Determinants of Exchange Rates

- governed by supply and demand factors
- short run: transfers of bank deposits in response to interest rate differentials
- medium run: cyclical economic fluctuations
- long run: flows of goods & services based on inflation, productivity, tastes, and trade policy
Long Run – Relative Price Levels

- assume: U.S. price level increases and UK price level remains constant
- U.S. consumers want relatively low-priced UK goods increasing demand for pounds
- UK consumers want fewer U.S. goods decreasing supply of pounds

result: increase in U.S. price level leads to depreciation of dollar
Long Run – Relative Productivity

- assume: greater U.S. productivity growth than UK
- U.S. goods become relatively less expensive
- UK consumers want more U.S. goods increasing supply of pounds
- U.S. consumers want fewer UK goods decreasing demand for pounds

result: increase in relative productivity leads to appreciation of dollar
Long Run – Foreign Preferences

- assume: U.S. consumers develop strong preference for goods from the UK
- U.S. consumers purchase more pounds to buy UK goods
- demand for pounds increases which decreases value of the dollar

result: increased demand for imports leads to depreciation of dollar
Long Run – Trade Barriers

- assume: U.S. government imposes trade barriers on products from the UK
- UK goods become more expensive
- U.S. consumers purchase fewer pounds to buy UK goods
- decrease in demand for pound increases value of the dollar

result: trade barriers lead to appreciation of dollar
Law of One Price

- identical good should cost same in all nations
- Big Mac Index – used to determine extent to which market exchange rate differs from equilibrium exchange rate

<table>
<thead>
<tr>
<th>Country/Currency</th>
<th>In Local Currency</th>
<th>In U.S. Dollars*</th>
<th>Local Currency Overvaluation (⁺), Undervaluation (⁻) (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States (dollar)</td>
<td>$3.41</td>
<td>$3.41</td>
<td>—</td>
</tr>
<tr>
<td>Switzerland (franc)</td>
<td>6.30</td>
<td>5.20</td>
<td>+53%</td>
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<tr>
<td>Denmark (krone)</td>
<td>27.75</td>
<td>5.08</td>
<td>+49</td>
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<tr>
<td>Euro area (euro)</td>
<td>3.06</td>
<td>4.17</td>
<td>+22</td>
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<tr>
<td>United Kingdom (pound)</td>
<td>1.99</td>
<td>4.01</td>
<td>+18</td>
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<tr>
<td>Venezuela (bolivar)</td>
<td>7,400</td>
<td>3.45</td>
<td>+1</td>
</tr>
<tr>
<td>Mexico (peso)</td>
<td>29.0</td>
<td>2.69</td>
<td>−21</td>
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<td>Japan (yen)</td>
<td>280</td>
<td>2.29</td>
<td>−33</td>
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<tr>
<td>Russia (ruble)</td>
<td>52.0</td>
<td>2.03</td>
<td>−41</td>
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<tr>
<td>China (yuan)</td>
<td>11.0</td>
<td>1.45</td>
<td>−58</td>
</tr>
</tbody>
</table>
Purchasing Power Parity (PPP)

- purchasing power parity theory – application of law of one price to national price levels
- implies currency prices adjust to make goods & services cost the same everywhere
- changes in relative national price levels determine changes in exchange rates over long run
- in theory:

\[
\text{exchange rate}_1 = \text{exchange rate}_0 \times \frac{P_{US1}/P_{US0}}{P_{F1}/P_{F0}}
\]

1 = current year; 0 = base year
Example of PPP

- U.S. and UK 1973 to 2003 indicates PPP is relatively good predictor in the long run
- Negligible predictive power in the short run
Empirical Evidence on PPP

According to relative PPP, the percentage change in the exchange rate should equal the inflation differential.

Rate of depreciation 1975–2005 (% per year relative to U.S. $)

Relationship predicted by PPP

Inflation differential 1975–2005 (% per year relative to U.S.)
According to absolute PPP, over time relative prices should converge.
• Hyperinflation occurs when the monthly inflation rate equals 50% or more over a sustained period.
  – Relative PPP predicts the large inflation differentials should lead to equally large depreciations in the currency.
How Slow is Convergence to PPP?

• Two measures:
  – Speed of convergence: how quickly deviations from PPP disappear over time (estimated to be 15% per year).
  – Half-life: how long it takes for half of the deviations from PPP to disappear (estimated to be about four years).

• These estimates are useful for forecasting how long exchange rate adjustments will take.
Asset-Market Approach

- investors consider:
  1) relative levels of interest rates
  2) expected changes in exchange rate itself over term of investment
- nominal interest rate is first approximation
- however rate of inflation is significant factor
- real interest rate may be more important to investors

\[
\text{real interest rate} = \text{nominal interest rate} - \text{inflation rate}
\]
Significance of Real Interest Rates

![Graph showing real interest rates and trade-weighted value of the dollar from 1974 to 2006. The graph indicates a trend where real interest rates have generally decreased over time, leading to depreciation of the dollar.](image-url)

- Real Interest Rate
- Dollar's Exchange Value
- Trade-Weighted Value of the Dollar (Index: March 1973 = 100)

- Appreciate
- Depreciate
Relative Interest Rates

- Assume: decrease in interest rates in U.S. and no change in interest rates in UK
- U.S. investors demand pounds in order to purchase investments in UK
- UK investors will invest less in U.S. decreasing supply of pounds

Result: dollar depreciates (pound appreciates)
Expected Change in Exchange Rate

- assume: UK investors expect future increase in exchange value dollar
- UK investors can buy dollars relatively cheaply now with return in more valuable dollars later
- U.S. investments are more attractive which increases supply of pounds

result: dollar appreciates (pound depreciates)
Historical Value of Dollar – 1980s

- Increase in value of dollar began in 1979
- Caused by tighter monetary policy and higher interest rates in response to high inflation
- Larger deficits also increased interest rates
- Late 80s saw depreciation of dollar because of speculation that dollar could not continue to appreciate and expansionary monetary policy
Historical Value of Dollar – 1990s

- 1990s began with decrease in value of dollar associated with weak economy, expansionary monetary policy and low interest rates
- Mid-1990s saw economic growth and budget surplus
- Japanese and European economies were sluggish
- These factors caused appreciation of the dollar
Historical Value of Dollar – 2000s

- Dollar depreciated in 2002-04 because of decrease in demand for U.S. investments and recession.
- Stock market decline, accounting practices, and low interest rates were also factors.
- By 2005 dollar began to appreciate again due to economic improvement and higher interest rates associated with restrictive monetary policy.
Exchange Rate Overshooting

- definition – short run response to change in market fundamentals is greater than long run response

- changes in fundamentals exert greater short run impact on exchange rates

- partially due to greater degree of elasticity in the short run
Forecasting Exchange Rates

- **judgmental forecasts**
  - “subjective” or “common sense” models
  - wide array of political and economic data

- **technical forecasts**
  - extrapolation from past trends
  - ignores economical and political determinants
  - analysis of short term movements

- **fundamental analysis**
  - statistical estimation based on economic variables related to currency supply & demand
  - best suited to long term forecasting