$$Y_t = f(\underset{\uparrow}{M_t}, \overset{\downarrow}{M_{t-k}}, N_t, N_{t-i}, Y_{t-j})$$

lag values

contemperanous impact

$$Y_t = \alpha_1 + \sum_{i=2}^{k=0} \alpha_i M_{t-k} + \sum_{N=0}^{j} \beta_j N_{t-N}$$

NESTED MODEL $\longrightarrow + \sum_{m=1}^{z=1} \lambda_z Y_{t-m} + e_t$

AR, ΔL

ARDL

In S.E. it is all eco. theory

$$Y_t = \alpha_1 + \sum_{m=1}^{z=1} \lambda_z Y_{t-m} + e_t \quad (AR)$$

$$Y_t = \alpha_1 + \sum_{i=2}^{k=0} \alpha_i M_{t-k} + e_t$$

$\beta_j = 0; \lambda_z = 0$

$$Y_t = \alpha_1 + \sum_{i=2}^{k=0} \alpha_i M_{t-k} + \sum_{m=1}^{t-1} \lambda_t Y_{t-m} + e_t$$

$B_i = 0$

we can take any combination.

$$Y_t = \alpha_1 + \sum_{N=0}^{i=k} B_j \cdot N_{t-N} + e_t.$$

First, you get the general.
It does not be based on any theory

you estimate ~~that~~ and find that any of the parameter are statistically different from 0, then we drop any

you derive a parsimonious in nature → It means the model is

This is called Hendry General to Specific approach.

DATE 04 02 2016

Reg.
Sim. Eq } — theoritical models

univariate
Henry General to specific modelling approa } atheoritic model

all assume single dependent variable

1, 3, 4 — all assume single dependent variable

2. SEM is a statistic model, what if see the role of time in relation

3. endogenous or exogenous, how sure are they are

4. policy transmission mechanism and not- improve policy.

5. Issue of restriction and identification

VECTOR AUTO REGRESSION

ex-anti diagnostics → VAR level, var differ, VECM, P VAR, CI-VAR

check for stochastic properties of time series data

check for
1) mean
2) variance
3) covariance

ex-post diagnostic → check for Serial correlation you have to check for error multivariate S.Corre homo or hetero and finally normality

2) Integration properties ✓
Stationarity test ✓
unit root test ✓

3) Second thing is to test for cointegration

4) Third thing is you check for causality

The ex-anti will tell you which model to take

Let y_t be vector of times series data

$$y_t = (X_t, M_t, N_t)$$

if y_t is stationary at level

mean, variance are constant over time and then covariance is 0

$$E(y_t) = \mu$$

$$Var(y_t) = E(y_t - \mu) = \sigma^2$$

$$Cov(y_t, y_{t+m}) = \cancel{constant}\ 0$$
$$m \neq 0$$

stationary is called mean reversion

IF y_t is stationary then we take Var(level)

SECOND MODEL

$E(y_t) = \mu$ depends on time

$Var = \sigma^2_t$ depends on time

Co-var is also $\neq 0$

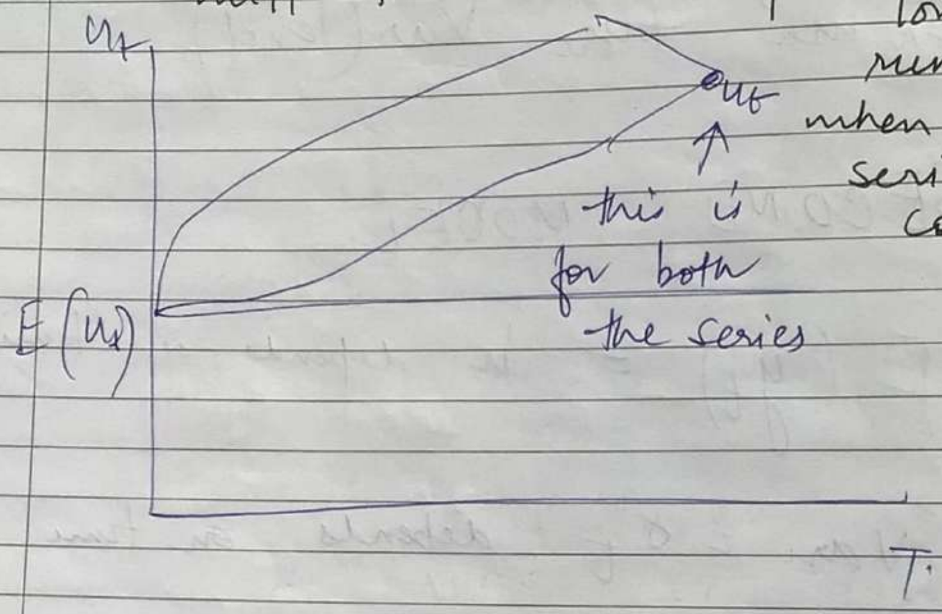
mean constant

Then, I have to go for second condition → co-integration

classmate

CO-INTEGRATION

will there be a point in long run when the series will collide



if else, co-integration exists, then we take third or fifth

VECM or CI-VAR

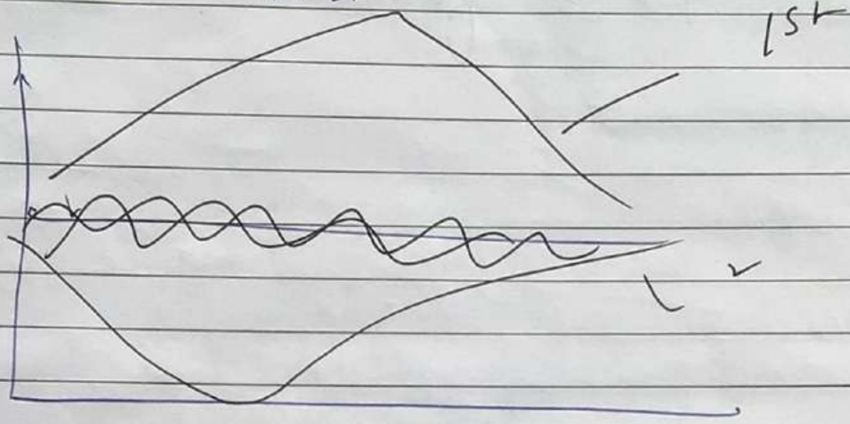
Combine both S.R and L.R.

IF ALSO, the third thing is that no integration

we cannot use, the third or fifth model.

then, we use Difference-VAR

Then the Series will behave like this



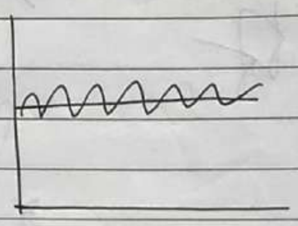
This is short run,
we have lost the original
quality so no - long - run
relationship.

P - VAR

$y = \alpha_1 + \alpha_2 y_{t-1} + \alpha_3 j$

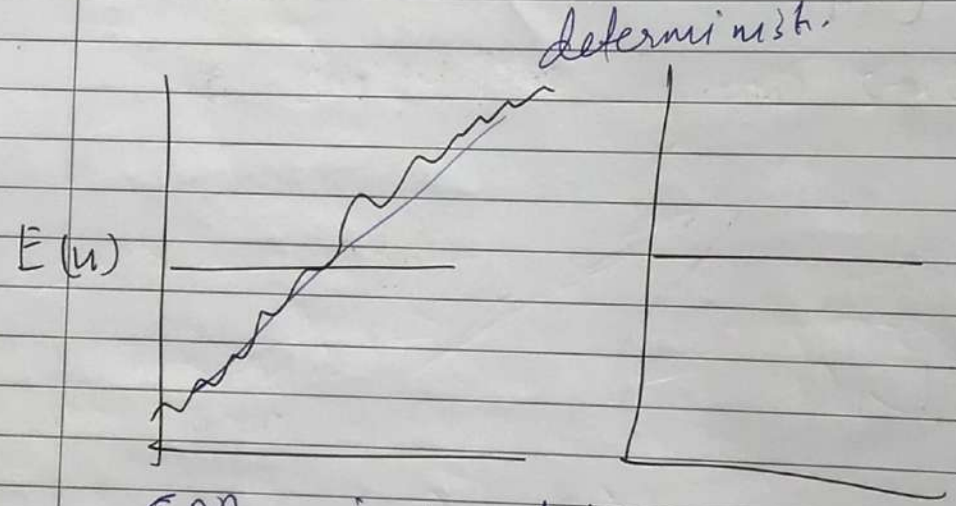
If α_2 is insignificant.
then we taken
and when check for
ex - post diagnostic check.

y_t stationarity or not



trend — stochastic

— deterministic



GDP will be deterministic

1. RWM — without a drift parameter

$$Y_t = Y_{t-1} + e_t$$

$t=1$

$$Y_1 = Y_0 + e_1 \quad \Big| \quad Y_1 = Y_0 + e_1 + e_2$$

 $t=2$ $\quad Y_1 + e_2$

DATE

$$Y_3 = Y_2 + e_3$$

$$Y_3 = Y_0 + e_1 + e_2 + e_3$$

$$Y_t = Y_0 + \sum e_t$$

$$E(Y_t) = E\left(Y_0 + \sum \cancel{E(e_t)}\right)$$

$$= Y_0 + \sum E(e_t) = \sigma^2$$

$$= Y_0 + E(e_t) \qquad E(e_t) = 0$$

$$E(Y_0) = y_0 \longrightarrow \text{constant}$$

Constant

$$Var(Y_t) = E(Y_t - \boxed{\mu}) = \sigma^2$$

Variance will depend on time

$$= t\sigma^2$$

variance is not Constant

Then, the covariance of Y_t will not be constant

Whenever you have Random walk without drift then it can be ~~b~~ said that non-stationary

2ND MODEL.

Can it be ARIMA(1,0,0) RWM WITH DRIFT.

$$Y_t = \lambda + Y_{t-1} + e_t$$

$$Y_t = \lambda t + Y_0 + \Sigma e_t$$

Now the model depend on and Y_0

Mean will not be

based and so will

covariance and covariance

Hence, it will be non-stationarity

FROM THIS IF WE SUB

$$Y_t - Y_{t-1} = \alpha + e_t$$

$$\Delta Y_t = \lambda + e_t$$

IF you Take difference.

IF take level it

is stationarity

9. RWM WITH DRIFT AND ~~B~~ TREND.

$$Y_t = \lambda + Y_{t-1} + t + e_t.$$

$$= \lambda + \beta Y_{t-1} + \alpha t + e_t$$ → NESTED MODEL.

IF $\lambda = 0$ $\alpha = 0$.

THEN IT BECOMES

RWM - WITHOUT DRIFT AND ~~DE~~ TREND.

IF $\alpha = 0$

RWM WITH DRIFT.

HOW TO CHECK FOR STATIONARITY

$$Y_t = B Y_{t-1} + e_t. \text{ - AR(1)}$$

$$Y_t = \sum_{B=1}^{k=1} B_i Y_{t-k} + e_{t-k}$$

AR (k)

$$-1 \leq B_1 \leq 1.$$

$H_0 : B = 1$ (unit root)

$H_{1A} : |B| < 1$ Stationary

$H_{1B} : |B| > 1$ explossive

2) RWM WITHOUT DRIFT

THE SAME PROCESS

$Y_t = \beta Y_{t-1} + e_t$

$\Delta Y_t = \beta Y_{t-1} - Y_{t-1} + e_t$

$\Delta Y = (\beta - 1) Y_{t-1} + e_t$

$H_0 : \beta < 1$ Unit root

$H_1 : \beta > 1$ Explosive

3.) Stationarity based on trend.

$H_0 : \alpha_1 = 1$ unit root

$H_1 : \alpha_1 < 1$ station

$H_1 \; \alpha > 1$