Outline

- Trends, composition and drivers of capital flows
- FDI: characteristics and drivers
- Debt: sovereign spreads and determinants
- A new source of hard currency: remittances
- Policy options for regulating capital flows: intervention
- Policy options: capital controls (not discussed).
Red line: Capital flows recovered after 2002. 2005: Net direct investment up; portfolio and other components down. Recent data: final 2005 figures probably higher than 9/05 forecasts. Portfolio flows more important in some countries than conveyed by figure.

Capital flows in emerging markets

Total net private capital flows
Net direct investment
Net private portfolio flows
Other net private capital flows

1 In billions of US dollars.  2 Annual average.
Source: IMF, World Economic Outlook, September 2005.
Capital Flows: Stylized Facts (A)

- Cycles in private capital flows to developing countries
  - 1990-1996: Boom period
  - 1997-2002: extended decline
  - 2003-: Recovery, 1996-1997 peaks now exceeded

- Punctuated by crises or financing constraints
  - 1994-1995 - Tequila crisis; 1997-1998 - Asian Crisis (Reversal);
    1998-1999 - Russia-LTCM-Brazil crises
  - 2001: Argentina and Turkey crises,
  - 2002: Brazil, Turkey and Venezuela face higher costs of funds
    (see later)
Capital Flows: Stylized Facts (B)

Direction
- Capital flows to Asia and transition economies recovered in 2000 – a lot of the flows to China, now India
- Latin America: flows ceased in 2002, recovered in 2003

Composition
- **1980s**: Mostly bank and trade-related lending;
- **1990s**  (1) Mostly direct (FDI) and portfolio investment (not Asia, still banks, Asian crises involved reversal in bank lending); (2) Flows very concentrated in private sector and a few countries
- **2000s**: Mostly FDI. Note switch in banking from offshore to onshore (ie foreign bank presence larger than indicated by cross-border loans, Table)
- **2003-** Signs of recovery.
  - Increased issuance of bonds in international markets exploiting lower costs of financing; more issuance of bonds in domestic markets (Graphs). More portfolio investment eg in India and some Latin American countries.
### Claims of BIS reporting banks

<table>
<thead>
<tr>
<th></th>
<th>International claims</th>
<th>Local claims</th>
<th>Local claims / international claims</th>
<th>Local claims / domestic bank credit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In billions of US dollars</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>In per cent</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia⁴</td>
<td>730</td>
<td>471</td>
<td>644</td>
<td>160</td>
</tr>
<tr>
<td>Hong Kong SAR</td>
<td>241</td>
<td>110</td>
<td>120</td>
<td>96</td>
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<tr>
<td>Malaysia</td>
<td>17</td>
<td>21</td>
<td>40</td>
<td>4</td>
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<tr>
<td>Latin America⁵</td>
<td>195</td>
<td>260</td>
<td>196</td>
<td>38</td>
</tr>
<tr>
<td>Argentina</td>
<td>38</td>
<td>69</td>
<td>15</td>
<td>4</td>
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<tr>
<td>Colombia</td>
<td>11</td>
<td>12</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Mexico</td>
<td>57</td>
<td>64</td>
<td>65</td>
<td>4</td>
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<tr>
<td>Venezuela</td>
<td>12</td>
<td>13</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Central Europe⁶ and Russia</td>
<td>76</td>
<td>92</td>
<td>212</td>
<td>4</td>
</tr>
<tr>
<td>Saudi Arabia, South Africa and Turkey</td>
<td>42</td>
<td>79</td>
<td>102</td>
<td>2</td>
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</table>

1. Outstanding positions at year-end.  
2. BIS reporting banks’ cross-border claims in all currencies and their foreign affiliates’ local claims in foreign currencies (consolidated banking statistics).  
3. BIS reporting banks’ local claims in local currencies.  
4. Total of the countries shown plus China, India, Indonesia, Korea, the Philippines, Taiwan (China) and Thailand.  
5. Total of the countries shown plus Brazil, Chile and Peru.  
6. The Czech Republic, Hungary and Poland.  
Sources: IMF; BIS.

Source: Updated from Moreno and Villar, 2005.
## Gross issuance in international bond and note markets

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<th>2004</th>
<th>2005</th>
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<th>2005</th>
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<tr>
<td></td>
<td>Year</td>
<td>Year</td>
<td>Q4</td>
<td>Q1</td>
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<tr>
<td>Total announced issues</td>
<td>3,296.9</td>
<td>3,836.3</td>
<td>822.3</td>
<td>1,076.9</td>
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<tr>
<td>Of which bonds</td>
<td>1,782.7</td>
<td>2,045.0</td>
<td>434.9</td>
<td>595.8</td>
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<tr>
<td>Developed countries</td>
<td>3,008.3</td>
<td>3,447.7</td>
<td>751.9</td>
<td>953.9</td>
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<tr>
<td>United States</td>
<td>773.6</td>
<td>835.7</td>
<td>182.3</td>
<td>214.6</td>
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<td>Euro area</td>
<td>1,469.4</td>
<td>1,792.4</td>
<td>364.8</td>
<td>532.4</td>
</tr>
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<td>Japan</td>
<td>62.0</td>
<td>56.3</td>
<td>9.9</td>
<td>13.9</td>
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<td>Offshore centres</td>
<td>39.2</td>
<td>50.4</td>
<td>13.5</td>
<td>11.4</td>
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<tr>
<td>Emerging markets</td>
<td>152.4</td>
<td>230.9</td>
<td>35.1</td>
<td>83.3</td>
</tr>
</tbody>
</table>
International debt securities issuance by emerging market entities

In billions of US dollars

Gross issuance, by nationality of issuer

Net issuance, by nationality of issuer

Gross issuance, by sector of issuer

Net issuance, by sector of issuer

1 Excluding issuance by the Republic of Argentina in the first and second quarters of 2005.

Sources: Dealogic; Euroclear; ISMA; Thomson Financial Securities Data; BIS.

Graph 3.2

Source: BIS Quarterly Review, March 2006
International debt securities issuance in local currency

1 Announced issuance by nationality of issuer in millions of US dollars. 2 Excluding issuance by the Republic of Argentina in the first quarter of 2005. 3 Adjusted for Argentina; monthly averages, in basis points.

Sources: Dealogic; Euroclear; ISMA; Thomson Financial Securities Data; BIS.

Graph 3.3

Source: BIS Quarterly Review, March 2006
Capital flows influence business cycle

- **Inflow periods**: flows finance economic booms, possibly inflationary, with growing financial fragility in some cases, higher public indebtedness in others, and real exchange rate appreciation.

- **Outflow periods**: Economic “busts.” Financing is withdrawn and economy contracts.

- Motivates search for drivers & policy options
Capital Flows: Long Run Perspective

- “Home bias” in investment. Reflects asymmetric information or lack of “familiarity.” Hard to assess risk abroad. Incomplete markets?
- Technological advances make it easier to monitor investments abroad.
- Traditional role of banking as supplier of specialized information on borrowers falls. More dedicated investors in emerging economies.
- Process of international diversification still at very early stage—powerful forces for continued global financial market integration

Cyclical patterns: Global and domestic factors influence capital flows

- **Global shocks:** Low global interest rate declines in 1989-1993 and more recently encouraged flows to emerging markets.

- **Domestic factors:** Capital flows to countries with good fundamentals (higher returns).
  - Disinflation, smaller deficits
  - Structural reforms: Liberalization and incentives

- Global factors more important early 1990s, domestic factors more important later.

- **Question:** What factors influenced capital flows in 2002-2005?
Outline

- Trends, composition and drivers of capital flows
- FDI: characteristics and drivers
- Cyclical factors: sovereign spreads and determinants
- Policy options for regulating capital flows: intervention
Foreign Direct Investment is of particular interest

- It has been relatively stable even as other sources of financing declined
- FDI to developed countries is largest
  - FDI recipients are stable: Best predictor of inward FDI this period are stocks or flows last period
  - Two stylized facts (1) Advanced countries with large FDI inflows also have large FDI outflows; (2) FDI inflows are not associated with high investment
    - Interpretation: FDI to developed countries does not finance capital formation but transfers assets from less efficient to more efficient owners
    - U.S. Outward FDI production tends to be higher in industries of earlier U.S. export comparative advantage
- FDI to developing countries: seen as enhancing growth although efficiency effects are very important

### 2005: FDI flows continue to rise

<table>
<thead>
<tr>
<th>Region</th>
<th>2003</th>
<th>2004</th>
<th>2005 estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>All developing economies</td>
<td>153.4</td>
<td>189.1</td>
<td>209.2</td>
</tr>
<tr>
<td>Asia</td>
<td>67.1</td>
<td>81.6</td>
<td>84.2</td>
</tr>
<tr>
<td>Latin America</td>
<td>36.1</td>
<td>46.6</td>
<td>46.1</td>
</tr>
<tr>
<td>Central and Eastern Europe</td>
<td>14.9</td>
<td>23.8</td>
<td>32.5</td>
</tr>
<tr>
<td>Commonwealth of Independent States</td>
<td>5.3</td>
<td>13.4</td>
<td>8.6</td>
</tr>
<tr>
<td>Africa</td>
<td>14.6</td>
<td>13.9</td>
<td>19.5</td>
</tr>
<tr>
<td>Middle East</td>
<td>13.6</td>
<td>11.3</td>
<td>15.4</td>
</tr>
</tbody>
</table>

1 in billions of US dollars.
Sources: IMF, World Economic Outlook, September 2005, CEIC.
But FDI flows are highly concentrated

- 2004: Five countries—Brazil, China, India, Mexico, and the Russian Federation accounted for 88 percent of net FDI flows to developing countries.
  - Small share of low income countries, although may be large in proportion to their economic size. (Graphs).
  - High concentration has been observable for some time (Graph)
- China accounted for
  - one-third of net FDI inflows to all developing countries (down from 35 percent in 2003)
  - almost 90 percent of net FDI inflows to the East Asia and Pacific region; however its share appears to have fallen in 2005
  - Part of regional relocation of production in which see
    - Higher export revenues for China, and more intra-regional East Asian trade (Graph)
    - Declining net FDI in rest of East Asia. ASEAN-4 particularly affected (Graph), but some recovery in 2005
    - Gross FDI outflows from more developed East Asian economies to China (part of aggregate increase in FDI outflows – Graph)
Figure 1.6 Share of net FDI inflows to low-income and least developed countries, 1990–2004

% net FDI flows to developing countries

Sources: World Bank Debtor Reporting System and staff estimates.

Middle income countries = 85% of FDI
Figure 2.3 FDI is concentrated in large countries, but many small countries receive large amounts relative to GDP.

(percent share of total FDI)

(FDI as a share of GDP)

Some countries with a small share of total FDI have high FDI-to-GDP ratios (right axis).

Top 10 receive almost 80% of total FDI flows (left axis).

Note: Countries sorted by share of total FDI, 1999. Source: World Bank data.
Longer run patterns: Most capital flows to a small number of (wealthier) developing countries

Shares in Total Capital Flows, 1970-98 (%)

Note 1: Share of low income countries to 2004 remains low

Note 2: “Private capital flows” refer to private long-term (and short-term) resource flows. The group of top 10 emerging markets consists of Argentina, Brazil, Chile, China, India, Indonesia, Korea, Malaysia, Mexico, and Thailand. Source: World Bank, *Global Development Finance.*
Exports and FDI inflows

Exports\(^1\)
- China
- Other Asia\(^2\)
- Latin America

FDI net inflows\(^3\)

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\(^1\) In US dollar terms, 1995 = 100.  
\(^2\) Hong Kong SAR (except for FDI), India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan (China) and Thailand.  
\(^3\) In billions of US dollars.

Sources: CEIC; IMF; national data.
Figure 1.7  FDI outflows from developing countries, 1990–2004

Sources: World Bank Debtor Reporting System and staff estimates.
Factors influencing direction of FDI flows

- Country size (+) & distance (-) (gravity model), per capita income (+),
growth (-), tax (0) (Lipsey, NBER WP 6876, 1999)
- Institutional factor + Policies
  - Corruption acts like a tax (Wei, 1997). It may also mean less stable
  or liberal economic policies (resort to inflation tax), decreasing
  expected returns (Bay & Wei, 2000)
  - Direction of FDI negatively correlated with institutional quality
    (Lipsey, NBER WP 6876, 1999). Caveat: institutional quality may be
    correlated with per capita income.

- Policy implication: If country small or far from FDI source, countries need
  better characteristics to attract FDI. Better institutions, low corruption etc.
Geography/information may play a role in limiting spread of investment

- Portes and Rey – determinants of gross equity flows
  - Market size (equity market capitalization) (+),
  - Info asymmetry (distance, insider trading)
  - Information transmission (telephone call traffic and multinational bank branches)
  - Financial sophistication (efficiency of transactions)
  - Openness

- Implies capital flows more broadly might be more concentrated.
Are remittances a new kind of non-resident investment?
Recorded remittances have grown faster than private capital flows and ODA (US$ billions)

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers’ remittances</td>
<td>58</td>
<td>160</td>
</tr>
<tr>
<td>Foreign direct investment</td>
<td>107</td>
<td>166</td>
</tr>
<tr>
<td>Private debt and portfolio equity</td>
<td>170</td>
<td>136</td>
</tr>
<tr>
<td>Official development assistance</td>
<td>59</td>
<td>79</td>
</tr>
</tbody>
</table>

Source: World Bank Global Economic Prospects, Table 4.2

Traditional view: remittances used for consumption.
More recent view: used for investment.
Figure 4.1 Top 20 remittance-recipient countries, 2004

<table>
<thead>
<tr>
<th>Country</th>
<th>Billions of dollars</th>
<th>Share of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>21.7</td>
<td>31.1</td>
</tr>
<tr>
<td>China</td>
<td>21.3</td>
<td>27.1</td>
</tr>
<tr>
<td>Mexico</td>
<td>18.1</td>
<td>25.8</td>
</tr>
<tr>
<td>France</td>
<td>12.7</td>
<td>24.8</td>
</tr>
<tr>
<td>Philippines</td>
<td>11.6</td>
<td>22.5</td>
</tr>
<tr>
<td>Spain</td>
<td>6.9</td>
<td>20.4</td>
</tr>
<tr>
<td>Belgium</td>
<td>6.8</td>
<td>17.4</td>
</tr>
<tr>
<td>Germany</td>
<td>6.5</td>
<td>17.2</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>6.4</td>
<td>16.2</td>
</tr>
<tr>
<td>Morocco</td>
<td>4.2</td>
<td>15.5</td>
</tr>
<tr>
<td>Serbia</td>
<td>4.1</td>
<td>13.5</td>
</tr>
<tr>
<td>Pakistan</td>
<td>3.9</td>
<td>13.2</td>
</tr>
<tr>
<td>Brazil</td>
<td>3.6</td>
<td>12.4</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>3.4</td>
<td>12.4</td>
</tr>
<tr>
<td>Egypt, Arab Rep.</td>
<td>3.3</td>
<td>12.1</td>
</tr>
<tr>
<td>Portugal</td>
<td>3.2</td>
<td>11.9</td>
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<tr>
<td>Vietnam</td>
<td>3.2</td>
<td>11.7</td>
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<td>Colombia</td>
<td>3.2</td>
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<td>United States</td>
<td>3.0</td>
<td>11.3</td>
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<tr>
<td>Nigeria</td>
<td>2.8</td>
<td>10.0</td>
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Remittances to Developing Countries (US$ billions)

<table>
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<tr>
<td>Developing countries</td>
<td>31.2</td>
<td>57.8</td>
<td>85.6</td>
<td>160.4</td>
<td>166.9</td>
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<td>Lower middle income</td>
<td>13.9</td>
<td>30.0</td>
<td>42.6</td>
<td>83.5</td>
<td>88.0</td>
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<td>Upper middle income</td>
<td>9.1</td>
<td>14.5</td>
<td>20.0</td>
<td>33.0</td>
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<td>Low income</td>
<td>8.1</td>
<td>13.3</td>
<td>22.8</td>
<td>43.9</td>
<td>45</td>
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<td>Latin America and the Caribbean</td>
<td>5.8</td>
<td>13.4</td>
<td>20.1</td>
<td>40.7</td>
<td>42.4</td>
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<td>South Asia</td>
<td>5.6</td>
<td>10.0</td>
<td>17.2</td>
<td>31.4</td>
<td>32.0</td>
</tr>
<tr>
<td>East Asia and the Pacific</td>
<td>3.3</td>
<td>9.7</td>
<td>16.7</td>
<td>40.9</td>
<td>43.1</td>
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<td>Middle East and North Africa</td>
<td>11.4</td>
<td>13.4</td>
<td>13.2</td>
<td>20.3</td>
<td>21.3</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>3.2</td>
<td>8.1</td>
<td>13.4</td>
<td>19.4</td>
<td>19.9</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>1.9</td>
<td>3.2</td>
<td>4.9</td>
<td>7.7</td>
<td>8.1</td>
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<td>World (developing &amp; industrial)</td>
<td>68.6</td>
<td>101.6</td>
<td>131.5</td>
<td>225.8</td>
<td>232.3</td>
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<td>Outward remittances from</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>developing countries</td>
<td>6.1</td>
<td>12.5</td>
<td>12.1</td>
<td>24.1</td>
<td>–</td>
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<tr>
<td>Outward remittances from</td>
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<td>Saudi Arabia</td>
<td>11.2</td>
<td>16.6</td>
<td>15.4</td>
<td>13.6</td>
<td>–</td>
</tr>
</tbody>
</table>
Factors contributing to higher remittances

- More workers abroad (e.g., Indian workers in the Middle East)
- Rising migrant worker incomes
- Greater uncertainty associated with tighter host immigration controls/enforcement (e.g., Pakistan)
- Better economic prospects in home country
- Lower remittance costs (e.g., 60% drop in US-Mexico)
- Lower taxes on remittances
- Easing of regulations and controls, more flexible exchange rate, some opening of capital account (would shift remittances from untracked informal to tracked formal sector)
- Availability of financial instruments for investment in home country (e.g., India made bonds available, foreign currency deposits).
Outline

- Trends, composition and drivers of capital flows
- FDI: characteristics and drivers
- Cyclical influences: sovereign spreads and determinants
- Policy options for regulating capital flows: intervention
Cyclical influences on international capital flows

- **Global recovery in source & recipient countries**
- **Global market shocks.**
  - 2002: Sudden increase in loss aversion. Spreads on high yield assets and internationally issued emerging market bonds widen
  - 2003-2004: Spreads fall, capital flows pick up
- **Domestic factors:**
  - Political uncertainty
  - Improved policies reassure investors
  - Example: Brazil. Large primary budget surpluses & commitment to inflation target.
- Market sentiment reflected in sovereign spreads
Emerging market bond spreads\(^1\) and US corporate bond yield

\(^1\) Spread between international sovereign US dollar bonds and benchmark US treasury bonds, in basis points; unweighted average of the countries shown.  
\(^2\) China, India, Indonesia, Korea, Malaysia, the Philippines and Thailand.  
\(^3\) Brazil, Chile, Colombia, Mexico, Peru and Venezuela.  
\(^4\) The Czech Republic, Hungary and Poland.  
\(^5\) Sub-investment grade corporate bond yield.

Sources: Bloomberg; Datastream; national data.
Sovereign spreads -

- Turbulence in 2002:
  - Spreads in sub-investment grade paper and in Latin America widen and then narrow, effect on other regions muted
  - High correlation with spreads on US high yield bonds during that period.
  - Suggests global and region-or country-specific factors affect spreads
- Questions (1) What drives volatility in spreads? (2) What made Latin America less attractive? (3) Why do we care?
Sovereign spreads

- Spreads = $i_t^f - i_t^*$ = reflects perceived risk of default and possibly a risk premium over treasury benchmark.

- First RHS term is yield on a country’s international bond in foreign currency, second RHS term is yield on benchmark foreign security (e.g., US Treasury).

- Spreads are related to the probability of default.
  - $S = (1 + i^*)(1 - p)/p$ where $i^*$ is the risk-free rate and $1 - p$ is the probability of default.
    - Follows from spread definition and the equilibrium condition: $1 + i^* = p(1 + i^f) + (1 - p)x0$, ie risk free rate = expected repayment on the risky bond
    - Predictions: spread rises if following rise (1) probability of default; (2) risk free rate

- Spreads can also be driven by other factors, investor risk appetite or global risk aversion. Can add a risk premium.
Sovereign spreads – determinants

- **Common global factors.** On average 1/3 of total variation is driven by common forces (McGuire and Schrijvers, BIS 2003). Q: What are these factors?
- **Global interest rates**
  - US interest rates fell and are now rising. Implications for spreads?
- **Investor risk appetite or global risk aversion.** Calvo: Sovereign spreads correlated with US corporate bond spreads. Garcia Herrero and Ortiz (2004). The correlation is not constant over time. EMBI spreads have fallen but high yield spreads have not (previous Graph).
  - Do low spreads underprice risks or lead to financial fragility in emerging markets?
- **Country specific factors.** Debt sustainability, political uncertainty. (Graph)
Sovereign spreads

- Distinct positive relationship between Debt/exports in 2001 and spreads in 2002
  - “Debt intolerance” – if your debt is too high may be vulnerable to crises (Reinhart, Rogoff and Savastano, 2004) and adverse shifts in market sentiment.

- Outliers – Brazil and Venezuela: country-specific political uncertainty.
  - Venezuela had lower debt ratio than Chile: Difference in spreads a measure of political uncertainty and governance issues

- 2003-2005 search for yield and enhanced credibility lowered spreads everywhere
Sovereign spreads – why we care

- Spreads are a signal of financing constraints. When too high EM borrowers stop issuing debt in international markets (markets close)
- Associated with currency depreciation and higher domestic interest rates
- Inflation tends to rise and economic activity to slow down. If there are currency mismatches, economic contraction can be severe
- Liquidity can vanish in domestic financial markets – leading to crises.
- Less vulnerable with higher credit rating
Brazil: exchange rates and bond spread

The vertical lines represent the months in which the S&P credit rating changed from BB- to B+, to BB-, to B+, to BB- and to BB, respectively.

1 Real per US dollar; inverted log scale.  2 In basis points.  3 Over benchmark US Treasury bonds.  4 Composite index.

Sources: Bloomberg; Datastream; national data.
Case study Brazil

- **2002:** Shock
  - 02.H1 Spreads rise, policy rates do not adjust, currency depreciates
  - Impact in part depends on proportion of exchange rate indexed public debt and short-term debt (interest rate exposure)
  - 02.Q4: spreads begin declining but inflation picks up sharply, inflation target breached

- **2003:** Shock reversal and economic adjustment
  - Investors search for yield, sovereign spreads narrow.
  - 03.Q1. Policy rates raised sharply and then are gradually lowered 10 pp. Disinflation & slow recovery.

- **2004-:** Recovery from 2002 episode
  - Growth recovers to strongest in years. Inflation target breached – Central bank refrains from lowering rates further.
  - Significant improvement in fiscal fundamentals. Primary surpluses very large, net debt declines

- Versus Chile (investment grade rated)

2002: Bond spread remained well below EMBI spread
2003: EMBI spread falls.

1 Left-hand scale; peso per US dollar; inverted log scale.  2 Right-hand scale; in basis points.  3 Over benchmark US Treasury bonds.  Sources: Bloomberg; Datastream; national data.

Chile: exchange rates and bond spread

1 Peso per US dollar; inverted log scale.    2 In basis points.    3 Over benchmark US Treasury bonds.    4 Composite index.

Sources: Bloomberg; Datastream; national data.
Outline

- Trends, composition and drivers of capital flows
- FDI: characteristics and drivers
- Cyclical influences: sovereign spreads and determinants
- Policy options for regulating capital flows: intervention
Possible responses to capital inflows:

Let the currency appreciate
- Pros and cons

Intervention in foreign exchange markets
- What is intervention?
- How much intervention?
- Why intervene?
- Domestic implications
Two alternative definitions of intervention

- **Narrow definition.** It is intervention only if it is sterilized and if the goal is to influence the exchange rate. Rule out small technical operations to adjust reserve levels, non-discretionary (formula-based) operations or transactions that do not affect the exchange rate (e.g., financed by foreign borrowing).

- **Disadvantages.** Can miss many large transactions done by emerging market economies. Forex operations to accumulate reserves or that are not sterilised can involve huge sums.

- **Broad definition.** Any purchase or sale of foreign exchange is intervention, however financed. Could include passive intervention – direct central bank transactions with government corporate entities designed to insulate the forex market from large currency inflows from exports, FDI or privatisation (Mexico, South Africa, Czech). Can look at changes in foreign reserves.
### Table 1

**Capital flows, current accounts and intervention**

<table>
<thead>
<tr>
<th>Region</th>
<th>Net capital flows</th>
<th>Current account balance</th>
<th>Change in reserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia, large</td>
<td>119</td>
<td>350</td>
<td>-18</td>
</tr>
<tr>
<td>Asia, other</td>
<td>70</td>
<td>-206</td>
<td>-40</td>
</tr>
<tr>
<td>Latin America</td>
<td>100</td>
<td>77</td>
<td>-64</td>
</tr>
<tr>
<td>Central Europe</td>
<td>23</td>
<td>85</td>
<td>-13</td>
</tr>
<tr>
<td><strong>Developing countries, total</strong></td>
<td><strong>332</strong></td>
<td><strong>238</strong></td>
<td><strong>-170</strong></td>
</tr>
</tbody>
</table>

1. In billions of US dollars.  
2. Sum for China, India, Korea and Taiwan (China).  
3. Sum for Hong Kong SAR, Indonesia, Malaysia, the Philippines, Singapore and Thailand.  
4. Sum for Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.  
5. Sum for the Czech Republic, Hungary and Poland.  


Intervention more than 15 times as large than in mid-1990s, largely due to Asia, where capital flows. Smaller or negative but current accounts in surplus. 2005: Capital flows fell in Asia, as an increase to India did not offset a drop in China.
Why intervene? (A)  
To target or influence exchange rate level

- Nominal anchor for inflation: Argentina, Brazil – first half of 1990s.
- External balance - Korea until 1998
- Concerns with currency mismatches
- Growth and competitiveness ("New Bretton Woods")
  - Attract foreign direct investment, promote exports and growth
  - Do Asian economies still benefit from resisting appreciation? (Graph)
- Problem: Targeting level can lead to speculative pressures or crises. Many now float.
Exports and FDI inflows

Exports\(^1\)

- China
- Other Asia\(^2\)
- Latin America

FDI net inflows\(^3\)

\(^1\) In US dollar terms, 1995 = 100. \(^2\) Hong Kong SAR (except for FDI), India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan (China) and Thailand. \(^3\) In billions of US dollars.

Sources: CEIC; IMF; national data.
Why intervene? To dampen volatility under floating (B)

- **Respond to volatility symmetrically** – some countries intervene when volatility exceeds a certain threshold. Horizon matters – Czech National Bank does not intervene to counter short-run volatility – wants market to take care of it. Bank Indonesia has intervened when volatility exceeded average annual volatility. Some concern short run volatility might be destabilizing and affect liquidity (see below)

- **Prevent excessive movements or overshooting.** Sometimes exchange rate movements persist in one direction for months. Concern with misalignment, eg CNB worries about extreme fluctuations along long run trend. In some cases, eg Chile concern that excessive movement incompatible with inflation target.

- **Resist too rapid movements** (“lean against the wind”). Can facilitate foreign exchange market development and supply of hedging instruments by reducing uncertainty. But government role could also reduce incentives to hedge (Chile, Israel, Mexico)

- **Maintain liquidity in forex markets.** Sometimes forex markets lose liquidity. Bid-ask spreads widen and turnover falls. Brazil 1998-1999 and 2002 Brazil. During latter episode Brazil intervened and provided exchange-rate linked debt as a hedge
Trading volumes, volatility and spreads

Brazil

- Volumes (lhs)
- Spot rate (rhs)

India

- Volumes (lhs)
- Volatility (rhs)

Spread (lhs)

1 In billions of US dollars.  
2 Standard deviation over 30-day period.  
3 As a percentage of the middle rate. 

Source: National data.
Currency market under stress

- **1998-1999**: Aftermath of Russian crisis and LTCM
- Brazil (i) crawling peg collapsed, (ii) exchange rate volatility increased sharply, (iii) transactions volumes rose summer 1998 but as *liquidity in market for currency dried up* trading volume fell off sharply and bid-ask spreads rose
- Contrast to India (i) volatility lower, falling even as volatility in Brazil peaking, (ii) trading volume exhibit some fluctuations but remained order of magnitudes smaller than in Brazil.
- **IMPLICATION**: Central banks may have strong incentives to avoid sharp fluctuations in liquidity by intervening
Why intervene? To influence the amount of foreign reserves

- High FX reserves provide insurance against crises (Aizenman and Marion, 2002)

Possible calls on reserves

- Import payments (3-6 months)
- Short-term foreign currency debt (Guidotti rule, 1 year cover)
- M2 (fraction) (Calvo)
- May improve sovereign credit ratings and lower costs of external financing
<table>
<thead>
<tr>
<th>Country</th>
<th>Reserves, USD bn</th>
<th>Reserves as a percentage of:</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>140</td>
<td>819</td>
<td>854</td>
<td>12</td>
<td>15</td>
<td>13</td>
<td>22</td>
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<tr>
<td>India</td>
<td>24</td>
<td>131</td>
<td>137</td>
<td>7</td>
<td>13</td>
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<td>25</td>
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<tr>
<td>Indonesia</td>
<td>16</td>
<td>33</td>
<td>33</td>
<td>4</td>
<td>6</td>
<td>22</td>
<td>27</td>
</tr>
<tr>
<td>Korea</td>
<td>20</td>
<td>210</td>
<td>216</td>
<td>2</td>
<td>10</td>
<td>6</td>
<td>21</td>
</tr>
<tr>
<td>Philippines</td>
<td>7</td>
<td>16</td>
<td>18</td>
<td>2</td>
<td>4</td>
<td>18</td>
<td>30</td>
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<tr>
<td>Thailand</td>
<td>26</td>
<td>51</td>
<td>52</td>
<td>5</td>
<td>5</td>
<td>27</td>
<td>32</td>
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<tr>
<td>Latin America</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>51</td>
<td>54</td>
<td>57</td>
<td>10</td>
<td>9</td>
<td>24</td>
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<td>Chile</td>
<td>17</td>
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<td>16</td>
<td>11</td>
<td>7</td>
<td>58</td>
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<td>Mexico</td>
<td>28</td>
<td>73</td>
<td></td>
<td>3</td>
<td>4</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Venezuela</td>
<td>14</td>
<td>23</td>
<td>23</td>
<td>12</td>
<td>13</td>
<td>84</td>
<td>74</td>
</tr>
</tbody>
</table>
## Measures of reserves adequacy

<table>
<thead>
<tr>
<th></th>
<th>Reserves, USD bn</th>
<th>Reserves as a percentage of:</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Europe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>10</td>
<td>30</td>
<td>29</td>
<td>4</td>
<td>5</td>
<td>29</td>
<td>36</td>
</tr>
<tr>
<td>Hungary</td>
<td>8</td>
<td>18</td>
<td>20</td>
<td>5</td>
<td>3</td>
<td>43</td>
<td>35</td>
</tr>
<tr>
<td>Poland</td>
<td>21</td>
<td>42</td>
<td>46</td>
<td>6</td>
<td></td>
<td>42</td>
<td>33</td>
</tr>
<tr>
<td>Others</td>
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<td></td>
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<td>Russia</td>
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<td>South Africa</td>
<td>5</td>
<td>18</td>
<td>20</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Turkey</td>
<td>19</td>
<td>50</td>
<td>57</td>
<td>5</td>
<td>5</td>
<td>35</td>
<td>30</td>
</tr>
</tbody>
</table>

1. End of period.
2. Estimated as international debt securities and liabilities to BIS reporting banks with maturity of less than one year.
3. Estimated as international debt securities and liabilities to BIS reporting banks, all maturities.

Sources: IMF; BIS; national data.
Questions regarding reserves

- Are reserves adequate?
- Which countries/regions have tried reducing reserves?
Intervention to adjust reserves - issues

- *Exchange rate impact to be minimized and market friendliness.* Very large presence of central bank can distort foreign exchange markets and deter market development.
  - Mexico, Colombia – options mechanisms. South Africa, “creaming off”

- *Costs and benefits of additional foreign reserves.* Example: Costs depend on how intervention financed – by printing money, issuing domestic securities (domestic interest rate less return on US treasury bond if held in USD) or by borrowing abroad (sovereign spread). Benefits: Reduced probability of crises*GDP loss during crisis.
  - Chile, Mexico: reduce or limit growth in foreign reserves
  - What is your calculation?

- *Intervention could encourage more capital inflows*
Short Run Exchange Rate Determination

Assume mobile capital: incipient capital flows equate returns at home and abroad

1) \( i_t = i^*_t + (s^e_{t+1} - s_t) \)

Terms: Domestic and world interest rates and expected future exchange rate, spot exchange rate, n.c./US$ in logs

Exchange rate determination: (abstract from risk premium)

1) \( s_t = i_t - i^*_t + s^e_{t+1} \)
How are capital flows dampened when world interest rate falls?

- **Float**: \( i^* \text{ falls, } i > i^* \), currency appreciates \( (s_t \text{ falls}) \), lowering expected return on domestic assets in foreign currency terms.

- **Peg**: *Government intervenes in fx market, buys dollars to prevent appreciation*, money supply increases (Table) and \( i \text{ falls} \) until expected returns equal.

- **Two points**:
  
  - The exchange rate must appreciate or domestic interest rate must fall to equate expected returns. This regulates capital flows.
  
  - If the intervention not thought to be sustainable (or peg is not credible) capital flows may persist
Central Bank Balance Sheet
Case: Capital Inflow with FX market intervention (unsterilized)

<table>
<thead>
<tr>
<th>Pegged Exchange Rate or Intervention Case</th>
<th>Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liabilities (money)</td>
<td></td>
</tr>
<tr>
<td>∆H &gt; 0</td>
<td>∆FA &gt; 0</td>
</tr>
<tr>
<td>∆DC = 0</td>
<td></td>
</tr>
</tbody>
</table>

Note:

- H: Monetary Base, FA: Foreign Assets, DC: domestic credit of the central bank, \( \Delta \): Change or difference Operator, * means exogenous
- Pegging: \( \Delta H = \Delta FA^* \) (inflow)
Intervention/pegging may encourage more capital flows (A)

● 1990s. Many East Asian economies pegged to U.S. dollar.
  – Yen appreciation against US dollar made East Asian assets cheaper. 
    Japanese investment flowed to East Asia. Boom in East Asia.
    Reverse when yen depreciates.
  – Effect due to peg to U.S. dollar, dissipated if peg to basket or float

● 2003-. Expectations that currencies would have to appreciate 
  encouraged capital flows to China, Korea and Thailand.
  – 2003. Thailand restricted foreign access to short term Thai baht 
    onshore NDF market. China, India ease outflows.
  – China: Net errors and omissions turn positive. Worker remittances 
    seen as disguised FDI. Incentives for overinvoicing exports and 
    underinvoicing imports as a form of disguised inflow.
Intervention/pegging may encourage capital flows (B)

- Peg is implicit government “guarantee” that currency won’t lose its value. Encourages borrowing cheaper foreign funds without hedging. (“Original sin”: May be impossible to hedge.)
- Further borrowing encouraged by implicit or explicit guarantees to financial institutions
  - Asia pre-1997 crises: Private sector borrowed, some of the debt eventually assumed by government
  - Latin America, 1990s: Government borrowed, fiscal policy procyclical
- Results: Faster growth during inflow episodes. Lack of hedging contributes to widespread bankruptcies and post devaluation financial crises if inflows reverse.
Sterilized intervention can amplify capital inflows (C)

- Central bank buys foreign currency to dampen appreciation, tending to increase money supply – this can conflict with inflation targets or stabilization policy goals

- “Sterilizes” money creation by reducing central bank domestic credit: shift government deposits to central bank, cut discount window loans, sell government or central bank securities (See balance sheet (Table, China graph)

- Interest rates stay high, encouraging more capital inflows (Figure)
Central Bank Balance Sheet with Capital Inflow that Increases Foreign Assets

<table>
<thead>
<tr>
<th>Sterilization Case</th>
<th>Liabilities (Money)</th>
<th>Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \Delta H = 0 )</td>
<td>( \Delta FA &lt; 0 )</td>
</tr>
<tr>
<td></td>
<td>( \Delta DC &lt; 0 )</td>
<td></td>
</tr>
</tbody>
</table>

Note:
- H: Monetary Base, FA: Foreign Assets, DC: domestic credit of the central bank, \( \Delta \): Change or difference Operator, * means exogenous
- Pegging: \( \Delta H = \Delta FA^* \) (inflow)  Sterilization: \( \Delta DC = -\Delta FA^* \), \( \Delta H = 0 \)
Sterilization in China dampens base money growth in spite of large FX reserves accumulation

Source: JP Morgan
Sterilized intervention and interest rates – 1990s

- Chile: the short-term interest rate (30- to 89-day bank lending rate) rose from about 28% in the period (1988-89) preceding capital inflows to over 46% during the period (January to July 1990) of heavy inflows and sterilisation.

- Colombia, with prime lending rates of banks more than doubling from 22% during the pre inflow period (1989-90) to over 47% during the peak of sterilisation (January to November 1991).

- Rate increases: Korea, Malaysia and Indonesia

- Reinhart and Reinhart (1999): “sterilization policies were either abandoned or scaled back or complemented by capital controls, as it became evident that the high domestic interest rates were attracting more inflows”.
Sterilization in the past meant higher interest rates and more short-term capital inflows

Interest rates and sterilization policies, Indonesia and Chile

Sterilization can have costly effects

- **On banking sector.** If sterilization is achieved by increasing reserve requirements it imposes a tax on banks, encouraging disintermediation, or the creation of non-bank financial intermediaries.

- **On central bank financial position.** If central banks buy low-yielding foreign assets and sell high-yielding domestic assets.
  - Chile: annual loss to the central bank from foreign exchange market intervention about 0.5% of GDP during 1990 to 1993 (Velasco and Cabezas (1999). No description of how estimated.
## Intervention: estimates of the carrying costs

<table>
<thead>
<tr>
<th>Carrying cost¹</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>−0.04</td>
<td>−0.05</td>
<td>0.00</td>
<td>0.06</td>
</tr>
<tr>
<td>India</td>
<td>0.05</td>
<td>0.09</td>
<td>0.19</td>
<td>0.17</td>
</tr>
<tr>
<td>Indonesia</td>
<td>0.45</td>
<td>0.48</td>
<td>0.11</td>
<td>0.11</td>
</tr>
<tr>
<td>Korea</td>
<td>0.06</td>
<td>0.07</td>
<td>0.09</td>
<td>0.14</td>
</tr>
<tr>
<td>Malaysia</td>
<td>0.03</td>
<td>−0.01</td>
<td>0.04</td>
<td>0.16</td>
</tr>
<tr>
<td>Philippines</td>
<td>0.10</td>
<td>0.25</td>
<td>−0.01</td>
<td>0.08</td>
</tr>
<tr>
<td>Singapore</td>
<td>−0.16</td>
<td>0.03</td>
<td>−0.04</td>
<td>−0.03</td>
</tr>
<tr>
<td>Latin America</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>−0.04</td>
<td>0.38</td>
<td>0.43</td>
<td>0.74</td>
</tr>
<tr>
<td>Chile</td>
<td>−0.02</td>
<td>0.01</td>
<td>−0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Mexico</td>
<td>0.07</td>
<td>0.14</td>
<td>0.07</td>
<td>0.12</td>
</tr>
</tbody>
</table>

¹ Calculated as the spread between the domestic and the US one-year treasury bill interest rate, applied to the change in foreign exchange reserves in domestic currency, as a percentage of GDP, in the year shown.

Source: Mohanty and Turner, 2005 National data; BIS calculations.
## Intervention: estimates of the carrying costs

<table>
<thead>
<tr>
<th>Country</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Europe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>−0.01</td>
<td>0.03</td>
<td>0.15</td>
<td>−0.01</td>
</tr>
<tr>
<td>Hungary</td>
<td>0.16</td>
<td>−0.06</td>
<td>−0.19</td>
<td>0.07</td>
</tr>
<tr>
<td>Poland</td>
<td>0.19</td>
<td>−0.16</td>
<td>0.10</td>
<td>0.05</td>
</tr>
<tr>
<td>Israel</td>
<td>0.01</td>
<td>0.02</td>
<td>0.16</td>
<td>0.06</td>
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<tr>
<td>New Zealand</td>
<td>−0.00</td>
<td>−0.00</td>
<td>0.01</td>
<td>0.03</td>
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<tr>
<td>South Africa</td>
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<td>0.06</td>
<td>0.08</td>
<td>−0.10</td>
</tr>
<tr>
<td>Turkey</td>
<td>0.98</td>
<td>2.79</td>
<td>3.50</td>
<td>1.26</td>
</tr>
</tbody>
</table>

1. Calculated as the spread between the domestic and the US one-year treasury bill interest rate, applied to the change in foreign exchange reserves in domestic currency, as a percentage of GDP, in the year shown.

Source: Mohanty and Turner, 2005 National data; BIS calculations.
Topics for discussion.

- How does weak central bank balance sheet affect central bank independence?
- If the central bank balance sheet is weak how does it affect the incentive to intervene or accumulate reserves?
- Who should bear the costs of intervention? Central bank or Finance Ministry?
- What issues are raised by sterilised intervention when there are capital outflows?
Sterilized intervention with capital outflows can lead to currency collapse

- With capital outflows, efforts to maintain peg contract money and raise domestic interest rates. If too costly, peg may be abandoned.

- **Key message:** *There may be no good options to stabilize an exchange rate when capital outflow pressure is intense.*
Sterilized intervention with capital outflows can lead to currency collapse (cont’d)

- Sterilized intervention implies two targets with open capital account: Exchange rate and monetary target (interest rate)

- Based on exchange rate determination model, is this possible?

\[ s_t = i_t^* - i_t + s_{t+1}^e \]
The “impossible” trinity (policy trilemma)

- Cannot simultaneously maintain
  - An open capital account (free capital flows)
  - An exchange rate target
  - A monetary target or monetary control

- In principle poses a constraint at any attempt at sustained intervention in foreign exchange market
  - Can lead to persistent inflows if sterilised
  - Or higher money growth and inflation if unsterilised
Resolving the “impossible trinity”

- **Float the exchange rate.**
  - Intervene occasionally to curb volatility or misalignment. Explicitly avoid targeting exchange rate level.
  - Inflation targeting regime

- **Peg but do not sterilize.** “Soft” pegs do not usually last more than 5 years (Obstfeld and Rogoff, 1995)
  - China, Malaysia have relied on capital controls

- **Currency board:** money stock must be fully (usually) backed by foreign assets held by the central bank.
  - Since cannot create money to finance government deficits, less likely to destabilize peg (Avoid 1st generation currency crisis, Krugman).
  - However currency boards can fail (Argentina)

- **Currency union.**
Outline

- Trends, composition and drivers of capital flows
- FDI: characteristics and drivers
- Cyclical influences: sovereign spreads and determinants
- Policy options for regulating capital flows: intervention
- End
References


