International Financial Markets

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What are the Global Financial Markets?

- The Foreign Exchange Market
- Eurocurrency Markets and Lending
- International Bond Markets
- International Equity Markets
- Using the Global Capital Markets: Investors’ and Issuers’ Perspectives
**Policies and Exchange Rate Regimes**

- Exchange rate systems--fixed vs floating
- Managed floating
- EMS-type currency blocs
- De facto blocs--the dollar

**The Eurocurrency Market**

“A Eurodollar is a dollar deposited in a bank within a jurisdiction outside the United States”

- Separation of currency, institution and jurisdiction
- Why do people want Eurocurrency deposits and loans?
- Why is LIBOR the world’s key benchmark rate?”
The Eurocurrency Market

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Where the Eurocurrency Market Fits In

- US Domestic Market
- Eurodollar Market
- Euro-Deutsche Mark Market
- Foreign Exchange Market
- Euro-Yen Market
- Euro-Commercial Paper Market
- Euro-Floating Rate Note Market
- Straight Eurobond Market
- German Domestic Market
- Japanese Domestic Market
Interest Rate Linkages in the International Money Market

Two stories to tell:
- Domestic vs. Euro
- Eurocurrency A vs. Eurocurrency B

Domestic versus Euro

The Eurodollar Premium
Market price of risk versus Cost of regulation
- Eurodollar vs. U.S. Interest Rate
  Effective cost of domestic deposit
  \[
  \text{Effective cost} = \frac{\text{interest rate} + \text{FDIC fees}}{1 - \text{reserve requirement}}
  \]
- Capital controls and divided credit markets
Foreign Exchange

- Mechanics and calculations
- How banks make money
- How banks hedge
- Tasks of the corporate FX manager

Foreign Exchange Quotations

Spot
Forward points
## Exchange Rates

<table>
<thead>
<tr>
<th>Currency</th>
<th>How quoted</th>
<th>Spot (2 business days)</th>
<th>Forward (90 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>British pounds</td>
<td>US$ per GBP</td>
<td>1.632</td>
<td>1.617</td>
</tr>
<tr>
<td>Japanese yen</td>
<td>Yen per GBP</td>
<td>117.5</td>
<td>116.3</td>
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## Foreign Exchange Quotations

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<tr>
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<th>Bid</th>
<th>Offer</th>
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<td>Forward points</td>
<td></td>
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Rule:  
- *add if bid<offer,*  
- *subtract if bid>offer*  
- *Outright forward*
### Exchange Rates

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### A Typical Forward Contract

- We agree today to pay a certain price for a currency in the future.
How Does the Bank Hedge a Forward Contract?

Hedging approaches:
- Open
- Forward
- Spot plus swap
- Rollover
- Money market

How Banks Hedge

<table>
<thead>
<tr>
<th></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>
<td></td>
</tr>
</tbody>
</table>

Methods:
- Spot + swap
- Spot + rollover swap
- Money market
- Outright forward
Currency Risk Exposure
(The Normal Distribution)

Probability

Return on large company stocks

-3σ = 48.2%  -2σ = 27.9%  -1σ = 12.7%  0 = 33.0%  +1σ = 66.8%  +2σ = 95.5%  +3σ = 99.9%

Covered Interest Arbitrage

Money market 1  Money market 2

Spot  Forward
Foreign exchange and Eurocurrency dealing are interrelated activities and so are done on the same trading floor.
Funding a Eurokrona Loan

Three ways to fund:

- Take domestic krona deposit
- Take EuroKrona deposit
- Fund with dollars, hedged into krona
  - Take E$ deposit
  - Do FX swap: sell USD spot, buy USD forward
Linkages Between Eurocurrency Rates

Interest rate differential

Covered interest rate parity

Uncovered interest rate parity

Forward premium

Expected % change in exchange rate

Unbiased forward rate

Interest-Rate Parity

$1 \left(1 + \frac{E_S}{E_P}\right) = \left(\frac{1}{S_t}\right)\left(1 + \frac{1}{E_P}\right) \cdot F^n_t$

where $S_t$ is the spot exchange rate (dollars per British Pound) and $F^n_t$ is the forward rate.

to a close approximation,

\[
\left(\frac{E_S}{E_P} - \frac{1}{E_P}\right) = \left[\frac{(F^n_t - S_t)}{S_t}\right] \times \frac{365}{n} \times 100
\]

Interest-rate differential = forward premium or discount
**Example: Anglo’s Funding**

- Anglo-American, the natural resources conglomerate, is seeking 3-month US$ funding.
  - Anglo can fund in the US CP market at 5.5%
  - Or in the Eurosterling market at 6.7%
  - The BP is:
    - spot $1.5484, 3-mo forward $1.5454
  - *Which is cheaper?*

**Anglo’s Answer**

It’s cheaper for Anglo-American to borrow in the US CP market. Reason:

- **US**: simply borrow for 3 months
  - Cost: \(1 \times (1 + 5.5\% / 4) = 1.01375\)

- **UK**: borrow British pounds, change into dollars at spot rate, cover by buying sterling at 3-mo forward rate to repay the pounds
  - Cost: \((1 / 1.5484) \times (1 + 6.7\% / 4) \times 1.5454 = 1.01478\)
Unbiased Forward Rate Theory

Spot

Forward

Actual

Today

TIME

In three months

Probability distribution of actual exchange rate

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**Unbiased Forward Rate**

Forward premium or discount

\[ P_{\$/DM} = \mathbb{E}(R_{\$/DM}) \]

That is,

**International Fisher Effect**

- Spot
- Forward
- Interest rate differential
- Probability distribution of actual exchange rate

- Today
- In three months
- TIME
International Fisher Effect

\[
\frac{1}{E_S} = \frac{1}{E_{DM}} + E(R_{S/DM})
\]

That is,

Interest-rate differential equals Expected annual rate of change of 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>
**Law of One Price**

\[ p = S_p^* \]

The Price of Tin

<table>
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<tr>
<th></th>
<th>On the Kuala Lumpur Market</th>
<th>On the London Metal Exchange</th>
</tr>
</thead>
<tbody>
<tr>
<td>In New York</td>
<td></td>
<td></td>
</tr>
<tr>
<td>273c per lb.</td>
<td></td>
<td>15.37 ringgit per kilogram</td>
</tr>
<tr>
<td>= US$6.02 per kilogram</td>
<td></td>
<td>= US$7.00 per kilogram</td>
</tr>
<tr>
<td>= US$6.02 per tonne</td>
<td></td>
<td>= US$5.83 per kilogram</td>
</tr>
</tbody>
</table>

* 1 avoirdupois pound = 0.45359 kilograms

* US$1 = 2.6965 Malaysian ringgit on the date of calculation

* 1 tonne = 1000 kilogram.

All data taken from the Commodities section of the London Financial Times.

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**Purchasing Power Parity: Theory and Evidence**

\[ \frac{S_{t+1} - S_t}{S_t} = \frac{I - I^*}{1 + I^*} \]

- **MEXICO 1994**
- **JAPAN 1995**
Deviations from Purchasing Power Parity

Source: JP Morgan. Index of real effective exchange rate versus 18 industrial country currencies, adjusted for change in relative wholesale price of domestic manufactures. A fall in the index indicates improved international competitiveness.
**Inflation & Interest Rates**

- **US Expected Inflation Rate**: 2%
- **Canadian Expected Inflation Rate**: 7%
- **US Interest Rate**: 5%
- **Canadian Interest Rate**: 10%

**Expected Rate of Change of the Exchange Rate**
Inflation & Interest Rates

- Borrow at US Interest Rate 5%
- Invest at Canadian Interest Rate 10%

Buy Canadian Dollars Forward (at discount of 5%)
**Inflation & Interest Rates**

- Borrow at US Interest Rate 5%
- Invest at Canadian Interest Rate 10%
- Buy Canadian Dollars Forward (at discount of 5%)
- Buy Canadian Dollar Futures (at discount of 5%)

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**The Linkages Again**

1. Relative Excess Money Supply
2. Relative Inflation Rates
3. Exchange Rate Change
4. Relative Interest Rates
5. Forward Exchange Premium or Discount
A Framework

Country A
DOMESTIC ECONOMIC POLICIES
↓ INFLATION RATE
↓ INTEREST RATE

Country B
DOMESTIC ECONOMIC POLICIES
↓ INFLATION RATE
↓ INTEREST RATE

EXCHANGE RATE
FORWARD RATE

Turkey, 1995

Turkish Lira:
Down 33.5%