2. FOREIGN EXCHANGE MARKET CONCEPTS

- Two points about bid-offer quotes:
  - Offer price is always > bid price.
  - Counterparty who inquires price quote will have the option to deal at either the bid or offer price quoted to them by the dealer.
- Size of bid-ask spread depends on the following factors:
  - The currency pair involved ⇒ more liquid currency pairs, ↓ bid-offer spread.
  - The time of day ⇒ the interbank FX markets are the most liquid when the major FX trading centers are open ⇒ low spreads.
  - Market volatility ⇒ ↑ uncertainty about the factors influencing price, wider bid-ask spreads.
  - Size of transaction ⇒ larger the transactions, wider the spread (greater difficulty the dealer faces in laying off the foreign exchange risk).
  - Relationship b/w the dealer & the client can also affect the size of the bid-offer spread.

2.1 Arbitrage Constraints on Spot Exchange Rate Quotes

- Two arbitrage constraints to avoid riskless arbitrage opportunities:
  - The bid (offer) shown by a dealer cannot be higher (lower) than the current interbank offer (bid).
  - The cross rate bids (offers) posted by a dealer must be lower (higher) than the implied cross-rate offers (bids) available in the interbank market.
- Forwards ⇒ agreements to exchange one currency for another on a future date at an exchange rate agreed on today.
- Forward rates must satisfy an arbitrage relationship that equates the investment return on two alternative but equivalent investments.
- An investor with one unit of DC to invest for one year faces two alternatives:
  - Invest cash for one year at the domestic \( R_d \) & at the end of year, investment would be worth \((1 + i_d)\).
  - Convert the DC to FC at spot rate \( S_{f/d} \), invest for one-year \((i_f)\) & at the end of year the investor would have \(S_{f/d}(1 + i_f)\). Undertake a forward at the start of the investment at \(F_{f/d}\) to convert foreign investment into DC. At the end of year the investment would be worth

\[
S_{f/d}(1 + i_f)(1 + F_{f/d})
\]

\[
(1 + i_d) = S_{f/d}(1 + i_f)\left(\frac{1}{F_{f/d}}\right)
\]

- Covered IRP ⇒ \( F_{f/d} = S_{f/d} \left( \frac{1 + i_f}{1 + i_d} \right) \)
- Covered IR differential b/w two markets is zero.
- Forward premium or discount ⇒ \( F_{f/d} - S_{f/d} = S_{f/d} \left( \frac{1 + i_f}{1 + i_d} \right) (i_f - i_d) \)
- Factors that determine spot bid-ask spread (e.g. liquidity, transaction size etc.) also determine bid-offer spread for forward swap.
- Mark-to-market value of forward ⇒ profit/loss that would be realized from closing out the position at the current market price.
3. A LONG-TERM FRAMEWORK FOR EXCHANGE RATES

- Trading decision in FX markets lays a view on future market prices & conditions.
- Decision to be fully hedged implies that future market conditions are very uncertain.
- International parity conditions ⇒ determine long run movements in exchange rates, IR & inflation.
- Following concepts must be clearly understood:
  - Long run v/s short run.
  - Real v/s nominal values.
  - Expected v/s unexpected changes.
  - Relative movements.

3.1 International Parity Conditions

- Key international parity conditions rarely hold in either the short or medium term.
- Two reasons to study international parity conditions:
  - Each condition reflects economic forces that should not be ignored altogether.
  - Currency positions offer profitable opportunities only when parity conditions fail to hold.

3.1.1 Covered Interest Rate Parity

- An investment in a foreign money market (completely hedged against exchange risk) should yield exactly the same return as an otherwise identical domestic money market investment.
- If this parity does not hold, arbitrage profit is possible.
- Assumptions ⇒ no transaction costs, identical instruments.

3.1.2 Uncovered Interest Rate Parity

- The expected return on an uncovered FC investment should be equal to the return on a comparable DC investment.
- Expected exchange rate differential = yield differential.
  \[ \%\Delta S_{t+d} = i_f - i_d \]
- Country with ↑ IR is expected to see the value of its currency depreciate.
- This parity relationship works better over very long term horizons.

3.1.3 Forward Rate Parity

- If both covered & uncovered IR parity hold, forward exchange rate will be an unbiased forecast of the future spot exchange rate.
- Forward exchange rates are poor predictors of future spot exchange rates.
- Without using any current information to predict future spot rates, the random walk prediction can be slightly biased.
3.1.4 Purchasing Power Parity

- Law of one price \( \Rightarrow \) identical goods should trade at the same price across countries when valued in terms of a common currency.
- Absolute versions of PPP \( \Rightarrow \) equilibrium exchange rate b/w two countries is determined entirely by the ratio of their national price levels.
  - Due to significant transaction costs, this relationship does not hold.
- Relative version of PPP \( \Rightarrow \) % change in spot rate will be completely determined by the difference b/w the foreign & domestic inflation rates.
- Ex-ante version of PPP \( \Rightarrow \) expected changes in the spot exchange rate being entirely driven by expected differences in national inflation rates.

3.1.5 The Fisher Effect & Real Interest Rate Parity

- International fisher effect:
  \[ i_f - i_d = \pi_f - \pi_d \]
  - Foreign – domestic yield spread = foreign-domestic expected inflation differential, assuming real IR are equal across markets.
  - Fisher effect examines how ER, IR, & inflation rates interact.

4. CARRY TRADE

- FX carry trade \( \Rightarrow \) it involves taking long positions in high yield currencies & short positions in low yield currencies (funding currencies).
- The idea behind this trade is that the high-yield currencies on avg. have not depreciated, & low yield currencies have not appreciated to the level predicted by IR differentials.
- During periods of low volatility, carry trades tend to generate positive excess returns, (prone to significant crash risk in turbulent times).
- Valuation overlay approach to manage downside crash risks \( \Rightarrow \) high yielders will be overweighted & low yielders will be underweighted when ER lie inside prescribed PPP bands.
- Dangers of carry trade:
  - Create ER misalignment around the world.
  - Can cause a serious currency or financial crises.
5. THE IMPACT OF BALANCE OF PAYMENTS FLOWS

- Current a/c balance ⇒ sum of all recorded transactions in traded goods, services, income & net transfer payments in a country’s overall BOP.
- Countries that run persistent current a/c deficits (surpluses) often see their currencies depreciate (appreciate) over time.
- The current a/c must be matched by an equal & opposite balance in capital a/c (to balance BOP account).
- Financing decisions are usually the dominant factors in determining ER movements.
- There are four reasons for this:
  - Prices of real goods & services adjust more slowly than ER & other asset prices.
  - Production of real goods & services takes time.
  - It reflects financing of current expenditures & also reallocation of existing portfolios.
  - Expected ER movements can induce very large short-term capital flows.

5.1 Current Account Imbalances & the Determinations of Exchange Rates

5.1.1 The Flow Supply/Demand Channel

- Purchases & sales of internationally traded goods & services require the exchange of domestic & foreign currencies.
- Countries with persistent current a/c surpluses would see their currencies appreciate over time & vice versa.
- The amount by which ER must adjust to restore current accounts to balanced positions depends on a no. of factors:
  - Initial import & export gap.
  - Response of import & export prices to Δ in ER.
  - Response of import & export demand to Δ in import & export prices.

5.1.2 The Portfolio Balance Channel

Current a/c imbalances ⇒ shift financial wealth from deficit nations to surplus nations ⇒ lead to shifts in global asset preferences ⇒ exert an impact on the path of ER.

5.1.3 The Debt Sustainability Channel

Persistent current a/c imbalances ⇒ for deficit nations, ever-rising net external debt levels as a % of GDP ⇒ steady downward revision in market expectations of the currency’s real long-run equilibrium value.

5.2 Capital Flows & the Determination of Exchange Rates

- Excessive surges in capital inflow to EM may cause economic or currency crises by contributing to:
  - An unwarranted real appreciation of the EM currency.
  - A huge buildup in external indebtedness by EM Govt., businesses or banks.
  - Property market or financial asset market bubble.
  - A consumption binge & overinvestment in risky projects.
5.2.1 Equity Market Trends & Exchange Rates

- The relationship between equity market performance and exchange rates (ER) is not stable.
- Judgments on possible future currency moves, based solely on expected equity market performance, is difficult.

6. MONETARY AND FISCAL POLICIES

6.1 The Mundell-Fleming Model

Changes in monetary and fiscal policy affect the level of interest rates (IR) and economic activity, which leads to changes in the direction and magnitude of trade capital flows and changes in the ER.

Expansionary Monetary Policy

- With Flexible ER
  - ↓ Domestic IR ⇒ capital flow to higher yielding market ⇒ ↓ value of domestic currency (DC).
  - ↓ In currency value will ↑ net exports.
- With Fixed ER
  - Monetary authority will have to buy its own currency to prevent depreciation.
  - Result ⇒ tight domestic credit conditions to offset the intended expansionary monetary policy.

Expansionary Fiscal Policy

- With Flexible ER
  - Upward pressure on domestic IR ⇒ inflow of capital from lower-yielding markets ⇒ upward pressures on DC.
- With Fixed ER
  - Monetary authority will have to sell its own currency in the FX market to prevent DC appreciation.

Some insights of this model:
- Objectives of independent monetary policy, free capital flows, and to defend fixed ER cannot be satisfied at the same time.
- Degree of capital mobility is critical to the effectiveness of monetary and fiscal policy in an open economy.

Monetary-Fiscal Policy Mix & the Determination of Exchange Rates under Conditions of High Capital Mobility

<table>
<thead>
<tr>
<th>Expansionary Fiscal Policy</th>
<th>Restrictive Monetary Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansionary Monetary Policy</td>
<td>Ambiguous</td>
</tr>
<tr>
<td>Restrictive Fiscal Policy</td>
<td>Domestic currency depreciates</td>
</tr>
</tbody>
</table>

Reference: Level II Curriculum, Volume 1, Reading 10, Exhibit 5.
Monetary-Fiscal Policy Mix & the Determination of Exchange Rates under Conditions of Low Capital Mobility

<table>
<thead>
<tr>
<th>Expansionary Fiscal Policy</th>
<th>Restrictive Fiscal Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expansionary Monetary Policy</strong></td>
<td><strong>Restrictive Monetary Policy</strong></td>
</tr>
<tr>
<td>Domestic currency depreciates</td>
<td>Ambiguous</td>
</tr>
<tr>
<td>Ambiguous</td>
<td>Domestic currency appreciates</td>
</tr>
</tbody>
</table>

Reference: Level II Curriculum, Volume 1, Reading 10, Exhibit 6

6.2 Monetary Models of Exchange Rate Determination

Under these models output is fixed & monetary policy affects ER through the price level & the rate of inflation.

The Monetary Approach with Flexible Prices

- An extension of the classical quantity theory of money to an open economy.
- According to quantity theory $\Delta M$ are the primary determinant of price level $\Delta \pi$ (PPP holds).
- In a pure monetary approach model, a change in the money supply future growth rate would have no immediate impact on the current ER.

The Dornbusch Overshooting Model

- Shortcoming of pure monetary approach $\Rightarrow$ assumption that PPP holds at all times (PPP rarely hold in short or medium run).
- Dornbusch model $\Rightarrow$ assumes that output prices exhibit limited flexibility in short run but are fully flexible in the long run.
- Long run price level flexibility ensures that an $\uparrow$ in domestic money supply will give rise to a proportional $\uparrow$ in domestic prices & contribute to a depreciation of DC in long run.
- If domestic price level is assumed to be inflexible in the short run $\Rightarrow$ the ER is likely to overshoot its long run PPP path in the short run.
6.3 Portfolio Balance Approach

- Role of monetary policy in determining ER ⇒ expansionary (restrictive) monetary policy downward (upward) pressure on DC value.
- Impact of fiscal policy on ER ⇒ ambiguous.
- Mundell-Fleming model ⇒ short-run model of ER determination.
- Portfolio balance approach ⇒ global investor will hold a diversified portfolio of domestic & foreign assets including bonds.
  - A steady ↑ in the supply of domestic bonds outstanding ⇒ continued widening of the Govt. budget deficit ⇒ compensated in the form of ↑ E(R).
  - ↑ E(R) could come from
    - ↑ IR / risk premium
    - Immediate depreciation of the currency to a level sufficient to generate anticipation of gains from subsequent currency appreciation.
  - Govts. that run large budget deficits on a sustained basis could eventually see their currencies ↓ in value.
  - Combination of Mundell-fleming & portfolio balance models ⇒ expansionary fiscal policy may be +ve for a currency in short run but −ve in the long run.

The Short- and Long-Run Response of Exchange Rates to Changes in Fiscal Policy

Increase in Real Interest Rate Differential

Expansive Fiscal Policy
  
Long-Run Response

Government Debt Buildup

Central Bank Monetizes Debt

Fiscal Stance Turns Restrictive

Currency Appreciates

Currency Depreciates

Reference: Level II Curriculum, Volume 1, Reading 10, Exhibit 7.

7. EXCHANGE RATE MANAGEMENT: INTERVENTION AND CONTROLS

- Capital inflows ⇒ blessing ⇒ if they enable growing economies to bridge the gap b/w domestic investment & savings.
- Capital inflows ⇒ Curse ⇒ if they fuel boom like conditions, asset price bubbles & overshooting of the currency into overvalued territory.
- ↑ in Capital inflows are caused by combination of pull and push factors.
  - Push Factors: +ve developments that attract overseas capital into the economy [relaxed regulations, liberal mkts. Flexible exchange rates, privatization of state-owned entities etc.]
  - Pull Factors: developments in other economies that cause capital to flow to a particular economy [attract high yielding economies become attractive amid low interest rates policies or ultra low interest rates in developed economies].
- Governments directly intervene to resist excessive inflows and to avoid currency bubbles.
8. WARNING SIGNS OF CURRENCY CRISSES

Two school of thoughts with respect to currency crises anticipation
1. Deteriorating & weak economic conditions are warning sign for currency crises.
2. No particular factor as crises can occur out of the blue

To anticipate crises some factors are highly interrelated and often one factor leads to another.

- Large foreign capital inflows
- Domestic banks borrow in FC.

Liberalized Financial Markets

- Domestic currency depreciates, initially
- Banks trouble servicing short-term debt
- Foreign investors withdraw capital
- Speculators short currency
- Currency declines further

Primary Action: Increase interest rates to stem capital outflows but it may worsen banking industry & slow down economy.
- Secondary Action: In FX market, buying own currency that lowers FC reserves.

If Govt. intervenes:
- Capital outflow and speculative attacks increase

If Govt. is unable to intervene: