**Forwards, Futures and Money Market Hedging**

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**Hedging Transactions Exposure**

- Types of exposure
- One-shot exposure
- Hedging approaches:
  - Open
  - Forward
  - Money market
  - Futures
  - Options
- Ongoing transactions exposure
Petrobras has to pay for equipment from Japan, in Japanese yen, in 3 months
- Borrow and pay now?
- Use a forward contract/FX swap?
- Pay later at spot?

**Tools for Hedging**

**Forward Contracts, Futures and Money Market Hedging**

- Money market hedging: match currency of assets and liabilities
- Forwards: OTC agreement to exchange currencies at certain exchange rate in the future
- FX swap: simultaneous spot sale and forward purchase of a currency
- Futures: Exchange-traded contracts for notional future delivery, minimizing default risk via marking-to-market
Forward Contracts

- Agreement to exchange currencies at certain exchange rate in the future
- Default risk in forward contracts arises because such a contract is a commitment for future performance, and one or other party may be unwilling or unable to honor that commitment.
- On the settlement date, one party in effect owes the other party a net amount.

A Typical Forward Contract

- We agree today to pay a certain price for a currency in the future
Customization, Performance Risk and Liquidity

- Customization implies *bilateral contracts*, which carry performance risk.
- Liquidity implies standardization and freedom from counterparty risk, through *exchange-traded contracts*.

How Does the Bank Hedge a Forward Contract?

Hedging approaches:
- Open
- Forward
- Spot plus swap
- Rollover
- Money market
**Foreign Exchange Quotations**

<table>
<thead>
<tr>
<th>Date</th>
<th>Spot</th>
<th>Forward Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1615</td>
<td>152</td>
<td>31.8/5</td>
</tr>
<tr>
<td>1616</td>
<td>125</td>
<td>45.5/45</td>
</tr>
<tr>
<td>1617</td>
<td>516</td>
<td>91/91/2</td>
</tr>
<tr>
<td>1618</td>
<td>170</td>
<td>29.4/1</td>
</tr>
<tr>
<td>1619</td>
<td>31</td>
<td>6.9/6.6</td>
</tr>
<tr>
<td>1620</td>
<td>34</td>
<td>52/51.7</td>
</tr>
<tr>
<td>1621</td>
<td>136</td>
<td>17/16.5</td>
</tr>
<tr>
<td>1622</td>
<td>156</td>
<td>6.3/6.1</td>
</tr>
<tr>
<td>1623</td>
<td>124</td>
<td>31.5/31.5</td>
</tr>
</tbody>
</table>

**How Banks Hedge**

<table>
<thead>
<tr>
<th>Date</th>
<th>SHORT</th>
<th>LONG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Today</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T+2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T+90</td>
<td></td>
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</table>

Methods:
- Spot + swap
- Spot + rollover swap
- Money market
- Outright forward
The FX Swap Hedge

- Dealers typically hedge a forward foreign-exchange commitment with a spot plus “FX Swap”: spot sale plus forward purchase of a foreign currency
- The FX swap rate is determined by the interest differential

The Roll-Over Swap Hedge

- Dealers often hedge a long-term foreign-exchange commitment with shorter-term contracts, which are “rolled over” as they come due
- Corporations themselves do this too.
The FX Swap Hedge

- Dealers also hedge a forward commitment in the money market: borrow the currency you will be receiving, and invest in the currency you will be paying.
- The FX swap rate is determined by the interest differential.

The Forward Rate Tracks the Spot Rate
**Linkages Between Interest Rates**

- Interest rate differential
- Forward premium
- Expected % change in exchange rate

**Cost of Hedging**

<table>
<thead>
<tr>
<th>Type of Hedge</th>
<th>Cost of Hedging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward</td>
<td>Forward premium</td>
</tr>
<tr>
<td>Money Market Hedge</td>
<td>Interest rate differential</td>
</tr>
<tr>
<td>(Borrow to match assets)</td>
<td></td>
</tr>
<tr>
<td>Do nothing</td>
<td>Expected rate of change of exchange rate</td>
</tr>
</tbody>
</table>
Corporate Hedging Decisions: Frutas Amazonas

Exporting bananas to Spain, get paid in Spanish pesetas. Funding is in U.S. dollars.

Corporate Hedging Decisions: Frutas Amazonas

- Continue funding in U.S. dollars. The peseta might get stronger in the next three months, from $1=128$ pesetas to $1=126$ pesetas. This could be the cheapest.
- Switch funding to pesetas, despite the slightly higher cost.
- Borrow in dollars, but hedge the exchange risk in the forward market.
Frutas Amazonas

- Eurodollar 3-month loan rate: 5 9/16%
- Europeseta 3-month loan rate: 7 15/16%
- Spot exchange rate today: Pta128.210 per USD
- Forward exchange rate today: Pta129.005 per USD
- Forward discount, % per annum: -2.5%

Frutas Amazonas

<table>
<thead>
<tr>
<th>Type of Hedge</th>
<th>Cost of Hedging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward</td>
<td>2.5%</td>
</tr>
<tr>
<td>Money Market Hedge (Borrow to match assets)</td>
<td>2.375%</td>
</tr>
<tr>
<td>Do nothing</td>
<td>2/128 x 4 = 6.25% gain (or 2.5% loss?)</td>
</tr>
</tbody>
</table>
Bid and Offer Quotations in the Long-Dated Forward Market

Forwards, Money Market Hedging and Futures

- **Forward contracts**: OTC contracts for future delivery, often settled in cash
- Forwards can be used in
  1. Hedging
  2. Positioning
  3. Arbitrage
- Interest rate parity means that a forward hedge is, normally, the same as a money market hedge.
- **Futures** are free of default risk.
Marking-to-Market of a Futures Contract

Forwards vs Futures vs Options

- Good credit: Forward usually best
- Sometimes, Money Market Hedge better
  - Perfect market: same (covered int. arb.)
  - Imperfect market: MMH may be better
- Credit problem: Futures
  - But: limited and standardized
  - Requires margin and daily settlement
- Uncertain future cash flows:
  - Liquid instrument (futures/forwards to assure flexibility
  - Options sometimes advisable