ECON 2102A (Intermediate Macroeconomics I)
Summer 2021
Practice Exam (Part-2) Solution
Time: 7:00 pm - 8:00 pm, May 25th, 2021

1. Consider the following table:

	Year		
	2015	2016	2017
Price of a laptop	$500	$600	$650
Quantity of laptop	1000	1150	1100
Price of a burger	$10	$11	$12
Quantity of burger	5000	5200	5300

Suppose an economy produces and consumes only laptop and burger. Using the year 2015 as the base year answer the following questions

a. (5 Points) Compute the inflation rate in 2017
b. (4 Points) Compute the Nominal GDP growth of 2017.

a) Inflation rate in 2017 $= \frac{\text{GDP Deflator}_{2017} - \text{GDP Deflator}_{2016}}{\text{GDP Deflator}_{2016}} \times 100\%$

$\text{Nominal GDP}_{2016} = 600 \times 1150 + 11 \times 5200$

$= 747200$

$\text{Nominal GDP}_{2017} = 650 \times 1100 + 12 \times 5300$

$= 778600$

$\text{Real GDP}_{2016} = 500 \times 1150 + 10 \times 5200$

$= 627000$

$\text{Real GDP}_{2017} = 500 \times 1100 + 10 \times 5300$

$= 603000$

$$\text{GDP Deflator}_{2016} = \frac{NG_{2016}}{RG_{2016}} \times 100$$

$$= 119.17$$

$$\text{GDP Deflator}_{2017} = \frac{NG_{2017}}{RG_{2017}} \times 100$$

$$= 129.12$$

$$\text{Inflation}_{2017} = \frac{129.12 - 119.17}{119.17} \times 100\%$$

$$= 8.35\%$$

b) Nominal GDP Growth Rate in 2017

$$= \frac{NG_{2017} - NG_{2016}}{NG_{2016}} \times 100\%$$

$$= \frac{778600 - 747200}{747200} \times 100\%$$

$$= 4.2\%$$

2. a) (5 Points) Determine whether the production function has constant, decreasing, or increasing returns to scale:

$$F(K, L) = 2\sqrt{K} + 15\sqrt{L}$$

b) (4 Points) Does the production function have diminishing marginal returns to capital?

$$F(K, L) = \frac{K}{2L}$$

a) $F(zk, zL) = 2\sqrt{zk} + 15\sqrt{zL}$

$= \sqrt{z}\left(2\sqrt{k} + 15\sqrt{L}\right)$

$= \sqrt{z}\, f(k, L)$

The production function has a decreasing returns to scale for $z > 1$ [not for $0 < z < 1$]

b) First differentiate $f(k, L)$ with respect to k to get MPk.

$$MPk = \frac{d\left(\frac{K}{2L}\right)}{dk}$$

$$= \frac{1}{2L}.$$

Now differentiate MPk w.r.t. k.

$$\frac{d\,MPk}{dk} = 0$$

So production function doesn't have diminishing returns to capital

3. Suppose the total currency in Canada is 10 Billion dollar and the total deposit in banks is 30 Billion. The banks have a total reserve of 10 Billion dollar.
   a. (5 Points) What is the total money supply?
   b. (4 Points) If the monetary base increases to 25 Billion dollars than what is the increase in money supply.

not ↓ increases by 25 Billion.

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a) Given

$C = \$10$ Billion
$D = \$30$ "
$R = \$10$ "

Initial monetary Base

$B_1 = C + R = 20$

Total money supply $M = C + D$

$= 10 + 30$

$= \$40$ Billion.

b) we know

$\Delta M = m \Delta B$ → multiplier

Now $m = \frac{C+D}{C+R}$

$= \frac{10+30}{10+10}$

$= 2.$

As monetary base increases to 25.

i.e $B_2 = 25$, so change in B, $\Delta B = B_2 - B_1$

$= 5$

So, $\Delta M = 2 \times 5 = 10.$ Money supply increases by \$10 Billion.

4. Jack borrowed 1000 dollar for one year from a Bob at an interest of 5%. Jack predicted that the inflation rate would be 2% in this year. However, at the end of the year the actual inflation rate turns out to be 4%.
   a) (5 Points) Is Jack better off or worse off? Why?
   b) (4 Points) Is Bob better off or worse off? Why?

Nominal interest rate = 5%

Expected inflation $E\pi = 2\%$

Actual inflation $\pi = 4\%$

Here actual real interest rate $r = 5\% - 4\%$

$= 1\%$

Expected real interest rate $= Er = 5\% - 2\%$

$= 3\%$

As $r < Er$.

That means actual real interest rate is lower than expected real interest rate.

a) Jack is better off because he is paying less interest in real term than what he estimated

b) Bob is worse off because he is receiving less interest in real term than what he estimated/expected.

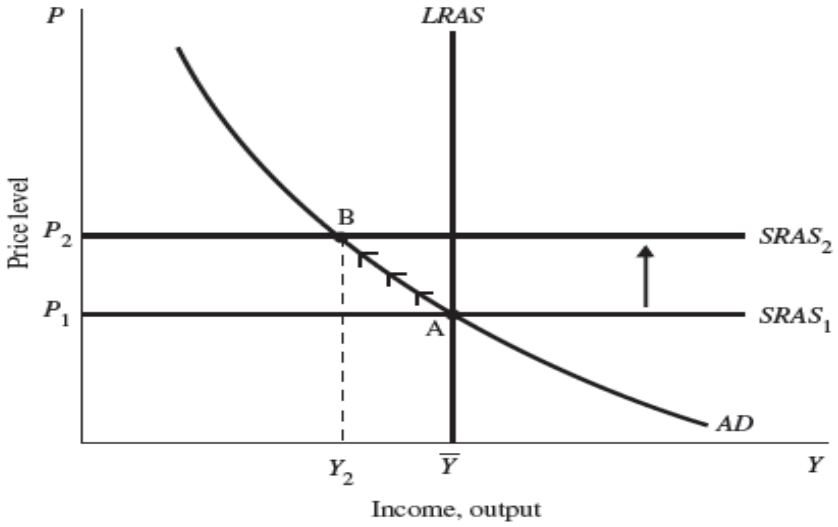
5. Suppose there is a supply shock in the economy (e.g. oil price increases).

i) (4 Points) Show the impact of this shock in the output and price level in the short run.

ii) (5 Points) What stabilization policy the central bank can take to restore the output to natural-rate level output and what will be the impact on price level of this policy?

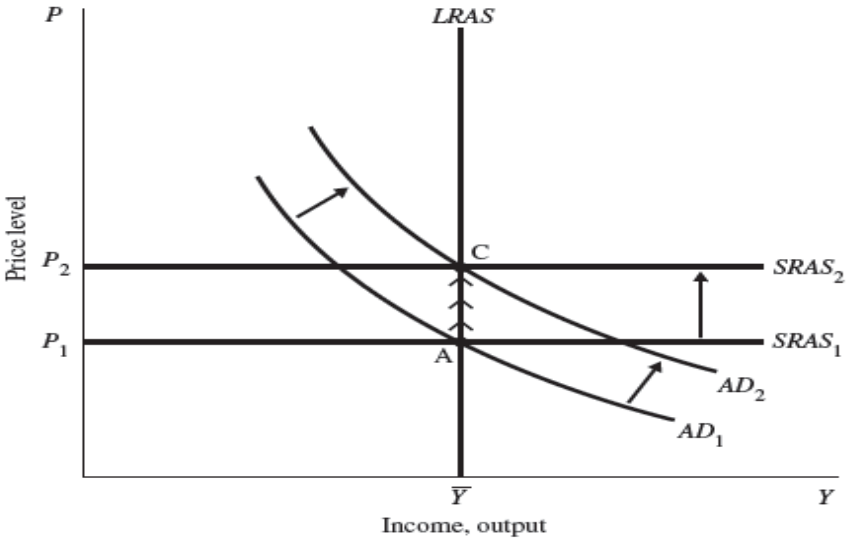
Answer:

i) If there is an adverse supply shock (e.g., oil price increases) in the economy, then the short-run aggregate supply curve shifts up, and the economy moves from point A to point B. The output level falls below the natural rate of output level and price level increases.



ii) The central bank has two options. Its first option is to hold aggregate demand constant i.e. does not change money supply. Eventually prices fall and restore full employment, but the cost of this is that the economy will be in a recession.

The central bank's second option is to increase aggregate demand by increasing the money supply, bringing output back toward its natural-rate level, as in the following figure



But this policy leads to a permanently higher price level at the new equilibrium, point C. Thus, in the case of a supply shock, there is no way to adjust aggregate demand to maintain both full employment and a stable price level.