

أثر الأداء المالي للمصارف الإسلامية الأردنية في سوق عمان المالي للمدة (1990-2008)

مستخلص

Abstract

The last four decades have witnessed a number of rapid and successive international changes in terms of future impacts and orientations. International economy has transformed into a competitive small village due to the information technology revolution and the liberation processes and the economic openness that the market witnesses, there became one market and the activists in this international market are not governments only but rather international organizations and huge multinational corporations where each spares no effort to take every opportunity and face challenges within the frame of removing all impediments and release transactions under the auspices of these global developments, the idea of creating Islamic banks was accelerated for this topic is regarded a new subject within the financial and banking sciences. Albeit the challenges that impede the Islamic financial transactions are immense, these organizations managed to anchor its bases and build a steadfast base as regards international financial transactions. Islamic banks became a reality in the world of international financial life after they nosed their way in banking domains quite remote from their Islamic bases and mechanisms. These banks have also managed to score tangible successes through offering a group of very distinguished financing formulae far from the rule of usury and debts on which the traditional banking systems rely.

The significance of this study lies in assessing Islamic banks as holding a very important position in the Islamic world for it can be considered as a theoretical frame and a scientific subject in the financial and banking science by means of expanding the area of treatments and the transformation from the theoretical to the applied aspect. The significance of the study emanates also from showing the impact of Islamic banks through their financial performance in the indexes of the financial markets and then getting to know the scope of their influence the international financial markets exchange in a sample of countries. The problem of the study is represented in the fact that though four decades have passed since Islamic banks were established and the huge amounts of money invested, the impact of these banks on the international markets exchange has not been tested because there is an uncertainty characteristic of the relationship between these banks and the international markets exchange which is ascribable to the fact that these banks do not deal in the same financial instruments that abide by the interest principle on which the markets exchange is based.



المقدمة ومنهجية البحث

1- أهمية الدراسة

2- مشكلة الدراسة

3- فرضية الدراسة



4- أهداف الدراسة

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(Liquidity Ratios)

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الاحتياطي القانوني لدى المصرف المركزي

:(19)

$$\%100 \times \frac{\text{اجمالي الودائع}}{\text{الاحتياطي القانوني لدى المصرف المركزي}} = -1$$

النقدية + المستحق على المصرف

$$\%100 \times \frac{\text{النقدية + المستحق على المصرف}}{\text{اجمالي الموجودات}} = -3$$

اجمالي الموجودات

(Profitability Ratios)

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صافي الأرباح

:(20)

$$\%100 \times \frac{\text{صافي الأرباح}}{\text{حق الملكية}} = -1$$

$$\%100 \times \frac{\text{صافي الأرباح}}{\text{اجمالي الودائع}} = -5$$

اجمالي الودائع



(Solvency Ratios)

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$$\begin{aligned} & \text{حق الملكية} \\ & \text{اجمالي الأستثمارات في الاوراق} \\ & \text{المالية} \\ & \text{حق الملكية} \\ & \text{اجمالي الموجودات} \end{aligned} \quad \begin{aligned} & : \\ & = \\ & = \\ & = \end{aligned} \quad \begin{aligned} & -1 \\ & -2 \end{aligned}$$

(Investment Ratios)

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$$\begin{aligned} & \text{اجمالي الأستثمارات} \\ & \text{اجمالي الودائع + حق الملكية} \\ & \text{اجمالي الأستثمارات} \\ & \text{اجمالي الودائع} \\ & \text{اجمالي الايرادات} \\ & \text{اجمالي الاستثمارات} \end{aligned} \quad \begin{aligned} & : \\ & = \\ & = \\ & = \end{aligned} \quad \begin{aligned} & -1 \\ & -3 \\ & -4 \end{aligned}$$

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(2008 - 1990)

(178) (13)
 (124) 1978/11/28

(1985) (62)
 2000/8/2

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(10) (58)
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148.878	6.769	70.871	190.382	12.149	244.831	7.200	3.182	1990
209.770	7.443	135.195	296.977	12.966	256.751	7.200	3.208	1991
260.919	8.401	160.608	369.555	14.122	435.348	7.200	2.120	1992
306.639	12.352	181.476	420.594	39.109	528.257	15.000	2.612	1993
356.105	14.271	175.570	462.154	39.116	570.007	14.586	3.750	1994
418.154	14.926	166.824	508.483	41.979	621.914	14.586	3.806	1995
442.085	16.512	135.335	502.302	43.783	618.656	14.586	5.610	1996
461.871	14.574	162.758	513.442	45.786	650.616	18.233	3.750	1997
481.390	17.675	194.405	527.801	50.910	706.763	22.000	5.752	1998
490.186	15.673	219.291	543.586	52.588	756.731	22.000	4.494	1999
531.846	16.858	260.042	564.577	54.529	828.286	38.500	2.215	2000
574.344	27.149	289.429	621.509	53.579	901.700	38.500	1.975	2001
637.715	28.549	321.419	710.520	55.600	1029.700	40.000	2.128	2002
624.294	32.497	497.902	876.956	57.000	1159.200	40.000	3.332	2003
692.454	36.164	574.136	1020.570	58.200	1301.400	40.000	3.434	2004
814.728	53.395	667.435	1155.680	69.400	1568.400	40.000	13.637	2005
1044.600	61.184	665.580	1236.672	115.300	1726.000	64.139	15.473	2006
1248.200	75.476	643.402	1677.300	133.500	1926.000	65.000	22.990	2007
1434.000	83.472	689.500	1882.000	166.000	2170.300	81.250	35.140	2008

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85.982	2.839	46.874	54.308	40.610	137.294	40	0.627	1998
145.747	4.297	65.284	118.032	42.025	216.321	40	1.474	1999
97.742	4.941	94.817	198.578	45.177	197.036	40	3.135	2000
120.066	6.485	129.336	275.696	45.559	253.246	40	2.882	2001
154.627	6.772	155.488	289.433	47.085	314.741	40	1.828	2002
186.466	6.943	193.288	315.638	45.917	385.529	40	1.970	2003
210.251	5.964	185.400	331.653	50.378	402.174	40	1.461	2004
212.666	11.234	169.569	364.676	54.830	404.863	40	3.801	2005
326.514	12.938	244.970	541.877	62.778	574.325	40	7.980	2006
464.557	18.408	251.285	595.670	74.083	593.987	40	10.870	2007
581.697	19.529	332.191	666.068	92.209	906.312	73	6.508	2008

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0.0455	0.0496	0.2619	0.2895	1990
0.0355	0.0505	0.2474	0.5266	1991
0.0322	0.0324	0.1501	0.3689	1992
0.0403	0.0740	0.0668	0.3435	1993
0.0401	0.0686	0.0959	0.3080	1994
0.0357	0.0675	0.0907	0.2682	1995
0.0374	0.0708	0.1281	0.2188	1996
0.0316	0.0704	0.0819	0.2502	1997
0.0362	0.1084	0.0697	0.2859	1998
0.0314	0.0972	0.0631	0.2925	1999
0.0346	0.0972	0.0537	0.3461	2000
0.0484	0.0858	0.0490	0.3626	2001
0.0446	0.0764	0.0385	0.3547	2002
0.0487	0.0686	0.0501	0.4475	2003
0.0467	0.0637	0.0451	0.4459	2004
0.0629	0.0630	0.1404	0.4242	2005
0.0541	0.0774	0.1317	0.3958	2006
0.0547	0.0824	0.1631	0.3550	2007
0.0511	0.0823	0.1645	0.3321	2008

.(1)

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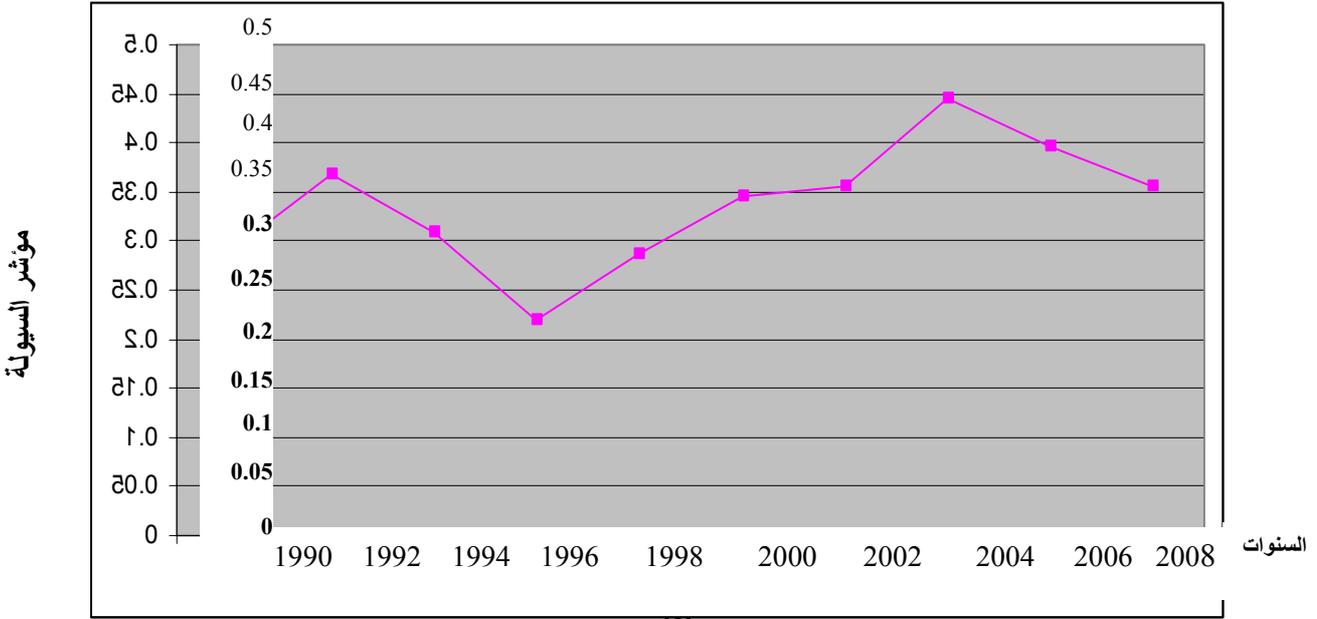


(70.871)	(0.5266)	(1991)	(0.2895)	(1990)
(0.2502)	(618.656)	(1991)	(135.195)	(1990)
(0.3321)	(0.3550)	(0.3958)	(0.4242)	(256.751)
(0.3321)	(0.3550)	(0.3958)	(0.4242)	(256.751)

(2008 - 1990)

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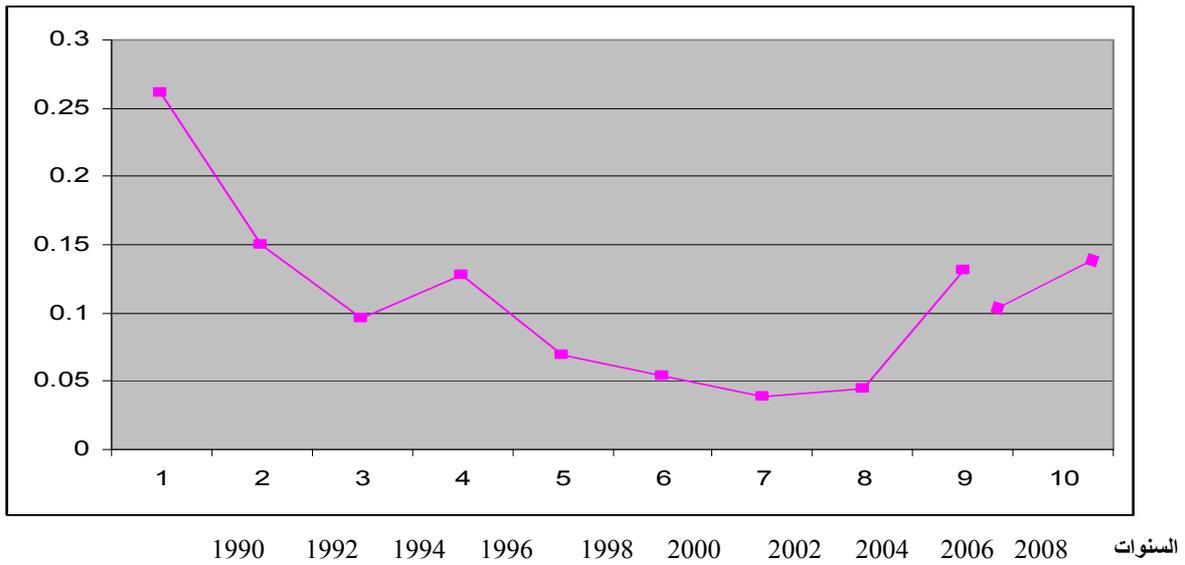
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(0.2619) (1990)
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 (2006) (33.860) (23.453)
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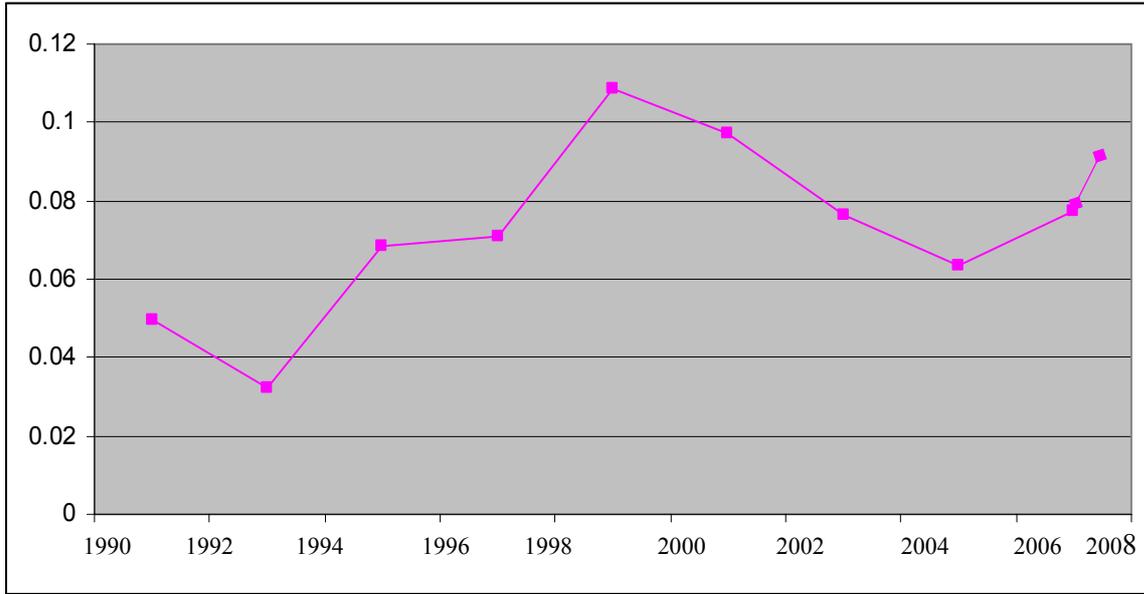


(0.0505)	(1991)			
1992	(0.0324)		(0.0496)	(1990)
(1993)			(1998)	(1993)
			(0.0740)	
(1998)			(1998)	(0.1084)
	(45.786)		(1997)	(91.520)
(2005)	(0.0630)			(1998)
				2006
			(2007)	(0.0824)
	(207.583)	(2007)		(0.0774)
			(124.583)	(2005)
				(0.0823)
				(2008)

(3)

(2008 - 1990)

مؤشر ملاحة رأس المال



السنوات

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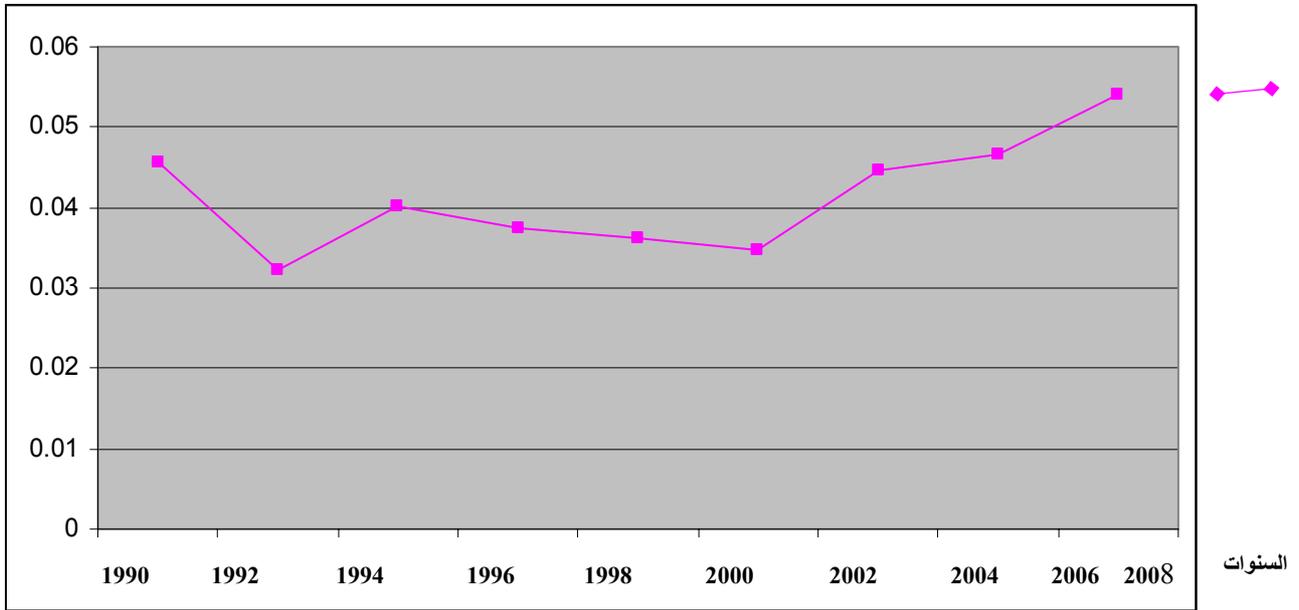
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(1990) (13)
 (1992 1991) (0.0322) (0.0355) (0.0455)
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 (148.878) (1995) (1992)
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مؤشر توظيف الأموال



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سادساً- نشأة سوق الأوراق المالية في الأردن وتطوره

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(100 = 1994)	(%)	()	()	()	
55.98	20.0	105	276.638	1360.292	1990
69.64	17.2	101	293.630	1707.697	1991
90.46	39.14	103	895.165	2287.339	1992
110.31	28.15	101	954.123	3388.974	1993
100.00	13.53	95	437.449	3232.998	1994
111.52	10.94	97	366.553	3349.437	1995
109.28	7.71	97	248.930	3230.502	1996
116.73	9.20	139	355.798	3868.410	1997
119.50	11.17	150	464.126	4156.626	1998
116.84	9.42	152	389.482	4136.831	1999
94.35	8.21	163	287.790	3504.700	2000
117.93	14.80	161	662.206	4476.739	2001
111.95	18.83	158	946.281	5024.704	2002
181.03	23.78	161	1848.462	7772.753	2003
272.88	28.98	192	3776.964	13033.831	2004
554.50	63.24	201	16878.681	26685.916	2005
366.70	72.70	227	15319.000	21078.200	2006
522.60	43.3	245	12348.100	29225.600	2007
406.90	8.8	262	2237.000	25406.300	2008

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(2008 - 1990)



سابعاً- توصيف المتغيرات الأساسية وبناء النموذج القياسي

(Granger test)

$$\left(\begin{array}{c} \dots \\ \dots \\ \dots \end{array} \right) \quad (26)$$

$$Y_t = \sum_{i=1}^n a_i X_{t-i} + \sum_{j=1}^n B_j Y_{t-j} + u_{1t} \dots \dots \dots (1)$$

$$X_t = \sum_{i=1}^m \lambda_i X_{t-i} + \sum_{j=1}^m \delta_j Y_{t-j} + u_{2t} \dots \dots \dots (2)$$

(u_{2t}) (u_{1t})

unidirectional causality from x to y : y x -1

$$(1) \quad x$$

$$(2) \quad y : (\sum a_i \neq 0) .$$

$$(\sum \delta_j = 0)$$

unidirectional causality from y to x : x y -2

$$x \quad x \quad y \quad (1) \quad (\sum a_i = 0)$$

$$(\sum \delta_j \neq 0) \quad (2) \quad y$$

Feedback or bilateral causality :

$$y \quad x \quad -2$$

$$(\sum \delta_j \neq 0) \quad (\sum a_i \neq 0)$$

Independence -4

$$y \quad x$$

$$(\sum \delta_j = 0) \quad (\sum a_i = 0)$$

:

$$\begin{array}{ll} = Y_{1t} & = X_{1t} \\ = Y_{2t} & = X_{2t} \\ = Y_{3t} & = X_{3t} \\ = Y_{4t} & = X_{4t} \end{array}$$



$$(\sum \delta_j = 0). (\sum a_i \neq 0)$$

$$\begin{array}{rcl}
 & & - \\
 = & Y_{1t} & X_{1t} \\
 = & & X_{2t} \\
 = & & X_{3t} \\
 = & & X_{4t} \\
 & & - \\
 & Y_{2t} & X_{1t} \\
 = & & X_{2t} \\
 = & & X_{3t} \\
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 \end{array}$$

&

: (Granger test)

$$\begin{array}{rcl}
 = Y_{2t} & & = Y_{1t} \\
 = Y_{4t} & & = Y_{3t}
 \end{array}$$



:

$$= X_{2t}$$

$$= X_{1t}$$

$$= X_{4t}$$

$$= X_{3t}$$

التحليل الكمي

:

$$(Y_{1t})$$

:

$$(X_1)$$

:

$$Y_{1t} = 38109 + 25378 X_2 + 121884 X_3 + 824150 X_4$$

(t) (- 3.92) (1.46) (1.90)* (5-58)**

$$R^2 = 70.7\% , R^{-2} = 64.8\% , D.W = 1.27 , F^{**} = 12.05$$

.(t)
%1

%1

Y₁

%5

%70

(R²)

.(F)

DW

:

$$Y_{2t} = - 18454 + 7633 X_2 + 15245 X_3 + 458942 X_4$$

(t) (-2.93) (1.49) (1.27) (4.80)**

$$R^2 = 62.3\% , R^{-2} = 59.8\% , DW = 1.22 , F^{**} = 8.26$$

%1

(t)

%1

.(R²)

.(D.W)

%62

(F)

:

:



$$Y_{3t} = 35.6 + 1386 X_4$$

$$(t) \quad (-2.16) \quad (3.67)^{**}$$

$$R^2 = 44.2\% , R^{-2} = 40.9\% , DW = 1.25 , F^{**} = 13.44$$

$$(F) \quad \%1 \quad \%44 \quad (R^2)$$

$$. (D.W)$$

%1

$$(F) \quad \%1 \quad \%70 \quad (R^2)$$

. (Dw)

$$Y_{4t} = -540 + 273 X_2 + 1450 X_3 + 13936 X_4$$

$$(t) \quad (-3.3) \quad (0.68) \quad (0.99) \quad (5.61)^{**}$$

$$R^2 = 69.8\% , R^{-2} = 63.7\% , DW = 1.30 , F^{**} = 11.55$$



الاستنتاجات والتوصيات

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	. 3	2006
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	. 215-214	2006
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	.16	2002
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	.7	2004
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		-25
	. 68-66	2009
26- Damodar N. Gujarati, Basic Econometrics, 3 rd ed, McGraw Hill, Inc, Singapore, 1995 , pp.620-623 .		
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148.878	6.769	70.871	190.382	12.149	244.831	47.200	3.182	1990
209.770	7.443	135.195	296.977	12.966	256.751	47.200	3.208	1991
260.919	8.401	160.608	369.555	14.122	435.348	47.200	2.120	1992
306.639	12.352	181.476	420.594	39.109	528.257	55.000	2.612	1993
356.105	14.271	175.570	462.154	39.116	570.007	54.586	3.750	1994
418.154	14.926	166.824	508.483	41.979	621.914	54.586	3.806	1995
442.085	16.512	135.335	502.302	43.783	618.656	54.586	5.610	1996
461.871	14.574	162.758	513.442	45.786	650.616	58.233	3.750	1997
567.372	20.514	241.279	582.109	91.520	844.057	62.000	6.379	1998
635.933	19.970	284.575	661.618	94.613	973.052	62.000	5.968	1999
629.588	21.799	354.859	763.155	99.706	1025.322	78.500	5.350	2000
694.410	33.634	418.765	897.205	99.138	1154.946	78.500	4.857	2001
792.342	35.321	476.907	999.953	102.685	1344.441	80.000	3.956	2002
810.760	39.440	691.190	1192.594	105.917	1544.729	80.000	5.302	2003
902.705	42.128	759.536	1352.223	108.578	1703.574	80.000	4.895	2004
1026.394	64.574	837.004	1520.356	124.230	1973.263	80.000	17.438	2005
1371.114	74.122	910.550	1778.549	178.078	2300.325	104.139	23.453	2006
1717.057	93.884	894.687	2289.170	207.583	2519.987	105.000	33.860	2007
2015.697	103.001	1021.691	2548.068	253.209	3076.612	154.250	41.648	2008

. (2) (1)

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(2 _____)

(Granger test)

$$\begin{array}{l}
 (X_{1t}) \quad (Y_{1t}) \quad : \\
 Y_{1t} = -19488 + 30068 X_{1t-1} + 28395 X_{1t-2} - 12630 X_{1t-3} + 13811 X_{1t-4} \\
 + 0.352 Y_{1t-1} + 0.509 Y_{1t-2} - 0.93 Y_{1t-3} - 1.98 Y_{1t-4} \\
 X_{1t} = 0.011 + 0.905 X_{1t-1} - 0.180 X_{1t-2} + 0.126 X_{1t-3} - 0.099 X_{1t-4} - 0.000000 Y_{1t-1} - \\
 0.000003 Y_{1t-2} - 0.000019 Y_{1t-3} + 0.000047 Y_{1t-4}
 \end{array}$$

$$\begin{array}{l}
 (X_{2t}) \quad (Y_{1t}) \quad : \\
 Y_{1t} = 9638 - 91618 X_{2t-1} + 12902 X_{2t-2} - 10703 X_{2t-3} - 11281 X_{2t-4} \\
 + 0.850 Y_{1t-1} + 0.706 Y_{1t-2} + 0.06 Y_{1t-3} - 0.82 Y_{1t-4} \\
 X_{2t} = -0.006 + 0.137 X_{2t-1} + 0.556 X_{2t-2} - 0.449 X_{2t-3} + 0.402 X_{2t-4} \\
 + 0.000005 Y_{1t-1} - 0.000001 Y_{2t-2} - 0.000002 Y_{1t-3} + 0.000004 Y_{1t-4}
 \end{array}$$

$$\begin{array}{l}
 (X_{3t}) \quad (Y_{1t}) \quad : \\
 Y_{1t} = 6867 - 125826 X_{3t-1} - 37767 X_{3t-2} + 5833 X_{3t-3} + 42033 X_{3t-4} \\
 + 0.497 Y_{1t-1} + 0.650 Y_{1t-2} - 1.24 Y_{1t-3} + 2.57 Y_{1t-4} \\
 X_{3t} = 0.0450 + 0.539 X_{3t-1} + 0.166 X_{3t-2} - 0.238 X_{3t-3} - 0.337 X_{3t-4} \\
 + 0.000001 Y_{1t-1} - 0.000000 Y_{1t-2} + 0.000005 Y_{1t-3} + 0.000012 Y_{1t-4}
 \end{array}$$

$$\begin{array}{l}
 (X_{4t}) \quad (Y_{1t}) \quad : \\
 Y_{1t} = -43891 + 12497 X_{4t-1} + 410726 X_{4t-2} + 351578 X_{4t-3} \\
 + 422032 X_{4t-4} + 0.283 Y_{1t-1} + 0.097 Y_{1t-2} - 1.63 Y_{1t-3} + 2.91 Y_{1t-4} \\
 X_{4t} = -0.0071 + 0.296 X_{4t-1} + 0.488 X_{4t-2} + 0.065 X_{4t-3} + 0.237 X_{4t-4} - 0.000000 Y_{1t-1} - \\
 0.000001 Y_{1t-2} - 0.000002 Y_{1t-3} + 0.000004 Y_{1t-4}
 \end{array}$$

$$\begin{array}{l}
 (X_{1t}) \quad (Y_{2t}) \quad : \\
 Y_{2t} = -15710 + 22578 X_{1t-1} + 43761 X_{1t-2} - 22260 X_{1t-3} + 5183 X_{1t-4} \\
 + 0.547 Y_{2t-1} - 0.268 Y_{1t-2} - 1.34 Y_{1t-3} + 5.23 Y_{2t-4} \\
 X_{1t} = 0.17 + 0.788 X_{1t-1} + 0.215 X_{1t-2} - 0.120 X_{1t-3} - 0.257 X_{1t-4} - 0.000000 Y_{2t-1} \\
 + 0.000002 Y_{2t-2} + 0.000005 Y_{2t-3} - 0.000032 Y_{2t-4}
 \end{array}$$

$$\begin{array}{l}
 (X_{2t}) \quad (Y_{2t}) \quad : \\
 Y_{2t} = 5620 - 104166 X_{2t-1} - 28224 X_{2t-2} + 589 X_{2t-3} + 12309 X_{2t-4} \\
 + 1.29 Y_{2t-1} - 0.397 Y_{2t-2} - 1.72 Y_{2t-3} + 9.51 Y_{2t-4} \\
 X_{2t} = 0.017 - 0.531 X_{2t-1} + 0.088 X_{2t-2} - 0.000014 X_{2t-3} + 0.464 X_{2t-4} \\
 + 0.000007 Y_{2t-1} - 0.000005 Y_{2t-2} - 0.000014 Y_{2t-3} + 0.000012 Y_{2t-4}
 \end{array}$$



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$$\begin{aligned}
 & \text{(X}_{3t}\text{)} \qquad \qquad \qquad \text{(Y}_{2t}\text{)} \qquad \qquad \qquad : \\
 & Y_{2t} = 6024 - 104488 X_{3t-1} - 14303 X_{3t-2} + 21517 X_{3t-3} + 48779 X_{3t-4} \\
 & \quad + 0.840 Y_{2t-1} + 0.068 Y_{2t-2} - 0.40 Y_{2t-3} - 0.83 Y_{2t-4} \\
 & X_{3t} = 0.0301 + 0.642 X_{3t-1} + 0.177 X_{3t-2} + 0.149 X_{3t-3} - 0.100 X_{3t-4} \\
 & \quad + 0.000001 Y_{2t-1} - 0.000001 Y_{2t-2} - 0.000001 Y_{2t-3} + 0.000006 Y_{2t-4} \\
 \\
 & \text{(X}_{4t}\text{)} \qquad \qquad \qquad \text{(Y}_{2t}\text{)} \qquad \qquad \qquad : \\
 & Y_{2t} = 34061 + 26482 X_{4t-1} + 356839 X_{4t-2} + 172479 X_{4t-3} + 419542 X_{4t-4} \\
 & \quad + 0.510 Y_{2t-1} - 0.592 Y_{2t-2} - 0.481 Y_{2t-3} - 1.04 Y_{2t-4} \\
 & X_{4t} = 0.0145 + 0.469 X_{4t-1} + 0.571 X_{4t-2} + 0.191 X_{4t-3} + 0.302 X_{4t-4} \\
 & \quad + 0.000000 Y_{2t-1} - 0.000000 Y_{2t-2} + 0.000001 Y_{2t-3} + 0.000007 Y_{2t-4} \\
 \\
 & \text{(X}_{1t}\text{)} \qquad \qquad \qquad \text{(Y}_{3t}\text{)} \qquad \qquad \qquad : \\
 & Y_{3t} = - 43.7 + 23.1 X_{1t-1} + 178 X_{1t-2} - 30.5 X_{1t-3} + 25.4 X_{1t-4} \\
 & \quad + 0.876 Y_{3t-1} - 0.854 Y_{3t-2} - 0.019 Y_{3t-3} - 0.023 Y_{3t-4} \\
 \\
 & X_{1t} = 0.181 + 0.563 X_{1t-1} + 0.316 X_{1t-2} - 0.127 X_{1t-3} - 0.157 X_{1t-4} \\
 & \quad + 0.00008 Y_{3t-1} + 0.00033 Y_{3t-2} - 0.00020 Y_{3t-3} - 0.00025 Y_{3t-4} \\
 \\
 & \text{(X}_{2t}\text{)} \qquad \qquad \qquad \text{(Y}_{3t}\text{)} \qquad \qquad \qquad : \\
 & Y_{3t} = 22.2 - 228 X_{2t-1} - 122 X_{2t-2} + 72 X_{2t-3} - 51.4 X_{2t-4} - 0.998 Y_{3t-1} \\
 & \quad + 0.513 Y_{3t-2} + 1.55 Y_{3t-3} + 0.274 Y_{3t-4} \\
 & X_{2t} = 0.0116 - 0.293 X_{2t-1} + 0.263 X_{2t-2} - 0.016 X_{2t-3} + 0.039 X_{2t-4} \\
 & \quad + 0.00153 Y_{3t-1} - 0.00079 Y_{3t-2} + 0.00168 Y_{3t-3} - 0.00020 Y_{3t-4} \\
 \\
 & \text{(X}_{3t}\text{)} \qquad \qquad \qquad \text{(Y}_{3t}\text{)} \qquad \qquad \qquad : \\
 & Y_{3t} = 49 + 407 X_{3t-1} - 178 X_{3t-2} + 146 X_{3t-3} + 50 X_{3t-4} \\
 & \quad + 1.23 Y_{3t-1} - 0.948 Y_{3t-2} + 0.506 Y_{3t-3} - 0.717 Y_{3t-4} \\
 & X_{3t} = 0.0519 + 0.533 X_{3t-1} + 0.228 X_{3t-2} - 0.186 X_{3t-3} - 0.214 X_{3t-4} \\
 & \quad + 0.000259 Y_{3t-1} - 0.000174 Y_{3t-2} - 0.000164 Y_{3t-3} - 0.000095 Y_{3t-4} \\
 \\
 & \text{(X}_{4t}\text{)} \qquad \qquad \qquad \text{(Y}_{3t}\text{)} \qquad \qquad \qquad : \\
 & Y_{3t} = - 82.1 + 627 X_{4t-1} + 608 X_{4t-2} - 33 X_{4t-3} + 1637 X_{4t-4} \\
 & \quad + 0.822 Y_{3t-1} - 1.34 Y_{3t-2} + 0.435 Y_{3t-3} - 0.401 Y_{3t-4} \\
 & X_{4t} = - 0.0061 + 0.437 X_{4t-1} + 0.494 X_{4t-2} + 0.152 X_{4t-3} \\
 & \quad + 0.317 X_{4t-4} - 0.000035 Y_{3t-1} - 0.000086 Y_{3t-2} - 0.000033 Y_{3t-3} + 0.000025 Y_{3t-4}
 \end{aligned}$$



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(X_{1t}) (Y_{4t}) :

$$\begin{aligned}
 Y_{4t} &= -599 + 884 X_{1t-1} - 74 X_{1t-2} + 151 X_{1t-3} + 533 X_{1t-4} \\
 &+ 0.465 Y_{4t-1} + 0.235 Y_{4t-2} - 1.59 Y_{4t-3} + 3.53 Y_{4t-4} \\
 X_{1t} &= -0.048 + 1.06 X_{1t-1} - 0.406 X_{1t-2} + 0.228 X_{1t-3} - 0.067 X_{1t-4} \\
 &+ 0.000105 Y_{4t-1} - 0.000174 Y_{4t-2} - 0.000810 Y_{4t-3} + 0.00023 Y_{4t-4}
 \end{aligned}$$

(X_{2t}) (Y_{4t}) :

$$\begin{aligned}
 Y_{4t} &= 50 - 1856 X_{2t-1} + 309 X_{2t-2} - 349 X_{2t-3} + 191 X_{2t-4} + 0.857 Y_{4t-1} \\
 &+ 0.616 Y_{4t-2} - 0.58 Y_{4t-3} + 1.05 Y_{4t-4} \\
 X_{2t} &= -0.121 + 0.153 X_{2t-1} + 0.615 X_{2t-2} - 0.487 X_{2t-3} - 0.641 X_{2t-4} \\
 &+ 0.000356 Y_{4t-1} - 0.000095 Y_{4t-2} - 0.000515 Y_{4t-3} + 0.000128 Y_{4t-4}
 \end{aligned}$$

(X_{3t}) (Y_{4t}) :

$$\begin{aligned}
 Y_{4t} &= 141 - 3019 X_{3t-1} - 1050 X_{3t-2} - 264 X_{3t-3} = 816 X_{3t-4} 0.511 Y_{4t-1} \\
 &+ 0.461 Y_{4t-2} - 1.38 Y_{4t-3} + 3.22 Y_{4t-4} \\
 X_{3t} &= 0.0341 + 0.583 X_{3t-1} + 0.151 X_{3t-2} - 0.137 X_{3t-3} - 0.157 X_{3t-4} \\
 &+ 0.000023 Y_{4t-1} - 0.000001 Y_{4t-2} - 0.000064 Y_{4t-3} + 0.000121 Y_{4t-4}
 \end{aligned}$$

(X_{4t}) (Y_{4t}) :

$$\begin{aligned}
 Y_{4t} &= -918 + 438 X_{4t-1} + 8824 X_{4t-2} + 7688 X_{4t-3} + 9041 X_{4t-4} \\
 &+ 0.205 Y_{4t-1} - 0.059 Y_{4t-2} - 1.44 Y_{4t-3} + 2.30 Y_{4t-4} \\
 X_{4t} &= -0.014 + 0.41 X_{4t-1} + 0.47 X_{4t-2} + 0.098 X_{4t-3} + 0.269 X_{4t-4} \\
 &+ 0.000015 Y_{4t-1} - 0.000024 Y_{4t-2} - 0.000084 Y_{4t-3} + 0.000168 Y_{4t-4}
 \end{aligned}$$