

LM04 · ECONOMICS · CFA LEVEL I

Monetary Policy

How central banks influence money, credit, interest rates, and ultimately output and inflation

What This Reading Covers

Monetary policy is the set of **activities that influence the quantity of money and credit** in an economy. This reading builds from the nature of money itself, through the mechanics of the banking system, to the specific tools — open market operations, the policy rate, and reserve requirements — that central banks use, and finally to the transmission mechanism, effectiveness qualities, and limitations of monetary policy.

Learning Outcome Statements

- LOS a** Describe the roles and objectives of central banks
- LOS b** Describe tools used to implement monetary policy and the monetary transmission mechanism; explain the relationships between monetary policy and economic growth, inflation, interest, and exchange rates
- LOS c** Describe qualities of effective central banks; contrast their use of inflation, interest rate, and exchange rate targeting in expansionary or contractionary monetary policy; describe the limitations of monetary policy
- LOS d** Explain the interaction of monetary and fiscal policy

Exam Tip: Three tools (OMO, policy rate, reserve requirements) and three qualities (independence, credibility, transparency) come up almost every sitting. Expect a conceptual question on the **liquidity trap**, a numerical interpretation question on whether a policy rate is **expansionary vs. contractionary** relative to the neutral rate, and a recognition question on **inflation targeting** (~2%).

NATURE OF MONEY

Money: Functions and the Money Supply

The Three Functions of Money

MEDIUM OF EXCHANGE

Money is accepted in settlement of transactions, removing the "double coincidence of wants" required by barter. Fiat currency **"acts as a medium of exchange as long as it holds its value"** — so confidence in the currency is critical.

UNIT OF ACCOUNT

Money is the common yardstick in which prices are quoted and accounts are kept, enabling consistent comparisons of value.

STORE OF VALUE

Money transfers purchasing power to the future. This function is undermined by inflation — which is why price stability is the dominant central-bank mandate.

Fiat Currency

Fiat currency is not convertible into any commodity — it derives its value from government decree and from the confidence of those who accept it. Central banks are the **sole supplier of the domestic (legal-tender) currency**.

The Money Supply — Narrow and Broad

The money supply is grouped into tiers ordered by how liquid each component is. The most liquid tier is called **narrow money**; adding progressively less-liquid assets produces **broad money**.

AGGREGATE	WHAT IT INCLUDES	LABEL
M0 (Monetary base)	Physical currency in circulation + bank reserves held at the central bank — the raw, most-liquid base issued by the central bank	Narrow
M1	Currency in circulation + demand (checking) deposits (and often traveler's cheques) — everything readily usable as a medium of exchange	Narrow

M2	M1 + short-term time deposits and savings accounts, retail money-market fund balances — money plus near-money	Broad
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Exam Tip: Narrow aggregates (M0, M1) = what's immediately spendable. Broad aggregates (M2 and above) = money plus near-money. Exact definitions of M1 and M2 differ by jurisdiction, so focus on the concept: narrower = more liquid.

FRACTIONAL-RESERVE BANKING · MONEY MULTIPLIER

How Banks Create Money

Commercial banks operate on a **fractional-reserve** basis: they hold only a fraction of their deposits as reserves and lend the rest. When a loan is made, the borrower's new deposit becomes another bank's deposit — so an initial injection of reserves multiplies through the banking system.

The Mechanics

- 1 Central bank buys bonds via **open market operations** → commercial bank reserves rise.
- 2 Bank must hold the **reserve requirement** (a % of deposits set by the central bank) but can lend out the rest.
- 3 Loan proceeds are spent and re-deposited elsewhere in the banking system → a new deposit arises against which fresh lending can occur.
- 4 Process repeats; total deposits created = **(initial reserves) × money multiplier**.

The Money Multiplier

$$MoneyMultiplier = 1/ReserveRequirement$$

Lower reserve requirement → larger multiplier → more money created per unit of reserves.

EXAMPLE 1 Money Creation via the Reserve Requirement

GIVEN

The central bank purchases \$100 million of government bonds from commercial banks. The reserve requirement is **10%**.

FIND

(a) The money multiplier. (b) The maximum increase in the money supply that can result from this injection.

→ SOLUTION

- 1 Apply the multiplier formula.

$$\text{Money Multiplier} = 1 / \text{Reserve Requirement} = 1 / 0.10 = 10$$

- 2 Maximum expansion in the money supply.

$$\begin{aligned} \Delta \text{Money Supply} &= \text{New reserves} \times \text{Multiplier} \\ &= 100 \text{ million} \times 10 = 1,000 \text{ million} = \$1 \text{ billion} \end{aligned}$$

- 3 Sanity check.

of 100m new reserves, banks keep 10m) and lend \$90m;
 90m is redeposited → 9m kept, \$81m lent; and so on.
 Sum of a geometric series → $100m / 0.10 = 1,000m$.

✓ ANSWER

Money multiplier	10×
Maximum Δ Money Supply	\$1,000 million

◆ TAKEAWAY

If the central bank instead raised the reserve requirement to 20%, the multiplier would fall to $1/0.20 = 5$ and the same 100m injection would only expand the money supply by 500m. This is why **lowering RR expands money** and **raising RR contracts it**.

Exam Tip: The multiplier result assumes banks lend out all excess reserves and no cash leaks from the system. In stressed conditions (e.g., banks hoard excess reserves), actual money creation falls far short — a key driver of the **liquidity trap**.

FISHER EQUATIONS · QUANTITY THEORY OF MONEY

The Quantity Theory & Interest-Rate Decomposition

Quantity Theory of Money — The Equation of Exchange

The identity relating money, prices, and output is the **equation of exchange** (Fisher):

$$M \times V = P \times Y$$

- M** Money supply
- V** Velocity of money — the number of times per period a unit of money changes hands
- P** Price level
- Y** Real output (real GDP)

$P \times Y$ is nominal GDP, so the identity says *money × velocity = nominal GDP*. Under the **quantity theory of money**, V is assumed stable in the long run and Y is determined by real factors, so changes in M pass through to P — giving the famous long-run proposition: **inflation is always a monetary phenomenon**.

Money Neutrality

In the long run, changes in the money supply affect the **price level but not real output** — this is money neutrality. In the short run, however, money is *not* neutral: changes in M feed through the transmission mechanism to affect real GDP growth, interbank rates, asset prices, investment, consumption, and aggregate demand.

Interest-Rate Decomposition

Nominal interest rates on risky debt can be decomposed into several premia:

$$Nominalrate = Realrisk - freerate + Expectedinflation + Default - riskpremium +$$

COMPONENT	COMPENSATES LENDERS FOR
Real risk-free rate	Time value of money — deferring consumption
Expected inflation (π^e)	Loss of purchasing power over the life of the loan

Default-risk premium	Possibility the borrower fails to pay interest or principal
Liquidity premium	Difficulty of converting the instrument to cash quickly without a price concession
Maturity premium	Greater price sensitivity of longer-dated bonds to interest-rate shifts

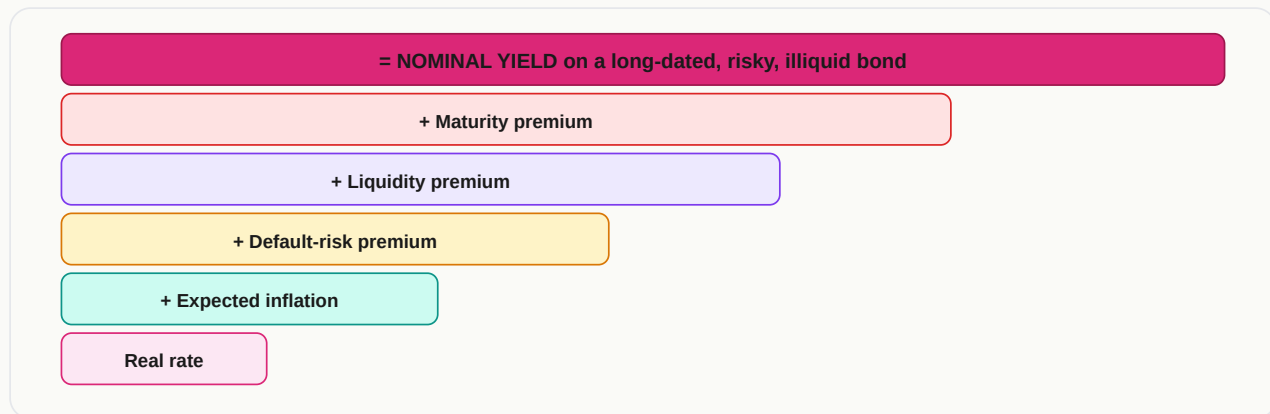
Short-Form (Fisher) Identity

Ignoring risk premia, the Fisher relation is: **Nominal rate $\approx$ Real rate + Expected inflation.** Central-bank policy most directly moves short-term *nominal* rates; real rates respond through changes in inflation expectations.

BUILDING UP A NOMINAL INTEREST RATE

From Real Rate to Risky Nominal Yield

$$\text{NOMINAL RATE} = \text{REAL} + \pi^E + \text{DEFAULT} + \text{LIQUIDITY} + \text{MATURITY}$$



Short-term vs. Long-term Rate Linkages

The central bank directly influences **short-term** nominal rates via the policy rate and open market operations. **Long-term** rates depend on expectations of future short rates and expected inflation — which is why central-bank **credibility** is essential.

Credible tightening

Higher policy rate signals lower long-run inflation → long-term rates may *fall*. Short-term up, long-term down = yield curve **inverts** (a known challenge for the transmission mechanism).

Not-credible easing

Lower policy rate raises inflation expectations → long-term rates *rise*. Yield curve **steepens**, working *against* the expansionary intent.

Exam Tip: Recognize the pattern: when short-term rates move one way and long-term rates move the opposite way, blame **expectations** (credibility of the central bank's inflation objective).

QUIZ 1 · CHECKPOINT

Test Your Understanding: Money, Multiplier & Rates

Q1. Which of the following is *not* one of the three functions of money?

Q2. A central bank lowers the reserve requirement from 20% to 10%. The money multiplier changes from:

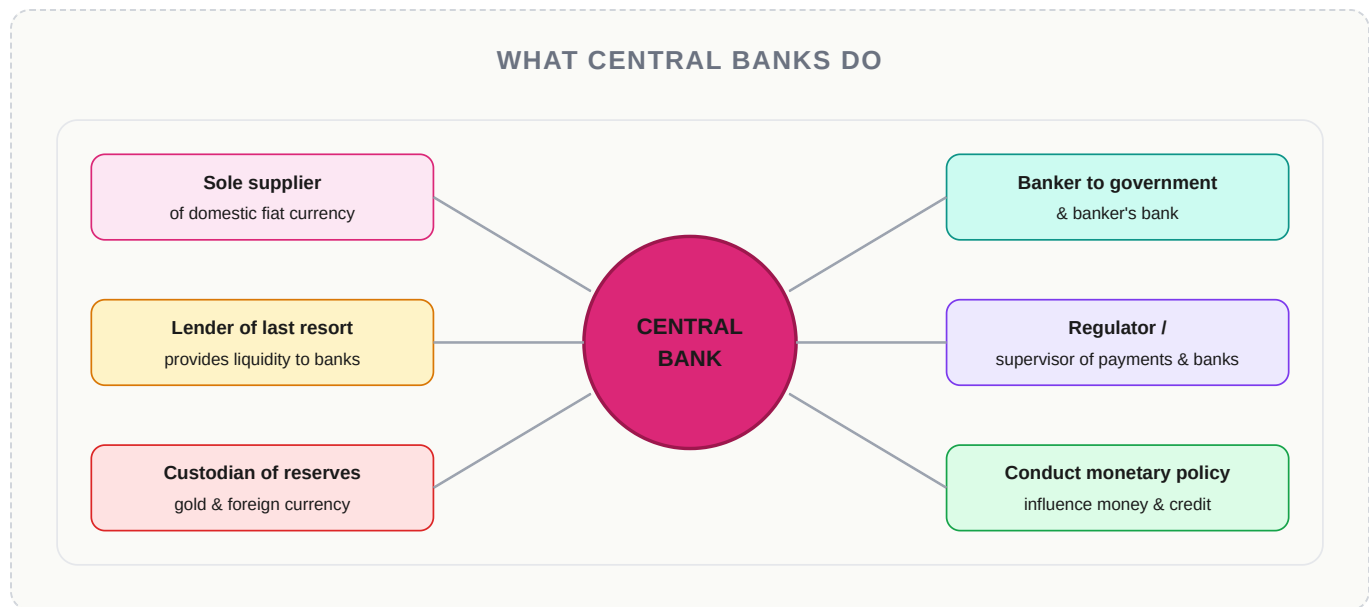
Q3. Which aggregate is *most likely* classified as "broad money"?

Q4. According to the Fisher equation, the nominal interest rate on a risky bond is *best* described as the real risk-free rate plus:

Q5. In the equation of exchange $MV = PY$, $P \times Y$ represents:

LOS A · ROLES OF CENTRAL BANKS

The Six Roles of a Central Bank



ROLE	WHAT IT MEANS
1. Sole supplier of legal-tender currency	Only the central bank issues the domestic fiat money. Confidence that the currency will hold its value is the bedrock of its role as a medium of exchange.
2. Banker to the government and bankers	Holds the government's deposits, handles its payments, and provides deposit/clearing services for commercial banks.
3. Lender of last resort	"Stands ready to provide funds (liquidity) to any of the banks under its jurisdiction" — can print money when solvent banks face liquidity stress, preventing runs.
4. Regulator / supervisor of the payment & banking system	Sets rules on capital, risk-taking, and operational standards for banks and the payment system.
5. Custodian of reserves	Manages the country's foreign-currency reserves and gold reserves.
6. Conducts monetary policy	Conducts activities that influence the quantity of money and credit in an economy — the focus of this reading.

Why "Lender of Last Resort" Matters

Because the central bank can print money, it can always provide liquidity to solvent but illiquid banks. This backstop prevents otherwise healthy banks from failing simply because depositors simultaneously

demand withdrawals.

LOS A · OBJECTIVES

Central-Bank Objectives

Price stability is the *primary* stated objective of most central banks. Controlled, predictable inflation allows households and firms to plan, protects the real value of savings, and preserves the currency's role as a store of value.

Mandate Types

SINGLE MANDATE

ECB-style. Price stability is the sole explicit objective — other goals are pursued only insofar as they do not conflict with price stability.

DUAL MANDATE

U.S. Federal Reserve-style. Stated goals include maximum employment, stable prices, and moderate long-term interest rates.

Typical Stated Objectives

- 1 **Price stability** — the most common explicit mandate; typically operationalized as inflation close to 2%.
- 2 **Maintain stability of the financial system** — prevent crises that disrupt payments and credit.
- 3 **Promote full employment.**
- 4 **Promote sustainable economic growth.**
- 5 **Moderate long-term interest rates; stability of exchange rates** (in some regimes).

Exam Tip: "Price stability" is rarely zero inflation — 0% risks deflation, with its disruptive consequences for debt and spending. The typical target is around 2%.

LOS B · MONETARY POLICY TOOLS

The Three Tools of Monetary Policy

1. OPEN MARKET OPERATIONS

Purchase/sale of government bonds with commercial banks and designated market makers (overnight to ~2 weeks).

2. POLICY RATE

The headline rate (e.g., U.S. federal funds rate, ECB main refinancing rate, UK Bank Rate).
Used to set the cost of banks' short-term funding.

3. RESERVE REQUIREMENTS

The percentage of deposits banks must hold as reserves. Seldom adjusted in developed economies; more common in emerging markets.

Tool 1 — Open Market Operations (OMO)

ACTION	EFFECT ON BANKS	EFFECT ON MONEY SUPPLY / RATES
Central bank buys bonds	Banks receive cash → excess reserves rise	Money supply increases ; short-term rates fall ; expansionary
Central bank sells bonds	Banks pay cash → excess reserves fall	Money supply decreases ; short-term rates rise ; contractionary

Repo vs. Reverse Repo (secured loans)

Repo (repurchase agreement) — central bank *buys* securities with an agreement to sell them back at a later date (typically overnight to 2 weeks). Temporarily injects reserves. **Reverse repo** — central bank *sells* securities with an agreement to buy them back. Temporarily drains reserves.

Tool 2 — The Policy Rate

The policy rate is typically framed as a **corridor**:

Upper bound The rate at which the central bank is willing to *lend* to banks (discount/refinancing/repo rate).

Lower bound The rate at which the central bank is willing to *borrow* from banks (deposit/reverse-repo rate).

A **hike** in the policy rate is meant to increase lending rates economy-wide and constrict credit growth. Banks that need reserves can borrow from the central bank via repo, paying the discount/repo rate.

Tool 3 — Reserve Requirements

ACTION	MONEY MULTIPLIER	MONEY SUPPLY	STANCE
Lower RR	Increases (1/RR bigger)	Expands	Expansionary
Raise RR	Falls	Contracts	Contractionary

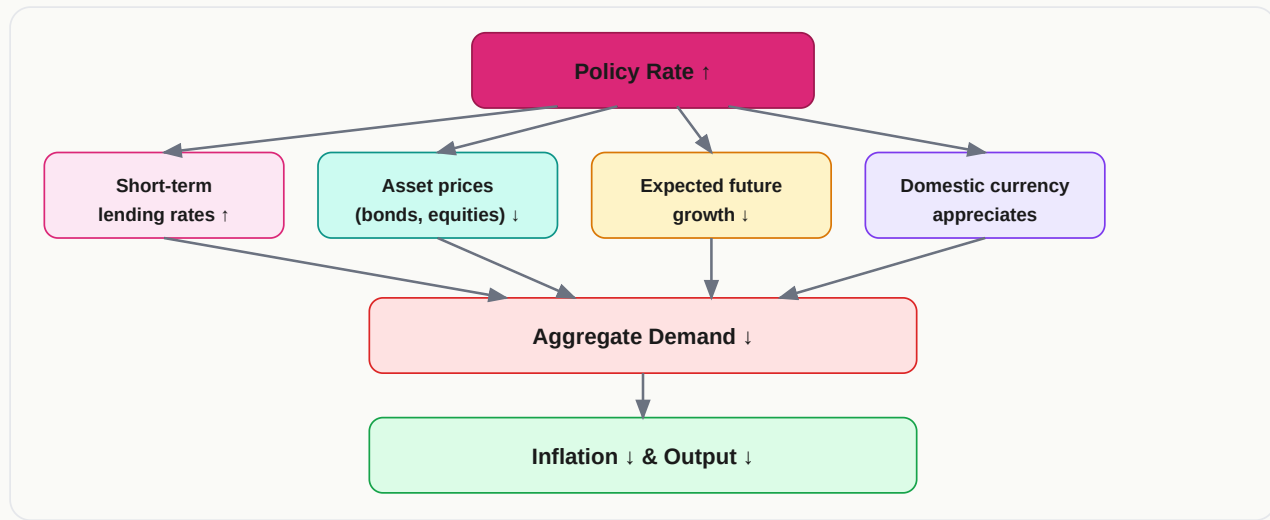
Exam Tip: Reserve requirements are a blunt instrument and are **rarely changed in developed economies**; OMO and the policy rate do almost all the day-to-day work. RR changes are more common in emerging markets.

LOS B · MONETARY TRANSMISSION MECHANISM

How Policy Rates Reach Inflation

The **monetary transmission mechanism** is the chain of effects by which a change in the policy rate works through the economy to affect output and inflation. Five channels operate in parallel.

TRANSMISSION OF A CONTRACTIONARY MOVE (POLICY RATE ↑)



The Five Channels

- 1 **Short-term rates channel.** Interbank and other short-term rates move in line with the policy rate, raising the cost of new borrowing for firms and households.
- 2 **Asset-price channel.** Higher discount rates lower bond and equity prices; falling household wealth curbs consumption and saving.
- 3 **Expectations channel.** Changes in the expected path of growth affect consumption and investment decisions today.
- 4 **Exchange-rate channel.** Foreign capital flows respond to rate differentials → the domestic currency appreciates (tightening) or depreciates (easing), shifting net exports.
- 5 **Long-term rates channel.** Longer yields respond to inflation expectations — a credible move can pull long-term borrowing costs in the same direction.

Net Effect of Tightening

Higher rates + lower asset prices + weaker growth expectations + stronger currency → **aggregate demand falls** → **downward pressure on the price level**. The opposite holds for expansionary policy.

QUIZ 2 · CHECKPOINT**Test Your Understanding: Roles, Tools & Transmission**

Q6. Which is *least likely* a role of a central bank?

Q7. A central bank conducts an *open market purchase* of government securities. The *most likely* immediate effect is that:

Q8. A repurchase agreement (repo) conducted by the central bank *most likely*:

Q9. Which channel of the transmission mechanism is *best* described as operating through household wealth effects?

Q10. Reserve requirements are *most likely*:

LOS C · QUALITIES OF EFFECTIVE CENTRAL BANKS

Independence, Credibility, Transparency

INDEPENDENCE

The central bank can make decisions **without government approval**.

Being non-partisan and non-elected, it will not use monetary policy to get re-elected.

Operational independence = sets rate levels. **Target** independence = also sets the inflation target, the definition of inflation, and the horizon.

CREDIBILITY

The market must **believe** the central bank will stick to its targets. Credibility is measurable through inflation expectations — if they remain anchored to the target after a shock, the bank is credible.

Credibility turns an inflation target into a **self-fulfilling prophecy**: if everyone expects 2% inflation, wage and price-setting behavior tends to deliver 2%.

TRANSPARENCY

Regular **minutes, press conferences, and economic forecasts** (e.g., the Fed's Summary of Economic Projections) — the bank should consider a wide range of economic and financial-market indicators and explain how they feed decisions.

Independence — Two Flavors

TYPE	WHAT THE CENTRAL BANK DECIDES
Operational independence	Sets the level of policy rates
Target independence	Sets the inflation target, the definition of inflation it targets, and the horizon over which the target is to be achieved

Why These Three Work Together

Independence makes decisions non-political, which supports **credibility**, which is reinforced by **transparency**. Take any one away and the anchor on inflation expectations weakens.

Exam Tip: A common trap: "credibility" is *not* the same as "independence." Independence is the institutional freedom; credibility is the market's belief that the bank will follow through.

LOS C · INFLATION TARGETING & ALTERNATIVES

Inflation Targeting

Inflation targeting gained prominence during the 1990s. It **began in New Zealand** (targeting a range of 0–2%) and is now the dominant framework worldwide. The central bank announces a target range, *makes it public*, and designs policy to deliver on it — so the target "**finds its way into expectations**" and becomes self-fulfilling.

Typical Target: ~2%

~2%

MOST COMMON TARGET

±1%

TYPICAL TOLERANCE BAND

0%

TOO LOW — RISKS DEFLATION

Why not 0% inflation? A 0% target risks tipping into deflation, which raises the real value of debt, lowers revenues as prices drop, and causes consumers to delay big-ticket purchases.

Why not a higher target? Higher targets are associated with higher inflation volatility — which is not consistent with price stability.

Three Required Elements for Inflation Targeting to Work

- 1 **Central bank independence** — freedom from government approval in setting and defending the target.
- 2 **Credibility** — market must believe the bank will stick to its target; measurable through inflation expectations.
- 3 **Transparency** — publish minutes, forecasts, and the rationale for decisions; consider a wide range of economic and financial market indicators.

Notable Exceptions

Bank of Japan

No explicit measure of inflation target; *deflation* has been the larger threat, largely due to demographics. A target may not even be credible if announced.

U.S. Federal Reserve

No formal inflation target, but **uses PCE ~2%** as compatible with stable prices. Dual mandate: maximum employment, stable prices (and moderate long-term interest rates).

Alternative Frameworks

FRAMEWORK	MECHANISM
Interest-rate targeting	Keep rates inside a band; vary money supply to defend the band.
Inflation targeting	Keep CPI (or PCE) growth inside a band; typically centered on 2%.
Exchange-rate targeting	Peg (fixed level) or band around a major currency. "Import" price stability from the anchor economy. Sell foreign FX + buy domestic FX → reduces domestic money supply and inflation; rates adjust upward. Developing-country version: set FX, rates adjust (more volatile).

Dollarization

Dollarization is when a country adopts the USD (or another foreign currency) as its functional currency — the most extreme form of exchange-rate anchoring.

LOS C · EXPANSIONARY VS. CONTRACTIONARY POLICY

Neutral Rate, Policy Stance & the Taylor Rule

The Neutral Interest Rate

The **neutral rate** is the policy rate that neither **increases nor decreases the rate of economic growth** (and hence neither fuels nor suppresses inflation relative to target).

$$\text{Neutral Rate} = \text{Real trend rate of GDP growth} + \pi^e(\text{long-run expected inflation at target})$$

POLICY RATE < NEUTRAL

Expansionary — stimulates aggregate demand, pushes growth and inflation higher.

POLICY RATE > NEUTRAL

Contractionary — restrains aggregate demand, pushes growth and inflation lower.

The Taylor Rule

The Taylor rule is a benchmark formula that prescribes a policy rate based on deviations from inflation and output targets:

$$r = r_N + \pi + 0.5(\pi - \pi^*) + 0.5(Y - Y^*)$$

- r Prescribed (target) policy rate
- r_N Real neutral (equilibrium) rate of interest
- π Current inflation rate
- π^* Target inflation rate
- Y Log of current real GDP (or real GDP growth)
- Y^* Log of trend (potential) real GDP

Notice the structure: the nominal neutral rate is $r_N + \pi$, and the bank then leans *against* positive inflation gaps and positive output gaps with a coefficient of 0.5 on each.

EXAMPLE 2**Taylor Rule — Prescribed Policy Rate**

GIVEN

Real neutral rate (r_N)	2.0%
Current inflation (π)	4.0%
Target inflation (π^*)	2.0%
Current GDP gap ($Y - Y^*$)	+1.0% (economy above potential)

? FIND

The Taylor-rule prescribed policy rate, and the policy stance implied.

→ SOLUTION

1

Write the Taylor rule.

$$r = r_N + \pi + 0.5(\pi - \pi^*) + 0.5(Y - Y^*)$$

2

Substitute.

$$r = 2\% + 4\% + 0.5(4\% - 2\%) + 0.5(1\%)$$

3

Evaluate each term.

$$\begin{aligned} &= 2\% + 4\% + 0.5(2\%) + 0.5(1\%) \\ &= 2\% + 4\% + 1\% + 0.5\% \\ &= 7.5\% \end{aligned}$$

4

Compare to the nominal neutral rate.

$$\begin{aligned} \text{Nominal neutral} &= r_N + \pi^* = 2\% + 2\% = 4\% \\ \text{Prescribed rate (7.5\%)} &> \text{Neutral (4\%)} \rightarrow \text{Contractionary} \end{aligned}$$

✓ ANSWER

Taylor-rule policy rate

7.5%

Implied stance

Contractionary

◆ TAKEAWAY

Inflation 2 pp above target and output 1 pp above potential together call for a policy rate 3.5 pp above the nominal neutral rate. The 0.5 coefficients make the rule *lean against* both gaps — an aggressive response would use higher coefficients.

Exam Tip: If the exam asks whether policy is expansionary or contractionary, compute the **nominal neutral rate** = **real trend growth** + **target inflation** and compare: policy rate *above* neutral → contractionary; *below* → expansionary.

LOS C · LIMITATIONS OF MONETARY POLICY

Where Monetary Policy Breaks Down

Problem 1 — Demand vs. Supply Shocks

Rate changes work well for **demand** shocks (too much or too little aggregate demand) but poorly for **supply** shocks. Example: raising rates cannot fix a labor shortage — higher rates will not create more supply.

Problem 2 — Broken Transmission / Yield-Curve Responses

Inverted yield curve during tightening

Short rates rise with credible hikes, but markets *lower* long-term yields on expectations of lower future inflation. Short rates > long rates → works *against* contractionary policy.

Curve steepeners during easing

If markets believe cuts will raise future inflation, long rates rise — working *against* expansionary policy.

Problem 3 — The Liquidity Trap

A **liquidity trap** arises when money demand becomes perfectly elastic — extra money supplied by the central bank is simply held (hoarded) rather than lent or spent. More common when deflation is expected:

- 1 Loans become risky as borrowers' real debt burden grows.
- 2 Real rates rise rapidly even though nominal rates are low.
- 3 Banks hold excess reserves rather than lending → the multiplier collapses.

Problem 4 — The Zero-Lower-Bound & Deflationary Trap

Policy rates cannot easily go much below zero. In deflation — a sustained fall in the general price level — even a 0% nominal rate implies a *positive real rate* (since expected inflation is negative), so policy is accidentally tight:

- 1 Deflation **increases the real value of debt**.
- 2 **Lowers revenues** as prices drop.
- 3 **Consumers delay big-ticket purchases**, feeding the downturn.

Problem 5 — What Central Banks Cannot Control

Central banks cannot directly control (i) the amount of money households and corporations put on deposit, (ii) the willingness of banks to expand credit, or (iii) long-term rates, which depend on expectations. Underdeveloped financial markets, rapid financial innovation, and lack of credibility also impair transmission.

The QE Response

Quantitative Easing (QE)

Large-scale asset purchases — the central bank buys long-duration bonds (and in some cases other securities) on a massive scale. Effects: **lowers longer-term rates, floods the economy with money**, and signals commitment to accommodation. Deployed by the U.S. Fed, Bank of England, BOJ, and ECB after the 2008 crisis and in later episodes.

Exam Tip: A stock question: when can QE substitute for conventional rate cuts? Answer — at the zero lower bound, when conventional rate cuts are exhausted and the central bank still needs to ease.

QUIZ 3 · CHECKPOINT

Test Your Understanding: Effectiveness, Taylor Rule & Limits

Q11. The three qualities of an effective central bank are *best* described as:

Q12. The real trend rate of GDP growth is 2% and the inflation target is 2%. If the policy rate is currently 6%, the stance is *best* described as:

Q13. Using the Taylor rule $r = r_N + \pi + 0.5(\pi - \pi^*) + 0.5(Y - Y^*)$, with $r_N = 2\%$, $\pi = 3\%$, $\pi^* = 2\%$, and $(Y - Y^*) = 0\%$, the prescribed policy rate is *closest to*:

Q14. A liquidity trap is *best* described as a situation in which:

Q15. Quantitative easing is *most likely* used when:

MODULE COMPLETE

Your Scorecard

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LM04 Key Takeaways — Exam-Ready Cheat Sheet

Money & the Banking System

- 1 **Three functions of money:** medium of exchange, unit of account, store of value. Fiat currency holds value only if confidence is maintained.
- 2 **Money aggregates:** narrow ($M0$ = base money, $M1$ = currency + demand deposits), broad ($M2$ = $M1$ + savings/time deposits).
- 3 **Money multiplier = $1 / \text{Reserve Requirement}$.** $\Delta \text{Money Supply} = \text{new reserves} \times \text{multiplier}$.

Core Equations

- 4 **Quantity theory (Fisher):** $M \times V = P \times Y$. Nominal GDP = money $\times$ velocity. Long run: money is neutral.
- 5 **Nominal rate = Real + π^e + default + liquidity + maturity premia.**
- 6 **Neutral rate = Real trend growth + π^e (target).** Policy $<$ neutral $\rightarrow$ expansionary; $>$ neutral $\rightarrow$ contractionary.
- 7 **Taylor rule:** $r = r_N + \pi + 0.5(\pi - \pi^*) + 0.5(Y - Y^*)$.

Central Bank Roles, Tools & Transmission

- 8 **Six roles:** sole supplier of currency · banker to government/bankers · lender of last resort · regulator/supervisor · custodian of reserves · conducts monetary policy.

- 9 **Three tools:** open market operations (repo/reverse repo), policy rate (discount / fed funds), reserve requirements (blunt; rarely used in developed markets).
- 10 **Transmission (tightening):** short rates $\uparrow \rightarrow$ long rates, asset prices, FX, expectations adjust $\rightarrow$ AD $\downarrow \rightarrow$ inflation & output $\downarrow$.

Effectiveness & Limits

- 11 **Three qualities:** independence (operational + target), credibility (anchored expectations), transparency (minutes, forecasts, press).
- 12 **Inflation targeting:** typically $\sim 2\%$; began in NZ in the 1990s. Avoid 0% (deflation) and too-high (volatility).
- 13 **Limits:** ineffective against supply shocks · yield-curve responses can work against intent · liquidity trap · zero lower bound / deflationary trap. **QE** = large-scale bond buying to ease when rates are near zero.

Last-Minute Exam Checklist

Money multiplier: $1 / RR$ · **Quantity theory:** $MV = PY$

Nominal rate: real + π^e + default + liquidity + maturity premia

Neutral rate: real trend growth + π^e target · **Taylor rule:** $r = r_N + \pi + 0.5(\pi - \pi^*) + 0.5(Y - Y^*)$

Tools: OMO (daily) · policy rate · reserve requirements (rare in DM)

Effective CB: independence + credibility + transparency

Inflation target: typically 2%; avoid 0% (deflation) and too-high (volatility)

At ZLB: liquidity trap risk $\rightarrow$ QE (large-scale asset purchases)