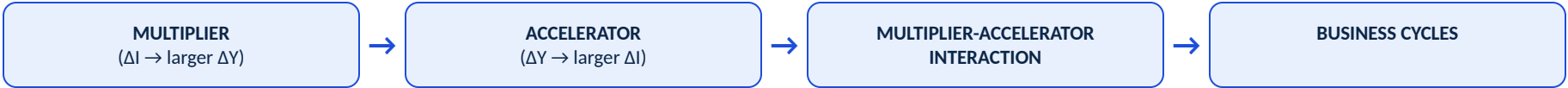


1 CHAPTER ROADMAP



Theme: built on Chapter 6's C-S-I foundation. "Spending of one is income to the other" – a small initial change in investment sets off a chain reaction that changes total output by a MULTIPLE amount (Multiplier); conversely, a change in consumer demand triggers an even larger, magnified change in investment (Accelerator). Together, their interaction explains the recurring boom-bust pattern known as the Business Cycle.

2 KEY DEFINITIONS

Investment Multiplier (k) Ratio of change in total output to change in investment ($\Delta Y/\Delta I$) – the number by which a change in investment must be multiplied to get the final change in output.	Positive Multiplier A greater increase in final output resulting from a small increase in investment.
Negative Multiplier A greater fall in final output resulting from a tiny decrease in investment.	Tax Multiplier (Kt) Measures the change in a country's total output in response to a change in government tax.
Accelerator (β) Numerical value of the relation between an increase in income/demand and the resulting increase in investment: $\beta = \Delta I/\Delta Y$.	Capital-Output Ratio (C.O.R.) Amount of capital required to produce one unit of output.
Time Lag A delay between an economic action and its consequence (relevant to both multiplier and accelerator effects).	Business Cycle Recurring fluctuations of output that an economy experiences over a long period of time.

3 THE MULTIPLIER – FORMULA & DERIVATION

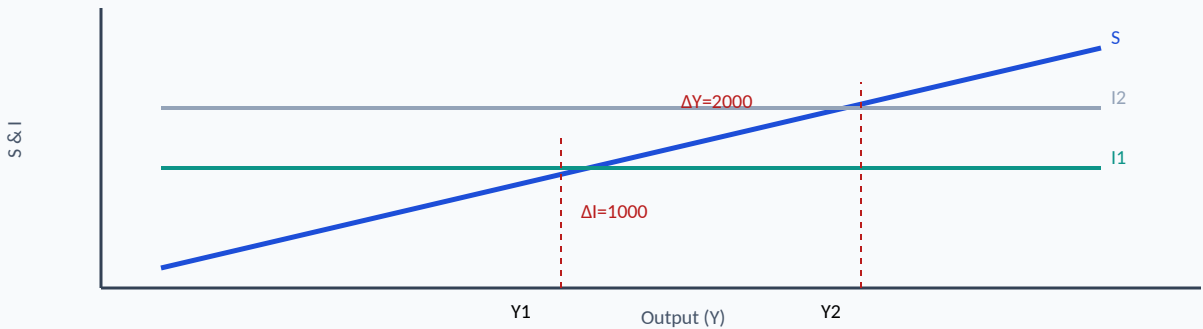
INVESTMENT MULTIPLIER

$k = \Delta Y \div \Delta I$ (or) $\Delta Y = k(\Delta I)$ (or) $k = 1 \div (1 - MPC) = 1 \div MPS$

Since $MPC + MPS = 1 \Rightarrow 1 - MPC = MPS$ | Considers only exogenous/autonomous investment change

Derivation (geometric series): $\Delta Y = \Delta I + \Delta I(MPC) + \Delta I(MPC)^2 + \dots = \Delta I \times [1 \div (1 - MPC)]$

Worked example: Initial investment Rs.1000m, $MPC=0.5 \Rightarrow k = 1 \div (1 - 0.5) = 2 \Rightarrow \Delta Y = 1000 \times 2 = \text{Rs.2000m}$. If MPC rose to 0.8, $k=5$ and $\Delta Y=5000\text{m}$ – **k and MPC are directly proportional.**



A small rightward shift in investment ($I1 \rightarrow I2$) along the saving curve S produces a much LARGER increase in equilibrium output ($Y1 \rightarrow Y2$) – this is the multiplier effect visualised.

4 ASSUMPTIONS & LIMITATIONS OF THE MULTIPLIER

ASSUMPTIONS

- Constant MPC throughout the process
- Continuous (uninterrupted) spending
- No change in price level
- Full employment NOT yet achieved
- No change in tax rate (stable fiscal policy)

LIMITATIONS

- Ineffective once full employment is reached
- Requires surplus availability of consumer goods
- Time lag between investment and full multiplier effect

5 MULTIPLIER EXTENSIONS: TAX & IMPORT MULTIPLIERS

TAX MULTIPLIER (CLOSED ECONOMY WITH GOVERNMENT)

$K_t = 1 \div (MPS + MPT)$

MPT = Marginal Propensity to Tax | Example: MPS=0.3, MPT=0.2 ⇒ $K_t = 1 \div 0.5 = 2$

IMPORT MULTIPLIER (OPEN ECONOMY)

$K_m = 1 \div (MPS + MPT + MPM)$

MPM = Marginal Propensity to Import | Example: MPS=0.3, MPT=0.2, MPM=0.1 ⇒ $K_m = 1 \div 0.6 = 1.67$

Exam clue: each extra "leakage" (saving → tax → import) added to the denominator makes the multiplier SMALLER – more leakages mean less of each rupee gets re-spent domestically.

6 MULTIPLIER FAMILY – QUICK COMPARISON

Multiplier	Formula	Applies To
Investment (k)	$1 \div (1 - MPC) = 1 \div MPS$	Simple closed economy (only C & I)
Tax (Kt)	$1 \div (MPS + MPT)$	Closed economy WITH government
Import (Km)	$1 \div (MPS + MPT + MPM)$	Open economy (with foreign trade)

7 ACCELERATOR PRINCIPLE (B)

ACCELERATOR

$I = f(Y) \text{ so } \Delta I = \beta(\Delta Y) \text{ or } \beta = \Delta I \div \Delta Y$

Demand for capital goods is a DERIVED demand – a rise in consumer-goods demand triggers a magnified rise in investment (J.M. Clark)

ASSUMPTIONS

- Constant Capital-Output Ratio (C.O.R.)
- Existing plants operating at FULL capacity
- Surplus availability of resources for new plants
- Flexibility in production (quick response to demand changes)
- Credit money is elastic (funds readily available)

8 WORKED EXAMPLE: FURNITURE INDUSTRY (C.O.R. = 3:1)

Year	Demand (000)	Required Capital (000)	Depreciation (000)	Net Investment (000)	Gross Investment (000)
t	100	300	–	–	–
t+1	100	300	60	0	60
t+2	130	390	60	90	150
t+3	150	450	60	60	120
t+4	160	480	60	30	90
t+5	160	480	60	0	60
t+6	150	450	60	–30	30
t+7	120	360	60	–90	–30

GROSS INVESTMENT

Gross Investment = Net (New) Investment + Depreciation (Replacement Cost)

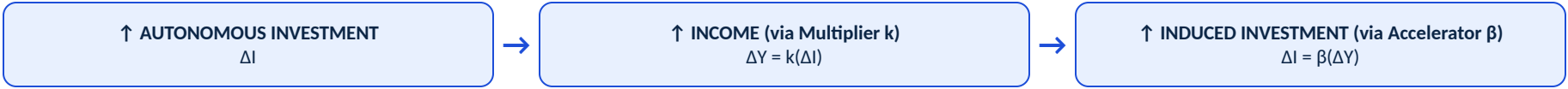
Net Investment = C.O.R. × change in output per year

Key insight (t → t+2): a 30% rise in demand (100→130) required Net Investment of Rs.90,000, pushing Gross Investment up 150% (60→150) – a small demand change produces a MUCH larger swing in investment. When demand later falls (t+6 to t+7), gross investment can even turn NEGATIVE.

9 LIMITATIONS OF THE ACCELERATOR PRINCIPLE

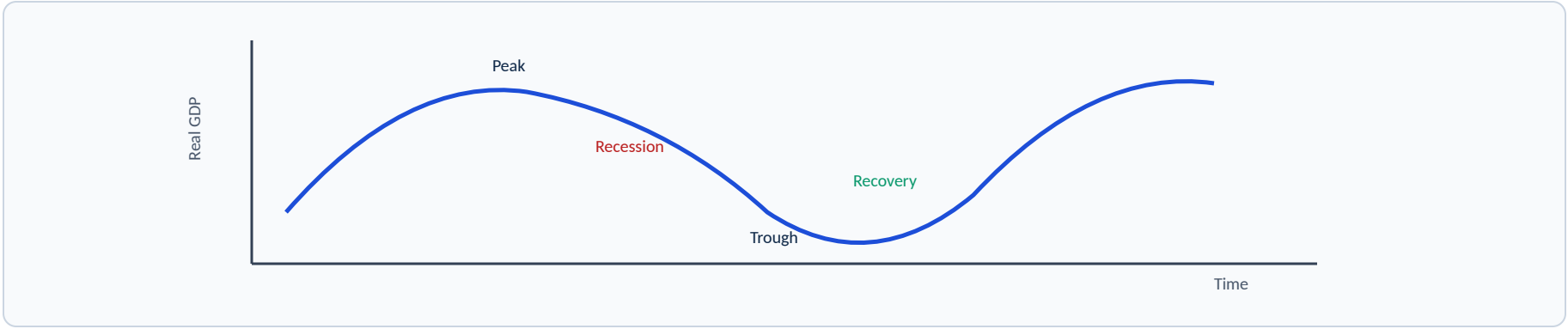
- Ignores adjustment/time-lag costs of installing new machinery
- Spare capacity may absorb demand rise without new net investment
- Becomes ineffective once full employment is reached
- Constant C.O.R. is impractical in the real world
- Only works if the rise in consumer demand is SUSTAINED (temporary spikes are met from existing capacity, not new investment)

10 MULTIPLIER – ACCELERATOR INTERACTION



(Samuelson) Growing output induces new investment via the accelerator; that new investment raises output further via the multiplier – a self-sustaining cycle. But growth eventually outpaces the economy's productive capacity, forcing investment to scale back – which then triggers a multiplier-driven FALL in output, itself accelerated again. This interaction is the root cause of business cycles.

11 BUSINESS CYCLE – THE FOUR PHASES



Phase	Key Characteristics
Peak (Boom)	Output, income, employment, prices & profits all rise; easy credit; inflationary pressure; central bank may raise interest rates
Downturn (Recession)	Demand falls, firms cut production/investment, credit tightens, job losses; deflationary tendency
Trough (Depression)	High unemployment, low income/demand/investment, idle machinery, very low business confidence
Recovery (Revival)	Postponed spending resumes, demand & production rise, investment & credit increase, confidence returns

Over the long run, Real GDP shows an upward trend despite these peak-trough fluctuations – each cycle typically ends at a higher level than the one before.

PRC-3 – ECONOMICS | Chapter 7: Multiplier and Accelerator

12 EXAM PATTERNS & MCQ QUICK CLUES

"Ratio of change in output to change in investment"	→	Investment Multiplier (k)
"MPC given, find total change in Y"	→	Use $k = 1/(1-MPC)$, then $\Delta Y = k \times \Delta I$
"Tax rate also given, along with MPS"	→	Tax multiplier $K_t = 1/(MPS+MPT)$
"Imports also mentioned (open economy)"	→	Import multiplier $K_m = 1/(MPS+MPT+MPM)$
"Change in investment caused by change in demand/output"	→	Accelerator ($\beta = \Delta I/\Delta Y$)
"Credit issued freely, prices/profits rising"	→	Peak/Boom phase
"High unemployment, idle machinery, low confidence"	→	Trough/Depression phase

⚠ ECONOMICS EXAM TRAPS

- Trap: Confusing Multiplier ($\Delta I \rightarrow$ larger ΔY , driven by MPC) with Accelerator ($\Delta Y \rightarrow$ larger ΔI , driven by C.O.R.) – they run in OPPOSITE causal directions.
- Trap: Forgetting that each extra leakage (tax, then imports) added to the multiplier's denominator makes k SMALLER, not larger.
- Trap: Assuming the multiplier keeps working at full employment – both multiplier AND accelerator become ineffective once full employment is reached.
- Trap: Mixing up Net Investment ($=C.O.R. \times \Delta output$) with Gross Investment ($=Net\ Investment+Depreciation$) in accelerator calculations.
- Trap: Reversing the business cycle phase order – sequence is Peak $\rightarrow$ Downturn/Recession $\rightarrow$ Trough $\rightarrow$ Recovery $\rightarrow$ back to Peak.

13 COMPLETE CHAPTER DECISION TREE

QUESTION GIVEN $\rightarrow$ Multiplier, Accelerator, or Business Cycle question? $\rightarrow$ Identify given values (MPC/MPS/MPT/MPM or C.O.R./ ΔY) $\rightarrow$ Select relevant formula (k, K_t , K_m , or β) $\rightarrow$ Substitute & calculate $\rightarrow$ For business cycle: identify phase from characteristics described $\rightarrow$ Interpret & select final answer

PRC-3 ECONOMICS – CHAPTER 7 IN 60 SECONDS

- Multiplier $k = \Delta Y/\Delta I = 1/(1-MPC) = 1/MPS$.
 - k and MPC are directly proportional; higher MPC = bigger multiplier.
 - Tax multiplier $K_t = 1/(MPS+MPT)$; Import multiplier $K_m = 1/(MPS+MPT+MPM)$.
 - Multiplier assumptions: constant MPC, continuous spending, stable prices, below full employment, stable tax.
- Accelerator $\beta = \Delta I/\Delta Y$; driven by a constant Capital-Output Ratio.
 - Gross Investment = Net Investment + Depreciation.
 - Multiplier-Accelerator interaction: $\Delta I \rightarrow \Delta Y(k) \rightarrow \Delta I(\beta)$ – explains business cycles.
 - 4 Business Cycle phases: Peak $\rightarrow$ Downturn/Recession $\rightarrow$ Trough/Depression $\rightarrow$ Recovery.
 - Both multiplier and accelerator become ineffective AT full employment.

14 CHAPTER MEMORY MAP

