

# 1 Sample Question 3

Which of the following events will cause a reduction in equilibrium output?

**Ans: D**

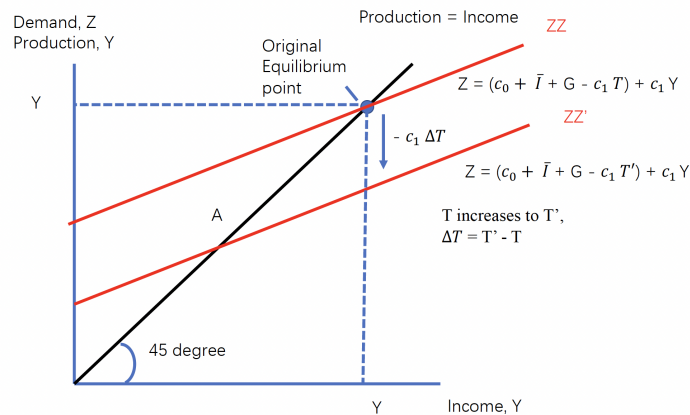
This question turns out to be more difficult than I initially thought!

## Graphical Method

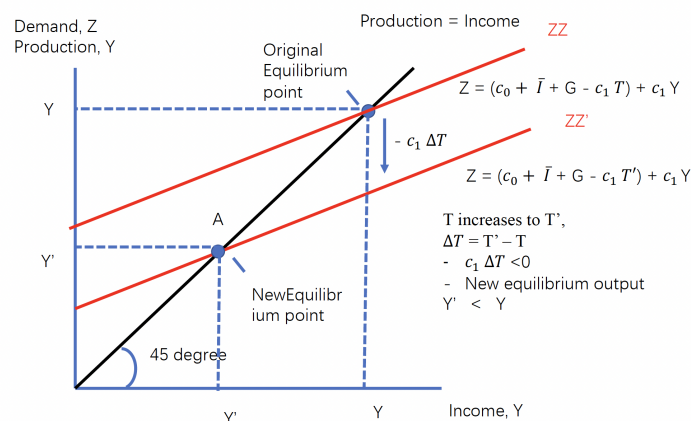
B) an increase in taxes:

$$Z = (c_0 + \bar{I} + G - c_1 T) + c_1 Y$$

If there is an increase in taxes,  $-c_1 T$  decreases. The ZZ demand curve shifts down to the new ZZ' demand curve. We can see that the equilibrium output at the new equilibrium point is smaller.



An Increase in Taxes



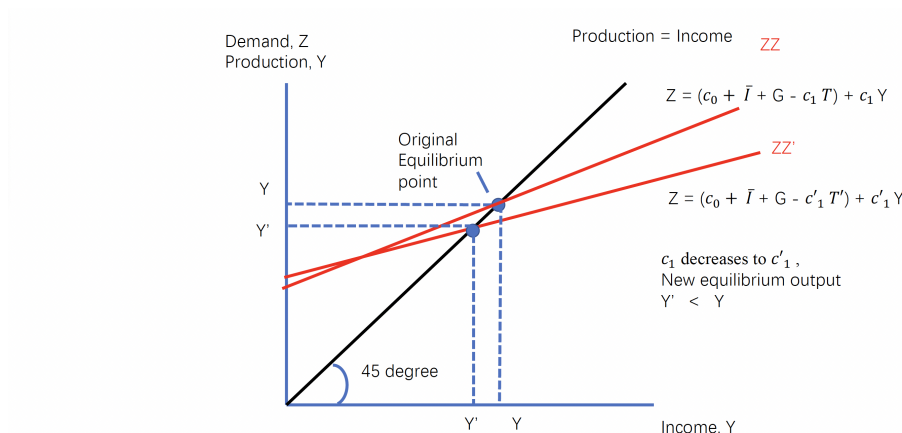
An Increase in Taxes

A) an increase in marginal propensity to save and a reduction in the marginal propensity to consume:  
In our model,  $C = c_0 + c_1(Y - T)$  and  $S = -c_0 + (1 - c_1)(Y - T)$ .  $c_1$  is the marginal propensity to consume and  $(1 - c_1)$  is the marginal propensity to save.

If  $c_1$  decreases,  $(1 - c_1)$  increases. A and C are the same.

If  $c_1$  decreases:

$c_1 T$  decreases,  $-c_1 T$  increases. ZZ curve becomes flatter.



A Decrease in  $c_1$

There is a reduction in equilibrium output when  $c_1$  decreases.

### Algebraic Method

We can use the equilibrium output in the model we derive in this lecture to think about the changes

$$Y = \frac{1}{1-c_1}[c_0 + \bar{I} + G - c_1 T]$$

B) an increase in taxes:

If  $T$  increases 1 unit,  $Y$  changes by  $\frac{-c_1}{1-c_1}$  units. Since  $0 < c_1 < 1$ ,  $\frac{-c_1}{1-c_1} < 0$ , equilibrium output  $Y$  decreases by  $\frac{c_1}{1-c_1}$  units.

A) an increase in marginal propensity to save and a reduction in the marginal propensity to consume:  
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If  $c_1$  decreases,  $(1 - c_1)$  increases. A and C are the same.

When  $c_1$  decreases, the multiplier  $\frac{1}{1-c_1}$  decreases, and  $\frac{c_1}{1-c_1}$  decreases. The equilibrium output decreases since  $c_0 + \bar{I} + G > c_1 T$ . You can test the intuition by assigning  $c_1 = 0.4$  initially, and then reduce  $c_1$  to 0.2, you will see why there is a reduction in equilibrium output.

Alternatively, if we start with an initial equilibrium that production equals total demand.  $c_1$  decreases, with consumption function  $C = c_0 + c_1(Y - T)$ ,  $Y > T$ , consumption  $C$  will decrease in the first round. The first round decrease in  $C$  leads to smaller demand, smaller production and smaller income. Finally, output decreases in the new equilibrium.

## 2 Sample Question 4

Suppose the United States economy is represented by the following equations:

$$Z = C + I + G, C = 500 + 0.5Y_D, T = 600, I = 300$$

$$Y_D = Y - T, G = 2000$$

(A)

Production = Demand,  $Y = Z \Rightarrow Y = C + I + G$

$$Y = 500 + 0.5(Y - T) + I + G$$

$$\Rightarrow 0.5Y = 500 + I + G - 0.5T = 500 + 300 + 2000 - 300 = 2500$$

$$\Rightarrow Y = 5000$$

(B)

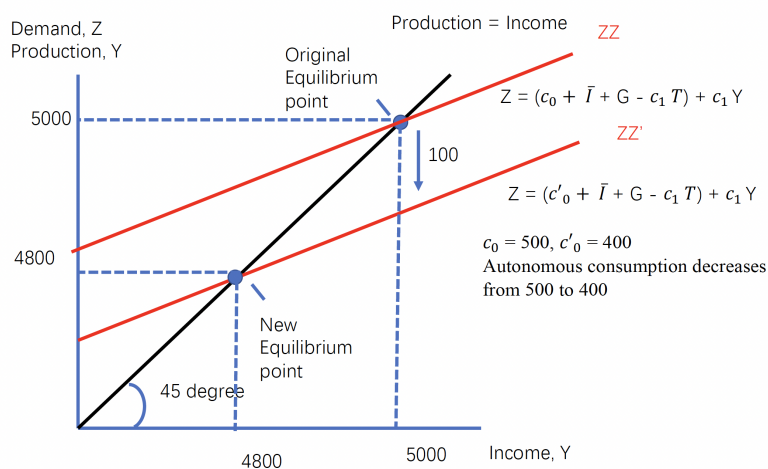
$c_0$  decreases from 500 to 400, we can repeat the step in (A)

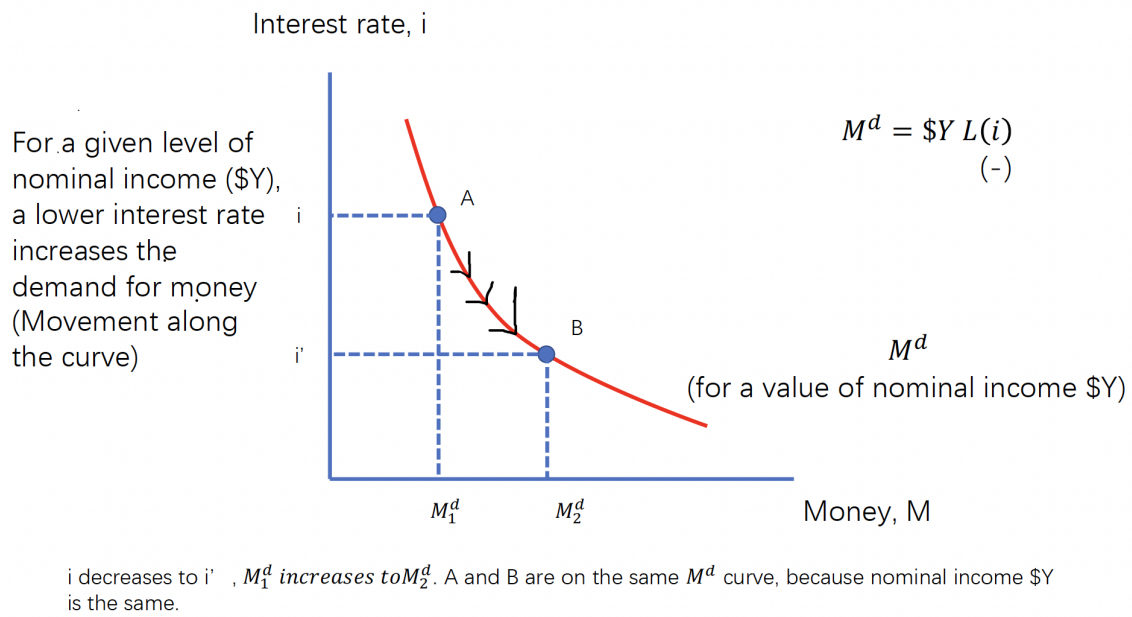
$$0.5Y = 400 + I + G - 0.5T = 400 + 300 + 2000 - 300 = 2400$$

$$\Rightarrow Y = 4800$$

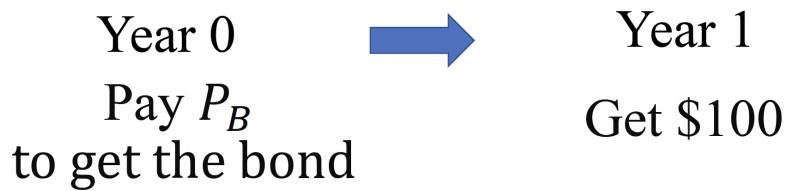
The multiplier is  $\frac{1}{1-c_1}$ .  $c_1 = 0.5 \Rightarrow \frac{1}{1-c_1} = 2$ .

(C)



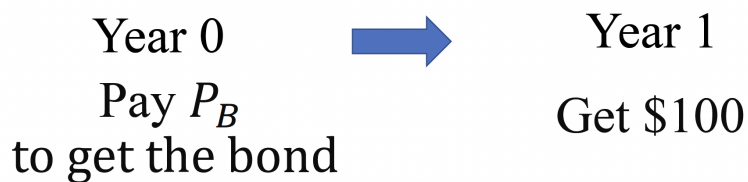


## The Interest Rate on the Bond




What is the rate of return or the interest rate on the bond? Think about a financial investor.

## The Interest Rate on the Bond



The rate of return should be the final payment minus the initial cost divided by the initial cost.


$$i = \frac{\$100 - P_B}{P_B}$$