ECON3123
Macroeconomic Theory I

Tutorial #3: The Keynesian Cross, Paradox of Saving and the Government

Today's tutorial

- Our first model: the Keynesian Cross

    - Case study: the Corona virus outbreak

- Saving

- The role of the government

    - Public debt in perspective

    - Exercise: the Balanced Budget multiplier

Our first model: the Keynesian Cross

- A model to explain how demand determines output and income in an economy

- $Z = \text{Demand} = C + \bar{I} + G + NX$

  - In this course we assume $NX = 0$ (ie a closed economy)

- Components of demand:

  - $C = \text{Consumption} = c_0 + c_1 Y_D$

    - $Y_D = \text{Disposable income} = Y - T$ ($Y = $ income, $T = $ taxes, assumed fixed)

    - $c_0 = $ consumption that takes place independent of income (eg spending funded out of wealth)

    - $c_1 = $ Marginal Propensity to Consume (change in consumption given a \$1 change in income; assume c_1 is greater than 0 but strictly less than 1 – what if it's not?)

- $\bar{I} = \text{Investment (assumed fixed in this model)}$

- $G = \text{Government spending}$

Our first model: the Keynesian Cross

- What does the consumption function look like when we draw it?

C

- C = Consumption = $c_0 + c_1 Y_D$

- Y_D = Disposable income = $Y - T$ (Y = income, T = taxes, assumed fixed)

- $\qquad C = c_0 + c_1[Y - T]$

- $\qquad\quad = c_0 - c_1 T + c_1 Y$

- $c_0 - c_1 T$ = Autonomous consumption

- $\qquad c_1 Y$ = Consumption dependent on income

Y

Our first model: the Keynesian Cross

- What does the consumption function look like when we draw it?

C

- $C = c_0 - c_1 T + c_1 Y$

- What happens when c_0 changes?

Y

Our first model: the Keynesian Cross

- What does the consumption function look like when we draw it?

C

- $C = c_0 - c_1 T + c_1 Y$

- What happens when T changes?

Y

Our first model: the Keynesian Cross

- What does the consumption function look like when we draw it?

- $C = c_0 - c_1 T + c_1 Y$

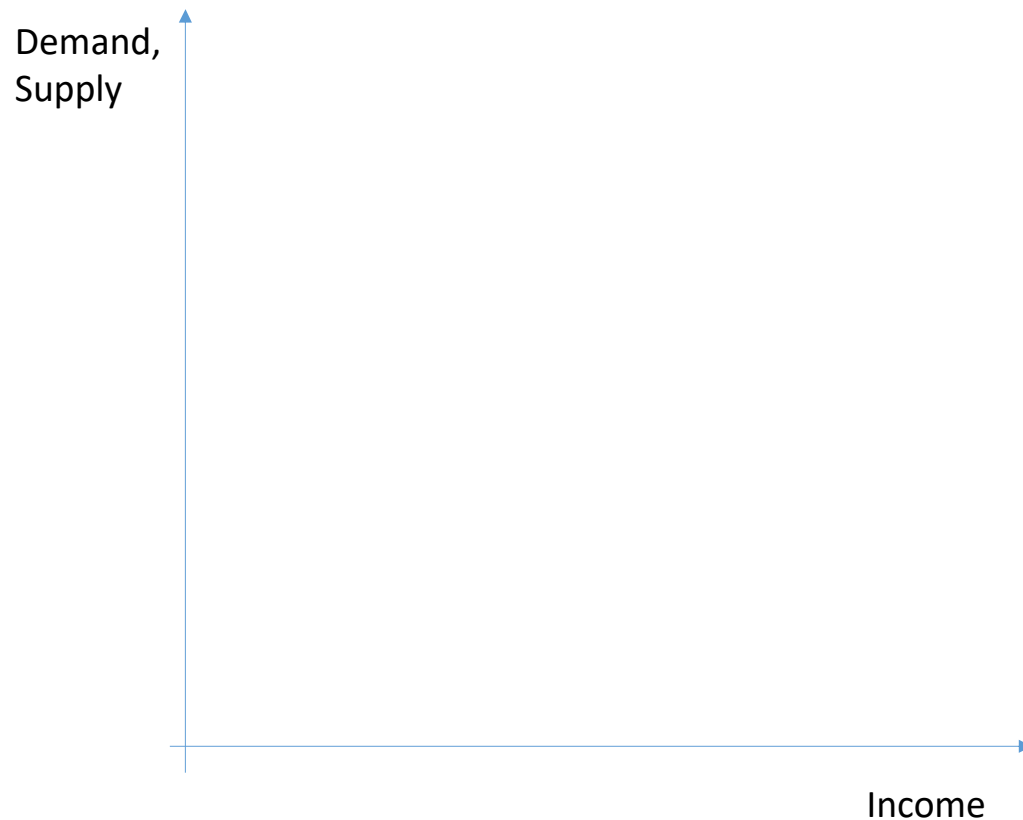- What happens when c_1 changes?

C

Y

Our first model: the Keynesian Cross

- We have:

- $Z = \text{Demand} = C + \bar{I} + G$

- $\text{Output} = \text{Supply} = Y$

- Equilibrium condition:

  - $\text{Demand} = \text{Supply}$

  - $Z = Y$

- And we know from our study of GDP that Output $=$ Income (always)

- Therefore, in equilibrium, we have:

  - $\text{Demand} = \text{Output} = \text{Income}$

  - $Z = Y$

Our first model: the Keynesian Cross

- Let's draw this:

Demand, Supply

Income

The ZZ curve:

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

- And:

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

- Therefore:

- $Y_0 = \frac{1}{(1-c_1)} [\, c_0 - c_1 T + \bar{I} + G \,]$

- So Z determines equilibrium income and therefore equilibrium output Y_0

The multiplier effect

- We have equilibrium output :

- $Y_0 = \frac{1}{(1-c_1)} [\, c_0 - c_1 T + \bar{I} + G \,]$

- What happens to Y_0 when we change autonomous spending?

- For example if investment increases by $\Delta \bar{I}$:

  - $\Delta Y_0 =$

- Is this greater than, the same as or less than $\Delta \bar{I}$?

Example: Blanchard Ch3 Q2

- Assume the following:

- $C = 480 + 0.5\, Y_D$

- $\bar{I} = 110$

- $T = 70$

- $G = 250$

- Solve for goods market equilibrium:

- Find equilibrium disposable income (Y_D)

- Find equilibrium Consumption C

How the multiplier effect works

- Assume that investment increases by 1 (ie $\Delta \bar{I} = 1$), and that the Marginal Propensity to consume is 0.80

- Let's follow the impact of the increase as it passes through the economy:

Round #	Spend	Save	ΔY_0	Total impact on Y_0

Case Study: the impact of the Corona virus outbreak

- We have our model:

- The ZZ curve:

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

- And equilibrium output:

  - $Y_0 = \frac{1}{(1-c_1)}[\, c_0 - c_1 T + \bar{I} + G\,]$

- What impact do you think the Corona virus will have on demand in the economies affected?

- Consumption?   - Equilibrium ouput?

- Investment?

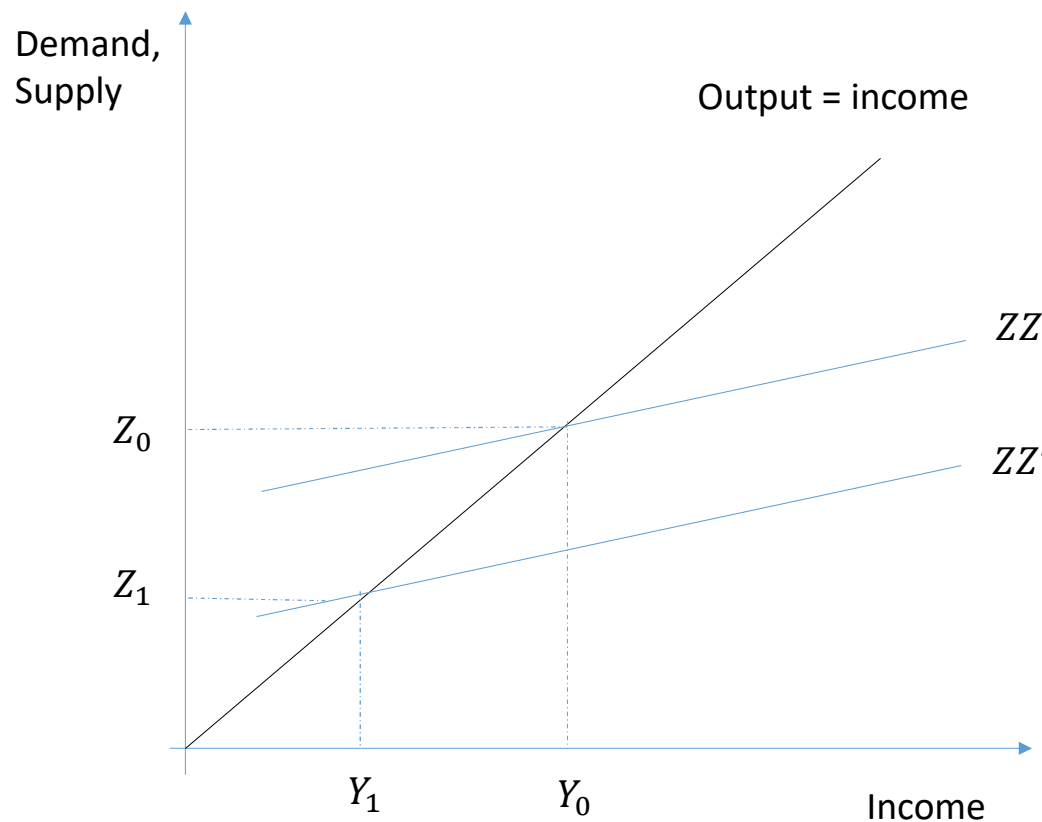## Case Study: the impact of the Corona virus outbreak

- Let's draw the impact

Demand,
Supply

Output = income

Z_0

ZZ

Y_0

Income
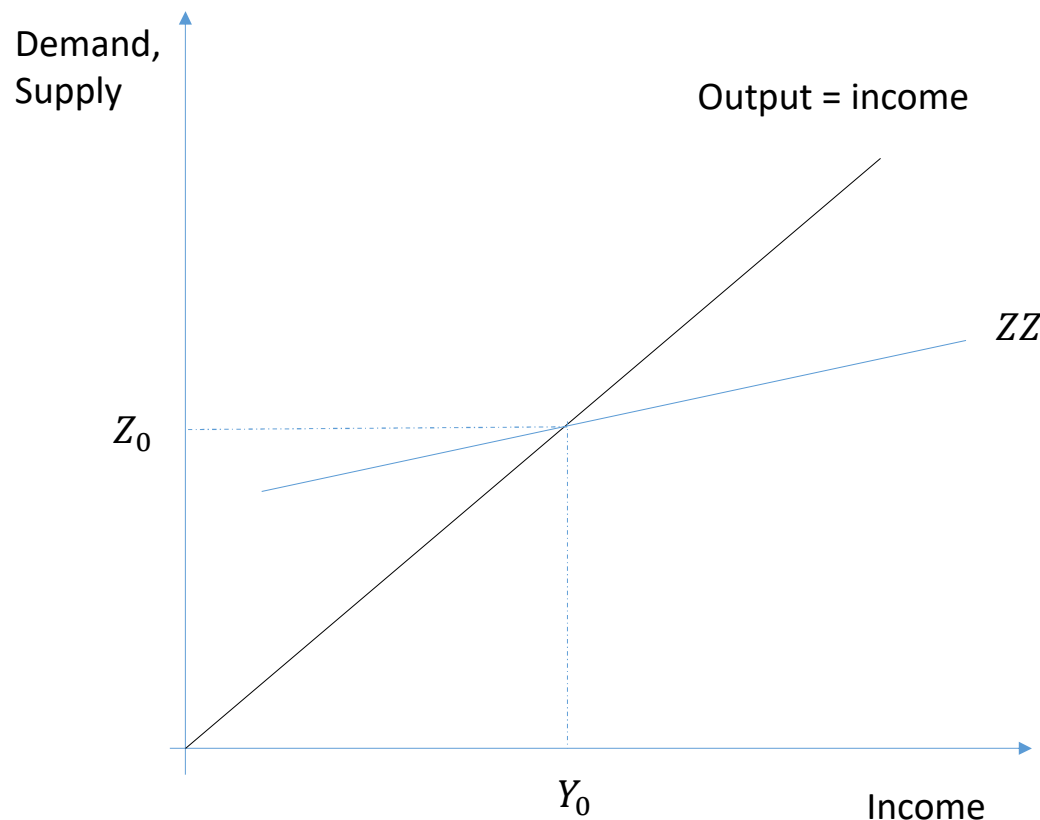
The model

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

- $Y_0 = \frac{1}{(1-c_1)} [\, c_0 - c_1 T + \bar{I} + G \,]$

- Assume that both c_0 and $\bar{I}$ fall

- What's the effect on Y_0?

Case Study: the impact of the Corona virus outbreak

- If the government wanted to avoid a fall in equilibrium output, what could it do?

Demand, Supply

Output = income

Z_0

ZZ

Z_1

ZZ'

Y_1 Y_0

Income

The model

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

- $Y_1 = \frac{1}{(1-c_1)} \left[c_0' - c_1 T + \overline{I'} + G \right]$

- What's the effect on Y_1?

Case Study: the impact of the Corona virus outbreak

- What have been governments doing to counter the economic impact of the outbreak?

CNBC

Hong Kong plans $15 billion spending to support its economy amid coronavirus outbreak

PUBLISHED TUE, FEB 25 2020·10:54 PM EST | UPDATED WED, FEB 26 2020·12:19 AM EST

Bloomberg

Italy Doubles Stimulus to Fight Virus Impact to $8.4 Billion

I·C·I·S Independent Commodity Intelligence Services

Coronavirus outbreak to lower China 2020 GDP growth to 5.6% - IMF

Los Angeles Times

The Fed makes emergency rate cut to offset the coronavirus impact, but will it work?
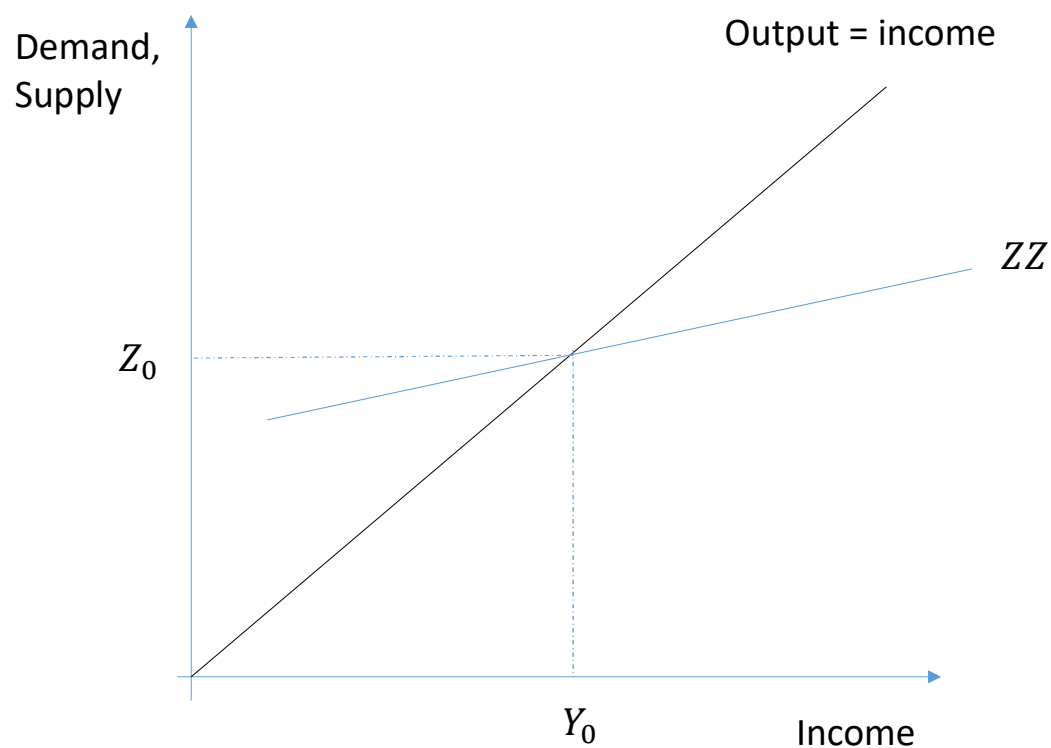
How we model Saving

- We have:

  - $Y = C + I + G$

- Private Saving: $S = Y_D - C$

- Public Saving $= T - G$

- We then have:

  - $S = Y - T - C \Rightarrow S = I + G - T$

- Or:

  - $S - I = G - T$

- And when public saving = 0:

  - $S = I$

The Paradox of Saving

- Assume that c_0 falls by Δc_0 ie that Private Savings increase at every level of income
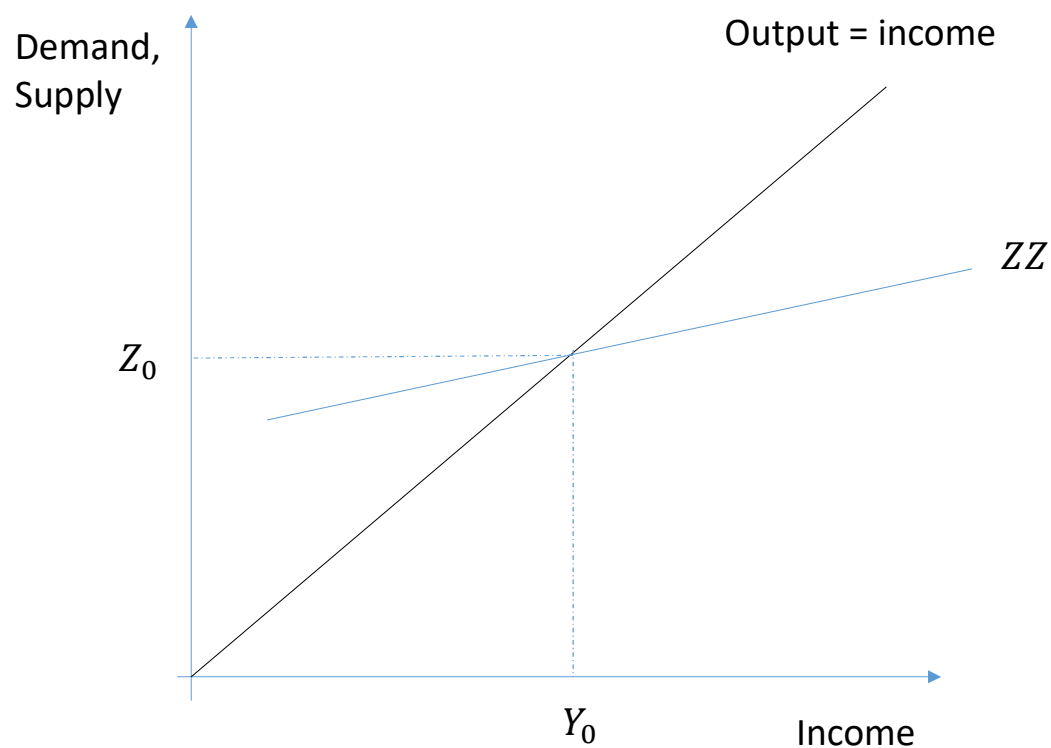
- What happens to S in equilibrium?

We have:

Demand,
Supply

Output = income

ZZ

Z_0

Y_0

Income

The Paradox of Saving

- Now assume that c_1 falls by Δc_1 ie that the Marginal Propensity to Save increases

- What happens to S in equilibrium?

We have:

Demand, Supply

Output = income

ZZ

Z_0

Y_0

Income

The Paradox of Saving

- Now assume that c_1 falls by Δc_1 ie that the Marginal Propensity to Save increases
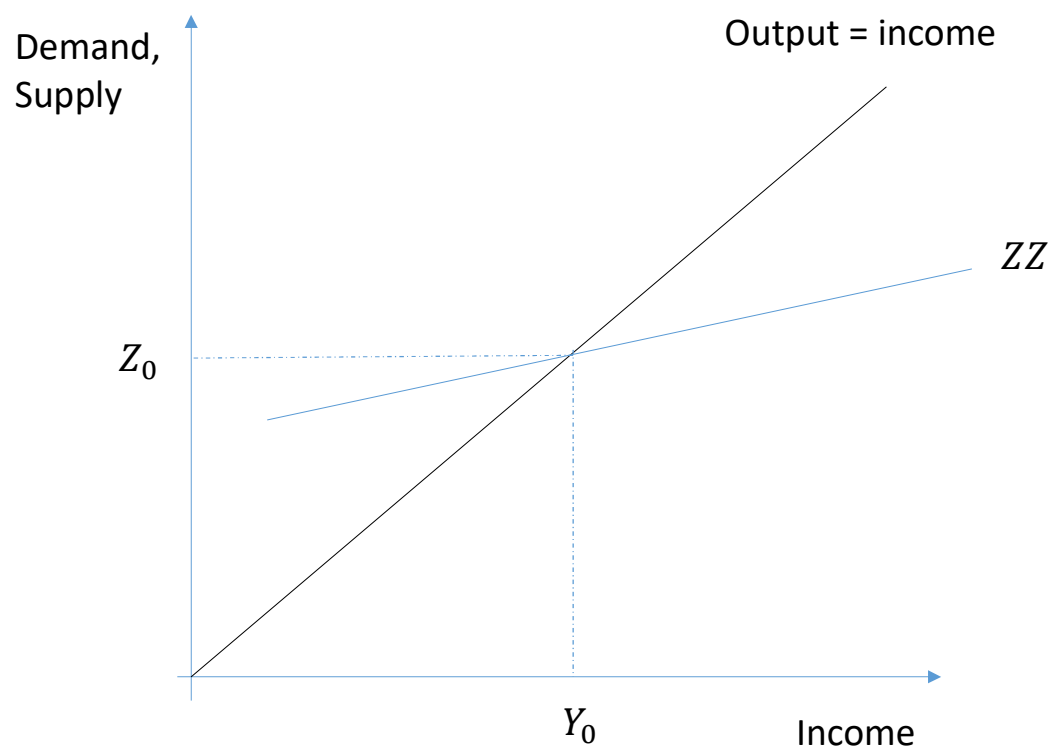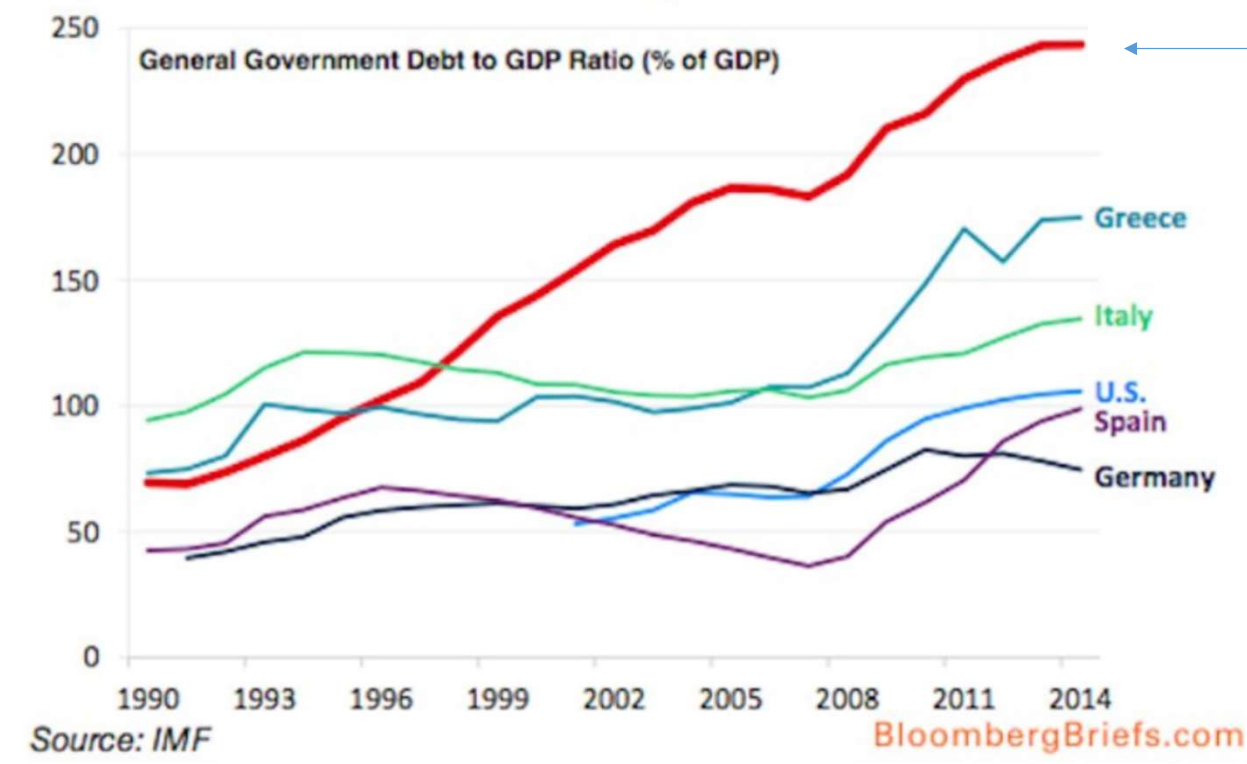
- What happens to S in equilibrium?

We have:

Demand, Supply

Output = income

ZZ

Z_0

Y_0

Income

The role of the government: Financing government spending

- Governments fund their spending either from taxation or else by borrowing from investors

- Most governments have accumulated large amounts of debt

Which country is this?

General Government Debt to GDP Ratio (% of GDP)

Source: IMF

BloombergBriefs.com

The role of the government: Financing spending

- What interest rate would you require to lend money to the following governments for the periods shown?:

Country	2 years (%)	10 years (%)
US		
Italy		
Germany		
Japan		

One reason why government bond yields are so low

The US stock market so far in 2020

US 10 year government bond yields

- Fears over the Corona virus worldwide have caused investors to buy safe assets instead of

  riskier assets

- Government bonds in the developed economies are considered safe assets

- Equities are usually considered riskier assets

Exercise: the Balanced Budget multiplier – Blanchard Ch3 Q4

- Is it possible to affect output through changes in G and T so that the government budget remains balanced?

- We have: $Y_0 = \dfrac{1}{(1 - c_1)}[\, c_0 - c_1 T + \bar{I} + G\,]$

1. By how much does Y_0 increase by when G increases by one unit?

2. By how much does Y_0 decrease by when T increases by one unit?

Exercise: the Balanced Budget multiplier – Blanchard Ch3 Q4

- Is it possible to affect output through changes in G and T so that the government budget remains balanced?

- We have: $Y_0 = \dfrac{1}{(1 - c_1)}[\, c_0 - c_1 T + \bar{I} + G\,]$

3. What has happened to the budget deficit as a result of the government's actions?

4. What is the overall effect of the government's policies on equilibrium output?   Why?