Advanced Macroeconomic Theory and Policy: Open Economy Dynamics, Exchange Rates, and Stabilization

1. Introduction to Macroeconomic Analysis and the Open Economy Paradigm

The study of macroeconomics, particularly within the rigorous academic framework of a graduate-level Business Management curriculum, necessitates a fundamental departure from the intuitive, agent-specific logic of microeconomics. While microeconomics concerns itself with the optimization problems of individual firms and households—how much a consumer spends on food, or how much a worker chooses to work based on wage rates—macroeconomics addresses the aggregate outcomes of these millions of individual decisions.[1] This transition is not merely additive; one cannot simply sum the microeconomic behaviors to arrive at macroeconomic truths due to the fallacy of composition and the complex feedback loops inherent in general equilibrium systems. The aggregation problem, a central theme in foundational macroeconomics, highlights that relationships valid for an individual (e.g., thriftiness leads to increased personal wealth) may fail or reverse when applied to the economy as a whole (e.g., the paradox of thrift, where collective saving reduces aggregate demand and income).[1]

In the context of the Business Management (BM) curriculum, as exemplified by the coursework at institutions like XLRI Jamshedpur under instructors such as Prof. Arundhati Sarkar Bose, the focus shifts from abstract theory to policy-relevant analysis.[1] The primary issues addressed—growth, inflation, and unemployment—are analyzed not just as academic curiosities but as vital variables affecting business profitability, consumer purchasing power, and national welfare. The curriculum typically progresses from closed economy models, which establish the basic relationships between output (Y), interest rates (i), and price levels (P), to the far more complex and realistic domain of Open Economy Macroeconomics.

This report serves as a comprehensive synthesis of these advanced topics, specifically designed to elucidate the transition from autarky to global integration. It rigorously examines the theoretical underpinnings of the Mundell-Fleming model (the IS-LM-BP framework), the asset market approach to exchange rate determination (Interest Rate Parity conditions), and the dynamic adjustment mechanisms characterized by the Dornbusch Overshooting Model and the J-Curve effect. Furthermore, it grounds these theories in the contemporary empirical reality of 2024-2025, analyzing the Reserve Bank of India's (RBI) strategic pivot in currency management amidst global volatility.

1.1 The Objectives of Macroeconomic Policy

Before delving into open economy dynamics, it is essential to anchor the analysis in the core objectives of macroeconomic policy.

- **Output Growth:** The continuous expansion of real Gross Domestic Product (GDP) is the primary driver of rising living standards. However, growth is rarely smooth; it fluctuates around a long-term trend, giving rise to business cycles. The distinction between short-run fluctuations (driven by demand shocks) and long-run growth (driven by capital accumulation and technological progress) is foundational.[3]
- **Price Stability:** Low and stable inflation is a prerequisite for efficient resource allocation. High inflation erodes purchasing power and introduces uncertainty, while deflation can lead to liquidity traps. Central banks typically target an inflation rate (e.g., 2-6% in India) to anchor expectations.[3]
- **Full Employment:** Minimizing involuntary unemployment is a social and economic imperative. The relationship between output and employment (Okun's Law) and inflation and unemployment (Phillips Curve) forms the basis of stabilization policy.[3]

In an open economy, a fourth objective emerges: **External Balance**. This refers to a sustainable position in the Balance of Payments (BoP), avoiding excessive current account deficits that lead to debt crises or excessive surpluses that invite protectionist retaliation.

1.2 The Open Economy Identity

The transition to an open economy fundamentally alters the national income identity. In a closed economy, aggregate demand is the sum of Consumption (C), Investment (I), and Government Spending (G). In an open economy, we must account for the foreign sector:

$$Y = C + I + G + NX$$

Where NX (Net Exports) is the difference between Exports (X) and Imports (M).
This identity implies that domestic output (Y) need not equal domestic spending ($C+I+G$).

- If $Y > C+I+G$, the country produces more than it consumes, exporting the surplus ($NX > 0$).
- If $Y < C+I+G$, the country consumes more than it produces, importing the difference ($NX < 0$).

Crucially, this leads to the savings-investment identity for an open economy:

$$S - I = NX$$

This equation states that a country's net exports equal the difference between its domestic savings and domestic investment. This is also equal to the Net Capital Outflow (NCO). A country that runs a trade surplus ($NX > 0$) is a net lender to the rest of the world ($S > I$), while a country with a trade deficit ($NX < 0$) is a net borrower ($S < I$).5

Table 1: Key Differences Between Closed and Open Economy Frameworks

Feature	Closed Economy	Open Economy
Aggregate Demand	$Y = C + I + G$	$Y = C + I + G + NX$
Savings & Investment	$S = I$	$S = I + NX$ (or $S - I = NCO$)
Market Equilibrium	Goods & Money Markets	Goods, Money, & Foreign Exchange Markets
Policy Constraints	Inflation vs. Unemployment	Impossible Trinity (Exchange Rate vs. Monetary Independence)
Shock Transmission	Domestic shocks only	Domestic and External shocks (e.g., US tariffs)

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2. The Goods Market in an Open Economy

To understand how output is determined in an open economy, we must dissect the determinants of the demand for domestic goods. This analysis draws heavily from the frameworks presented in Blanchard (Chapter 19) and standard macroeconomic theory.[7]

2.1 Domestic Demand vs. Demand for Domestic Goods

A subtle but critical distinction exists between "domestic demand for goods" and "demand for domestic goods."

- Domestic Demand for Goods (DD): This is the total spending by domestic residents, regardless of where the goods are produced.

  $$DD = C + I + G$$
- Demand for Domestic Goods (Z): This is the total spending on goods produced within

the country. To arrive at Z, we must subtract the part of domestic demand that falls on foreign goods (Imports, IM) and add the foreign demand for domestic goods (Exports, X).

$$Z = C + I + G - \frac{IM}{\epsilon} + X$$

Here, imports are divided by the real exchange rate (ϵ) to express their value in terms of domestic goods.7

2.2 Determinants of Net Exports

The Net Export function (NX) is central to the IS curve in an open economy. It is determined by three key variables:

$$NX = X(Y^*, \epsilon) - IM(Y, \epsilon)/\epsilon$$

1. **Domestic Income (Y):** As domestic income rises, consumers spend more on all goods, including foreign goods. Thus, imports increase. This implies that NX is a decreasing function of Y. This leakage is why the open economy multiplier is smaller than the closed economy multiplier.
2. **Foreign Income (Y^*):** An increase in foreign income leads to higher foreign consumption, part of which falls on domestic goods (exports). Thus, NX depends positively on Y^*. This highlights a transmission mechanism: a boom in the US (higher Y^*) stimulates the Indian economy via higher exports.[7]
3. Real Exchange Rate (ϵ): The real exchange rate is the relative price of domestic goods in terms of foreign goods.

   $$\epsilon = \frac{EP}{P^*}$$

   Where E is the nominal exchange rate (foreign currency per unit of domestic currency), P is the domestic price level, and P^* is the foreign price level.
   - **Real Depreciation ($\downarrow \epsilon$):** Domestic goods become relatively cheaper. This stimulates exports and discourages imports, thereby improving Net Exports (provided the Marshall-Lerner condition holds).[7]

2.3 The Open Economy IS Curve

Combining these elements, the equilibrium condition in the goods market becomes:

$$Y = C(Y-T) + I(Y, i) + G + NX(Y, Y^*, \epsilon)$$

This equation defines the open economy IS curve.

- **Slope:** It is downward sloping because a lower interest rate (i) stimulates investment

(I), increasing demand and output (Y). As noted, it is steeper than the closed economy IS curve because the multiplier is dampened by the marginal propensity to import.[12]

- **Shifts:**
  - An increase in G shifts the IS curve to the right.
  - An increase in foreign output (Y^*) shifts the IS curve to the right (export-led growth).
  - A real depreciation ($\downarrow \epsilon$) shifts the IS curve to the right (expenditure switching).

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3. The Mundell-Fleming Model (IS-LM-BP Framework)

The Mundell-Fleming model acts as the "workhorse" of international macroeconomics. Extensions of the IS-LM model developed by Robert Mundell and Marcus Fleming in the 1960s allow for the analysis of stabilization policy under different exchange rate regimes.[13]

3.1 Assumptions and Framework

The model is built on several simplifying but powerful assumptions:

1. **Small Open Economy:** The economy is too small to influence world interest rates (i^*) or world income (Y^*). The domestic interest rate is constrained by the world rate plus a risk premium.
2. **Perfect Capital Mobility:** Financial assets are perfect substitutes across borders. Capital flows (KA) are infinitely elastic with respect to the interest rate differential ($i - i^*$).
3. **Fixed Prices (Short Run):** The price level (P) is fixed, implying that movements in the nominal exchange rate (E) translate one-to-one to movements in the real exchange rate (ϵ).
4. **Demand Determination:** Output is determined by aggregate demand.[14]

3.2 The Three Markets

The model solves for equilibrium in three markets simultaneously:

1. **Goods Market (IS Curve):** $Y = C(Y-T) + I(i) + G + NX(Y, \epsilon)$
2. **Money Market (LM Curve):** $M/P = L(i, Y)$
3. **Balance of Payments (BP Curve):** $BP = NX(Y, \epsilon) + KA(i - i^*)$

In the case of perfect capital mobility, the BP curve becomes a **horizontal line** at $i = i^*$. Any deviation of the domestic interest rate from the world rate triggers massive capital flows that force the system back to parity or force an exchange rate adjustment.[12]

3.3 Policy Effectiveness Under Flexible Exchange Rates

Under a floating exchange rate regime, the central bank allows the currency to find its market value. The Balance of Payments is always zero because the exchange rate adjusts to eliminate any incipient surplus or deficit.

3.3.1 Fiscal Policy (Ineffective)

Consider a fiscal expansion (e.g., increased government spending, $\Delta G > 0$).

1. **IS Shift:** The IS curve shifts to the right, putting upward pressure on domestic output (Y) and interest rates (i).
2. **Interest Rate Differential:** The domestic interest rate rises above the world rate ($i > i^*$).
3. **Capital Inflow:** High domestic rates attract massive foreign capital inflows. Demand for the domestic currency surges.
4. **Appreciation:** The exchange rate appreciates ($E \uparrow$).
5. **Crowding Out:** Appreciation makes domestic exports more expensive and imports cheaper. Net Exports (NX) fall.
6. Adjustment: The IS curve shifts back to the left until it returns to its original position.
   Result: Output remains unchanged (Y is constant). The increase in G is exactly offset by the decrease in NX. Fiscal policy is completely crowded out by the exchange rate mechanism.14

3.3.2 Monetary Policy (Highly Effective)

Consider a monetary expansion (e.g., open market purchase, $\Delta M > 0$).

1. **LM Shift:** The increase in money supply shifts the LM curve to the right.
2. **Interest Rate Differential:** The domestic interest rate falls below the world rate ($i < i^*$).
3. **Capital Outflow:** Investors sell domestic assets to seek higher returns abroad. They sell domestic currency, leading to depreciation.
4. **Depreciation:** The exchange rate depreciates ($E \downarrow$).
5. **Stimulus:** Depreciation makes domestic goods cheaper abroad. Net Exports (NX) rise.
6. Adjustment: The IS curve shifts to the right due to higher NX.
   Result: Output increases significantly. Monetary policy is powerful because it works through two channels: the interest rate channel (investment) and, more importantly, the exchange rate channel (exports).12

3.4 Policy Effectiveness Under Fixed Exchange Rates

Under a fixed regime, the central bank is committed to buying and selling foreign exchange to maintain a specific parity ($E = \bar{E}$). This commitment forces the money supply to become endogenous.

3.4.1 Fiscal Policy (Highly Effective)

Consider a fiscal expansion ($\Delta G > 0$).

1. **IS Shift:** IS shifts right; i rises above i^*.
2. **Capital Inflow:** Capital floods in, putting upward pressure on the currency (appreciation).
3. **Central Bank Intervention:** To prevent appreciation, the central bank must sell domestic currency and buy foreign reserves.
4. **Monetary Accommodation:** The sale of domestic currency increases the money supply (M). The LM curve shifts to the right.
5. Equilibrium: The LM curve continues to shift until the interest rate returns to i^*.
   Result: Output increases by more than in a closed economy. The central bank is forced to accommodate the fiscal expansion to maintain the peg.12

3.4.2 Monetary Policy (Ineffective)

Consider a monetary expansion ($\Delta M > 0$).

1. **LM Shift:** LM shifts right; i falls below i^*.
2. **Capital Outflow:** Capital flees, causing downward pressure on the currency (depreciation).
3. **Central Bank Intervention:** To defend the peg, the central bank must buy domestic currency and sell foreign reserves.
4. Reversal: The purchase of domestic currency reduces the money supply. The LM curve shifts back to the left.
   Result: The LM curve returns to its exact original position. Output is unchanged. The central bank has no control over the money supply; it effectively imports the monetary policy of the anchor country.12

3.5 The Impossible Trinity (Policy Trilemma)

The results of the Mundell-Fleming model are summarized by the "Impossible Trinity." A country cannot simultaneously achieve:

1. **Free Capital Mobility** (Open Capital Account)
2. **Fixed Exchange Rate** (Exchange Rate Stability)
3. **Independent Monetary Policy** (Monetary Autonomy)

It must choose one side of the triangle (i.e., two out of three options):

- **Option 1 (USA, Eurozone):** Independent Monetary Policy + Free Capital Mobility. *Cost:* Floating Exchange Rate (volatility).
- **Option 2 (Hong Kong, Gold Standard):** Fixed Exchange Rate + Free Capital Mobility. *Cost:* No Monetary Independence (imports US interest rates).
- **Option 3 (China - historically):** Fixed Exchange Rate + Independent Monetary Policy. *Cost:* Restricted Capital Mobility (Capital Controls).[18]

The "New" Dilemma: Recent research suggests that for emerging markets, even floating rates (Option 1) may not guarantee monetary independence due to the overwhelming force of the Global Financial Cycle (driven by the US Fed). This transforms the Trilemma into a Dilemma: restrict capital flows or lose autonomy, regardless of the exchange rate regime.[20]

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4. Asset Markets and Exchange Rate Determination

While Mundell-Fleming provides a comparative static view (comparing equilibrium points), it treats the exchange rate primarily as a trade-balancing mechanism. Modern macroeconomics recognizes that exchange rates are asset prices, determined in highly liquid financial markets by expectations of the future. This leads to the Interest Rate Parity (IRP) conditions.

4.1 Covered Interest Parity (CIP)

CIP is a no-arbitrage condition enforced by market makers. It states that the rate of return on a domestic investment must equal the rate of return on a hedged foreign investment.

$$(1 + i_t) = \frac{1}{S_t} (1 + i^*_t) F_t$$

Where F_t is the forward exchange rate contracted at time t for delivery at $t+1$.
Taking logs, this approximates to:

$$i_t - i^*_t \approx f_t - s_t$$

Where $f_t - s_t$ is the forward premium or discount.

- **Intuition:** If the domestic interest rate is 5% and the foreign rate is 3%, the domestic currency *must* trade at a 2% forward discount (it is cheaper in the forward market). If not, risk-free arbitrage profits would exist. Empirical evidence shows CIP holds strongly, except during crises when counterparty risk spikes (e.g., 2008, 2020).[21]

4.2 Uncovered Interest Parity (UIP)

UIP is a behavioral hypothesis. It assumes investors are risk-neutral and do not hedge. It states that the domestic interest rate must equal the foreign rate plus the expected depreciation of the domestic currency.

$$(1 + i_t) = (1 + i^*_t) \frac{E_t}{S_t}$$Approximation:$$i_t \approx i^*_t + \Delta s^e_{t+1}$$

Where Δs^e_{t+1} is the expected percentage change in the exchange rate.

- **Logic:** If India offers 7% interest and the US offers 5%, why doesn't all global capital flow to India? According to UIP, it is because investors *expect* the Rupee to depreciate by exactly 2% over the period, equalizing the total return (in dollars).[22]

4.3 The UIP Puzzle (Forward Bias Puzzle)

Theory suggests a regression of the change in the spot rate on the interest differential:

$$\Delta s_{t+1} = \alpha + \beta(i_t - i^*_t) + \epsilon_{t+1}$$

should yield $\beta = 1$.
However, decades of empirical research (starting with Fama, 1984) consistently find $\beta < 0$. This implies that currencies with high interest rates tend to appreciate (or depreciate less than the interest differential), rather than depreciate as theory predicts.
The Carry Trade:
This failure of UIP is the basis of the "Carry Trade" strategy: borrowing in a low-interest currency (funding currency, e.g., Yen) and investing in a high-interest currency (target currency, e.g., Rupee). If UIP held, the target currency would depreciate to wipe out the interest gain. Since it often appreciates instead, carry traders reap "excess returns."

- **Risk Explanation:** The excess return is a compensation for "crash risk." High-interest currencies (often emerging markets) are prone to sudden, catastrophic devaluations during global panics. The carry trade picks up pennies in front of a steamroller.[24]

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5. Dynamic Adjustment: The Dornbusch Overshooting Model

One of the most elegant resolutions to the puzzle of exchange rate volatility is the "Overshooting Model" developed by Rudiger Dornbusch (1976). It marries the sticky-price assumption of Keynesian economics with the rational expectations of asset markets.[26]

5.1 The Logic of Overshooting

The model posits that asset markets (exchange rates) adjust instantaneously to news, while goods markets (prices) adjust slowly.
Consider an unanticipated, permanent increase in the Money Supply (M).

1. **Long Run:** We know from the Quantity Theory that prices (P) will rise proportionally, and the nominal exchange rate (E) will depreciate proportionally (to maintain PPP). The real variables (real exchange rate, interest rate) will be unchanged.
2. **Short Run:** Prices are sticky (P is fixed). The increase in M implies an increase in real money balances (M/P).
3. **Liquidity Effect:** To clear the money market with higher supply, the domestic interest

rate (i) must fall.

4. **Disequilibrium:** Now $i < i^*$. According to UIP ($i - i^* = \Delta s^e$), if the domestic rate is lower, investors must expect the domestic currency to **appreciate**.
5. **The Paradox:** How can the currency be expected to *appreciate* in the future when we know it must *depreciate* in the long run?
6. **The Resolution:** The spot rate must instantly depreciate by **more** than the long-run equilibrium level. It "overshoots." From this deeply depreciated level, it can then slowly appreciate back to the new long-run equilibrium, satisfying the UIP condition while the price level slowly catches up.

5.2 Mathematical Derivation

Using the notation from standard texts 26:
Let lowercase letters denote logs.

- (1) Uncovered Interest Parity: $r = r^* + \dot{s}^e$
- (2) Expectations (Regressive): $\dot{s}^e = \theta(\bar{s} - s)$ (Investors expect reversion to long run $\bar{s}$)
- (3) Money Demand: $m - p = \phi y - \lambda r$

Substituting (1) and (2) into (3):

$$m - p = \phi y - \lambda (r^* + \theta(\bar{s} - s))$$
Differentiating with respect to a change in money supply dm:
In the short run, $dp = 0$ (sticky prices). Long run $d\bar{s} = dm$ (neutrality).

$$dm - 0 = 0 - \lambda \theta (dm - ds) \\ dm = -\lambda \theta dm + \lambda \theta ds \\ ds = dm (1 + \frac{1}{\lambda \theta})$$
Since $\lambda > 0$ and $\theta > 0$, the term $(1 + \frac{1}{\lambda \theta})$ is strictly greater than 1.
Thus, $\frac{ds}{dm} > 1$. The change in the exchange rate is proportional to the money shock magnified by the inverse of the interest elasticity and adjustment speed. The currency overshoots.26

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6. Trade Dynamics: The J-Curve and Marshall-Lerner Condition

Moving from the financial side to the real economy, we examine the response of the trade balance to exchange rate changes. Standard theory suggests that a real depreciation improves the trade balance (NX). However, empirical evidence shows a lag, described by

the J-Curve.[29]

6.1 The Marshall-Lerner Condition

The condition determines whether a depreciation eventually improves the trade balance. Let TB be the trade balance in domestic currency:

$$TB = P X - E P^* M$$

Where P is export price (domestic), P^* is import price (foreign), E is exchange rate. A depreciation ($E \uparrow$) has two effects:

1. **Price Effect:** It increases the domestic cost of imports ($E P^* M$), worsening the balance.
2. **Volume Effect:** It increases export volume (X) and reduces import volume (M), improving the balance.

The Marshall-Lerner condition states that for the volume effect to dominate, the sum of the absolute price elasticities of demand for exports (η_X) and imports (η_M) must exceed 1:

$$|\eta_X| + |\eta_M| > 1$$

Mathematical Proof:
Differentiating the TB equation with respect to E and expressing in elasticities reveals:

$$\frac{dTB}{dE} = X [\eta_X + \eta_M - 1]$$

Thus, $\frac{dTB}{dE} > 0$ (improvement) only if $\eta_X + \eta_M > 1$ (assuming initial balanced trade).31

6.2 The J-Curve Effect

In the real world, elasticities are not constant; they are low in the short run and high in the long run.

1. **Currency Contract Period:** Contracts are set. Quantities are fixed. A depreciation raises the import bill immediately. TB worsens.
2. **Pass-Through Period:** Import prices rise. Export prices in foreign currency fall.
3. **Quantity Adjustment Period:** Firms and consumers substitute away from expensive imports and toward cheaper exports. Quantities adjust significantly. Elasticities rise.

Graphing TB against time yields a 'J' shape: an initial drop below zero, followed by a recovery and movement into surplus.

Empirical Evidence from India:
Research by Bahmani-Oskooee and others on India-US trade reveals evidence of the J-Curve. Specifically, Indian imports (like oil) are often price inelastic in the short run, leading to a deep initial trough. However, manufactured exports show significant long-run elasticity, confirming the Marshall-Lerner condition over a horizon of 4-6 quarters.33

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7. Contemporary Case Study: India's Strategic Shift (2024-2025)

The theoretical frameworks discussed above provide the lens to analyze the significant macroeconomic shifts in India during 2024 and 2025.

7.1 The Pivot to Managed Float

For years, the Reserve Bank of India (RBI) maintained a strategy of aggressive intervention to stabilize the Rupee, effectively running a "dirty float." In 2022 and 2024, the RBI sold over $30 billion and $38 billion in reserves respectively in single quarters to defend the currency against depreciation pressures.[35] This aligns with the "Fixed Exchange Rate" corner of the Impossible Trinity, sacrificing some monetary independence (liquidity) to maintain stability.

However, in late 2025, a structural shift occurred. Despite severe headwinds—including US tariffs of 50% on certain goods and Foreign Portfolio Investment (FPI) outflows of $17 billion—the RBI limited its intervention to just $10.9 billion in Q3 2025.[35] The Rupee was allowed to depreciate past 90 per USD.

7.2 Interpreting the Pivot via Mundell-Fleming

This shift represents a movement along the Impossible Trinity toward the "Floating Rate" corner.

- **Why?** Facing a massive external shock (tariffs and FPI exit), defending the peg would require depleting reserves and hiking interest rates (contractionary monetary policy).
- **The Trade-off:** By allowing depreciation (floating), the RBI preserves its foreign exchange reserves and maintains **Monetary Independence**. It can keep domestic interest rates conducive to growth rather than raising them to defend the currency.
- **Automatic Stabilizer:** The depreciation acts as a stimulus to Net Exports (Mundell-Fleming logic), helping to offset the negative demand shock from US tariffs.

7.3 J-Curve Implications for India

The depreciation to 90/USD will trigger a J-Curve effect.

- **Short Term:** The import bill (especially energy and gold) will balloon in Rupee terms, worsening the Current Account Deficit and potentially driving "imported inflation." RBI

models suggest a 5% depreciation adds ~35 basis points to CPI inflation.[36]

- **Long Term:** If the Marshall-Lerner condition holds (as research suggests it does for India's services and manufacturing exports), the lower exchange rate will eventually boost export volumes, narrowing the trade deficit.
- **Risk:** The critical risk is if global demand is too weak (due to recession) or protectionism (tariffs) is too high, preventing the volume adjustment. In that case, India suffers the inflationary pain of depreciation without the export gain—a scenario known as "elasticity pessimism."

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8. Academic Assessment: Questions and Solutions

8.1 Multiple Choice Questions (MCQs)

Q1. In the Mundell-Fleming model with perfect capital mobility and flexible exchange rates, an expansionary fiscal policy:
A) Increases output and depreciates the currency.
B) Has no effect on output and appreciates the currency.
C) Increases output and has no effect on the exchange rate.
D) Decreases output and depreciates the currency.
Answer: B.
Reasoning: Fiscal expansion shifts IS right $\rightarrow$ higher interest rates $\rightarrow$ massive capital inflows $\rightarrow$ currency appreciation $\rightarrow$ Net Exports fall. The appreciation continues until the crowding out of NX completely offsets the fiscal stimulus. Y remains unchanged.14
Q2. According to the Dornbusch Overshooting Model, following an unanticipated permanent increase in the money supply:
A) The exchange rate depreciates slowly to its new long-run equilibrium.
B) The exchange rate appreciates immediately and then depreciates.
C) The exchange rate depreciates immediately by more than the long-run equilibrium level.
D) The price level jumps immediately to its new long-run equilibrium.
Answer: C.
Reasoning: Prices are sticky. To clear the money market (where i drops), investors must expect the currency to appreciate (UIP). For it to appreciate in the future but depreciate in the long run, it must depreciate instantly beyond the long-run target (overshoot).26
Q3. The Marshall-Lerner condition states that real depreciation improves the trade balance if:
A) The sum of price elasticities of demand for exports and imports > 1.
B) The sum of price elasticities of demand for exports and imports < 1.
C) Domestic supply elasticity is infinite.
D) The income elasticity of imports is zero.
Answer: A.
Reasoning: The volume effect (increasing exports, decreasing imports) must outweigh the price effect (imports costing more). This requires demand to be sufficiently elastic.31

Q4. Uncovered Interest Parity (UIP) implies that:
A) Interest rate differentials are perfectly offset by the forward premium.
B) High interest rate currencies are expected to depreciate.
C) Investors always hedge their foreign exchange exposure.
D) Arbitrage is risk-free.
Answer: B.
Reasoning: UIP states $i - i^* = \Delta s^e$. If $i > i^*$, then $\Delta s^e > 0$ (depreciation) must occur to equalize returns in a common currency. If the high-rate currency didn't depreciate, it would offer superior returns, violating equilibrium.22
Q5. Which phenomenon explains the observation that the trade balance often worsens immediately following a devaluation?
A) The Liquidity Effect.
B) The J-Curve Effect.
C) The Fisher Effect.
D) The Multiplier Effect.
Answer: B.
Reasoning: In the short run (currency contract period), quantities are fixed/inelastic. The devaluation simply raises the price of imports, worsening the deficit before quantities adjust.29
Q6. Under a fixed exchange rate regime, which policy is most effective at influencing output?
A) Monetary Policy.
B) Fiscal Policy.
C) Trade Policy (Tariffs).
D) Neither Fiscal nor Monetary Policy.
Answer: B.
Reasoning: Fiscal expansion puts upward pressure on rates/currency. The central bank must expand the money supply to defend the peg, reinforcing the fiscal stimulus (Monetary Accommodation).12
Q7. The "Impossible Trinity" states that a country cannot simultaneously maintain:
A) Low inflation, low unemployment, and high growth.
B) Fixed exchange rate, independent monetary policy, and free capital flows.
C) Fiscal balance, trade balance, and full employment.
D) High savings, high investment, and a current account surplus.
Answer: B.
Reasoning: A fixed rate requires intervention that negates independent monetary policy if capital is free to move. One must be sacrificed.18
Q8. The "UIP Puzzle" refers to the empirical finding that:
A) Forward rates are unbiased predictors of future spot rates.
B) Currencies with high interest rates tend to appreciate or depreciate less than predicted.
C) Real interest rates are equal across all countries.
D) Covered Interest Parity fails frequently.
Answer: B.
Reasoning: Regressions often show a negative coefficient for the interest differential, meaning

high rates predict appreciation, allowing for profitable "carry trades".25
Q9. In the context of India's 2025 currency strategy, a "managed float" implies:
A) A hard peg to the US Dollar.
B) No intervention whatsoever by the RBI.
C) Market-determined rates with selective intervention to smooth volatility.
D) A return to the Gold Standard.
Answer: C.
Reasoning: The RBI allows the trend (depreciation to 90) but intervenes ($10.9bn) to prevent disorderly crashes.35
Q10. Mathematically, in the Dornbusch model, the degree of overshooting depends on:
A) The income elasticity of money demand.
B) The interest semi-elasticity of money demand and the speed of adjustment.
C) The fiscal multiplier.
D) The marginal propensity to import.
Answer: B.
Reasoning: The derived formula $\frac{ds}{dm} = 1 + \frac{1}{\lambda \theta}$ shows dependence on λ (interest sensitivity) and θ (expectations adjustment).26

8.2 Long Answer Questions (LAQs) with Solutions

Q1. "In a small open economy with floating exchange rates, fiscal policy is powerless." Critically evaluate this statement using the Mundell-Fleming model. Does this hold true for India?

Solution Model:

- **Theoretical Evaluation:** The statement is valid under the strict assumptions of the Mundell-Fleming model with *perfect* capital mobility.
    - *Mechanism:* Expansionary Fiscal Policy ($\uparrow G$) $\rightarrow$ shifts IS right $\rightarrow$ Higher i $\rightarrow$ Capital Inflows $\rightarrow$ Currency Appreciation $\rightarrow$ $\downarrow$ Net Exports.
    - *Result:* The fall in NX exactly offsets the rise in G. Output is unchanged. This is complete "external crowding out."
- **Critique/Nuance:**
    - *Imperfect Mobility:* If the BP curve is upward sloping (capital is not perfectly mobile), fiscal policy retains some effectiveness.
    - *Large Country Effect:* If the country is large (like the US), its fiscal expansion raises world interest rates, mitigating the appreciation effect.
- **India Context:** India is a "large" emerging market with *imperfect* capital mobility (capital controls/CFMs). Thus, fiscal policy is *not* powerless. The RBI often manages the appreciation (dirty float), preventing full crowding out. Additionally, government spending on infrastructure can improve supply-side competitiveness, countering the Dutch Disease effect. Therefore, while the theoretical constraint exists, in practice, fiscal policy

remains a potent tool in India, albeit one that must be coordinated with monetary management to avoid excessive twin deficits.

Q2. Derive the condition under which a devaluation improves the trade balance. Why might this condition fail in the short run?

Solution Model:

- **Derivation (Marshall-Lerner):**
  - Define Trade Balance in domestic currency: $TB = P X - E P^* M$.
  - Assume trade is initially balanced ($P X = E P^* M$).
  - Differentiate TB with respect to E.
  - Express changes in terms of elasticities: η_X (export demand) and η_M (import demand).
  - The derivative $\frac{dTB}{dE}$ is positive (improvement) if and only if $|\eta_X| + |\eta_M| > 1$.
- **Short-Run Failure (The J-Curve):**
  - In the short run, consumer preferences and business contracts are "sticky."
  - *Currency Contract Period:* Prices are fixed in contract currency. A devaluation instantly raises the domestic price of imports ($E \uparrow \rightarrow Price_{Imp} \uparrow$).
  - *Inelastic Demand:* Since firms cannot switch suppliers instantly, import volume M does not fall much ($\eta_M \approx 0$). Export volume X does not rise much ($\eta_X \approx 0$).
  - *Result:* The sum of elasticities is < 1. The price effect (higher import bill) dominates the volume effect. The trade deficit widens (the dip in the J).
  - *Recovery:* Over time, contracts are renegotiated, and substitution occurs. Elasticities rise above 1, and the balance improves.

Q3. Analyze the Reserve Bank of India's "Pivot" in 2025 through the lens of the Impossible Trinity. What are the macroeconomic risks of this strategy?

Solution Model:

- **The Trinity Analysis:**
  - *Pre-2025:* RBI aimed for Exchange Rate Stability (Fixed-ish) + Monetary Independence (controlling inflation/yields) + Semi-Open Capital Account. This required massive reserve intervention ($30-40bn/quarter).
  - *The Pivot:* In 2025, facing US tariffs and FPI outflows, the RBI reduced intervention ($10bn) and allowed depreciation to 90/USD.
  - *Interpretation:* This is a move toward the **Floating Exchange Rate** corner. It sacrifices stability to preserve **Monetary Independence** (liquidity) and **Reserves**.
- **Macroeconomic Risks:**
  - *Inflation Pass-through:* A 90 INR/USD rate makes oil, electronics, and fertilizers expensive. This imports inflation. If global oil prices were high, this would be

disastrous (Stagflation). (Fortunately, oil was soft in 2025).
    - *Balance Sheet Effects:* Indian firms with unhedged dollar debt ($ECBs$) see their debt servicing costs explode in Rupee terms, potentially leading to corporate distress.
    - *Confidence Crisis:* Rapid depreciation can become self-fulfilling (expectations of further fall drive more outflows). The "managed" part of the float is crucial to prevent panic.

Q4. Explain the concept of "Overshooting" in exchange rates. Why is this model considered a bridge between Keynesian and Monetarist theories?

Solution Model:

- **Concept:** Overshooting is the phenomenon where the exchange rate's immediate response to a disturbance (e.g., money supply change) exceeds its long-run response.
- **Mechanism:** It arises from the disparity in adjustment speeds. Financial markets are flexible (instant adjustment); goods markets are sticky (slow adjustment).
- **Process:** $\uparrow M \rightarrow$ Short run P fixed $\rightarrow \uparrow M/P \rightarrow \downarrow i$.
    - Since $i < i^*$, UIP requires expectations of appreciation ($\Delta s^e < 0$).
    - For the currency to appreciate in the future but depreciate in the long run (due to $\uparrow M \rightarrow \uparrow P$), it must depreciate *instantly* to a level weaker than the long-run equilibrium.
- **Theoretical Bridge:**
    - *Keynesian:* It accepts "Sticky Prices" in the short run (the source of the disequilibrium).
    - *Monetarist:* It accepts "Neutrality of Money" and "Rational Expectations" in the long run (prices eventually adjust, markets are efficient).
    - It reconciles the volatility of asset prices (Monetarist/Finance view) with the sluggishness of the real economy (Keynesian view).

Q5. What is the "Carry Trade" and how does it relate to the empirical failure of Uncovered Interest Parity?

Solution Model:

- **Definition:** Carry Trade involves borrowing in a low-interest currency (e.g., JPY, CHF) and investing in a high-interest currency (e.g., INR, BRL, AUD) to capture the interest rate differential (the "carry").
- **Relation to UIP:**
    - UIP Theory: $i_{High} - i_{Low} = Expected Depreciation$. The high-rate currency should fall, wiping out the profit.
    - Empirical Reality (The Puzzle): High-rate currencies often remain stable or even appreciate. The depreciation does *not* occur as predicted ($\beta < 0$ in Fama regression).

    - *Consequence:* This violation of UIP makes the Carry Trade profitable on average.
- **Risks:** The strategy is subject to "picking up pennies in front of a steamroller." While profitable in calm times, high-rate currencies often crash violently during global risk-off events (unwinding the trade), causing massive losses that wipe out years of carry in days (e.g., 2008, 1998).

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