

CHAPTER 4

Determination of Income and Employment

CBSE Class 12 · Macroeconomics · Chapter 4

CBSE · Macroeconomics · Class 12

WHAT THIS CHAPTER DOES

A

Write $AD = C + I$ and $AS = C + S$ and the equilibrium condition $AD = AS \Leftrightarrow S = I$.

B

Use the consumption function $C = c + bY$ and the identities $MPC + MPS = 1$, $APC + APS = 1$.

Boards prep that builds confidence, not anxiety.

TODAY'S MISSION

Today's mission

1

Write $AD = C + I$ and $AS = C + S$ and the equilibrium condition $AD = AS \Leftrightarrow S = I$.

2

Use the consumption function $C = c\bar{+} + bY$ and the identities $MPC + MPS = 1$, $APC + APS = 1$.

3

Derive the investment multiplier $k = 1/(1 - MPC)$ and compute ΔY for a given ΔI .

4

Identify deflationary and inflationary gaps and list fiscal + monetary corrective measures.

WHY THIS MATTERS

Why this chapter matters

1

8-10 marks every CBSE board paper — the highest-yield chapter in Macroeconomics.

2

Multiplier numerical + gap-correction questions are repeat 4-6 markers.

3

Real-world relevance: every Union Budget and RBI rate decision is an application of this chapter.

TOPIC

A

Aggregate Demand, Aggregate Supply, equilibrium

THEOREM · LOAD-BEARING RESULT

Aggregate Demand and Aggregate Supply (two-sector model)

Aggregate Demand (AD) is the total planned spending on final goods and services at a given level of income. Aggregate Supply (AS) is the total planned output, which is disposed of as consumption or saving.

STATEMENT

In a two-sector closed economy (households + firms, no government, no foreign sector): $AD = C + I$ and $AS = C + S = Y$. Equilibrium occurs where $AD = AS$, i.e., $C + I = Y$, OR equivalently where

WHY THIS MATTERS

- Keynes argued that output is demand-determined in the short run with price level constant
- If planned spending exceeds planned output, inventories fall and firms expand
- if spending falls short, inventories pile up and firms contract — pushing the economy to the $AD =$

WATCH OUT FOR

NOTE Equilibrium is NOT $C = I$. State it as $AD = AS$ or, equivalently, $S = I$ (planned). Ex-post S always equals ex-post I by accounting identity even out of equilibrium.

TOPIC

C, S, MPC, MPS — the consumption and saving functions

CONSUMPTION FUNCTION $C = C^- + bY$

The consumption function says households consume a fixed AUTONOMOUS amount c^- (consumption even at zero income, met by dis-saving or transfers) plus a fraction b of every rupee of income, where b is the MARGINAL PROPENSITY TO CONSUME (MPC) — the

SAVING FUNCTION $S = -C^- + (1 - b)Y$

Saving is income not consumed: $S = Y - C = Y - (c^- + bY) = -c^- + (1 - b)Y$. The intercept is negative ($-c^-$) — at zero income, saving equals minus autonomous consumption (i.e., dis-saving of c^-). The slope is $(1 - b) =$ MARGINAL PROPENSITY TO SAVE (MPS). The saving line

$MPC + MPS = 1$ AND $APC + APS = 1$

Because every additional rupee of disposable income is either consumed or saved, $\Delta C + \Delta S = \Delta Y$. Dividing both sides by ΔY gives $MPC + MPS = 1$. The same logic on totals gives $APC + APS = 1$. These identities are used in almost every numerical: if $MPC = 0.8$ then MPS MUST equal

APC VS MPC (AND APS VS MPS)

AVERAGE Propensity to Consume $APC = C/Y$; MARGINAL Propensity to Consume $MPC = \Delta C/\Delta Y$. Similarly $APS = S/Y$; $MPS = \Delta S/\Delta Y$. APC is the slope of the RAY from the origin to a point on the C-curve, MPC is the slope of the CURVE ITSELF. APC can be greater than 1 at low

TOPIC

B

Equilibrium output and the multiplier

THEOREM · LOAD-BEARING RESULT

Equilibrium income and the investment multiplier

Equilibrium income (Y^*) is the level of output at which planned aggregate demand equals planned aggregate supply. A change in autonomous investment changes equilibrium income by a MULTIPLE of itself, called the investment multiplier.

STATEMENT

$Y = C + I$, $C = c + bY \Rightarrow Y = (c + I)/(1 - b)$. The investment multiplier $k = \Delta Y/\Delta I = 1/(1 - MPC) = 1/MPS$. Therefore $\Delta Y = k \times \Delta I$. With $MPC = 0.8$: $k = 1/0.2 = 5$, so $\Delta I = ₹100$ crore raises Y by ₹500 crore.

WHY THIS MATTERS

- Initial investment ₹100 cr becomes income for factor owners, who spend $0.8 \times 100 = ₹80$ cr on consumption, which becomes new income, of which $0.8 \times 80 = ₹64$ cr is re-spent, and so on
- The infinite geometric sum $100 \times (1 + 0.8 + 0.64 + \dots) = 100 \times 1/(1 - 0.8) = 100 \times 5 = ₹500$ cr.

WATCH OUT FOR

NOTE Multiplier is $1/(1 - MPC)$, NOT $1/MPC$. Range: k is at least 1 ($MPC = 0$) and at most infinity ($MPC = 1$). Always state $k = 1/MPS$ as the equivalent form.

WORKED EXAMPLE

Multiplier — MPC = 0.8, $\Delta I = ₹100$ crore

- 1 Given: MPC = 0.8 \Rightarrow MPS = 1 – 0.8 = 0.2. $\Delta I = ₹100$ crore.
- 2 Multiplier $k = 1/(1 - \text{MPC}) = 1/(1 - 0.8) = 1/0.2 = 5$.
- 3 Round 1 $\Delta Y = ₹100$ cr (the new investment itself).
- 4 Round 2 $\Delta Y = 0.8 \times 100 = ₹80$ cr (consumed out of round-1 income).
- 5 Round 3 $\Delta Y = 0.8 \times 80 = ₹64$ cr; Round 4 = $0.8 \times 64 = ₹51.2$ cr; the rounds shrink geometrically.
- 6 Total $\Delta Y = ₹100$ cr $\times 5 = ₹500$ crore. (Check: $₹100 \times (1 + 0.8 + 0.64 + 0.512 + \dots) = ₹100 \times 1/(1 - 0.8) = ₹500$ cr.)

WORKED EXAMPLE**Multiplier — MPC = 0.75, $\Delta I = ₹200$ crore**

- 1 Given: MPC = 0.75 \Rightarrow MPS = $1 - 0.75 = 0.25$. $\Delta I = ₹200$ crore.
- 2 Multiplier $k = 1/(1 - \text{MPC}) = 1/0.25 = 4$.
- 3 $\Delta Y = k \times \Delta I = 4 \times ₹200 \text{ cr} = ₹800$ crore.
- 4 Cross-check via MPS form: $k = 1/\text{MPS} = 1/0.25 = 4$. Same answer.
- 5 Note: lower MPC (0.75 vs 0.8) gives smaller multiplier (4 vs 5) — less re-spending in each round.

WORKED EXAMPLE

Equilibrium income — $c = 40$, $I = 60$, $MPC = 0.8$

- 1 Given: $C = 40 + 0.8Y$; $I = ₹60$ crore (autonomous).

- 2 Equilibrium $AD = AS \Rightarrow Y = C + I = 40 + 0.8Y + 60 = 100 + 0.8Y$.

- 3 Rearrange: $Y - 0.8Y = 100 \Rightarrow 0.2Y = 100 \Rightarrow Y^* = ₹500$ crore.

- 4 Cross-check via $S = I$: $S = -40 + 0.2Y$. Set $S = I$: $-40 + 0.2Y = 60 \Rightarrow 0.2Y = 100 \Rightarrow Y^* = ₹500$ cr. Same.

- 5 At $Y^* = 500$: $C = 40 + 0.8(500) = ₹440$ cr; $S = 500 - 440 = ₹60$ cr = I . Equilibrium verified.

TOPIC

C

Deflationary and inflationary gaps

THEOREM · LOAD-BEARING RESULT

Output gaps relative to full employment

“ If equilibrium AD at the full-employment level of income is less than full-employment AS, the economy has a **DEFLATIONARY** (recessionary) gap — output settles below full employment and involuntary unemployment results. If AD exceeds full-employment AS, the economy has an **INFLATIONARY** gap — output cannot rise further (resources are fully employed), so the excess demand bids up

STATEMENT

Deflationary gap = (Full-employment AS) – (AD at full-employment Y) > 0.

Inflationary gap = (AD at full-employment Y) – (Full-employment AS) > 0. Both gaps are measured AT the

WHY THIS MATTERS

- Below full employment, raising AD raises real output (with unused capacity)
- at or above full employment, raising AD only raises prices
- So the correct policy depends on which gap the economy is in.

WATCH OUT FOR

NOTE Deflationary gap ≠ deflation. Deflation is a fall in price level; a deflationary gap is a **SHORTFALL** of AD relative to full-employment AS. Measure both gaps AT Y_F .

TOPIC

Corrective measures — fiscal + monetary

DEFLATIONARY GAP — FISCAL EXPANSION

Goal: raise AD up to the full-employment level. INCREASE government expenditure (G) on infrastructure, welfare, capex — directly adds to AD and, via the multiplier, raises income further. CUT direct taxes (income tax) and indirect taxes (GST) — raises households' disposable

DEFLATIONARY GAP — MONETARY EXPANSION

Goal: increase money supply and lower interest rates to revive private spending. LOWER the repo rate / Bank Rate — cheaper RBI credit lets banks lend more at lower rates, boosting investment (I) and durable-goods consumption (C). CUT CRR and SLR — frees

INFLATIONARY GAP — FISCAL CONTRACTION

Goal: cool AD down to the full-employment level. REDUCE government expenditure on non-essential spending — directly lowers AD via G and (negatively) through the multiplier. RAISE direct and indirect taxes — squeezes households' disposable income, reducing C. Cut transfer

INFLATIONARY GAP — MONETARY CONTRACTION

Goal: shrink money supply and raise interest rates to dampen private spending. RAISE the repo rate / Bank Rate — costlier RBI credit forces banks to charge higher lending rates, curbing investment and big-ticket consumption. RAISE CRR and SLR — reduces banks' lendable funds,

TOPIC

D

Involuntary unemployment and ex-ante / ex-post

TOPIC

Unemployment types and planned vs actual

INVOLUNTARY UNEMPLOYMENT

INVOLUNTARY unemployment is the situation in which workers are willing and able to work at the PREVAILING wage rate but cannot find jobs — typically because aggregate demand is too low (a deflationary gap) so firms do not need to hire. Keynesian

VOLUNTARY UNEMPLOYMENT

VOLUNTARY unemployment exists when workers are unwilling to work at the prevailing wage rate — perhaps because they expect higher wages, are between jobs by choice, or value leisure more. It is NOT a policy problem in the Keynesian sense: raising AD will not

EX-ANTE (PLANNED)

EX-ANTE values are the PLANNED or INTENDED quantities — what households plan to consume and save, what firms plan to invest, before the period unfolds. Equilibrium in the two-sector model is defined in ex-ante terms: planned AD = planned AS, equivalently planned S = planned I. If ex-ante S

EX-POST (ACTUAL)

EX-POST values are the ACTUAL or REALISED quantities, after the period has ended — actual consumption, actual saving, and actual investment (the last including UNPLANNED inventory changes). By accounting identity, ex-post S always equals ex-post I in a two-sector model, even out of

WORKED EXAMPLE

From identities to equilibrium

- 1 Given $C = 50 + 0.6Y$. Then $MPC = 0.6$, $MPS = 1 - 0.6 = 0.4$, and $S = -50 + 0.4Y$.
- 2 Multiplier $k = 1/(1 - MPC) = 1/0.4 = 2.5$.
- 3 If autonomous investment $I = ₹150$ cr, set $S = I$: $-50 + 0.4Y = 150 \Rightarrow 0.4Y = 200 \Rightarrow Y^* = ₹500$ cr.
- 4 If $\Delta I = ₹40$ cr (new), $\Delta Y = k \times \Delta I = 2.5 \times 40 = ₹100$ cr \Rightarrow new $Y^* = ₹600$ cr.
- 5 Cross-check at $Y = 600$: $C = 50 + 0.6(600) = ₹410$ cr, $S = 600 - 410 = ₹190$ cr = new I ($150 + 40$). Confirms.

TOPIC

MPC vs APC

TRAP → TRUTH

× **MISTAKE** MPC and APC are the same thing.

✓ **CORRECT** APC (Average Propensity to Consume) = C/Y (total consumption divided by total income). MPC (Marginal Propensity to Consume) = $\Delta C/\Delta Y$ (change in consumption per unit change in income). APC can exceed 1 at very low income (dis-saving), but MPC is the SLOPE of the consumption line and lies between 0 and 1. Confusing the two costs marks in 3-mark distinguishes.

TOPIC

MPC + MPS = 1

TRAP → TRUTH

× **MISTAKE** MPC + MPS can be any value.

✓ **CORRECT** Since every additional rupee of income is either consumed or saved, $\Delta C + \Delta S = \Delta Y$. Dividing by ΔY gives $MPC + MPS = 1$ (and similarly $APC + APS = 1$). If $MPC = 0.8$, **MPS MUST** be 0.2. This identity is the most-tested one-liner.

TOPIC

Multiplier formula

TRAP → TRUTH

× **MISTAKE** Multiplier $k = 1/\text{MPC}$.

✓ **CORRECT** Multiplier $k = 1/(1 - \text{MPC}) = 1/\text{MPS}$. With $\text{MPC} = 0.8$, $k = 1/(1 - 0.8) = 1/0.2 = 5$. A common –2 mark error is writing $k = 1/\text{MPC} = 1/0.8 = 1.25$ — WRONG. Always use 1 minus MPC in the denominator.

TOPIC

Equilibrium condition

TRAP → TRUTH

× **MISTAKE** Equilibrium occurs when $C = I$.

✓ **CORRECT** Equilibrium in the two-sector Keynesian model is where AGGREGATE DEMAND = AGGREGATE SUPPLY, i.e., $C + I = Y$, OR equivalently planned SAVING = planned INVESTMENT ($S = I$). $C = I$ is not the condition. Stating $S = I$ (planned) wins the mark.

TOPIC

Deflationary gap direction

TRAP → TRUTH

× **MISTAKE** A deflationary gap means AD is greater than full-employment AD.

✓ **CORRECT** A DEFLATIONARY (recessionary) gap arises when AD at full employment is LESS than full-employment AS, leaving the economy below full employment with involuntary unemployment. An INFLATIONARY gap is the opposite — AD GREATER than full-employment AS, pushing up the price level. Mixing up the directions reverses every corrective measure.

TOPIC

Corrective measures

TRAP → TRUTH

× **MISTAKE** Raise the repo rate to fight a deflationary gap.

✓ **CORRECT** Deflationary gap needs EXPANSIONARY policy: increase government spending (G), CUT taxes (T), LOWER the repo rate, CUT CRR/SLR, RBI BUYS securities (OMO) — all of which raise AD. Inflationary gap needs the OPPOSITE (contractionary) policy. Naming the wrong direction reverses the answer entirely.

TOPIC

Involuntary unemployment

TRAP → TRUTH

× **MISTAKE** Involuntary unemployment means people who do not want to work.

✓ **CORRECT** INVOLUNTARY unemployment is when workers are willing and able to work at the prevailing wage but cannot find jobs — caused by deficient aggregate demand. VOLUNTARY unemployment is when workers are unwilling to work at the prevailing wage. Keynesian macro is about ending INVOLUNTARY unemployment by raising AD.

TOPIC

Ex-ante vs ex-post

TRAP → TRUTH

× **MISTAKE** Ex-ante and ex-post values are always equal.

✓ **CORRECT** EX-ANTE = planned / intended (what households plan to consume or save, what firms plan to invest). EX-POST = actual / realised. Equilibrium requires EX-ANTE $S = EX-ANTE I$. Ex-post S always equals ex-post I by accounting identity, but this is true even out of equilibrium and is not the equilibrium condition.

TOPPER TEMPLATE · MARK-BY-MARK

5-6 mark: 'Derive the investment multiplier and show its working with a numerical.'

- 1 DEFINE + INTUITION**
1 m

The investment multiplier (k) measures the multiple by which equilibrium income (Y) increases for a given increase in autonomous investment (I): $k = \Delta Y / \Delta I$. Intuition: new investment creates income for factor owners, who spend a fraction (MPC) on consumption, which becomes someone else's income, and the chain continues in shrinking rounds.
- 2 DERIVATION**
2 m

In the two-sector model, $Y = C + I$ and $C = c + bY$ where $b = \text{MPC}$. Substituting: $Y = c + bY + I$, so $Y(1 - b) = c + I$, giving $Y = (c + I) / (1 - b)$. A change in autonomous investment ΔI raises Y by $\Delta Y = \Delta I / (1 - b)$. Therefore $k = \Delta Y / \Delta I = 1 / (1 - \text{MPC}) = 1 / \text{MPS}$.
- 3 NUMERICAL**
2 m

Suppose $\text{MPC} = 0.8$ and $\Delta I = ₹100$ crore. Then $\text{MPS} = 1 - 0.8 = 0.2$ and $k = 1 / 0.2 = 5$. So $\Delta Y = k \times \Delta I = 5 \times ₹100 \text{ cr} = ₹500$ crore. Round-by-round: Round 1 $\Delta Y = 100$, Round 2 = 80 (= 0.8×100), Round 3 = 64, Round 4 = 51.2, ... summing to ₹500 cr.
- 4 LIMITS + CONCLUSION**
1 m

The multiplier is LIMITED by the MPC: higher MPC \rightarrow larger k (more re-spending), lower MPC \rightarrow smaller k . The maximum value of k is infinity (MPC = 1, all is spent), the minimum is 1 (MPC = 0, none re-spent). Thus the multiplier shows how a small autonomous push can produce a much larger change in equilibrium income.

TOPPER TEMPLATE · MARK-BY-MARK

5-mark: 'Explain deflationary and inflationary gaps with corrective measures.'

1 DEFINE BOTH GAPS

1 m

DEFLATIONARY (recessionary) GAP = the amount by which AD at FULL EMPLOYMENT falls short of full-employment AS, leaving the economy below full employment with involuntary unemployment.
INFLATIONARY GAP = the amount by which AD exceeds full-employment AS, pushing up the general price level without increasing real output.

2 DEFLATIONARY GAP REMEDIES

2 m

Expansionary FISCAL policy: increase government expenditure (G) on infrastructure/welfare, CUT direct and indirect taxes, increase transfer payments — all raise disposable income and AD. Expansionary MONETARY policy: LOWER the repo rate, CUT CRR and SLR, RBI BUYS government securities (OMO) — all increase money supply, lower interest rates, and raise investment and consumption.

3 INFLATIONARY GAP REMEDIES

2 m

Contractionary FISCAL policy: REDUCE government expenditure, RAISE taxes, cut transfers — to cool AD. Contractionary MONETARY policy: RAISE the repo rate, RAISE CRR and SLR, RBI SELLS government securities — to absorb money, raise interest rates, and curb borrowing/spending. The aim is to bring AD back down to the full-employment level without crashing output.

TOPPER TEMPLATE · MARK-BY-MARK

3-mark: 'Distinguish APC and MPC (or APS and MPS).'

1 DEFINITIONS

1 m

APC = C/Y (average — total consumption divided by total income). MPC = $\Delta C/\Delta Y$ (marginal — change in consumption per unit change in income). APS = S/Y ; MPS = $\Delta S/\Delta Y$.

2 RANGE AND LINK TO GRAPH

1 m

APC can be GREATER than 1 at very low income (when households dis-save to consume more than they earn) and falls as income rises. MPC is the SLOPE of the consumption function and lies strictly between 0 and 1. MPC is constant for a linear consumption function; APC is not.

3 IDENTITY

1 m

APC + APS = 1 (every rupee of income is either consumed or saved) and MPC + MPS = 1 (every additional rupee of income is either consumed or saved). These identities are used in almost every numerical.

PYQ PATTERNS




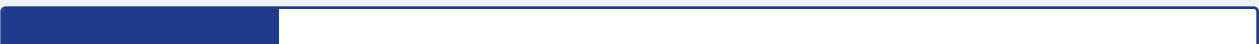


Top PYQ patterns to drill

#1	Derive the investment multiplier $k = 1/(1 - MPC)$ and compute ΔY for a given ΔI . (4-6 marks)	2018, 2020, 2022, 2024
#2	Explain the deflationary / inflationary gap with corrective fiscal and monetary measures. (4-6 marks)	2019, 2021, 2023
#3	Find equilibrium income given $C = c + bY$ and I . (3-4 marks)	2018, 2021, 2024
#4	Distinguish APC and MPC / APS and MPS / involuntary vs voluntary unemployment. (3 marks)	Most years
#5	If $MPC = 0.8$, find multiplier and ΔY when $\Delta I = ₹100$ crore. (3 marks)	2019, 2022, 2024

MARKS DISTRIBUTION

10-year marks distribution

10-YEAR PYQ MARKS DISTRIBUTION

Consumption / saving functions, MPC, MPS, APC, APS		18%
Equilibrium AD = AS or S = I		16%
Investment multiplier — derivation and numerical		24%
Deflationary / inflationary gap + corrective measures		22%
Involuntary vs voluntary unemployment		8%
Ex-ante vs ex-post		6%

RECAP · MEMORISE THESE

Recap

1 AD, AS, equilibrium —
 $AD = C + I$; $AS = C + S = Y$. Equilibrium where $AD = AS \Leftrightarrow$ planned $S =$ planned I (ex-ante).
 $C = c^- + bY$, $S = -c^- + (1 - b)Y$. $MPC + MPS = 1$; $APC + APS = 1$.

2 Multiplier — $k = 1/(1 - MPC) = 1/MPS$; $\Delta Y = k \times \Delta I$. $MPC\ 0.8 \Rightarrow k\ 5 \Rightarrow \Delta I\ 100\ cr \rightarrow \Delta Y\ 500\ cr$. $MPC\ 0.75 \Rightarrow k\ 4 \Rightarrow \Delta I\ 200\ cr \rightarrow \Delta Y\ 800\ cr$.

3 Gaps + remedies —
 Deflationary gap \rightarrow expand: raise G , cut T , lower repo/CRR, RBI BUYS securities.
 Inflationary gap \rightarrow contract: cut G , raise T , raise repo/CRR, RBI SELLS securities.
 Involuntary unemployment = willing at the

WHAT'S NEXT

What's next

- Chapter 5 — Government Budget and the Economy (fiscal policy in formal terms).
- Sit the 15-MCQ Quick Drill, then re-do the $MPC = 0.75$ numerical.
- Then the full Board-Pattern Paper — 25 marks.

You've mastered Income & Employment.

AD/AS, consumption function, multiplier, gaps — now prove it.

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Boards prep that builds confidence, not anxiety.