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Macroeconomics

(*) Consumption.

a) Keynes Absolute Income Hypothesis

b) Modigliani's Life cycle Hypothesis.

A) Keynes consumption function:

i) consumption (C) depends on current income (Y)

ie, $C = C(Y)$ —— (1)

A linear consumption fn,

$C = a + bY$ —— (2)

$mpc = \frac{dC}{dY}$

a = autonomous consumption (when y=0)

fixed.

(ii) Avg Prop to Consume (APC) $= \frac{C}{Y}$

as Y ↑ses ⇒ APC will fall.

(iii) Marginal Propensity to Consume (MPC) $= \frac{dC}{dY}$

(iii) Marginal ... $(MPC) = \frac{dc}{dy}$

i.e, $0 < \Delta C < \Delta Y$

$$0 < \frac{\Delta C}{\Delta Y} < 1$$

$$\left(\text{or } \frac{dc}{dy}\right)$$

$\Rightarrow 0 < mpc < 1$

Anomalies of Absolute Income Hypothesis (or Keynes consumption fn).

a) Secular Stagnation ⇒ (depression) no growth ~~for indefinite period~~]

[(ii) conjecture of Keynes. APC falls as Y ↑ses. ⇒ people tend to save more ⇒ aggregate demand in the economy will fall]

⇒ Low investment.

⇒ Stagnation

⇒ Depression

Why solution is fiscal & Monetary policy.

(b) Consumption Puzzle:

↳ Kuznet

APC is stable as Y ↑ses

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(This result does not follow Keynes conjecture that APC↓ ⇒ Y↑ses)

Kuznet studied SR household data ⇒ then he observed as Y↑ses ⇒ APC↓.

but in LR ⇒ as Y↑ses ⇒ APC was stable
(puzzle)

SR: $C = a + bY$

$APC = \frac{a}{Y} + b$

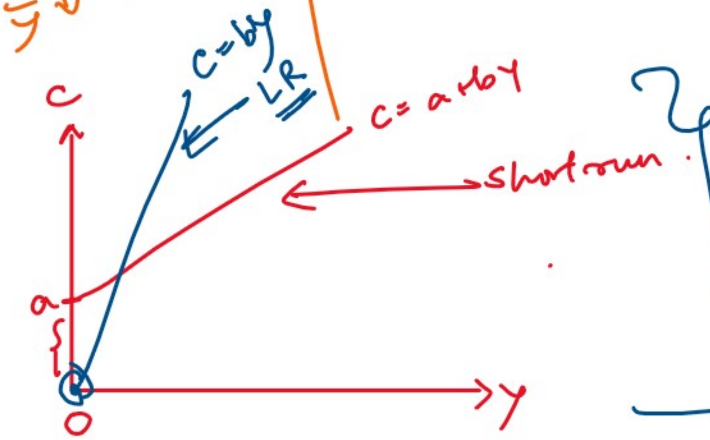
as $Y\uparrow \Rightarrow a$ is const

$\therefore \frac{a}{Y}\downarrow \Rightarrow APC\downarrow$

LR: $C = bY$

$APC = \frac{C}{Y} = b = \text{const}$

as $Y\uparrow \Rightarrow APC = b$ stable



consumption puzzle.

2) Life Cycle Hypothesis:

2] Life Cycle Hypothesis.

Acc to Modigliani ⇒ People try to distribute their smoth consumption in these two periods to maintain std of living.

in two parts
1 — Working (High income)
2. After Retirement. (Low income)

going to live 'T' more years from now.

working years left ⇒ 'R' years.

Total income earned while working ⇒ 'RY'

If 'W' = weath then,

At the end of Retirent: $W + RY$

$\therefore$ Consumption, $C = \dfrac{W + RY}{T}$

$\Rightarrow C = \dfrac{W}{T} + \dfrac{R}{T} \cdot Y$

generally, $C = \alpha W + \beta Y$

marg prop to consume from wealth ie $\alpha = \dfrac{dc}{dW}$

and β = mpc from income ie, $\beta = \dfrac{dc}{dY}$

$Y \uparrow$ 2 times, time $\uparrow$ } $\dfrac{W}{Y}$ is stable const

$Y\uparrow$ 2 times
$w\uparrow$ 2 time $\Big\}$ $\frac{w}{Y}$ is const

$APC = \frac{C}{Y} = \frac{\alpha w}{Y} + \beta$

$\Rightarrow$ In SR as $Y\uparrow$ses $\Rightarrow$ w is const
$\Rightarrow \frac{w}{Y}\downarrow$
$\Rightarrow$ APC$\downarrow$ in SR.

But in LR $Y\uparrow$ and $w\uparrow$ses proportionately
$\therefore$ w/Y is const with Y
$\therefore$ APC is stable

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STATISTICS.

Construction of Confidence Interval and Hypothesis Testing.

1. $X \Rightarrow X \sim N(\mu, \sigma^2)$
$\hookrightarrow N \rightarrow$ then if X is transformed linearly to 'Z' (then $Z \sim N(0,1)$
then $Z \sim$ std Normal distribution.
Z or τ test.

2. $(Z)^2 \sim \chi^2_{(n)}$ $\rightarrow$ [chi-square]

3. $\left.\begin{array}{l} X \sim \chi^2_{(m)} \\ Y \sim \chi^2_{(n)} \end{array}\right\}$ X, Y are indp rv.

$Y \sim \chi^2(n)$

then $\frac{X}{Y} \sim F_{(m,n)}$

4. $Z \sim N(0,1) \Rightarrow$ std normal variable
$Y \sim \chi^2_{(n)} \Rightarrow$ Chi-square
$\}$ Z & Y indp

then, $t = \dfrac{Z}{\sqrt{Y/n}}$ follows 't' dis with df 'n'.

5. Also remember $t^2 = F$

Construction of Confidence Interval.

Suppose $X_1, X_2 \dots X_n$ is a ~~Normal population~~ with mean μ and variance σ^2.

then $\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i \Rightarrow$ sample mean

$s^2 = \frac{1}{n}\sum(x_i - \bar{x})^2 \Rightarrow$ sample variance (biased).

$(s')^2 = \frac{1}{(n-1)}\sum(x_i - \bar{x})^2 \Rightarrow$ unbiased.

Case I. find μ (unknown) when σ is known

$\alpha = 5\%, 1\%$
~ level of

$\alpha = 5\%,\ 1\%$

$\alpha \leftarrow$ level of sign (rejection)

$1-\alpha$: 95%, 99%

$$Z \text{ or } \tau = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$$

$$P\left[\tau_{1-\frac{\alpha}{2}} \le \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} \le \tau_{\alpha/2}\right] = 95\% \ (1-\alpha)$$

$$P\left[\underbrace{\bar{x} - \frac{\sigma}{\sqrt{n}}\tau_{\alpha/2}}_{\text{lower limit}} \le \mu \le \underbrace{\bar{x} + \frac{\sigma}{\sqrt{n}}\tau_{1-\alpha/2}}_{\text{upper limit}}\right] = 1-\alpha$$