.7	23780	66.52
1992	362764.4	0.01	12686.5	68764	414270.6	73052.3	117.6	24495	168.7
1993	836743	0.0133	134037	141488	910456	18796060	101.3	25222	89.68
1994	1660369	0.0216	219989	1881.3	1751572.7	426439	115.4	25961	50.92
1995	3426693.5	0.04	21575	4049.7	3870076	894045.9	68.4	26688	74.14
1996	9890.3	124.6	84430	10478.1	961388.6	1409.1	132.7	27875	65.19
1997	15316.6	157.7	12790.8	16137.4	1517059.1	2842.9	47.7	28627	36.98
1998	19688.2	199.4	174825	21935.9	2098293	5751.4	17.1	29496	29.58
1999	24920.8	199.4	219495	27058.8	2594841.6	4424.5	16	30326	24.63
2000	30791.6	251.6	336938	33770.6	2981387.3	3267.7	8	31081	34.41
2001	35240.6	257.1	418603.1	40658.6	3720295.8	6787.5	4.9	31913	24.68
2002	40382.3	258.7	517850.1	47747.5	4415805.9	10426.4	8.3	32769	30.32
2003	47901.4	263.3	739395.1	57031.1	5110608.5	9880.1	7.7	33648	30.33
2004	57789.5	260.8	1103834	68698.7	6338115	13069.6	8.5	34512	30.84
2005	77912.2	258.3	1385300	85707.1	7839031	16756.3	8.5	35398	46.09
2006	89086.8	243.6	1396900	98719.1	8991763	20793.5	7.2	36307	27.37
2007	95415.6	217.2	1876670	114017.5	10763252.5	22165.3	8.1	37270	10.31
2008	102883.7	201.6	1798650	127764.9	12084777.1	24496.6	14.3	38193	16.33
2009	116667.6	209.1	1976520	148137	12436966.9	7702	11.2	38984	18.0033
2010	123800	2.63	205467	162203.9	14895819	25158	13	39924	14.8811
2011	146712.1	2.67	219393	186689.9	17027970	40831.2	15.4	39984	11.25

المصدر/ بنك السودان المركزي،وزارة المالية،جهاز الإحصاء المركزي،الدراسات السابقة

ملحق رقم (2) إختبار سكون متغيرالناتج المحلي الاجمالي

ADF Test Statistic	-4.560796	1% Critical Value*	-3.6959
		5% Critical Value	-2.9750
		10% Critical Value	-2.6265

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP,2)
Method: Least Squares
Date: 07/24/14   Time: 07:48
Sample(adjusted): 1985 2011
Included observations: 27 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-1.439741	0.315677	-4.560796	0.0001
D(GDP(-1),2)	0.183603	0.202152	0.908242	0.3728
C	9398.668	6547.129	1.435540	0.1640

R-squared	0.618385	Mean dependent var	898.1481
Adjusted R-squared	0.586583	S.D. dependent var	50860.36
S.E. of regression	32701.94	Akaike info criterion	23.73270
Sum squared resid	2.57E+10	Schwarz criterion	23.87668
Log likelihood	-317.3914	F-statistic	19.44527
Durbin-Watson stat	2.027556	Prob(F-statistic)	0.000010

ملحق رقم (3)إختبار سكون متغير معد عرض النقود

ADF Test Statistic	-6.405013	1% Critical Value*	-3.6959
		5% Critical Value	-2.9750
		10% Critical Value	-2.6265

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RMS,2)
Method: Least Squares
Date: 07/24/14   Time: 07:52
Sample(adjusted): 1985 2011
Included observations: 27 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RMS(-1))	-1.750181	0.273252	-6.405013	0.0000
D(RMS(-1),2)	0.486132	0.177641	2.736593	0.0115
C	-1.026867	5.101083	-0.201304	0.8422

R-squared	0.686616	Mean dependent var	0.209219
Adjusted R-squared	0.660501	S.D. dependent var	45.46494
S.E. of regression	26.49084	Akaike info criterion	9.495915
Sum squared resid	16842.36	Schwarz criterion	9.639896
Log likelihood	-125.1948	F-statistic	26.29173
Durbin-Watson stat	1.856262	Prob(F-statistic)	0.000001

ملحق رقم (4)إختبار سكون متغيرحجم السكان

PP Test Statistic	-5.712618	1% Critical Value*	-3.6959
		5% Critical Value	-2.9750
		10% Critical Value	-2.6265

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel: 3	(Newey-West suggests: 3)	
Residual variance with no correction		43428.27
Residual variance with correction		45803.72

Phillips-Perron Test Equation
Dependent Variable: D(POP,3)
Method: Least Squares
Date: 07/24/14   Time: 07:56
Sample(adjusted): 1985 2011
Included observations: 27 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POP(-1),2)	-1.586415	0.279895	-5.667893	0.0000
C	2.511331	42.07982	0.059680	0.9529
R-squared	0.562363	Mean dependent var		-30.33333
Adjusted R-squared	0.544858	S.D. dependent var		321.0145
S.E. of regression	216.5699	Akaike info criterion		13.66489
Sum squared resid	1172563.	Schwarz criterion		13.76088
Log likelihood	-182.4760	F-statistic		32.12501
Durbin-Watson stat	1.438623	Prob(F-statistic)		0.000007

ملحق رقم (5) إختبار سكون متغير= الأستهلاك الخاص

ADF Test Statistic	-4.735659	1% Critical Value*	-3.6959
		5% Critical Value	-2.9750
		10% Critical Value	-2.6265

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CO,2)
Method: Least Squares
Date: 07/24/14   Time: 07:58
Sample(adjusted): 1985 2011
Included observations: 27 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CO(-1))	-1.505609	0.317930	-4.735659	0.0001
D(CO(-1),2)	0.194397	0.200233	0.970858	0.3413
C	7135.238	147611.8	0.048338	0.9618
R-squared	0.644246	Mean dependent var		788.3148
Adjusted R-squared	0.614600	S.D. dependent var		1235463.
S.E. of regression	766982.8	Akaike info criterion		30.04276
Sum squared resid	1.41E+13	Schwarz criterion		30.18674
Log likelihood	-402.5772	F-statistic		21.73120
Durbin-Watson stat	2.070574	Prob(F-statistic)		0.000004

ملحق رقم (6) إختبار سكون متغير= معدل التضخم

ADF Test Statistic	-3.778810	1% Critical Value*	-3.6959
		5% Critical Value	-2.9750
		10% Critical Value	-2.6265

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INF,2)
Method: Least Squares
Date: 07/24/14   Time: 08:08
Sample(adjusted): 1985 2011
Included observations: 27 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	-1.268389	0.335658	-3.778810	0.0009
D(INF(-1),2)	-0.066082	0.203645	-0.324497	0.7484
C	-0.815714	5.189439	-0.157187	0.8764
R-squared	0.680402	Mean dependent var		0.040000
Adjusted R-squared	0.653769	S.D. dependent var		45.78734
S.E. of regression	26.94190	Akaike info criterion		9.529682
Sum squared resid	17420.78	Schwarz criterion		9.673663
Log likelihood	-125.6507	F-statistic		25.54723
Durbin-Watson stat	2.021498	Prob(F-statistic)		0.000001

ملحق رقم (7) إختبار سكون متغير = سعر الصرف

ADF Test Statistic	-5.264994	1% Critical Value*	-3.7076
		5% Critical Value	-2.9798
		10% Critical Value	-2.6290

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EX,3)
Method: Least Squares
Date: 07/24/14   Time: 08:10
Sample(adjusted): 1986 2011
Included observations: 26 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EX(-1),2)	-2.359080	0.448069	-5.264994	0.0000
D(EX(-1),3)	0.380881	0.317790	1.198531	0.2429
C	-7.656667	10.06594	-0.760651	0.4546
R-squared	0.819619	Mean dependent var		7.942738
Adjusted R-squared	0.803934	S.D. dependent var		114.4568
S.E. of regression	50.68071	Akaike info criterion		10.79713
Sum squared resid	59076.29	Schwarz criterion		10.94230
Log likelihood	-137.3628	F-statistic		52.25409
Durbin-Watson stat	2.094152	Prob(F-statistic)		0.000000

ملحق رقم (8) إختبار سكون متغير = الدخل المتاح

ADF Test Statistic	3.605393	1% Critical Value*	-3.6852
		5% Critical Value	-2.9705
		10% Critical Value	-2.6242

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IN)
Method: Least Squares
Date: 07/24/14   Time: 08:11
Sample(adjusted): 1984 2011
Included observations: 28 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IN(-1)	0.166695	0.046235	3.605393	0.0014
D(IN(-1))	-0.363826	0.214991	-1.692282	0.1030
C	181036.6	207388.1	0.872936	0.3910
R-squared	0.350860	Mean dependent var		607831.2
Adjusted R-squared	0.298929	S.D. dependent var		997490.0
S.E. of regression	835198.4	Akaike info criterion		30.20968
Sum squared resid	1.74E+13	Schwarz criterion		30.35242
Log likelihood	-419.9356	F-statistic		6.756246
Durbin-Watson stat	2.157861	Prob(F-statistic)		0.004511

ملحق رقم (9) إختبار سكون متغير الإستثمار

ADF Test Statistic	-3.538505	1% Critical Value*	-3.6852
		5% Critical Value	-2.9705
		10% Critical Value	-2.6242

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(I)
Method: Least Squares
Date: 07/24/14   Time: 08:13
Sample(adjusted): 1984 2011
Included observations: 28 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
I(-1)	-1.008218	0.284928	-3.538505	0.0016
D(I(-1))	-0.006878	0.199969	-0.034394	0.9728
C	737042.2	726483.5	1.014534	0.3200
R-squared	0.507664	Mean dependent var		1403.604
Adjusted R-squared	0.468277	S.D. dependent var		5051633.
S.E. of regression	3683617.	Akaike info criterion		33.17765
Sum squared resid	3.39E+14	Schwarz criterion		33.32038
Log likelihood	-461.4870	F-statistic		12.88917
Durbin-Watson stat	1.999578	Prob(F-statistic)		0.000142

ملحق رقم (10) إختبار سكون متغير الإنفاق الحكومي

PP Test Statistic	-5.360756	1% Critical Value*	-3.6852
		5% Critical Value	-2.9705
		10% Critical Value	-2.6242

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel: 3	(Newey-West suggests: 3)
Residual variance with no correction	1.35E+11
Residual variance with correction	1.42E+11

Phillips-Perron Test Equation
Dependent Variable: D(G,2)
Method: Least Squares
Date: 07/24/14   Time: 08:15
Sample(adjusted): 1984 2011
Included observations: 28 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(G(-1))	-1.050047	0.195870	-5.360937	0.0000
C	8169.932	72150.69	0.113234	0.9107

R-squared	0.525024	Mean dependent var	493.0286
Adjusted R-squared	0.506756	S.D. dependent var	543504.4
S.E. of regression	381710.4	Akaike info criterion	28.61146
Sum squared resid	3.79E+12	Schwarz criterion	28.70662
Log likelihood	-398.5605	F-statistic	28.73965
Durbin-Watson stat	1.985244	Prob(F-statistic)	0.000013

ملحق رقم (11)إختبار التكامل المشترك لمتغيرات الدراسة

Date: 10/02/14   Time: 12:21
Sample: 1982 2011
Included observations: 28
Test
assumption:
Linear
deterministic
trend in the
data
Series: CO EX G I IN INF POP RMS
Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.999773	512.7445	156.00	168.36	None **
0.975376	277.7927	124.24	133.57	At most 1 **
0.907626	174.0797	94.15	103.18	At most 2 **
0.802323	107.3863	68.52	76.07	At most 3 **
0.609430	61.99496	47.21	54.46	At most 4 **
0.509509	35.67078	29.68	35.65	At most 5 **
0.307523	15.72502	15.41	20.04	At most 6 *
0.176448	5.435586	3.76	6.65	At most 7 *

*(**) denotes
rejection of the
hypothesis at
5%(1%)
significance
level
L.R. test
indicates 8
cointegrating
equation(s) at
5%
significance
level

ملحق رقم (12) تقديرمعالم النموذج الدالة الخطية المقترحة:

Dependent Variable: GDP
Method: Least Squares
Date: 10/02/14   Time: 12:24
Sample: 1982 2011
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-72588.78	38152.69	-1.902586	0.0709
INF	-119.3716	72.58346	-1.644611	0.1149
CO	-0.020042	0.001819	-11.01618	0.0000
G	0.010358	0.004580	2.261448	0.0345
MS	462.3777	55.77342	8.290289	0.0000
I	0.006012	0.000367	16.38016	0.0000
POP	3.187743	1.904763	1.673564	0.1090
IN	0.007314	0.002377	3.077326	0.0057
EX	-140.8633	61.67373	-2.284008	0.0329
R-squared	0.991806	Mean dependent var		51231.14
Adjusted R-squared	0.988685	S.D. dependent var		56181.66
S.E. of regression	5976.284	Akaike info criterion		20.47231
Sum squared resid	7.50E+08	Schwarz criterion		20.89267
Log likelihood	-298.0847	F-statistic		317.7324
Durbin-Watson stat	1.888621	Prob(F-statistic)		0.000000

ملحق رقم (13)اختبار اختلاف التباين للنموذج المقترح

ARCH Test:

F-statistic	0.240038	Probability	0.628136
Obs*R-squared	0.255547	Probability	0.613196

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 10/02/14   Time: 12:30
Sample(adjusted): 1983 2011
Included observations: 29 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	28177271	8907138.	3.163448	0.0038
RESID^2(-1)	-0.093248	0.190326	-0.489937	0.6281
R-squared	0.008812	Mean dependent var		25836974
Adjusted R-squared	-0.027899	S.D. dependent var		39932336
S.E. of regression	40485534	Akaike info criterion		37.93726
Sum squared resid	4.43E+16	Schwarz criterion		38.03156
Log likelihood	-548.0903	F-statistic		0.240038
Durbin-Watson stat	2.020995	Prob(F-statistic)		0.628136

ملحق رقم (14) اختبار مشكلة الارتباط الخطي المتعدد للنموذج المقترح

	CO	EX	G	I	IN	INF	POP	RMS
CO	1	-0.276568154518	-0.141989042978	0.210306863799	-0.0384029015448	0.357079911555	-0.0851001129258	0.340728395573
EX	-0.276568154518	1	0.680184527079	-0.181211597585	0.373153150344	-0.568889011071	0.666526957521	-0.327339261133
G	-0.141989042978	0.680184527079	1	-0.0962348123967	0.675566869254	-0.474803893036	0.737393118041	-0.334024406155
I	0.210306863799	-0.181211597585	-0.0962348123967	1	-0.119161276279	0.297197996346	-0.103883065491	0.316423065727
IN	-0.0384029015448	0.373153150344	0.675566869254	-0.119161276279	1	-0.500991973432	0.917857352986	-0.418156601585
INF	0.357079911555	-0.568889011071	-0.474803893036	0.297197996346	-0.500991973432	1	-0.5014233576	0.733622713995
POP	-0.0851001129258	0.666526957521	0.737393118041	-0.103883065491	0.917857352986	-0.5014233576	1	-0.357601425713
RMS	0.340728395573	-0.327339261133	-0.334024406155	0.316423065727	-0.418156601585	0.733622713995	-0.357601425713	1

ملحق رقم (15) تقدير معالم النموذج المصحح

Dependent Variable: LOG(GDP)
Method: Least Squares
Date: 10/01/14   Time: 22:30
Sample(adjusted): 1983 2011
Included observations: 29 after adjusting endpoints
Convergence achieved after 12 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.240451	0.991267	9.321861	0.0000
I	1.47E-07	1.71E-08	8.623688	0.0000
MS	0.014242	0.002994	4.757007	0.0001
IN	1.73E-07	7.55E-08	2.291408	0.0314
CO	4.85E-07	1.32E-07	-3.675278	0.0013
AR(1)	0.843670	0.094803	8.899146	0.0000

R-squared	0.949293	Mean dependent var		9.996739
Adjusted R-squared	0.938270	S.D. dependent var		1.618645
S.E. of regression	0.402160	Akaike info criterion		1.198059
Sum squared resid	3.719856	Schwarz criterion		1.480948
Log likelihood	-11.37186	F-statistic		86.11786
Durbin-Watson stat	1.518900	Prob(F-statistic)		0.000000

Inverted AR Roots	.84			

ملحق رقم (16) اختبار مشكلة اختلاف التباين للنموذج المصحح

ARCH Test:

F-statistic	13.64606	Probability	0.001033
Obs*R-squared	9.637520	Probability	0.001906

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 10/02/14   Time: 12:50
Sample(adjusted): 1984 2011
Included observations: 28 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.050787	0.041973	1.209989	0.2372
RESID^2(-1)	0.588814	0.159395	3.694057	0.0010

R-squared	0.344197	Mean dependent var		0.128444
Adjusted R-squared	0.318974	S.D. dependent var		0.232947
S.E. of regression	0.192238	Akaike info criterion		-0.391416
Sum squared resid	0.960841	Schwarz criterion		-0.296259
Log likelihood	7.479830	F-statistic		13.64606
Durbin-Watson stat	1.869757	Prob(F-statistic)		0.001033

ملحق رقم (17) اختبار مشكلة الارتباط الخطي المتعدد

	CO	IN	I	RMS
CO	1	-0.0384029015448	0.210306863799	0.340728395573
IN	-0.0384029015448	1	-0.119161276279	-0.418156601585
I	0.210306863799	-0.119161276279	1	0.316423065727
RMS	0.340728395573	-0.418156601585	0.316423065727	1