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

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Financial Globalization: Shifting Balances

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 propogation?** 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 open identification issues of previous empirical research
  - Omitted variables
  - Measurement error
  - Reverse causation
  - Underlying shocks
- Identify the one-way effect of financial integration on business cycle synchronization.
  - Sample: 20 advanced economies, period 1978-2007 (pre-crisis)

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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
- Synthesis (e.g. Holmstrom and Tirole, 1997; Quadrini and Perri, 2009): Opposing effects of shocks; ambiguous effect

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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/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
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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?

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

- α_t: Year fixed-effects (common global shocks)
- α_{ij}: Country-pair fixed-effects (bilateral unobserved or hard-to-account-for factors)
- $\mathbf{X}'_{ijt-1}\delta$: Other controls such as trade

- Reverse causation may still drive the estimates.
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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).

$$SYNCH1_{ijt} \equiv -\left|(\ln Y_{it} - \ln Y_{it-1}) - (\ln Y_{jt} - \ln Y_{jt-1})\right| \quad (1)$$

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

$$SYNCH2_{ijt} \equiv -|\nu_{it} - \nu_{jt}| \quad (2)$$

$$\ln Y_{it} - \ln Y_{it-1} = \gamma_i + \phi_t + \nu_{it} \ \forall i, j \quad (3)$$

3. SYNCH3: 5-year correlation of the cyclical component of output of country-pairs

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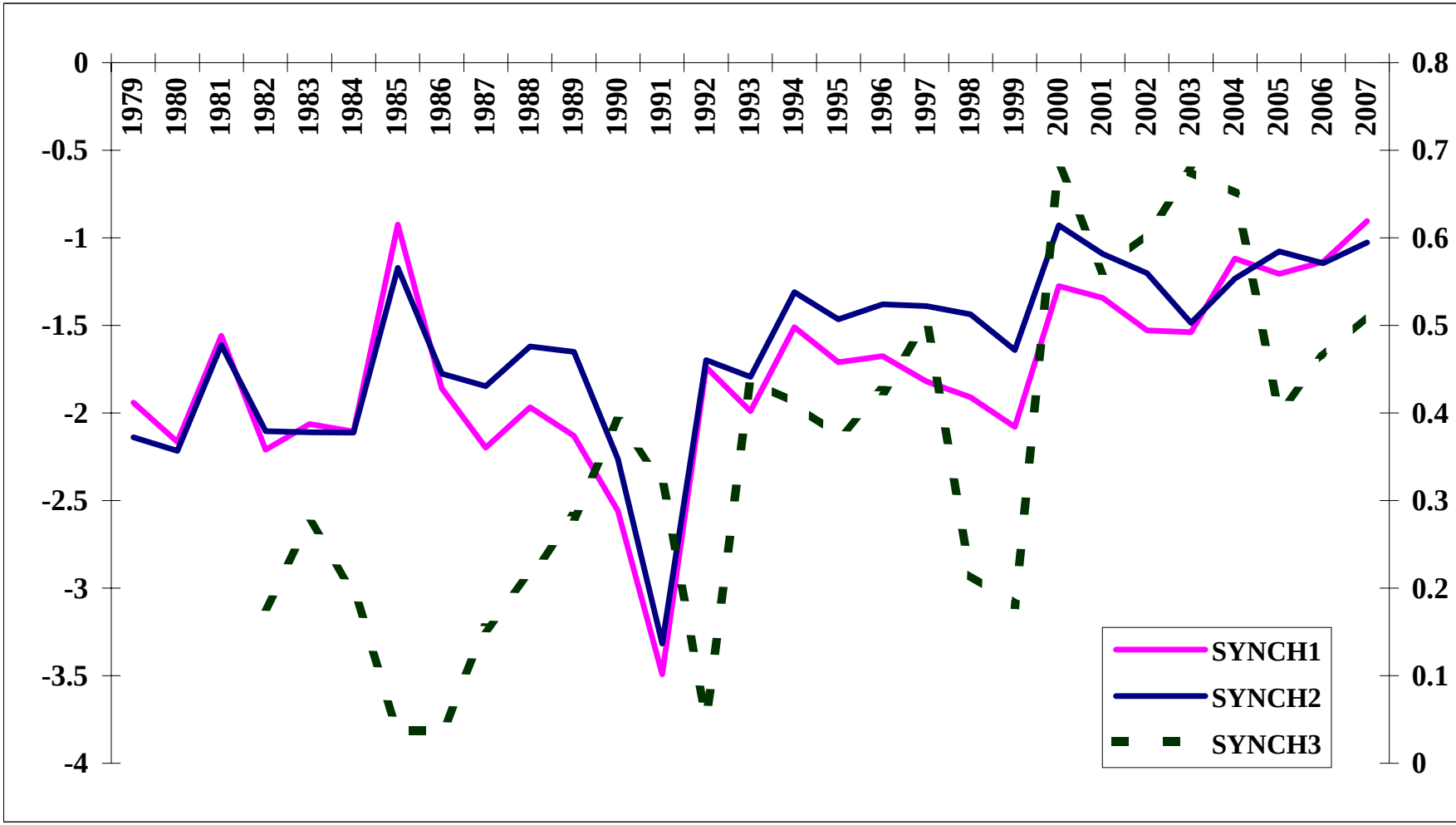
Evolution of Synchronization

Figure 2: GDP Synchronization across Time



Bilateral Bank Integration Measures

- $BANKINT1_{ijt}$: 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.
- $BANKINT2_{ijt}$: 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.

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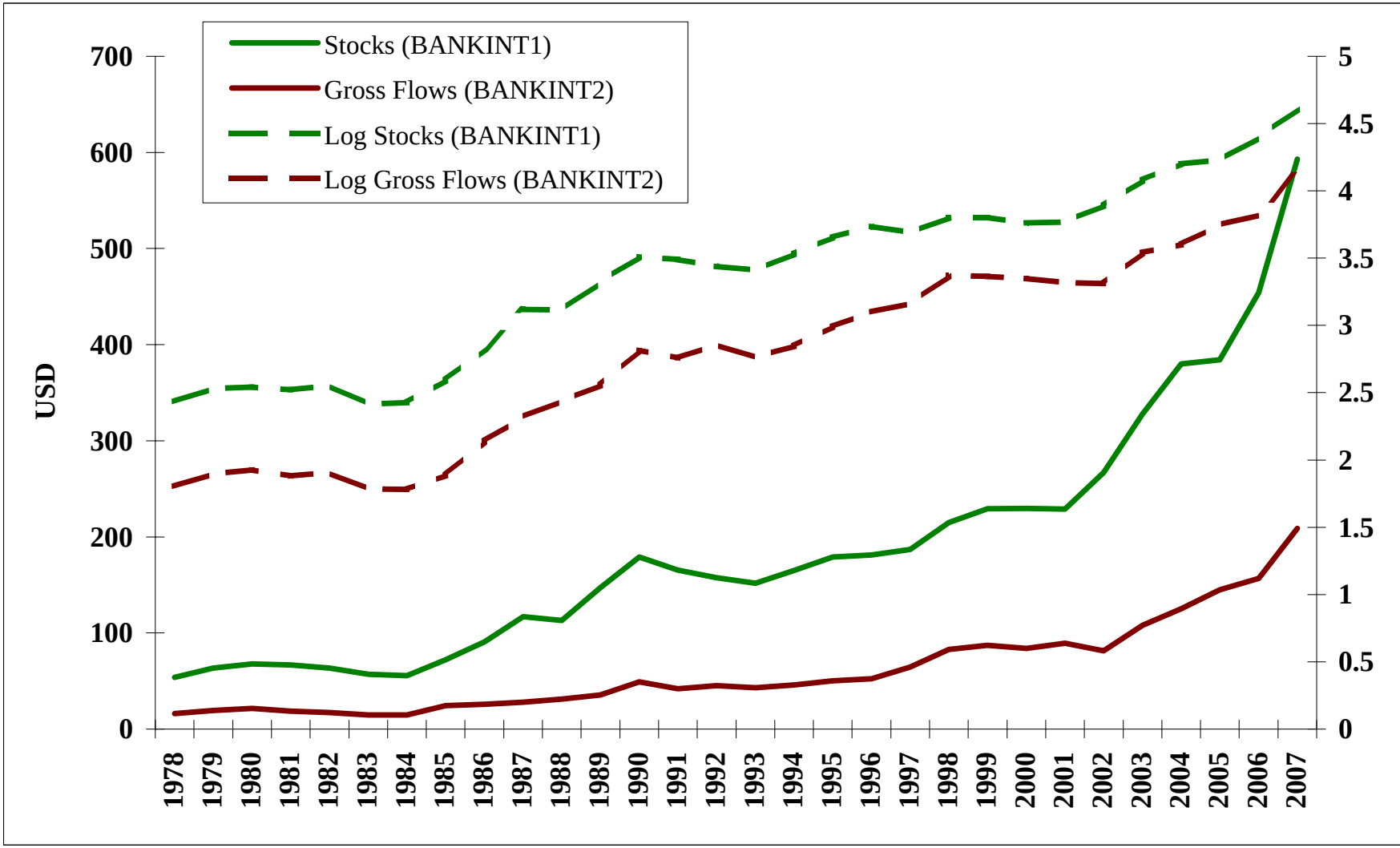
Evolution of Banking Integration

Figure 1: Banking Integration over Time



Bank Integration and Synchronization: Between Estimates

Dependent variable: Synchronization		
Synchronization Measure	SYNCH2	SYNCH2
Bank Integration Measure	BANKINT1	BANKINT2
Banking Integration	.078***	.087***
	(.017)	(.023)
Country-Pair Fixed Effects	no	no
Time (Year) Fixed Effects.	no	no
R^2	.100	.071
Observations	5376	5376
Country-Pairs	190	190

Bank Integration and Synchronization: Within Estimates

Dependent variable: Synchronization

Synchronization Measure	SYNCH2	SYNCH2	SYNCH2	SYNCH2
Bank Integration Measure	BANKINT1	BANKINT1	BANKINT2	BANKINT2
Banking Integration	.078***	−.068***	.087***	−.082***
	(.017)	(.029)	(.023)	(.032)
Country-Pair Fixed Effects	no	yes	no	yes
Time (Year) Fixed Effects	no	yes	no	yes
R^2	.100	.131	.071	.132
Observations	5376	5376	5376	5376
Country-Pairs	190	190	190	190

OLS: Results Summary

Robust result (control trade/spec. patterns, dynamic panel, GDP growth, WLS, 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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Solution

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 $\Rightarrow$ Banking Integration $\Rightarrow$ Business Cycle Synchronization

Panel IV

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?

$$
\begin{aligned}
SYNCH_{i,j,t} &= \alpha_t + \alpha_{ij} + \beta BANKINT_{ijt-1} + \mathbf{X}'_{i,j,t-1}\Psi + \varepsilon_{i,j,t} \\
BANKINT_{i,j,t} &= \delta_t + \delta_{ij} + \gamma HARMON_{i,j,t} + \mathbf{X}'_{i,j,t}\Phi + v_{i,j,t}
\end{aligned}
$$

- $HARMON_{i,j,t}$: 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

- EU Commission launched in 1999 the Financial Services Action Plan (FSAP).
- 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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Financial Services Action Plan (cont.)

- 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.
  - Money laundering Directive.
  - Directive on insider dealing and market manipulation.

Financial Harmonization as an Instrument

(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.

$$HARMON_{i,j,t} \equiv \ln\left(\sum_{k=1}^{K=27} LEX^{k}_{i,,j,t}\right) \tag{4}$$

Reduced Form Estimates

Dependent variable: GDP Synchronization (*SYNCH2*)		
Financial Harmonization	-.1246***	-.1380***
	(.0355)	(.0374)
R-squared (within)	0.129	0.129
Country-Pair Fixed-Effects	Yes	Yes
Time (Year) Fixed-Effects	Yes	Yes
Controls	No	Yes
Observations	5376	5376
Country-Pairs	190	190

First Stage Estimates

Dependent variable: Banking Integration (*BANKINT2*)		
Financial Harmonization	.3146***	.2597***
	(.0523)	(.0498)
Exchange Rate Regime		–.2221***
		(0.0589)
F-score	36.24	27.22
Country-Pair Fixed-Effects	Yes	Yes
Time (Year) Fixed-Effects	Yes	Yes
Observations	5376	5376
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Second Stage: Integration and Synchronization

Dependent variable: Synchronization (*SYNCH2*)		
Banking Integration (*BANKINT2*)	−.4044***	−.5417***
	(.1365)	(.1800)
Exchange Rate Regime		−.1746***
		(0.0726)
F-score	36.24	27.22
Observations	5376	5376
Country-Pairs	190	190

Sensitivity Analysis: Dynamic Panel IV with Controls

Dependent variable: Synchronization (*SYNCH2*)

Banking Integration Measure	*BANKINT1*	*BANKINT2*
Banking Integration	−.6768***	−.7760***
	(.2331)	(.2743)
Controls	*GDP, EU, EURO, EXR, LAGS*	
F-score	16.08	15.59
Observations	5029	5024
Country-Pairs	190	190

To Conclude...

- Standard theory predicts that financial integration leads to a lower degree of business cycle synchronization
- 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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Our Paper

Using this type of measure for banking integration, we find:

- In the cross-section, a higher degree of financial integration is associated with more synchronized output cycles
- Within estimates show a higher degree of financial integration is associated with less synchronized cycles
- The instrumental variable specifications reveal that this negative association is most likely causal and quantitatively important
  - Explain 20% of the actual variation in synchronization
  - Pairs that pass 5 identical directives at the same time, experience the median increase in financial integration (50%) and their cycle synchronization decreases by 2 percentage points.

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Policy Implications

- 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.
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