

Currency Exchange Rates: Understanding Equilibrium Value

IRP = Interest Rate Parity

DC = Domestic Currency

FC = Foreign Currency

IR = Interest Rates

PPP = Purchasing Power Parity

BOP = Balance of Payment

EM = Emerging Markets

ER = Exchange Rate

E(R) = Expected Return

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 \Rightarrow more liquid currency pairs, \downarrow bid-offer spread.
 - The time of day \Rightarrow the interbank FX markets are the most liquid when the major FX trading centers are open \Rightarrow low spreads.
 - Market volatility \Rightarrow \uparrow uncertainty about the factors influencing price, wider bid-ask spreads.
 - Size of transaction \Rightarrow 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 \Rightarrow 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_f & 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 $\Rightarrow F_{f/d} = S_{f/d} \left[\frac{1 + i_f \left(\frac{\text{actual}}{360} \right)}{1 + i_d \left(\frac{\text{actual}}{360} \right)} \right]$
 - Covered IR differential b/w two markets is zero.
- Forward premium or discount $\Rightarrow F_{f/d} - S_{f/d} = S_{f/d} \left[\frac{\frac{\text{actual}}{360}}{1 + i_d \left(\frac{\text{actual}}{360} \right)} \right] (i_f - i_d)$
- 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 \Rightarrow 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 \Rightarrow 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 \Rightarrow 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.

$$\% \Delta S_{f/d}^e = i_f - i_d$$
- Country with \uparrow 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 % Δ in spot rate will be completely determined by the diff. 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:

$$i_f - i_d = \pi_f^e - \pi_d^e$$
 - 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 +ve 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 \Rightarrow 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 \Rightarrow shift financial wealth from deficit nations to surplus nations \Rightarrow lead to shifts in global asset preferences \Rightarrow exert an impact on the path of ER.

5.1.3 The Debt Sustainability Channel

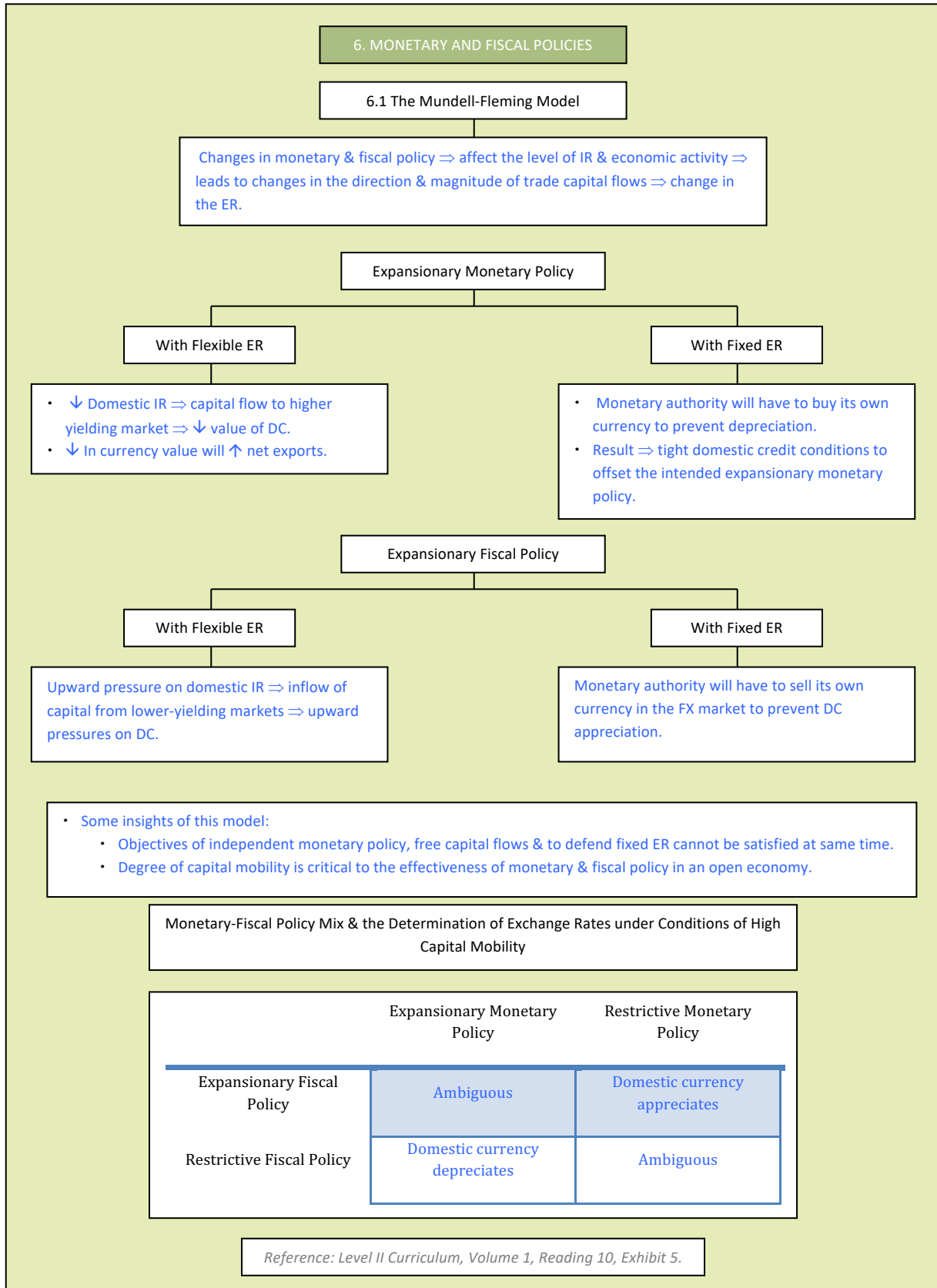
Persistent current a/c imbalances \Rightarrow for deficit nations, ever-rising net external debt levels as a % of GDP \Rightarrow steady downward revision in market expectations of the currency's real long-run equilibrium value.

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 b/w equity market performance & ER is not stable.
- Judgments on possible future currency moves, based solely on expected equity market performance is difficult.



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

	Expansionary Monetary Policy	Restrictive Monetary Policy
Expansionary Fiscal Policy	Domestic currency depreciates	Ambiguous
Restrictive Fiscal Policy	Ambiguous	Domestic currency appreciates

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 \Rightarrow money supply Δ are the primary determinant of price level Δ (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.

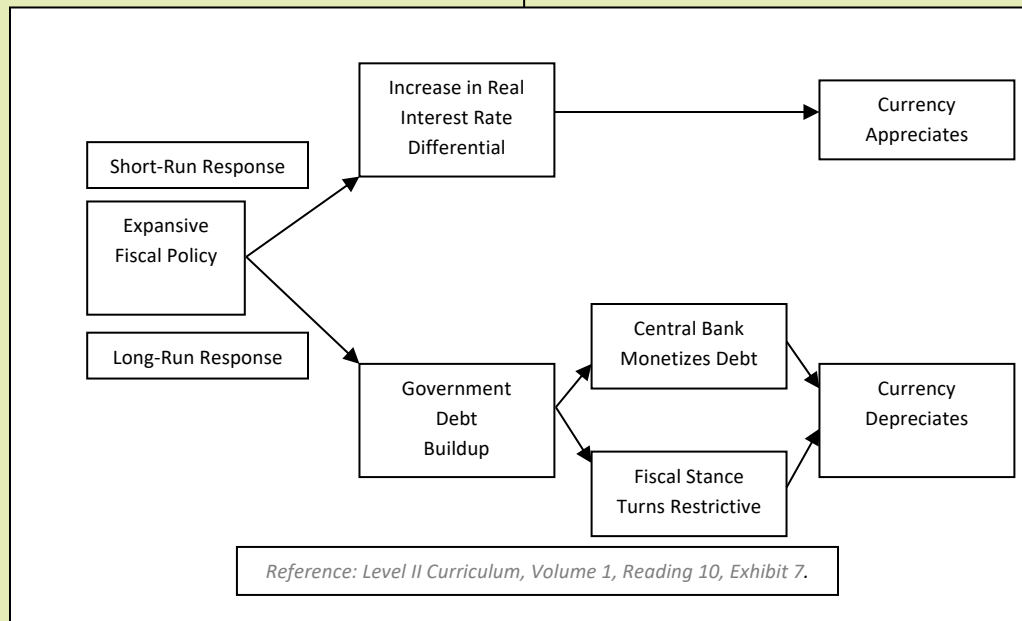
The Dornbusch Overshooting Model

- 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 \Rightarrow expansionary (restrictive) monetary policy downward (upward) pressure on DC value.
- Impact of fiscal policy on ER \Rightarrow ambiguous.
- Mundell-Fleming model \Rightarrow short-run model of ER determination.
- Portfolio balance approach \Rightarrow global investor will hold a diversified portfolio of domestic & foreign assets including bonds.
 - A steady \uparrow in the supply of domestic bonds outstanding \Rightarrow continued widening of the Govt. budget deficit \Rightarrow compensated in the form of $\uparrow E(R)$.
 - $\uparrow E(R)$ could come from
 - $\uparrow IR$ / 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 \downarrow in value.
- Combination of Mundell-fleming & portfolio balance models \Rightarrow 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



7. EXCHANGE RATE MANAGEMENT: INTERVENTION AND CONTROLS

- Capital inflows \Rightarrow blessing \Rightarrow if they enable growing economies to bridge the gap b/w domestic investment & savings.
- Capital inflows \Rightarrow Curse \Rightarrow if they fuel boom like conditions, asset price bubbles & overshooting of the currency into overvalued territory.
- \uparrow 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 CRISES

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.

