Examining the decoupling hypothesis for India

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Recent debate on decoupling has increased in the recent crisis:

- Greater trade and financial linkages suggest synchronisation.
- But developing countries like India and China did not slow down like industrial countries.
- Theory does not give a clear guidance on whether there should be “coupling” or “decoupling”.
Empirical research in the field

1. Studies changes in comovements over time.
2. Measures spillover from industrial countries to developing countries.
3. Analyses determinants of business cycle comovement.
Part I

Increasing integration of the Indian economy
Goods & Services exports to GDP

Exports of goods and services to GDP (%)

5 10 15 20

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Increasing integration

<table>
<thead>
<tr>
<th>Sub-Sample</th>
<th>Trade/GDP (%)</th>
<th>(CA+KA)/GDP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992-1997</td>
<td>20.44</td>
<td>45.83</td>
</tr>
<tr>
<td>1997-2003</td>
<td>23.28</td>
<td>53.77</td>
</tr>
<tr>
<td>2003-2008</td>
<td>34.26</td>
<td>93.94</td>
</tr>
</tbody>
</table>

Table: Ratios of trade and capital flows to GDP in India
### Table: Correlations of weekly returns on the CMIE Cospi stock market index against global stock market indexes

<table>
<thead>
<tr>
<th></th>
<th>UK FTSE-100</th>
<th>Japan Nikkei-225</th>
<th>US S&amp;P 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992-1997</td>
<td>-0.008</td>
<td>-0.038</td>
<td>-0.023</td>
</tr>
<tr>
<td>1997-2003</td>
<td>0.184</td>
<td>0.168</td>
<td>0.167</td>
</tr>
<tr>
<td>2003-2008</td>
<td>0.463</td>
<td>0.390</td>
<td>0.339</td>
</tr>
<tr>
<td>Full period</td>
<td>0.192</td>
<td>0.149</td>
<td>0.150</td>
</tr>
</tbody>
</table>
Integration and business cycle synchronisation

Theory:

- Increased trade implies demand shocks in one country lead to output shocks in another.
- Shocks such as commodity/oil prices can affect all countries.
- Monetary policy shocks can get transmitted.
- Increased financial integration implies financial shocks in one country may lead to contagion.

But

- Impact of specialisation/vertical production structures on shocks can result in decoupling.
Empirical studies:

- Evidence for synchronisation strong in developed countries (Frankel and Rose, 1998).
- No consensus for developing economies.
- Evidence of greater comovement with greater trade: (Calderon, Chong and Stein, 2003)
- Others seem to suggest decoupling of Indian and Chinese business cycles from industrial countries. (Fidrmuc, Korhonen and Batorova, (2008), Kose, Otrok, Prasad (2008)).
- No study focusing only on India.
Part II

India in the last US recession
India in the 2001 recession

YOY IIP Growth

2000 2001 2002 2003 2004 2005

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India in the 2001 recession

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March 24, 2009 13 / 30
India in the 2001 recession

YOY growth in India's merchandise exports

-10 0 10 20 30 40 50 60

2000 2001 2002 2003 2004 2005

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Part III

India since the early 1990s
Data

- India: Index of Industrial Production (IIP).
- US: Conference Board coincident indicator.
- Industrial economies: IIP for all industrialised economies.
Indian IIP and the US coincident indicator

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March 24, 2009 18 / 30
Indian IIP and IIP of industrial economies
Rolling correlations with Indian IIP
Indian IIP during the US expansion and contraction

![Graph showing YOY IIP and NBER dates from 2000 to 2009]
Questions

The above suggests business cycle synchronisation.

Questions for formal analysis:

- Are Indian business cycles synchronised with industrial country business cycles?
- How has synchronisation changed over time?
- How does comovement with industrial economies compare with that with the US?
Part IV

Methodology
Harding-Pagan index of concordance

- Studies the “state-series" of a variable: 0-1 binary variable
- Index of concordance: Proportion of time that two variables are in the same state [Harding and Pagan, 2006]
- Index = 0, countercyclical. Index = 1, procyclical. E[Index] = 0.5.
### Harding-Pagan index of concordance: Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\hat{I}_{xy}$</th>
<th>$\rho \hat{S}_x \hat{S}_y$</th>
<th>t statistic</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Period 1: 1992-1997</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USCOINCIDENT</td>
<td>0.536</td>
<td>-0.136</td>
<td>-0.8</td>
<td>0.427</td>
</tr>
<tr>
<td>AEIIP</td>
<td>0.500</td>
<td>-0.333</td>
<td>-2.629</td>
<td>0.011**</td>
</tr>
<tr>
<td><strong>Period 2: 1997-2003</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>USCOINCIDENT</td>
<td>0.767</td>
<td>0.356</td>
<td>1.544</td>
<td>0.127</td>
</tr>
<tr>
<td>AEIIP</td>
<td>0.781</td>
<td>0.526</td>
<td>2.72</td>
<td>0.008**</td>
</tr>
<tr>
<td><strong>Period 3: 2003-2008</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USCOINCIDENT</td>
<td>0.781</td>
<td>0.501</td>
<td>6.438</td>
<td>0.000***</td>
</tr>
<tr>
<td>AEIIP</td>
<td>0.984</td>
<td>0.965</td>
<td>43.497</td>
<td>0.000***</td>
</tr>
<tr>
<td><strong>Full period: 1992-2008</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USCOINCIDENT</td>
<td>0.639</td>
<td>0.254</td>
<td>2.178</td>
<td>0.031**</td>
</tr>
<tr>
<td>AEIIP</td>
<td>0.743</td>
<td>0.476</td>
<td>3.569</td>
<td>0.000***</td>
</tr>
</tbody>
</table>
Insights

There is business cycle synchronisation over 1992-2008. This is increasing over time.

- 1992-1997: Weakly counter-cyclical to world cycle
- 1997-2003: Weakly pro-cyclical
- 2003-2008: Strongly procyclical and synchronised

Indian cycle seems more synchronised with industrial economies cycles than with US cycles
Key results

- There is evidence of business cycle synchronisation.
- This synchronisation has increased over time.
- Indian business cycles are more synchronised with cycles in a broader group of industrial countries than with the US.
Robustness checks

- Alternative methodologies - cross-correlation and spectral analysis.
- Change sample period:
  - This is not a definite "start-end" process. Rather, slowly evolving phenomenon reflecting structural changes in the Indian economy
- Detrend the data using the HP filter
- Redefine key variables: use US industrial production, World trade.

The key results hold.
Next steps

- To study the transmission mechanism of business cycle synchronisation.
- Use other indicators to study comovements.
Thank you.