Financial Regulation, Financial Globalization, and the Synchronization of Economic Activity

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Motivation

- A key question in international economics and finance: **What is the effect of financial integration on business cycle synchronization?**

- Many argue that financial globalization, banks’ international linkages especially, acted as catalysts for the transmission of the 2007–2008 crisis from a corner of the U.S. capital markets to the rest of the world.

- **What did we know before 2007–2008 crisis about propagation?** We lack a good understanding of the effect of financial integration on the transmission of productivity and “financial” shocks
  - Elaborate theoretical models
  - Empirical studies tend to contradict canonical models
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This Paper: Identification

- Analyze empirically the effect of financial (banking) integration on international output co-movement.
- Address some key identification issues of previous empirical research.
- Identify the one-way effect of financial integration on business cycle synchronization.
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Theory

- **Standard IRBC Theory** (e.g. Backus, Kehoe, Kydland, 1992): A higher degree of financial integration leads to less synchronized (more divergent) output cycles

- **Comparative Advantage/Specialization** (Obstfeld, 1995): Cross-border financial integration leads to specialization and to divergent output cycles

- **International Diversification** (e.g. Heathcote and Perri, 2005): Diversification gains are larger when output growth patterns are not much correlated

- **Contagion/Financial frictions** (e.g. Calvo and Mendoza, 1999): Negative financial shock might lead to a withdrawal from all markets

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Empirics

- Most country studies document a positive cross-country correlation between financial integration and output co-movement (e.g. Kose et al. 2008).

- Most country-pair cross-sectional studies also document a positive cross-country correlation between bilateral financial integration and output co-movement (e.g. Imbs, 2004, 2006; Otto, Voss, and Willard, 2001).
Challenges to Identification

- **Omitted Variable Bias:**
  - Country-pair unobserved or hard-to-account-for factors
  - Global factors (related to other features of globalization)

- Isolating idiosyncratic from common (global/regional) shocks
- Separating productivity from financial shocks
- Reverse causality

- **Measurement Issues**
  - Classical measurement error may not be a major concern
  - Indirect exposure, financial centers
  - Other types of flows/holdings (FDI, FPI)
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Identification using time variation

- Confidential dataset from the BIS on banks’ international bilateral exposure over the past 30 years in a panel of 20 developed countries
  - Account for time-invariant bilateral factors (e.g. culture) via country-pair fixed effects
  - Account for global shocks and trends via time fixed effects

- Focus on high-income countries during last 3 decades (before recent crisis):
  - Minimize parameter heterogeneity and outlier problems since these countries are similar
  - Can separate (roughly) the types of shocks since there was no major financial shock during this period for these countries.
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Empirical Specification: Bilateral Panel OLS

**Question:** Do country-pairs whose banks are more integrated over time experience a higher degree of synchronization of their business cycles?

**Notation:**

\[
SYNCH_{ijt} = \alpha_t + \alpha_{ij} + \beta BANKINT_{ijt-1} + X'_{ijt-1}\delta + \varepsilon_{ijt}
\]

- \(\alpha_t\): Year fixed-effects (common global shocks)
- \(\alpha_{ij}\): Country-pair fixed-effects (bilateral unobserved or hard-to-account-for factors)
- \(X'_{ijt-1}\delta\): Other controls such as trade
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Three alternative measures of synchronization

1. SYNCH1: Negative of absolute value of real GDP per capita growth differences between countries $i$ and $j$ in year $t$ (Giannone, Lenza, and Reichlin, 2009).

2. SYNCH2: Same as SYNCH1 but look at the deviations from the country and time average growth (Morgan, Rime, and Strahan, QJE 2004).

3. SYNCH3: 5-year correlation of the cyclical component of output of country-pairs.
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Bilateral Bank Integration Measures

- $BANKINT_{1ijt}$: average value of the (logs) of real bilateral STOCKS - HOLDINGS of bank asset and liabilities normalized with the sum of the population of the two countries.
- $BANKINT_{2ijt}$: average value of the (logs) of real bilateral GROSS FLOWS - TRANSACTIONS of bank assets and liabilities normalized with the sum of the population of the two countries.

According to the aggregate statistics of Lane and Milesi-Ferretti (2009):

- Debt holdings around 67% of the total stock of international positions for our group of countries.
- Banking activities (loans, debt) around 50% of total external positions.
Bilateral Bank Integration Measures

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<tr>
<th>Dependent variable: Synchronization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Synchronization Measure</strong></td>
</tr>
<tr>
<td><strong>Bank Integration Measure</strong></td>
</tr>
<tr>
<td>Banking Integration</td>
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<td></td>
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<tr>
<td>Country-Pair Fixed Effects</td>
</tr>
<tr>
<td>Time (Year) Fixed Effects</td>
</tr>
<tr>
<td>$R^2$</td>
</tr>
<tr>
<td>Observations</td>
</tr>
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<td>Country-Pairs</td>
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</table>
Bank Integration and Synchronization: Within Estimates

<table>
<thead>
<tr>
<th>Synchronization Measure</th>
<th>BANKINT1</th>
<th>BANKINT1</th>
<th>BANKINT2</th>
<th>BANKINT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYNCH2</td>
<td>.078***</td>
<td>-.068***</td>
<td>.087***</td>
<td>-.082***</td>
</tr>
<tr>
<td>Banking Integration</td>
<td>(.017)</td>
<td>(.029)</td>
<td>(.023)</td>
<td>(.032)</td>
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<tr>
<td>Country-Pair Fixed Effects</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
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<td>Time (Year) Fixed Effects</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
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<tr>
<td>R^2</td>
<td>.100</td>
<td>.131</td>
<td>.071</td>
<td>.132</td>
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<td>Observations</td>
<td>5376</td>
<td>5376</td>
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OLS: Results Summary

Robust result (control trade patterns, dynamics, GDP growth, outliers such as Luxemburg)

1. Across country-pairs: A positive correlation between banking integration and GDP synchronization
   - In line with previous empirical studies

2. Within country-pairs: A higher degree of bilateral banking integration leads to less synchronized (more divergent) GDP fluctuations.
   - Contrasts previous studies, but supportive to “standard” theory.
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Shortcomings of OLS Estimation

- Although we have dealt with omitted variables (arising from hard-to-account-for time-invariant country-pair factors and common to all countries trends), the panel OLS coefficients may be driven by reverse causation.

- Moreover there is a possibility that we have omitted another country-pair time-varying factor (although we do control for trade and production differences)

- Measurement error.
  - Non bank flows (FDI, FPI, other investment flows)
  - Indirect exposure
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A heroic approach to account for these issues

Bilateral time-varying IV: Index of legislative-regulatory harmonization policies in financial markets used as an instrument for bilateral banking linkages (using data from Kalemli-Ozcan, Papaioannou, and Peydro JIE 2010)

Legislative-Regulatory Harmonization Policies in Financial Services ⇒ Banking Integration ⇒ Business Cycle Synchronization
Question: Do country-pairs who harmonized their financial markets sooner, experience a higher level of banking integration, which is followed by a higher degree of synchronization of their business cycles?

Notation:

\[ \text{SYNCH}_{i,j,t} = \alpha_t + \alpha_{ij} + \beta \text{BANKINT}_{ij,t-1} + X'_{i,j,t-1} \psi + \epsilon_{i,j,t} \]

\[ \text{BANKINT}_{i,j,t} = \delta_t + \delta_{ij} + \gamma \text{HARMON}_{i,j,t} + X'_{i,j,t} \phi + \nu_{i,j,t} \]

- \( \text{HARMON}_{i,j,t} \): Index reflecting the degree of bilateral legislative-regulatory harmonization policies (in the context of EU’s Financial Services Action Plan (FSAP))
Financial Services Action Plan

- FSAP was package of legislative measures to create a single liquid financial market.
- FSAP were mainly contained in a set of EU-wide laws (27 EU Directives and 2 EU Regulations).
  - Directives do not mechanically become enforced across national borders (in contrast to Regulations).
  - EU countries delay the transposition of the Directives into national law.
  - Use information from the Commission on the implementation of each of the 27 Directives of the FSAP.

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Categories of legislative acts

- Banking
- Insurance
- Securities (Corporate law/governance)

Examples:

- Directive on the taking up, pursuit and prudential supervision of the business of electronic money institutions.
- Directive on insider dealing and market manipulation.
(1) Define 27 indicator variables (one for each Directive $k$) that equal one if at any given year both countries in each country-pair cell have transposed the Directive into national law and zero otherwise.

(2) Take the sum of these 27 indicator variables.
## First Stage Estimates

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<tr>
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<th>Panel OLS</th>
<th>Panel IV</th>
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<tbody>
<tr>
<td><strong>Dependent variable:</strong> Banking Integration ($BANKINT2$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Financial Harmonization</strong></td>
<td>0.3146*** (0.0523)</td>
<td>0.2597*** (0.0498)</td>
</tr>
<tr>
<td><strong>Exchange Rate Regime</strong></td>
<td>-0.2221*** (0.0589)</td>
<td></td>
</tr>
<tr>
<td><strong>F-score</strong></td>
<td>36.24</td>
<td>27.22</td>
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<td><strong>Country-Pair Fixed-Effects</strong></td>
<td>Yes</td>
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Second Stage: Integration and Synchronization

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<td>Banking Integration (BANKINT2)</td>
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<tr>
<td>-0.4044***</td>
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<tr>
<td>(0.1365)</td>
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<tr>
<td>-0.5417***</td>
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<tr>
<td>(0.1800)</td>
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<tr>
<td>Exchange Rate Regime</td>
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<tr>
<td>(0.0726)</td>
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<tr>
<td>F-score</td>
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<td>36.24</td>
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- Surprisingly, cross-country studies find the opposite.
- We argued that for identification what is needed is a time-varying measure of financial integration per pair of countries.
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- The instrumental variable specifications reveal that this negative association is most likely causal
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- Our results suggest that policy suggestions based on simple time-series or cross-sectional correlations can be quite misleading.

- When productivity shocks are dominant, financial integration leads to less synchronized cycles.

- When credit shocks are dominant, this result can be reversed.

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When credit shocks are dominant, this result can be reversed.

Future research should analyze the effect of financial globalization on the propagation of the recent financial crisis (a credit shock).
### "Reduced Form" Estimates

<table>
<thead>
<tr>
<th></th>
<th>Estimate 1</th>
<th>Estimate 2</th>
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<tbody>
<tr>
<td>Financial Harmonization</td>
<td>-.1246***</td>
<td>-.1380***</td>
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<td></td>
<td>(.0355)</td>
<td>(.0374)</td>
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<td>Exchange Rate Regime</td>
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<td>R-squared (within)</td>
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<td>Country-Pair Fixed-Effects</td>
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<td>Time (Year) Fixed-Effects</td>
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<td>Observations</td>
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<td>Country-Pairs</td>
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