

# MULTIPLIER AND ACCELERATOR THEORY

Chapter 18 of Blink and Dorton's IB Course  
Companion for Economics

Section 3.4 of Matt McGee's Economics in  
Terms of the Good, the Bad and the  
Economist

Section 3 of Constantine Ziogas' IB Study  
Guide : Economics

## OUTLINE

- ⦿ Explain the multiplier effect of injections on national income
- ⦿ Calculate the value of the multiplier
- ⦿ Explain the accelerator effect of investment on national income
- ⦿ Explain what is meant by “crowding out”

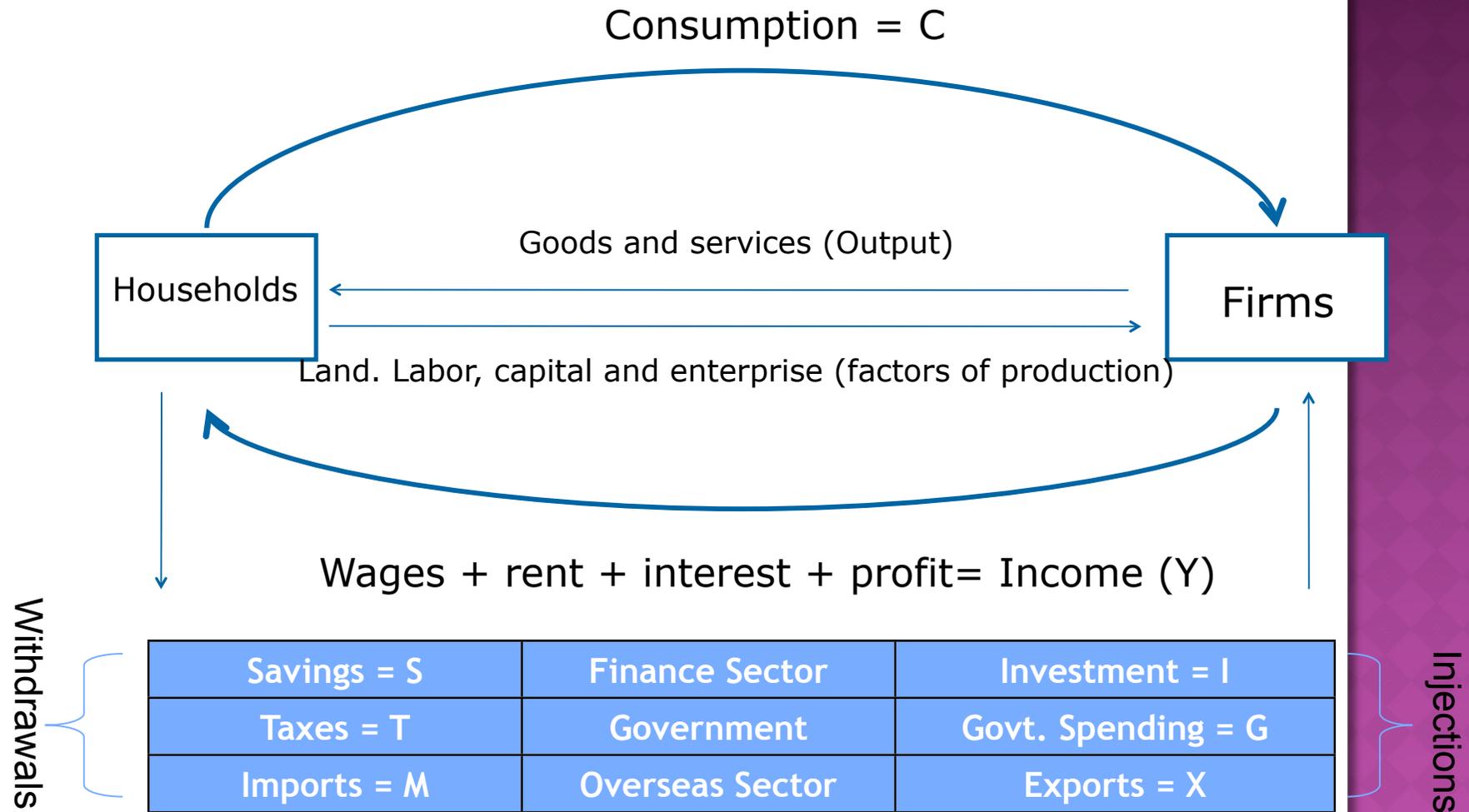
# MULTIPLIER

- ◉ Situation: The government decides to fill a deflationary gap by increasing its government spending. The effect will be the final increase in aggregate demand that is greater than the amount of government spending.
- ◉ In fact, any increase in aggregate demand will result in a proportionately larger increase in national income.

## MULTIPLIER: HOW IT WORKS

- Recall: circular flow diagram, there are injections and withdrawals from the economy. Taxes, imports and savings are withdrawals and investment, exports and government spending are injections.
- Government spends \$100 million on a school building project.

# Circular Flow of Income



# MULTIPLIER: HOW IT WORKS

\$100 M



Income of Labor  
(builders, plumbers,  
architects, etc.)

Payment to Capital (steel, cement, etc.)  
and become income of the owners of  
these factors of production



withdrawals

Income  
again..

## MULTIPLIER: NUMERICAL EXAMPLE

### ⦿ Assumption:

- Government spends \$100M in an economy.
- 20% of all additional income goes to taxes, 10% is saved and 10% is used to buy imports.
- The remaining income of 60% is spent on domestic goods and services. This 60% is known as the marginal propensity to consume and is usually expressed as a decimal,  $MPC = .60$ .
- Given this information, what is the total spending of the economy from the initial spending of \$100M?

## MULTIPLIER: NUMERICAL EXAMPLE

Initial spending by government	<b>100M</b>
2 <sup>nd</sup> round of spending=60% of \$100M	60M
3 <sup>rd</sup> round of spending=60% of \$60M	36M
4 <sup>th</sup> round of spending=60% of 36M	21.60
And so on....	
20 <sup>th</sup> round of spending	0.01M
Total spending including the initial spending by government	249.99 M

Exercise! Try to complete the table and check that the total spending is correct.

The final addition to national income, when all the money has been spent and re-spent amounts to \$250M, 2.5 times the original government spending of \$100M. Any injection into the circular flow of this economy would contribute 2.5x its amount to national income.

## MULTIPLIER: FORMULA

- MPC is the proportion of any increase in income used for domestic consumption.  
 $MPC = \text{change in } C / \text{change in } Y$ .
- MPW is the proportion of a change in income which does not return to the system in the form of consumption. Equal to MPS, MPM and MRT
- $MPS = \text{change in savings} / \text{change in } Y$
- $MPM = \text{change in imports} / \text{change in } Y$
- $MRT = \text{change in taxes} / \text{change in } Y$

## MULTIPLIER: FORMULA

- ◉ Rather than do a table to find the value of the multiplier, there are formulas that can be used.
- ◉ 2 ways: (1) Look at the marginal propensity to consume (mpc) or the marginal propensity to withdraw (=marginal propensity to save (mps)+ marginal rate of taxation (mrt)+ marginal propensity to import (mpm))

# MULTIPLIER: FORMULA

## ◉ Multiplier:

(1) The multiplier:  $\frac{1}{1-mpc}$

$$\frac{1}{mps+mpm+mrt} = \frac{1}{mpw}$$

Example?

## MULTIPLIER:

- Calculate the multiplier for an economy where the mpc is 0.75
- By how much will national income increase in total if there is an investment of \$50,000.
- Answer: Multiplier is 4.  $1/0.25=4$
- National income increases by \$200,000 ( $4*\$50,000$ )

# MULTIPLIER

- ◉ Any change in any of the withdrawals from the circular flow will change the multiplier. If taxation rate increases, multiplier falls. If mpm falls, multiplier increases. If mps falls, what happens to the multiplier?
- ◉ What are the two things to keep in mind when government plans to intervene to fill a deflationary gap?

## THINGS TO CONSIDER WHEN FILLING A DEFLATIONARY GAP

- ⦿ It must estimate the gap between the equilibrium output and full employment output.
- ⦿ It must estimate the value of the multiplier so it can judge the suitable increase in AD that is necessary to inject into the economy in order to fill the gap.

## THINGS TO CONSIDER WHEN FILLING A DEFLATIONARY GAP

- ◉ The higher the withdrawals (taxes, imports and savings), the lower the multiplicative effect of any given increase in government spending.
- ◉ Lower interest rates will lower the MPS, lower income taxes will lower the MRT and barriers to trade will lower the MPM. All will lower the MPW and thus increase the value of the multiplier.

# ACCELERATOR THEORY

- ◉ The accelerator theory suggests that the level of induced investment will be determined by the rate of change of national income (and not interest rate). When national income is rising rapidly, then firms will want to meet increasing demand by expanding their capacity. But as the rate of GNP growth falls, businesses will no longer need to add to capacity and so investment levels fall back to the original level necessary to maintain depreciated capital.

## ACCELERATOR THEORY: RATIONALE

- ◉ Firms must replace/do replacement investment to replace depreciated equipment.
- ◉ Let us say that firms are already at full capacity and are spending a constant amount on investment in order to maintain the level of existing capital. (they try to replace depreciated equipment).
- ◉ If national income rises, consumption increases then demand from consumers will rise.

## ACCELERATOR THEORY: RATIONALE

- ◉ If the firms want to meet the rising demand, they have to increase the level of their investment to increase their capacity. They will invest in NEW plant and equipment to meet the increase in demand.
- ◉ This type of investment is called investment induced investment.
- ◉ Let's give an example...

## ACCELERATOR THEORY: APPLICATION

- One firm, A, that makes microwave ovens. It has an annual demand of 200,000 ovens and operates 20 machines to meet this demand. Capital to output ratio is (1:10,000).
- Each machine costs \$20,000 and one-tenth of its machines is replaced due to depreciation.
- Total investment per year will be \$40000 (10% of 20 times \$20,000)

## ACCELERATOR THEORY: APPLICATION

- ◉ National income rises causing consumption to increase and demand for microwave ovens increase by 5%. Demand is now  $200000 * 1.1 = 210,000$ .
- ◉ If Firm A wants to meet this demand, total investment will be \$60,000 (\$40,000 to replace the depreciated machines and an investment induced investment of 1 machine (\$20,000) to meet the additional demand).
- ◉ There is a 50% increase from regular investment.

# MULTIPLIER AND ACCELERATOR

- A small increase in demand (5%) can lead to a large increase in investment (50%), we say that investment accelerates when demand rises.
- How do we link the multiplier and the accelerator.

## MULTIPLIER AND ACCELERATOR

- ◉ The investment induced investment is subject to the multiplier effect, increasing national income further. This is known as the combined multiplier/accelerator effect and can explain the upward momentum in the recovery phase of the business cycle.

# CROWDING OUT

- ⦿ There are three ways government can fund increased government spending during a fiscal year: printing money, raising taxes or borrowing from its citizens.
- ⦿ The question is will borrowing money from its citizens increase aggregate demand?
- ⦿ Argument: Assume that the government borrows money (through bond issuance) in order to finance government spending in line with demand side policies.

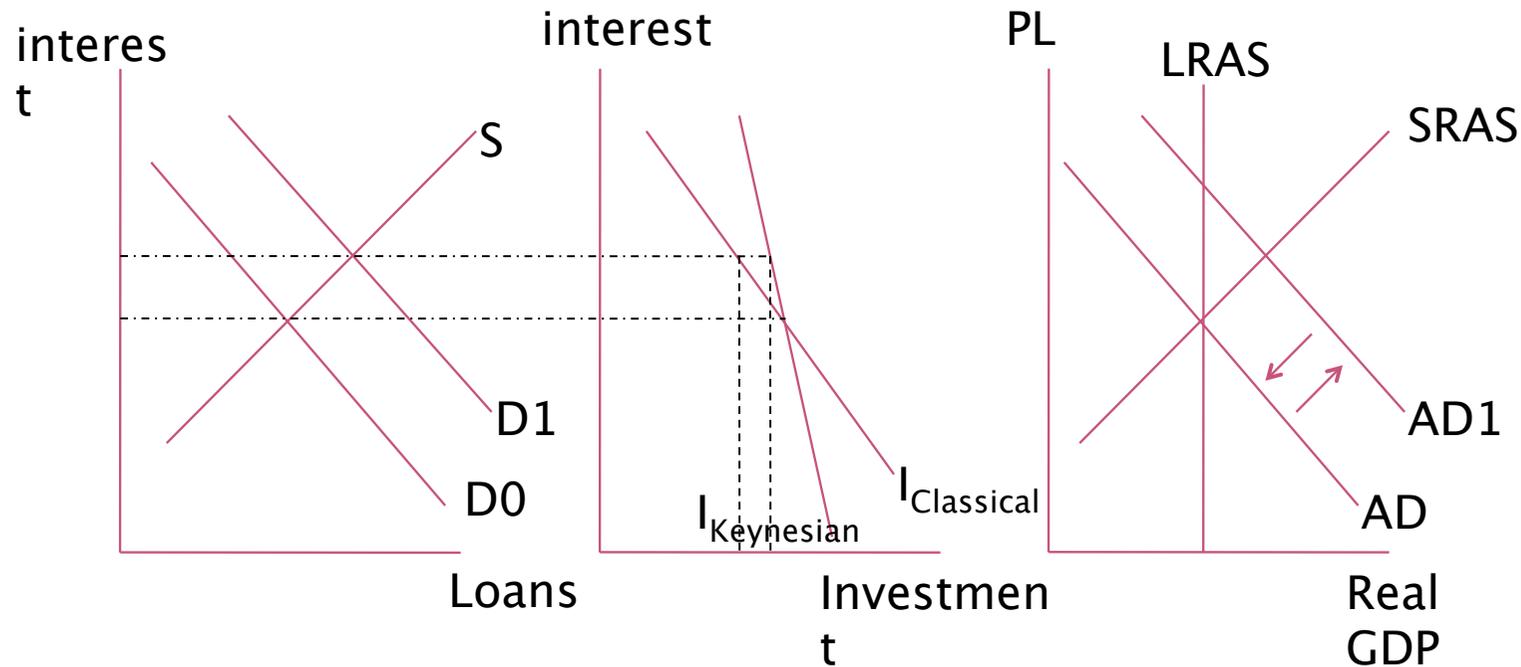
# CROWDING OUT

- ⦿ The increase in government borrowing increases the demand for loanable funds which increases interest rates and causes investment spending to fall. Thus, the potential increase in AD is negated (crowded out) by the increase in interest rates and fall in investment.
- ⦿ However, for crowding out to happen, there are a number of assumptions.
- ⦿ Economy is operating at or above the full employment level of output

# CROWDING OUT

- ◉ Second, real borrowing has to take place, the government's increased borrowing from either households or the financial sector cannot be compensated by pumping additional money out into the market.
- ◉ How will these work?

# CROWDING OUT



If the economy is at full employment and then government increases government spending by increasing borrowing on the open market. There will be an increase in the demand for loans which will drive the interest rate up. The higher interest rate will lower investment.

# CROWDING OUT

- ◉ Partial crowding out versus complete crowding out.
- ◉ Keynesian: Investment is largely unaffected by interest rates.
- ◉ Classical: Complete crowding out will occur as long as there is real borrowing that is taking place since demand for investment is highly responsive to changes in interest rates.