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Monetary Economics

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COMPREHENSIVE STUDY HANDOUT

ECO604

Monetary Economics

Lecture-wise study notes prepared for Virtual University of Pakistan students.

Covers all major topics with objectives, key definitions, summaries and exam pointers.



11 study units

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Unit 1: Money: Functions, Forms and Measurement

Learning Objectives

- Objective 1:** Define money and its four classical functions
- Objective 2:** Trace the evolution from commodity to fiat and digital money
- Objective 3:** Explain monetary aggregates M0-M3

Money is defined functionally: anything widely accepted in exchange. The classical functions are four. Medium of exchange overcomes the double coincidence of wants in barter. Unit of account provides the measuring rod for prices. Store of value carries purchasing power through time, though inflation erodes it. Standard of deferred payment lets debts be denominated and settled later. An asset must perform all four reasonably to count as money.

Money's forms evolved with trust and technology. Commodity money (gold, silver, cowries) had intrinsic value but was heavy and variable. Representative money (gold-backed notes) economized on metal. Fiat money has value purely by government decree and social convention, which is what circulates today. Digital forms now extend the spectrum: commercial bank deposits are already electronic, central bank digital currencies (CBDCs) are being piloted, and cryptocurrencies remain volatile speculative assets rather than true money.

Central banks measure money in aggregates by liquidity. M0 (monetary base) is currency plus bank reserves at the central bank. M1 adds demand deposits. M2 adds savings and small time deposits. Broader aggregates add large deposits and institutional funds. Very important: monetary policy operates by influencing these aggregates and the interest rates that price them; exam questions often ask which aggregate a policy action affects first.

Key Definitions

Fiat money is defined as money whose value derives from government decree and social acceptance, not intrinsic worth.

Monetary base (M0) is defined as currency in circulation plus commercial bank reserves held at the central bank.

Liquidity is defined as the ease and speed with which an asset can be converted into means of payment.

Key Points to Remember

- Four functions: medium of exchange, unit of account, store of value, standard of deferred payment.
- Evolution: commodity -> representative -> fiat -> digital (deposits, CBDC pilots, crypto).
- Aggregates by liquidity: M0 (base), M1, M2, broader measures.
- Policy works through aggregates and interest rates.

Unit Summary

Money is defined by its functions; it evolved from commodities to fiat to digital forms, and is measured in liquidity-ranked aggregates that policy targets.

Exam Pointer

Very important: list the four functions with a one-line explanation each, and order the monetary aggregates. A question on why cryptocurrencies are not yet money is common.

Unit 2: The Demand for Money

Learning Objectives

Objective 1: Explain the classical quantity theory

Objective 2: Present Keynes's liquidity preference theory

Objective 3: Discuss Baumol-Tobin and modern portfolio approaches

The classical quantity theory, $MV = PY$, says money supply times velocity equals the price level times real output. With velocity and output fixed in the classical long run, prices move proportionally with money: doubling M doubles P . This is the intellectual ancestor of monetarism and the proposition that inflation is always a monetary phenomenon in the long run.

Keynes's liquidity preference theory made money demand a choice. People hold money for transactions (daily commerce), precaution (unexpected needs), and speculation (betting on bond prices). The speculative motive creates the crucial link: when interest rates are low, people expect them to rise (bond prices to fall) and hoard money instead, making money demand interest-elastic. At the zero lower bound this becomes the liquidity trap, where extra money is simply hoarded and policy loses traction.

Later theories refined the transactions motive. The Baumol-Tobin model treats cash management as inventory: holding cash saves transaction costs but forgoes interest, yielding an optimal cash balance rising with the square root of expenditure. Friedman recast money demand as portfolio choice among many assets, depending on wealth and relative returns. Very important: exams contrast Keynes (interest-elastic, unstable velocity) with Friedman (stable function of permanent income); that contrast organizes the whole topic.

Key Definitions

Quantity theory ($MV=PY$) is defined as money supply times velocity equals nominal output; with V, Y fixed, P moves with M .

Liquidity preference is defined as Keynes's theory that money demand depends on income (transactions) and interest rates (speculation).

Liquidity trap is defined as a situation at near-zero rates where money demand becomes infinitely elastic and monetary policy stalls.

Key Points to Remember

- $MV=PY$: classical long-run link from money to prices.
- Keynes: transactions, precautionary, speculative motives; demand falls as interest rises.
- Liquidity trap: policy impotence at the zero lower bound.
- Baumol-Tobin: square-root cash rule; Friedman: money as one asset in a portfolio.

Unit Summary

Money demand theories run from the quantity equation through Keynes's interest-sensitive liquidity preference to inventory and portfolio refinements.

Exam Pointer

Very important: contrast Keynes vs Friedman on interest elasticity and velocity stability.
Liquidity-trap mechanics are a favourite analytical question.

Unit 3: Money Supply and the Banking System

Learning Objectives

Objective 1: Explain fractional reserve banking and the money multiplier

Objective 2: Describe central bank balance sheets and policy instruments

Objective 3: Analyze how reserves become broad money

Modern money is mostly bank-created. Under fractional reserve banking, banks keep a fraction of deposits as reserves and lend the rest; the loan becomes someone else's deposit, which is partly lent again. The textbook money multiplier says deposits expand to $(1/\text{reserve ratio})$ times initial reserves. In reality the multiplier is a ceiling, not a machine: lending is constrained by creditworthy borrowers, capital regulation and banks' willingness, which is why massive post-2008 reserve injections did not multiply into runaway broad money.

The central bank's balance sheet is the lever. Its liabilities are currency and bank reserves (the monetary base); its assets are government securities and loans to banks. Open market operations, buying securities to inject reserves, are the standard tool. The discount window lends to banks directly. Reserve requirements set the minimum reserve fraction, and interest on reserves now lets central banks steer market rates even with abundant reserves.

Monetary transmission from base to broad money runs through bank lending and portfolio choices, and it can clog: in crises, banks hoard reserves and borrowers retrench, weakening the link. Very important: understand both the multiplier mechanics and why it broke down after 2008; examiners reward the two-sided story over mechanical recitation.

Key Definitions

Fractional reserve banking is defined as banks hold a fraction of deposits as reserves and lend the remainder.

Money multiplier is defined as the maximum ratio of broad money to base money, $1/\text{reserve ratio}$ in the simple model.

Open market operations is defined as central bank purchases/sales of securities to adjust reserves and interest rates.

Key Points to Remember

- Banks create deposits by lending; the multiplier is a ceiling, not an automatic machine.
- Central bank liabilities (currency + reserves) = monetary base; assets = securities + loans.

- Tools: OMOs, discount window, reserve requirements, interest on reserves.
- Post-2008: huge reserves, weak multiplication; lending needs willing borrowers.

Unit Summary

Fractional reserve banking multiplies base money into deposits up to a limit; the central bank steers this via its balance sheet tools, though transmission can weaken in crises.

Exam Pointer

Very important: derive the simple multiplier, then explain with the post-2008 evidence why it is not mechanical. List the four policy instruments.

Unit 4: IS-LM and Aggregate Demand

Learning Objectives

- Objective 1:** Derive the IS and LM curves
- Objective 2:** Analyze monetary and fiscal policy in IS-LM
- Objective 3:** Explain the AD curve and its slopes

The IS-LM model is the workhorse of short-run macroeconomics. The IS curve shows combinations of interest rate and output where goods-market equilibrium holds: higher rates depress investment, so IS slopes downward. The LM curve shows money-market equilibrium: higher income raises money demand, requiring higher rates to clear the market, so LM slopes upward. Their intersection is the short-run equilibrium with sticky prices.

Policy analysis is the payoff. Monetary expansion shifts LM right: rates fall, investment and output rise. Fiscal expansion shifts IS right: output rises but rates rise too, partially crowding out investment. In the liquidity trap, LM is flat and monetary policy cannot shift it, while fiscal policy is fully effective. In the classical case LM is vertical and fiscal policy is fully crowded out. These polar cases are exam gold.

The aggregate demand curve is derived by varying the price level: higher P reduces real money supply, shifting LM left and lowering output, so AD slopes downward. Its position depends on fiscal and monetary stance plus expectations. Very important: every AD shift traces back to an IS or LM shift; never treat AD as independent of the underlying curves.

Key Definitions

IS curve is defined as goods-market equilibrium: output as a decreasing function of the interest rate.

LM curve is defined as money-market equilibrium: interest rate as an increasing function of output.

Crowding out is defined as fiscal expansion raising rates and displacing private investment.

Key Points to Remember

- IS slopes down (rates vs investment); LM slopes up (income vs money demand).
- Monetary policy shifts LM; fiscal shifts IS with partial crowding out.

- Liquidity trap: flat LM, monetary impotence, fiscal full power. Classical: vertical LM, fiscal fully crowded out.
- AD slopes down because higher P shrinks real money balances.

Unit Summary

IS-LM determines short-run equilibrium; policy effectiveness depends on curve slopes, with the liquidity trap and classical cases as polar benchmarks; AD derives from price-level effects on LM.

Exam Pointer

Very important: draw IS-LM policy experiments and explain the trap and classical cases. Derive AD from IS-LM step by step.

Unit 5: Inflation: Causes, Costs and Cures

Learning Objectives

- Objective 1:** Distinguish demand-pull, cost-push and monetary inflation
- Objective 2:** Explain the costs of anticipated vs unanticipated inflation
- Objective 3:** Evaluate disinflation strategies and credibility

Inflation's causes are classified three ways. Demand-pull: too much spending chases too few goods, often from loose fiscal or monetary policy. Cost-push: supply shocks (oil, wages) raise production costs and the price level. Monetary: sustained money growth beyond output growth, the long-run quantity-theory story. Hyperinflations are always fiscal-monetary: governments printing to cover deficits, as in Weimar Germany or Zimbabwe.

Costs depend on anticipation. Fully anticipated inflation still imposes shoe-leather costs (economizing on cash), menu costs (repricing), and tax distortions (bracket creep, taxed nominal returns). Unanticipated inflation is worse: it redistributes arbitrarily from lenders to borrowers, distorts price signals, and breeds uncertainty that deters investment. Deflation, conversely, raises real debt burdens and can trigger debt-deflation spirals.

Curing inflation means credible disinflation. Cold-turkey tightening cuts inflation fast but with deep recession; gradualism spreads the pain. The sacrifice ratio (output lost per point of disinflation) is lower when policy is credible, because expectations adjust faster. This is why central bank independence and clear inflation targets matter: credibility is a policy technology. Very important: the expectations-augmented analysis is what separates strong answers from lists.

Key Definitions

- Demand-pull inflation** is defined as rising prices from excess aggregate demand.
- Cost-push inflation** is defined as rising prices from adverse supply shocks raising costs.
- Sacrifice ratio** is defined as cumulative output loss per percentage point of disinflation.

Key Points to Remember

- Causes: demand-pull, cost-push, monetary; hyperinflation is fiscal-monetary.
- Anticipated costs: shoe-leather, menu, tax distortions. Unanticipated: redistribution, uncertainty.

- Deflation raises real debt burdens (Fisher's debt-deflation).
- Credible disinflation has a lower sacrifice ratio; independence and targets build credibility.

Unit Summary

Inflation arises from demand, supply or monetary sources; its costs hinge on anticipation; credible, well-communicated tightening minimizes disinflation pain.

Exam Pointer

Very important: classify inflation causes with examples and explain why credibility lowers the sacrifice ratio. Hyperinflation mechanics are standard essay material.

Unit 6: The Phillips Curve and Expectations

Learning Objectives

- Objective 1:** Trace the Phillips curve from empirical to expectations-augmented
- Objective 2:** Explain adaptive vs rational expectations
- Objective 3:** Discuss the NAIRU and policy implications

Phillips (1958) found an inverse UK relationship between wage inflation and unemployment, quickly recast as price inflation versus unemployment. Policymakers briefly read it as a permanent menu: accept a little more inflation, get a little less unemployment. Friedman and Phelps demolished the permanence: only unanticipated inflation can push unemployment below its natural rate, because workers adjust wage demands once they see through the inflation.

The expectations-augmented Phillips curve, $\pi_t = \pi_t^e - \beta(u_t - u_n) + \text{supply shocks}$, restored a short-run trade-off while imposing a vertical long run at the natural rate (NAIRU). How expectations form decides dynamics: adaptive expectations (looking backward) make disinflation costly; rational expectations (using all information, Muth/Lucas) imply credible policy can disinflate cheaply, the policy-ineffectiveness proposition in its strong form.

Modern New Keynesian Phillips curves forward-look to expected future inflation and marginal costs, underpinning inflation-targeting central banks. Supply shocks shift the curve adversely, forcing the cruel choice between inflation and unemployment that oil shocks made famous. Very important: always specify which Phillips curve (short vs long run, adaptive vs rational) you are using; ambiguity here sinks answers.

Key Definitions

Phillips curve is defined as the inverse short-run relationship between inflation and unemployment.

NAIRU is defined as the non-accelerating-inflation rate of unemployment; the long-run anchor.

Rational expectations is defined as expectations formed using all available information and the true economic model.

Key Points to Remember

- Original: empirical inflation-unemployment trade-off; misread as a permanent menu.

- Expectations-augmented: $\pi = \pi^e - \beta(u - u_n) + \text{shocks}$; vertical in the long run.
- Adaptive (backward) vs rational (forward, model-consistent) expectations change disinflation costs.
- Supply shocks shift the curve; policy then faces inflation vs unemployment.

Unit Summary

The Phillips curve survives only as a short-run, expectations-dependent trade-off anchored at the NAIRU, with expectation formation determining policy costs.

Exam Pointer

Very important: derive the expectations-augmented curve and explain why the long run is vertical. Contrast adaptive and rational expectations implications.

Unit 7: Monetary Policy Transmission

Learning Objectives

- Objective 1:** Map the channels from policy rate to the real economy
- Objective 2:** Explain the credit channel and balance-sheet effects
- Objective 3:** Discuss lags and transmission in developing economies

Transmission is the chain from the central bank's policy rate to output and inflation. The interest-rate channel is textbook: lower policy rates cut market rates, cheapening investment and durable consumption, raising aggregate demand. The exchange-rate channel: lower rates depreciate the currency, boosting net exports. The asset-price channel: lower rates lift equity and housing wealth, spurring consumption (wealth effects) and investment (Tobin's q).

The credit channel adds financial frictions. The bank-lending channel: tight policy drains reserves and deposits, forcing bank-dependent borrowers to cut spending. The balance-sheet channel: policy moves asset values and cash flows, changing borrowers' net worth and hence the external finance premium they face; this financial accelerator amplifies both booms and busts. These channels explain why policy hits small firms and households hardest.

Transmission is slow and uncertain: recognition, decision and impact lags stretch 12-24 months, which is why central banks are forward-looking. In developing economies like Pakistan, transmission is weaker: large informal sectors, administered prices, fiscal dominance and shallow financial markets blunt the channels. Very important: a strong answer always names at least three channels and one reason transmission may fail.

Key Definitions

Transmission mechanism is defined as the channels through which monetary policy affects the real economy.

Financial accelerator is defined as the amplification of shocks via borrower balance sheets and credit premia.

Policy lags is defined as delays between recognizing a need, acting, and feeling the effects.

Key Points to Remember

- Channels: interest rate, exchange rate, asset price (wealth, Tobin's q), credit (bank lending, balance sheet).
- Financial accelerator amplifies cycles through net worth and risk premia.
- Lags of 12-24 months force forward-looking policy.
- Developing economies: informality, fiscal dominance, shallow markets weaken transmission.

Unit Summary

Policy travels through interest-rate, exchange-rate, asset-price and credit channels with long lags, amplified by financial frictions and blunted by structural weaknesses.

Exam Pointer

Very important: diagram the transmission channels and explain the financial accelerator. One question on developing-country transmission weaknesses is likely.

Unit 8: Central Banking: Independence, Rules and Targets

Learning Objectives

- Objective 1:** Explain the time-inconsistency problem
- Objective 2:** Argue the case for central bank independence
- Objective 3:** Compare policy rules: Taylor rule, inflation targeting, NGDP

The time-inconsistency problem (Kydland-Prescott) motivates modern central banking: a policymaker promising low inflation is tempted to inflate for short-run employment gains, but the public anticipates this, so the economy ends with higher inflation and no employment gain. Rules beat discretion because commitment anchors expectations. This is the deep logic behind every institutional reform that follows.

Central bank independence, operational freedom to set rates toward a mandated goal, empirically correlates with lower inflation without output cost. Independence needs accountability: clear mandates (price stability), transparency (published forecasts, minutes), and appointment safeguards. The State Bank of Pakistan's 2021 amendments strengthening its autonomy reflect this global consensus.

Operating frameworks vary. The Taylor rule prescribes rates from inflation and output gaps ($i = r^* + \pi + 0.5(\pi - \pi^*) + 0.5(y - y^*)$). Inflation targeting commits to a numerical target with transparent communication. Nominal GDP targeting, and older money-growth rules, are alternatives debated after crises. Very important: be able to apply the Taylor rule numerically; it is the most testable rule in the course.

Key Definitions

Time inconsistency is defined as the temptation to deviate from an announced optimal policy once expectations are set.

Central bank independence is defined as freedom from political pressure in operating monetary policy toward a mandate.

Taylor rule is defined as a guideline setting the policy rate from inflation and output gaps.

Key Points to Remember

- Time inconsistency: discretionary promises are not credible; rules anchor expectations.
- Independence lowers inflation without output cost, paired with accountability.
- Taylor rule: $i = r^* + \pi + 0.5(\pi - \pi^*) + 0.5(\text{output gap})$; apply it numerically.
- Frameworks: inflation targeting (dominant), NGDP targeting, money-growth rules.

Unit Summary

Time inconsistency justifies rules and independent central banks; the Taylor rule and inflation targeting are the leading operational frameworks.

Exam Pointer

Very important: explain time inconsistency with the inflation-bias story, and compute a Taylor-rule rate from given data. The SBP autonomy context suits Pakistan-focused questions.

Unit 9: Money in the Open Economy

Learning Objectives

Objective 1: Explain exchange rate determination

Objective 2: Present the Mundell-Fleming model

Objective 3: Discuss the impossible trinity

Exchange rates link monetary policy to the world. Purchasing power parity says rates reflect relative price levels in the long run; interest rate parity ties expected depreciation to interest differentials in the short run. In practice, rates overshoot (Dornbusch): sticky prices force the exchange rate to jump beyond its long-run level after monetary shocks, explaining observed volatility.

The Mundell-Fleming model extends IS-LM to open economies. Under floating rates, monetary policy is powerful (rate cuts depreciate the currency, boosting net exports) while fiscal policy leaks abroad. Under fixed rates the ranking reverses: monetary policy merely defends the peg while fiscal policy works fully. The BP curve's slope, reflecting capital mobility, modulates these results.

The impossible trinity states that a country cannot simultaneously have fixed exchange rates, free capital movement, and independent monetary policy; at most two. Pakistan's managed float with partial controls is a textbook compromise. Very important: trinity questions are clean and testable: given two choices, derive the sacrificed third with a concrete mechanism.

Key Definitions

Purchasing power parity is defined as long-run exchange rates reflect relative national price levels.

Mundell-Fleming model is defined as the open-economy IS-LM analyzing policy under fixed vs floating rates.

Impossible trinity is defined as only two of: fixed exchange rate, free capital flows, monetary autonomy.

Key Points to Remember

- PPP (long run), interest parity (short run); Dornbusch overshooting explains volatility.
- Floating: monetary works, fiscal leaks. Fixed: fiscal works, monetary defends the peg.
- Capital mobility (BP slope) modulates both.
- Impossible trinity: pick two; Pakistan's managed float is a compromise.

Unit Summary

Open-economy monetary economics runs through exchange-rate determination, Mundell-Fleming policy rankings, and the impossible trinity constraint.

Exam Pointer

Very important: use Mundell-Fleming to rank policies under fixed vs floating rates, and apply the trinity to a country case.

Unit 10: Financial Markets, Crises and Unconventional Policy

Learning Objectives

Objective 1: Explain the role of financial markets in monetary economics

Objective 2: Analyze financial crises: causes and propagation

Objective 3: Evaluate QE, forward guidance and negative rates

Financial markets are transmission's plumbing. The term structure (yield curve) embeds expectations of future short rates plus premia; an inverted curve has predicted recessions reliably. Credit spreads price default risk and widen in stress, choking the credit channel. Asset prices feed wealth and balance-sheet channels, which is why central banks watch markets even when targeting inflation.

Crises follow a pattern: optimism fuels leverage and asset bubbles, a trigger (defaults, panic) sparks deleveraging, fire sales collapse collateral values, and the financial accelerator turns a shock into a recession. The 2008 crisis added securitization opacity and wholesale funding runs; Pakistan's pressures more often run through fiscal dominance and external financing. Lender-of-last-resort doctrine (Bagehot: lend freely, against good collateral, at penalty rates) remains the crisis playbook.

At the zero lower bound, unconventional tools deploy: quantitative easing (buying long assets to compress term premia), forward guidance (committing to low future rates), and negative policy rates (taxing reserves). Evidence suggests they eased conditions but with diminishing returns and side effects on bank profitability and inequality. Very important: evaluate these tools against the transmission channels from Unit 7; that integration is what top answers do.

Key Definitions

Yield curve is defined as the plot of interest rates against maturity, embedding rate expectations.

Quantitative easing is defined as large-scale asset purchases to lower long-term rates at the zero bound.

Lender of last resort is defined as the central bank's crisis role of providing liquidity against collateral.

Key Points to Remember

- Yield curve and credit spreads are transmission gauges; inversion predicts recessions.
- Crisis anatomy: leverage, trigger, deleveraging, accelerator; Bagehot's rule responds.
- Unconventional tools: QE, forward guidance, negative rates; diminishing returns and side effects.
- Judge every tool through the transmission channels.

Unit Summary

Financial markets transmit and amplify policy; crises propagate through leverage and collateral; unconventional tools extend policy at the zero bound with limits.

Exam Pointer

Very important: explain Bagehot's lender-of-last-resort rule and evaluate QE through transmission channels. Crisis anatomy is strong essay material.

Unit 11: Monetary Policy in Pakistan

Learning Objectives

- Objective 1:** Describe the SBP's framework and instruments
- Objective 2:** Analyze Pakistan's inflation and exchange-rate experience
- Objective 3:** Evaluate current challenges: fiscal dominance, external account

The State Bank of Pakistan operates an interest-rate-based framework centered on the policy (target) rate, implemented via open market operations and standing facilities within an interest-rate corridor. Since the 2021 SBP Act amendments, price stability is the primary objective with greater institutional autonomy. Monetary Policy Committee statements communicate the stance, increasingly in inflation-targeting language.

Pakistan's experience illustrates course themes vividly. Fiscal dominance, government borrowing from the banking system, has repeatedly complicated monetary control. Exchange-rate management moved from pegs to a market-based system in 2019, restoring Mundell-Fleming relevance. Supply shocks (energy, food) drive much inflation, limiting what demand-side policy can achieve and echoing the Phillips-curve supply-shift dilemma.

Current challenges are structural: a narrow tax base forces deficit financing, external debt creates vulnerability to global rates and the dollar, and shallow financial markets weaken transmission. **Very important: Pakistan-focused exam answers should explicitly invoke the trinity, fiscal dominance, and transmission weakness rather than narrating headlines.**

Key Definitions

Policy rate is defined as the SBP's target interest rate steering money-market conditions.

Fiscal dominance is defined as a situation where government financing needs dictate monetary policy.

Interest-rate corridor is defined as standing facilities bounding market rates around the policy rate.

Key Points to Remember

- SBP: policy-rate framework, OMO implementation, corridor system, post-2021 autonomy.
- Fiscal dominance and supply-shock inflation are the recurring Pakistani themes.
- 2019 shift to market-based exchange rate restored policy autonomy (trinity logic).
- Structural limits: narrow taxes, external debt, shallow markets.

Unit Summary

Pakistan's monetary policy operates a modern rate-based framework constrained by fiscal dominance, supply shocks and structural weaknesses, illustrating the course's core models.

Exam Pointer

Very important: analyze any Pakistani episode (e.g. 2022-23 inflation) using fiscal dominance, supply shocks and the trinity. Examiners reward model-driven, not headline-driven, answers.