Global Economic Issues and Policies
First edition

UNIT THREE
International Finance: Enduring Issues

Chapter 8
The Power of Arbitrage—Purchasing Power and Interest Rate Parities

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PowerPoint Presentation by Charlie Cook
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Fundamental Issues

1. What does the concept of absolute purchasing power parity imply about the value of the real exchange rate?

2. What is relative purchasing power parity, and is it useful as a guide to movements in exchange rates?

3. What are the covered and uncovered interest parity conditions?

4. What is the distinction between adaptive and rational expectations?
5. What is foreign exchange market efficiency?

6. Under what conditions does real interest parity hold, and why is it a useful indicator of international integration?
Law of One Price and Absolute Purchasing

Power Parity

• **Purchasing Power Parity (PPP)**
  - A proposition that the price of a good or service in one nation should be the same as the exchange-rate-adjusted price of the same good or service in another nation.

• **Arbitrage**
  - Buying an item in one market to sell at a higher price in another market.
Law of One Price and Absolute Purchasing Power Parity

• Absolute Purchasing Power Parity
  - The price of one currency ($P$) should equal that current currency’s price ($P^*$) times the spot exchange rate ($S$).
    \[ P = S \times P^* \]
  - The bilateral spot exchange rate should equal the ratio of the price levels of the two nations.
    \[ S = P / P^* \]
<table>
<thead>
<tr>
<th>Country</th>
<th>Big Mac Prices in Local Currency</th>
<th>Implied PPP Exchange Rate</th>
<th>Actual Exchange Rate</th>
<th>Local Currency Under (-) / Over (+) Valuation, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$2.49</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Brazil</td>
<td>Real 3.60</td>
<td>1.45 Real/$</td>
<td>2.34 Real/$</td>
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<td>Baht 70.00</td>
<td>22.1 Baht/$</td>
<td>43.3 Baht/$</td>
<td>−49</td>
</tr>
</tbody>
</table>

Relative Purchasing Power Parity

- Relative Purchasing Power Parity
  - The relationship of relative changes in exchange rates to relative changes in countries’ price levels.
  - $\% \Delta P$ represents the proportionate change in a country’s price level over a period.

$$\% \Delta S = \% \Delta P - \% \Delta P^*$$
International Interest Rate Parity

• Covered Interest Returns
  ➢ Returns completely hedged against foreign-exchange risk depend on forward and spot exchange rates.

• Covered Interest Parity
  ➢ A prediction that the interest rate on one nation’s bond should approximately equal the interest rate on a similar bond in another nation plus the forward premium
    ➢ The difference between the forward exchange rate and the spot exchange rate divided by the forward exchange rate.
Covered Interest Parity Example

\[ 1 + R_{US} = (F/S)(1 + R_{UK}). \]

\[ F/S = (S/S) + (F - S)/S = 1 + (F - S)/S \]

\[ 1 + R_{US} = [1 + (F - S)/S](1 + R_{UK}) \]

\[ 1 + R_{US} = 1 + (F - S)/S + R_{UK} + [R_{UK} \times (F - S)/S] \]

\[ R_{US} = R_{UK} + (F - S)/S \]
Figure 8-1a  Covered Interest Arbitrage and Interest- and Exchange-Rate Adjustments

Spot Exchange Rate

$S(\$/\£)$

$S_E$  $D_E$

Forward Exchange Rate

$F(\$/\£)$

$F_1$  $F_2$

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Figure 8-1b
Covered Interest Arbitrage and Interest-and Exchange-Rate Adjustments (cont'd)
Uncovered Interest Arbitrage

• Uncovered Interest Parity

  The equality between the interest rate in one nation and the sum of the interest rate and expected currency depreciation for another nation.

  \[ R_{US} = R_{UK} + \%\Delta S^e \]

• Risk Premium

  The increase in the return offered on a bond to compensate individuals for the additional foreign exchange risk they undertake in uncovered transactions.

  \[ R_{US} = R_{UK} + \%\Delta S^e + RP \]
Figure 8-2  Approximate Deviations from Uncovered Interest Parity

Are Foreign Exchange Markets Efficient?

• Adaptive Expectations
  - Expectations that are based only on information from the past.

• Drawbacks of Adaptive Expectations
  - People make forecasts that they realize in advance should turn out to be wrong.
  - There is no way to say, in advance, what adaptive expectations process is “best.”
Are Foreign Exchange Markets Efficient?

• Rational Expectations Hypothesis
  ➢ The idea that individuals form expectations based on all available past and current information and on a basic understanding of how markets function.

• Advantages of the Rational Expectations Hypothesis
  ➢ It is a more general theory of expectations formation than adaptive expectations.
  ➢ Rationally formed forecasts of the market prices and returns are better, on average, than adaptive forecasts.
The Efficient-Markets Hypothesis

• Efficient-Markets Hypothesis
  - A theory that stems from application of the rational expectations hypothesis to financial markets.
  - States that equilibrium prices of and returns on bonds should reflect all past and current information plus traders’ understanding of how market prices and returns are determined.
Foreign Exchange Market Efficiency

- Foreign Exchange Market Efficiency
  - Market efficiency exists when the forward exchange rate is a good predictor—often called an “unbiased predictor”—of the future spot exchange rate, meaning that on average the forward exchange rate turns out to equal the future spot exchange rate.

\[
\frac{(F - S)}{S} = %\Delta S^e
\]

\[
\frac{(F - S)}{S} = \frac{(S^e - S)}{S}
\]

\[
F = S^e
\]
Figure 8-3  Forward and Spot Exchange-Rate Differentials


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Revisiting Global Integration of the Real and Financial Sectors

• Nominal Interest Rate
  ➢ A rate of return in current-dollar terms that does not reflect anticipated inflation.

• Real Interest Rate
  ➢ The anticipated rate of return from holding a bond after taking into account the extent to which inflation is expected to reduce the amount of goods and services that this return could be used to buy.

\[ r = R - \%\Delta P^e \]
Combining Relative Purchasing Power Parity and Uncovered Interest Parity: Real Interest Parity

• Real Interest Parity
  - An equality between two nations’ real interest rates that arises if both uncovered interest parity and relative purchasing power parity are satisfied.

\[
\%\Delta P^e - \%\Delta P^*e = \%\Delta S^e
\]

\[
R - R^* = \%\Delta S^e
\]

\[
\%\Delta P^e - \%\Delta P^*e = R - R^*
\]

\[
R - \%\Delta P^e = R^* - \%\Delta P^*e
\]
Figure 8-4  Real Interest Rate Differences