

Macro-Economics



Analysing the outlook for GDP growth

Measurement of Economic Activity: National Income Accounting

- GDP at market prices: Value of final output (including) indirect taxes
- GDP at factor cost: Excludes indirect taxes from output and adds back subsidies.
- Nominal GDP: GDP at current prices → Problem
↳ inflation gets factored in
- Real GDP: GDP at constant prices i.e. nominal GDP adjusted for impact of inflation
↳ base yr

VAT	
Value of final output	<u>100</u>
Ind. tax	<u>20</u>
Subsidies	10

GDP at market prices: $100 + 20 = 120$

GDP at factor cost: $100 + 10 = 110$

Compensation paid by govt. to firms

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		Qty	Price
<u>2021</u>	<u>Cars</u> :	100	$\times \$ \underline{1000} / \text{car}$
	GDP:	<u>100,000</u>	
2022	Cars:	100	$\times \underline{1100} / \text{car}$
	<i>Nominal</i> GDP:	<u>110,000</u> £	
Real GDP:	Constant Prices	$100 \times 1000 = 100,000$	

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Calculating National Income:

Let us understand the following relationships:

➤ As already stated, Output = Income = Expenditure

➤ GDP (Household Income) is denoted by Y; C is the household consumption and S is household savings

$$100 = 80 + 20$$

➤ Since consumers will spend the money and save the remaining: $Y = C + S$ → Income

➤ From Output perspective $Y = C + I$, mathematically; ~~$Y = C + S$~~ ; ~~$Y = C + I$~~ , hence $S = I$. → equilibrium

↳ output is purchased by households (C) & firms I (investment)

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Calculating National Income:

Now let us bring government and external sector in the picture:

➤ Y (GDP at market prices) = C + I + G → Businesses
→ gout expenditure
↙ Households

➤ Finally, with external sector: Y = C + I + G + X - M → imports
↓
exports

Other Equations:

➤ Y (GDP at factor cost) = C + I + G - t → indirect tax like VAT

➤ YD = Y + T - t_y → disposable income → income left after
↳ households paying tax

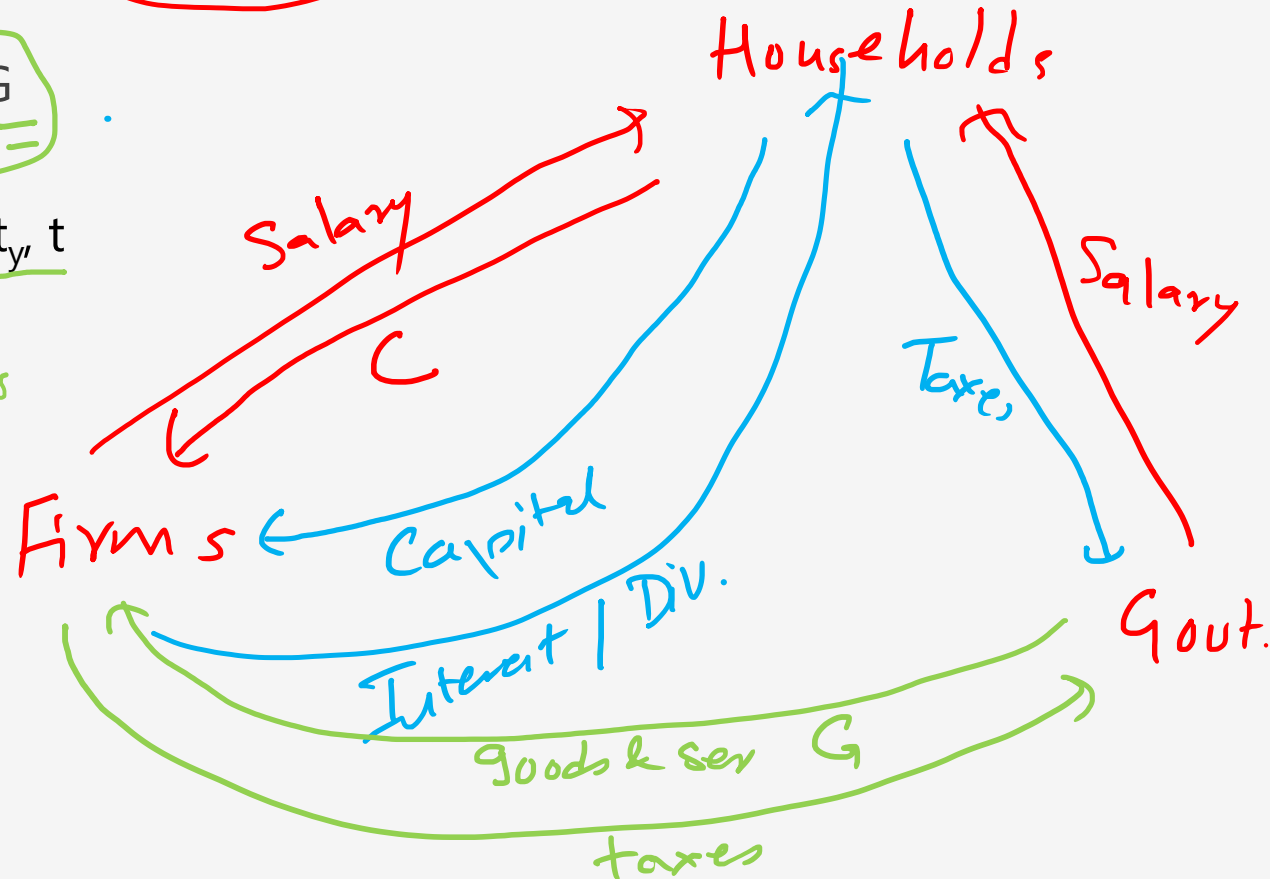
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Injections into and Leakages out of circular flow:

- Injections into the system. I, X, G
- Leakages or Withdrawals: S, M, t_y, t

Savings

Imports



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Relationship between savings, investments, government expenditure, taxes, exports and imports

- From expenditure perspective: $Y = C + I + G + X - M$
 - From income perspective: $Y = C + S + T$
- $C + I + G + X - M = C + S + T$
 GDP

➤ By equating the above and rearranging, we get an important equation:

➤ **$S - I = G - T + X - M$**

↳ diff betw savings & investment

➤ This is an important equation to understand imbalances in the economy

$X - M$ → Trade balance

↳ +ve: Trade surplus; -ve: trade deficit

$G - T =$ Budget balance
 ↳ +ve: Budget deficit
 ↳ -ve: Budget surplus

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Relationship between savings, investments, government expenditure, taxes, exports and imports

$$S - I = G - T + X - M$$

Questions:

➤ If a country runs high fiscal deficit, and is a net exporter, what is the implication on S and I?

$\text{imp} > \text{exp}$ $\text{Tax} > \text{G. exp}$

➤ If a country runs a trade deficit, and has fiscal surplus, what is the implication on S and I?

$(S) > (I)$ $S - I = G - T + X - M$ firms are lending to foreigners
 $+ 150 = + 100 + 50$

$(I) > (S)$ $S - I = G - T + X - M$ firms are borrowing from foreigners
 $- 90 = - 60 + - 30$

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Important Equations:

$$1) Y = C + I + G + X - M$$

$$2) S - I = G - T + X - M$$

Analysing the outlook for GDP growth

Concept of National Income

$$NNP = GNP - \text{Capital used in production}$$

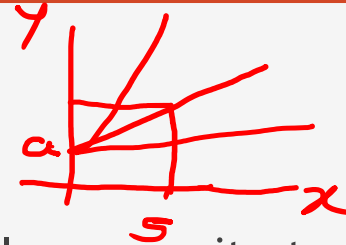
- National income is net national product (NNP)
- It is calculated as GNP at factor cost less capital used in production i.e. depreciation of buildings and machinery
- Per capita GDP or GNP = GDP or GNP divided by number of individuals in the country

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intercept
 $y = a + bx$
 ← slope of line

Total demand in economy

Aggregate demand and equilibrium output



$y = a + bx$
 $C = a + c Y_D$

- Consumption Function: $C = a + c Y_D$, where c is marginal propensity to consume (MPC) and Y_D is disposable income. In the absence of government, $Y_D = Y$.

Salary: 30000 @ AR
 Tax: 3000 Tax @ 10%
 Dis. Inc. ← 27000

- MPC indicates proportion of additions to disposable income that is spent by a consumer. For example, if $c = 0.9$, 90% of increase in disposable income will be spent and remaining 10% will be saved.

Q: An economy has MPC of 0.85. Assume disposable income goes up by \$300. How much will consumption change?

- Thus, 10% becomes Marginal Propensity to Save (MPS). $MPS = 1 - MPC$. $\hookrightarrow = 300 \times 0.85 =$

- Consumer spending mainly depends upon disposable income as per the consumption function.

$$MPC = \frac{\Delta \text{Consumption}}{\Delta \text{dis. income}} = \frac{900}{1000} = 90\% = 0.9$$

Analysing the outlook for GDP growth

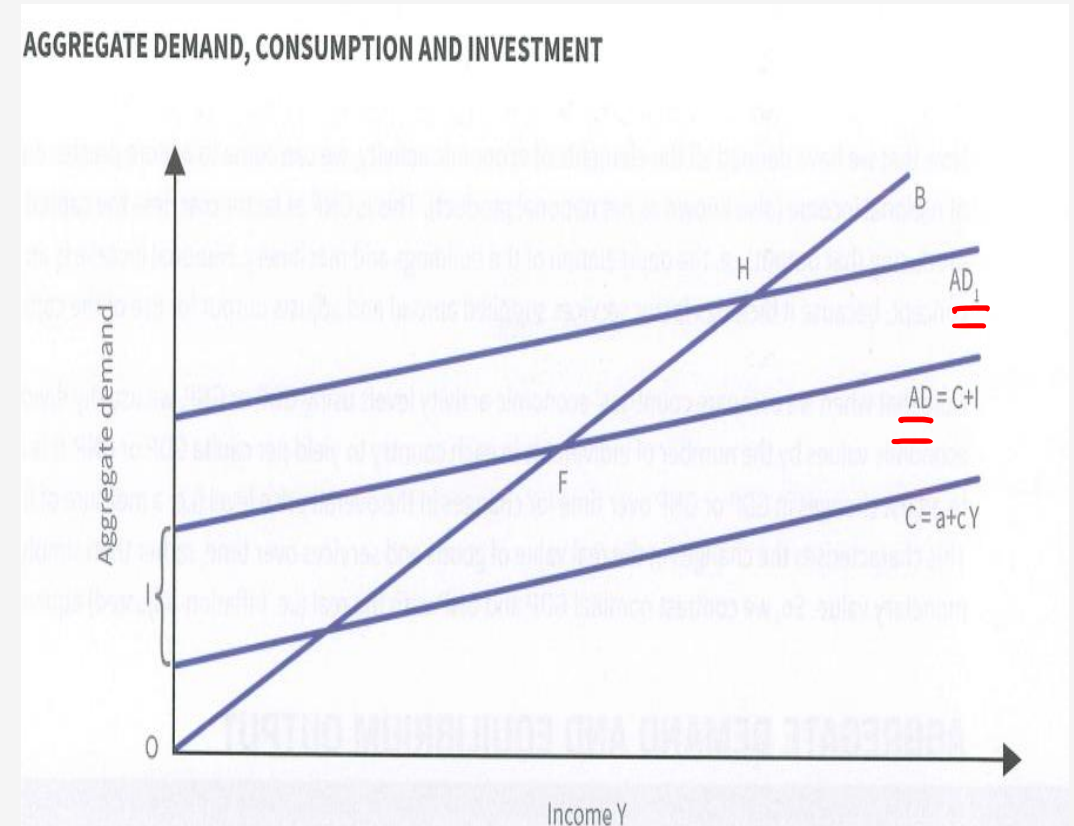
Aggregate demand and equilibrium output

- On what parameters Investments (I) depends?
 - First of all, investment demand consists of both capital goods and changes in inventory (planned).
 - machines*
↓
 - materials*
↓
 - Many factors such as interest rates, output expectations, tax rates
 - Let us follow a simplistic framework where we consider only households and firms as economic agents and investment demand is determined by factors outside our framework.
 - In economics language it is called "autonomous".
 - *given*

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Aggregate demand and equilibrium output

- In the diagram, Line AD represents total planned (not actual as per national income accounting) expenditure by households and firms.
- Point F represents short term equilibrium since at this point planned aggregate spending equals output produced.
- If AD curve shifts up to AD1, new equilibrium will be reached at point H.



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MPC tells us Δ in consumption due to Δ in disposable income

Aggregate demand and equilibrium output: Concept of multiplier

Invest demand is given. \$100 \rightarrow \$150 \rightarrow 50

- Multiplier effect occurs because increase in autonomous expenditure, by consumers / firms, increases output more than proportionately. Why does this happen?

- Because if consumers increase autonomous expenditure, producers will have to produce more. Hence, labor will start earning more leading to greater spending by them, which will further increase aggregate demand.

$$\text{Multiplier} = \frac{1}{1-0.9} = \frac{1}{0.1} = 10 \rightarrow \text{MPC} = 0.9$$

- This multiplier effect can be captured by a formula: $1/(1-c)$ or inverse of MPS. We have assumed a simplistic model, there is no government and hence no taxes. Else this equation will change.

- Conclusion: Rise or fall in autonomous expenditures leads to much larger proportionate changes in income.

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BODMAS

Aggregate demand and equilibrium output: Government included

- Now aggregate demand equals C + I + G. → given
- Now the consumption function changes to: $C = a + c(1 - t^1)Y$, where is t¹ tax rate.
- The multiplier effect can be captured by a formula: $1/(1 - c(1 - t^1))$.
MPC → 0.9
t¹ → 30%
- Conclusion: Rise or fall in autonomous expenditures leads to much larger proportionate changes in income.

$$\begin{aligned} &= \frac{1}{(1 - 0.9 \times 0.7)} = \frac{1}{(1 - 0.63)} = \frac{1}{0.27} = 3.7 \end{aligned}$$

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Initially, $I \rightarrow$ given, then $G \rightarrow$ given, $Exp \rightarrow$ given

Aggregate demand and equilibrium output: Foreign trade included

\rightarrow Multiplier

No govt.

- We now include foreign trade i.e. exports and imports. Exports can be autonomous because exports depend upon income of the rest of the world.

- Imports can have a similar function as consumption: $M = d + eY$, where e is marginal propensity to import.

$$C = a + cY_d \quad \rightarrow \text{given}$$

$$M = d + eY$$

↓ imports ↓ MP_I ↓ income

- The multiplier effect can be captured by a formula: $1/(1-(c-e))$.

\rightarrow Measures \uparrow or \downarrow in imports due to \uparrow \downarrow GDP or income in country.

Analysing economic policy

Analysing Economic policy

Learning Outcomes.....

- **Identify** the major components of the Classical, Monetarist, Keynesian and Austrian schools of thought and distinguish between them
- **Describe** fiscal policy and its influence on aggregate demand
- **Identify** the problems associated with fiscal policy
- **Identify** money supply (from 'narrow' through 'broad')
- **Identify** key features of, and changes to the understanding of, the fractional reserve banking system including **defining** and **calculating** money multiplier

Analysing Economic policy

Learning Outcomes.....continued

- **Explain** the transmission mechanism whereby monetary policy influences economic aggregates
- **Describe** unemployment and **explain** how it is measured in the UK
- **Define** inflation (including deflation), **explain** how it is measured in the UK and **identify** different causes
- **Explain** the relationship between inflation and unemployment according to the Phillips curve

Analysing Economic policy

Learning Outcomes.....continued

- **Explain** how inflation targeting operates in the UK
- **Distinguish** between the different mandates and approaches of the major central banks
- **Explain** the unconventional tools used by central banks to manage the economy
- **Explain** the impact of bank capital and liquidity requirements and the move towards macro prudential regulation of the macro-economy
- **Identify** the role of debt in the business cycle

Analysing Economic policy

Economic schools of thought:

- Many schools of economic thought have tried to understand, explain the relationships between macro economic variables. Let us understand major ones.

Classical economics

- This schools proposed that real economy is self-regulating and is capable of achieving natural level of GDP which ensures full employment of resources.
- Thus, even if temporarily economy may fall short or exceed natural level of output, it will come back to natural level of output by a self-adjusting mechanism without needing intervention from government.

Analysing Economic policy

Classical economics


'invisible hand'

- This thought depends upon Say's law which states that "supply creates its own demand" which means when economy produces certain level of output, it automatically generates income that can be used to purchase the output.
- This demand ensures all output is bought and natural level of GDP is maintained.
- Wages and prices were assumed to be flexible and fall in wages was expected to increase employment.
- However, as observed in real life, there are structural problems in economy which may lead aggregate demand to fall further.

→ unemployment Problems: temporary
- Great depression of 1930s proved contrary to what classical economists believed.

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Economic schools of thought: Keynesian economics

- Taking lessons from great depression, Keynes observed that demand declined drastically and unemployment soared.
- Before Keynes' work, there was no distinction between micro and macro economics.
- In order to bring the economy back on track, Keynes advocated government intervention in the periods of economic slowdown. 
- Specifically, governments should spend during periods of economic stress even if it results in widening fiscal deficits.

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Economic schools of thought: Monetarist economics

- Monetarists believed that inflation is a result of variation in money supply, rather than changes in aggregate demand.
- They feared the 'crowding out' effect of fiscal policy, hence advocated no government intervention. They opined that markets are competitive and naturally lead to macro economic stability.
- Monetarists focused on monetary policy, which was ignored by Keynesians.

→ Private Sector

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Economic schools of thought: Rational Expectations or New Classical Economics

- Assertions of the theory
 - Rational behaviour of individuals, who collect and analyse relevant economic information.
Hence public policy may be affected since people may offset impact of government policies.
 - Competitive markets
 - Prices adjust to changes in aggregate demand

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Economic schools of thought: Austrian economics

- Prices of goods are determined by individual preferences that are subjective, unlike costs of production as assumed by classical economists.
- Hence reward to capital and labour depends upon the prices that consumers are willing to pay
- Some theoretical contributions of Austrian economists:
 - Subjective theory of value; Importance of marginalism in theory of pricing; Austrian business cycle theory; Dynamic role of entrepreneur in putting capital, labour and land to productive use.

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Economic schools of thought: Austrian economics

(S) (I)



- They differ in their perspective from Classical economist in determination of interest rate.
Classical economists believed supply and demand for capital to balance savings and investment determines the interest rates.
- As per Austrian school, preference to spend now or save for the future determines interest rates.
- Preference to consume more now may lead to primitive economy while more savings for the future helps the economy to develop in more productive one.

less developed

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US
2001: Dot com bubble
↳ lost jobs, AD ↓

Economic schools of thought: Austrian economics

Fed Res → Int rates ↓ \bar{s}_i → (i!)

➤ As per Austrian school, business cycles arise due to incorrect policy decisions by central banks. For example, fixing lower than market determined interest rates may lead to formation of bubble in the economy. This bubble will burst and cause economic instability.

2003/4 → borrowing

➤ Thus a boom due to lower interest rates is likely to lead to a bust. Government intervention will only make it worse.

↳ 2005 to 2007 → Boom

➤ This school is criticized due to

↑ int rates bubble

➤ Emphasize on deduction than induction

➤ rejecting empirical methods

Analysing Economic policy

Fiscal Policy

G

T

- Fiscal policy is about government spending and taxation.
- Many governments announce plans for spending and taxation annually in an exercise called "Budget".

<u>Budget or Fiscal Surplus</u>	<u>Budget or Fiscal Deficit</u>
When government revenue (<u>t_y</u>) is greater than expenditure (<u>G</u>).	When government revenue (<u>t_y</u>) is ^{less} <u>greater</u> than expenditure (G).

- Government may change G or tax rate t_1 to influence the level of economic activity.
- For example, to fight an economic slowdown, G is increased and / or t_1 is decreased. → **Expansionary**

Analysing Economic policy

Fiscal Policy: Balanced Budget Multiplier

$G \uparrow$, $AD \uparrow$ more than proportionately

➤ Assume that government expenditure is increased and is equally matched by increase in tax revenue, then the balance of $G - t_y$ remains unchanged.

➤ What is the impact on aggregate demand? Increased G will boost AD and increased t_y will dampen AD .

Bal. bud. multiplier is 1.2. If govt spend \$1000, how much will AD change? $\rightarrow 1000 \times 1.2 = \1200

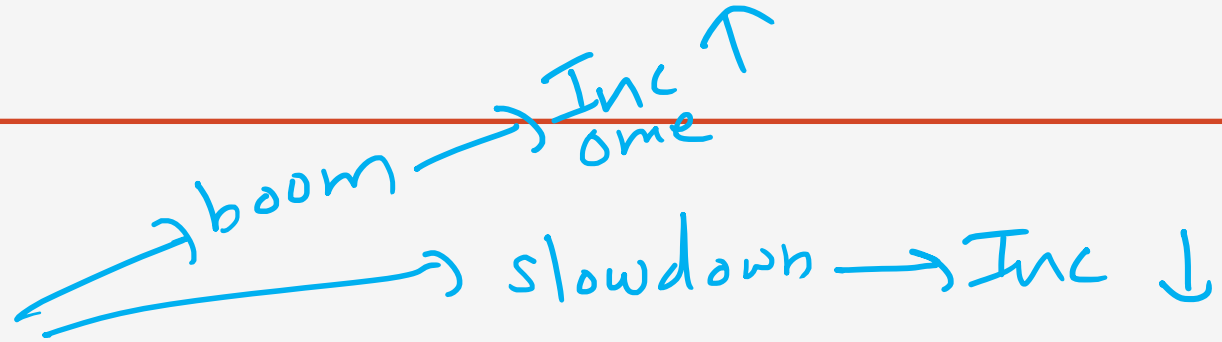
➤ However, the net impact is that the AD increases. This is the idea behind balanced budget multiplier.

$G \uparrow \rightarrow 500$
 $AD \rightarrow \uparrow$

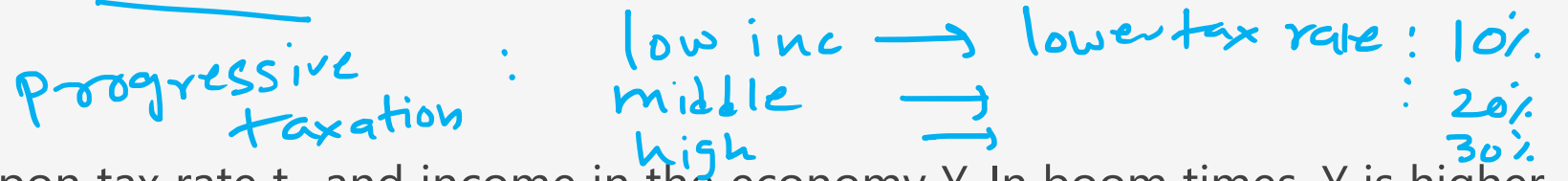
$T \rightarrow 500$
 $AD \rightarrow \downarrow$ } $AD \uparrow$

Analysing Economic policy

Fiscal Policy: Impact of business cycles



➤ Assuming G is constant, business cycles will lead to changes in budget surplus or deficit automatically as follows:



➤ Tax revenue t_y depends upon tax rate t_1 and income in the economy Y . In boom times, Y is higher, so automatically t_y is higher leading to budget surplus.

➤ During economic slowdown, Y is lower, so automatically t_y is lower leading to lower or negative budget surplus.

➤ Because of this cyclicality, it is difficult to determine the fiscal stance of the government whether it is expansionary or contractionary.

Analysing Economic policy

Fiscal Policy: Fiscal Stance

$G \uparrow \& T \downarrow$

- **Expansionary fiscal policy** involves governments increasing expenditure and / or reducing taxes. So, the fiscal deficit is expected to widen (or surplus will fall).

$G \downarrow \& T \uparrow$

- **Contractionary fiscal policy** involves governments reducing expenditure and / or increasing taxes. So, the fiscal deficit is expected to fall (or surplus will increase).

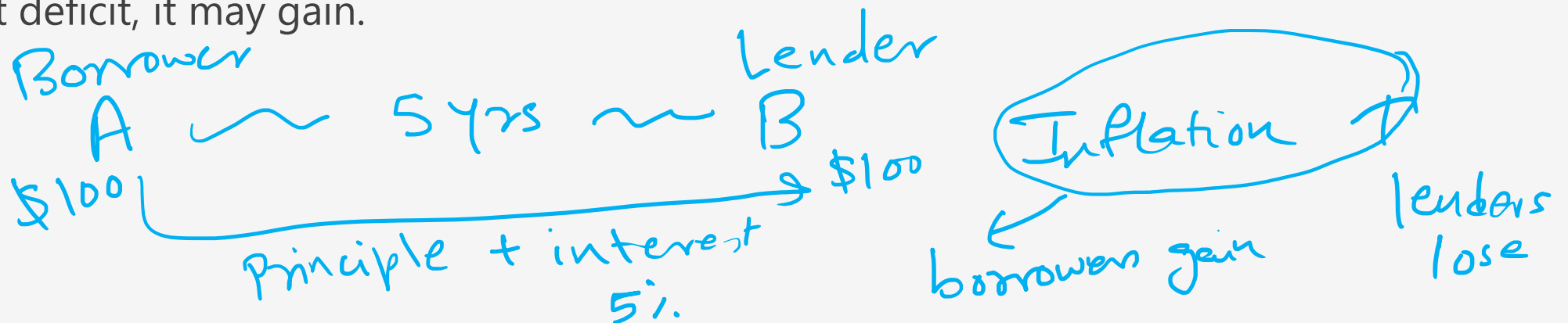
- To understand fiscal stance, we can calculate budget surplus / deficit at current G and t_1 levels, if Y were at full employment level. This is known as full employment budget surplus.

- In UK, budget deficit is known as **public sector net cash requirements (PSNCR)**.

Analysing Economic policy

Fiscal Policy: Fiscal Stance

- Assessment of fiscal stance at full employment level, ignored the impact of inflation on outstanding government debt (bonds issued by government in the past to fund the budget deficit).
- Due to inflation, real value of government debt falls and even if government is running budget deficit, it may gain.



Analysing Economic policy

Fiscal Policy: Automatic stabilizers

- As already stated, tax rates (progressive taxation) act as automatic stabilizers in the economy.
- When the economy has slowed down, i.e. Y is lower, consumers pay lower taxes, whereas when economy is booming, i.e. Y is higher, consumers have to pay higher taxes. This leads to automatic stabilization.
- Apart from automatic stabilizers, governments can take discretionary measures to stabilize the economy. *→ by choice*
- If these measures can be taken, then why economy operates below full employment?

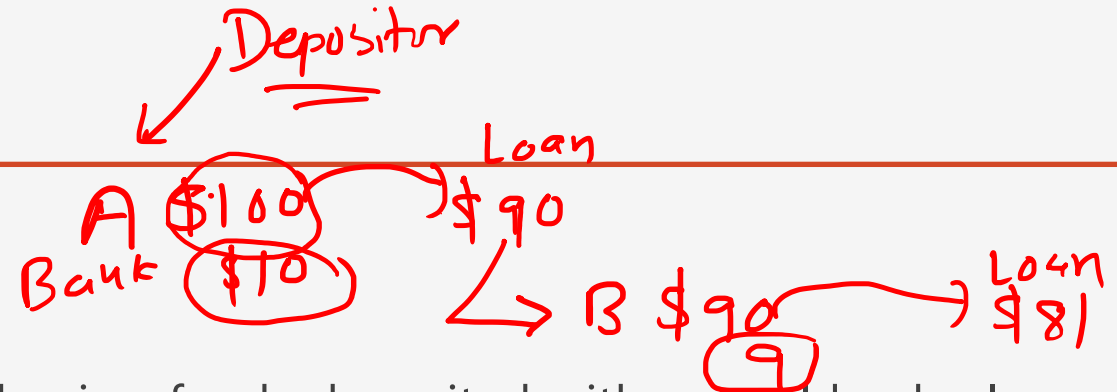
Analysing Economic policy

Fiscal Policy: Challenges in implementing

- This is because in real life economic variables such as consumption, output cannot be estimated with full reliability and there is considerable lag in data being available.
- Similarly, exact state of the economy from business cycle perspective is difficult to judge. There could be errors made in understanding this.
- There are significant time lags in implementing and having the impact of fiscal policy.
- Fiscal policy may be criticized due to effects such as "crowding out" private investment.

Analysing Economic policy

Monetary Policy: Fractional Reserve Banking



- Assets of commercial banks include notes and coins, funds deposited with central banks, loans and advances given to individuals, companies, investments in bonds and other securities.
→ you own
- The most important and sizable liabilities of banks are deposits that customers keep with banks in various forms.
- **Fractional reserve banking** means a very small portion of money received from liabilities is kept in liquid cash. There are other investments which are liquid and can be converted in cash at a short notice.
→ deposit
- However, if many depositors want to withdraw money at the same time, it might create liquidity problem.

Analysing Economic policy

Monetary Policy: Money Supply → define money?

➤ In UK, following definition of money are used:

UK

➤ Notes and coins: Narrowest measure of money, these are sterling notes and coins in circulation

➤ M0: Until 2006, this was narrow money measure of BOE. This consisted of notes, coins and bank's operational deposits with BOE.

➤ Non-interest bearing M1: Notes and coins + non-interest bearing sight deposits held by non-bank private sector. Less useful now and not published by BOE.

→ No restrictions on withdrawal

Analysing Economic policy

Monetary Policy: Money Supply

➤ In UK, following definition of money are used:

➤ M2 (or retail M4): Notes, coins + all retail deposits held by non-bank private sector. Published by BOE.

➤ M3: Notes, coins + all sight and time deposits held by non-bank private sector. Considered headline broad money till 1987.

↳ fixed deposit

➤ M4: Notes and coins, deposits, CDs, repos and securities with a maturity of < 5 years held by non-bank private sector. Considered headline broad money till 2007.

➤ M4ex: M4 excluding deposits of international offshore financial centers. This is measure of broad money now.

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Monetary Policy: Money Multiplier

→ money multiplied by banking system *created or*

➤ Money Stock = Money multiplier * Monetary base

➤ Due to a fractional banking system, banks create more money from the deposits received. How much money is created from deposits is based on money multiplier which in turn is determined by

*Money multiplier → 3.4
Deposit : \$ 1000 (Monetary base)*

➤ Proportion of bank reserves to total bank deposits

10% ← Regulator

➤ Private sector's desired ratio of cash in circulation to total bank deposits

*money created:
 $1000 \times 3.4 = \$3400$
 $\frac{200}{1000}$*

➤ The lower the above ratios, larger will be money multiplier