TOPIC 3.2

The Circular Flow of Income

MCQ Section

1. In a closed economy, the full employment level of income is \$200 million.

$$C = \frac{3}{4}Y,$$
$$I = \$(50 - 5r) \text{ million,}$$

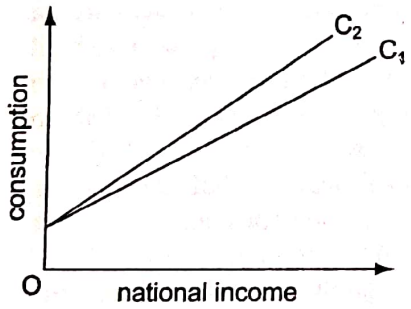
where C = consumption,
Y = income,
I = investment,
r = the rate of interest.

If planned government expenditure is \$30 million, what rate of interest would be required for there to be full employment?

A 2 % per annum
B 4 % per annum
C 6 % per annum
D 8 % per annum

[J08/P3/Q20]

2. In the diagram, C_1 shows the initial relationship between consumption and national income.



What could cause the consumption function to shift to C_2?

A an increase in exports
B an increase in investment
C a decrease in the rate of unemployment benefits
D a decrease in the standard rate of income tax

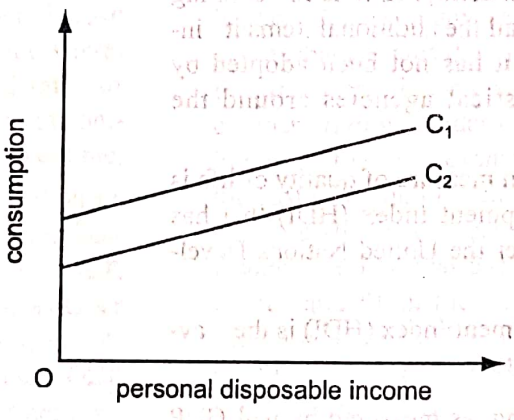
[J08/P3/Q21]

3. Which of the following correctly identifies net leakages from the circular flow of income?

	trade surplus (exports - imports)	government budget deficit (government spending - taxes)	private sector surplus (saving - investment)
A	✓	✓	×
B	✓	×	×
C	×	✓	✓
D	×	×	✓

[J09/P3/Q16]

4. A country's initial consumption function is C_1.



What would be most likely to cause the consumption function to shift from C_1 to C_2?

A a decrease in personal disposable income
B a decrease in the expected future rates of income tax
C an increase in interest rates
D an increase in wealth

[J09/P3/Q18]

HELPS to MCQ

1. C

$Y = C + I + G$

$200 = \frac{3}{4}(200) + 50 - 5r + 30$

$\therefore\ r = 6$

2. D A decrease in MRT results in an increase in MPC, hence, consumption function shifts pivotal upward. Options **A** and **B** are unrelated and option **C** shifts consumption function downward.

3. D Trade surplus and budget deficit both result in net injections whereas private sector surplus suggests that the level of saving is larger than the level of investment, resulting in a net leakage.

4. C A rise in interest rate causes C to fall at each level of income, therefore, shifting C function parallel downward. Options **A**, **B** and **D** result in an increase in C.

5. In a closed economy with no government $C = 30 + 0.7Y$, where C is consumption and Y is income.

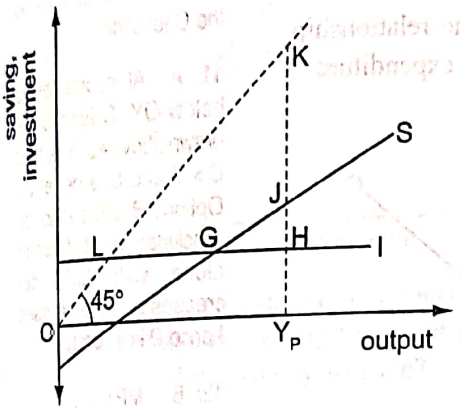
The equilibrium level of income is 300.

What is the level of investment?

A 60 B 100
C 210 D 270

[J09/P3/Q19]

6. The diagram shows the saving and investment curves of a closed economy with no government.



The potential level of output is OY_P.

Which distance measures the gap between actual and potential output?

A LG B GH
C JH D KJ

[J09/P3/Q20]

7. The table gives the national income of a country over six years.

year	national income (Y)
1	2100
2	2110
3	2125
4	2145
5	2160
6	2170

According to the accelerator principle, in which year did net investment first fall to a level below that of the previous year?

A year 3 B year 4
C year 5 D year 6

[N09/P3/Q18]

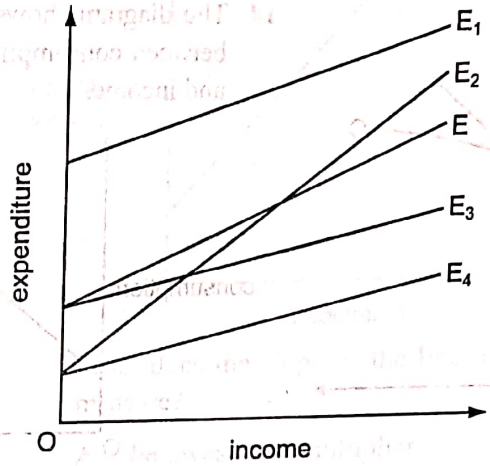
8. Out of any addition to national income, 20 % is spent on imports, 15 % is paid in taxes, 5 % is saved and the rest is spent on domestically-produced goods.

What is the value of the multiplier?

A 2.5 B 5
C 6 D 20

[N09/P3/Q19]

9. The diagram shows a number of expenditure functions. The original expenditure function is shown by E.



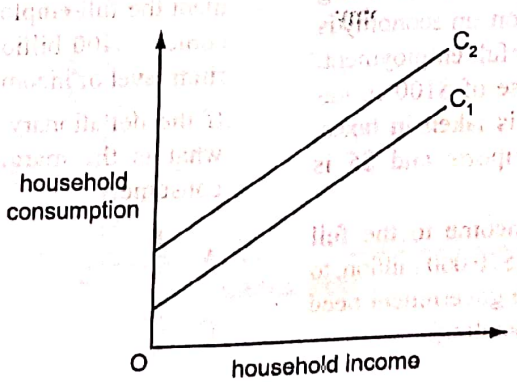
The government announces a decrease in government expenditure on goods and services and reduces the standard rate of income tax.

Which line shows the new expenditure function resulting from these changes?

A E_1 B E_2
C E_3 D E_4

[N09/P3/Q20]

10. The diagram shows the relationship between household income and household consumption.



HELPS to MCQ

5. **A** $C = 30 + 0.7(300)$
$C = 240$
$Y - C = S$
$300 - 240 = 60$

At the equilibrium level of NY, S = I.

6. **B** In the graph actual output is where NY is in equilibrium i.e. S = I whereas potential output is Yp.

7. **C** $It = a(Yt - Yt-1)$

year	(Δ Y Xa = Δ I) (assuming a = I) Δ I
2	10
3	15
4	20
5	15
6	10

8. **A** MPS = 0.2
MPT = 0.15
MPM = 0.05

$$K = \frac{1}{MPS + MPT + MPM}$$

$$2.5 = \frac{1}{0.4}$$

9. **B** Decrease in G shifts E function parallel downward whereas cut in standard rate of income tax shifts E function pivotal upward.

What would be likely to cause the household consumption curve to shift from C_1 to C_2?

A a decrease in household income

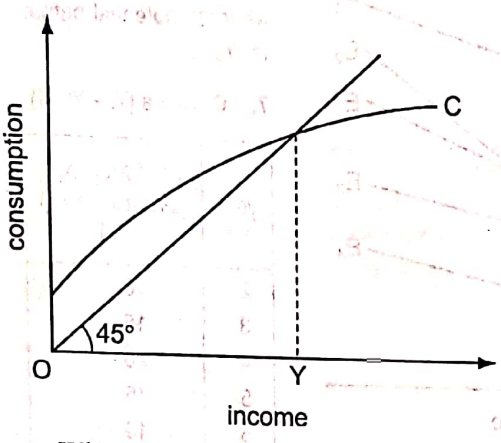
B a decrease in the value of household assets

C an increase in interest rates

D an increase in the expected future level of household income

[J10/P3/Q17]

11. The diagram shows a consumption function for a closed economy with no government.



What can be concluded from the diagram?

A At income levels below OY, saving is negative.

B At income levels below OY, there is an inflationary gap.

C The equilibrium level of income is OY.

D The marginal propensity to consume increases as income increases.

[J10/P3/Q18]

12. When national income equals \$40 000 million and government spending equals \$15 000 million, an economy is in equilibrium below full employment. Out of every increase of \$100 in national income, \$15 is taken in taxes, \$30 is spent on imports and \$5 is saved.

To raise national income to the full employment level of \$50 000 million, to which level will the government need to raise its own spending?

A \$15 500 million

B \$20 000 million

C \$25 000 million

D \$35 000 million

[J10/P3/Q19]

13. What is **not** a leakage from the circular flow of income?

A expenditure on foreign goods

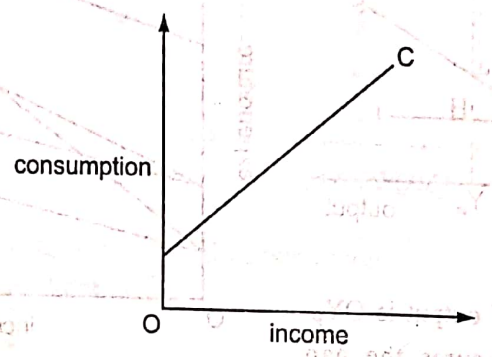
B indirect taxes

C undistributed profits

D unemployment benefits

[N10/P3/Q16]

14. The diagram shows the relationship between consumption expenditure and income.



Which statement is correct?

A The average propensity to consume is constant.

B The average propensity to consume is rising.

C The marginal propensity to consume is equal to the average propensity to consume.

D The marginal propensity to consume is less than the average propensity to consume.

[N10/P3/Q19]

15. In a closed economy with no government the full employment level of income = \$400 billion and the equilibrium level of income = \$380 billion.

If the deflationary gap is \$4 billion, what is the marginal propensity to consume?

A $\frac{1}{5}$

B $\frac{1}{4}$

C $\frac{3}{4}$

D $\frac{4}{5}$

[N10/P3/Q20]

HELPS to MCQ

10. D C increases at each level of household income when they expect higher income in future. Both a decrease in the value of household assets and an increase in interest rate cause C to fall. Hence options B and C are incorrect. Change in household income would cause movement along the C function.

11. A At income levels below OY, C function is drawn above 45° line, thus C > Y and S is negative. Options B & C cannot be concluded from C function alone while MPC decreases as income rises hence D is incorrect.

12. B MPT = 0.15

MPM = 0.3

MPS = 0.05

MPL = 0.5

It follows that $K = \frac{1}{0.5} = 2$

$\frac{\$10000}{2} = 5000$

Government spending must increase from \$15000 to \$20000 million.

13. D Government spending is an injection.

14. D Autonomous consumption causes the value of APC to be higher than the value of MPC.

15. D

$1 - mpc = mpl$

$1 - \frac{4}{5} = \frac{1}{5}$

and $K = 1/1/5 = 5$

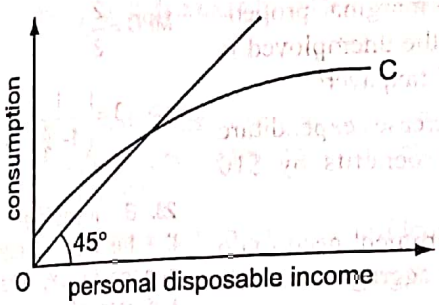
Hence $4 \times 5 = 20$

16. What will reduce the value of the investment multiplier?

A a low marginal propensity to import
B automatic stabilisers
C low marginal tax rates
D low rates of unemployment benefit

[J11/P3/Q15]

17. The diagram shows a consumption function.



As income increases, what happens to the average propensity to save and the marginal propensity to save?

	average propensity to save	marginal propensity to save
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

[J11/P3/Q16]

18. In a closed economy, households pay \$0.10 in tax on every \$1 increase in their gross income, and spend $\frac{5}{6}$ of every increase in their disposable income.

What is the value of the multiplier?

A 1.5 B 4.0
C 6.0 D 7.5

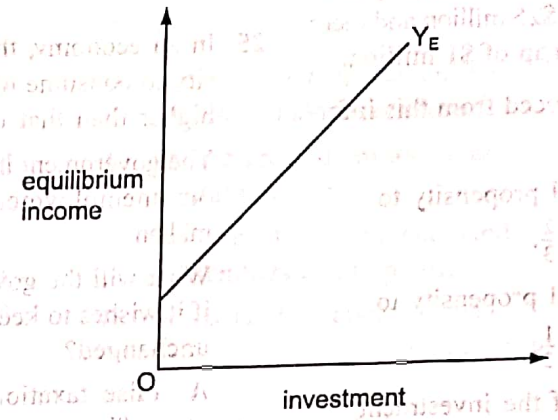
[N11/P3/Q18]

19. What will be the effect, in the short run, on the price level and on national output of an increase in aggregate demand if firms are working at full capacity?

	price level	national output
A	rise	rise
B	rise	unchanged
C	unchanged	rise
D	unchanged	unchanged

[N11/P3/Q20]

20. In the diagram, Y_E indicates the equilibrium level of income corresponding to different levels of investment.

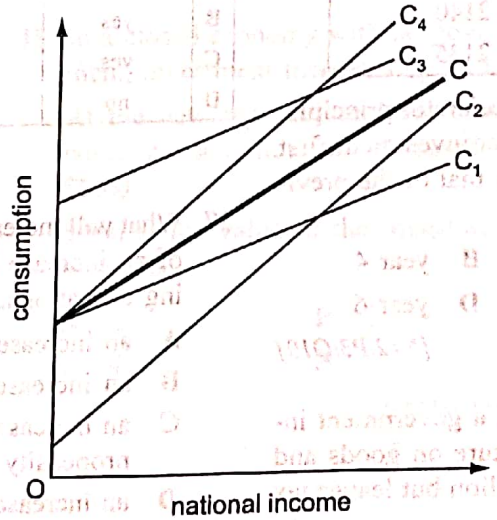


What does the slope of the line Y_E measure?

A the investment multiplier
B the marginal propensity to save
C the rate of growth of investment
D the rate of growth of national income

[J12/P3/Q21]

21. In the diagram, C is an economy's initial relationship between consumption and national income.



HELPS to MCQ

16. B An automatic rise in tax rate along with an increase in national income dampens the size of investment multiplier. A lower value of MPM and MPT is likely to generate a higher value of multiplier thus **A** & **C** are incorrect. Option **D** does not affect the size of multiplier.

17. D A decreasing slope of C function suggests that as Y rises both MPC and APC fall, thus the values of both MPS and APS must rise because 1 – MPC = MPS, and 1 – APC = APS.

18. B MPT = 0.1

disposable income;

1 – MPT = Yd

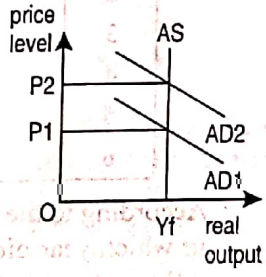
therefore, 1 – 0.1 = 0.9,

and $\frac{5}{6} \times 0.9 = 0.75$

thus; 1 – 0.75 = 0.25

and $\frac{1}{0.25} = 4$

19. B



20. A $K = \frac{\Delta NY}{\Delta I}$

A change in investment causes a proportionately larger change in NY equilibrium.

Which curve could show the economy's new consumption function following a reduction in the rate of unemployment benefits?

A C_1 B C_2
C C_3 D C_4

[J12/P3/Q22]

22. In a closed economy with no government, the level of investment is \$5 million, the equilibrium level of income is \$22 million, the full employment level of income is \$25 million and there is a deflationary gap of \$1 million.

What can be deduced from this information?

A The marginal propensity to consume is $\frac{2}{3}$.

B The marginal propensity to consume is $\frac{1}{3}$.

C The value of the investment multiplier is 5.

D The value of the investment multiplier is 1.5.

[N12/P3/Q18]

23. The table gives the national income of a country over six years.

year	national income (Y)
1	2100
2	2110
3	2125
4	2135
5	2140
6	2135

According to the accelerator principle, in which year did net investment first fall to a level below that of the previous year?

A year 3 B year 4
C year 5 D year 6

[N12/P3/Q19]

24. During a recession, a government increases its expenditure on goods and services by \$10 million but leaves tax rates unchanged.

Why might the subsequent increase in national income be less than \$10 million?

A Increased government borrowing increases interest rates.

B The marginal propensity to consume is less than 1.

C The marginal propensity to import is greater than 0.

D There is no accelerator effect on investment.

[N12/P3/Q28]

25. In an economy, the marginal propensity to consume of the unemployed is higher than that of taxpayers.

The government increases expenditure on unemployment benefits by \$10 million.

What will the government need to do if it wishes to keep aggregate demand unchanged?

A raise taxation by less than \$10 million

B raise taxation by more than \$10 million

C raise taxation by \$10 million

D leave taxes unchanged

[N12/P3/Q30]

26. Which correctly identifies injections into a country's circular flow of income?

	private sector I > S	government sector G > T	trade sector M > X
A	no	yes	yes
B	yes	no	no
C	yes	yes	no
D	no	no	yes

[J13/P3/Q20]

27. What will increase the multiplier effect of an increase in government spending on national income?

A an increase in direct taxation

B an increase in interest rates

C an increase in the marginal propensity to consume

D an increase in the marginal propensity to import

[J13/P3/Q29]

HELPS to MCQ

21. B A reduction in unemployment benefit will cause both autonomous consumption to fall and MPC to rise.

22. A Required change in NY / size of deflationary = K. So, K = 3 and MPC = $\frac{2}{3}$.

$\Rightarrow 3 = \left(\frac{1}{1-\frac{2}{3}}\right)$.

23. B Investments is the function of rate of change in NY. A fall in the rate of increase in NY suggests a fall in increase in the level of net investment.

24. A Impact of increase in government spending will be offset by increasing interest rate leading to a fall in both consumption and investment.

25. B Tax payers have lower MPC and therefore lower size of multiplier.

26. C I & G are injections and both are higher than their respective withdrawals. In the trade sector X is an injection and it is less than its respective withdrawal (M).

27. C The higher the value of MPC the larger is the size of multiplier and hence the greater the effect of government spending on national income.

28. In an economy, the marginal propensity to consume of the unemployed is higher than that of taxpayers.

The government increases expenditure on unemployment benefits by $10 m and increases taxation by $10 million.

What will be the impact on aggregate demand?

A It will be unchanged.

B It will increase by less than $10 million.

C It will increase by $10 million.

D It will decrease by $10 million.

[N13/P3/Q20]

29. What will cause the level of investment to fall according to the accelerator model?

A a decrease in business confidence

B a decrease in the rate of growth of national income

C an increase in the price of capital equipment

D an increase in the rate of interest

[J14/P3/Q18]

30. In a closed economy with no government, consumption is 4/5 of income at all levels of income.

The present equilibrium level of income is $220 million.

The full employment level of income is $240 million.

By how much would investment have to increase to reach full employment?

A $2 million B $4 million

C $16 million D $20 million

[J14/P3/Q19]

31. Other things being equal, what will result in a decrease in aggregate demand?

A a decrease in interest rates

B a decrease in the balance of trade deficit

C a decrease in the government's budget deficit

D a decrease in the household saving ratio.

[J14/P3/Q20]

32. In a closed economy with no government $C = 40 + 0.8\,Y$ and $I = 60$, where C is consumption, Y is income and I is investment.

What is the equilibrium level of income?

A 80 B 100

C 300 D 500

[N14/P3/Q23]

33. Which is not an injection into a country's circular flow of national income?

A inward direct investment by multinational corporations

B private gross domestic fixed capital formation

C the sale of government bonds to members of the public

D wages paid to civil servants

[J15/P3/Q19]

34. The national income is initially in equilibrium.

If there is an increase in exports, which change of equivalent value will restore national income to its initial equilibrium level?

A a decrease in imports

B a decrease in investment

C an increase in government expenditure on goods and services

D a reduction in taxation

[J15/P3/Q20]

35. In a closed economy with no government, investment increases by $400.

At the new equilibrium level of income, consumption has increased by $1200.

What is the value of the investment multiplier?

A 2 B 3

C 4 D 8

[J15/P3/Q21]

HELPS to MCQ

28. B Only part of change in income is spent, therefore, AD rises by less than 10 million.

29. B Accelerator theory suggests that investment is the function of rate of change in NY.

30. B Since $MPC = \frac{4}{5}$,

therefore, $MPL = \frac{1}{5}$

and $K = \frac{1}{\frac{1}{5}} = 5.$

Δ NY required = $20 million, therefore,

$$\frac{\$20 \text{ million}}{5} = \$4 \text{ million}$$

31. C A fall in budget deficit suggests either a fall in G or an increase in T thus results in a fall in AD. Options A, C & D would increase consumption, investment and X-M, and hence AD.

32. D $Y = C + I$

$\Rightarrow Y = 40 + 0.8Y + 60$

$0.2Y = 100$

$$Y = \frac{100}{0.2}$$

$Y = 500$

33. C People buying bonds will result in money going out of the circular flow of income(leakage) into the government's vaults. Other options can be classified as injections into the flow of income.

34. B Exports and investment are classified as injections, therefore, a fall in investment will offset a rise in exports.

36. In a 4-sector economy, consisting of households, firms, government and foreign trade, the level of national income is in equilibrium where $C+I+G+(X-M)=Y$.

What must Y include for an equilibrium to exist?

A C+S+M

B C+S+T

C S+T

D S+T+M

[J16/P3/Q26]

37. What will increase the multiplier effect of an increase in government spending on national income?

A an increase in direct taxation

B an increase in interest rates

C an increase in the marginal propensity to consume

D an increase in the marginal propensity to import

[J16/P3/Q30]

38. If the marginal propensity to consume in an economy in a given period becomes greater than unity, this must mean that

A consumers will be spending more than they are earning.

B inflation will be generated in the economy.

C the country will suffer a trade deficit.

D the marginal propensity to save will be negative.

[N16/P3/Q23]

39. Which row correctly identifies net leakages from the circular flow of income?

	trade surplus (exports – imports)	government budget deficit (government spending – taxes)	private sector surplus (saving – investment)
A	✓	✓	×
B	✓	×	×
C	×	✓	✓
D	×	×	✓

[N16/P3/Q24]

40. The table shows the levels of consumption expenditure and savings for given family incomes.

disposable family income ($)	consumption expenditure ($)	savings ($)
2000	2150	−150
3000	3100	−100
4000	4000	0
5000	4850	150
6000	5650	350
7000	6380	620

Over the range of disposable income shown, as income rises the marginal propensity to consume

A falls and then rises.

B falls continuously.

C rises and then falls.

D rises continuously.

[N16/P3/Q25]

HELPS to MCQ

35. C Assuming K = 4, then MPC = 0.75 because

$$K=\frac{1}{1-MPC}=\frac{1}{1-0.75}=4.$$

Since investment rises by 400, therefore, NY rises by $400 \times 4 = 1600$. Also MPC = 0.75, therefore, consumption rises by $1600 \times 0.75 = 1200$.

36. B $C+I+G+(X-M) = C+S+T$

37. C The greater the value of MPC the higher is the multiplier effect.

38. D $1 = MPC + MPS$

39. D Trade surplus (X > M) and budget deficit (G > T) refer to net injection. S > I refers to net leakages.

40. B $MPC=\frac{\Delta C}{\Delta Y}$.

It can be noted that ΔC is becoming progressively smaller in response to an increase in disposable income at constant rate.

41. The table shows the levels of consumption expenditure for given family incomes.

disposable family income ($)	consumption expenditure ($)
2000	2150
3000	3100
4000	4000
5000	4850
6000	5650
7000	6380

Over the range of disposable income shown, as income rises what happens to the marginal propensity to consume?

A It falls and then rises.
B It falls continuously.
C It rises and then falls.
D It rises continuously.

[J17/P3/Q24]

42. In an economy with unemployed resources the government increases its expenditure.

When would this be least likely to increase national income by the full multiplier effect?

A when the level of autonomous private investment is increased
B when the marginal propensity to save is reduced
C when the government allows money supply to expand
D when the level of interest rates rises

[J17/P3/Q30]

43. What could **not** exist in a closed, mixed economy?

A a balance of trade deficit
B a budget deficit
C household debt
D national debt

[N17/P3/Q22]

44. What does the accelerator principle state?

A Consumption is a function of the rate of change of income.
B Income is a function of the rate of change of investment.
C Investment is a function of the rate of change of income.
D Investment is a function of the rate of interest.

[N17/P3/Q23]

45. What represents a leakage from the circular flow of income in an economy?

A a balance of trade surplus
B a government budget surplus
C reduction in funds for research and development
D re-investment of a firm's profits

[N17/P3/Q25]

46. What will cause a downward shift in the aggregate demand curve of an economy?

A an increase in firms' stocks of raw materials
B a decrease in the export of goods
C a decrease in the propensity to import
D a decrease in saving

[N17/P3/Q26]

47. What would **not** exist in a free market, open economy?

A autonomous investment
B household saving
C import spending
D indirect taxation

[J18/P3/Q22]

HELPS to MCQ

41. **B** $MPC = \frac{\Delta C}{\Delta Y}$

42. **D** An increase in savings resulting from higher interest rate would increase the size of overall withdrawals from the circular flow of income that would weaken the effect of multiplier. This rules out options **B** & **C** while **A** would not affect the size of multiplier.

43. **A** Closed economy means no imports & exports.

44. **C** By definition.

45. **B** Taxes cause leakage and government spending is an injection into the circular flow of NY. A budget surplus means that government takes more money in the form of taxes than what it spends, therefore it acts as net leakage.

46. **B** It will result in a fall in net exports (X-M), therefore reduces AD. This rules out option **C**. Option **A** will affect AS while **D** will result in a higher AD.

47. **D** An indirect tax is a form of government intervention in markets that is beyond the role of a government in a free market economy.

48. What will definitely increase a country's Gross National Product?

A an increase in income taxes

B an increase in the marginal propensity to import

C an increase in the value of a country's currency

D increased government expenditure on education

[J18/P3/Q25]

49. According to the accelerator theory, what determines this year's net investment?

A last year's consumption

B last year's output

C the change in last year's investment

D the change in last year's national income

[J18/P3/Q26]

50. In an open economy, when autonomous investment increases by 100, equilibrium national income increases by 300.

Which conclusion can be drawn?

A The accelerator is 3.

B The marginal propensity to consume is $\frac{2}{3}$

C The marginal propensity to import is $\frac{2}{3}$

D The marginal propensity to save plus marginal tax rate is $\frac{1}{3}$

[N18/P3/Q25]

HELPS to MCQ

48. **D** Government expenditure is an injection into the circular flow of NY, therefore an increase is likely to raise GDP. Options A, B & C suggest increase in leakages from the circular flow of NY resulting in GDP to decrease.

49. **D** By definition.

50. **B** $\frac{300}{100}=3$, The value of multiplier (K) in the economy equals 3.

$K=\frac{1}{1-MPC}$, when the value of $MPC=\frac{2}{3}$,

$K=\frac{1}{1-\frac{2}{3}}=3$.

TOPIC 3.2

The Circular Flow of Income

ESSAY Section

LIST OF QUESTIONS

Q1 (J08/P4/Q6)

(a) It is feared that if the government increases taxes the level of national income will fall. Explain whether this is necessarily true. [10]

Q2 (N08/P4/Q7)

(a) Explain the factors influencing the level of investment in an economy. [10]

(b) Discuss the extent to which national income is determined by private investment. [15]

Q3 (J09/P4/Q7)

A World Bank report in 2007 commented on the continuing need for major spending worldwide on infrastructure on everything from roads and railways to water and electricity generation.

(a) Explain the effect on national income when there is an increase in spending on infrastructure. [10]

Q4 (N10/P4/Q6)

Explain what is meant by an equilibrium level of national income and discuss why this equilibrium might change in a developing country. [25]

Q5 (J11/P4/Q6)

(a) An increase in investment will raise national income but an increase in the desire by consumers to save will reduce national income.

Explain why this is the case. [12]

Q6 (J12/P4/Q5)

(a) As part of the measurement of GDP governments calculate the level of investment expenditure.

What determines the level of investment and how do changes in investment expenditure affect GDP? [12]

Q7 (N13/P4/Q5)

(a) Explain, using the concept of the multiplier, the possible link between a fall in interest rates and an increase in national income. [12]

Question 1

It is feared that if the government increases taxes the level of national income will fall. Explain whether this is necessarily true. [10]

[J08/P4/Q6(a)]

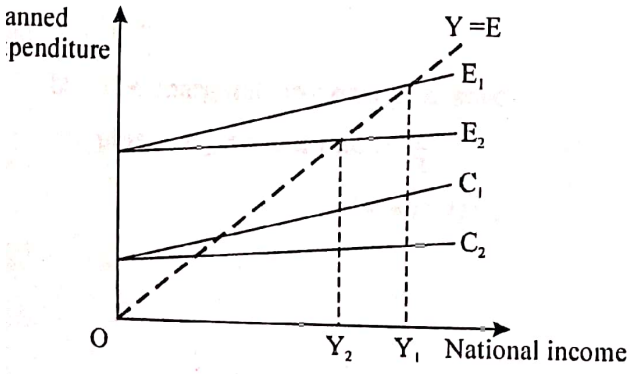
Essay

National income is the value of the flow of goods and services becoming available to a nation during a given period. Governments can influence the flow of national income by altering their policy related to expenditure and levying of taxation.

Tax is a legal compulsion and results in a transfer of money from individuals and businesses to government, therefore, represent a leakage. An important classification of taxes is direct taxes such as income tax and indirect taxes such as VAT, Excise duty etc.

A change in direct tax rates changes the relationship between disposable income and national income. As a result, the relationship between planned consumption and national income also changes i.e. for any given level of income there will be a different level of disposable income and thus a different level of consumption and investment.

A rise in direct tax rates with no corresponding change in government expenditures causes a decrease in both disposable income and consumption expenditure at each level of national income. This results in pivotal downward shift of the aggregate expenditure, and thus decreases the level of national income equilibrium.



It is now possible to see what happens if the government increases rates of tax so that more tax is paid at every level of income. As shown in the figure above, an increase in the marginal propensity to tax will lower the marginal propensity to consume out of national income. This can be shown by a swing downwards in the consumption function from C_1 to C_2. If we now add planned investment and government spending, we arrive at the aggregate expenditure lines in figure above. A rise in tax rates has led to a fall in aggregate expenditure from E_1 to E_2 and as a consequence, the equilibrium national income falls from Y_1 to Y_2.

However, the final effect on national income can only be estimated by considering the other side of the coin i.e corresponding changes in government expenditure. An increase in tax rates with no corresponding change in government expenditure would result in a fall in national income. But what if government increases both taxes and expenditure by the same amount? The outcome of it can be different. For instance, if majority of taxpayers fund the extra taxes by reducing their savings rather than consumption and government spends money on projects related to welfare of people such as housing, national income is likely to rise due to the redistribution of income from taxpayers to the underprivileged.

Similarly, the effect of rise in tax depends on whom the increase in tax is levied for instance, raising taxes on higher incomes will lead to a small decrease in consumption due to lower MPC and larger decrease in savings. Thus an increase in tax rate would result in relatively smaller fall in aggregate expenditure and hence, a smaller fall in NY. On the contrary, when increase in tax applies more on lower income group then, due to their higher MPC, it would lead to a larger fall both in consumption and national income

Raising indirect taxes are also likely to reduce AE when tax rates are increased on goods with high price elasticity of demand. On the contrary, increase in taxes on goods with low price elasticity of demand will result in an increase in consumer spending and reduction in savings. Hence an increase in taxation would lead to an increase in government revenue and, if this were used to finance public expenditure, there might be an overall increase in national income. Similarly, increasing tariffs rate as part of protectionist policy can help switch expenditure on local products resulting in an increase in AE and NY.

Thus, we conclude that raising taxes does not necessarily lead to a fall in national income. Overall, the effects of raising taxes on NY depend on a number of factors as explained in the answer.

Question 2

(a) Explain the factors influencing the level of investment in an economy. [10]

(b) Discuss the extent to which national income is determined by private investment. [15]

[N08/P4/Q7]

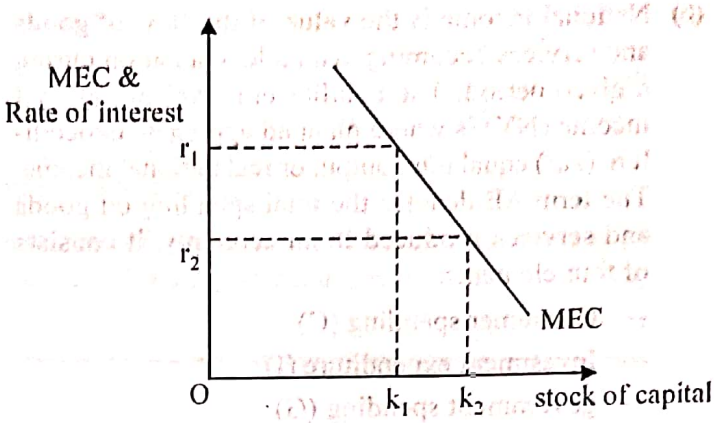
Essay:

(a) Investment is an important component of national income. It can be undertaken by either the private or the public sectors, and can involve the purchase of new plant and machinery, the building of new houses, factories or schools and the construction of roads and reservoirs. Net additions to stocks of raw materials, semi-finished and finished goods are also classed as investment. Note that investment is not the buying and selling of stocks and shares or the placing of money in a bank account.

It is important to distinguish between net investment and replacement investment. The former increases capital stock and the latter simply maintains capital stock. The two together constitute gross investment.

The decision taken by private firms to invest is likely to be based on different criteria to those of the public sector. Profit is an important factor in private sector investment, whereas public sector investment can be a political or social decision.

When a private firm purchases a new machine, the expectation is that the yield from the investment will be greater than the cost of buying machine. The expected yield is difficult to calculate since it will occur over a number of years. Also, a given sum of money received next year will be worth less than the same sum received now. Therefore, it is usual to discount these yields to their present value and to express the return over the initial cost as a rate. This rate will be referred to as the marginal efficiency capital (MEC). Thus if the MEC is greater than the real rate of interest the investment should precede. The relationship between MEC and rate of interest is illustrated in the figure below.



By investing, a firm can build up a stock of capital goods and, as with labour, capital is subject to the law of diminishing returns so the MEC will fall. So long as the MEC is greater than the rate of interest, the investment is worthwhile. In figure above, investment should cease once k_1 is reached at an interest rate r_1. A fall in the rate of interest to r_2 will lead to a rise in the capital stock from k_1 to k_2. The increase in capital stock, $k_2 - k_1$, will require new investment to take place. The size of the capital stock, therefore, varies with the rate of interest.

In our explanation above, the rate of interest was assumed to be the rate at which firms have to borrow money. However, a large part of investment by firms is financed from retained profit. This does not alter the relationship between the rate of interest and investment. Thus, the higher the rate of interest on savings, the higher the opportunity cost of investment and hence the lower will be the amount of planned investment in the economy.

Although rate of interest is the main factor, influencing investment but several other factors can also lead to a change in investment. The other factors include the firm's expectations of the future economic climate, and business confidence mostly influenced by a change in technology, a change in cost of capital, a change in government or its policies, and more importantly the rumors of an increase in the rate of interest.

In the preceding analysis we assumed that investment was autonomous. This is an assumption, which we now relax, with investment being partly induced. This means that investment is related to national income.

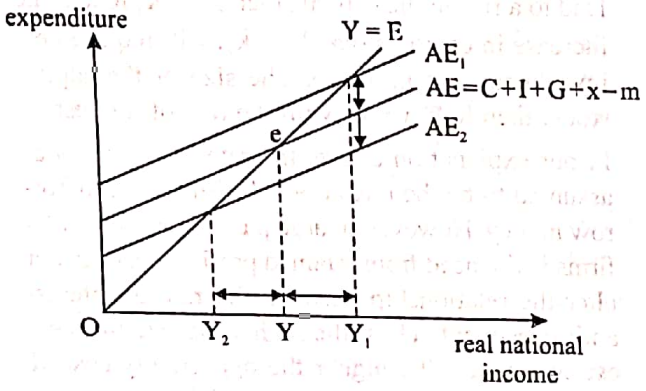
For instance, when consumer demand increases, this can have an effect on investment. The rate of change of national income will thus bring about changes in the level of net investment through what is called the accelerator principle.

(b) National income is the value of the flow of goods and services becoming available to a nation during a given period. The equilibrium level of national income (NY) is where planned aggregate expenditure (AE) equal total output or real national income. The term AE denotes the total spending on goods and services produced in an economy. It consists of four elements:

- Consumer spending (C)
- Investment expenditure (I)
- government spending (G)
- Net expenditure on exports and imports (X – M),

and is usually represented by means of the following expression: $AE = C + I + G + (x - m)$

Determination of national income equilibrium can be illustrated through simple Keynesian analysis and is shown as follows



In the graph above all points along the 45* line are equidistant from both axes therefore they represent expenditure exactly equal to income(Y=E). The AE function intersects the 45* line at point 'e'. Thus we have OY equilibrium level of real NY and there would be no further tendency for NY to change. Hence the equilibrium level of national income occurs where AE equals total output.

Any changes in equilibrium level of NY are the result of changes in planned expenditure (AE). For instance a rise in the amount of AE at each level of NY will increase equilibrium level of NY and a fall in AE will lower equilibrium national income as shown in the graph above.

Changes in planned expenditure are the consequences of changes in all or any of the components of planned expenditure. For instance, if domestic consumers collectively alter their purchases of the nation's real output at each level of income, the entire AE curve shifts. Factors such as changes in real consumer wealth, future expectations, interest rate and credit availability may alter consumer spending. Planned expenditure curve shifts upward when consumers plan to buy more at each possible price level or shifts downward when consumers plan to buy less at each possible price level as depicted in the figure above.

Similarly a decline in the amount of new capital goods desired by the firms, shifts AE curve downward whereas, an increase in the desired amount of investment goods will shift the AE curve upwards bringing about a corresponding change in equilibrium level of NY. The level of planned investment changes due to changes in interest rate, business confidence, government policy and technology.

Also an increase in government purchases of goods and services at each price level will increase AE as long as tax collections and interest rates do not change. In contrast, a reduction in government spending, such as a cut back in order for military hardware, will reduce AE.

The final determinant of AE is net export spending. When foreign consumers increase their purchases of the nation's commodities, the nation's AE curve shifts upward also a fall in imports implies an increase in expenditure on domestic expenditure. The factors, which alter net exports, are primarily national income abroad and exchange rates.

Hence it can be concluded that private investment is not the only determinant of NY however it can be argued that in today's modern economies private investment has an essentially significant role play in determining NY.

Another important aspect of our analysis is that an increase in AE increases equilibrium national income by a multiple of the initial increase in planned expenditure through what is known as multiplier effect. We define multiplier as the ratio of the change in NY to the change in AE. The extent of change in NY can be measured by the following:

$$K = \frac{\text{change in NY}}{\text{change in injection}} \quad \text{or} \quad K = \frac{1}{MPS + MPT + MPM}$$

To elaborate we assume that the economy is open with government sector and there are unemployed resources. The MPS, MPT and MPM are 0.3, 0.1 and 0.1 respectively and that the firms increase their level of planned investment by $100 million. By applying the formula we can calculate the value of K in this economy and then the resulting change in NY.

$2.5 = \frac{1}{0.3 + 0.1 + 0.1}$, hence, effect on NY is 2.5 times of change in investment i.e. $100 x 2.5 = 250.

So what causes the multiplier effect? The answer is that, any increase in injection into the economy will produce a stream of new incomes through additional spending. For example, if firms to invest more, this will lead to more people being employed and hence more incomes being paid to households. Households will then spend part of this increased income on domestically produced goods (the remainder will be withdrawn). This increased consumption will encourage firms to produce more goods to meet the demand. Firms will thus employ more people and other factors of production. This leads to even more incomes being paid out to households. Consumption will thus increase yet again, and so the process continues.

Since multiplier is not infinite, therefore, an increase in injections would not cause national income to go on rising forever. Each time people receive extra income they will save some of it, pay some of it in taxes and spend some of it on imports. Eventually, as income goes on rising, all the extra injections will have leaked away into the three withdrawals. At that point the multiplier process will have ceased; a new equilibrium Y_2 will have been reached.

In our analysis of simple Keynesian theory we are assuming that prices are constant i.e. there is no inflation and hence any increase in income is matched by extra production. So, it is the extra output that this spending generates that we are concerned with. However, the extent to which rise in investment causes a change in real NY depends on the level of employment in the economy. For instance, if the economy is already operating at full employment and no extra resources available to produce output to match with the rising demand for both capital goods and consumer goods then increase in AE results in an increase in price level alone with no change in real NY. Also the multiplier effect becomes weaker with an increase in the rising values of mps, mpt and mpm.

Finally it can be stated that private investment, although very important, is one of the four major determinants of national income and also the extent to which changes in private investment affects NY is subject to certain conditions.

Question 3

A World Bank report in 2007 commented on the continuing need for major spending worldwide on infrastructure on everything from roads and railways to water and electricity generation.

Explain the effect on national income when there is an increase in spending on infrastructure. [10]

[J09/P4/Q7(a)]

Essay

(a) An increase in spending on infrastructure will act as a rise in injections into the circular flow of national income. However, this increase in injections is expected to have a more extensive effect upon total economic activity. Strictly in economic terms, the resulting increase in national income is likely to be more than the rise in injections through what is known as the multiplier effect.

The theory of multiplier is all important in economic analysis for it shows how a change in injections or leakages will influence national income. This can be described as the ratio of a change in equilibrium national income to the change in injections. Usually denoted by "K" and stated as follows;

$$K = \frac{\Delta NY}{\Delta J}$$

or by rearranging our equation, we can say that;
$\Delta NY = K \times \Delta J$

So, for instance, if \$5 billion increase in spending led to a \$10 billion rise in NY then the size of K = 2.

The rationale underlying the multiplier effect is that the economy has continuous flows of expenditure and income through which money spent by an individual is received as income by another. It follows that an initial change in spending will cause a spending chain reaction which, although of diminishing importance at each successive step, will cumulate to a multiple change in NY.

To illustrate the multiplier process let's consider an example of an open economy with government. Furthermore we assume that there are unemployed resources in the country and marginal propensity to save is 0,2, marginal propensity to tax is 0.2 and marginal propensity to import is 0.1. It follows that marginal propensity to withdraw (MPW) = 0.5. MPW is the proportion of an increase in NY that is withdrawn from the circular flow. Where MPW = MPS + MPT + MPM. This means that out of every \$100 increase in income \$50 are withdrawn in the

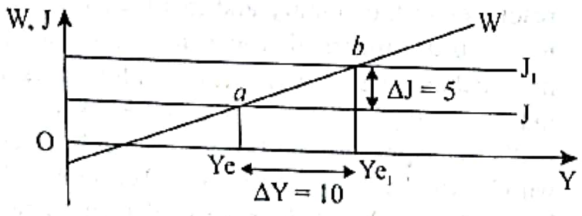
form of saving, taxes and imports from the circular flow of NY and the remaining $50 are spent on local products. Hence marginal propensity to consume (MPCd) = 0.5.

To get an idea how a larger increase in income results from a given increase in spending. We can follow the progress of the increased injection around the circular flow of money as shown in the table below;

Round	ΔJ	ΔY $(bn)	ΔC (mpc = 0.5)	ΔW (mpw = 0.5)
1	10	10	5	5
2	–	5	2.5	2.5
3	–	2.5	1.25	1.25
4	–	1.25	0.63	0.63
	–			
	–			
All rounds		$20	$10	$10

If say, $10 billion are spent on developing infrastructure. This will create employment for thousands of engineers, technicians and workers who are directly or indirectly involved in infrastructure building. Initially the $10 billion spending generates an equal amount of wage, rent, interest and profits because spending and receiving income are two sides of the same transaction.

The new employees will now have wages, profits will have increased, and total income will have risen by the $10 billion. If we assume MPC = 1/2 and MPL 1/2, we know households will spend $2.5 billion and the remaining $2.5 billion will be withdrawn as savings, imports and taxes. The addition to consumption further increases aggregate demand. This time, the firms producing consumer goods find sales rising and stocks falling. They will increase output, take on more labour, pay more in wages and earn more profit. If we continue to calculate increase in expenditure occurring as a result of this expansion in the economy we will be able to calculate final change in NY. The effect is shown in the figure below:



An increase in spending on infrastructure will raise the level of injections from J to J_1. Equilibrium will move from point *a* to point *b*. National income thus rises from Ye to Ye_1. The multiplier is therefore:

$$K = \frac{\Delta Y}{\Delta J}$$

Hence, it follows that a major spending on infrastructure will cause a spending chain through the economy. That chain of spending, although of diminishing magnitude at each successive step, will cumulate to a multiple change in national income.

Question 4

Explain what is meant by an equilibrium level of national income and discuss why this equilibrium might change in a developing country. [25]

[N10/P4/Q6]

Essay

National income (NY) is the total income earned by residents of a country after deducting capital consumption. Equilibrium refers to a situation where there is no further tendency for national income to change The Keynesian theory of income determination outlines two approaches income-expenditure and leakages-injections in order to explain NY equilibrium.

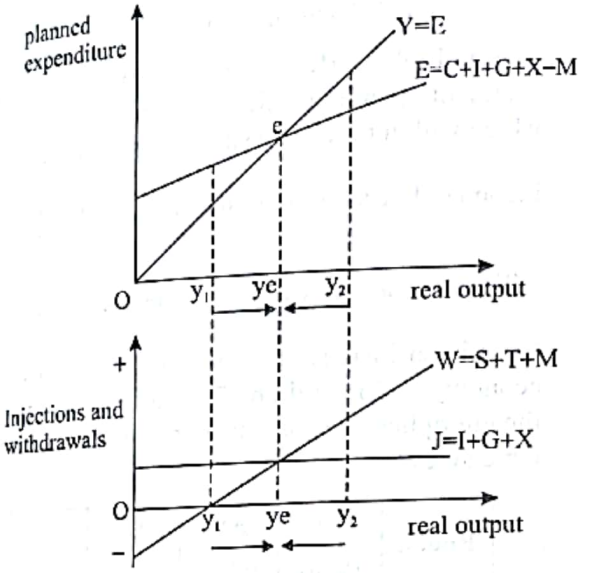
According to the income expenditure approach the level of real national income and, thus, employment is determined by the level of planned aggregate expenditure in an economy. Assuming an open economy with government the total planned expenditures on goods and services comprises of consumer spending (C), investment expenditure by firms on investment goods (I), planned government expenditure on goods and services (G), exports (X) relating to foreigners demanding an economy's goods and services minus imports (M) which represents the demand for goods and services from abroad. Thus: AE = C + I + G + X – M.

There is only one level of national income where aggregate expenditure equals the total value of goods and services produced and this is called the equilibrium level of national income. When the economy reaches this point there is no more tendency for national income to change. According to Keynes this may not, however, be the full employment level of national income.

The leakages injections approach is an alternative method of expressing the equilibrium level of national income. Using this approach the equilibrium is where:

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

Leakages are classified as withdrawal from the circular flow. On the left side of the equation savings (S) + taxes (T) + imports (M) represent sum of withdrawals. On the right side inv estment (I) + government expenditures (G) + exports (X) represent injections (J) into the circular flow. National income equilibrium is said to achieve when total amount of leakages equals the total amount of injections. The two approaches can be shown on a Keynesian cross diagram.

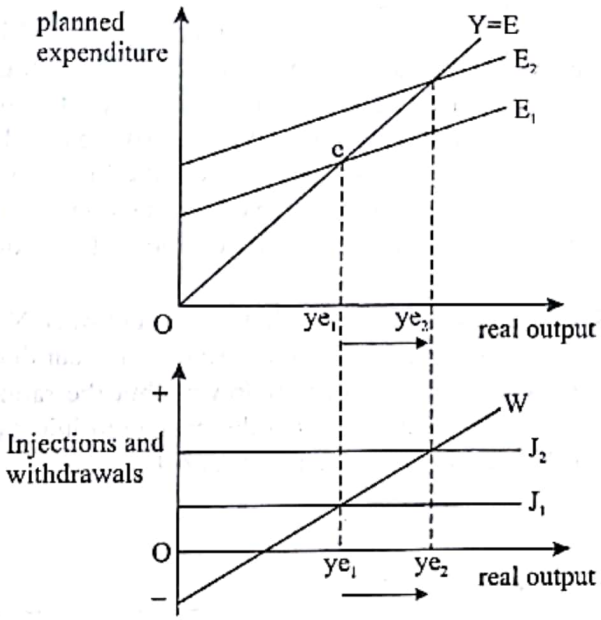


The first of the two graphs shows that NY equilibrium occurs at point e where Y + E. The graph just below shows NY equilibrium where W = J. However a situation where Y is not equal to E or W is not equal to J is called disequilibrium. For instance at y_1 planned expenditure exceed the level of output. In this situation there may be shortages of goods and services. Alternatively, stocks of goods already produced may be run down. In both situation, firms are likely to expand their output and thus national income will increase. On the other hand at income level y_2 firms will find that they have increasing unsold stocks and it will not be long before they reduce their output thus NY decreases.

If national income were at Ye, planned expenditure would equal real output. Firms would not change level of output they produce and stocks would remain unchanged. National income would thus be in equilibrium.

In the second of the two graphs at y_1 planned injections are obviously greater than the leakages and thus national income will increase. With planned withdrawals exceeding planned injections, at y_2 firms would be unable to sell all of their output Thus there would be unplanned investment in stock and firms would cut back their output, leading to a decrease in national income. National income is only in equilibrium when planned withdrawals equal planned investment.

Now, changes to the equilibrium level of national income can also occur and this can be due to changes in injections or leakages. According to the Keynesian model, injections are autonomous, that is, they are independent of the level of income. So an increase in investment government expenditure and exports results in a parallel upward shift in the expenditure function leading to an increase in the size of the economy, that is, national income will rise. This can be shown graphically:



From the graphs above we can see that an increase in injections has led to an increase in national income from Ye_1 to Ye_2. This increase in injections, particularly in a developing country, might have been due to increasing investment by foreign multinationals, or else the government may initiate development programs thus increasing in spending in the economy. Also rising exports, possibly due to depreciation of the country's currency also causes X and hence injections to increase.

Another important point to note is that the resulting change in national income is much larger than the change in injections. This is attributed to what is known as the multiplier effect. Multiplier represents the number of times national income changes due to a given change in injections. Multiplier is denoted by K, and the value of K can be found by:

$$K = 1/mpw \quad \text{or} \quad K = \frac{\text{change in NY}}{\text{change in J}}$$

Marginal propensity to withdraw (mpw) is the sum of marginal propensity to save (MPS), marginal propensity to tax (MPT) and marginal propensity to import (MPM). MPW is inversely related to the value of the multiplier and generally, in a developing economy the multiplier effect is larger because it has a smaller mpw. This means that out of a given increase in income,

people spend relatively greater proportion on consumption. This leads to a higher mpc (marginal propensity to consume) in developing economies. Since mpc and multiplier are directly related, so a higher mpc leads to a higher multiplier value and a large increase in national income.

The rationale underlying the multiplier effect is that the economy has continuous flows of expenditure and income through which money spent by an individual is received as income by another. Therefore it follows that an initial change in spending will cause a spending chain reaction which will cumulate to a multiple change in NY. In a developing economy with a higher mpc, this increase in national income is expected to be even larger. Another point to note is that the developing economies usually operate below the full employment level of output, so increases in national income are possible here, as the multiplier effect of injections will occur.

Thus it follows that NY equilibrium occurs when Y = E or W = J. Also changes in equilibrium can occur due to changes in injections or withdrawals but the ratio of change in NY is greater than the change in injections or leakages due to the multiplier effect.

Question 5

An increase in investment will raise national income but an increase in the desire by consumers to save will reduce national income.

Explain why this is the case. [12]

[J11/P4/Q6(a)]

Essay

An increase in investment will act as an injection into the circular flow of national income and, therefore, will generate a full multiplied rise in national income through what is known as the multiplier effect. The reason is that all the money gets spent and thus all of it goes to boosting aggregate demand.

The tendency for a change in injections or withdrawals to result in a greater change in national income is known as multiplier effect. In fact multiplier magnifies business activities initiated by changes in injections or withdrawals.

In an open economy with government the value of multiplier can be estimated in advance by the formula:

$$K = \frac{1}{\text{Marginal propensity to withdraw } (MPW)}$$

MPW is the proportion of an increase in NY that is withdrawn from the circular flow. It is the sum of *MPS*, *MPT* and *MPM*. *MPS* represents marginal propensity to save, MPT indicates marginal propensity to tax and MPM relates to marginal propensity to imports. The higher the amount of withdrawals the lower is the multiplier effect.

The value of multiplier can also be found after the change in income has occurred by using the formula:

$$\frac{\text{change in real GDP}}{\text{initial change in injection}} = \frac{\Delta Y}{\Delta J}$$

The multiplier effect occurs because a rise in investment spending will create incomes, some of which will in turn be spent and thereby create more incomes. Let us assume that the $MPW = \frac{1}{2}$. This will give us an $MPCd = \frac{1}{2}$. Let us also assume that there is an increase in planned investment in the economy of \$10 billion. The rationale underlying the multiplier effect is illustrated numerically in the table below:

Round	ΔJ ($bn)	ΔY ($bn)	ΔC ($bn)	ΔW ($bn)
1	10	10	5	5
2	–	5	2.5	2.5
3	–	2.5	1.25	1.25
4	–	1.25		
	–			
	–			
		20	10	10

To get an idea how a larger increase in income will result from a given increase in investment we can follow the progress of the increased injection around the circular flow of money. If say, firms planned to increase investment by \$10 billion they need to employ thousands of engineers, technicians and workers and also need to buy machinery and raw material.

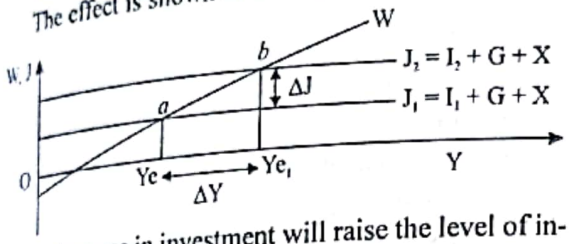
The new employees will now have wages, profits will have increased, and total income will have risen by the \$10 billion as shown in the table. Assuming $MPC = \frac{1}{2}$ and $MPW = \frac{1}{2}$, we know households will spend \$5 billion and the remaining \$5 billion will be withdrawn as savings, imports and taxes. The addition to consumption further increases aggre-

gate demand. This time, the firms producing consumer goods find sales rising and stocks falling. They will increase output, take on more labour, pay more in wages and earn more profit. If we continue to calculate increase in expenditure occurring as a result of this expansion in the economy we will be able to calculate final change in NY as worked out below:

$$2 = \frac{1}{0.5}$$

Then initial change in injections is multiplied by the value of multiplier to calculate final change in national income. $10 \times 2 = 20$.

The effect is shown in the figure below:

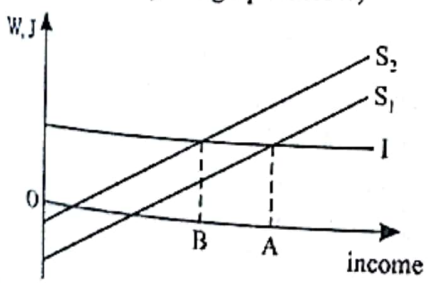


An increase in investment will raise the level of injections from J_1 to J_2. Equilibrium will move from point *a* to point *b*. National income thus rises from Ye to Ye_1. The multiplier is therefore:

$$K = \frac{\Delta Y}{\Delta J}$$

Hence, it follows that an increase in investment will cause a spending chain through the economy. That chain of spending, although of diminishing magnitude at each successive step, will cumulate to a multiple change in national income.

On the other hand a rise in saving could mean more funds available to lend which might allow investment to rise and economy to grow. However, if everyone saves more then consequently they spend less. Increased saving and low spending affects businesses. Less spending means less demand for goods and services and therefore lost orders for firms. Firms will cut back production and lay off workers. So the income of household will fall. This phenomenon is called paradox of thrift and is illustrated by the graph below;



An increase in savings at all levels of income will lead to an upward shift in the savings function. Equilibrium income will fall from OA to OB. We know from the multiplier that the resulting fall in national income will be greater than the fall in spending because this means reduced injections into the economy as people spend less. Thus extra saving and less consumption would only make matters worse by lowering income and increasing unemployment.

From the above it follows that an increase in investment will bring a proportionately larger increase in national income, while a rise in savings will reduce national income by a larger proportion.

Question 6

As part of the measurement of GDP governments calculate the level of investment expenditure.

What determines the level of investment and how do changes in investment expenditure affect GDP?

[12]

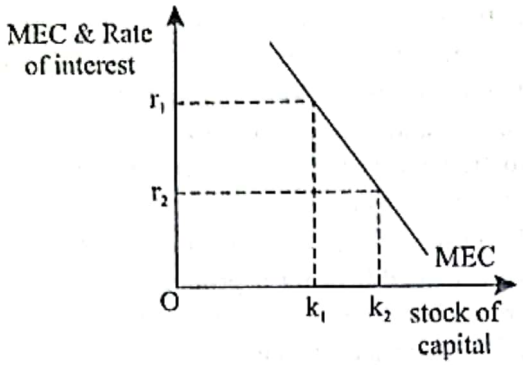
[J12/P4/Q5(a)]

Essay

Investment is an important component of national income. It can be undertaken either by the private or the public sectors, and can involve the purchase of new plant and machinery, the building of new houses, factories or schools and the construction of roads and reservoirs. Net additions to stocks of raw materials, semi-finished and finished goods are also classed as investment.

Profit is an important factor in private sector investment, whereas public sector investment can be a political or social decision.

When a private firm purchases a new machine, the expectation is that the yield from the investment will be greater than the cost of buying machine. The expected yield is difficult to calculate since it will occur over a number of years. Also, a given sum of money received next year will be worth less than the same sum received now. Therefore, it is usual to discount these yields to their present value and to express the return over the initial cost as a rate. This rate will be referred to as the marginal efficiency capital (MEC).Thus if the MEC is greater than the real rate of interest the investment should proceed. The relationship between MEC and rate of interest is illustrated in the figure below.



By investing, a firm can build up a stock of capital goods and, as with labour, capital is subject to the law of diminishing returns so the MEC will fall. So long as the MEC is greater than the rate of interest, the investment is worthwhile. In figure above, investment should cease once k_1 is reached at an interest rate r_1. A fall in the rate of interest to r_2 will lead to a rise in the capital stock from k1 to k_2. The increase in capital stock, $k_2 - k_1$, will require new investment to take place. The size of the capital stock, therefore, varies with the rate of interest.

In our explanation above, the rate of interest was assumed to be the rate at which firms have to borrow money. However, a large part of investment by firms is financed from retained profit. This does not alter the relationship between the rate of interest and investment. Thus, the higher the rate of interest on savings, the higher the opportunity cost of investment and hence the lower will be the amount of planned investment in the economy.

Although rate of interest is the main factor influencing investment but several other factors can also lead to a change in investment. For instance, if business executives become more optimistic about future business, the planned investment curve will shift to the right; a pessimistic outlook will shift it to the left. Business expectations may be based on changes in the domestic political and economic climate, international relations, population growth and stock market conditions.

Furthermore, a rapid rate of technological progress stimulates investment. The development of a more efficient machine, for example, will lower production costs, increasing the expected rate of net profit from investing in new machine. Finally, business owners look to expected profits after taxes in making their investment decisions. An increase in business taxes will lower profitability and lowers the level of planned investment; a tax reduction will stimulate investment.

In the preceding analysis we assumed that investment was planned or autonomous. This is an assumption which we now relax, with investment being partly induced. This means that investment is related to national income. When, for instance, consumer demand increases it can have an effect on investment. The rate of change of national income will thus bring about changes in the level of net investment through what is called the accelerator principle.

GDP is the total market value of all final goods and services produced within a country in one year time period. The level of GDP is determined by planned aggregate expenditure i.e.

$$AE = C + I + G + (x - m)$$

The term AE denotes the total spending on goods and services produced in an economy. It consists of four elements:

- Consumer spending (C)
- Investment expenditure (I)
- government spending (G)
- Net expenditure on exports and imports (X – M),

Investment is one of the four components of planned expenditure therefore, a change in the level of investment expenditure would in turn change the planned expenditure leading to a proportionately greater change in the country's GDP through what is known the multiplier effect.

We define multiplier as the ratio of the change in GDP to the change in planned expenditure. The extent of change in GDP can be measured by the following:

$$K = \frac{\text{change in GDP}}{\text{Change in injection}} \quad \text{or} \quad K = \frac{1}{MPS + MPT + MPM}$$

To elaborate we assume that the economy is open with government sector and there are unemployed resources. The MPS, MPT and MPM are 0.3, 0.1 and 0.1 respectively and that the firms increase their level of planned investment by $100 million. By applying the formula we can calculate the value of K in this economy and then the resulting change in GDP.

$$2.5 = \frac{1}{0.3 + 0.1 + 0.1}$$

hence, effect on GDP is 2.5 times of change in investment i.e. $\$100 \times 2.5 = 250$.

The cause of multiplier effect is that, any increase in injection into the economy will produce a stream of new incomes through additional spending. For example, if firms to invest more, this will lead to more people being employed and hence more incomes being paid to house-holds. Households will then spend part of this increased income on domestically produced goods (the remainder will be

withdrawn). This increased consumption will encourage firms to produce more goods to meet the demand. Firms will thus employ more people and other factors of production. This leads to even more incomes being paid out to households. Consumption will thus increase yet again, and so the process continues. Since multiplier is not infinite, therefore, an increase in injections would not cause national income to go on ris-ing forever. Each time peo-ple receive extra income they will save some of it, pay some of it in taxes and spend some of it on imports. Hence income generation would become progressively smaller after each transaction.

Thus a change in the level of investment is expected to result in a proportionately larger change in GDP of an economy.

Question 7

Explain, using the concept of the multiplier, the possible link between a fall in interest rates and an increase in national income. [12]

[N13/P4/Q5(a)]

Essay

In the money market the condition for monetary equilibrium is that the rate of interest will be such that everyone is just willing to hold the existing supply of money, i.e. interest rate does the job of equating the quantity of money demanded to the available supply and hence produces monetary equilibrium. In the figure below, we see how the interest rate produces monetary equilibrium.

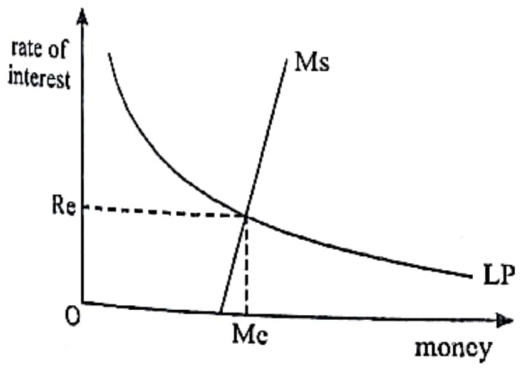


Fig. 1

Equilibrium is achieved with a rate of interest Re and the quantity of money Me. If the rate of interest were above Re, people would have money balances surplus to their needs. They would use these to buy securities and other assets. This would drive up the price of securities and drive down the rate of interest toward equilibrium. Similarly, if the rate of interest were below Re, people would have insufficient money balances. They would sell securities, thus lowering their prices and raising the rate of interest until it reached the equilibrium level.

Changes in money supply will affect national income via changes in the rate of interest. Let's assume that monetary authorities seek to adopt easy monetary measures and attempt to increase money supply, say, by lowering liquidity ratio of commercial banks or buying securities through open market operation.

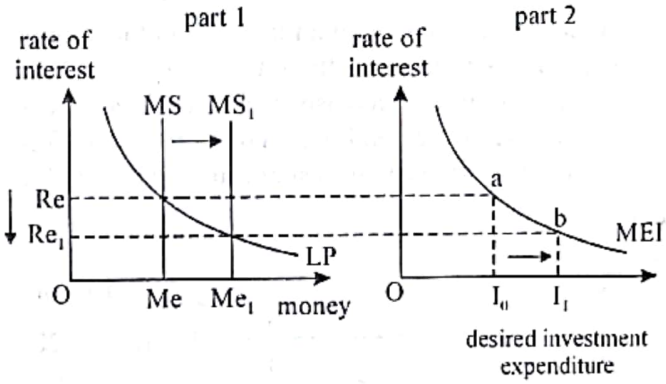


Fig. 2

These measures shift the supply curve of money from MS to MS_1 as shown in the first part of the graph. Consequently, there is excess supply of money at the existing rate of interest Re. People still wish to hold only Me of money balances, but Me_1 is now available. In order to eliminate their excess holdings of money, People attempt to buy bonds and securities. This attempt of buying bonds and other financial assets increases their price and subsequently lowers the rate of interest. When interest has fallen to Re_1 the quantity of money demanded will have risen to equal the available supply of Me_1. Monetary equilibrium is, thus re-established, though at a lower rate of interest.

The curve in the part 2 of the graph is called a marginal efficiency of investment curve (or just a demand for investment curve). MEC curve shows the relation between planned investment and the rate of interest, assuming all other things are equal. It is derived from prospective yield of one more unit of investment and the cost of obtaining it. Firms make their investment decisions by comparing MEC with the rate of interest. For instance, if the expected real net rate of return on an individual project (MEC) is greater than the real rate of interest, investment is profitable and hence is undertaken. Thus investment demand curve shows that the lower the rate of interest, the larger will be the number of investment opportunities that will

show a profit and, hence, the larger the volume of investment expenditure that firms wish to undertake.

Note that, because both parts of the Figure above have the interest rate on the vertical axis, the interest rate can be compared between the two. Both parts show an initial equilibrium with the quantity of money of Me and an interest rate of Re. When the equilibrium is disturbed, say due to an increase in the money supply to Ms_1, the rate of interest falls to Re_1. Part (ii) of the Figure tells us that the fall in the interest rate from Re to Re_1 increases desired investment expenditure from I_0 to I_1.

So far, we have seen that an increase in the money supply leads to a fall in the interest rate which, in turn, results in an increase in desired investment expenditure. We extend our analysis to finally figure out how these changes subsequently affect NY.

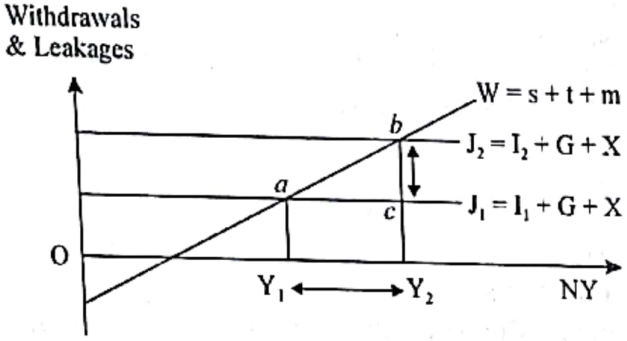


Fig. 3

Equilibrium NY can be found by W = J. The withdrawals function is the vertical sum of the net saving, net taxes and import functions. Similarly, the injection function is the vertical addition of the investment, government expenditure and export functions. Initially, the equilibrium can be located at point a, indicating Y_1 as the equilibrium level of NY. A rise in investment expenditure shifts the J function upwards and will cause NY to increase $(Y_1 - Y_2)$ by more than the increase in investment (bc). The number of times that the increase in income (NY) is greater than the increase in investment is known as the multiplier (k).

So an increase in injection into the economy will produce a stream of new incomes through additional spending that causes a multiplier effect. For example, if firms to invest more, this will lead to more people being employed and hence more incomes being paid to house-holds. Households will then spend part of this increased income on domestically produced goods (the remainder will be withdrawn). This increased consumption will encourage firms to produce more goods to meet the demand. Firms will thus employ more people and other factors of production. This leads to even more incomes being paid out to households. Consumption will thus increase yet again, and so the process continues until NY rises by full multiplier effect.