Discussion of

Has Globalization Really Increased Business Cycle Synchronization?

by E. Monnet and D. Puy

Ambrogio Cesa-Bianchi (BoE and CfM)

First CEBRA-BOE-IFM Annual Meeting

Bank of England – October 19-20, 2017

*The views expressed in this paper do not necessarily reflect the position of the Bank of England.

This paper

- **Question** What is the relation between trade/financial integration and international business cycle comovement?
  - Perennial question in international macro
  - Openness: risk-sharing or contagion?

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- **This paper** Applies existing methodologies in a novel way on a new historical data set on industrial production

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- Estimate S_i on four sub-samples to get S_{it}
  - t=1 Bretton Woods (1951-1971)
  - t=2 Oil shocks (1972-1983)
  - t=3 Great Moderation (1984-2006)
  - t=4 Global financial crisis (2007-2014)

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  - t=3 Great Moderation (1984-2006)
  - t=4 Global financial crisis (2007-2014)
- Estimate panel regression ($i = 1, 2, ...20$, $t = 1, 2, 3, 4$)

$$S_{it} = \alpha_i + \gamma_t + \beta_1 \cdot Fin\ Int_{it} + \beta_2 \cdot Trade\ Int_{it} + \varepsilon_{it}$$

Two main comments

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- Share of industrial production in GDP has been falling steadily over time
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[#2] Synchronization (S_{it}) $\equiv$ Share of variance of y_{it} explained by global factor

- 'Unusual' synchronization measure in this literature
  - Typically GDP Pearson correlation or pairwise GDP growth differential
- Is it well-suited to answer the question? How to interpret it?

[#1] Business cycle: Industrial production vs. GDP

- Many good reasons to use Industrial Production (IP) data
  - Bretton Woods period, no interpolation,...
  - IP has strong common component that is closely related to GDP
    [Andreou, Gagliardini, Ghysels, Rubin (2017) - Foerster, Sarte, and Watson (2011)]

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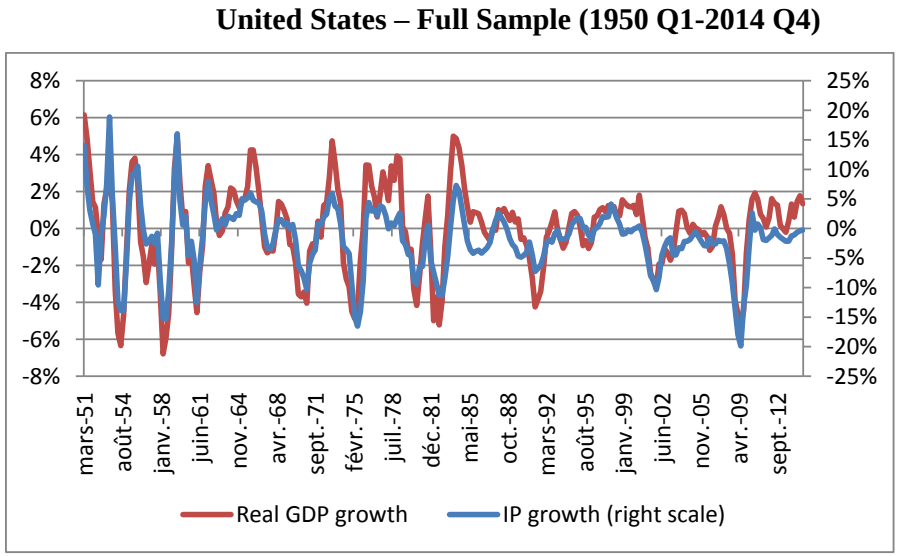

NOTE. From Online Appendix of Monnet and D. Puy (2017) "Has Globalization Really Increased Business Cycle Synchronization?".

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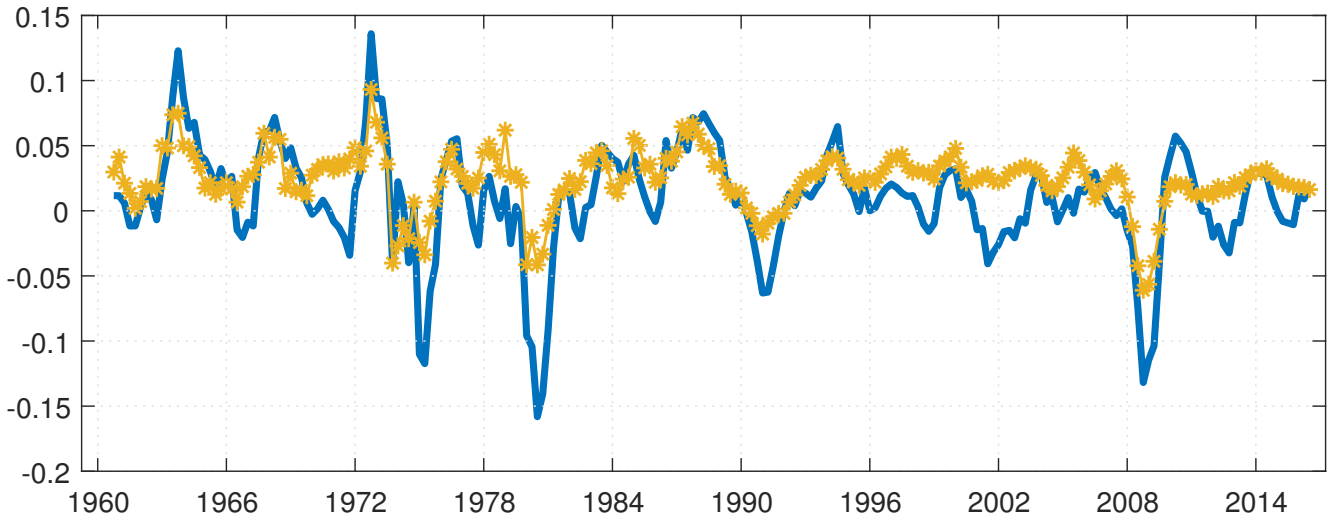
- Visual inspection is fine... but the important role of IP in the paper calls for a more careful analysis

- UK data
  - Industrial production, Manufacturing (Source: OECD)
  - Real GDP (Source: OECD)
  - Sample period: 1960:Q1 to 2016:Q4

[#1] Business cycle: Industrial production vs. GDP

- IP vs. GDP: year-on-year growth ($Corr = 0.8$)



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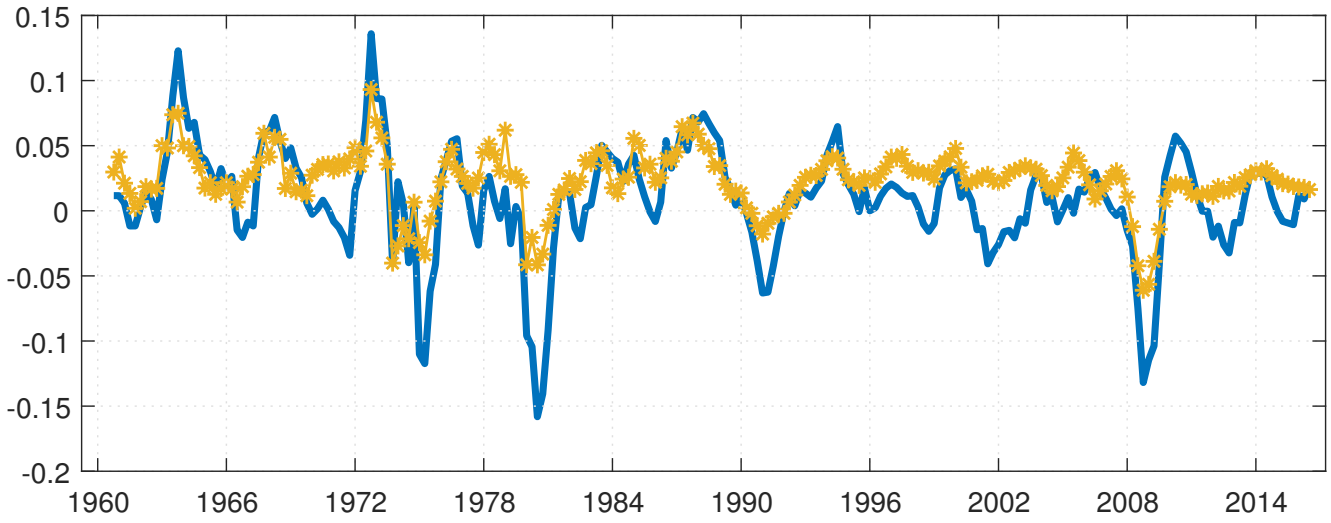

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- Why year on year growth rates?
  1. Introduce annoying moving average terms

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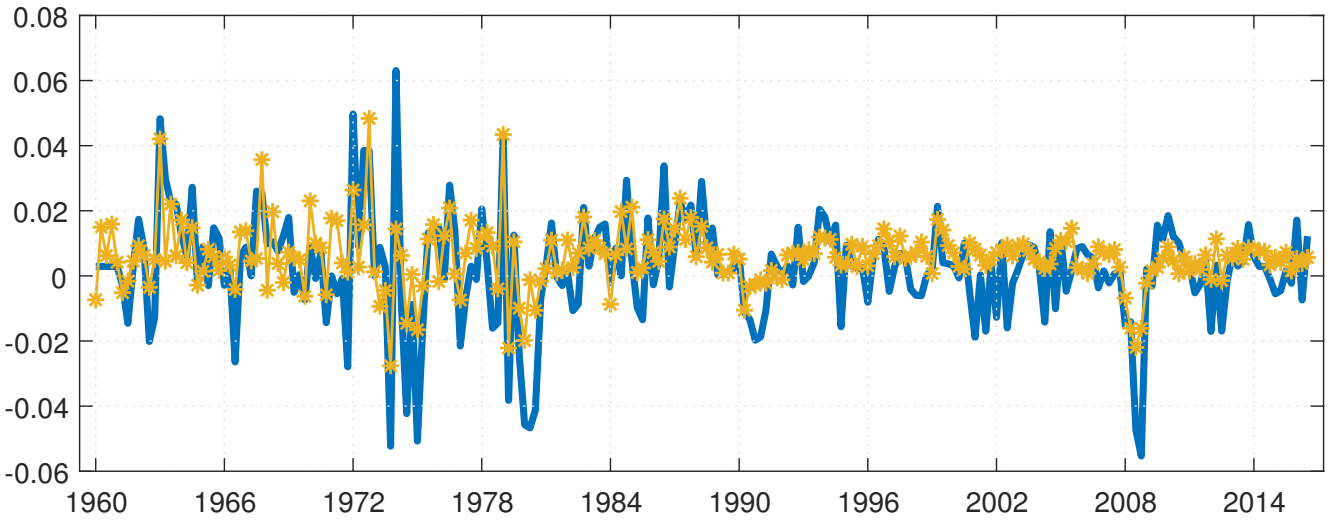
- IP vs. GDP: quarter-on-quarter growth ($Corr = 0.7$)



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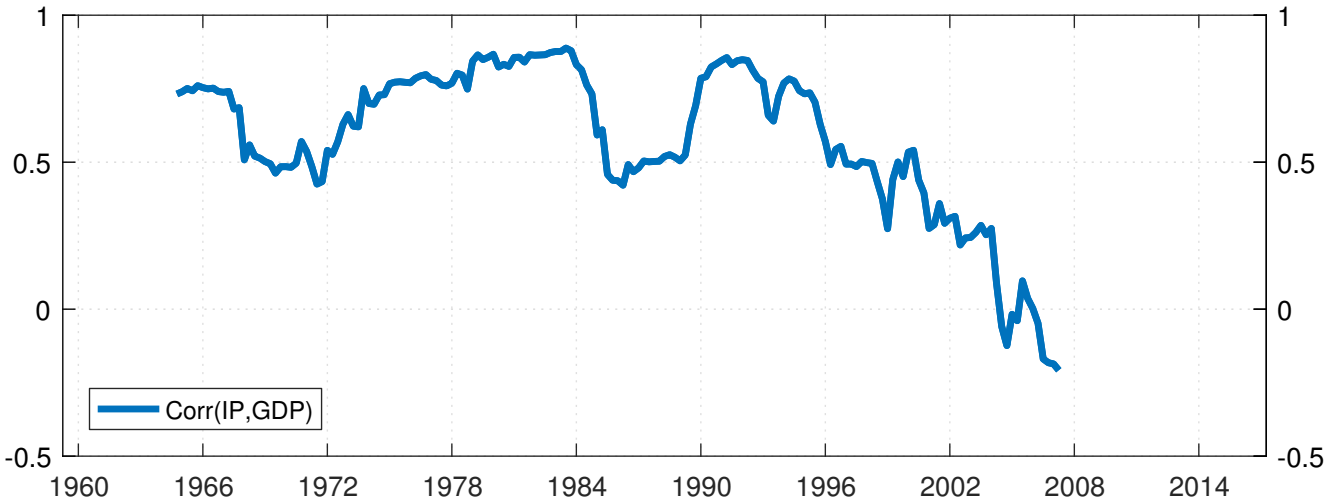
- Why year on year growth rates?

1. Introduce annoying moving average terms
2. Comovement is magnified

[#1] Business cycle: Industrial production vs. GDP

- Correlation between IP and GDP



NOTE. 5-year (20 quarters) rolling window correlation between Industrial Production and Real GDP. Source: OECD.

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  - Very high before '90s
  - Downward trend since the '90s

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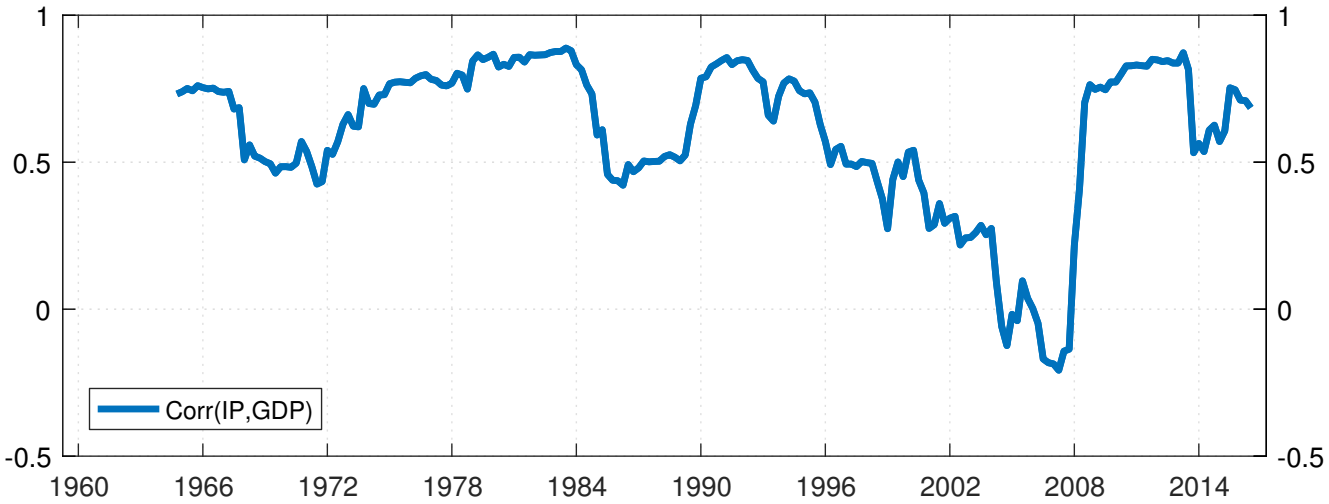

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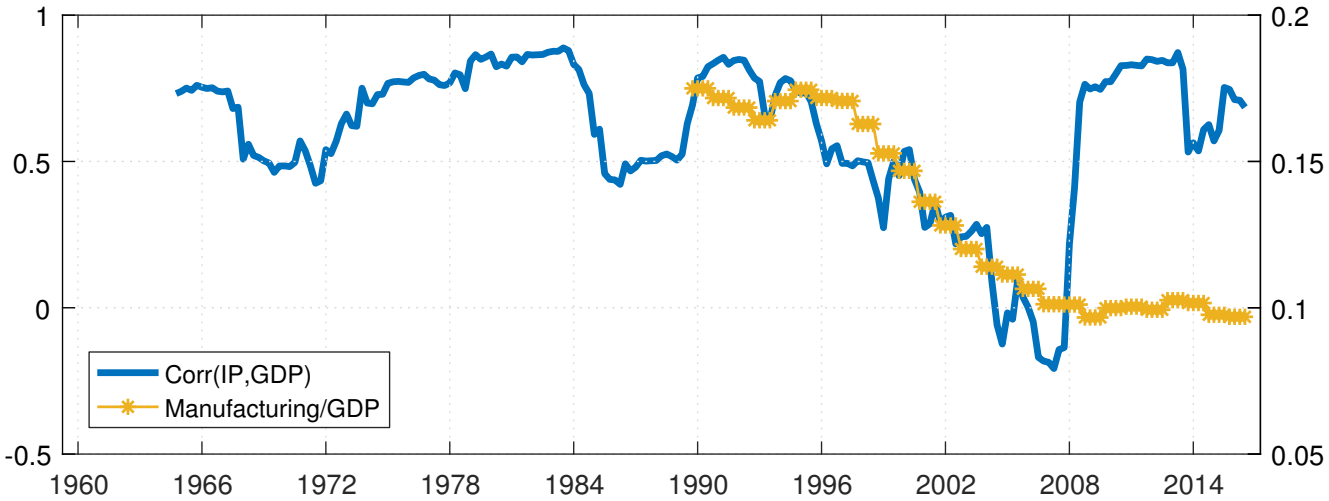

NOTE. 5-year (20 quarters) rolling window correlation between Industrial Production (IP) and Real GDP (left axis); share of manufacturing in GDP (right axis). Source: OECD and WB WDI.

- Substantial degree of time variation
  - Very high before '90s
  - Downward trend since the '90s
  - Spike in the crisis (mechanical, Forbes-Rigobon (2001) - Corsetti et al (2002))
  - Share of manufacturing in GDP correlated with pre-crisis fall in correlation

[#1] Business cycle: Industrial production vs. GDP

- In sum, UK evidence seems to show that IP is a good proxy in the early period, but less so in Great Moderation
  - Fall in synch during Great Moderation crucial for the results
  - How much is this due to IP vs. GDP?

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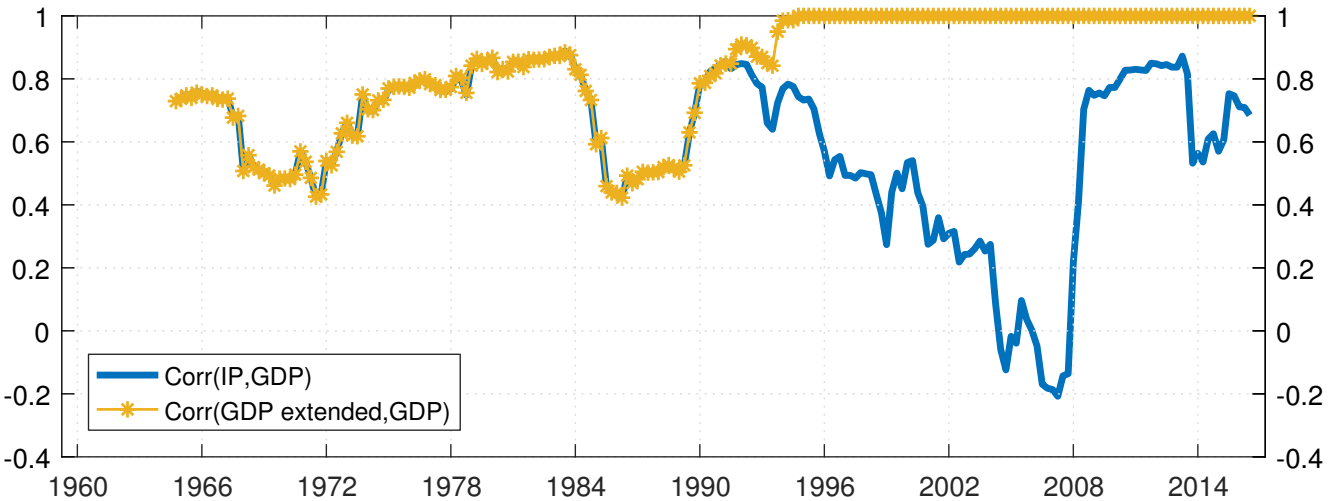
- Could use GDP where available and extend it backward with IP data?



NOTE. 5-year (20 quarters) rolling window correlation between Industrial Production (IP) and Real GDP; and between real GDP and a synthetic Real GDP series constructed with IP growth rates from 1990 (chosen arbitrarily in this example) to 1960. Source: OECD.

[#2] Synch: Measurement & Interpretation

- Synchronization (S_i) $\equiv$ Share of variance of industrial production (y_{it}) explained by global factor

$$y_{i,t} = \beta_{W,i} f_{W,t} + \beta_{R,i} f_{R,t} + \varepsilon_{it} \quad \Rightarrow \quad S_{it} = \frac{\beta^2_{W,i} \sigma^2_{f_W,t}}{\sigma^2_{y_i,t}}$$

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- Theory has ambiguous predictions about $Corr(y_{i,t}, y_{j,t})$ conditional on idiosyncratic shocks (ε_{it})
  - IRBC vs. Financial frictions models

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- But conditional on common shocks, sign of $Corr(y_{i,t}, y_{j,t})$ is not ambiguous
  - (If loadings have same sign, as in the data)
- What does theory tell us about the impact of $Fin\ Int_{it}$ on S_{it}?

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[b] Role of regional factors ($f_{R,t}$)

- During Great Moderation importance of the global factor has fallen, but importance of regional factors has increased [Kose, Otrok, Prasad (2012, IER)]
- Overall, share of variance explained by $f_{W,t}$ plus $f_{R,t}$ has remained constant

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- Are the regression results robust to $S_{it} = \frac{\beta^2_{W,i} \sigma^2_{f_W,t} + \beta^2_{R,i} \sigma^2_{f_R,t}}{\sigma^2_{y_i,t}}$?

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[c] Role of idiosyncratic shocks (ε_{it})

- Idiosyncratic shocks (ε_{it}) can also lead to synchronized business cycles
- After controlling for common factors, *Fin Int* is positively associated with synch, as measured by growth differentials [Cesa-Bianchi, Imbs, Saleheen (2016)]

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- After controlling for common factors, *Fin Int* is positively associated with synch, as measured by growth differentials [Cesa-Bianchi, Imbs, Saleheen (2016)]
- Careful in describing results: "*Our results suggest that reducing financial integration [...] would probably increase co-movement in normal times, when the world is dominated by idiosyncratic shocks*"

[#3] Other points

- Sub-samples are chosen somewhat arbitrarily
  - Why not estimating a TVP-SV factor model?
  - Would give many more observations for panel regression
- India and Pakistan (and to a lesser extent Chile and Mexico) seem too different to be included in the 'common factor' analysis
  - Some robustness dropping these countries?
- Are global and regional factors enough to clean up for the commonality across countries? Or need more factors?
  - Could test for idiosyncratic shocks cross-country dependence

Summing up

- **Nice paper, intriguing results, great data effort**
  - Will be used by many other researchers
- Open issues
  - Is industrial production a good proxy for the business cycle after Great Moderation?
  - Role of regional factors
  - Missing link between theory and synch measure

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