

Pedroni Residual Cointegration Test

Series: E MS Y R P

Date: 05/20/09 Time: 22:34

Sample: 1999Q1 2008Q2

Included observations: 228

Cross-sections included: 6

Null Hypothesis: No cointegration

Trend assumption: Deterministic intercept and trend

Lag selection: Automatic SIC with a max lag of 8

Newey-West bandwidth selection with Bartlett kernel

Alternative hypothesis: common AR coeffs. (within-dimension)

	<u>Statistic</u>	<u>Prob.</u>	Weighted	<u>Statistic</u>	<u>Prob.</u>
Panel v-Statistic	6.168154	0.0000	0.820032	0.2850	
Panel rho-Statistic	-0.144461	0.3948	0.013664	0.3989	
Panel PP-Statistic	-3.414188	0.0012	-1.916640	0.0636	
Panel ADF-Statistic	-2.865830	0.0066	-1.736314	0.0884	

Alternative hypothesis: individual AR coeffs. (between-dimension)

	<u>Statistic</u>	<u>Prob.</u>
Group rho-Statistic	0.801046	0.2894
Group PP-Statistic	-3.983177	0.0001
Group ADF-Statistic	-2.583205	0.0142

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
1	0.329	0.000403	0.000406	1.00	37
2	0.480	0.000297	0.000287	2.00	37
3	-0.006	0.000519	7.03E-05	36.00	37
4	0.483	0.000123	0.000122	3.00	37
5	0.392	8.87E-05	9.19E-05	3.00	37
6	0.439	0.000101	0.000107	1.00	37

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
1	0.329	0.000403	0	8	37
2	0.480	0.000297	0	8	37
3	-0.605	0.000413	2	8	35
4	0.483	0.000123	0	8	37
5	0.392	8.87E-05	0	8	37
6	0.439	0.000101	0	8	37

Kao Residual Cointegration Test

Series: E MS Y R P

Date: 05/20/09 Time: 22:34

Sample: 1999Q1 2008Q2
Included observations: 228
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
Lag selection: Automatic 3 lags by SIC with a max lag of 9
Newey-West bandwidth selection using Bartlett kernel

	t-Statistic	Prob.
ADF	-1.983987	0.0236
Residual variance	0.000608	
HAC variance	0.000484	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID)
Method: Least Squares
Date: 05/20/09 Time: 22:34
Sample (adjusted): 2000Q1 2008Q2
Included observations: 204 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.166157	0.047644	-3.487486	0.0006
D(RESID(-1))	-0.148228	0.074315	-1.994607	0.0474
D(RESID(-2))	-0.107798	0.073580	-1.465051	0.1445
D(RESID(-3))	0.109168	0.066379	1.644618	0.1016
R-squared	0.140534	Mean dependent var		0.002122
Adjusted R-squared	0.127642	S.D. dependent var		0.031982
S.E. of regression	0.029872	Akaike info criterion		-4.164401
Sum squared resid	0.178463	Schwarz criterion		-4.099339
Log likelihood	428.7689	Hannan-Quinn criter.		-4.138082
Durbin-Watson stat	1.954103			

Johansen Fisher
Panel
Cointegration
Test
Series: E MS Y R P
Date: 05/20/09 Time: 22:35
Sample: 1999Q1 2008Q2
Included observations: 228
Trend assumption: Linear deterministic trend
Lags interval (in first differences): 1 1

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized	Fisher Stat.*		Fisher Stat.*	
No. of CE(s)	(from trace test)	Prob.	(from max-eigen test)	Prob.

None	66.96	0.0000	61.15	0.0000
At most 1	22.47	0.0326	20.64	0.0559
At most 2	8.842	0.7163	9.191	0.6866
At most 3	5.245	0.9493	5.100	0.9546
At most 4	10.87	0.5403	10.87	0.5403

* Probabilities are computed using asymptotic Chi-square distribution.

Individual cross section results

Cross Section	Trace Test Statistics	Prob.**	Max-Eign Test Statistics	Prob.**
Hypothesis of no cointegration				
1	82.9678	0.0031	40.3136	0.0074
2	73.8386	0.0230	33.4627	0.0559
3	97.4656	0.0001	42.5333	0.0036
4	81.3377	0.0046	38.3742	0.0136
5	87.4175	0.0011	55.9823	0.0000
6	65.3824	0.1073	32.3437	0.0753
Hypothesis of at most 1 cointegration relationship				
1	42.6541	0.1412	24.2381	0.1266
2	40.3758	0.2093	23.7057	0.1453
3	54.9323	0.0094	29.9303	0.0245
4	42.9635	0.1335	22.3757	0.2017
5	31.4353	0.6430	15.3901	0.7168
6	33.0387	0.5547	17.8762	0.5055
Hypothesis of at most 2 cointegration relationship				
1	18.4160	0.5355	13.1335	0.4400
2	16.6701	0.6643	8.9814	0.8339
3	25.0020	0.1614	16.9258	0.1755
4	20.5878	0.3838	15.1544	0.2782
5	16.0452	0.7091	10.0887	0.7363
6	15.1625	0.7694	9.7768	0.7653
Hypothesis of at most 3 cointegration relationship				
1	5.2825	0.7781	5.2202	0.7139
2	7.6887	0.4993	6.5010	0.5498
3	8.0762	0.4573	7.8239	0.3969
4	5.4333	0.7612	4.6719	0.7825
5	5.9565	0.7007	4.1289	0.8455
6	5.3857	0.7666	4.8741	0.7577
Hypothesis of at most 4 cointegration relationship				
1	0.0623	0.8029	0.0623	0.8029
2	1.1878	0.2758	1.1878	0.2758
3	0.2523	0.6155	0.2523	0.6155
4	0.7614	0.3829	0.7614	0.3829
5	1.8276	0.1764	1.8276	0.1764
6	0.5116	0.4745	0.5116	0.4745

**MacKinnon-Haug-Michelis (1999) p-values

Vector Error Correction Estimates

Date: 05/20/09 Time: 22:35

Sample (adjusted): 1999Q4 2008Q2

Included observations: 210 after adjustments

Standard errors in () & t-statistics in []

Cointegrating Eq:	CointEq1				
E(-1)	1.000000				
MS(-1)	16.06034 (2.53608) [6.33274]				
Y(-1)	-26.25828 (3.82607) [-6.86300]				
R(-1)	4.258814 (1.55770) [2.73405]				
P(-1)	33.65797 (13.0850) [2.57226]				
C	-91.07232				
Error Correction:	D(E)	D(MS)	D(Y)	D(R)	D(P)
CointEq1	-0.000489 (0.00077) [-0.63541]	-0.000942 (0.00084) [-1.11980]	-0.002003 (0.00127) [-1.58207]	-0.019404 (0.00668) [-2.90383]	-0.000743 (0.00031) [-2.40706]
D(E(-1))	-0.276455 (0.12907) [-2.14183]	0.020691 (0.14115) [0.14659]	-0.438893 (0.21232) [-2.06710]	-3.118645 (1.12061) [-2.78299]	-0.114392 (0.05179) [-2.20858]
D(E(-2))	-0.020988 (0.13712) [-0.15306]	0.196051 (0.14995) [1.30744]	0.252352 (0.22556) [1.11876]	-3.791374 (1.19049) [-3.18472]	-0.128167 (0.05502) [-2.32928]
D(MS(-1))	-0.117099 (0.11696) [-1.00117]	-0.126855 (0.12790) [-0.99180]	-0.381423 (0.19240) [-1.98245]	-2.911743 (1.01545) [-2.86743]	-0.037129 (0.04693) [-0.79109]
D(MS(-2))	-0.064607 (0.12510) [-0.51642]	0.217753 (0.13681) [1.59169]	0.373372 (0.20579) [1.81431]	-4.383634 (1.08614) [-4.03597]	-0.064009 (0.05020) [-1.27503]
D(Y(-1))	-0.051597 (0.05982) [-0.86253]	0.082345 (0.06542) [1.25879]	-0.479753 (0.09840) [-4.87536]	-0.674574 (0.51936) [-1.29886]	-0.027124 (0.02400) [-1.12994]

D(Y(-2))	-0.014490 (0.05510) [-0.26296]	0.098162 (0.06026) [1.62901]	-0.152713 (0.09064) [-1.68475]	0.219520 (0.47841) [0.45886]	-0.018428 (0.02211) [-0.83342]
D(R(-1))	0.011593 (0.00762) [1.52176]	-0.006074 (0.00833) [-0.72910]	-0.006563 (0.01253) [-0.52372]	-0.484689 (0.06614) [-7.32814]	0.003062 (0.00306) [1.00152]
D(R(-2))	0.003843 (0.00750) [0.51247]	-0.000901 (0.00820) [-0.10991]	-0.011969 (0.01233) [-0.97033]	-0.373405 (0.06510) [-5.73590]	0.006009 (0.00301) [1.99711]
D(P(-1))	0.090649 (0.17733) [0.51119]	-0.127255 (0.19392) [-0.65623]	-0.136994 (0.29170) [-0.46964]	-1.318053 (1.53956) [-0.85612]	0.187724 (0.07116) [2.63811]
D(P(-2))	-0.358861 (0.17737) [-2.02328]	0.265667 (0.19396) [1.36972]	-0.029122 (0.29176) [-0.09981]	0.321011 (1.53988) [0.20847]	0.178003 (0.07117) [2.50099]
C	-0.001070 (0.00319) [-0.33519]	0.004804 (0.00349) [1.37656]	0.016823 (0.00525) [3.20485]	0.052148 (0.02770) [1.88232]	0.000707 (0.00128) [0.55212]
R-squared	0.068450	0.080167	0.242834	0.326179	0.163377
Adj. R-squared	0.016698	0.029065	0.200769	0.288745	0.116898
Sum sq. resids	0.342779	0.409907	0.927538	25.83711	0.055196
S.E. equation	0.041608	0.045500	0.068444	0.361235	0.016696
F-statistic	1.322640	1.568776	5.772846	8.713335	3.515061
Log likelihood	375.8895	357.1108	271.3674	-77.97104	567.6409
Akaike AIC	-3.465614	-3.286769	-2.470166	0.856867	-5.291818
Schwarz SC	-3.274351	-3.095506	-2.278903	1.048130	-5.100554
Mean dependent	-0.002161	0.007083	0.011112	0.017673	-0.000617
S.D. dependent	0.041960	0.046176	0.076559	0.428328	0.017767
Determinant resid covariance (dof adj.)	9.70E-14				
Determinant resid covariance	7.23E-14				
Log likelihood	1687.269				
Akaike information criterion	-15.45018				
Schwarz criterion	-14.41417				

Dependent Variable: E
 Method: Panel Least Squares
 Date: 05/20/09 Time: 22:40
 Sample: 1999Q1 2008Q2
 Periods included: 38
 Cross-sections included: 6
 Total panel (balanced) observations: 228

	Coefficient	Std. Error	t-Statistic	Prob.
MS	-3.244843	0.233050	-13.92336	0.0000

Y	6.548803	0.354753	18.46017	0.0000
R	0.405943	0.148044	2.742045	0.0066
P	0.577054	1.281393	0.450333	0.6529
C	28.67874	1.214202	23.61941	0.0000
R-squared	0.821771	Mean dependent var	4.616044	
Adjusted R-squared	0.818574	S.D. dependent var	2.759362	
S.E. of regression	1.175326	Akaike info criterion	3.182653	
Sum squared resid	308.0500	Schwarz criterion	3.257858	
Log likelihood	-357.8225	Hannan-Quinn criter.	3.212996	
F-statistic	257.0501	Durbin-Watson stat	0.182630	
Prob(F-statistic)	0.000000			

Date: 05/25/09 Time: 22:26

Sample (adjusted): 2000Q2 2008Q2

Included observations: 198 after adjustments

Trend assumption: No deterministic trend

Series: E MS Y R P

Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.124212	57.65783	60.06141	0.0784
At most 1	0.103450	31.39682	40.17493	0.2858
At most 2	0.042156	9.775047	24.27596	0.8673
At most 3	0.005733	1.247207	12.32090	0.9901
At most 4	0.000549	0.108808	4.129906	0.7861

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.124212	26.26102	30.43961	0.1519
At most 1	0.103450	21.62177	24.15921	0.1063
At most 2	0.042156	8.527840	17.79730	0.6474
At most 3	0.005733	1.138399	11.22480	0.9876
At most 4	0.000549	0.108808	4.129906	0.7861

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b*S11*b=I):

E	MS	Y	R	P
-0.392363	1.416842	-1.087059	2.347259	4.766576
-0.277451	1.267666	-0.852037	0.025259	-3.209697
-0.229768	-0.578419	0.190729	-0.336635	17.82196
0.318055	0.106774	0.307460	-0.415251	-1.756197
0.058616	-1.502400	1.084868	-0.504711	-4.708067

Unrestricted Adjustment Coefficients (alpha):

D(E)	-0.000968	-0.004158	0.005710	0.001235	0.000157
D(MS)	0.002233	0.000124	-0.004906	-0.001395	-0.000528
D(Y)	-0.002096	-0.002200	-0.007348	-0.001486	-5.29E-06
D(R)	-0.102895	0.006923	0.008196	0.003263	-0.002210
D(P)	0.000641	0.000254	-0.001567	0.000945	-5.74E-05

1 Cointegrating Equation(s): Log likelihood 1844.948

Normalized cointegrating coefficients (standard error in parentheses)

E	MS	Y	R	P
1.000000	-3.611049	2.770544	-5.982367	-12.14838
	(1.07288)	(0.65278)	(0.93958)	(8.60212)

Adjustment coefficients (standard error in parentheses)

D(E)	0.000380
	(0.00105)
D(MS)	-0.000876
	(0.00112)
D(Y)	0.000822
	(0.00123)
D(R)	0.040372
	(0.00872)
D(P)	-0.000251
	(0.00044)

2 Cointegrating Equation(s): Log likelihood 1855.759

Normalized cointegrating coefficients (standard error in parentheses)

E	MS	Y	R	P
1.000000	0.000000	1.638141	-28.19091	-101.5539
		(0.89863)	(6.00386)	(60.5826)
0.000000	1.000000	-0.313594	-6.150163	-24.75888
		(0.22970)	(1.53464)	(15.4855)

Adjustment coefficients (standard error in parentheses)

D(E)	0.001533	-0.006642
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	(0.00127)	(0.00503)
D(MS)	-0.000910	0.003320
	(0.00138)	(0.00545)
D(Y)	0.001433	-0.005758
	(0.00151)	(0.00596)
D(R)	0.038451	-0.137010
	(0.01068)	(0.04225)
D(P)	-0.000322	0.001230
	(0.00054)	(0.00214)

3 Cointegrating Equation(s): Log likelihood 1860.023

Normalized cointegrating coefficients (standard error in parentheses)

E	MS	Y	R	P
1.000000	0.000000	0.000000	15.85457 (4.32297)	-17.32695 (42.5933)
0.000000	1.000000	0.000000	-14.58190 (3.39919)	-40.88268 (33.4915)
0.000000	0.000000	1.000000	-26.88747 (6.03631)	-51.41618 (59.4745)

Adjustment coefficients (standard error in parentheses)

D(E)	0.000221 (0.00139)	-0.009945 (0.00519)	0.005684 (0.00364)
D(MS)	0.000217 (0.00151)	0.006158 (0.00565)	-0.003468 (0.00396)
D(Y)	0.003121 (0.00164)	-0.001508 (0.00613)	0.002751 (0.00430)
D(R)	0.036568 (0.01183)	-0.141751 (0.04414)	0.107517 (0.03097)
D(P)	3.80E-05 (0.00060)	0.002137 (0.00222)	-0.001212 (0.00156)

4 Cointegrating Equation(s): Log likelihood 1860.592

Normalized cointegrating coefficients (standard error in parentheses)

E	MS	Y	R	P
1.000000	0.000000	0.000000	0.000000	-104.2214 (64.0267)
0.000000	1.000000	0.000000	0.000000	39.03665 (52.2532)
0.000000	0.000000	1.000000	0.000000	95.94648 (97.9759)
0.000000	0.000000	0.000000	1.000000	5.480720 (4.19268)

Adjustment coefficients (standard error in parentheses)

D(E)	0.000614 (0.00162)	-0.009813 (0.00520)	0.006064 (0.00373)	-0.004812 (0.00629)
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D(MS)	-0.000227 (0.00176)	0.006009 (0.00565)	-0.003897 (0.00405)	0.007474 (0.00684)
D(Y)	0.002648 (0.00191)	-0.001666 (0.00614)	0.002294 (0.00440)	-0.001884 (0.00742)
D(R)	0.037606 (0.01378)	-0.141402 (0.04420)	0.108521 (0.03171)	-0.245461 (0.05347)
D(P)	0.000339 (0.00069)	0.002238 (0.00222)	-0.000922 (0.00159)	0.001646 (0.00269)

Dependent Variable: E
Method: Panel Least Squares
Date: 05/25/09 Time: 22:54
Sample: 1999Q1 2008Q2
Periods included: 38
Cross-sections included: 6
Total panel (balanced) observations: 228

	Coefficient	Std. Error	t-Statistic	Prob.
MS	-0.512593	0.073119	-7.010412	0.0000
Y	0.200250	0.047761	4.192731	0.0000
R	-0.050046	0.010613	-4.715614	0.0000
P	-0.558709	0.076346	-7.318079	0.0000
C	3.938316	0.213924	18.40991	0.0000

Effects Specification

Cross-section fixed (dummyvariables)
Period fixed (dummyvariables)

R-squared	0.999700	Mean dependent var	4.616044
Adjusted R-squared	0.999623	S.D. dependent var	2.759362
S.E. of regression	0.053561	Akaike info criterion	-2.834577
Sum squared resid	0.519240	Schwarz criterion	-2.127650
Log likelihood	370.1418	Hannan-Quinn criter.	-2.549353
F-statistic	13093.79	Durbin-Watson stat	0.453494
Prob(F-statistic)	0.000000		

Vector Error Correction Estimates

Date: 05/25/09 Time: 22:43
Sample (adjusted): 1999Q4 2008Q2
Included observations: 210 after adjustments
Standard errors in () & t-statistics in []

Cointegrating Eq:	CointEq1				
E(-1)	1.000000				
MS(-1)	16.06034 (2.53608) [6.33274]				
Y(-1)	-26.25828 (3.82607) [-6.86300]				
R(-1)	4.258814 (1.55770) [2.73405]				
P(-1)	33.65797 (13.0850) [2.57226]				
C	-91.07232				
Error Correction:	D(E)	D(MS)	D(Y)	D(R)	D(P)
CointEq1	-0.000489 (0.00077) [-0.63541]	-0.000942 (0.00084) [-1.11980]	-0.002003 (0.00127) [-1.58207]	-0.019404 (0.00668) [-2.90383]	-0.000743 (0.00031) [-2.40706]
D(E(-1))	-0.276455 (0.12907) [-2.14183]	0.020691 (0.14115) [0.14659]	-0.438893 (0.21232) [-2.06710]	-3.118645 (1.12061) [-2.78299]	-0.114392 (0.05179) [-2.20858]
D(E(-2))	-0.020988 (0.13712) [-0.15306]	0.196051 (0.14995) [1.30744]	0.252352 (0.22556) [1.11876]	-3.791374 (1.19049) [-3.18472]	-0.128167 (0.05502) [-2.32928]
D(MS(-1))	-0.117099 (0.11696) [-1.00117]	-0.126855 (0.12790) [-0.99180]	-0.381423 (0.19240) [-1.98245]	-2.911743 (1.01545) [-2.86743]	-0.037129 (0.04693) [-0.79109]
D(MS(-2))	-0.064607 (0.12510) [-0.51642]	0.217753 (0.13681) [1.59169]	0.373372 (0.20579) [1.81431]	-4.383634 (1.08614) [-4.03597]	-0.064009 (0.05020) [-1.27503]
D(Y(-1))	-0.051597 (0.05982) [-0.86253]	0.082345 (0.06542) [1.25879]	-0.479753 (0.09840) [-4.87536]	-0.674574 (0.51936) [-1.29886]	-0.027124 (0.02400) [-1.12994]
D(Y(-2))	-0.014490 (0.05510) [-0.26296]	0.098162 (0.06026) [1.62901]	-0.152713 (0.09064) [-1.68475]	0.219520 (0.47841) [0.45886]	-0.018428 (0.02211) [-0.83342]

D(R(-1))	0.011593 (0.00762) [1.52176]	-0.006074 (0.00833) [-0.72910]	-0.006563 (0.01253) [-0.52372]	-0.484689 (0.06614) [-7.32814]	0.003062 (0.00306) [1.00152]
D(R(-2))	0.003843 (0.00750) [0.51247]	-0.000901 (0.00820) [-0.10991]	-0.011969 (0.01233) [-0.97033]	-0.373405 (0.06510) [-5.73590]	0.006009 (0.00301) [1.99711]
D(P(-1))	0.090649 (0.17733) [0.51119]	-0.127255 (0.19392) [-0.65623]	-0.136994 (0.29170) [-0.46964]	-1.318053 (1.53956) [-0.85612]	0.187724 (0.07116) [2.63811]
D(P(-2))	-0.358861 (0.17737) [-2.02328]	0.265667 (0.19396) [1.36972]	-0.029122 (0.29176) [-0.09981]	0.321011 (1.53988) [0.20847]	0.178003 (0.07117) [2.50099]
C	-0.001070 (0.00319) [-0.33519]	0.004804 (0.00349) [1.37656]	0.016823 (0.00525) [3.20485]	0.052148 (0.02770) [1.88232]	0.000707 (0.00128) [0.55212]
R-squared	0.068450	0.080167	0.242834	0.326179	0.163377
Adj. R-squared	0.016698	0.029065	0.200769	0.288745	0.116898
Sum sq. resids	0.342779	0.409907	0.927538	25.83711	0.055196
S.E. equation	0.041608	0.045500	0.068444	0.361235	0.016696
F-statistic	1.322640	1.568776	5.772846	8.713335	3.515061
Log likelihood	375.8895	357.1108	271.3674	-77.97104	567.6409
Akaike AIC	-3.465615	-3.286769	-2.470166	0.856867	-5.291818
Schwarz SC	-3.274351	-3.095506	-2.278903	1.048130	-5.100554
Mean dependent	-0.002161	0.007083	0.011112	0.017673	-0.000617
S.D. dependent	0.041960	0.046176	0.076559	0.428328	0.017767
Determinant resid covariance (dof adj.)	9.70E-14				
Determinant resid covariance	7.23E-14				
Log likelihood	1687.269				
Akaike information criterion	-15.45018				
Schwarz criterion	-14.41417				