

# Intermediate Macroeconomics

## Review session

ECON 3311

UT Dallas

# Question #1

$$Y = \bar{A} K^{\alpha} L^{\beta}$$

$$Y = 1 K^{0.3} (1.5 L)^{0.3}$$

$\approx (1.5)^{0.3} K^{0.3} L^{0.3}$   
 $\approx 1.129 Y$

DRS

Suppose a production function displays decreasing returns to scale. Which of the following statements is correct?

- ☒ a. If both inputs increase by 50%, output will decrease by less than 50%
- ☒ b. If only labor increase~~s~~ by 50%, and capital stays the same, output will increase by 50%
- ☒ c. If only labor increase~~s~~ by 50%, and capital stays the same, output will increase by 25%
- ☒ d. If only labor increase~~s~~ by 50%, output will stay the same because only labor increased and capital did not
- ☒ e. None of the above answers are correct

Returns to Scale:

Decreasing	$\alpha + \beta < 1$
Constant	$\alpha + \beta = 1$
Increasing	$\alpha + \beta > 1$

## Question #2

$$\text{Nom GDP} \approx \overset{0.95}{P} \cdot Q \rightarrow 1.1$$
$$\text{Real GDP} \approx \bar{P} \cdot Q \rightarrow 1.1$$

Suppose that real GDP has increased. Which of the following statements is true?

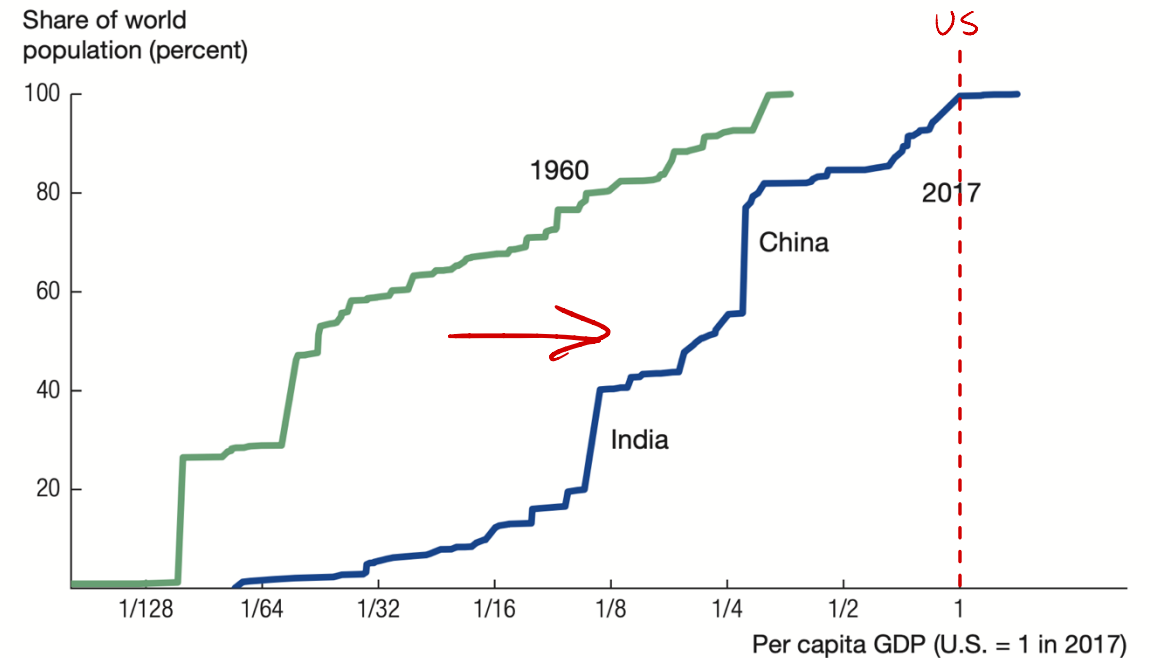
- ☒ a. Nominal GDP must have increased by more than real GDP
- ☒ b. The country is producing more of every single good and service
- ☒ c. The change in real GDP is equal to the sum of C+I+G+EX
- ☒ d. Prices may have decreased

# Question #3

Which of the following can be concluded from the graph?

- ☒ a. The income of every single country has increased from 1960 to 2017
- ☒ b. The GDP of all countries is lower than that of the US
- ☒ c. On average, countries have increased their real GDP from 1960 to 2017

The Distribution of World Population by Per Capita GDP, 1960 and 2017



## Question #4

$$M\bar{V} = PQ$$

If real GDP is growing at a faster rate than the money supply, then the quantity theory of money predicts that there will be inflation.

- a. True
- ✓ b. False

$$P = \frac{M\bar{V}}{Q} \xrightarrow{\text{In growth rates}} \Rightarrow \pi = g_M + \cancel{g_{\bar{V}}} - g_Q$$
$$\pi \approx g_M - g_Q$$

## Question #5

→ (CPI)

If the consumer price index was 110 in 2023 and 120 in 2024, this means that the inflation rate from 2023 to 2024 was:

- a. 10%
- b. 12%
- ✓ c. 9.09%
- d. 8.33%

$$\text{CPI} : 110 \rightarrow 120$$

$$\pi = \left( \frac{120}{110} - 1 \right) \times 100\% = 9.09\%$$

## Question #6

+ The CPI measures the increase <sup>growth</sup> in all prices in the economy.

a. True

✓ b. False

$$\text{GDP deflator} = \frac{\text{Nom GDP}}{\text{Real GDP}}$$

## Question #7

$$Y = F(K, L)$$

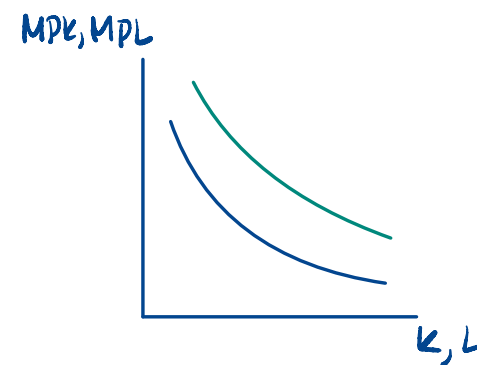
$$MPL = \frac{\partial Y}{\partial L} = \frac{\partial \bar{A} K^{\alpha} L^{\beta}}{\partial L} \xrightarrow{\alpha=1/3, \beta=2/3} MPL = \frac{2}{3} \frac{Y}{L}$$

$$MPK = \frac{\partial Y}{\partial K} = \frac{\partial \bar{A} K^{\alpha} L^{\beta}}{\partial K} \longrightarrow MPK = \frac{1}{3} \frac{Y}{K}$$

Which of the following is true regarding a production function with only two inputs  $Y=F(K,L)$ ?

- ✓ a. If it displays constant returns to scale, then there will be diminishing marginal product of labor and diminishing marginal product of capital
- ~~b.~~ If it displays constant returns to scale, then if there is diminishing marginal product of labor then the marginal product of capital is increasing
- ~~c.~~ If it displays constant returns to scale, then the marginal product of labor and the marginal product of capital are both constant

$$\frac{L^{\beta}}{L} = L^{\beta-1}$$





## Question #8

GDP will decrease if people started eating at home more and eating at restaurants less

- ☒ a. True
- ☐ b. False

## Question #9

Suppose a country growing at a constant growth rate had GDP grow by 120% in 35 years. What can we conclude about its growth rate?

More than doubled



- ✓ a. Greater than 2%
- b. 2%
- c. Less than 2%

Rule of 72  
Rule of 70

To double:

$$\frac{72}{g^*} \approx 35 \rightarrow g^* \approx 2\%$$

$$\Rightarrow g_{\text{question}} > g^* \approx 2\%$$

# Question #10

Most of the difference in GDP per capita between countries can be explained by:

- ✓ a. Differences in Total Factor Productivity →  $\bar{A}$ ; TFP; "technology"
- ✗ b. Differences in capital per person
- ✗ c. Differences in the marginal product of capital
- ✗ d. Differences in the amount of labor in each country

(approx) 6S scale in highest to lowest countries GDP per capita

$$6S \approx \underbrace{5}_{\frac{K}{L} \text{ differences}} \times 13 \rightarrow \text{TFP}$$

# Question #11

In the context of the basic Solow model, how can a country that's already at their (steady state) long-run capital level induce further growth?

- ☒ a. This is given, investment is always positive and thus capital keeps on increasing.
- ☒ b. By implementing technological improvements.
- ☒ c. By increasing their depreciation rate.
- ☒ d. By consuming more and saving less.

↑ Savings rate

↓ depreciation rate

↑  $\bar{A}$  (TFP)

# On the Solow Model: The case of an improvement in Technology

Remember the key condition to determine  $K^*$  is: *Investment = Depreciation*

Naturally (given our assumption  $I = sY$ ), features affecting  $Y$  can also push  $K^*$  **towards a higher level  $K^{**}$**

For example, a technological improvement:

