

Meta-Analysis of Economics Research Network 2015 Prague Colloquium Program

Meta-analysis of China's Business Cycle Correlation

Ilkka Korhonen, Bank of Finland

Jarko Fidrmuc, Zeppelin University Friedrichshafen

September 10-12, 2015

Institute of Economic Studies, Charles University Prague

Motivation

- China is ever-larger part of the global economy, the second largest GDP and world's largest exporter
- Thus, it is important to understand China's position in the global economy
- A relatively large strand of literature assessing China's business cycle synchronization
- We compare international and Chinese papers on the interdependence between China and the global economy
- Despite the economic integration, this literature is very fragmented, with only a few authors publishing in both regions and languages.

Brief literature survey 1

- Synchronization of business cycles received renewed interest in the run-up to the introduction of the euro and its subsequent enlargement(s); Bayoumi and Eichengreen (1993) etc.
- Some papers develop different metrics for assessing business cycle correlations, others try also ascertain reasons for business cycle convergence (e.g. Frankel and Rose, 1998)
- In recent years also many papers on business cycle synchronization among countries of other areas, e.g. Asia and Persian Gulf, sometimes linked to proposals for common currency

Brief literature survey 2

- Analyses of the synchronization of China's business cycle with other countries have become popular in early 2000s, both in English and Chinese languages
- Researchers looked at various indicators of business cycles: GDP, industrial production, inflation, supply and demand shocks
- Most papers are concerned with China's business cycle synchronization with at least its immediate neighbors (Hong Kong, Taiwan, Japan), often also with the US; other countries added to the sample depending on the purpose of the paper

Brief literature survey 3

- Meta-analysis is a technique used to summarize results from a large number of studies concentrating on the same topic; has been common for years e.g. in medicine and engineering, but is becoming more popular in economics (Stanley 2001)
- The idea is to collect a large number of studies on the same topic:
 - i. present meta statistics
 - ii. assess distribution of reported coefficients (possible publication bias)
 - iii. estimate coefficient(s) of interest,
 - iv. examine the objective factors influencing the reported coefficients, as well as

Data collection I

- We collected all in all 43 Chinese and 31 English language papers
- The Chinese-language papers were collected from 中国知网 (CNKI, www.cnki.net), which is the largest publication database online in China (中国知网)

□□	□□周期	□□	中国
East Asia	Business cycle	Synchronisation	China
□□□盟	□□一体化	□□盟	同步性
Monetary Union	Economic integration	ASEAN	Co-movement

- Difference between Chinese ‘core journals’ and other Chinese journals

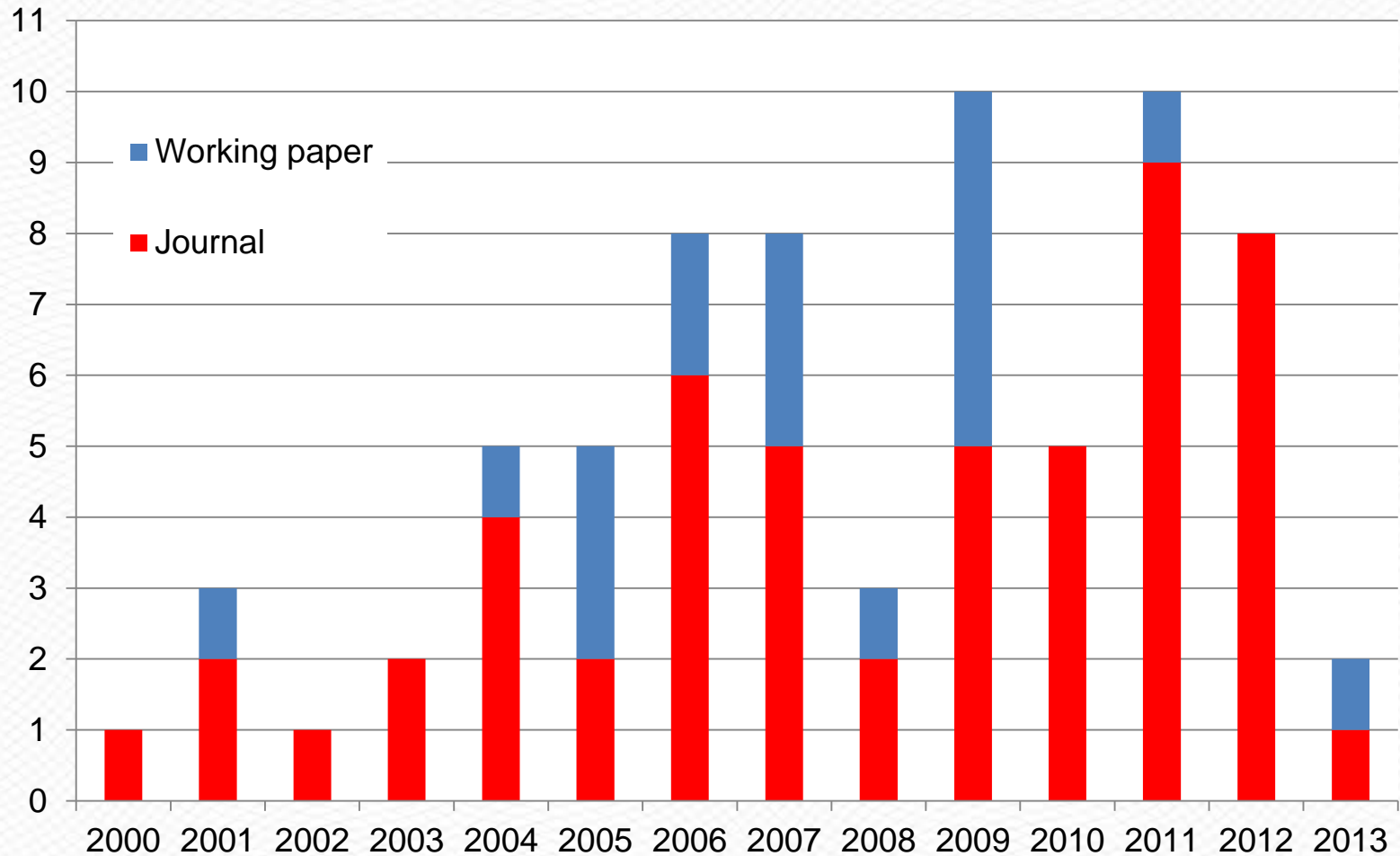
Data collection I

- English-language papers were searched in *Google Scholar*, *IDEAS* and *ScienceDirect*. Key words included: business cycle, correlation, Asian monetary union, SVAR, China, synchronisation, co-movement, and different variations of those
- All papers report correlation coefficients for their chosen variables and countries
- Almost all papers look at business cycle correlation with respect to several countries

Examples of papers

1. Gary George Madden, Scott James and Andrew McDonald: Assessing the Economic Preconditions for a Yen Bloc (Australian Economic Papers, 2000)
2. Soyoung Kim, Jong-Wha Lee and Cyn-Young Park: Emerging Asia: Decoupling or Recoupling (World Economy, 2011)
3. Grace H.Y. Lee and Sharon G.M. Koh: The prospects of a monetary union in East Asia (Economic Modelling, 2012)
4. Dong He and Wei Liao: Asian business cycle synchronization (Pacific Economic Review, 2012)
5. Li, X. (李晓洁), (2004), 亚洲货币联盟可行性研究——东亚实际产出波动的冲击分析. *Journal of Finance and Economics* (财经研究), Vol 30 No. 16.

Papers by publication year



Descriptive statistics

	Chinese	English	Total
Number of papers	43	31	74
Number of observations	996	898	1894
Share of papers with at least one author with Chinese affiliation	100%	29%	70%

Meta regressions

- We use Fisher transformation of the reported correlation coefficients as the dependent variable

$$\frac{1}{2} \log\left(\frac{1 + \rho_{ij}}{1 - \rho_{ij}}\right) = \tilde{\rho}_i + \sum_{k=1}^K \beta_{ijk} D_{ijk} + \varepsilon_{ijk}$$

- Country effects ρ_i tell the average correlation coefficient for country i , controlling for K factors (e.g. publication year, variable, methodology, sample size, frequency, author affiliation, journal or not) in publication j

Possible determinants of reported correlation coefficients

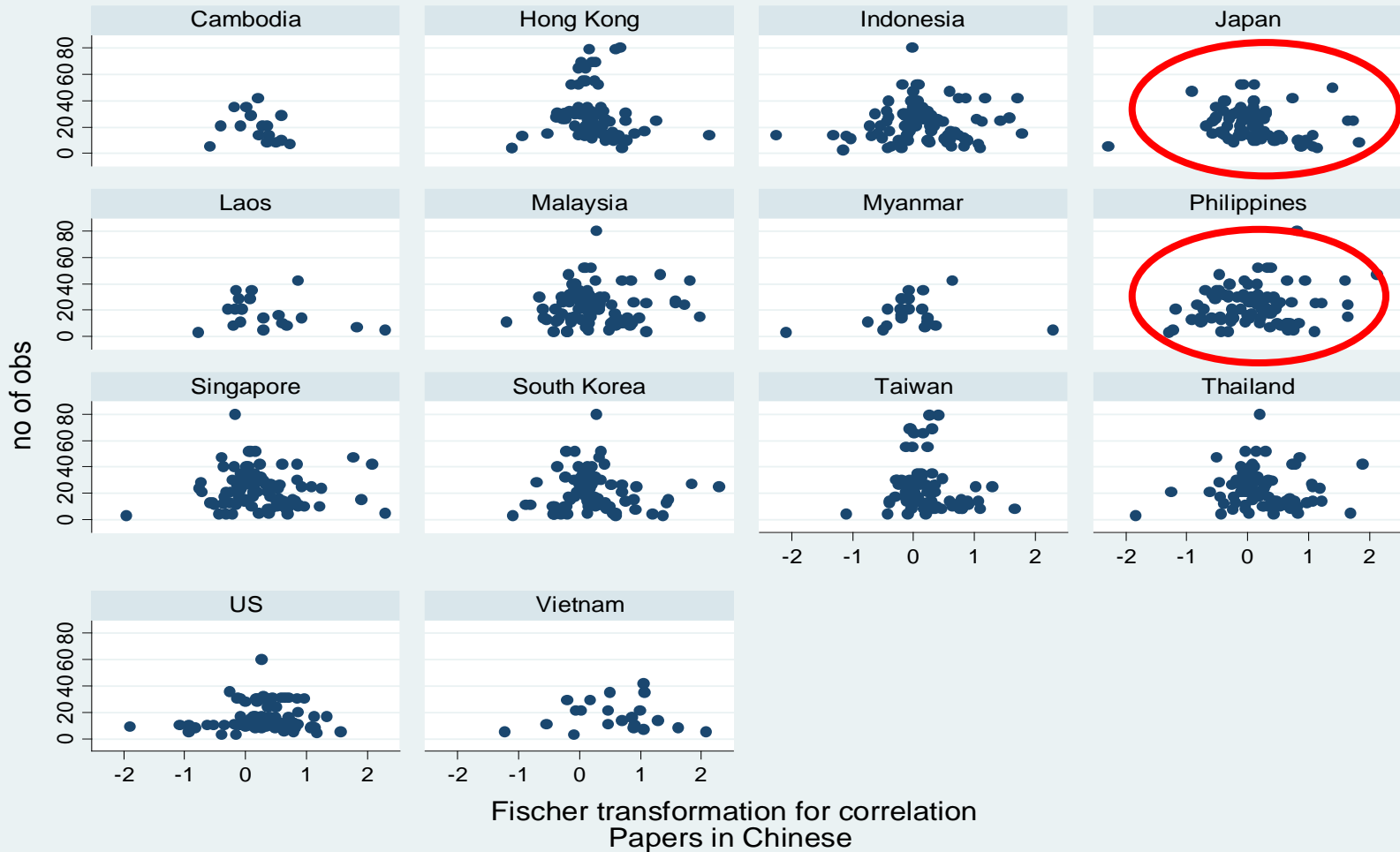
1. Related to publication: Year of publication, part of PhD thesis, journal, Chinese core journal, non-China focus
2. Related to authors: Chinese affiliation, central bank affiliation
3. Related to estimation method: simple correlation, time series method, Blanchard-Quah, HP and other filters
4. Related to variable studied: GDP, industrial production, demand shock, supply shock, inflation

Variable	Publication	Authors	Method	Variables	Preferred
USA	0.255***	0.263***	0.208**	0.290***	0.299***
Hong Kong	0.275***	0.204***	0.136	0.231***	0.334***
Taiwan	0.224***	0.167***	0.106	0.196***	0.276***
Philippines	0.102	0.046	-0.018	0.077	0.167***
Thailand	0.218***	0.163***	0.101	0.196***	0.283***
Indonesia	0.164**	0.110*	0.048	0.142***	0.229***
Malaysia	0.240***	0.181***	0.119	0.214***	0.302***
Japan	0.130**	0.075	0.010	0.107**	0.195***
Korea	0.203***	0.149***	0.086	0.181***	0.269***
Singapore	0.246***	0.189***	0.128	0.223***	0.309***
Brunei	-0.040	-0.077	-0.082	-0.007	0.026
Cambodia	0.111	0.066	0.038	0.125	0.190**
Myanmar	-0.047	-0.088	-0.118	-0.032	0.028
Laos	0.240*	0.203	0.173	0.259**	0.314**
Vietnam	0.444***	0.411***	0.382**	0.467***	0.518***
Germany	0.395***	0.342***	0.249**	0.411***	0.357***
Australia	0.060	-0.008	-0.161	-0.081	0.116
New Zealand	0.484***	0.419***	0.272**	0.350***	0.541***
Russia	0.228***	0.166***	0.011	0.235***	0.131*
Publication year	0.025***				0.022***
Chinese core journal	0.063**				0.079***
Non-China focus	-0.107***				-0.128**
Chinese affiliation		0.092***			
Central bank		-0.125***			
Time series			0.219***		0.176***
Demand shocks				-0.067**	-0.049**
Inflation				-0.274***	-0.184***
N	1894	1894	1894	1894	1894
R2	0.160	0.123	0.113	0.120	0.165

Robustness checks

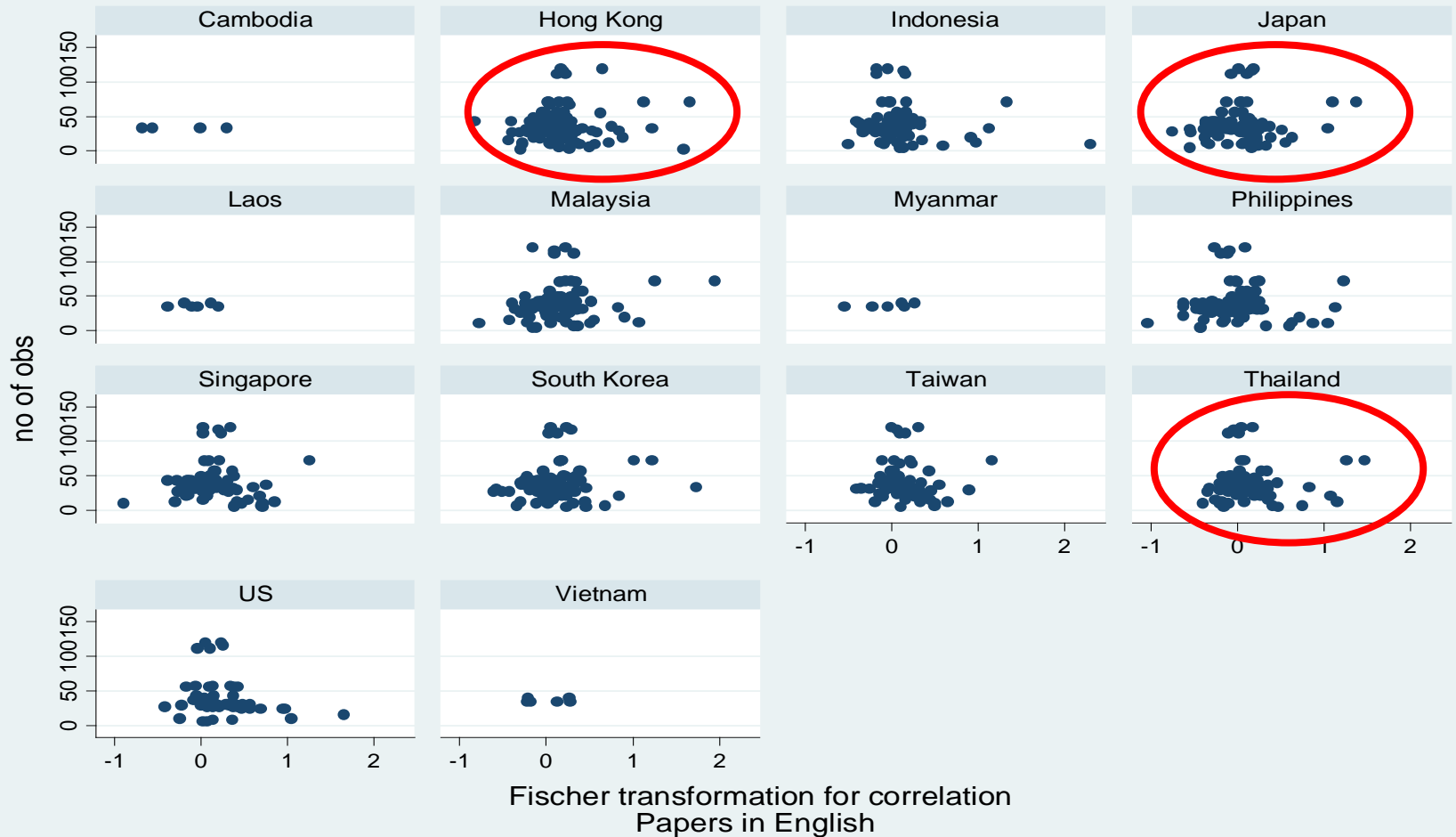
	Preferred regression	Weighted regression (by nr of obs)	Median regression	Robust regression (Cook's dist)	Random effects (for studies)
Year	0.022***	0.023***	0.016***	0.018***	0.026***
Chinese core journal	0.079***	0.004	0.027	0.010	0.030
Non-China focus	-0.128***	-0.177***	-0.117***	-0.150***	-0.149***
Central bank	-0.062	-0.110***	-0.031	-0.072***	-0.090**
Time series	0.176***	0.222*	0.101**	0.080	-0.046
Demand shock	-0.049**	-0.058***	-0.012	-0.017	-0.076
Inflation	-0.184***	-0.176***	-0.119***	-0.149***	-0.206***

Publication bias?



Graphs by country

Publication bias?



Graphs by country

Concluding remarks

- We can see that Chinese business cycle has been synchronized with business cycles of other countries
- Correlation is high also for large economies like the US, in addition to China's smaller neighbors in Asia
- However, reported correlation coefficients are obviously influenced by many factors relating to the variables chosen, methodology as well as focus of the paper
- There may be some publication bias

Robustness checks don't change countries' correlation coefficients

