

MÔ HÌNH KINH TẾ LƯỢNG ĐỘNG (EViews)**MÔ HÌNH KOYCK**

$$PPCE_t = \alpha + \beta_0 PPDI_t + \beta_1 PPDI_{t-1} + \beta_2 PPDI_{t-2} + \dots + u_t. \quad (1)$$

$$PPCE_t = \alpha(1 - \lambda) + \beta_0 PPDI_t + \lambda PPCE_{t-1} + v_t. \quad (2)$$

$$PPCE_t = \gamma_0 + \gamma_1 PPDI_t + \gamma_2 PPCE_{t-1} + v_t. \quad (3)$$

Hồi quy mô hình (1)

Dependent Variable: PPCE
Method: Least Squares
Date: 05/15/13 Time: 10:32
Sample (adjusted): 4 31
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2101.117	367.2620	-5.721029	0.0000
PPDI	1.121320	0.192341	5.829864	0.0000
PPDI(-1)	0.046253	0.284502	0.162576	0.8722
PPDI(-2)	-0.164407	0.194257	-0.846341	0.4057
R-squared	0.990698	Mean dependent var	16224.00	
Adjusted R-squared	0.989535	S.D. dependent var	2830.879	
S.E. of regression	289.5890	Akaike info criterion	14.30637	
Sum squared resid	2012683.	Schwarz criterion	14.49668	
Log likelihood	-196.2891	Hannan-Quinn criter.	14.36455	
F-statistic	852.0448	Durbin-Watson stat	0.658779	
Prob(F-statistic)	0.000000			

PPDI(-2) sai dấu kỳ vọng và không có ý nghĩa thống kê ở mức 5%

Dependent Variable: PPCE
Method: Least Squares
Date: 05/15/13 Time: 10:36
Sample (adjusted): 3 31
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1949.865	343.7191	-5.672845	0.0000
PPDI	1.142786	0.190810	5.989137	0.0000
PPDI(-1)	-0.144730	0.192419	-0.752161	0.4587
R-squared	0.990875	Mean dependent var	16063.90	
Adjusted R-squared	0.990173	S.D. dependent var	2910.503	
S.E. of regression	288.5250	Akaike info criterion	14.26514	
Sum squared resid	2164414.	Schwarz criterion	14.40658	

Log likelihood	-203.8445	Hannan-Quinn criter.	14.30944
F-statistic	1411.614	Durbin-Watson stat	0.659906
Prob(F-statistic)	0.000000		

PPDI(-1) sai dấu kỳ vọng và không có ý nghĩa thống kê ở mức 5%
Có thể có vấn đề tương quan chuỗi

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	19.17070	Prob. F(1,25)	0.0002
Obs*R-squared	12.58641	Prob. Chi-Square(1)	0.0004

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 05/15/13 Time: 10:46

Sample: 3 31

Included observations: 29

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-134.0259	265.4786	-0.504847	0.6181
PPDI	-0.189375	0.152649	-1.240596	0.2263
PPDI(-1)	0.201766	0.154653	1.304638	0.2039
RESID(-1)	0.774862	0.176972	4.378436	0.0002
R-squared	0.434014	Mean dependent var	-2.09E-12	
Adjusted R-squared	0.366096	S.D. dependent var	278.0297	
S.E. of regression	221.3620	Akaike info criterion	13.76492	
Sum squared resid	1225028.	Schwarz criterion	13.95351	
Log likelihood	-195.5913	Hannan-Quinn criter.	13.82398	
F-statistic	6.390234	Durbin-Watson stat	2.006901	
Prob(F-statistic)	0.002302			

▪ Xử lý vấn đề tương quan chuỗi trong mô hình (1)

Dependent Variable: PPCE

Method: Least Squares

Date: 05/15/13 Time: 10:42

Sample (adjusted): 4 31

Included observations: 28 after adjustments

Convergence achieved after 7 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3382.856	1503.524	-2.249952	0.0339
PPDI	0.938239	0.114827	8.170927	0.0000
PPDI(-1)	0.140710	0.122639	1.147350	0.2625
AR(1)	0.784428	0.133366	5.881771	0.0000
R-squared	0.995353	Mean dependent var	16224.00	

Adjusted R-squared	0.994773	S.D. dependent var	2830.879
S.E. of regression	204.6745	Akaike info criterion	13.61228
Sum squared resid	1005400.	Schwarz criterion	13.80260
Log likelihood	-186.5720	Hannan-Quinn criter.	13.67046
F-statistic	1713.701	Durbin-Watson stat	2.246103
Prob(F-statistic)	0.000000		

Inverted AR Roots .78

▪ Kiểm tra tương quan chuỗi

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.932234	Prob. F(1,23)	0.1778
Obs*R-squared	2.169984	Prob. Chi-Square(1)	0.1407

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 05/15/13 Time: 10:44

Sample: 4 31

Included observations: 28

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-875.9346	1604.100	-0.546060	0.5903
PPDI	0.074892	0.124879	0.599713	0.5546
PPDI(-1)	-0.033862	0.122766	-0.275827	0.7851
AR(1)	0.136773	0.163716	0.835428	0.4121
RESID(-1)	-0.390412	0.280863	-1.390048	0.1778

R-squared	0.077499	Mean dependent var	1.37E-11
Adjusted R-squared	-0.082935	S.D. dependent var	192.9690
S.E. of regression	200.8116	Akaike info criterion	13.60304
Sum squared resid	927481.7	Schwarz criterion	13.84094
Log likelihood	-185.4426	Hannan-Quinn criter.	13.67577
F-statistic	0.483058	Durbin-Watson stat	1.981964
Prob(F-statistic)	0.747935		

Không có cơ sở để bác bỏ giả thuyết H_0 không có tương quan chuỗi

Hồi quy mô hình KOYCK (mô hình 3)

ls ppce c ppdi ppce(-1)

Dependent Variable: PPCE

Method: Least Squares

Date: 05/18/11 Time: 11:55

Sample (adjusted): 3 31

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1242.169	402.5785	-3.085533	0.0048

PPDI	0.603376	0.150261	4.015516	0.0004
PPCE(-1)	0.410687	0.154618	2.656138	0.0133
R-squared	0.992666	Mean dependent var	16063.90	
Adjusted R-squared	0.992102	S.D. dependent var	2910.503	
S.E. of regression	258.6577	Akaike info criterion	14.04659	
Sum squared resid	1739499.	Schwarz criterion	14.18803	
Log likelihood	-200.6755	Hannan-Quinn criter.	14.09088	
F-statistic	1759.610	Durbin-Watson stat	1.005665	
Prob(F-statistic)	0.000000			

$$\gamma_2^{\wedge} = 0.41 \rightarrow \lambda = 0.41$$

$$\alpha = \gamma_0 / (1 - \lambda) = -1242.17 / 0.59 = -2105.37$$

$$\beta_0 = \gamma_1^{\wedge} = 0.6$$

$$\beta_1 = \beta_0 \lambda^1 = 0.6 * 0.41 = 0.246$$

$$\beta_2 = \beta_0 \lambda^2 = 0.6 * 0.41^2 = 0.1$$

$$\beta_3 = \beta_0 \lambda^3 = 0.6 * 0.41^3 = 0.04$$

Xử lý các vấn đề ước lượng

▪ Vấn đề tương quan giữa PPCE(-1) và v_t trong mô hình (2)

Covariance Analysis: Ordinary

Date: 05/15/13 Time: 10:25

Sample (adjusted): 3 31

Included observations: 29 after adjustments

Balanced sample (listwise missing value deletion)

Covariance		
t-Statistic		
Probability	PPCEL1	RESID
PPCEL1	7652982.	

RESID	7.76E-09	59982.74
	5.95E-14	-----
	1.0000	-----

Không đủ cơ sở để bác bỏ H_0 (đồng phương sai bằng 0)

▪ Vấn đề tương quan chuỗi của v_t trong mô hình (2)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	7.385240	Prob. F(1,25)	0.0118
Obs*R-squared	6.613258	Prob. Chi-Square(1)	0.0101

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 05/15/13 Time: 10:21

Sample: 3 31

Included observations: 29

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-331.6255	380.7969	-0.870872	0.3921
PPDI	0.143939	0.144679	0.994882	0.3293
PPCEL1	-0.143233	0.148226	-0.966312	0.3431
RESID(-1)	0.564463	0.207708	2.717580	0.0118
R-squared	0.228043	Mean dependent var		1.18E-12
Adjusted R-squared	0.135409	S.D. dependent var		249.2488
S.E. of regression	231.7601	Akaike info criterion		13.85672
Sum squared resid	1342818.	Schwarz criterion		14.04532
Log likelihood	-196.9225	Hannan-Quinn criter.		13.91579
F-statistic	2.461747	Durbin-Watson stat		1.833716
Prob(F-statistic)	0.085983			

Có đủ cơ sở bác bỏ H_0 với mức ý nghĩa 5% → có tương quan chuỗi**Xử lý vấn đề tương quan chuỗi trong mô hình (2)**

Dependent Variable: PPCE

Method: Least Squares

Date: 05/15/13 Time: 10:20

Sample (adjusted): 4 31

Included observations: 28 after adjustments

Convergence achieved after 8 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2778.505	1099.846	-2.526268	0.0185
PPDI	0.988354	0.133168	7.421849	0.0000
PPCEL1	0.064994	0.126737	0.512826	0.6128
AR(1)	0.727605	0.149636	4.862510	0.0001
R-squared	0.995150	Mean dependent var		16224.00
Adjusted R-squared	0.994544	S.D. dependent var		2830.879
S.E. of regression	209.1018	Akaike info criterion		13.65508
Sum squared resid	1049366.	Schwarz criterion		13.84540
Log likelihood	-187.1712	Hannan-Quinn criter.		13.71326
F-statistic	1641.565	Durbin-Watson stat		2.277560
Prob(F-statistic)	0.000000			
Inverted AR Roots	.73			

$$\hat{\gamma}_2 = 0.065 \rightarrow \lambda = 0.065$$

$$\alpha = \gamma_0 / (1 - \lambda) = -2778.5 / (1 - 0.06) = -2955.85$$

$$\beta_0 = \gamma^1 = \mathbf{0.988}$$

$$\beta_1 = \beta_0 \lambda^1 = 0.988 * 0.065 = \mathbf{0.06}$$

MÔ HÌNH KỲ VỌNG ĐIỀU CHỈNH

$$PCON_t = \beta_0 + \beta_1 GDP^* + v_t$$

Ls pcon c gdp(-1) pcon(-1)

Dependent Variable: PCON

Method: Least Squares

Date: 05/15/13 Time: 12:34

Sample (adjusted): 1968 1993

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1338.881	3032.737	0.441476	0.6630
GDP(-1)	0.379689	0.156899	2.419960	0.0238
PCON(-1)	0.553707	0.197090	2.809412	0.0100
R-squared	0.987118	Mean dependent var		121921.3
Adjusted R-squared	0.985998	S.D. dependent var		41385.10
S.E. of regression	4897.062	Akaike info criterion		19.93883
Sum squared resid	5.52E+08	Schwarz criterion		20.08399
Log likelihood	-256.2047	Hannan-Quinn criter.		19.98063
F-statistic	881.2438	Durbin-Watson stat		1.662857
Prob(F-statistic)	0.000000			

Kiểm tra vấn đề tương quan PCON(-1) và vt

Covariance Analysis: Ordinary

Date: 05/15/13 Time: 12:35

Sample (adjusted): 1968 1993

Included observations: 26 after adjustments

Balanced sample (listwise missing value deletion)

Covariance			
t-Statistic			
Probability			
	PCONL1	RESID	
PCONL1	1.54E+09		

RESID	3.04E-06	21214150	
	8.25E-14	-----	
	1.0000	-----	

Không có tương quan PCON(-1) và vt

Kiểm tra tương quan chuỗi

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.730639	Prob. F(1,22)	0.4019
Obs*R-squared	0.835727	Prob. Chi-Square(1)	0.3606

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 05/15/13 Time: 12:36

Sample: 1968 1993

Included observations: 26

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.89797	3050.854	0.009800	0.9923
GDP(-1)	0.091518	0.190716	0.479868	0.6361
PCON(-1)	-0.115728	0.240074	-0.482054	0.6345
RESID(-1)	0.219035	0.256249	0.854774	0.4019
R-squared	0.032143	Mean dependent var	6.24E-12	
Adjusted R-squared	-0.099837	S.D. dependent var	4697.097	
S.E. of regression	4925.992	Akaike info criterion	19.98308	
Sum squared resid	5.34E+08	Schwarz criterion	20.17663	
Log likelihood	-255.7800	Hannan-Quinn criter.	20.03881	
F-statistic	0.243546	Durbin-Watson stat	2.031332	
Prob(F-statistic)	0.865000			

Không có tương quan chuỗi

Kết quả:

1338.881

0.379689

0.553707

$$\gamma = 1 - 0.55 = 0.45$$

$$\beta^{\wedge}_0 = 1338.9 / 0.55 = 2434.36$$

$$\beta^{\wedge}_1 = 0.38 / 0.55 = 0.69$$

- Mô hình kỳ vọng hợp lý (Rational Expectation)**

Dependent Variable: PCON

Method: Least Squares

Date: 05/15/13 Time: 11:59

Sample (adjusted): 1968 1993

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1038.403	2501.455	0.415119	0.6819
GDP	0.404360	0.091942	4.397968	0.0002
PCON(-1)	0.500920	0.121307	4.129345	0.0004
R-squared	0.991221	Mean dependent var		121921.3
Adjusted R-squared	0.990458	S.D. dependent var		41385.10
S.E. of regression	4042.676	Akaike info criterion		19.55537
Sum squared resid	3.76E+08	Schwarz criterion		19.70053
Log likelihood	-251.2198	Hannan-Quinn criter.		19.59717
F-statistic	1298.466	Durbin-Watson stat		1.416214
Prob(F-statistic)	0.000000			

Kiểm tra vấn đề tương quan PCON(-1) và vt

Covariance Analysis: Ordinary

Date: 05/15/13 Time: 12:00

Sample (adjusted): 1968 1993

Included observations: 26 after adjustments

Balanced sample (listwise missing value deletion)

Covariance			
t-Statistic			
Probability		PCONL1	RESID
PCONL1		1.54E+09	

RESID		1.62E-06	14457470
		5.31E-14	-----
		1.0000	-----

Kiểm tra tương quan chuỗi

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.560495	Prob. F(1,22)	0.0724
Obs*R-squared	3.621717	Prob. Chi-Square(1)	0.0570

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 05/15/13 Time: 12:22

Sample: 1968 1993

Included observations: 26

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	129.1905	2373.847	0.054422	0.9571

GDP	0.147705	0.117192	1.260364	0.2207
PCONL1	-0.196615	0.155237	-1.266542	0.2186
RESID(-1)	0.503661	0.266921	1.886927	0.0724
R-squared	0.139297	Mean dependent var	-8.03E-12	
Adjusted R-squared	0.021928	S.D. dependent var	3877.598	
S.E. of regression	3834.848	Akaike info criterion	19.48229	
Sum squared resid	3.24E+08	Schwarz criterion	19.67584	
Log likelihood	-249.2697	Hannan-Quinn criter.	19.53802	
F-statistic	1.186832	Durbin-Watson stat	2.133072	
Prob(F-statistic)	0.337638			

Không có tương quan chuỗi

Kết quả:

$$\gamma = 1 - 0.5 = 0.5$$

$$\beta^{\wedge}_0 = 1038.4/0.5 = 2076.8$$

$$\beta^{\wedge}_1 = 0.4/0.5 = 0.8$$

MPC ngắn hạn =0.4 ; MPC dài hạn = 0.8

MÔ HÌNH ĐIỀU CHỈNH RIÊNG PHẦN

$$PCON^*_t = \beta_0 + \beta_1 GDP + v_t$$

ls pcon c gdp pcon(-1)

Dependent Variable: PCON

Method: Least Squares

Date: 05/18/11 Time: 10:21

Sample (adjusted): 1968 1993

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1038.403	2501.455	0.415119	0.6819
GDP	0.404360	0.091942	4.397968	0.0002
PCON(-1)	0.500920	0.121307	4.129345	0.0004
R-squared	0.991221	Mean dependent var	121921.3	
Adjusted R-squared	0.990458	S.D. dependent var	41385.10	
S.E. of regression	4042.676	Akaike info criterion	19.55537	
Sum squared resid	3.76E+08	Schwarz criterion	19.70053	
Log likelihood	-251.2198	Hannan-Quinn criter.	19.59717	
F-statistic	1298.466	Durbin-Watson stat	1.416214	
Prob(F-statistic)	0.000000			

Không có tương quan giữa PCON(-1) và vt

Không có tương quan chuỗi

MÔ HÌNH ALMON

Dependent Variable: INVEN

Method: Least Squares

Date: 05/15/13 Time: 13:09

Sample (adjusted): 1957 1999

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	25845.06	6596.998	3.917700	0.0003
Z0	1.114998	0.538172	2.071824	0.0449
Z1	-0.371350	1.374303	-0.270210	0.7884
Z2	-0.060046	0.454967	-0.131980	0.8957
R-squared	0.975507	Mean dependent var		230992.5
Adjusted R-squared	0.973623	S.D. dependent var		147449.8
S.E. of regression	23947.32	Akaike info criterion		23.09351
Sum squared resid	2.24E+10	Schwarz criterion		23.25734
Log likelihood	-492.5104	Hannan-Quinn criter.		23.15392
F-statistic	517.7656	Durbin-Watson stat		0.164303
Prob(F-statistic)	0.000000			

$$\beta^{\wedge}_0 = 1.11$$

$$\beta^{\wedge}_1 = 1.11 - 0.37 - 0.06 = 0.68$$

$$\beta^{\wedge}_2 = 1.11 - 2 * 0.37 - 4 * 0.06 = 0.13$$

$$\beta^{\wedge}_3 = 1.11 - 3 * 0.37 - 9 * 0.06 = -0.54$$

Is invent c (sales, k=3, m=2)

Dependent Variable: INVEN

Method: Least Squares

Date: 05/15/13 Time: 13:16

Sample (adjusted): 1957 1999

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	25845.06	6596.998	3.917700	0.0003
PDL01	0.683601	0.467258	1.463006	0.1515
PDL02	-0.491443	0.494345	-0.994130	0.3263
PDL03	-0.060046	0.454967	-0.131980	0.8957
R-squared	0.975507	Mean dependent var		230992.5
Adjusted R-squared	0.973623	S.D. dependent var		147449.8
S.E. of regression	23947.32	Akaike info criterion		23.09351
Sum squared resid	2.24E+10	Schwarz criterion		23.25734
Log likelihood	-492.5104	Hannan-Quinn criter.		23.15392
F-statistic	517.7656	Durbin-Watson stat		0.164303
Prob(F-statistic)	0.000000			

Lag Distribution of SALES	i	Coefficient	Std. Error	t-Statistic
. *	0	1.11500	0.53817	2.07182
. *	1	0.68360	0.46726	1.46301
. *	2	0.13211	0.46564	0.28372
* .	3	-0.53947	0.56566	-0.95371
Sum of Lags		1.39124	0.05630	24.7103

Kết quả giống như trên

1.11500

0.68360

0.13211

-0.53947

KIỂM ĐỊNH NHÂN QUẢ GRANGER

Kiểm định tính dừng của GDP và M

Null Hypothesis: **GDP has a unit root**

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.587142	0.0007
Test critical values: 1% level	-3.610453	
5% level	-2.938987	
10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GDP)

Method: Least Squares

Date: 05/09/12 Time: 13:07

Sample (adjusted): 2 40

Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.741344	0.161614	-4.587142	0.0001
C	275981.9	60474.46	4.563610	0.0001
R-squared	0.362529	Mean dependent var		3044.000
Adjusted R-squared	0.345300	S.D. dependent var		83425.17
S.E. of regression	67502.24	Akaike info criterion		25.12763
Sum squared resid	1.69E+11	Schwarz criterion		25.21294
Log likelihood	-487.9888	Hannan-Quinn criter.		25.15824
F-statistic	21.04187	Durbin-Watson stat		2.082963
Prob(F-statistic)	0.000050			

→ GDP là chuỗi dừng

Null Hypothesis: **M1 has a unit root**

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	1.155007	0.9973
Test critical values:		
1% level	-3.610453	
5% level	-2.938987	
10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(M1)

Method: Least Squares

Date: 05/09/12 Time: 13:09

Sample (adjusted): 2 40

Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
M1(-1)	0.023721	0.020538	1.155007	0.2555
C	-260.9246	594.8932	-0.438608	0.6635
R-squared	0.034800	Mean dependent var		418.0938
Adjusted R-squared	0.008714	S.D. dependent var		570.8072
S.E. of regression	568.3148	Akaike info criterion		15.57315
Sum squared resid	11950324	Schwarz criterion		15.65846
Log likelihood	-301.6764	Hannan-Quinn criter.		15.60376
F-statistic	1.334040	Durbin-Watson stat		1.665339
Prob(F-statistic)	0.255493			

→ M là chuỗi không dừng

k=1 ls gdp c m1(-1) gdp(-1)

ls m1 c m1(-1) gdp(-1)

Pairwise Granger Causality Tests

Date: 05/15/13 Time: 13:33

Sample: 1 40

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
M1 does not Granger Cause GDP	39	9.83721	0.0034
GDP does not Granger Cause M1		0.16080	0.6908

M1 tác động nhân quả lên GDP; GDP không tác động nhân quả lên M1.

Dependent Variable: GDP

Method: Least Squares

Date: 05/15/13 Time: 13:45

Sample (adjusted): 2 40

Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	147432.4	68058.21	2.166269	0.0370
M1(-1)	8.033422	2.561325	3.136432	0.0034
GDP(-1)	-0.016786	0.169693	-0.098922	0.9217

R-squared	0.265463	Mean dependent var	371210.1
Adjusted R-squared	0.224655	S.D. dependent var	68875.16
S.E. of regression	60647.09	Akaike info criterion	24.93733
Sum squared resid	1.32E+11	Schwarz criterion	25.06530
Log likelihood	-483.2780	Hannan-Quinn criter.	24.98325
F-statistic	6.505230	Durbin-Watson stat	2.000203
Prob(F-statistic)	0.003875		

Schwarz criterion	25.06530
Hannan-Quinn criter.	24.98325

Dependent Variable: M1

Method: Least Squares

Date: 05/15/13 Time: 13:45

Sample (adjusted): 2 40

Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-354.1680	645.1213	-0.548995	0.5864
M1(-1)	1.018683	0.024279	41.95786	0.0000
GDP(-1)	0.000645	0.001609	0.400994	0.6908

R-squared	0.985392	Mean dependent var	29043.24
Adjusted R-squared	0.984581	S.D. dependent var	4629.555
S.E. of regression	574.8716	Akaike info criterion	15.61997
Sum squared resid	11897184	Schwarz criterion	15.74794
Log likelihood	-301.5895	Hannan-Quinn criter.	15.66589
F-statistic	1214.226	Durbin-Watson stat	1.698888
Prob(F-statistic)	0.000000		

Akaike info criterion	15.61997
Schwarz criterion	15.74794

K=2

ls gdp c m1(-1) m1(-2) gdp(-1) gdp(-2)

ls m1 c m1(-1) m1(-2) gdp(-1) gdp(-2)

Pairwise Granger Causality Tests

Date: 05/15/13 Time: 13:40

Sample: 1 40

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
M1 does not Granger Cause GDP	38	3.66779	0.0364
GDP does not Granger Cause M1		0.02484	0.9755

M1 tác động nhân quả lên GDP; GDP không tác động nhân quả lên M1.

ls gdp c m1(-1) m1(-2) gdp(-1) gdp(-2)

Dependent Variable: GDP

Method: Least Squares

Date: 05/18/11 Time: 11:01

Sample (adjusted): 3 40

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	147144.6	81704.08	1.800946	0.0809
M1(-1)	9.875247	19.56428	0.504759	0.6171
M1(-2)	-1.604268	19.91512	-0.080555	0.9363
GDP(-1)	-0.023131	0.182173	-0.126975	0.8997
GDP(-2)	-0.014584	0.177614	-0.082112	0.9351
R-squared	0.262452	Mean dependent var	372118.1	
Adjusted R-squared	0.173052	S.D. dependent var	69562.76	
S.E. of regression	63258.05	Akaike info criterion	25.06991	
Sum squared resid	1.32E+11	Schwarz criterion	25.28538	
Log likelihood	-471.3283	Hannan-Quinn criter.	25.14658	
F-statistic	2.935715	Durbin-Watson stat	2.002608	
Prob(F-statistic)	0.035100			

H0: c(2)=c(3)=0

Wald Test:

Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	3.667792	(2, 33)	0.0364
Chi-square	7.335584	2	0.0255

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(2)	9.875247	19.56428
C(3)	-1.604268	19.91512

Restrictions are linear in coefficients.

ls m1 c m1(-1) m1(-2) gdp(-1) gdp(-2)

Dependent Variable: M1

Method: Least Squares

Date: 05/18/11 Time: 11:07

Sample (adjusted): 3 40

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-318.3947	762.5930	-0.417516	0.6790
M1(-1)	1.163628	0.182605	6.372376	0.0000
M1(-2)	-0.147345	0.185880	-0.792691	0.4336
GDP(-1)	0.000290	0.001700	0.170767	0.8654
GDP(-2)	0.000248	0.001658	0.149878	0.8818

R-squared	0.985156	Mean dependent var	29206.46
Adjusted R-squared	0.983356	S.D. dependent var	4576.572
S.E. of regression	590.4252	Akaike info criterion	15.72164
Sum squared resid	11503862	Schwarz criterion	15.93711
Log likelihood	-293.7112	Hannan-Quinn criter.	15.79831
F-statistic	547.5169	Durbin-Watson stat	1.939578

Wald Test:

Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	0.024835	(2, 33)	0.9755
Chi-square	0.049670	2	0.9755

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(4)	0.000290	0.001700
C(5)	0.000248	0.001658

Restrictions are linear in coefficients.

Kết luận GDP không gây ra M

VAR

Pairwise Granger Causality Tests

Date: 05/15/13 Time: 13:47

Sample: 1 40

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
M1 does not Granger Cause GDP	39	9.83721	0.0034
GDP does not Granger Cause M1		0.16080	0.6908
INTRATE does not Granger Cause GDP	39	2.75328	0.1057
GDP does not Granger Cause INTRATE		0.34818	0.5588
INTRATE does not Granger Cause M1	39	15.1025	0.0004
M1 does not Granger Cause INTRATE		0.26884	0.6073