

ملحق رقم (1) يوضح اختبار استقرار السلسلة الزمنية لمتغيرات الدراسة

1- الطلب على النقود MD

-3.6496	1% Critical Value*	-6.515208	ADF Test Statistic	
-2.9558	5% Critical Value			
-2.6164	10% Critical Value			
*MacKinnon critical values for rejection of hypothesis of a unit root.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(MD,2)				
Method: Least Squares				
Date: 08/01/15 Time: 18:13				
Sample(adjusted): 1983 2014				
Included observations: 32 after adjusting endpoints				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0000	-6.515208	0.311192	-2.027484	D(MD(-1))
0.0783	1.824902	0.177797	0.324462	D(MD(-1),2)
0.5063	0.673001	748087.8	503463.5	C
113081.0	Mean dependent var		0.786220	R-squared
8825509.	S.D. dependent var		0.771476	Adjusted R-squared
33.43714	Akaike info criterion		4218959.	S.E. of regression
33.57455	Schwarz criterion		5.16E+14	Sum squared resid
53.32669	F-statistic		-531.9942	Log likelihood
0.000000	Prob(F-statistic)		2.203938	Durbin-Watson stat

2- الناتج المحلي الاجمالي GDP

-3.6422	1% Critical Value*	3.733842	ADF Test Statistic	
-2.9527	5% Critical Value			
-2.6148	10% Critical Value			
*MacKinnon critical values for rejection of hypothesis of a unit root.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(GDP)				
Method: Least Squares				
Date: 08/01/15 Time: 18:15				
Sample(adjusted): 1982 2014				
Included observations: 33 after adjusting endpoints				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0008	3.733842	0.130294	0.486496	GDP(-1)
0.3994	-0.854852	0.269853	-0.230684	D(GDP(-1))
0.5996	0.530591	6675.810	3542.127	C
14225.15	Mean dependent var		0.412965	R-squared
45358.88	S.D. dependent var		0.373829	Adjusted R-squared
23.90098	Akaike info criterion		35892.91	S.E. of regression
24.03702	Schwarz criterion		3.86E+10	Sum squared resid
10.55214	F-statistic		-391.3661	Log likelihood
0.000339	Prob(F-statistic)		2.039813	Durbin-Watson stat

3- التضخم INF

-3.6496	1% Critical Value*	-3.983468	ADF Test Statistic	
-2.9558	5% Critical Value			
-2.6164	10% Critical Value			
*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: 08/01/15 Time: 18:17				
Sample(adjusted): 1983 2014				
Included observations: 32 after adjusting endpoints				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0004	-3.983468	0.302196	-1.203788	D(INF(-1))
0.5908	-0.543726	0.184634	-0.100391	D(INF(-1),2)
0.9270	0.092357	4.306724	0.397757	C
-0.166563	Mean dependent var		0.672732	R-squared
41.17557	S.D. dependent var		0.650162	Adjusted R-squared
9.312343	Akaike info criterion		24.35417	S.E. of regression
9.449756	Schwarz criterion		17200.64	Sum squared resid
29.80619	F-statistic		-145.9975	Log likelihood
0.000000	Prob(F-statistic)		2.052273	Durbin-Watson stat

4- سعر الصرف EX

-3.6496	1% Critical Value*	-3.866886	ADF Test Statistic	
-2.9558	5% Critical Value			
-2.6164	10% Critical Value			
*MacKinnon critical values for rejection of hypothesis of a unit root.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(EX,2)				
Method: Least Squares				
Date: 08/01/15 Time: 18:18				
Sample(adjusted): 1983 2014				
Included observations: 32 after adjusting endpoints				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0006	-3.866886	0.185496	-0.717291	D(EX(-1))
0.0740	1.853652	0.209812	0.388919	D(EX(-1),2)
0.1370	1.529317	0.071272	0.108998	C
-0.001687	Mean dependent var		0.341664	R-squared
0.439498	S.D. dependent var		0.296262	Adjusted R-squared
0.931342	Akaike info criterion		0.368691	S.E. of regression
1.068755	Schwarz criterion		3.942049	Sum squared resid
7.525237	F-statistic		-11.90147	Log likelihood
0.002331	Prob(F-statistic)		1.901398	Durbin-Watson stat

5- سعر الفائدة (معدل الإقراض) R

-3.6496	1% Critical Value*	-3.466394	ADF Test Statistic	
-2.9558	5% Critical Value			
-2.6164	10% Critical Value			
*MacKinnon critical values for rejection of hypothesis of a unit root.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(R,2)				
Method: Least Squares				
Date: 08/01/15 Time: 18:19				
Sample(adjusted): 1983 2014				
Included observations: 32 after adjusting endpoints				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0017	-3.466394	0.252355	-0.874763	D(R(-1))
0.8130	-0.238688	0.187000	-0.044635	D(R(-1),2)
0.7460	0.326959	0.768611	0.251304	C
-0.084375	Mean dependent var		0.454520	R-squared
5.646872	S.D. dependent var		0.416901	Adjusted R-squared
5.849743	Akaike info criterion		4.312005	S.E. of regression
5.987156	Schwarz criterion		539.2081	Sum squared resid
12.08209	F-statistic		-90.59588	Log likelihood
0.000153	Prob(F-statistic)		1.985554	Durbin-Watson stat

6- عرض النقود MS

-3.6496	1% Critical Value*	-3.915147	ADF Test Statistic	
-2.9558	5% Critical Value			
-2.6164	10% Critical Value			
*MacKinnon critical values for rejection of hypothesis of a unit root.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(MS,2)				
Method: Least Squares				
Date: 08/01/15 Time: 18:20				
Sample(adjusted): 1983 2014				
Included observations: 32 after adjusting endpoints				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0005	-3.915147	0.268223	-1.050133	D(MS(-1))
0.9717	0.035774	0.185693	0.006643	D(MS(-1),2)
0.9747	0.032006	78885.06	2524.834	C
351.0676	Mean dependent var		0.521619	R-squared
624009.9	S.D. dependent var		0.488628	Adjusted R-squared
28.94412	Akaike info criterion		446231.4	S.E. of regression
29.08154	Schwarz criterion		5.77E+12	Sum squared resid
15.81059	F-statistic		-460.1060	Log likelihood
0.000023	Prob(F-statistic)		2.001242	Durbin-Watson stat

-7 حجم الصادرات XP

-3.6422	1% Critical Value*	-3.886376	ADF Test Statistic	
-2.9527	5% Critical Value			
-2.6148	10% Critical Value			
*MacKinnon critical values for rejection of hypothesis of a unit root.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(XP)				
Method: Least Squares				
Date: 08/01/15 Time: 18:21				
Sample(adjusted): 1982 2014				
Included observations: 33 after adjusting endpoints				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0005	-3.886376	0.172749	-0.671368	XP(-1)
0.0638	1.924768	0.172068	0.331191	D(XP(-1))
0.1982	1.315742	14429.02	18984.86	C
263.6317	Mean dependent var		0.334880	R-squared
92761.93	S.D. dependent var		0.290538	Adjusted R-squared
25.45672	Akaike info criterion		78132.96	S.E. of regression
25.59277	Schwarz criterion		1.83E+11	Sum squared resid
7.552311	F-statistic		-417.0359	Log likelihood
0.002205	Prob(F-statistic)		1.744309	Durbin-Watson stat

-8 الاحتياطي النقدي الأجنبي FR

-3.6422	1% Critical Value*	15.40794	ADF Test Statistic	
-2.9527	5% Critical Value			
-2.6148	10% Critical Value			
*MacKinnon critical values for rejection of hypothesis of a unit root.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(FR)				
Method: Least Squares				
Date: 08/01/15 Time: 18:21				
Sample(adjusted): 1982 2014				
Included observations: 33 after adjusting endpoints				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0000	15.40794	0.202540	3.120717	FR(-1)
0.0000	-9.271472	0.316958	-2.938666	D(FR(-1))
0.1702	1.405183	273.3887	384.1611	C
1055.393	Mean dependent var		0.894991	R-squared
4563.196	S.D. dependent var		0.887991	Adjusted R-squared
17.58677	Akaike info criterion		1527.201	S.E. of regression
17.72282	Schwarz criterion		69970305	Sum squared resid
127.8452	F-statistic		-287.1817	Log likelihood

System: DEMAND

Estimation Method: Three-Stage Least Squares ملحق رقم (2) يوضح نتائج تقدير نموذج الطلب على النقود

Date: 07/30/15 Time: 08:30

Sample: 1982 2013

Included observations: 11

Total system (unbalanced) observations 32

Convergence achieved after: 1 weight matrix, 3 total coef iterations

Prob.	t-Statistic	Std. Error	Coefficient	
0.0079	-3.132914	27.16263	-85.09818	C(1)
0.0043	3.449827	2.394514	8.260656	C(2)
0.0046	3.420332	4.334411	14.82513	C(3)
0.0053	-3.340416	2.725120	-9.103035	C(4)
0.0156	-2.780022	13.18136	-36.64448	C(5)
0.0000	7.018072	1.920921	13.48116	C(7)
0.0384	0.899966	0.350462	0.315403	C(8)
0.0037	-3.532341	0.428025	-1.511929	C(9)
0.0029	3.647933	0.283258	1.033308	C(10)
0.0319	-1.035652	0.363563	-0.376525	C(11)
0.0087	3.086450	3.244131	10.01285	C(13)
0.0171	-2.733359	0.225576	-0.616581	C(14)
0.0048	3.388881	0.187778	0.636357	C(15)
0.3592	-0.950521	0.188008	-0.178706	C(16)
0.0375	0.482522	0.105712	0.051008	C(17)
0.0000	-11.21610	0.885402	-9.930759	C(19)
0.0075	3.163411	0.114620	0.362589	C(20)
0.0027	3.688876	0.191204	0.705326	C(21)
0.0000	6.409604	0.082556	0.529148	C(22)

0.152633 Determinant residual covariance

Equation:  $\text{LOG(D(MD))}=\text{C(1)}+\text{C(2)*LOG(GDP)}+\text{C(3)*LOG(D(INF))}+\text{C(4)*LOG(D(EX))}+\text{C(5)*LOG(D(R))}+[\text{C(6)}=\text{AR(1)}]$

Observations: 6

12.03750	Mean dependent var	0.665063	R-squared
4.461732	S.D. dependent var	-0.674685	Adjusted R-squared
33.33804	Sum squared resid	5.773910	S.E. of regression
		2.544508	Durbin-Watson stat

Equation:  $\text{LOG(GDP)}=\text{C(7)}+\text{C(8)*LOG(D(MD))}+\text{C(9)*LOG(D(INF))}+\text{C(10)*LOG(D(EX))}+\text{C(11)*LOG(XP)}+[\text{C(12)}=\text{AR(1)}]$

Observations: 10

8.930981	Mean dependent var	0.611258	R-squared
2.021225	S.D. dependent var	0.59736	Adjusted R-squared
21.64696	Sum squared resid	2.080719	S.E. of regression
		1.945009	Durbin-Watson stat

Equation:  $\text{LOG(D(INF))}=\text{C(13)}+\text{C(14)*LOG(GDP)}+\text{C(15)*LOG(D(EX))}+\text{C(16)*LOG(D(MS))}+\text{C(17)*LOG(D(MD))}+[\text{C(18)}=\text{AR(1)}]$

Observations: 10

1.655058	Mean dependent var	0.639061	R-squared
1.234338	S.D. dependent var	0.596311	Adjusted R-squared
6.731904	Sum squared resid	1.160337	S.E. of regression
		1.585800	Durbin-Watson stat

Equation:  $\text{LOG(D(EX))}=\text{C(19)}+\text{C(20)*LOG(GDP)}+\text{C(21)*LOG(D(INF))}+\text{C(22)*LOG(FR)}+[\text{C(23)}=\text{AR(1)}]$

Observations: 6

-2.123328	Mean dependent var	0.963954	R-squared
2.421837	S.D. dependent var	0.909886	Adjusted R-squared
1.057093	Sum squared resid	0.727012	S.E. of regression
		2.937330	Durbin-Watson stat

ملحق رقم (3) يوضح مصفوفة الارتباطات بين متغيرات معادلة الطلب على النقود

R	EX	INF	GDP	MD	
-0.044502	0.486247	-0.202776	0.434159	1.000000	MD
0.005142	0.699597	-0.039153	1.000000	0.434159	GDP
0.558351	-0.425475	1.000000	-0.039153	-0.202776	INF
-0.020503	1.000000	-0.425475	0.699597	0.486247	EX
1.000000	-0.020503	0.558351	0.005142	-0.044502	R

ملحق رقم (4) يوضح نتائج اختبار آرش ARCH لاكتشاف مشكلة اختلاف التباين

في معادلة الطلب على النقود

ARCH Test:					
0.999921	Probability			9.85E-09	F-statistic
0.999918	Probability			1.05E-08	Obs*R-squared
Test Equation:					
Dependent Variable: RESID^2					
Method: Least Squares					
Date: 08/01/15 Time: 20:08					
Sample(adjusted): 1981 2014					
Included observations: 34 after adjusting endpoints					
Prob.	t-Statistic	Std. Error	Coefficient	Variable	
0.0723	1.858575	0.347389	0.645649	C	
0.9999	-9.93E-05	0.176785	-1.75E-05	RESID^2(-1)	
0.645637	Mean dependent var		0.000000	R-squared	
1.883822	S.D. dependent var		-0.031250	Adjusted R-squared	
4.192277	Akaike info criterion		1.913031	S.E. of regression	
4.282063	Schwarz criterion		117.1099	Sum squared resid	
9.85E-09	F-statistic		-69.26871	Log likelihood	
0.999921	Prob(F-statistic)		1.999776	Durbin-Watson stat	

ملحق رقم (5) يوضح مصفوفة الارتباطات بين متغيرات معادلة الناتج المحلي الاجمالي

XP	EX	INF	MD	GDP	
0.441462	0.699597	-0.039153	0.434159	1.000000	GDP
0.227014	0.486247	-0.202776	1.000000	0.434159	MD
-0.122528	-0.425475	1.000000	-0.202776	-0.039153	INF
0.354407	1.000000	-0.425475	0.486247	0.699597	EX
1.000000	0.354407	-0.122528	0.227014	0.441462	XP

ملحق رقم (6) يوضح نتائج اختبار آرش ARCH لاكتشاف مشكلة اختلاف التباين

في معادلة الناتج المحلي الاجمالي

ARCH Test:				
0.000000	Probability		72.24282	F-statistic
0.000001	Probability		23.56283	Obs*R-squared
Test Equation:				
Dependent Variable: RESID^2				
Method: Least Squares				
Date: 08/01/15 Time: 21:05				
Sample(adjusted): 1981 2014				
Included observations: 34 after adjusting endpoints				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.5146	0.659057	0.380645	0.250867	C
0.0000	8.499578	0.133561	1.135213	RESID^2(-1)
1.854314	Mean dependent var		0.693024	R-squared
3.426251	S.D. dependent var		0.683431	Adjusted R-squared
4.207617	Akaike info criterion		1.927760	S.E. of regression
4.297403	Schwarz criterion		118.9203	Sum squared resid
72.24282	F-statistic		-69.52949	Log likelihood
0.000000	Prob(F-statistic)		2.106771	Durbin-Watson stat

ملحق رقم (7) يوضح مصفوفة الارتباطات بين متغيرات معادلة التضخم

MD	MS	EX	GDP	INF	
-0.202776	-0.407202	-0.425475	-0.039153	1.000000	INF
0.434159	-0.163154	0.699597	1.000000	-0.039153	GDP
0.486247	0.277242	1.000000	0.699597	-0.425475	EX
-0.051336	1.000000	0.277242	-0.163154	-0.407202	MS
1.000000	-0.051336	0.486247	0.434159	-0.202776	MD

ملحق رقم (8) يوضح نتائج اختبار آرش ARCH لاكتشاف مشكلة اختلاف التباين

في معادلة التضخم

ARCH Test:				
0.780304	Probability		8.049591	F-statistic
0.894005	Probability		6.833680	Obs*R-squared
Test Equation:				
Dependent Variable: RESID^2				
Method: Least Squares				
Date: 08/01/15 Time: 21:15				
Sample(adjusted): 1981 2014				
Included observations: 34 after adjusting endpoints				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0783	1.818572	0.184402	0.335349	C
0.0078	2.837180	0.159001	0.451115	RESID^2(-1)
0.628278	Mean dependent var		0.200991	R-squared
0.981461	S.D. dependent var		0.176022	Adjusted R-squared
2.663862	Akaike info criterion		0.890904	S.E. of regression
2.753648	Schwarz criterion		25.39871	Sum squared resid
8.049591	F-statistic		-43.28565	Log likelihood
0.007834	Prob(F-statistic)		1.888043	Durbin-Watson stat

ملحق رقم (9) يوضح مصفوفة الارتباطات بين متغيرات معادلة سعر الصرف

FR	INF	GDP	EX	
0.601583	-0.425475	0.699597	1.000000	EX
0.900933	-0.039153	1.000000	0.699597	GDP
-0.013927	1.000000	-0.039153	-0.425475	INF
1.000000	-0.013927	0.900933	0.601583	FR

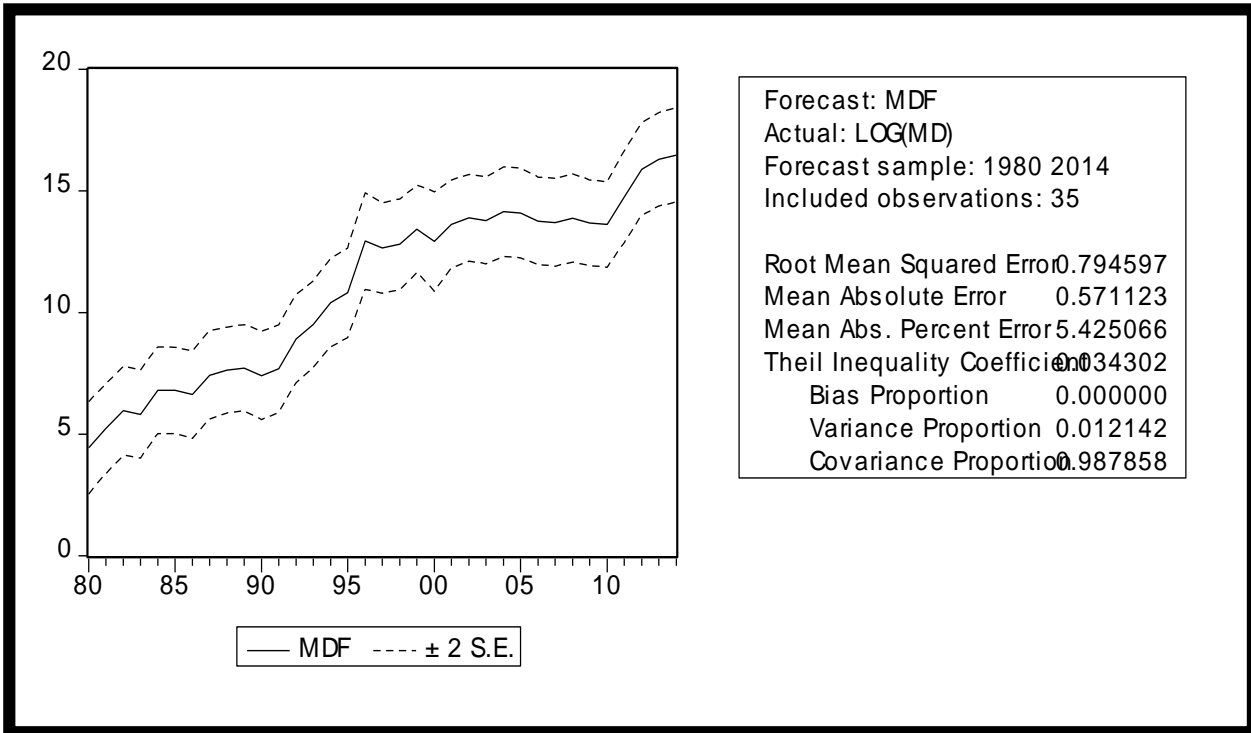


ملحق رقم (10) يوضح نتائج اختبار آرش ARCH لاكتشاف مشكلة اختلاف التباين

في معادلة سعر الصرف

ARCH Test:				
0.846509	Probability		0.039980	F-statistic
0.823540	Probability		0.049726	Obs*R-squared
Test Equation:				
Dependent Variable: RESID^2				
Method: Least Squares				
Date: 08/01/15 Time: 21:58				
Sample(adjusted): 1981 2014				
Included observations: 10				
Excluded observations: 24 after adjusting endpoints				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.1765	1.482519	0.350049	0.518954	C
0.8465	0.199950	0.155469	0.031086	RESID^2(-1)
0.565820	Mean dependent var		0.004973	R-squared
0.777091	S.D. dependent var		-0.119406	Adjusted R-squared
2.623135	Akaike info criterion		0.822177	S.E. of regression
2.683652	Schwarz criterion		5.407802	Sum squared resid
0.039980	F-statistic		-11.11567	Log likelihood
0.846509	Prob(F-statistic)		0.485642	Durbin-Watson stat

ملحق رقم (11) يوضح اختبار تايل لقياس القدرة التنبؤية لمعادلة الطلب على النقود



ملحق رقم (12) يوضح بيانات متغيرات الدراسة

FR	XP	MS	R	EX	INF	GDP	MD	obs
0.367	0.3946	123.211	8	0.005	26.09	4851	123.2	1980
3.033	0.5544	156.967	10	0.009	22.56	6398	157	1981
3.2513	0.6849	216.104	10	0.013	27.69	7620	216.1	1982
2.2594	0.9675	277.45	12	0.013	31.13	7185	277.5	1983
-1.8125	1.3002	326.149	14	0.025	32.45	6865	326.2	1984
-3.625	0.974	601.81	16	0.025	46.33	6396	601.3	1985
-1.5025	1.1722	775.61	16	0.025	29.04	6742	775.6	1986
31.563	1.4931	1040.74	19	0.045	24.98	7701	1040.7	1987
13.986	2.4332	1420.85	20	0.045	49.14	7676	1420.9	1988
-4.0725	3.4227	2270.87	22	0.045	74.08	8361	2270.9	1989
-17.9	4.6578	3164.46	29	0.045	67.4	7901	3164.5	1990
93.4	2.5484	5269.55	28	0.045	123.7	8498	5269.6	1991
29.3	15.832	14159.45	32	0.1	117.6	9057	14159.5	1992
-41.8	42.34	26858.34	27	0.1328	101.3	9471	26858.3	1993
30.5	90.189	40535.29	27	0.216	116.8	9566	40535.3	1994
-23.6	235.96	70586.6	28	0.4	69.4	1014	70586.6	1995
-2	577.4	116598.6	30	1.2464	129.3	1074	116598.6	1996
24	813.13	159713.7	41.7	1.5765	46.4	1142	159713.7	1997
24	1029.5	206951.3	36.3	1.9945	16.9	1215.6	206951.3	1998
-110	2022.9	257918	28	2.516	16.2	1294.2	257918	1999
-108	4902.7	346671	25.7	2.5714	3	1372.6	346670.6	2000
127.6	4417.1	432213	15.2	2.587	4.9	1464.9	432213	2001
-300	5370	563266	14.9	2.6334	8.3	1566.2	563266	2002
-422.6	6703	742356	16.2	2.6082	7.7	1717.3	734086	2003
-730.2	9869	969779.4	11.3	2.5826	8.5	1733.5	960446	2004
-530.5	12028	1403138	11	2.4358	8.5	1904.7	1378189	2005
208.6	12718	1787178	12.1	2.1715	7.2	2082.3	1564374.1	2006
282	18665	1971462	11.9	2.0159	8.1	2211	1245784	2007
-21.12	25401	2293316	13.4	2.0913	14.3	2354	1784532.4	2008
119.88	19120	16106.3	17.5	2.2359	11.2	2800	2138648.5	2009
-22.512	22359	19908.3	20.1	2.2373	13	2940	22753543	2010
174.2	362307.1	41853.1	18	2.4851	18.1	186689.9	3865354	2011
7717.3	406650	58663	20.7	4.4	35.1	243412.8	5743234	2012
9496	9579.4	66445.7	22.3	5.59	37.1	294630.2	6241309	2013
34831	8700.4	77739	19.6	5.54	36.9	475827.8	9859961	2014

المصدر : تقارير بنك السودان المركزي