**SEM Endogenous Testing**

**Declaring dataset as timeseries, yearly dataset**

**. tsset year, yearly**

time variable: year, 1967 to 2018

delta: 1 year

1. **1SLS**

Regress the model on any variable, here, mcap is chosen the dependent variable.

**. regress mcap gdp m3 gdcf fii pdi nds gds**

Source | SS df MS Number of obs = 52

-------------+------------------------------ F( 7, 44) = 0.37

Model | 1138.29094 7 162.612992 Prob > F = 0.9164

Residual | 19485.9537 44 442.862585 R-squared = 0.0552

-------------+------------------------------ Adj R-squared = -0.0951

Total | 20624.2447 51 404.396954 Root MSE = 21.044

------------------------------------------------------------------------------

mcap | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

gdp | -1.343999 .8820513 -1.52 0.135 -3.121656 .4336587

m3 | .2590587 .3797158 0.68 0.499 -.5062083 1.024326

gdcf | -.0405929 .2846076 -0.14 0.887 -.6141818 .532996

fii | .0173974 .0354334 0.49 0.626 -.0540139 .0888086

pdi | .2244723 .561436 0.40 0.691 -.9070277 1.355972

nds | .2685624 .7843592 0.34 0.734 -1.31221 1.849335

gds | -.2790701 1.058218 -0.26 0.793 -2.411768 1.853628

\_cons | 19.31093 10.27843 1.88 0.067 -1.403889 40.02574

------------------------------------------------------------------------------

We assume gdp to be the endogenous variable, so we regress gdp(dependent variable) on all variables

**. regress gdp mcap m3 gdcf fii pdi nds gds**

Source | SS df MS Number of obs = 52

-------------+------------------------------ F( 7, 44) = 3.14

Model | 270.251497 7 38.6073566 Prob > F = 0.0088

Residual | 540.691203 44 12.2884364 R-squared = 0.3333

-------------+------------------------------ Adj R-squared = 0.2272

Total | 810.9427 51 15.9008373 Root MSE = 3.5055

------------------------------------------------------------------------------

gdp | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

mcap | -.0372929 .0244749 -1.52 0.135 -.0866189 .012033

m3 | .1539593 .0591979 2.60 0.013 .0346538 .2732648

gdcf | .0118749 .0473861 0.25 0.803 -.0836255 .1073753

fii | .0063885 .0058396 1.09 0.280 -.0053804 .0181575

pdi | .223686 .0874127 2.56 0.014 .0475172 .3998548

nds | .1737826 .1281798 1.36 0.182 -.0845468 .432112

gds | -.2800692 .1712864 -1.64 0.109 -.6252743 .0651359

\_cons | 9.382001 1.079867 8.69 0.000 7.205672 11.55833

------------------------------------------------------------------------------

Predicted values of gdp

**. predict gdphat, xb**

Residual values of gdp and gdphat

**. predict res, residual**

Regress the same equation we started with, including the residual in the model.

**. regress mcap gdp m3 gdcf fii pdi nds gds res**

Source | SS df MS Number of obs = 52

-------------+------------------------------ F( 8, 43) = .

Model | 20624.2447 8 2578.03058 Prob > F = 0.0000

Residual | 2.4513e-10 43 5.7006e-12 R-squared = 1.0000

-------------+------------------------------ Adj R-squared = 1.0000

Total | 20624.2447 51 404.396954 Root MSE = 2.4e-06

------------------------------------------------------------------------------

mcap | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

gdp | -26.81473 4.47e-07 -6.0e+07 0.000 -26.81473 -26.81473

m3 | 4.128378 7.90e-08 5.2e+07 0.000 4.128378 4.128378

gdcf | .3184219 3.29e-08 9.7e+06 0.000 .3184219 .318422

fii | .1713072 4.81e-09 3.6e+07 0.000 .1713072 .1713072

pdi | 5.99808 1.18e-07 5.1e+07 0.000 5.99808 5.998081

nds | 4.659934 1.16e-07 4.0e+07 0.000 4.659934 4.659934

gds | -7.509981 1.72e-07 -4.4e+07 0.000 -7.509981 -7.50998

res | 26.81473 4.59e-07 5.8e+07 0.000 26.81473 26.81473

\_cons | 251.5758 4.14e-06 6.1e+07 0.000 251.5758 251.5758

------------------------------------------------------------------------------

Here r-squared = 1.0000 which means there is atleast one variable that is causing collinearity in the model, so either we redo the whole model with another dependent variable(earlier mcap) or omit one variable from the above equation and check r-squared.

Here, we regressed the model with gds omitted

**. regress mcap gdp m3 gdcf fii pdi nds res**

Source | SS df MS Number of obs = 52

-------------+------------------------------ F( 7, 44) = 5.69

Model | 9802.84186 7 1400.40598 Prob > F = 0.0001

Residual | 10821.4028 44 245.940973 R-squared = **0.4753**

-------------+------------------------------ Adj R-squared = 0.3918

Total | 20624.2447 51 404.396954 Root MSE = 15.683

------------------------------------------------------------------------------

mcap | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

gdp | -12.4767 1.986978 -6.28 0.000 -16.48119 -8.47221

m3 | 1.388872 .3137989 4.43 0.000 .7564524 2.021292

gdcf | .4447953 .2150523 2.07 0.045 .0113858 .8782048

fii | .0851814 .0287688 2.96 0.005 .0272017 .1431611

pdi | 1.276696 .2985901 4.28 0.000 .6749268 1.878464

nds | -.1188886 .2569554 -0.46 0.646 -.6367482 .3989709

**res | 12.4767 2.09832 5.95 0.000 8.247815 16.70559**

\_cons | 129.1068 19.96698 6.47 0.000 88.866 169.3476

------------------------------------------------------------------------------

The r-squared<0.05 and p-val of res is significant, hence it is **endogenous.**

1. **2SLS**

Regress any variable on all the variables. From Single stage least squares, we realised gds could be one of the variable that is causing collinearity in the model. So we include it in the model as an instrument variable, meaning it affects the model but is not a part of the model directly. Here, we equated it with nds.

. ivregress 2sls pdi mcap gdp m3 gdcf fii (gds=nds)

Instrumental variables (2SLS) regression Number of obs = 52

Wald chi2(6) = 139.13

Prob > chi2 = 0.0000

R-squared = 0.7866

Root MSE = 6.8561

------------------------------------------------------------------------------

pdi | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

gds | .723892 .0876108 8.26 0.000 .552178 .895606

mcap | .0209612 .0490602 0.43 0.669 -.075195 .1171174

gdp | .7483757 .2768157 2.70 0.007 .2058269 1.290924

m3 | -.0729518 .1090438 -0.67 0.503 -.2866736 .1407701

gdcf | -.3609715 .0435355 -8.29 0.000 -.4462996 -.2756435

fii | .0069186 .011521 0.60 0.548 -.0156621 .0294993

\_cons | -2.856997 3.475439 -0.82 0.411 -9.668731 3.954738

------------------------------------------------------------------------------

Instrumented: gds

Instruments: mcap gdp m3 gdcf fii nds

1. 3SLS

Here we define the model in the first parenthesis, exogenous variables in the second and endogenous variables in the third. At the end we declare all the variables to be exogenous.

. reg3 (pdi = mcap gdp m3 gdcf fii), exog( mcap gdp m3 gdcf fii) endog(gds nds) allexog

Three-stage least-squares regression

----------------------------------------------------------------------

Equation Obs Parms RMSE "R-sq" chi2 P

----------------------------------------------------------------------

pdi 52 5 12.49685 0.2909 21.33 0.0007

----------------------------------------------------------------------

------------------------------------------------------------------------------

pdi | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

pdi |

mcap | .0602396 .0890033 0.68 0.499 -.1142037 .2346828

gdp | 1.361275 .4861106 2.80 0.005 .4085158 2.314034

m3 | .1313634 .1935807 0.68 0.497 -.2480477 .5107746

gdcf | -.2380432 .0745766 -3.19 0.001 -.3842106 -.0918757

fii | .0103913 .0209858 0.50 0.620 -.0307401 .0515227

\_cons | -7.335314 6.25732 -1.17 0.241 -19.59944 4.928808

------------------------------------------------------------------------------

Endogenous variables:

Exogenous variables: pdi mcap gdp m3 gdcf fii

------------------------------------------------------------------------------

**Sir’s Code –**

. tsset year, yearly

. regress pdi mcap gdp m3 gdcf fii nds gds

. regress gds mcap gdp m3 gdcf fii nds

. predict gdshat, xb

. regress pdi mcap gdp m3 gdcf fii nds gdshat

. regress gds mcap gdp m3 gdcf fii nds

. predict res, residual

. regress pdi mcap gdp m3 gdcf fii gds res

since r2 <1 and res is significant, gds is endogeneous

. ivregress 2sls pdi mcap gdp m3 gdcf fii (gds=nds)

. reg3 (pdi = mcap gdp m3 gdcf fii), exog( mcap gdp m3 gdcf fii) endog(gds nds) allexog

Declaring timeseries, yearly

**. tsset year, yearly**

time variable: year, 1967 to 2018

delta: 1 year

Regressing pdi as the dependent variable

**. regress pdi mcap gdp m3 gdcf fii nds gds**

Source | SS df MS Number of obs = 52

-------------+------------------------------ F( 7, 44) = 45.13

Model | 10051.9211 7 1435.98872 Prob > F = 0.0000

Residual | 1399.88867 44 31.8156515 R-squared = 0.8778

-------------+------------------------------ Adj R-squared = 0.8583

Total | 11451.8097 51 224.545289 Root MSE = 5.6405

------------------------------------------------------------------------------

pdi | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

mcap | .0161263 .0403341 0.40 0.691 -.0651617 .0974143

gdp | .5791393 .2263179 2.56 0.014 .1230256 1.035253

m3 | -.2690736 .0939278 -2.86 0.006 -.4583725 -.0797746

gdcf | -.0399149 .0760638 -0.52 0.602 -.1932114 .1133816

fii | .0014452 .0095208 0.15 0.880 -.0177426 .020633

nds | -.8588312 .1659887 -5.17 0.000 -1.193359 -.524303

gds | 1.592142 .151541 10.51 0.000 1.286731 1.897553

\_cons | -.7389512 2.861149 -0.26 0.797 -6.505219 5.027317

------------------------------------------------------------------------------

Suppose we feel that gds is endogeneous which means the coef of gds is biased and will lead us to the problem of simultanous bias.

Regress gds as the dependent variable and omitting pdi

**. regress gds mcap gdp m3 gdcf fii nds**

Source | SS df MS Number of obs = 52

-------------+------------------------------ F( 6, 45) = 45.64

Model | 8430.045 6 1405.0075 Prob > F = 0.0000

Residual | 1385.41724 45 30.7870499 R-squared = 0.8589

-------------+------------------------------ Adj R-squared = 0.8400

Total | 9815.46224 51 192.460044 Root MSE = 5.5486

------------------------------------------------------------------------------

gds | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

mcap | .0055685 .039668 0.14 0.889 -.074327 .0854641

gdp | .1949166 .2207251 0.88 0.382 -.2496465 .6394798

m3 | .2258817 .0860428 2.63 0.012 .0525826 .3991807

gdcf | -.3697743 .0505978 -7.31 0.000 -.4716835 -.2678651

fii | .006304 .0093183 0.68 0.502 -.0124641 .025072

nds | .9891518 .0701341 14.10 0.000 .8478944 1.130409

\_cons | -2.439442 2.790927 -0.87 0.387 -8.060658 3.181774

------------------------------------------------------------------------------

Predicting values for gds

**. predict gdshat, xb**

Regressing the original model on gdshat included

**. regress pdi mcap gdp m3 gdcf fii nds gdshat**

note: nds omitted because of collinearity

Source | SS df MS Number of obs = 52

-------------+------------------------------ F( 6, 45) = 9.99

Model | 6540.00342 6 1090.00057 Prob > F = 0.0000

Residual | 4911.80631 45 109.151251 R-squared = 0.5711

-------------+------------------------------ Adj R-squared = 0.5139

Total | 11451.8097 51 224.545289 Root MSE = 10.448

------------------------------------------------------------------------------

pdi | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

mcap | .0209612 .0747598 0.28 0.780 -.1296129 .1715352

gdp | .7483757 .4218225 1.77 0.083 -.1012184 1.59797

m3 | -.0729518 .1661651 -0.44 0.663 -.4076255 .2617219

gdcf | -.3609715 .0663411 -5.44 0.000 -.4945895 -.2273536

fii | .0069186 .0175561 0.39 0.695 -.0284412 .0422784

nds | (omitted)

gdshat | .723892 .1335047 5.42 0.000 .4549997 .9927843

\_cons | -2.856997 5.296008 -0.54 0.592 -13.5237 7.809711

------------------------------------------------------------------------------

Here nds has been omitted because of collinearity.

Due to bias, model 1 either would have underestimated or overestimated the impact of gds on pdi. As coef of gds was 1.59 while gdshat was 0.72

Again regressing gds on all variables except pdi

**. regress gds mcap gdp m3 gdcf fii nds**

Source | SS df MS Number of obs = 52

-------------+------------------------------ F( 6, 45) = 45.64

Model | 8430.045 6 1405.0075 Prob > F = 0.0000

Residual | 1385.41724 45 30.7870499 R-squared = 0.8589

-------------+------------------------------ Adj R-squared = 0.8400

Total | 9815.46224 51 192.460044 Root MSE = 5.5486

------------------------------------------------------------------------------

gds | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

mcap | .0055685 .039668 0.14 0.889 -.074327 .0854641

gdp | .1949166 .2207251 0.88 0.382 -.2496465 .6394798

m3 | .2258817 .0860428 2.63 0.012 .0525826 .3991807

gdcf | -.3697743 .0505978 -7.31 0.000 -.4716835 -.2678651

fii | .006304 .0093183 0.68 0.502 -.0124641 .025072

nds | .9891518 .0701341 14.10 0.000 .8478944 1.130409

\_cons | -2.439442 2.790927 -0.87 0.387 -8.060658 3.181774

------------------------------------------------------------------------------

Predicting residual values

**. predict res, residual**

Regressing the original model with residual included

**. regress pdi mcap gdp m3 gdcf fii gds res**

Source | SS df MS Number of obs = 52

-------------+------------------------------ F( 7, 44) = 45.13

Model | 10051.921 7 1435.98872 Prob > F = 0.0000

Residual | 1399.8887 44 31.8156522 R-squared = 0.8778

-------------+------------------------------ Adj R-squared = 0.8583

Total | 11451.8097 51 224.545289 Root MSE = 5.6405

------------------------------------------------------------------------------

pdi | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

mcap | .0209612 .0403622 0.52 0.606 -.0603834 .1023058

gdp | .7483757 .2277381 3.29 0.002 .2893996 1.207352

m3 | -.0729518 .089711 -0.81 0.420 -.2537525 .107849

gdcf | -.3609715 .035817 -10.08 0.000 -.4331559 -.2887872

fii | .0069186 .0094784 0.73 0.469 -.0121838 .026021

gds | .723892 .072078 10.04 0.000 .5786284 .8691557

res | .8682502 .1678091 5.17 0.000 .5300531 1.206447

\_cons | -2.856997 2.859267 -1.00 0.323 -8.619471 2.905477

------------------------------------------------------------------------------

# since r-squared <1 and res is significant, gds is **endogenous.**

**UNIT ROOT TESTING**

**H0 : Unit root**

**H1 : Stationary**

If test stat <1% critical value, reject H0 ie. Stationary

**Dickey Fuller Test -**

**dfuller rbrazil** – For level variables

**dfuller d.rbrazil** – For first order differentiated variables \*(If H0 is accepted at level)

**Philips-Perron Test -**

**pperron rbrazil** – For level variables

**pperron d.rbrazil** – For first order differentiated variables \*(If H0 is accepted at level)

**Dickey Fuller Generalised Least Squares Test -**

**dfgls rbrazil** – For level variables

**dfgls d.rbrazil** – For first order differentiated variables \*(If H0 is accepted at level)

**ARIMA**

Autocorrelation graph (MA)

**. ac rbrazil**

Partial Autocorrelation graph (AR)

**. pac rbrazil**

ARIMA model for the optimum lags observed from the above two graphs

**. arima rbrazil, arima(ar, integration order, ma)**

Info criterion for the above arima model

**. estat ic**

\*Continue with all the possibilities of arima and find their individual ic

For the best model having the lowest aic score, run the model again..

**arima rbrazil, arima(ar, integration order, ma)**

Predict the residual

**predict res, residual**

Look at the pac graph, if 99% of all the lags lie in between the shaded area, this is the best arima model, else redo the arima models

**pac res**

**VECTOR AUTOREGRESSION**

Declaring the dataset, weekly

**. tsset weeks, weekly**

time variable: weeks, 1960w2 to 1980w21

delta: 1 week

Finding the optimum lag length for var

**. varsoc rbrazil rchile rcolombia rcostarica rperu rvenezuela**

Selection-order criteria

Sample: 1960w6 - 1980w21 Number of obs = 1056

+---------------------------------------------------------------------------+

|lag | LL LR df p FPE AIC HQIC SBIC |

|----+----------------------------------------------------------------------|

| 0 | -13454 4746.48 25.4924 25.5031\* 25.5206\* |

| 1 | -13389.3 129.44 36 0.000 4495.2\* 25.438\* 25.5128 25.6354 |

| 2 | -13354.1 70.257 36 0.001 4502.66 25.4397 25.5786 25.8062 |

| 3 | -13323 62.342\* 36 0.004 4544.1 25.4488 25.6519 25.9845 |

| 4 | -13308.4 29.211 36 0.781 4732.15 25.4893 25.7565 26.1942 |

+---------------------------------------------------------------------------+

Endogenous: rbrazil rchile rcolombia rcostarica rperu rvenezuela

Exogenous: \_cons

Estimating var for 1 lag

**. var rbrazil rchile rcolombia rcostarica rperu rvenezuela, lags(1)**

Vector autoregression

Sample: 1960w3 - 1980w21 No. of obs = 1059

Log likelihood = -13420.77 AIC = 25.42544

FPE = 4438.982 HQIC = 25.50007

Det(Sigma\_ml) = 4100.479 SBIC = 25.62236

Equation Parms RMSE R-sq chi2 P>chi2

----------------------------------------------------------------

rbrazil 7 1.84647 0.0369 40.53088 0.0000

rchile 7 2.21694 0.0288 31.36667 0.0000

rcolombia 7 1.11773 0.0026 2.717815 0.8433

rcostarica 7 1.23273 0.0045 4.761836 0.5747

rperu 7 1.45009 0.0331 36.28007 0.0000

rvenezuela 7 9.49353 0.0019 2.047251 0.9153

----------------------------------------------------------------

------------------------------------------------------------------------------

| Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

rbrazil |

rbrazil |

L1. | -.1162864 .0331825 -3.50 0.000 -.1813228 -.0512499

|

rchile |

L1. | -.0267047 .0263817 -1.01 0.311 -.0784118 .0250025

|

rcolombia |

L1. | .0116725 .0539646 0.22 0.829 -.0940962 .1174413

|

rcostarica |

L1. | .0397285 .0459767 0.86 0.388 -.0503841 .1298411

|

rperu |

L1. | .2476403 .0421496 5.88 0.000 .1650286 .3302521

|

rvenezuela |

L1. | .0001628 .0059761 0.03 0.978 -.0115501 .0118758

|

\_cons | .0800414 .0573033 1.40 0.162 -.0322709 .1923537

-------------+----------------------------------------------------------------

rchile |

rbrazil |

L1. | .020547 .0398401 0.52 0.606 -.0575381 .0986322

|

rchile |

L1. | .0110902 .0316748 0.35 0.726 -.0509912 .0731717

|

rcolombia |

L1. | -.0700815 .0647919 -1.08 0.279 -.1970713 .0569082

|

rcostarica |

L1. | -.2984599 .0552012 -5.41 0.000 -.4066523 -.1902675

|

rperu |

L1. | -.0319365 .0506064 -0.63 0.528 -.1311232 .0672502

|

rvenezuela |

L1. | .0026201 .0071751 0.37 0.715 -.0114428 .0166831

|

\_cons | .0241073 .0688004 0.35 0.726 -.1107389 .1589536

-------------+----------------------------------------------------------------

rcolombia |

rbrazil |

L1. | .0033727 .0200864 0.17 0.867 -.035996 .0427414

|

rchile |

L1. | -.0162729 .0159697 -1.02 0.308 -.0475729 .0150271

|

rcolombia |

L1. | .0364333 .0326666 1.12 0.265 -.027592 .1004585

|

rcostarica |

L1. | .006709 .0278312 0.24 0.810 -.0478391 .0612571

|

rperu |

L1. | -.0048443 .0255146 -0.19 0.849 -.0548519 .0451633

|

rvenezuela |

L1. | .0028853 .0036175 0.80 0.425 -.0042049 .0099755

|

\_cons | .1308335 .0346875 3.77 0.000 .0628471 .1988198

-------------+----------------------------------------------------------------

rcostarica |

rbrazil |

L1. | -.0363623 .022153 -1.64 0.101 -.0797814 .0070568

|

rchile |

L1. | -.0002933 .0176127 -0.02 0.987 -.0348136 .034227

|

rcolombia |

L1. | -.0082781 .0360274 -0.23 0.818 -.0788905 .0623343

|

rcostarica |

L1. | -.0376019 .0306945 -1.23 0.221 -.0977621 .0225583

|

rperu |

L1. | .0266453 .0281396 0.95 0.344 -.0285072 .0817979

|

rvenezuela |

L1. | .0014386 .0039897 0.36 0.718 -.006381 .0092583

|

\_cons | .1235375 .0382563 3.23 0.001 .0485565 .1985185

-------------+----------------------------------------------------------------

rperu |

rbrazil |

L1. | .0736214 .0260592 2.83 0.005 .0225463 .1246966

|

rchile |

L1. | -.0244892 .0207184 -1.18 0.237 -.0650965 .016118

|

rcolombia |

L1. | .0605892 .0423801 1.43 0.153 -.0224743 .1436527

|

rcostarica |

L1. | -.0300825 .0361069 -0.83 0.405 -.1008507 .0406858

|

rperu |

L1. | .1090295 .0331014 3.29 0.001 .0441519 .1739071

|

rvenezuela |

L1. | .0017663 .0046932 0.38 0.707 -.0074323 .0109648

|

\_cons | .0606996 .0450021 1.35 0.177 -.0275028 .148902

-------------+----------------------------------------------------------------

rvenezuela |

rbrazil |

L1. | .1792467 .1706057 1.05 0.293 -.1551343 .5136277

|

rchile |

L1. | .0498286 .1356398 0.37 0.713 -.2160205 .3156778

|

rcolombia |

L1. | -.2035159 .2774559 -0.73 0.463 -.7473194 .3402875

|

rcostarica |

L1. | .0313794 .2363862 0.13 0.894 -.431929 .4946878

|

rperu |

L1. | -.1696691 .2167098 -0.78 0.434 -.5944126 .2550744

|

rvenezuela |

L1. | .0043488 .0307257 0.14 0.887 -.0558724 .0645701

|

\_cons | .0852615 .2946213 0.29 0.772 -.4921857 .6627086

------------------------------------------------------------------------------

**IMPULSE RESPONSE GRAPHS**

Estimating varbasic, similar to var, for getting IRF Graphs

**. varbasic rbrazil rchile rcolombia rcostarica rperu rvenezuela, lags(1/2) step(8) irf**

Vector autoregression

Sample: 1960w4 - 1980w21 No. of obs = 1058

Log likelihood = -13374.39 AIC = 25.42986

FPE = 4458.656 HQIC = 25.56857

Det(Sigma\_ml) = 3847.379 SBIC = 25.79583

Equation Parms RMSE R-sq chi2 P>chi2

----------------------------------------------------------------

rbrazil 13 1.83811 0.0508 56.56605 0.0000

rchile 13 2.21214 0.0390 42.94709 0.0000

rcolombia 13 1.10577 0.0303 33.04158 0.0010

rcostarica 13 1.2313 0.0130 13.91896 0.3059

rperu 13 1.4451 0.0461 51.1812 0.0000

rvenezuela 13 9.51139 0.0048 5.140069 0.9531

----------------------------------------------------------------

------------------------------------------------------------------------------

| Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

rbrazil |

rbrazil |

L1. | -.1138052 .033702 -3.38 0.001 -.1798598 -.0477505

L2. | .0307621 .033525 0.92 0.359 -.0349457 .0964699

|

rchile |

L1. | -.0208997 .0266982 -0.78 0.434 -.0732272 .0314279

L2. | -.0000469 .0262261 -0.00 0.999 -.051449 .0513553

|

rcolombia |

L1. | .0098092 .053713 0.18 0.855 -.0954663 .1150847

L2. | .1768364 .0538848 3.28 0.001 .0712242 .2824486

|

rcostarica |

L1. | .044326 .0457398 0.97 0.333 -.0453224 .1339745

L2. | .0117469 .0464265 0.25 0.800 -.0792474 .1027412

|

rperu |

L1. | .2272267 .0425646 5.34 0.000 .1438017 .3106518

L2. | .0037217 .0427643 0.09 0.931 -.0800947 .0875382

|

rvenezuela |

L1. | .000403 .0059386 0.07 0.946 -.0112364 .0120424

L2. | -.0001945 .0059346 -0.03 0.974 -.011826 .0114371

|

\_cons | .0507076 .0575729 0.88 0.378 -.0621332 .1635483

-------------+----------------------------------------------------------------

rchile |

rbrazil |

L1. | .0248657 .0405598 0.61 0.540 -.0546301 .1043615

L2. | .0876289 .0403469 2.17 0.030 .0085505 .1667073

|

rchile |

L1. | .0216902 .0321309 0.68 0.500 -.0412852 .0846657

L2. | -.0388979 .0315627 -1.23 0.218 -.1007596 .0229639

|

rcolombia |

L1. | -.0735227 .0646428 -1.14 0.255 -.2002202 .0531749

L2. | -.0677034 .0648495 -1.04 0.296 -.1948061 .0593994

|

rcostarica |

L1. | -.2890325 .0550472 -5.25 0.000 -.3969231 -.1811419

L2. | .1243055 .0558736 2.22 0.026 .0147952 .2338159

|

rperu |

L1. | -.0414857 .0512259 -0.81 0.418 -.1418866 .0589151

L2. | -.0136866 .0514662 -0.27 0.790 -.1145585 .0871852

|

rvenezuela |

L1. | .0019601 .007147 0.27 0.784 -.0120477 .0159679

L2. | -.0025797 .0071422 -0.36 0.718 -.0165781 .0114186

|

\_cons | .0118449 .0692881 0.17 0.864 -.1239573 .1476471

-------------+----------------------------------------------------------------

rcolombia |

rbrazil |

L1. | .001445 .0202745 0.07 0.943 -.0382922 .0411822

L2. | .0359334 .020168 1.78 0.075 -.0035952 .075462

|

rchile |

L1. | -.0088275 .0160611 -0.55 0.583 -.0403068 .0226518

L2. | -.0033512 .0157771 -0.21 0.832 -.0342737 .0275714

|

rcolombia |

L1. | .0386474 .0323127 1.20 0.232 -.0246843 .1019792

L2. | .1089014 .032416 3.36 0.001 .0453672 .1724357

|

rcostarica |

L1. | .0109298 .0275162 0.40 0.691 -.043001 .0648606

L2. | .0216425 .0279293 0.77 0.438 -.033098 .0763829

|

rperu |

L1. | -.0267439 .025606 -1.04 0.296 -.0769309 .023443

L2. | .0454138 .0257262 1.77 0.078 -.0050086 .0958362

|

rvenezuela |

L1. | .00306 .0035725 0.86 0.392 -.003942 .0100621

L2. | -.0010969 .0035701 -0.31 0.759 -.0080942 .0059005

|

\_cons | .1076687 .0346347 3.11 0.002 .0397859 .1755516

-------------+----------------------------------------------------------------

rcostarica |

rbrazil |

L1. | -.0317744 .0225761 -1.41 0.159 -.0760227 .0124739

L2. | .0173504 .0224575 0.77 0.440 -.0266655 .0613663

|

rchile |

L1. | -.0030427 .0178844 -0.17 0.865 -.0380956 .0320101

L2. | .0416764 .0175682 2.37 0.018 .0072435 .0761094

|

rcolombia |

L1. | -.0054833 .0359809 -0.15 0.879 -.0760045 .065038

L2. | -.068434 .036096 -1.90 0.058 -.1391808 .0023128

|

rcostarica |

L1. | -.0362662 .0306399 -1.18 0.237 -.0963193 .0237869

L2. | -.0034125 .0310999 -0.11 0.913 -.0643672 .0575422

|

rperu |

L1. | .027238 .0285129 0.96 0.339 -.0286463 .0831222

L2. | -.0116293 .0286467 -0.41 0.685 -.0677758 .0445171

|

rvenezuela |

L1. | .0010547 .0039781 0.27 0.791 -.0067422 .0088517

L2. | .0004778 .0039754 0.12 0.904 -.0073138 .0082695

|

\_cons | .1329499 .0385665 3.45 0.001 .0573608 .2085389

-------------+----------------------------------------------------------------

rperu |

rbrazil |

L1. | .0683502 .0264962 2.58 0.010 .0164186 .1202818

L2. | .0268311 .0263571 1.02 0.309 -.0248278 .07849

|

rchile |

L1. | -.0164522 .0209899 -0.78 0.433 -.0575917 .0246872

L2. | .0160006 .0206187 0.78 0.438 -.0244113 .0564125

|

rcolombia |

L1. | .0657381 .0422287 1.56 0.120 -.0170285 .1485048

L2. | .0496543 .0423637 1.17 0.241 -.0333771 .1326856

|

rcostarica |

L1. | -.0264786 .0359603 -0.74 0.462 -.0969594 .0440023

L2. | .035589 .0365001 0.98 0.330 -.0359499 .1071279

|

rperu |

L1. | .0908964 .0334639 2.72 0.007 .0253084 .1564844

L2. | .0640313 .0336209 1.90 0.057 -.0018644 .1299271

|

rvenezuela |

L1. | .0018576 .0046688 0.40 0.691 -.0072932 .0110084

L2. | -.0028937 .0046657 -0.62 0.535 -.0120383 .006251

|

\_cons | .0433116 .0452633 0.96 0.339 -.0454028 .1320259

-------------+----------------------------------------------------------------

rvenezuela |

rbrazil |

L1. | .1889738 .1743928 1.08 0.279 -.1528299 .5307774

L2. | .1537783 .1734771 0.89 0.375 -.1862306 .4937873

|

rchile |

L1. | .0554112 .1381515 0.40 0.688 -.2153609 .3261832

L2. | .0381299 .1357084 0.28 0.779 -.2278536 .3041133

|

rcolombia |

L1. | -.1903127 .277941 -0.68 0.494 -.735067 .3544416

L2. | .1946102 .2788298 0.70 0.485 -.3518863 .7411066

|

rcostarica |

L1. | .0437636 .2366835 0.18 0.853 -.4201276 .5076548

L2. | -.0512646 .2402368 -0.21 0.831 -.5221201 .4195908

|

rperu |

L1. | -.2356977 .2202529 -1.07 0.285 -.6673855 .1959901

L2. | .1031277 .2212863 0.47 0.641 -.3305855 .5368408

|

rvenezuela |

L1. | .0042623 .0307295 0.14 0.890 -.0559664 .0644909

L2. | -.0036568 .0307088 -0.12 0.905 -.0638449 .0565313

|

\_cons | .0444755 .2979142 0.15 0.881 -.5394255 .6283765

------------------------------------------------------------------------------

Estimating the effect of unit change in brazil, on all other countries

**. irf graph irf, irf(varbasic) impulse(rbrazil) response(rchile rcolombia rcostarica rperu rvenezuela)**

**POST ESTIMATION TESTS**

VAR normality test

**. varnorm, jbera skewness kurtosis**

Jarque-Bera test

+--------------------------------------------------------+

| Equation | chi2 df Prob > chi2 |

|--------------------+-----------------------------------|

| brazil | 862.223 2 0.00000 |

| chile | 2.4e+07 2 0.00000 |

| colombia | 5551.338 2 0.00000 |

| costarica | 2.2e+04 2 0.00000 |

| peru | 1936.487 2 0.00000 |

| venezuela | 2.9e+07 2 0.00000 |

| ALL | 5.3e+07 12 0.00000 |

+--------------------------------------------------------+

Skewness test

+--------------------------------------------------------+

| Equation | Skewness chi2 df Prob > chi2 |

|--------------------+-----------------------------------|

| brazil | -.46523 38.202 1 0.00000 |

| chile | -24.625 1.1e+05 1 0.00000 |

| colombia | -1.2211 263.190 1 0.00000 |

| costarica | .20185 7.191 1 0.00733 |

| peru | .4182 30.868 1 0.00000 |

| venezuela | -26.44 1.2e+05 1 0.00000 |

| ALL | 2.3e+05 6 0.00000 |

+--------------------------------------------------------+

Kurtosis test

+--------------------------------------------------------+

| Equation | Kurtosis chi2 df Prob > chi2 |

|--------------------+-----------------------------------|

| brazil | 7.3214 824.021 1 0.00000 |

| chile | 731.43 2.3e+07 1 0.00000 |

| colombia | 13.947 5288.148 1 0.00000 |

| costarica | 25.395 2.2e+04 1 0.00000 |

| peru | 9.5717 1905.618 1 0.00000 |

| venezuela | 812.73 2.9e+07 1 0.00000 |

| ALL | 5.2e+07 6 0.00000 |

+--------------------------------------------------------+

VAR stability test

**. varstable**

Eigenvalue stability condition

+----------------------------------------+

| Eigenvalue | Modulus |

|--------------------------+-------------|

| .9970692 | .997069 |

| .9886827 | .988683 |

| .9884226 + .00850869i | .988459 |

| .9884226 - .00850869i | .988459 |

| .965817 + .00564828i | .965833 |

| .965817 - .00564828i | .965833 |

| .1408535 + .03737628i | .145728 |

| .1408535 - .03737628i | .145728 |

| -.05715482 | .057155 |

| .04484396 | .044844 |

| -.01768466 + .01989175i | .026616 |

| -.01768466 - .01989175i | .026616 |

+----------------------------------------+

All the eigenvalues lie inside the unit circle.

VAR satisfies stability condition.

**COINTEGRATION**

Finding the number of cointegrating vectors or variables \*Here we took the original values and not the return log values

**. vecrank brazil chile colombia costarica peru venezuela, trend(constant) max**

Johansen tests for cointegration

Trend: constant Number of obs = 1059

Sample: 1960w4 - 1980w22 Lags = 2

-------------------------------------------------------------------------------

5%

maximum trace critical

rank parms LL eigenvalue statistic value

0 42 -51333.79 . 106.2039 94.15

1 53 -51315.784 0.03343 70.1920 68.52

2 62 -51301.557 0.02651 41.7368\* 47.21

3 69 -51289.707 0.02213 18.0379 29.68

4 74 -51284.081 0.01057 6.7863 15.41

5 77 -51281.641 0.00460 1.9055 3.76

6 78 -51280.688 0.00180

-------------------------------------------------------------------------------

5%

maximum max critical

rank parms LL eigenvalue statistic value

0 42 -51333.79 . 36.0119 39.37

1 53 -51315.784 0.03343 28.4552 33.46

2 62 -51301.557 0.02651 23.6989 27.07

3 69 -51289.707 0.02213 11.2516 20.97

4 74 -51284.081 0.01057 4.8808 14.07

5 77 -51281.641 0.00460 1.9055 3.76

6 78 -51280.688 0.00180

-------------------------------------------------------------------------------

Finding the optimum lag length

**. varsoc brazil chile colombia costarica peru venezuela**

Selection-order criteria

Sample: 1960w6 - 1980w22 Number of obs = 1057

+---------------------------------------------------------------------------+

|lag | LL LR df p FPE AIC HQIC SBIC |

|----+----------------------------------------------------------------------|

| 0 | -64236.4 2.5e+45 121.556 121.567 121.584 |

| 1 | -51268.5 25936 36 0.000 5.9e+34 97.087 97.1618 97.2842\* |

| 2 | -51189.5 158.06 36 0.000 5.4e+34 97.0056 97.1444\* 97.3718 |

| 3 | -51129.8 119.25 36 0.000 5.2e+34\* 96.9609\* 97.1638 97.4962 |

| 4 | -51096.3 67.093\* 36 0.001 5.2e+34 96.9655 97.2325 97.6699 |

+---------------------------------------------------------------------------+

Endogenous: brazil chile colombia costarica peru venezuela

Exogenous: \_cons

Estimating VECM

**. vec brazil chile colombia costarica peru venezuela, trend(constant) rank(2) lags(4)**

**#add lag obtained +1(3+1)**

Vector error-correction model

Sample: 1960w5 - 1980w22 No. of obs = 1058

AIC = 96.9652

Log likelihood = -51196.59 HQIC = 97.13948

Det(Sigma\_ml) = 4.33e+34 SBIC = 97.42501

Equation Parms RMSE R-sq chi2 P>chi2

----------------------------------------------------------------

D\_brazil 15 1349.63 0.0389 42.18652 0.0002

D\_chile 15 295.381 0.1128 132.5387 0.0000

D\_colombia 15 227.879 0.0260 27.77923 0.0230

D\_costarica 15 368.806 0.0658 73.3558 0.0000

D\_peru 15 390.719 0.0516 56.68065 0.0000

D\_venezuela 15 21986 0.0145 15.36901 0.4252

----------------------------------------------------------------

------------------------------------------------------------------------------

| Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

D\_brazil |

\_ce1 |

L1. | -.0119508 .0065649 -1.82 0.069 -.0248178 .0009162

|

\_ce2 |

L1. | -.0469942 .0249341 -1.88 0.059 -.0958642 .0018758

|

brazil |

LD. | -.055008 .0373268 -1.47 0.141 -.1281673 .0181513

L2D. | .0008384 .037203 0.02 0.982 -.072078 .0737549

|

chile |

LD. | .092439 .1427379 0.65 0.517 -.1873221 .3722001

L2D. | -.0536569 .1365999 -0.39 0.694 -.3213879 .214074

|

colombia |

LD. | .0840534 .2054497 0.41 0.682 -.3186206 .4867275

L2D. | .9236609 .2058673 4.49 0.000 .5201684 1.327153

|

costarica |

LD. | -.0105463 .113386 -0.09 0.926 -.2327788 .2116863

L2D. | .370423 .1172739 3.16 0.002 .1405704 .6002757

|

peru |

LD. | -.0426476 .1235386 -0.35 0.730 -.2847787 .1994836

L2D. | -.0333649 .1226215 -0.27 0.786 -.2736987 .2069688

|

venezuela |

LD. | .0003944 .0019045 0.21 0.836 -.0033383 .0041272

L2D. | -.0003171 .0018989 -0.17 0.867 -.004039 .0034047

|

\_cons | 20.00334 42.81267 0.47 0.640 -63.90795 103.9146

-------------+----------------------------------------------------------------

D\_chile |

\_ce1 |

L1. | .0007628 .0014368 0.53 0.595 -.0020533 .0035789

|

\_ce2 |

L1. | -.0126774 .0054571 -2.32 0.020 -.0233731 -.0019817

|

brazil |

LD. | .0000564 .0081694 0.01 0.994 -.0159553 .016068

L2D. | .0230155 .0081422 2.83 0.005 .007057 .038974

|

chile |

LD. | .0720916 .0312396 2.31 0.021 .010863 .1333201

L2D. | -.0389665 .0298963 -1.30 0.192 -.0975621 .0196291

|

colombia |

LD. | -.0594228 .0449647 -1.32 0.186 -.147552 .0287065

L2D. | -.1023879 .0450561 -2.27 0.023 -.1906963 -.0140796

|

costarica |

LD. | -.2267058 .0248157 -9.14 0.000 -.2753437 -.178068

L2D. | .1498989 .0256666 5.84 0.000 .0995933 .2002044

|

peru |

LD. | -.0348562 .0270377 -1.29 0.197 -.0878491 .0181366

L2D. | -.0262475 .0268369 -0.98 0.328 -.0788469 .026352

|

venezuela |

LD. | .0000475 .0004168 0.11 0.909 -.0007695 .0008644

L2D. | .0000935 .0004156 0.22 0.822 -.0007211 .000908

|

\_cons | 5.386414 9.369981 0.57 0.565 -12.97841 23.75124

-------------+----------------------------------------------------------------

D\_colombia |

\_ce1 |

L1. | .0029789 .0011085 2.69 0.007 .0008064 .0051514

|

\_ce2 |

L1. | .0051402 .00421 1.22 0.222 -.0031113 .0133916

|

brazil |

LD. | .0058094 .0063024 0.92 0.357 -.0065432 .018162

L2D. | .008293 .0062815 1.32 0.187 -.0040185 .0206046

|

chile |

LD. | -.0071194 .0241006 -0.30 0.768 -.0543556 .0401169

L2D. | -.019421 .0230642 -0.84 0.400 -.064626 .025784

|

colombia |

LD. | -.0186639 .0346891 -0.54 0.591 -.0866533 .0493256

L2D. | .0695525 .0347596 2.00 0.045 .0014249 .1376802

|

costarica |

LD. | .0111162 .0191447 0.58 0.561 -.0264067 .048639

L2D. | .0241552 .0198011 1.22 0.223 -.0146542 .0629647

|

peru |

LD. | -.028535 .0208589 -1.37 0.171 -.0694176 .0123476

L2D. | .0162941 .020704 0.79 0.431 -.024285 .0568732

|

venezuela |

LD. | .0001378 .0003216 0.43 0.668 -.0004924 .0007681

L2D. | -.0001779 .0003206 -0.55 0.579 -.0008063 .0004505

|

\_cons | 9.147366 7.2287 1.27 0.206 -5.020626 23.31536

-------------+----------------------------------------------------------------

D\_costarica |

\_ce1 |

L1. | .0004382 .001794 0.24 0.807 -.0030779 .0039543

|

\_ce2 |

L1. | .0212045 .0068136 3.11 0.002 .0078501 .0345589

|

brazil |

LD. | .0046736 .0102001 0.46 0.647 -.0153182 .0246654

L2D. | -.008991 .0101662 -0.88 0.376 -.0289164 .0109344

|

chile |

LD. | .0343722 .0390051 0.88 0.378 -.0420764 .1108207

L2D. | .1360427 .0373278 3.64 0.000 .0628816 .2092039

|

colombia |

LD. | -.0426589 .0561419 -0.76 0.447 -.1526951 .0673773

L2D. | -.0587282 .0562561 -1.04 0.297 -.168988 .0515316

|

costarica |

LD. | .1161512 .0309843 3.75 0.000 .0554231 .1768792

L2D. | .0983856 .0320467 3.07 0.002 .0355752 .1611959

|

peru |

LD. | .0046074 .0337586 0.14 0.891 -.0615583 .070773

L2D. | .0015983 .033508 0.05 0.962 -.0640762 .0672728

|

venezuela |

LD. | .0002202 .0005204 0.42 0.672 -.0007999 .0012402

L2D. | -.0003806 .0005189 -0.73 0.463 -.0013976 .0006365

|

\_cons | 13.80609 11.69915 1.18 0.238 -9.123812 36.736

-------------+----------------------------------------------------------------

D\_peru |

\_ce1 |

L1. | .0032163 .0019005 1.69 0.091 -.0005087 .0069413

|

\_ce2 |

L1. | -.0194506 .0072184 -2.69 0.007 -.0335985 -.0053027

|

brazil |

LD. | .0016228 .0108061 0.15 0.881 -.0195568 .0228025

L2D. | .0009894 .0107703 0.09 0.927 -.02012 .0220987

|

chile |

LD. | .0015451 .0413227 0.04 0.970 -.0794459 .0825361

L2D. | -.0000464 .0395457 -0.00 0.999 -.0775546 .0774619

|

colombia |

LD. | .0353727 .0594778 0.59 0.552 -.0812016 .151947

L2D. | .0312165 .0595987 0.52 0.600 -.0855948 .1480278

|

costarica |

LD. | -.0093578 .0328253 -0.29 0.776 -.0736942 .0549787

L2D. | .0950849 .0339509 2.80 0.005 .0285425 .1616274

|

peru |

LD. | .1508043 .0357645 4.22 0.000 .0807072 .2209014

L2D. | .0303376 .035499 0.85 0.393 -.0392391 .0999143

|

venezuela |

LD. | .0002194 .0005514 0.40 0.691 -.0008612 .0013001

L2D. | -.0005768 .0005497 -1.05 0.294 -.0016542 .0005007

|

\_cons | 15.11222 12.39429 1.22 0.223 -9.180137 39.40457

-------------+----------------------------------------------------------------

D\_venezuela |

\_ce1 |

L1. | -.0743478 .1069449 -0.70 0.487 -.2839559 .1352603

|

\_ce2 |

L1. | -.4675743 .4061861 -1.15 0.250 -1.263685 .3285359

|

brazil |

LD. | 1.136616 .6080677 1.87 0.062 -.0551748 2.328407

L2D. | .3115324 .6060496 0.51 0.607 -.8763029 1.499368

|

chile |

LD. | .6296241 2.325252 0.27 0.787 -3.927785 5.187034

L2D. | .2380743 2.225262 0.11 0.915 -4.123359 4.599508

|

colombia |

LD. | -4.128848 3.34685 -1.23 0.217 -10.68855 2.430858

L2D. | 2.580413 3.353653 0.77 0.442 -3.992626 9.153451

|

costarica |

LD. | .7507057 1.8471 0.41 0.684 -2.869543 4.370954

L2D. | -.3229386 1.910435 -0.17 0.866 -4.067321 3.421444

|

peru |

LD. | -4.1047 2.012488 -2.04 0.041 -8.049104 -.1602959

L2D. | 1.972866 1.997549 0.99 0.323 -1.942258 5.88799

|

venezuela |

LD. | -.0095069 .0310248 -0.31 0.759 -.0703144 .0513006

L2D. | -.0579419 .0309343 -1.87 0.061 -.1185721 .0026883

|

\_cons | -2.058606 697.4338 -0.00 0.998 -1369.004 1364.887

------------------------------------------------------------------------------

Cointegrating equations

Equation Parms chi2 P>chi2

-------------------------------------------

\_ce1 4 305.7246 0.0000

\_ce2 4 51.54462 0.0000

-------------------------------------------

Identification: beta is exactly identified

Johansen normalization restrictions imposed

------------------------------------------------------------------------------

beta | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

\_ce1 |

brazil | 1 . . . . .

chile | (omitted)

colombia | .1099993 .7783379 0.14 0.888 -1.415515 1.635514

costarica | -.8384866 .2570415 -3.26 0.001 -1.342279 -.3346945

peru | -2.449077 .5299462 -4.62 0.000 -3.487753 -1.410402

venezuela | .0134093 .0147892 0.91 0.365 -.015577 .0423955

\_cons | -3448.254 . . . . .

-------------+----------------------------------------------------------------

\_ce2 |

brazil | -1.39e-17 . . . . .

chile | 1 . . . . .

colombia | -1.051845 .1771748 -5.94 0.000 -1.399102 -.7045893

costarica | .1096441 .0585109 1.87 0.061 -.0050352 .2243234

peru | .7197077 .1206328 5.97 0.000 .4832717 .9561437

venezuela | .0090619 .0033665 2.69 0.007 .0024637 .0156601

\_cons | -6143.826 . . . . .

------------------------------------------------------------------------------

**POST ESTIMATION TESTS**

**. veclmar, mlag(3)**

Lagrange-multiplier test

+--------------------------------------+

| lag | chi2 df Prob > chi2 |

|------+-------------------------------|

| 1 | 63.9567 36 0.00280 |

| 2 | 72.4006 36 0.00030 |

| 3 | 69.9693 36 0.00059 |

+--------------------------------------+

H0: no autocorrelation at lag order

**. vecnorm, jbera skewness kurtosis**

Jarque-Bera test

+--------------------------------------------------------+

| Equation | chi2 df Prob > chi2 |

|--------------------+-----------------------------------|

| D\_brazil | 987.426 2 0.00000 |

| D\_chile | 2.0e+07 2 0.00000 |

| D\_colombia | 5366.965 2 0.00000 |

| D\_costarica | 2.3e+04 2 0.00000 |

| D\_peru | 1943.210 2 0.00000 |

| D\_venezuela | 3.3e+07 2 0.00000 |

| ALL | 5.3e+07 12 0.00000 |

+--------------------------------------------------------+

Skewness test

+--------------------------------------------------------+

| Equation | Skewness chi2 df Prob > chi2 |

|--------------------+-----------------------------------|

| D\_brazil | -.5797 59.258 1 0.00000 |

| D\_chile | -23.371 9.6e+04 1 0.00000 |

| D\_colombia | -1.2108 258.530 1 0.00000 |

| D\_costarica | .00067 0.000 1 0.99293 |

| D\_peru | .45298 36.182 1 0.00000 |

| D\_venezuela | -27.804 1.4e+05 1 0.00000 |

| ALL | 2.3e+05 6 0.00000 |

+--------------------------------------------------------+

Kurtosis test

+--------------------------------------------------------+

| Equation | Kurtosis chi2 df Prob > chi2 |

|--------------------+-----------------------------------|

| D\_brazil | 7.5886 928.168 1 0.00000 |

| D\_chile | 682.07 2.0e+07 1 0.00000 |

| D\_colombia | 13.765 5108.436 1 0.00000 |

| D\_costarica | 25.991 2.3e+04 1 0.00000 |

| D\_peru | 9.5772 1907.028 1 0.00000 |

| D\_venezuela | 862.65 3.3e+07 1 0.00000 |

| ALL | 5.3e+07 6 0.00000 |

+--------------------------------------------------------+

**. vecstable**

Eigenvalue stability condition

+----------------------------------------+

| Eigenvalue | Modulus |

|--------------------------+-------------|

| 1 | 1 |

| 1 | 1 |

| 1 | 1 |

| 1 | 1 |

| .9800487 | .980049 |

| .9609723 | .960972 |

| .4000339 + .07796305i | .40756 |

| .4000339 - .07796305i | .40756 |

| -.3732159 + .0128935i | .373439 |

| -.3732159 - .0128935i | .373439 |

| .0942866 + .3401407i | .352967 |

| .0942866 - .3401407i | .352967 |

| -.05454231 + .2968527i | .301822 |

| -.05454231 - .2968527i | .301822 |

| .2868113 | .286811 |

| -.01046929 + .2039136i | .204182 |

| -.01046929 - .2039136i | .204182 |

| -.1390095 | .139009 |

+----------------------------------------+

The VECM specification imposes 4 unit moduli.