

Twenty Years of Convergence

Discussion by Şebnem Kalemli-Özcan

The Paper Documents:

- Convergence in the pairwise growth rates of GDP and consumption
- Links to the “Export” sector explain sectoral and aggregate GDP convergence that standard trade measures cannot explain
- Convergence in consumption is due to financial integration

General Impression and Comments

- A very comprehensive paper
- A rich canvas of data
- A new “trade” measure that enhances our understanding of the depth of European integration
- Measurement of GDP convergence
- Role of financial integration
- Total Factor Productivity convergence
- Consumption convergence
- Importance of a framework for interpretation and policy implications

Measurement

GDP Convergence or GDP Synchronization?

Measuring GDP Convergence

- Growth Literature

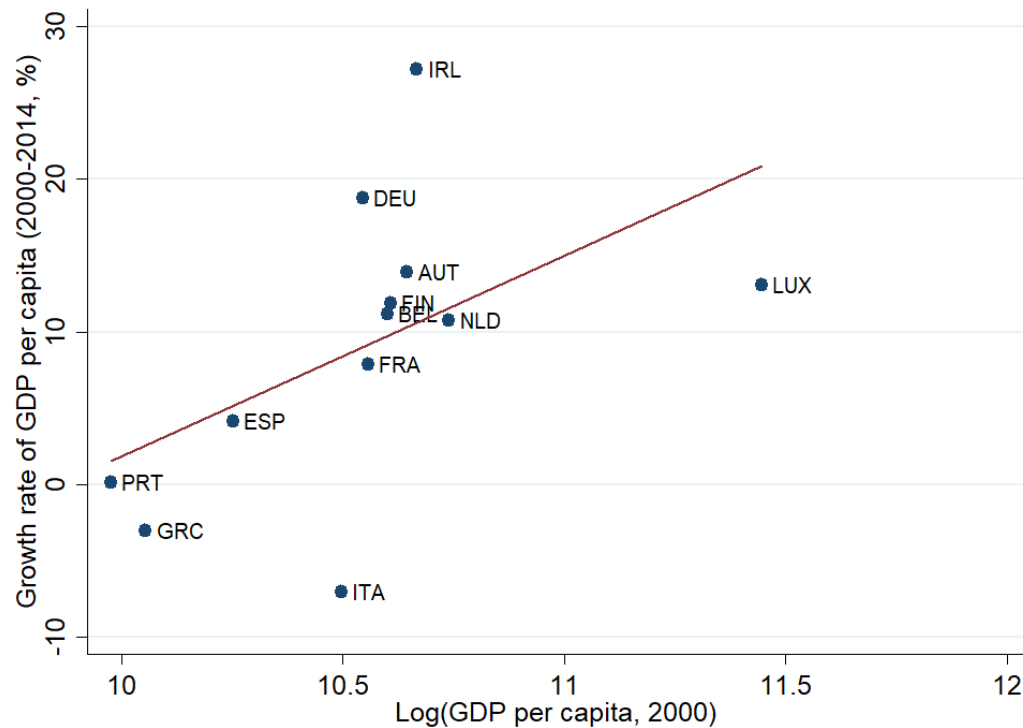
- **Convergence in GDP**: whether poor countries/regions grow faster than rich ones (Barro and Sala-i-Martin, 1992, JPE)

- International Business Cycle Literature

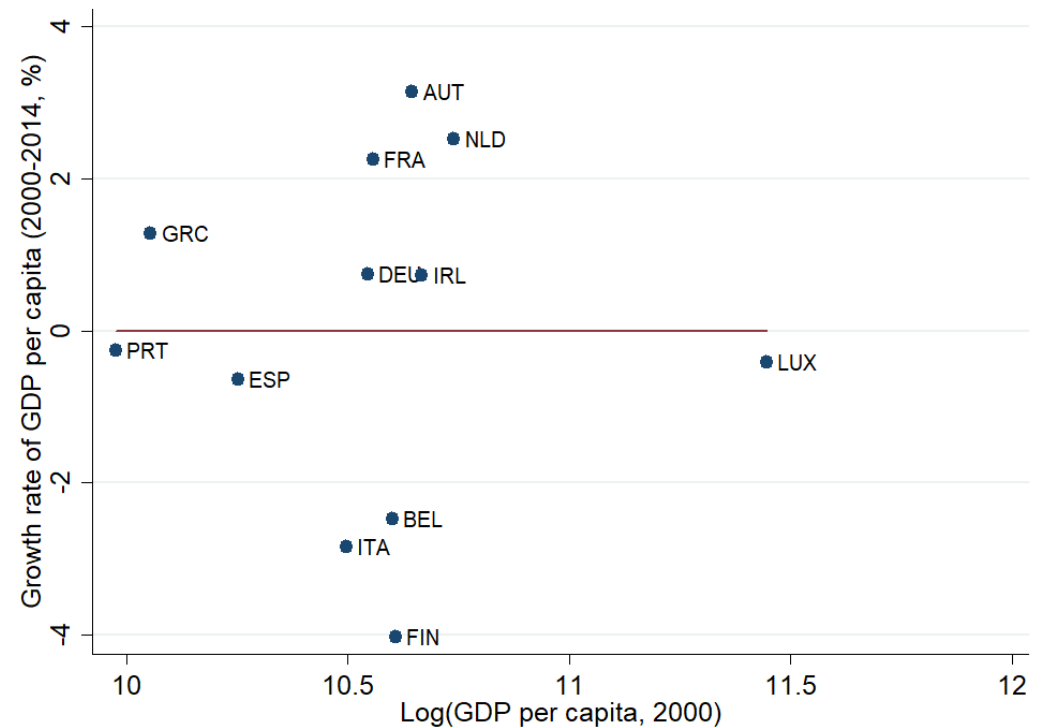
- **Synchronization of GDP Fluctuations** (Authors' measure)
- Desirability of economic integration centers on the degree of synchronization of GDP fluctuations across countries (Mundell, 1961, AER)
- Economic integration itself affects synchronization of GDP fluctuations (Frankel-Rose, 1998, EJ)

Growth Literature Measure Shows: Divergence in GDP for EMU12

(a) Unconditional



(b) Conditional

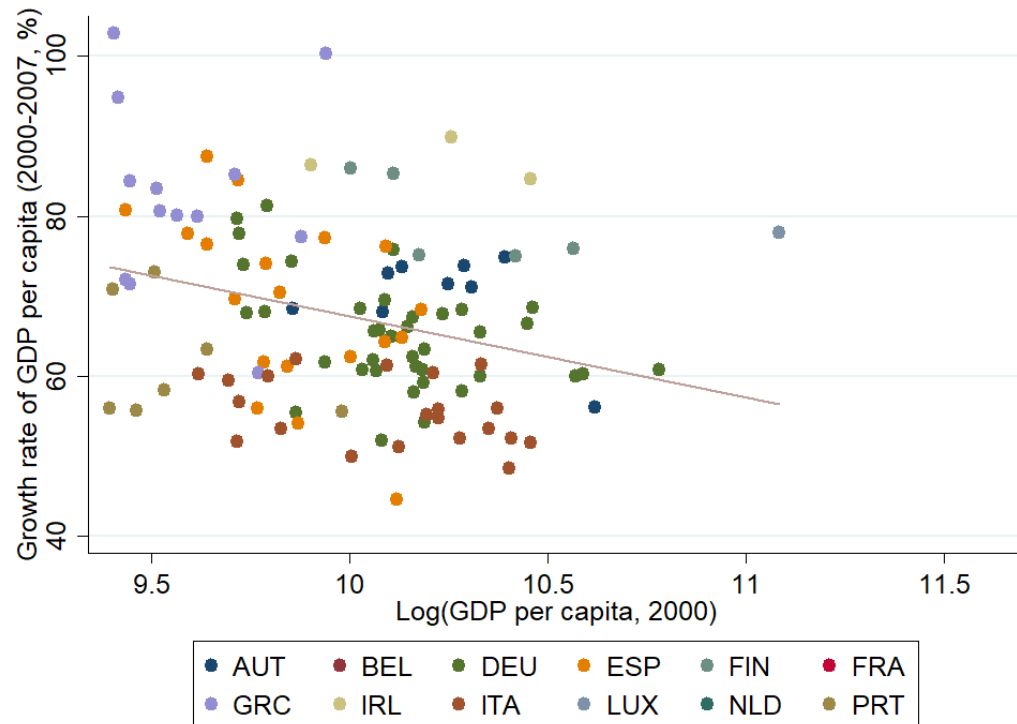


Note: The sample includes 12 original EMU member countries: Austria (AUT), Belgium (BEL), Germany (DEU), Spain (ESP), Finland (FIN), France (FRA), Greece (GRC), Ireland (IRL), Italy (ITA), Luxembourg (LUX), the Netherlands (NLD), and Portugal (PRT). Conditional scatter-plot is drawn as the partial relationship after controlling for structural variables, including life expectancy, fertility rate, education, investment ratio, inflation rate, openness, openness X ToT, and export intensity.

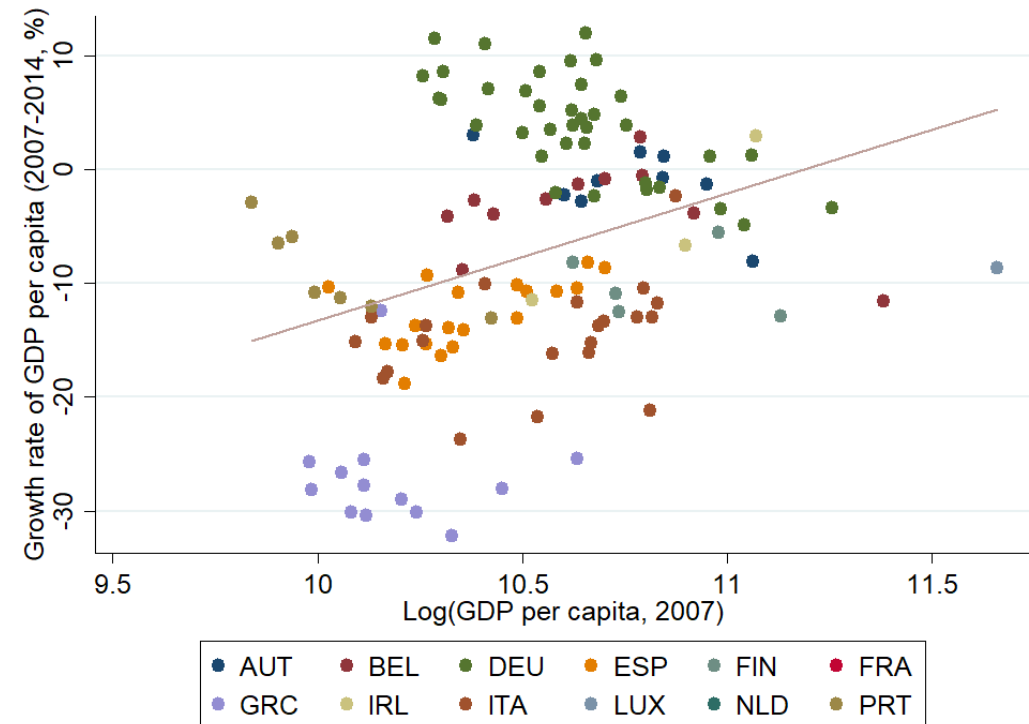
Source: Authors' data, World Bank WDI

Growth Literature Measure Shows: Convergence in Regional GDP before crisis

(a) Unconditional (2000-2007)



(a) Unconditional (2007-2014)



Note: The sample includes the NUTS 2 regions of 12 original EMU member countries. They are Austria (AUT), Belgium (BEL), Germany (DEU), Spain (ESP), Finland (FIN), France (FRA), Greece (GRC), Ireland (IRL), Italy (ITA), Luxembourg (LUX), the Netherland (NLD), and Portugal (PRT).

Source: Eurostat, NUTS2

Conditional Convergence in Regional GDP

	(1)	(2) 2000-2014	(3)	(4) 2000-2007	(5) 2007-2014
β	0.0057** (0.0025)	-0.0080*** (0.0030)	-0.0096*** (0.0025)	-0.0087*** (0.0031)	-0.0096*** (0.0034)
Controls	Y		Y	Y	Y
Export intensity		Y			
Country-FE			Y	Y	Y
N	113	113	113	108	124
R-squared	0.239	0.372	0.789	0.646	0.883

Note: Control variables are 1/life expectancy, log(fertility), and education rate.

Source: Eurostat, NUTS2

GDP Convergence Results

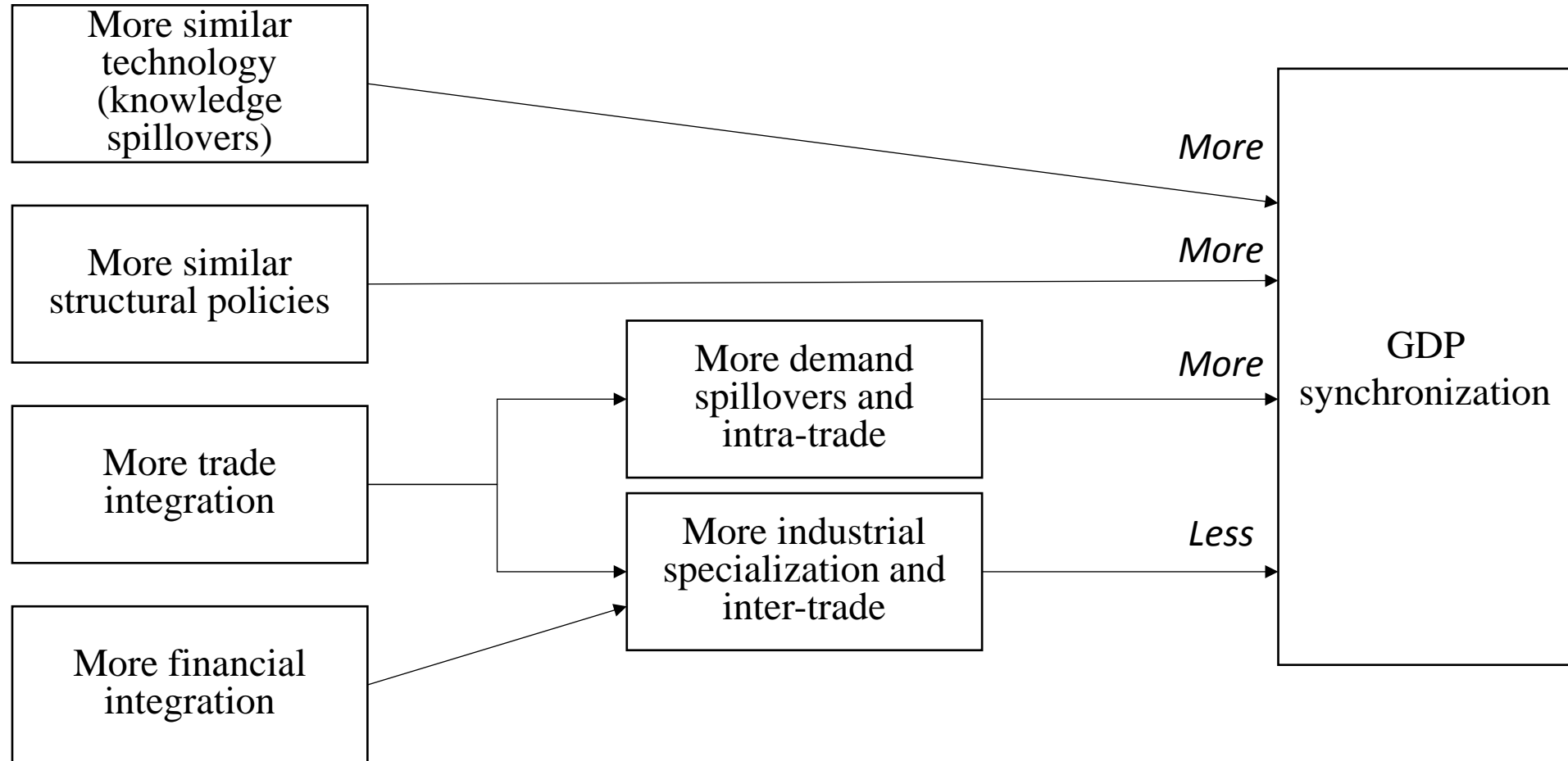
- Growth Literature Measure: Convergence in GDP
 - No for EMU12, since poor countries did not grow faster than rich ones
 - Yes for NUTS2 regions within EMU12 since poor regions did grow faster than rich ones
- International Business Cycle Literature Measure: Synchronization of GDP Fluctuations (Authors' measure)
 - EMU12 GDP fluctuations become more synchronized
 - Why?

The Role of Integration

The authors' measure of GDP convergence (synchronization), is endogenous to **trade and financial integration**

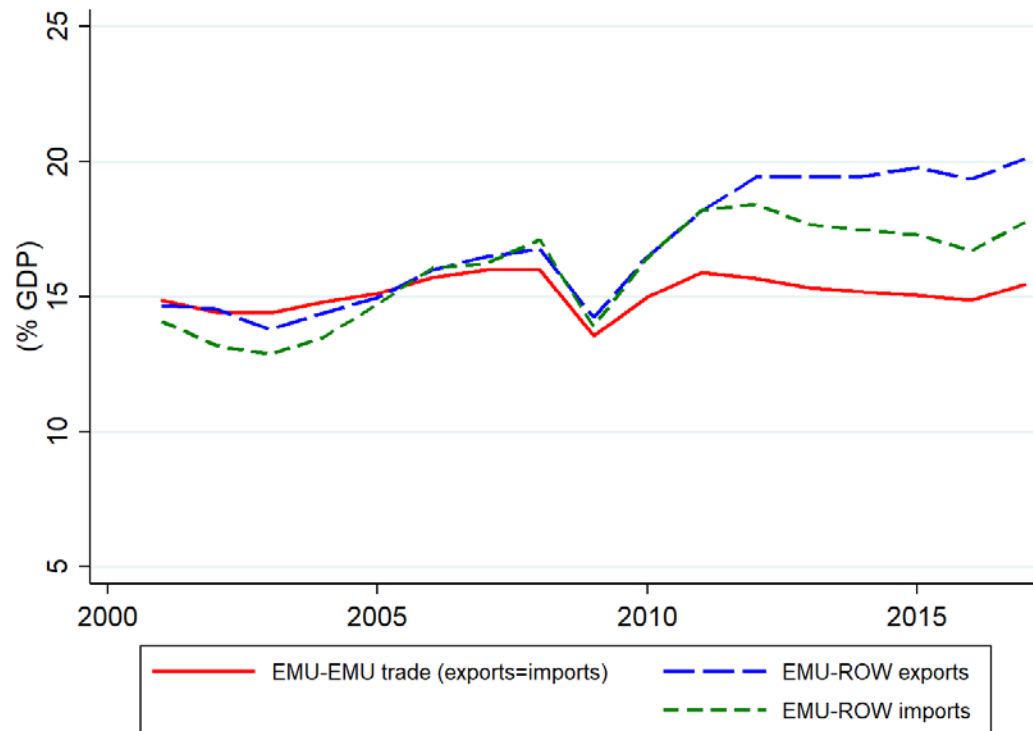
The authors' argument (trade endogeneity): Links to export sector increases GDP synchronization of those “linked” sectors and leads to GDP convergence in the aggregate

The Effect of Integration on GDP Synchronization

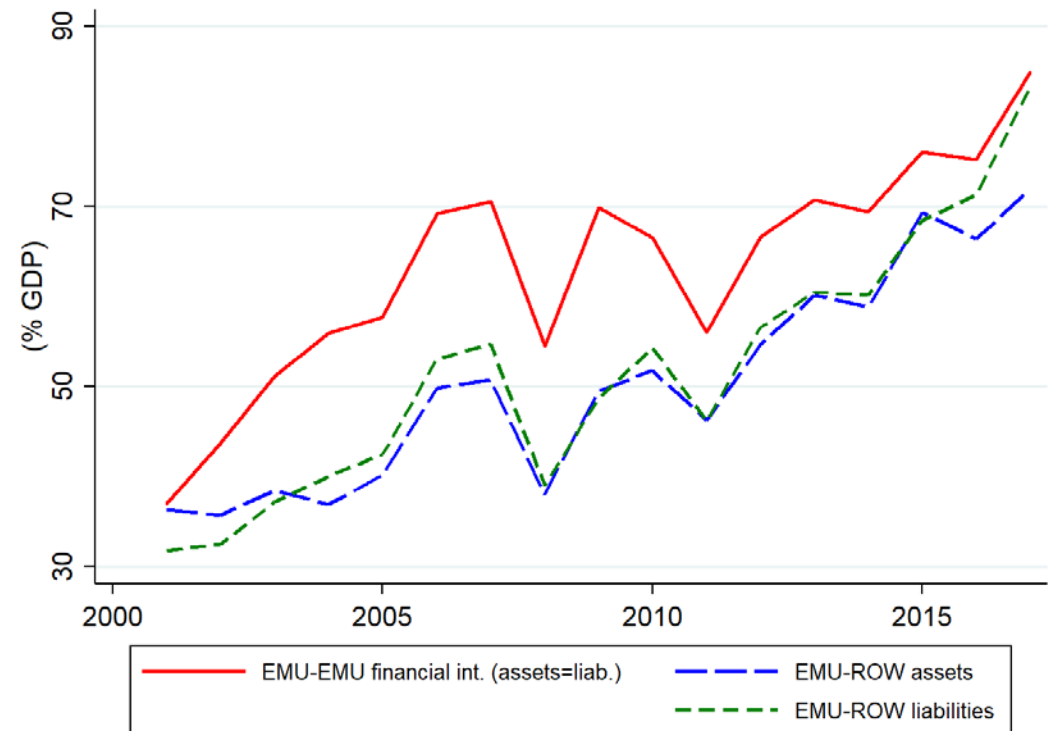


Trade and Financial Integration

(a) Trade integration of EMU



(b) Financial integration of EMU



Note: EMU includes 12 original EMU members including Austria (AUT), Belgium (BEL), Germany (DEU), Spain (ESP), Finland (FIN), France (FRA), Greece (GRC), Ireland (IRL), Italy (ITA), Luxembourg (LUX), the Netherland (NLD), and Portugal (PRT). ROW is the rest of the world.

Source: IMF data

Synchronization: Authors' Benchmark Measure

Dependent variable: Negative Absolute Difference of GDP growth

	(1)	(2)	(3)	(4)
		SECTOR		AGGREGATE
Crisis		0.65***		
		(0.02)		
Export intensity	0.2631***	0.2668***	-0.3231	0.0326
	(0.0692)	(0.0125)	(0.1997)	(0.0615)
Crisis X Export intensity			0.1251	-0.1182***
			(0.1005)	(0.0294)
Trade intensity	0.2733	0.2760**	-0.3775	0.5487**
	(0.2251)	(0.153)	(0.2885)	(0.2241)
Crisis X Trade intensity			0.1876*	-0.0079
			(0.1042)	(0.0832)
Financial integration	-0.03***	-0.03***	-0.08***	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)
Crisis X Financial integration			0.03***	0.05***
			(0.01)	(0.01)
Observations	2292391	2292391	491700	924
R-squared	0.250	0.250	0.629	0.327
Country-sector-pair FEs (ijrs)	Yes	Yes	Yes	
Country-sector-time FEs (irt, jst)	Yes		Yes	
Country-pair FEs (ij)				Yes
Country-time FEs (it, jt)				Yes

Note: Sample includes 12 original EMU countries.

Regression: IMF WEO 2013, Kalemli-Ozcan et al., 2013a,b, JF, JIE; Source: Authors' data

Synchronization: Authors' Alternative Measure

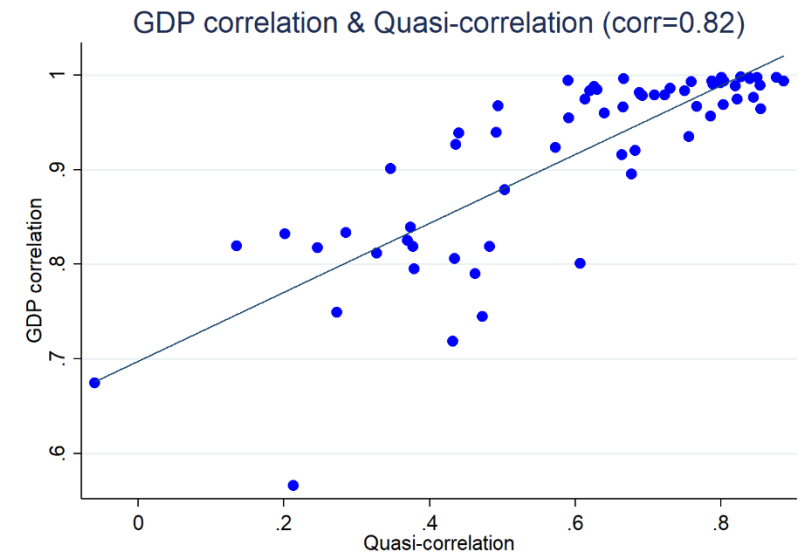
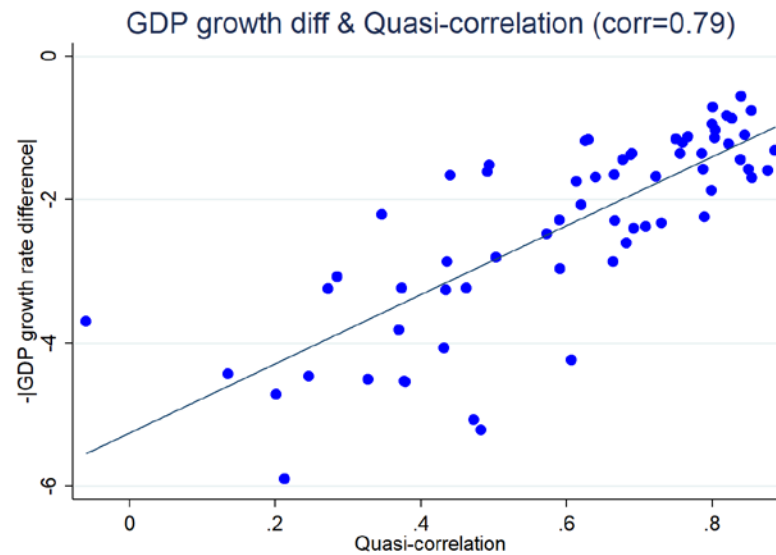
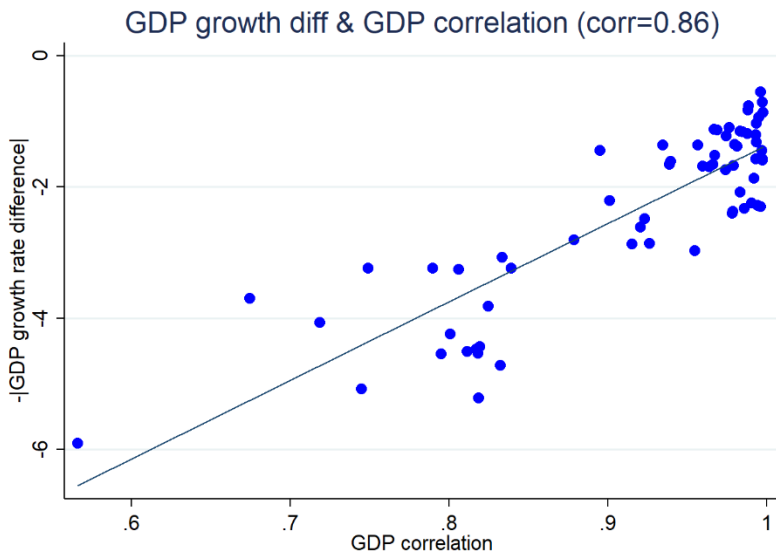
Dependent variable: Quasi-correlation of GDP growth

	(1)	(2)	(3)	(4)	(5)
<i>T</i> =2 ('01-'07 & '08-'14)	SECTOR		AGGREGATE		
Export intensity	4.0830*** (0.1310)	0.7171*** (0.0892)	6.3740*** (0.8148)	1.6959 (1.1449)	-0.0386 (1.0350)
Trade intensity	3.8132* (1.9797)	0.7182 (0.6990)	4.0985 (3.6851)	4.7745* (2.8155)	0.2424 (1.0526)
Financial integration				0.51*** (0.11)	0.72 (0.68)
Observations	325600	325600	132	132	128
R-squared	0.583	0.867	0.435	0.613	0.979
Country-sector-pair FEs (ijrs)	Yes	Yes			
Country-sector-time FEs (irt, jst)		Yes			
Country-pair FEs (ij)			Yes	Yes	Yes
Country-time FEs (it, jt)					Yes

Note: Sample includes 12 original EMU countries.

Source: Authors' data

Comparing Country-Pair Synchronization/Convergence Measures



Note: The sample includes the country pairs within 12 original EMU member countries: Austria (AUT), Belgium (BEL), Germany (DEU), Spain (ESP), Finland (FIN), France (FRA), Greece (GRC), Ireland (IRL), Italy (ITA), Luxembourg (LUX), the Netherland (NLD), and Portugal (PRT). The measures are averaged over 2000-2017.

Source: Authors' data, World Bank WDI

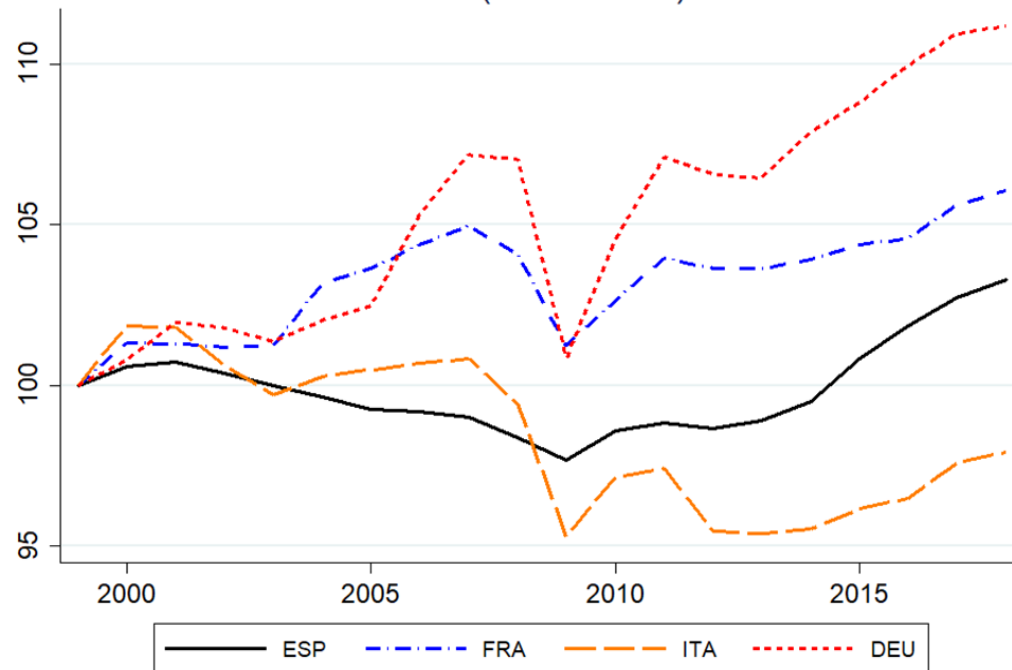
What about Total Factor Productivity?

- Sector-level GDP is more synchronized because of export intensity of the sectors
- What does this imply for total factor productivity convergence?
 - TFP might converge if technology is shared across sectors who do not trade
 - TFP might diverge if there is resource misallocation within sectors (Gopinath et al. 2017, QJE)

Divergence in Aggregate TFP

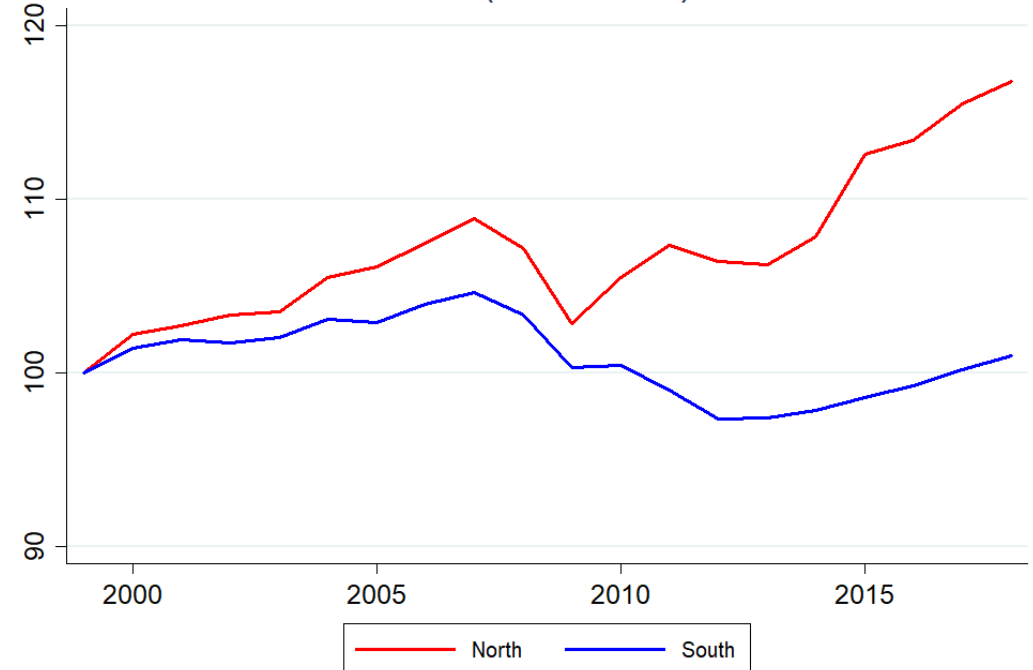
(a) 4 countries

TFP (1999 = 100)



(b) North vs. South

TFP (1999 = 100)



Note: The sample includes 12 original EMU member countries: Austria (AUT), Belgium (BEL), Germany (DEU), Spain (ESP), Finland (FIN), France (FRA), Greece (GRC), Ireland (IRL), Italy (ITA), Luxembourg (LUX), the Netherland (NLD), and Portugal (PRT). North countries are Belgium, Germany, Finland, France, Ireland, Luxembourg, and Netherlands. South countries are Greece, Italy, Portugal, and Spain.

Source: European Commission AMECO

Consumption Convergence

Ultimately we care about consumption convergence for welfare

EMU countries might face different shocks but if financial integration smooths out these shocks, then EMU citizens have smooth, converging consumption

Authors measure **convergence in consumption** via standard risk sharing regressions (aggregate and bilateral)

- **How much of the shocks to GDP are smoothed so that consumption does not comove with GDP**

Financial Integration and Consumption Convergence

- **Headline result:** Financial integration help to smooth consumption fluctuations before the crisis but made it worse after the crisis
- Before crisis results are robust and similar to the literature
- After crisis result: significant effect in aggregate, but not in bilateral regressions

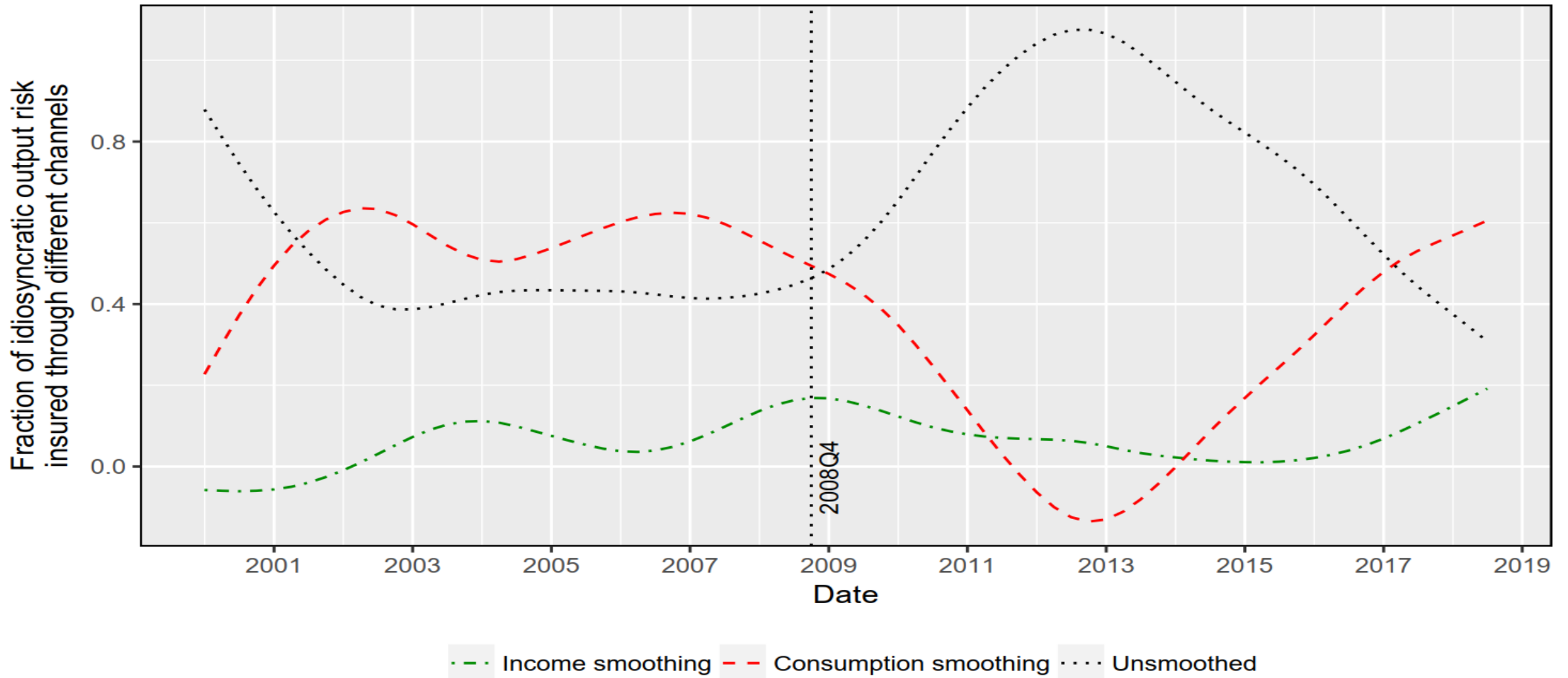
Financial Integration Measure and Consumption Convergence During Crisis

- Financial integration is measured with **FSAP Directives**
 - (Kalemli-Ozcan et al., 2008, ECB, 2013a,b, JF, JIE)
- Exogenous measure
- Policy relevant
 - To disentangle the impact of the single currency and harmonization policies on financial integration is of major relevance for process of further integration

Financial Integration Measure and Consumption Convergence During Crisis

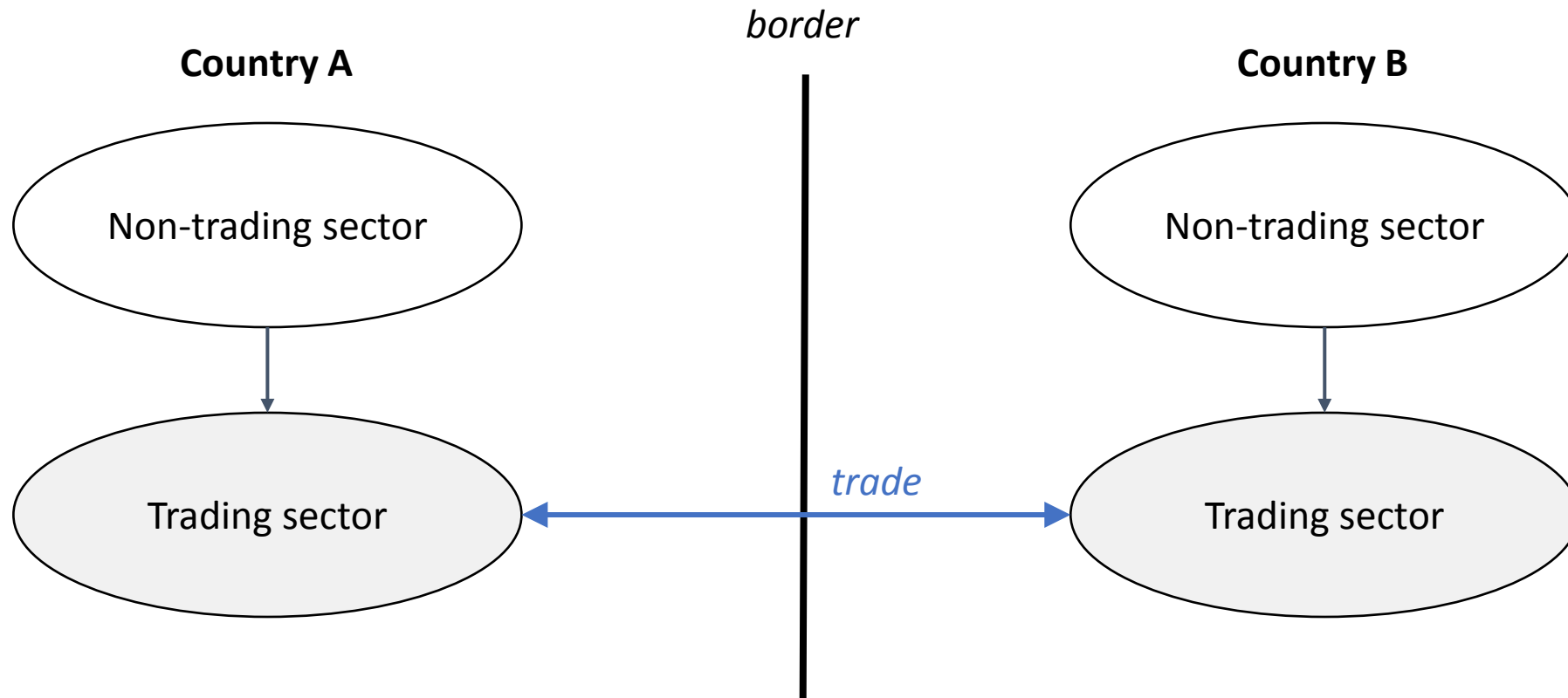
- Authors find: consumption comove more with GDP in countries that passed the FSAP directives...
 - ...does not mean these countries have more “contagion in consumption”
 - Countries can pass laws but they may not be deeply financially integrated
- Kalemli-Ozcan et al. 2008, “**The Euro at Ten: Lessons and Challenges**” finds that financial integration helped consumption smoothing tremendously **but there is a different role for cross-border liabilities and assets**

Consumption and Income Smoothing EMU12



Importance of a Framework

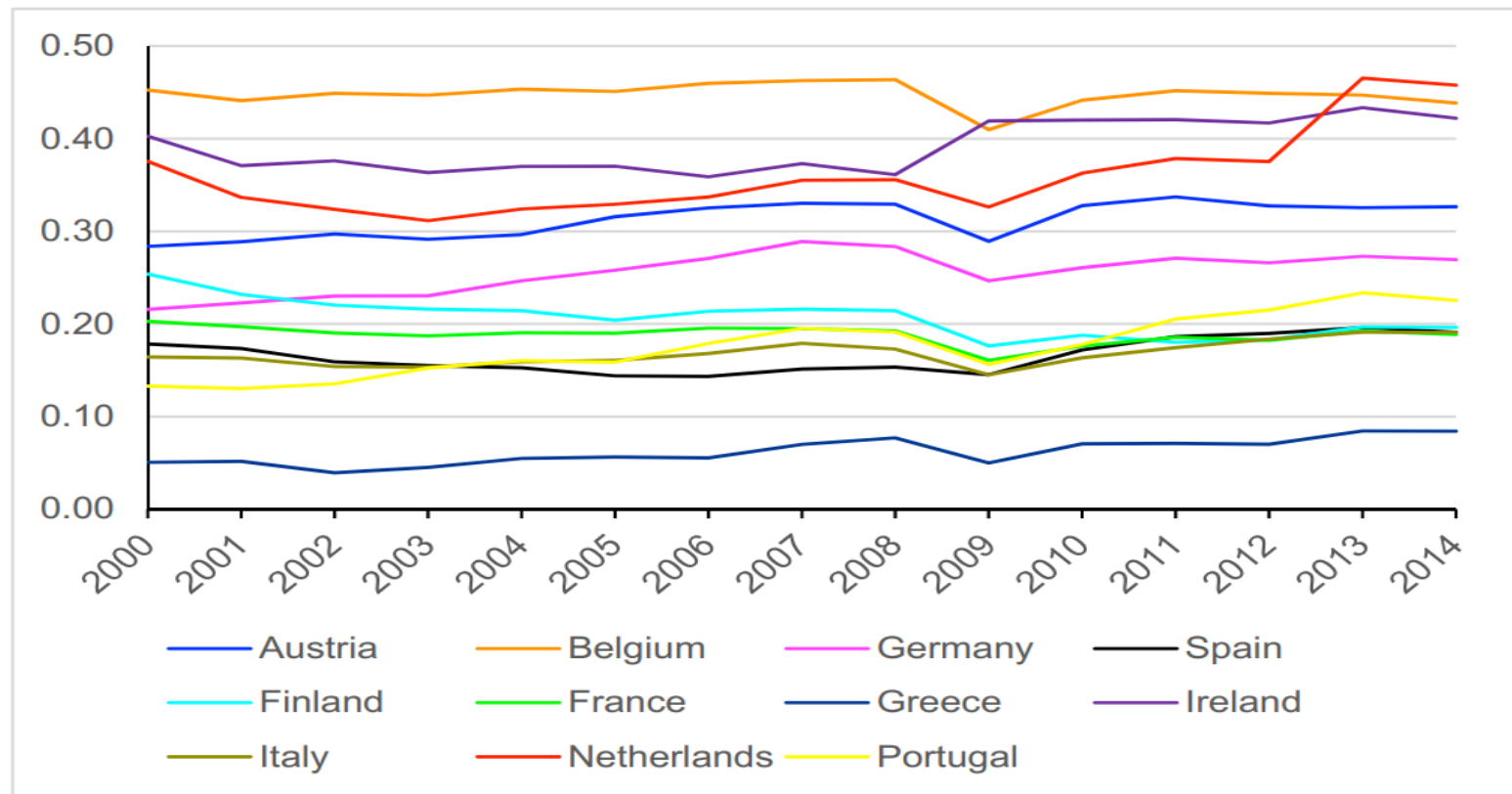
Framework: How to link sector to aggregate convergence?



Framework: Export intensity does not vary over time; how it explains convergence?

Chart 6

Export Intensities for EMU Member countries (without Luxembourg)



Sources: World Input Output Database.

Framework: Who is the right counterfactual?

If EMU12 GDPs are more synchronized relative to US and China...

...does this mean US and China are subject to different temporary/persistent shocks and/or have different degrees of trade and financial integration

....or EMU12 are integrated more?

Conclusion

- Interesting contribution that focuses on **GDP and consumption** convergence and provides a view of integration that is deeper than standard trade integration
- **Important to note:** Financial integration caused divergence in **GDP** during normal times, but also helped **consumption** to converge
- **Open question:**
 - If non-trading sectors converge due to their links to exporting sectors, why **aggregate GDP** did not converge in terms of standard measures?
 - Data issues? Not enough sectors linked to exporting sectors in the aggregate?

Appendix

Divergence in GDP

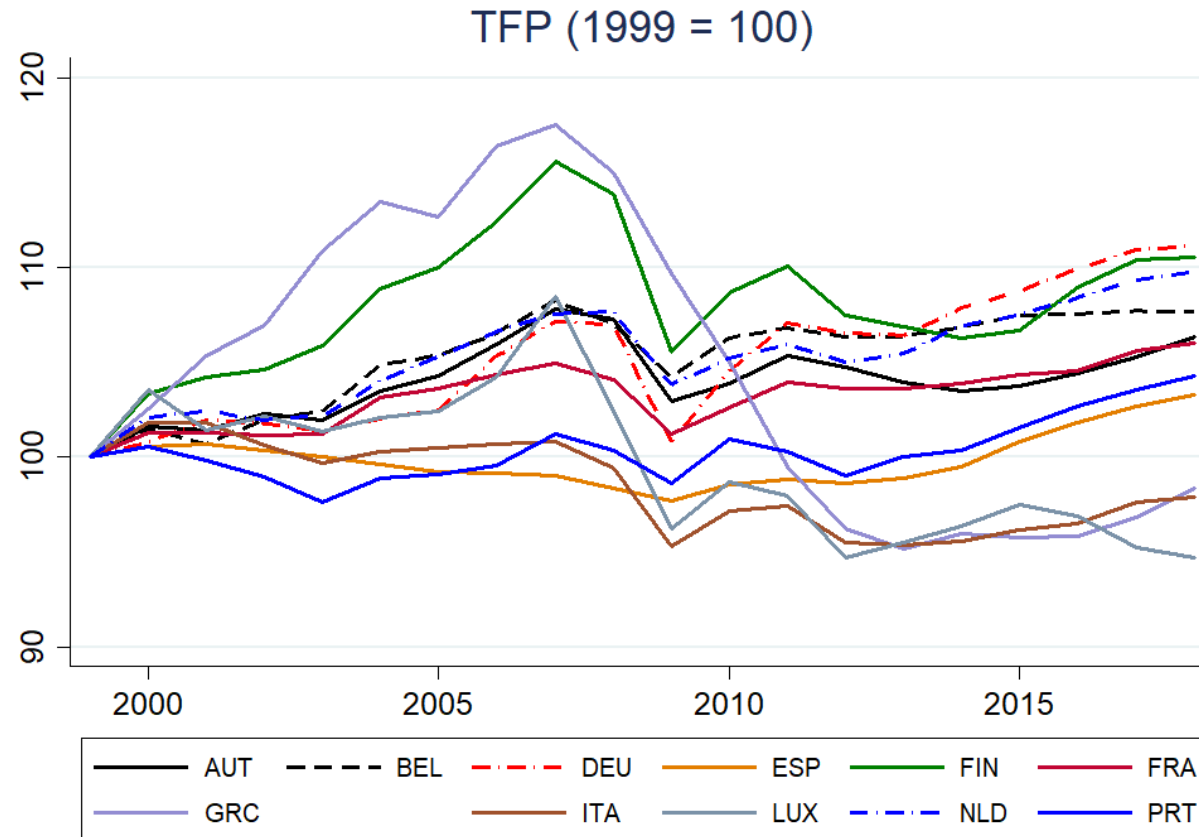
- $[1/T] \log (y_{it}/y_{it-T}) = a - [\log(y_{it-T})][(1-e^{\beta T})/T] + \gamma X$

	(1) Unconditional	(2) + Controls	(3) + Controls + Export intensity
β	0.0083* (0.0040)	0.0145 (0.0184)	0.0088 (0.0136)
Observations	12	12	12
R-squared	0.277	0.802	0.941

Note: Control variables are 1/life expectancy, log(fertility), education rate, investment ratio, inflation rate, openness, and openness X ToT.

Source: Authors' data, World Bank WDI

Divergence in TFP

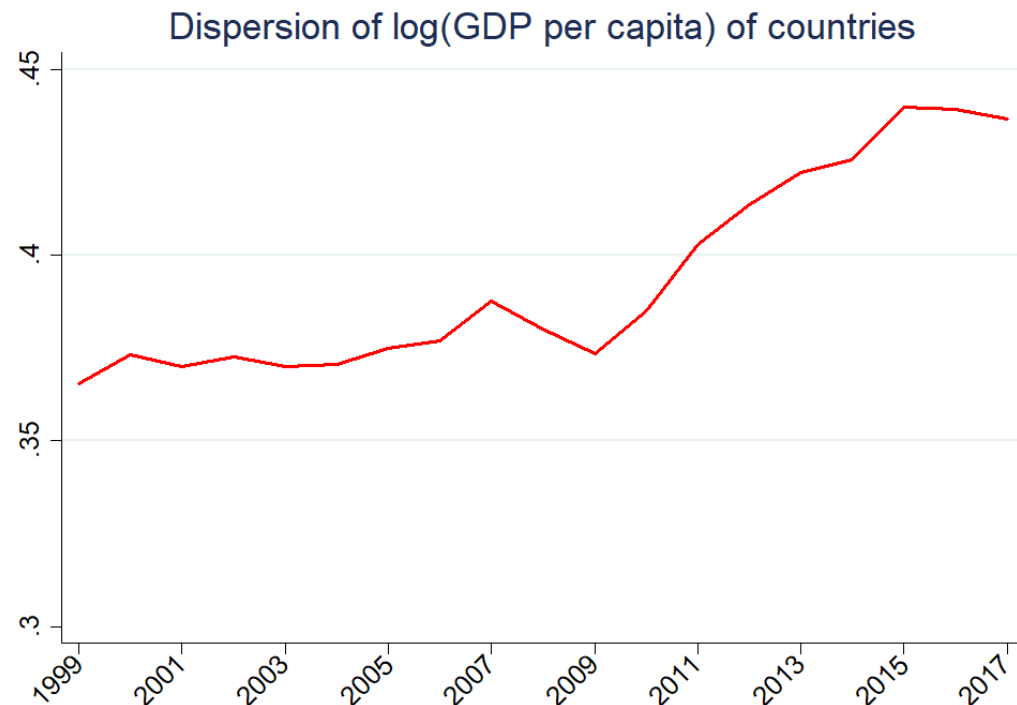


Note: The sample includes 11 original EMU member countries except for Ireland (IRL): Austria (AUT), Belgium (BEL), Germany (DEU), Spain (ESP), Finland (FIN), France (FRA), Greece (GRC), Italy (ITA), Luxembourg (LUX), the Netherlands (NLD), and Portugal (PRT). North countries are Belgium, Germany, Finland, France, Ireland, Luxembourg, and Netherlands. South countries are Greece, Italy, Portugal, and Spain.

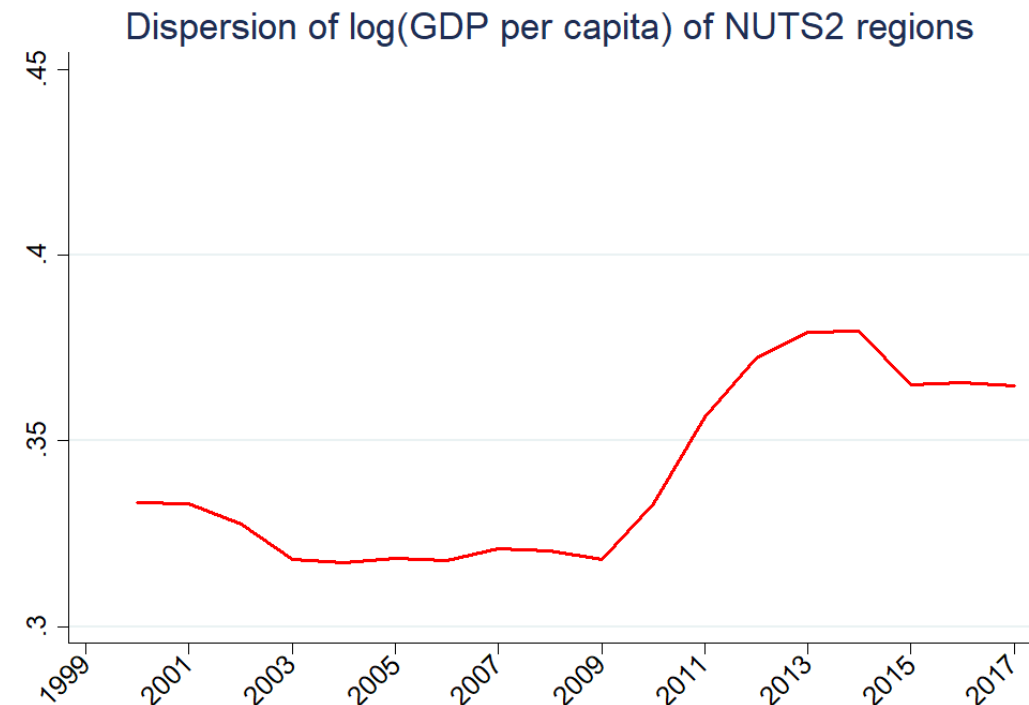
Source: European Commission AMECO

Convergence in GDP – $\sigma = \text{sd}(\log(\text{GDP per capita}))$

(a) Country-level



(a) Regional-level



Note: Sigma is the unweighted standard deviation of log of GDP per capita. The sample includes 12 original EMU member countries: Austria (AUT), Belgium (BEL), Germany (DEU), Spain (ESP), Finland (FIN), France (FRA), Greece (GRC), Ireland (IRL), Italy (ITA), Luxembourg (LUX), the Netherland (NLD), and Portugal (PRT). Regional-level is based on the NUTS 2 regions of the above countries.

Source: World Bank WDI, Eurostat