Project LINK 2005

Panel: Applied Economics, Mexico

Quarterly Macroeconometric Model of Mexico

Eduardo Loría

Center for Modeling and Economic Forecasting
School of Economics, UNAM

Spring Meeting May 19th 2005, Mexico City

I. Motivation:

- To build an easy manageable Macroeconometric Model of the Mexican Economy 1980.1-2004.3.

Purposes:

- Short-term forecasting
- Find main (structural) determinants
- Sensibility analysis
- Great introspection power
- Match Statistical Model- Economic Model

AGGREGATE DEMAND OF AN OPEN ECONOMY

REDUCED FORM MODEL

II. THE MODEL

Small Open Economy:

$$y = f(\overset{+}{q}, \overset{+}{y^{us}}, \overset{+}{y^{d}}, \overset{+}{m2})$$

H_0 = Domestic Economic Policy is efficient over GDP (y)

$$\alpha_1 * y^d > \alpha_2 * y^{us}$$

$$\alpha_3 * q, \ \alpha_4 * m2 > 0$$

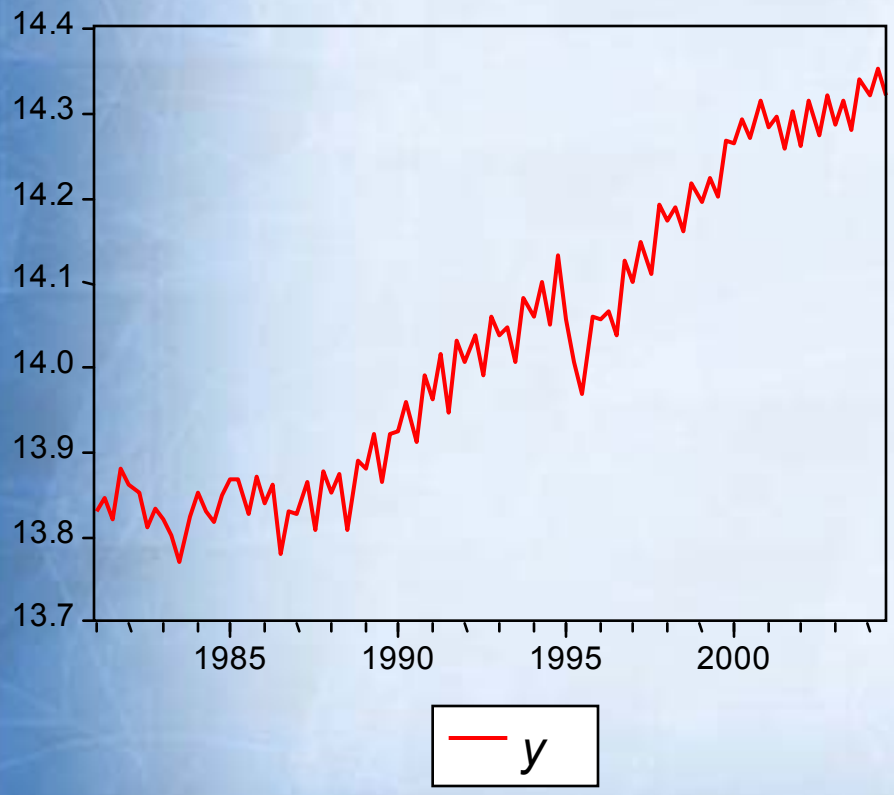
We reject that Mexican GDP depends entirely on US' GDP (y^{us})

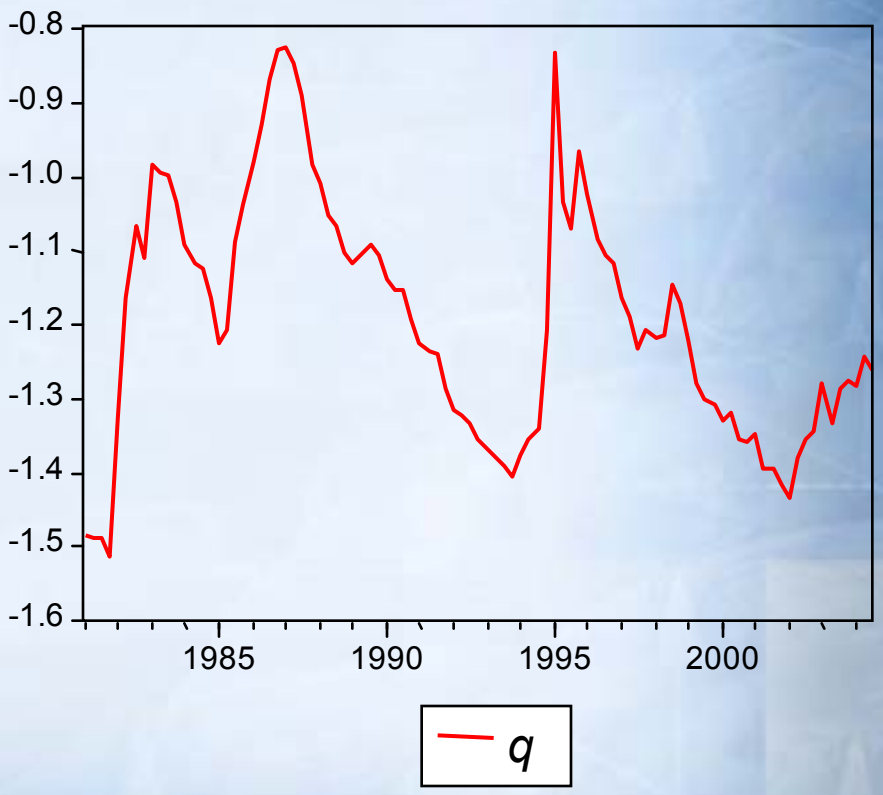
III. ESTIMATION

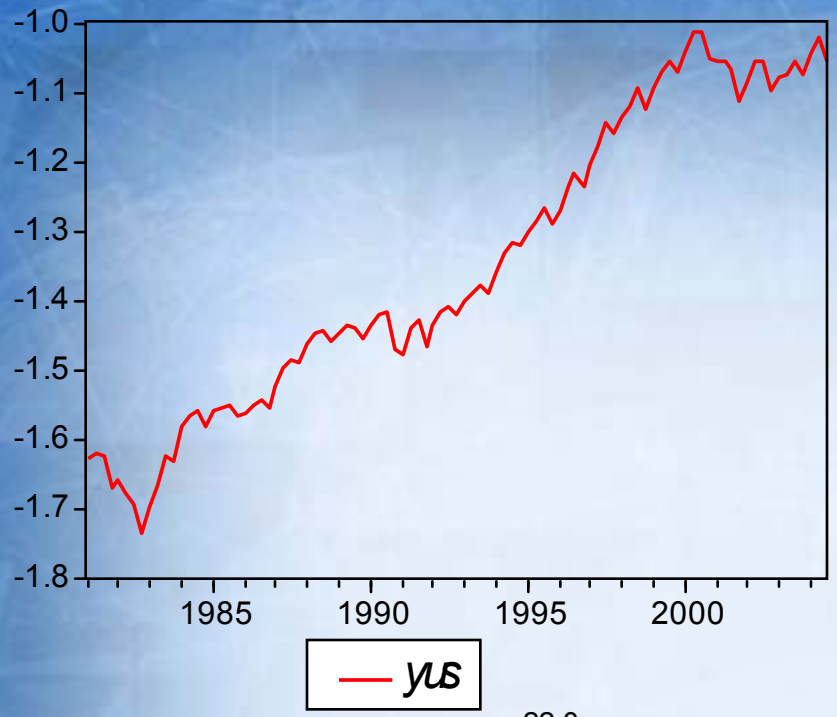
Cointegration & Error Correction Mechanism

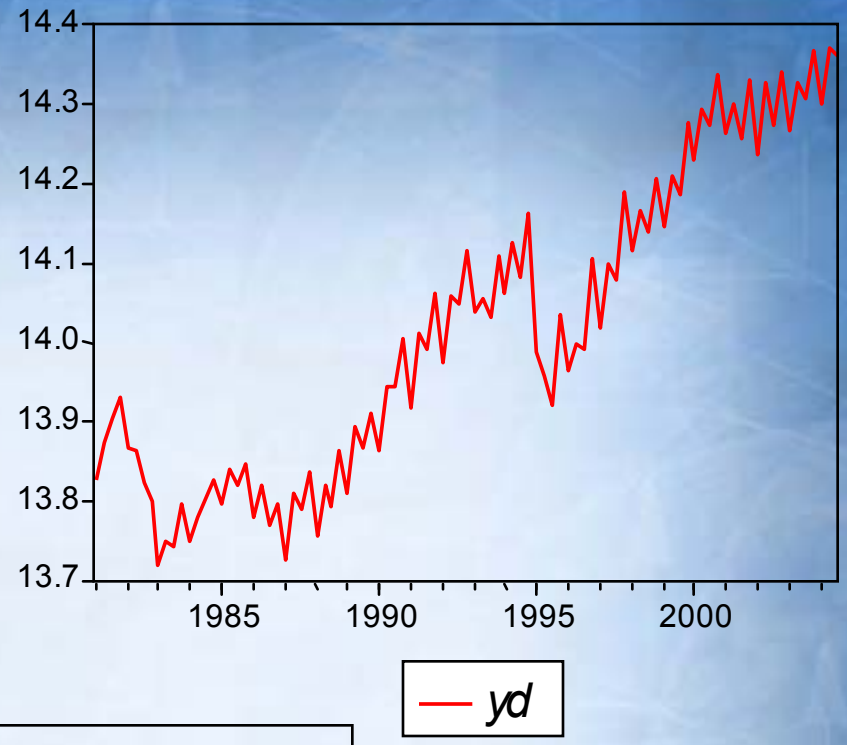
- **Engle-Granger Procedure**
- **Johansen's**

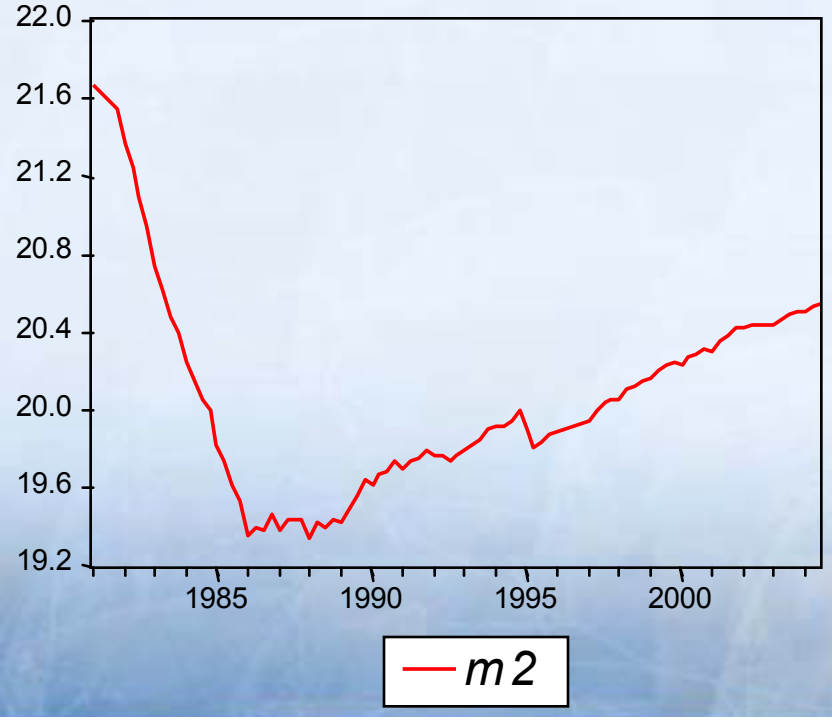
TIME SERIES
(Logs)






-1.0
-1.1
-1.2
-1.3
-1.4
-1.5
-1.6
-1.7
-1.8
1985
1990
1995
2000
yus


14.4
14.3
14.2
14.1
14.0
13.9
13.8
13.7
1985
1990
1995
2000
yd


22.0
21.6
21.2
20.8
20.4
20.0
19.6
19.2
1985
1990
1995
2000
m2

All variables are I(1)

Cointegration Estimation Applies

EG → $4.96 + 0.052*q + 0.268*y^{us} + 0.662*y^{d} + 0.011*m2$

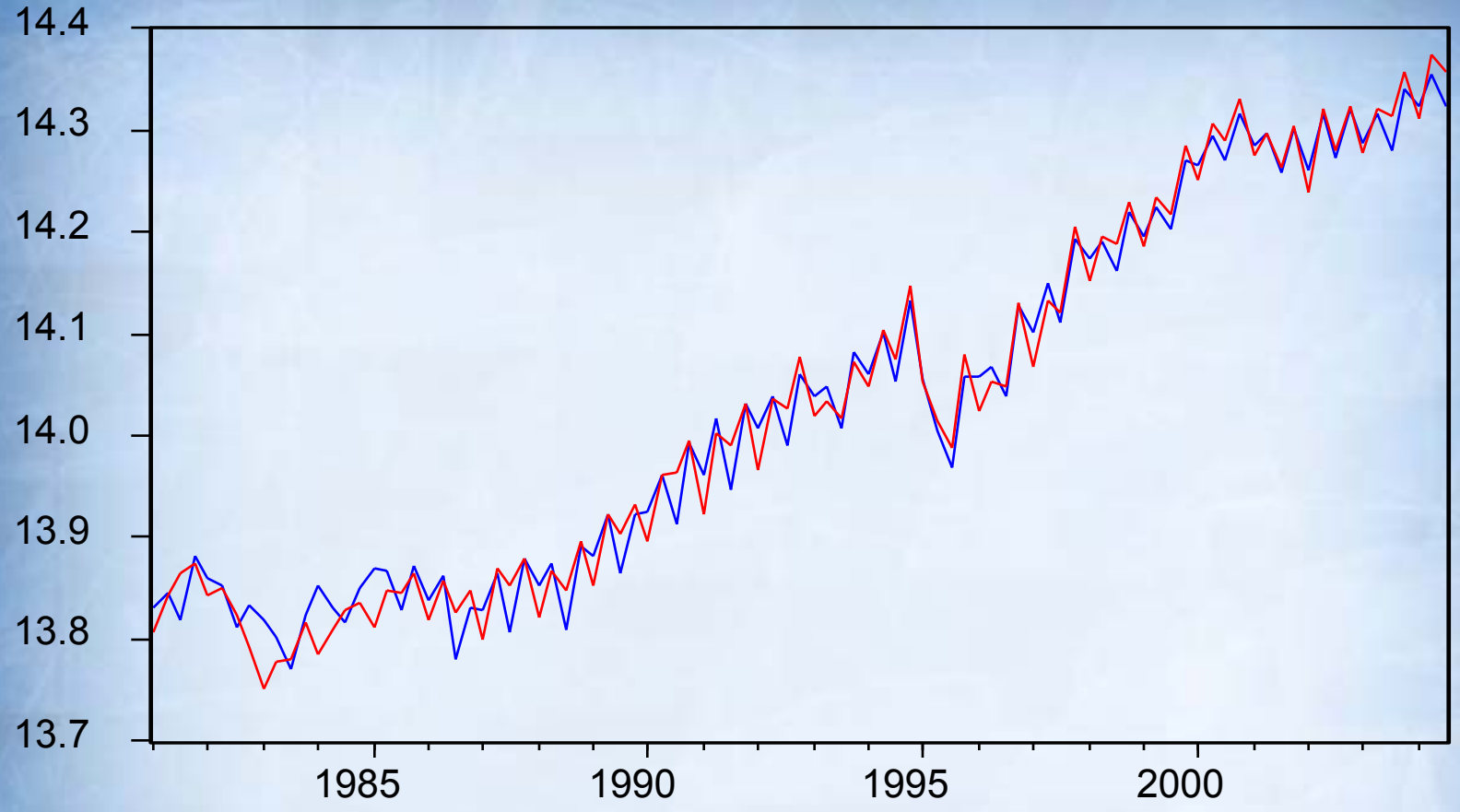
t (8.5) (2.29) (8.35) (16.09) (1.95)

$R^2 = 0.985$; DW = 1.716; JB = 3.44(0.18)

J → $3.56 + 0.092*q + 0.221*y^{us} + 0.768*y^{d} + 0.005*m2$

t (6.09) (4.52) (7.27) (19.25) (1.43)

GDP, REGRESSION OUTPUT



Sample period: 1981.1-2004-3

Observations: 95

Eigenvalue: 0.3359; Trace Statistic: 110.4; 1% Critical Value: 84.45

VEC

$$\Delta y = -0.308*\text{COINTEQ01} - 0.457*\Delta y_{t-1} - 0.430*\Delta y_{t-2} - 0.181*\Delta q_{t-1}$$

(-4.59) (-5.63) (-4.34) (-5.88)

$$- 0.152*\Delta q_{t-2} + 0.115*\Delta y^{us}_{t-1} + 0.165*\Delta y^{us}_{t-2} - 0.090*\Delta y^{d}_{t-1}$$

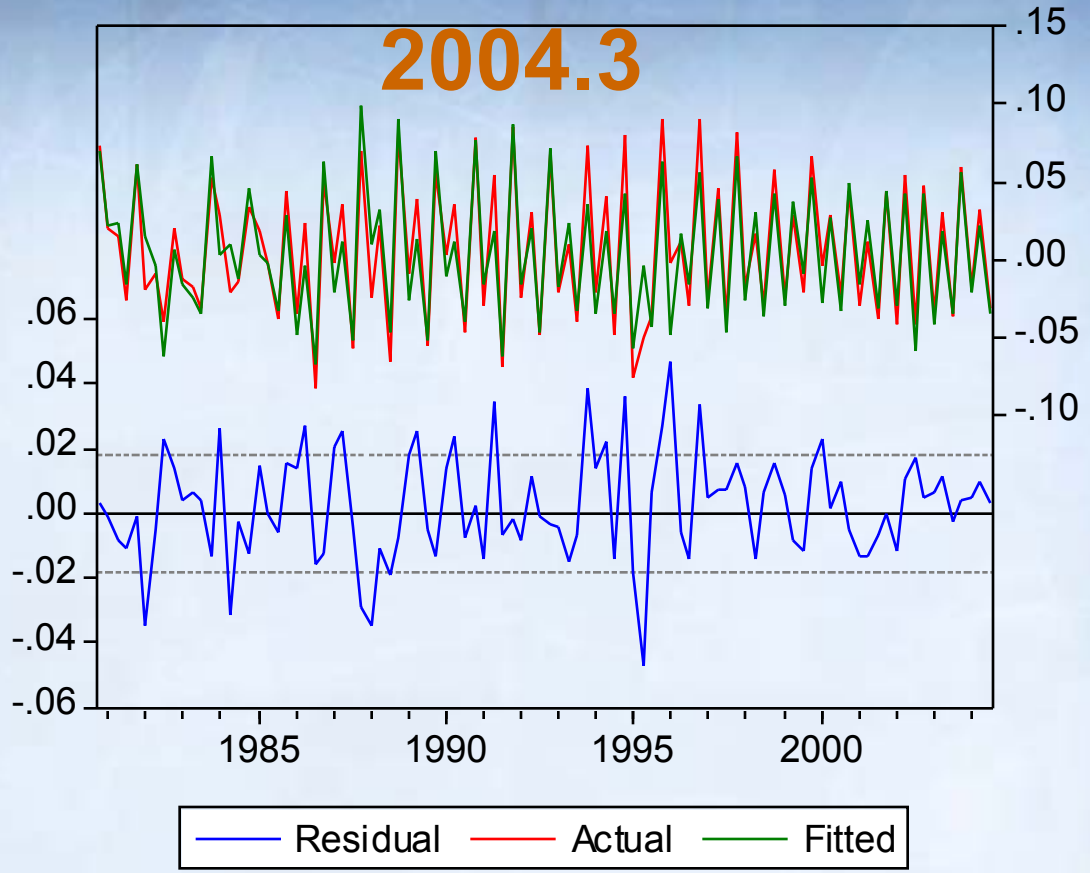
(-4.34) (1.01) (1.49) (-0.95)

$$+ 0.499*\Delta y^{d}_{t-2} - 0.077*\Delta m2_{t-1} + 0.128*\Delta m2_{t-2}$$

(7.08) (-1.69) (2.93)

JB = 0.397 (0.819); LM(1) = 1.785 (0.185); LM(2) = 2.281 (0.108); LM(3) = 1.824 (0.149); ARCH(1) = 0.001 (0.971); ARCH(2) = 0.969 (0.383); WHITE(n.c.) = 1.818 (0.030); WHITE(c.) =1.252 (0.0.304); RESET(1) = 0.062 (0.804); RESET(2) = 2.877 (0.061)

GDP, REGRESSION OUTPUT 1981.1-2004.3



THEIL COEFFICIENT

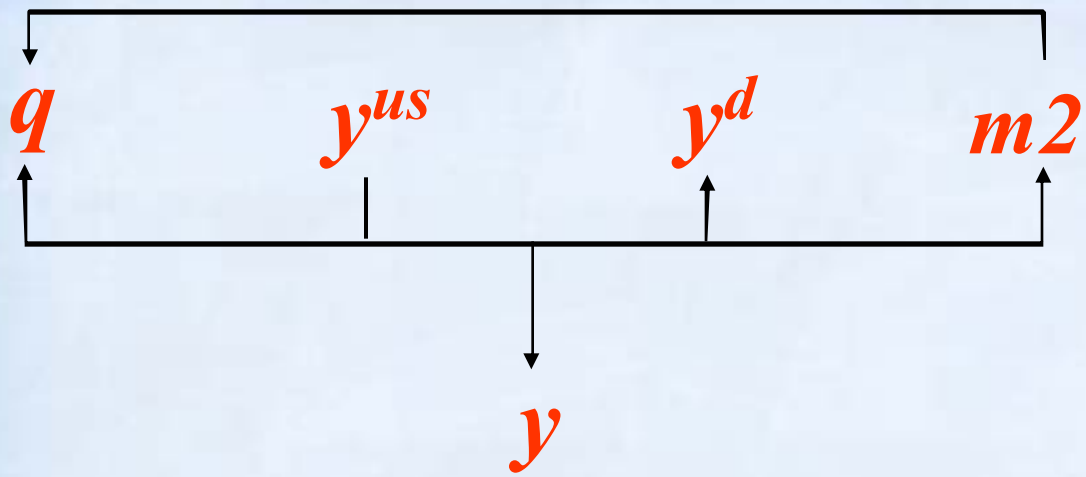
	THEIL	U^M	U^S	U^C
Cointegration	0.00084	0.000	0.051	0.949
VEC	0.19710	0.017	0.034	0.949

U^M (systematic error) = bias proportion, U^S = variance proportion, U^C (unsystematic error) = covariance proportion

VAR ESTIMATION

- Stability
- Normality
- No serial correlation
- All variables are weakly exogenous to GDP

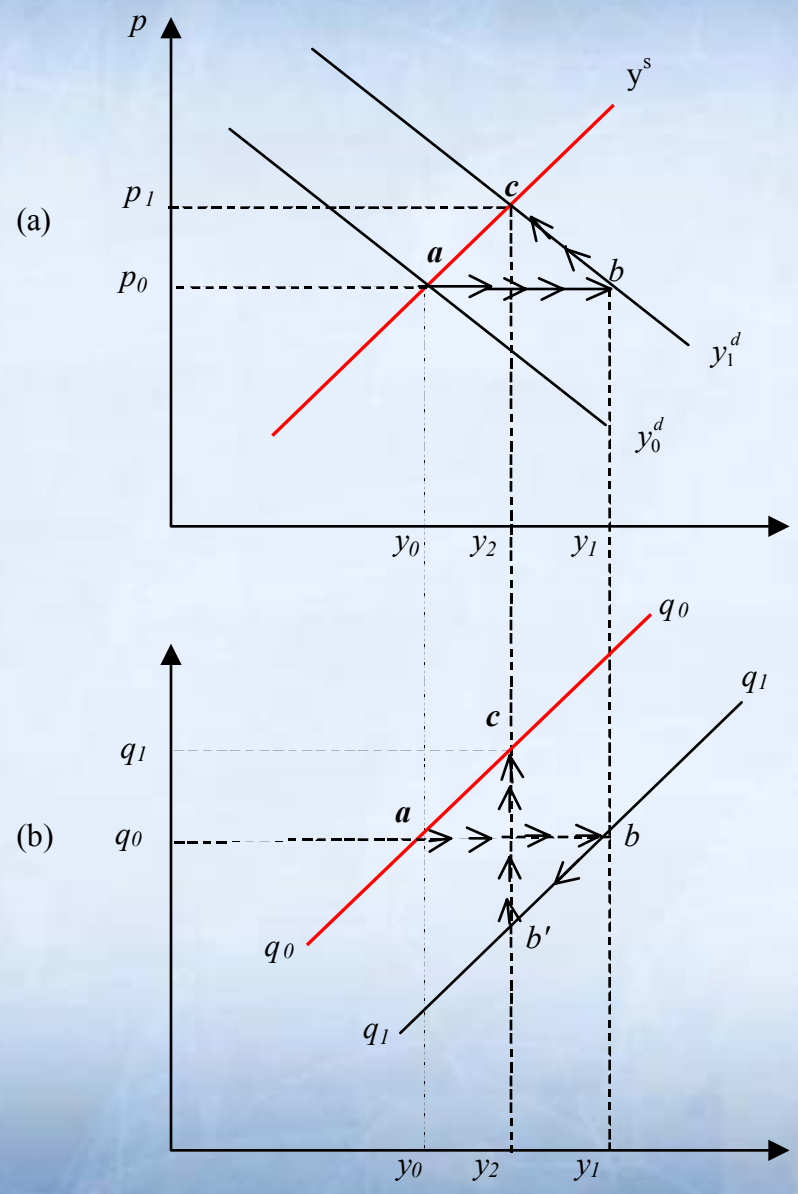
- Granger Causality Test



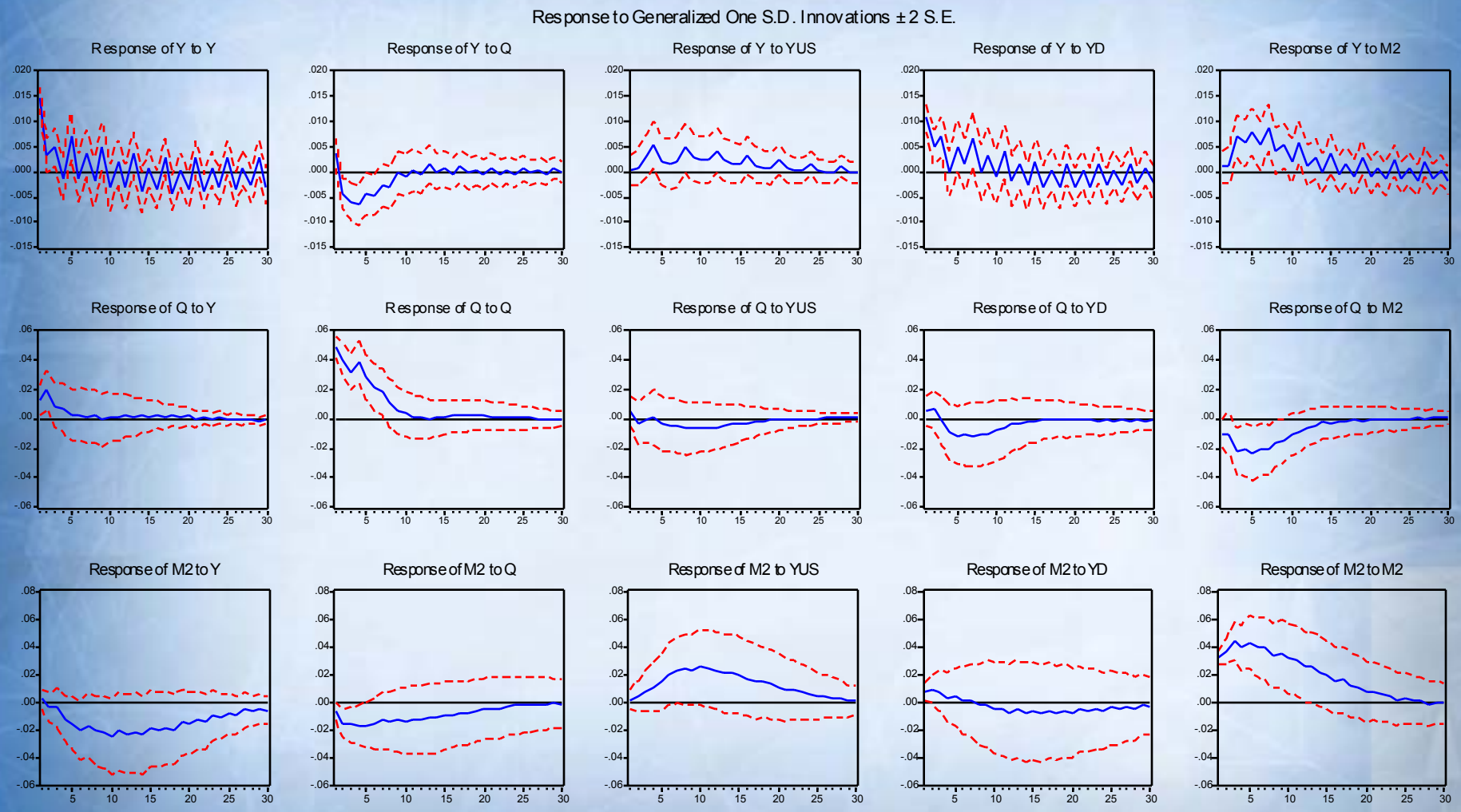
- All variables are strongly exogenous

Good predictors of GDP

THE EFFECTS OF MONETARY EXPANSION



IMPULSE-RESPONSE ANALYSIS



VARIANCE DESCOMPOSITION ANALYSIS

Variance descomposition of y:

Period	standar error	y	q	y^{us}	y^{d}	$m2$
1	0.015	100	0	0	0	0
5	0.026	47	25	9	9	10
10	0.031	38	22	12	14	15
15	0.033	36	19	13	15	17
20	0.035	38	17	14	15	16
25	0.036	39	17	13	15	16
30	0.036	40	16	13	15	16