UGC-NET & SET Economics: Macro Economics

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1. National Income: Concepts and Measurement

National income is the money value of all final goods and services produced by the normal residents of a country during a year, net of depreciation.

Key aggregates

Aggregate	Definition
GDP at market prices	Value of final output produced within domestic territory
GNP at market prices	GDP + Net Factor Income from Abroad (NFIA)
NDP	GDP − Depreciation (consumption of fixed capital)
NNP at factor cost (National Income)	NNP at MP − Net Indirect Taxes (Indirect taxes − Subsidies)
GVA at basic prices	GVA at factor cost + Production taxes − Production subsidies
Personal Income	NI − Corporate retained earnings − Corporate tax − Social security contributions + Transfer payments
Personal Disposable Income	Personal Income − Direct personal taxes

- **Nominal vs real GDP:** real GDP is valued at constant (base-year) prices. **GDP deflator** = (Nominal GDP / Real GDP) × 100.
- **Per capita income** = National income / Population.
- **Green GDP:** GDP adjusted for depletion of natural resources and environmental degradation.

Methods of measurement

1. **Production (value-added) method:** sum of gross value added by all sectors; avoids double counting by counting only value added (or only final goods).
2. **Income method:** compensation of employees + operating surplus (rent, interest, profit) + mixed income of self-employed.
3. **Expenditure method:** GDP = C + I + G + (X − M).

- All three give the same total (circular flow identity).
- Items excluded: transfer payments, sale of second-hand goods, purely financial transactions, illegal activities, household (non-market) services.
- Items included: imputed rent of owner-occupied houses, own-account production of goods, change in stocks.

Circular flow of income

- Two-sector (households and firms), three-sector (adds government), four-sector (adds foreign sector).
- Leakages (saving, taxes, imports) = injections (investment, government spending, exports) in equilibrium.

Measurement in India

- Compiled by the **National Statistical Office (NSO)**, Ministry of Statistics and Programme Implementation.
- First estimate: Dadabhai Naoroji (1867–68, *Poverty and Un-British Rule in India*); first scientific estimate: V.K.R.V. Rao (1931–32); National Income Committee (P.C. Mahalanobis, 1949).
- Since 2015 India uses GVA at basic prices and GDP at market prices, following the UN System of National Accounts (SNA 2008).

Limitations of GDP as a welfare measure

- Ignores distribution, leisure, non-market work, environmental damage and quality of life.
- Alternatives: Net Economic Welfare (Nordhaus–Tobin), HDI, Genuine Progress Indicator, Gross National Happiness.

Exam pointers: GDP vs GNP vs NNP at factor cost; GVA at basic prices; items excluded; GDP deflator.

2. Determination of Output and Employment: Classical and Keynesian Approaches

Classical theory

- **Say's Law:** "supply creates its own demand" — general overproduction is impossible.
- Full employment is the normal state; any unemployment is voluntary or frictional.
- **Wage–price flexibility** clears the labour market; output is set by the production function at full employment.
- **Saving = Investment** is ensured by a flexible rate of interest.
- **Quantity theory of money:** money is neutral; it determines only the price level (classical dichotomy).
- Policy implication: laissez-faire; no role for government demand management.

Keynesian theory (*General Theory*, 1936)

- Rejects Say's law; equilibrium can occur below full employment (**underemployment equilibrium**).
- Employment depends on **effective demand**, determined where Aggregate Demand Price = Aggregate Supply Price.
- Money wages are rigid downwards; wage cuts reduce demand and may not raise employment.
- Saving and investment are equalised by changes in **income**, not the interest rate.
- Interest is a monetary phenomenon (liquidity preference).

- **Paradox of thrift:** an increase in the desire to save may reduce total saving by reducing income.
- Policy implication: active fiscal policy (public investment) to raise demand.

Income determination (Keynesian cross)

- Two-sector: $Y = C + I$; $C = a + bY \rightarrow Y^* = (a + I)/(1 - b)$.
- Three-sector: $Y = C + I + G$ with taxes; four-sector adds $X - M$.
- **Inflationary gap:** AD exceeds output at full employment. **Deflationary gap:** AD falls short of full-employment output.

Comparison

Aspect	Classical	Keynesian
Equilibrium	Full employment	Can be below full employment
Wages and prices	Flexible	Rigid (downward)
S = I through	Interest rate	Income
Money	Neutral	Affects output via interest
Time horizon	Long run	Short run ("In the long run we are all dead")
Policy	Laissez-faire	Active fiscal policy

Exam pointers: Say's law; effective demand; paradox of thrift; underemployment equilibrium; Pigou (real balance) effect as classical reply.

3. Consumption Function

The consumption function shows the relationship between consumption and income: $C = f(Y)$.

Keynes' Absolute Income Hypothesis

- **Psychological law of consumption:** as income rises, consumption rises but by less than the increase in income ($0 < MPC < 1$).
- $APC = C/Y$; $MPC = \Delta C/\Delta Y$; $APS + APC = 1$; $MPS + MPC = 1$.
- APC falls as income rises ($APC > MPC$ for $C = a + bY$).
- Subjective factors (motives to save) and objective factors (wealth, interest rate, fiscal policy, windfall gains) determine it.

Kuznets' puzzle

- Short-run (cross-section, cyclical) data: APC falls with income (non-proportional).
- Long-run time series (Kuznets, 1869–1938): APC is roughly constant (proportional) despite rising income. Later theories try to reconcile the two.

Later hypotheses

Hypothesis	Author	Core idea
Relative Income	James Duesenberry (1949)	Consumption depends on income relative to others (**demonstration effect**) and on past peak income (**ratchet effect**)
Permanent Income	Milton Friedman (1957)	Consumption depends on permanent (expected long-run) income; transitory income is largely saved; C = k·Yp
Life Cycle	Ando–Modigliani–Brumberg (1950s–63)	People smooth consumption over their lifetime; save in working years, dissave in retirement; C = aW + bY
Random Walk	Robert Hall (1978)	Under rational expectations, consumption changes only with unforeseen news → follows a random walk

- **Ricardian equivalence (Barro, 1974):** debt-financed tax cuts do not raise consumption because people save to pay future taxes.
- Behavioural ideas: mental accounting (Thaler), hyperbolic discounting (Laibson).

Exam pointers: match hypothesis with author; ratchet and demonstration effects; APC > MPC; Kuznets' long-run constancy.

4. Investment Function

Investment is addition to the stock of real capital (machines, buildings, inventories). It is the most volatile component of aggregate demand.

Types of investment

- **Autonomous** (independent of income, e.g., public investment) vs **Induced** (depends on income/profit).
- Gross vs net investment (net = gross − depreciation).
- Fixed business investment, residential construction, inventory investment.

Marginal Efficiency of Capital (Keynes)

- MEC is the rate of discount that equates the present value of expected returns of a capital asset with its supply price:

  Supply price $C = R_1/(1+r) + R_2/(1+r)^2 + \ldots + R_n/(1+r)^n$

- Invest as long as MEC > market rate of interest.
- **MEI (marginal efficiency of investment, Lerner):** takes account of rising supply price of capital goods as investment rises.
- Expectations, "animal spirits" and business confidence shift MEC.

Theories of investment

Theory	Key idea
Accelerator (Clark, 1917)	Net investment depends on the change in output: $I = v \cdot \Delta Y$
Flexible accelerator / capital stock adjustment (Goodwin, Chenery, Koyck)	Firms close only part of the gap between desired and actual capital each period
Neoclassical (Jorgenson, 1963)	Desired capital depends on output and user cost of capital $(r + \delta) \cdot Pk$
Tobin's q (1969)	q = market value of firm / replacement cost of capital; invest if $q > 1$
Profits / internal funds theory	Investment depends on retained earnings (liquidity)
Irreversibility and uncertainty (Dixit–Pindyck)	Option value of waiting delays investment

Exam pointers: MEC vs MEI; Tobin's q; Jorgenson's user cost; accelerator coefficient.

5. Multiplier and Accelerator

Investment multiplier (Keynes, building on R.F. Kahn's employment multiplier, 1931)

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

- Higher MPC → larger multiplier. With MPC = 0.8, k = 5.
- **Open-economy multiplier:** $k = 1/(MPS + MPT + MPM)$ (MPT = marginal propensity to tax, MPM = marginal propensity to import).
- **Government expenditure multiplier** $= 1/(1 - b)$; **tax multiplier** $= -b/(1 - b)$; **balanced-budget multiplier = 1** (Haavelmo theorem).
- Static (comparative) vs dynamic (period) multiplier.
- Leakages: saving, taxes, imports, debt repayment, hoarding, price rise.
- Limited working in less developed countries (V.K.R.V. Rao): supply bottlenecks, disguised unemployment, high MPC spent on food.

Accelerator

- Change in investment results from change in output: $I(t) = v \cdot (Y(t) - Y(t-1))$; v = capital–output ratio.
- Works asymmetrically: disinvestment is limited to depreciation.
- Assumes no excess capacity and constant capital–output ratio.

Super-multiplier and interaction

- **Hicks's super-multiplier:** combines induced consumption and induced investment.
- **Samuelson's multiplier–accelerator interaction (1939):** $Y(t) = G + bY(t-1) + v \cdot b \cdot (Y(t-1) - Y(t-2))$. Depending on b and v, income shows damped, explosive or constant cycles.
- **Hicks's trade cycle model (1950):** cycles bounded by a full-employment ceiling and a floor set by autonomous investment.

Exam pointers: multiplier formulas; balanced budget multiplier = 1; Samuelson's interaction model; Kahn's employment multiplier.

6. Demand for Money

Classical approaches

- **Fisher's transactions approach:** MV = PT (V = transactions velocity). Money demanded only as a medium of exchange.
- **Cambridge cash-balance approach (Marshall, Pigou, Robertson, Keynes):** M = kPY, where k = proportion of income held as money (k = 1/V). Emphasises money as a store of value.

Keynes's Liquidity Preference Theory

- Three motives: **transactions**, **precautionary** (both depend on income: $L_1 = f(Y)$) and **speculative** (depends inversely on interest rate: $L_2 = f(r)$).
- **Liquidity trap:** at a very low interest rate, demand for money becomes perfectly elastic; monetary policy is ineffective.

Post-Keynesian theories

Theory	Author	Core idea
Inventory-theoretic approach	Baumol (1952), Tobin (1956)	Transactions demand rises with income and falls with interest: $M = \sqrt{(2bY/r)}$ — economies of scale in cash holding
Portfolio / risk-aversion theory	Tobin (1958)	Speculative demand arises from risk aversion and diversification between money and bonds
Modern Quantity Theory	Milton Friedman (1956)	Money is an asset; demand depends on permanent income (wealth), returns on bonds, equities, expected inflation and ratio of human to non-human wealth; stable demand function
Precautionary demand models	Whalen (1966)	Demand depends on variance of net payments and interest rates

Exam pointers: Cambridge k; liquidity trap; Baumol square-root formula; Friedman's restatement.

7. Supply of Money

Money supply is the stock of money held by the public at a point of time (excludes money held by government and banks).

Measures of money supply in India (RBI)

Measure	Components
M0 (Reserve Money)	Currency in circulation + Bankers' deposits with RBI + Other deposits with RBI
M1 (Narrow Money)	Currency with public + Demand deposits with banks + Other deposits with RBI
M2	M1 + Savings deposits with post office savings banks
M3 (Broad Money)	M1 + Time deposits with banks
M4	M3 + Total post office deposits

- RBI Working Group (Y.V. Reddy, 1998) introduced new aggregates NM0–NM3 and liquidity aggregates L1–L3.

Money multiplier

$$M = m \times H;\ m = (1 + c)/(c + r)$$

- H = high-powered money (reserve money); c = currency–deposit ratio; r = reserve–deposit ratio.
- Higher c or r → lower multiplier.
- Credit creation by commercial banks: deposit multiplier = 1/r (simple model).

Determinants and theories

- Exogenous view (monetarist): central bank controls money supply.
- Endogenous view (Post-Keynesian, Kaldor, Moore): money supply responds to demand for credit; central bank sets the interest rate.
- Sources of reserve money: net RBI credit to government, to banks, to commercial sector, net foreign exchange assets, government currency liabilities.

Exam pointers: M1 vs M3 components; money multiplier formula; high-powered money; endogenous money.

8. IS–LM Model Approach

Developed by **J.R. Hicks (1937)** and extended by **Alvin Hansen** — synthesises Keynes's real and monetary sectors to determine income and interest rate simultaneously.

IS curve (goods market)

- Locus of (Y, r) combinations where investment = saving (goods market equilibrium).
- Downward sloping: lower r → higher I → higher Y via the multiplier.
- Flatter when investment is interest-elastic and multiplier is large.
- Shifts right with higher G, autonomous C or I, lower taxes.

LM curve (money market)

- Locus of (Y, r) where money demand = money supply.
- Upward sloping: higher Y raises transactions demand → higher r for a given money supply.

- Three ranges: **Keynesian range** (horizontal — liquidity trap), **intermediate range**, **classical range** (vertical — zero interest elasticity).
- Shifts right with higher money supply or lower price level.

Equilibrium and policy

- Intersection gives equilibrium Y and r.
- **Fiscal policy** (IS shift) is most effective when LM is flat (Keynesian range) and ineffective when LM is vertical (classical range) — **crowding out**.
- **Monetary policy** (LM shift) is most effective when LM is vertical or IS is flat; ineffective in the liquidity trap.
- **Policy mix:** combinations of fiscal and monetary policy.

Extensions

- **IS–LM–BP (Mundell–Fleming model):** open economy. Under fixed exchange rates with perfect capital mobility, fiscal policy is effective and monetary policy is not; under flexible rates, the reverse.
- **AD–AS model:** AD curve derived from IS–LM by varying the price level.
- Criticisms: static, ignores expectations and supply side, assumes exogenous money.

Exam pointers: slopes of IS and LM; effectiveness of policies in different LM ranges; Mundell–Fleming results.

9. Inflation and Phillips Curve Analysis

Inflation is a sustained rise in the general price level.

Types and measures

- By rate: creeping, walking, running, galloping, **hyperinflation** (above 50% per month — Cagan).
- **Stagflation:** inflation with stagnation and unemployment.
- Measured by WPI, CPI and GDP deflator. India adopted **CPI (Combined)** as the nominal anchor for monetary policy (Urjit Patel Committee, 2014).

Theories of inflation

Type	Cause
Demand-pull	Excess demand (Keynesian inflationary gap; monetarist excess money growth)
Cost-push	Wage-push, profit-push, supply shocks (oil prices)
Structural (Latin American school — Prebisch, Myrdal)	Supply bottlenecks in agriculture, foreign exchange, infrastructure
Monetarist (Friedman)	"Inflation is always and everywhere a monetary phenomenon"

- **Inflation tax** and **seigniorage**.
- **Fisher effect:** nominal interest rate = real rate + expected inflation.

Phillips Curve

- **A.W. Phillips (1958):** inverse relation between money-wage growth and unemployment in the UK (1861–1957).
- **Samuelson–Solow (1960):** converted it into an inflation–unemployment trade-off — menu for policy choice.
- **Friedman (1968) and Phelps (1967):** expectations-augmented Phillips curve; trade-off is only short run. **Long-run Phillips curve is vertical** at the natural rate of unemployment.

$$\pi = \pi^e - \beta(u - u_n)$$

- **NAIRU:** non-accelerating inflation rate of unemployment.
- Rational expectations (Lucas, Sargent): no trade-off even in the short run for anticipated policy.
- **Okun's law:** a 1% rise in unemployment above the natural rate reduces output by about 2–3% below potential.
- **Sacrifice ratio:** % of output lost per 1 percentage point reduction in inflation.

Control of inflation

- Monetary measures (raising policy rates, open market sales), fiscal measures (reducing deficit), supply measures, incomes policy (wage–price controls).

Exam pointers: vertical long-run Phillips curve; NAIRU; Okun's law; structuralist view; Fisher effect.

10. Business Cycles

Business cycles are recurrent fluctuations in aggregate economic activity, with phases of **expansion (boom), peak, contraction (recession) and trough**.

Types by length

Cycle	Length	Associated with
Kitchin	3–5 years	Inventory changes
Juglar	7–11 years	Fixed investment
Kuznets	15–25 years	Building/infrastructure, demographic changes
Kondratieff	45–60 years	Major technological innovations (long waves)

Theories

Theory	Author	Cause of cycle
Sunspot	W.S. Jevons	Sunspots affecting harvests
Psychological	Pigou	Waves of optimism and pessimism
Monetary	Hawtrey	Expansion and contraction of bank credit
Over-investment (monetary)	Hayek	Bank credit pushes market rate below natural rate → over-investment in capital goods
Innovation	Schumpeter	Clusters of innovations ("creative destruction")
Keynesian	Keynes	Fluctuations in marginal efficiency of capital
Multiplier–accelerator	Samuelson, Hicks	Interaction of multiplier and accelerator
Kaldor's model	Kaldor	Non-linear saving and investment functions
Real Business Cycle (RBC)	Kydland & Prescott (1982), Long & Plosser	Real (technology) shocks; cycles are efficient responses
New Keynesian	Mankiw, Romer	Nominal rigidities (menu costs, sticky prices) amplify demand shocks
Political business cycle	Nordhaus (1975)	Governments stimulate before elections

Exam pointers: match cycle with length; Hayek vs Hawtrey; RBC (Kydland–Prescott, Nobel 2004); Hicks's ceiling and floor.

11. Monetary and Fiscal Policy

Monetary policy

- **Objectives:** price stability, growth, exchange-rate stability, financial stability.
- **Instruments:** quantitative (bank rate, repo/reverse repo, open market operations, CRR, SLR) and qualitative (margin requirements, credit rationing, moral suasion, selective credit controls).
- **Transmission channels:** interest rate, credit (bank lending), exchange rate, asset price (Tobin's q, wealth effect), expectations.
- **Rules vs discretion:** Friedman's k-percent money growth rule; **Taylor rule (1993)** — $i = r^* + \pi + 0.5(\pi - \pi^*) + 0.5(\text{output gap})$.
- **Time inconsistency** (Kydland–Prescott) → case for central bank independence and inflation targeting.
- Unconventional tools: quantitative easing, forward guidance, negative rates.

Fiscal policy

- **Instruments:** government expenditure, taxation, public debt.
- **Automatic (built-in) stabilisers:** progressive taxes, unemployment benefits.
- **Discretionary policy:** compensatory spending, pump priming.

- **Functional finance (Abba Lerner):** judge fiscal policy by its effect on the economy, not by budget balance.
- **Crowding out:** government borrowing raises interest rates and displaces private investment; complete in the classical (vertical LM) case.
- **Fiscal multiplier**, Ricardian equivalence.

Lags and debates

- Recognition, decision (administrative) and impact (operational) lags — fiscal policy has a long inside lag, monetary policy a long outside lag.
- Keynesians favour fiscal policy; monetarists favour monetary rules.

Exam pointers: Taylor rule; time inconsistency; automatic stabilisers; crowding out; policy lags.

12. Rational Expectations Hypothesis and its Critique

Expectations formation

- **Static expectations:** expected price = last period's price.
- **Adaptive expectations (Cagan, Friedman):** expectations are revised by a fraction of past forecast error: $\pi^e(t) = \pi^e(t-1) + \lambda(\pi(t-1) - \pi^e(t-1))$ — backward-looking, systematic errors possible.
- **Rational expectations (John Muth, 1961):** agents use all available information and the correct model; forecast errors are random with zero mean.

New Classical Macroeconomics

- Developed by **Robert Lucas, Thomas Sargent, Neil Wallace, Robert Barro**.
- Continuous market clearing + rational expectations.
- **Policy Ineffectiveness Proposition (Sargent–Wallace, 1975):** anticipated monetary policy has no effect on real output; only surprises matter.
- **Lucas critique (1976):** parameters of econometric models change when policy changes, so traditional models cannot evaluate policy.
- **Lucas islands model / surprise supply function:** output deviates from natural level only due to price surprises.
- Credibility, time-consistency and rules-based policy gain importance.

Critique

- Information is costly; agents may not know the "true" model (bounded rationality — Herbert Simon).
- Wages and prices are sticky due to contracts (**Fischer, Taylor staggered contracts**) — monetary policy matters even with rational expectations (New Keynesian response).
- Markets do not clear continuously; involuntary unemployment exists.
- Empirical evidence shows anticipated money affects output.
- Learning models and behavioural economics challenge full rationality.

Exam pointers: Muth (1961); Lucas critique; Sargent–Wallace policy ineffectiveness; adaptive vs rational expectations; New Keynesian sticky-price reply.