

Global Value Chains, Inflation Co-movement, and the Globalisation of Inflation

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Overview

- **GVC leads to international spillovers of production costs**
- **GVCs may thus drive the two international dimensions of inflation:**
 - Inflation is synchronized: 'Global Inflation Co-movement' (**GC**) as in Monacelli and Sala 2009, Ciccarelli and Mojon 2010, Mumtaz and Surico 2009 and 2012, ...
 - Global slack drives domestic inflation: 'Globalization of Inflation' (**GI**) as in Borio and Filardo 2007, BIS 2014, Bianchi and Civelli 2015, ...
- **This talk presents insights from two recent papers:**
 1. “International Inflation Spillovers Through Input Linkages” (w. Andrei Levchenko and Philip Saure)
 2. “The globalization of inflation: first evidence for the importance of input-output linkages” (w. Claudio Borio and Andrew Filardo)

1. International Inflation Spillovers Through Input Linkages

- 2 firms, perfect competition, production requires 1/2 of other output and local inputs at cost c_1 or c_2 :

$$p_1 = \frac{1}{2}p_2 + c_1 \qquad p_2 = \frac{1}{2}p_1 + c_2$$

$$\longrightarrow p_1 = \underbrace{\frac{1}{4}p_1}_{\text{simple network effect}} + \frac{1}{2}c_2 + c_1 = \frac{2}{3}c_2 + \frac{4}{3}c_1$$

- Leads :

$$\widehat{p}_1 = \frac{\dot{p}_1}{p_1} = \frac{\frac{2}{3}c_2}{\underbrace{\frac{2}{3}c_2 + \frac{4}{3}c_1}} \widehat{c}_2 + \frac{\frac{4}{3}c_1}{\frac{2}{3}c_2 + \frac{4}{3}c_1} \widehat{c}_1$$

$\equiv \gamma_{1,2}$ input cost share

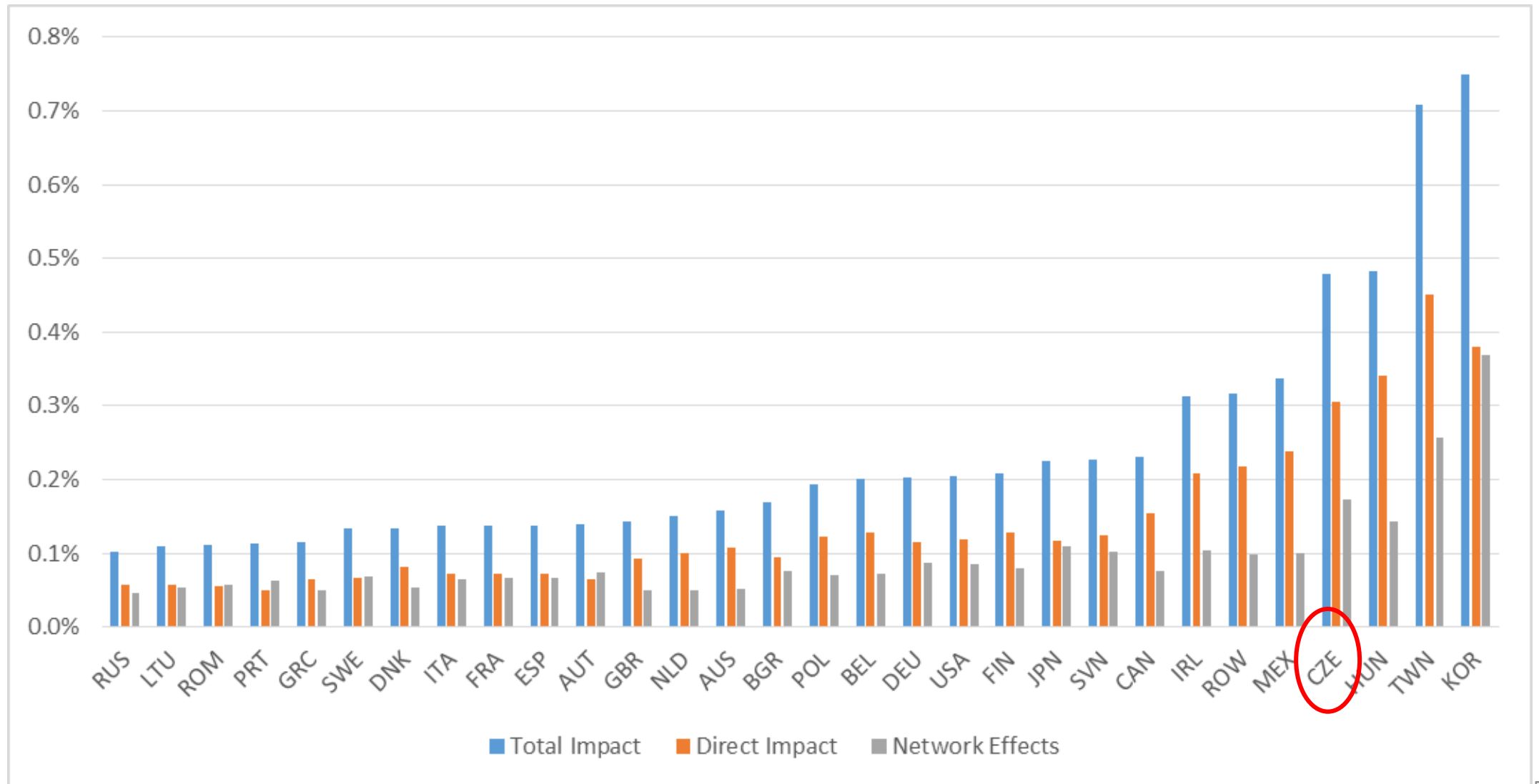
Bringing this to the data

- Use: WIOD, construct large dataset of sectoral PPIs, and exchange rates
- Firms charge markups that might vary; akin to ERPT rate $\beta < 1$
- A system of prices that follows:

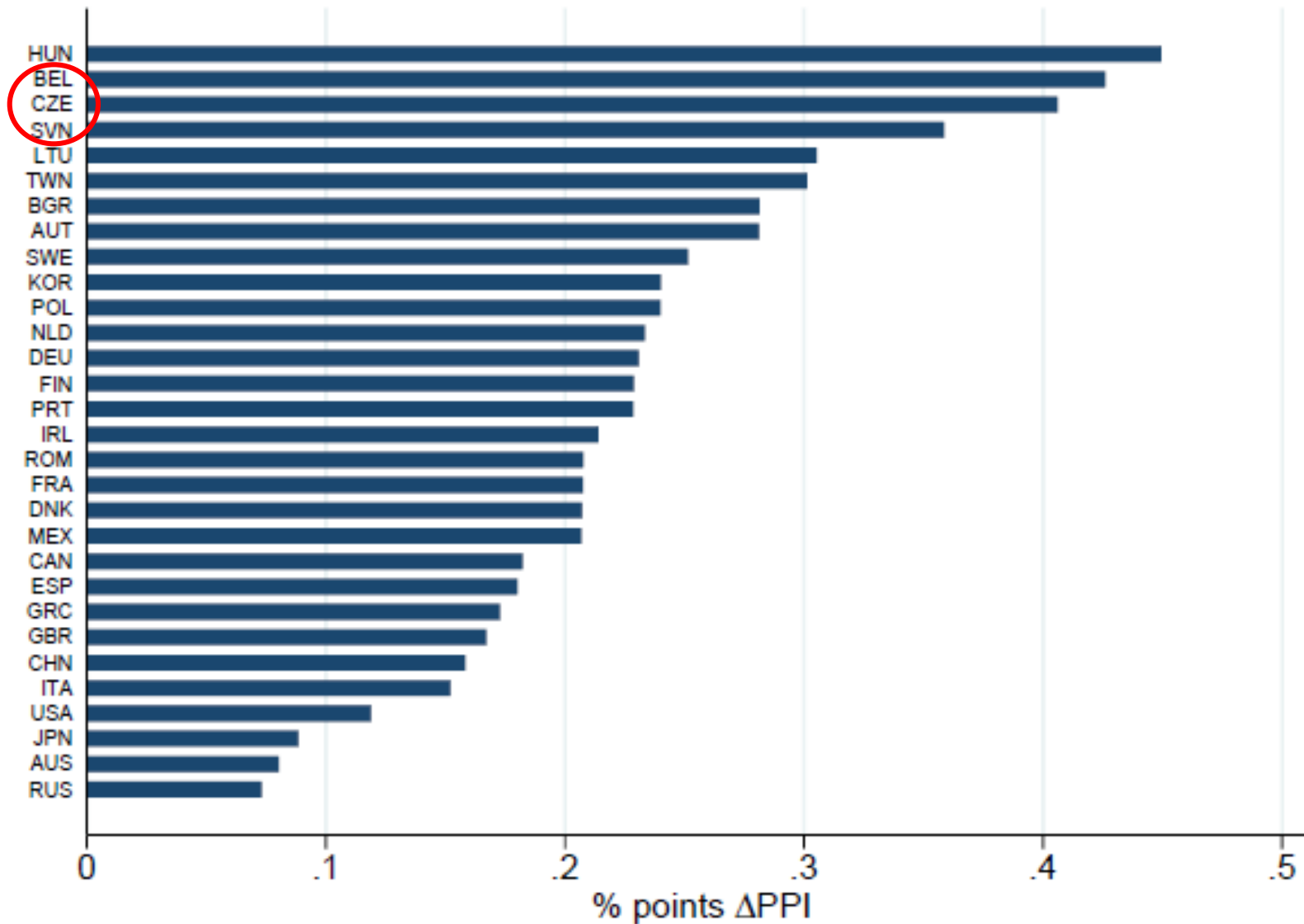
$$\widehat{p}_u = \beta * \left(\sum_{s \in S_u} \gamma_{u,s} * (\widehat{p}_s + \widehat{exr}_{u,s}) + \widehat{c}_u \right)$$

- Leontief inverse of the global input-output matrix adjusted for β : $P = \beta LP + \beta C$, where P are in common currency
- Second order terms

10% PPI Inflation Shock in China



Impact of a 1% PPI Inflation Shock in ROW



Linkages and inflation co-movement

- Impact of linkages: compare observed \widehat{p}_u and underlying \widehat{c}_u
- Construction of \widehat{c}_u involves no regression:

$$\widehat{p}_u = \beta * \sum_{s \in S_u} \gamma_{u,s} * (\widehat{p}_s + \widehat{exr}_{u,s}) + \widehat{c}_u$$

- observe \widehat{p} , \widehat{exr} , γ and have a prior for β (baseline $\beta=1$).
- can thus calculate \widehat{c} by taking the Leontief inverse (also including higher order terms).
- Replicate Ciccarelli and Mojon (2010) and Jackson et al. (2015) using \widehat{p}_u and \widehat{c}_u .

Results - Ciccarelli and Mojon (2010)

	Panel A: R ²			Panel B: Static Factor	
	PPI	Cost Shocks		$\frac{Var(\delta_{PPI,k}\widehat{F}_{PPI,t})}{Tot Var}$	$\frac{Var(\delta_{c,k}\widehat{F}_{c,t})}{Tot Var}$
Australia	0.378	0.192		0.480	0.310
Austria	0.377	0.056		0.552	0.089
Belgium	0.710	0.569		0.761	0.608
...
Median	0.378	0.139		0.430	0.310

Main Results

- 1. GVC gives rise to sizeable spillovers of global shocks into national PPI; a little less than half due to network effects**
- 2. On average, input linkages more than double the global co-movement of PPI inflation**
3. Underlying, sectoral shocks are an important driver of PPI synchronization across countries
4. Unbalanced international input use leads to fat-tailed global PPI inflation, i.e. deflation & high inflation (analogue to Acemoglu et al. 2014)

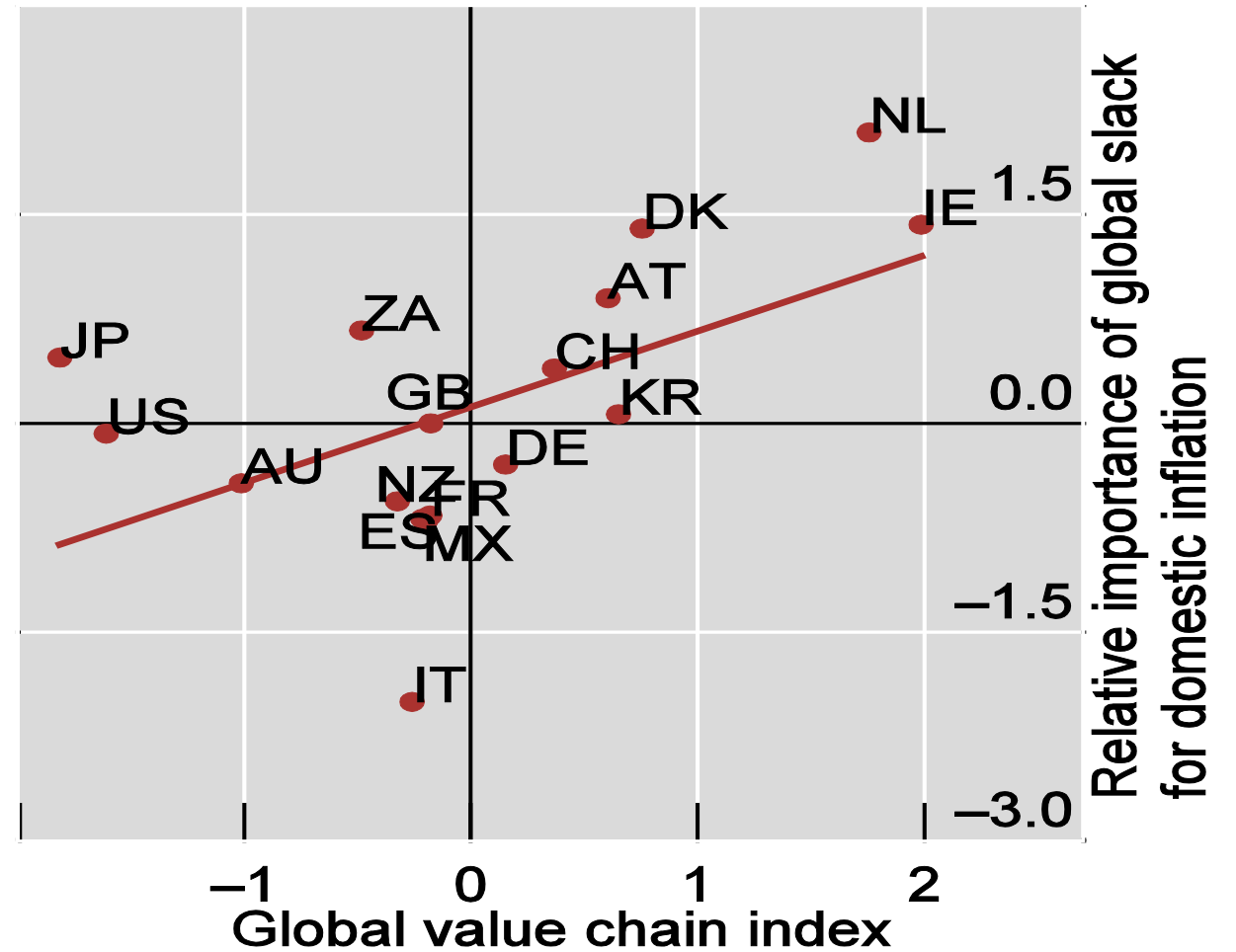
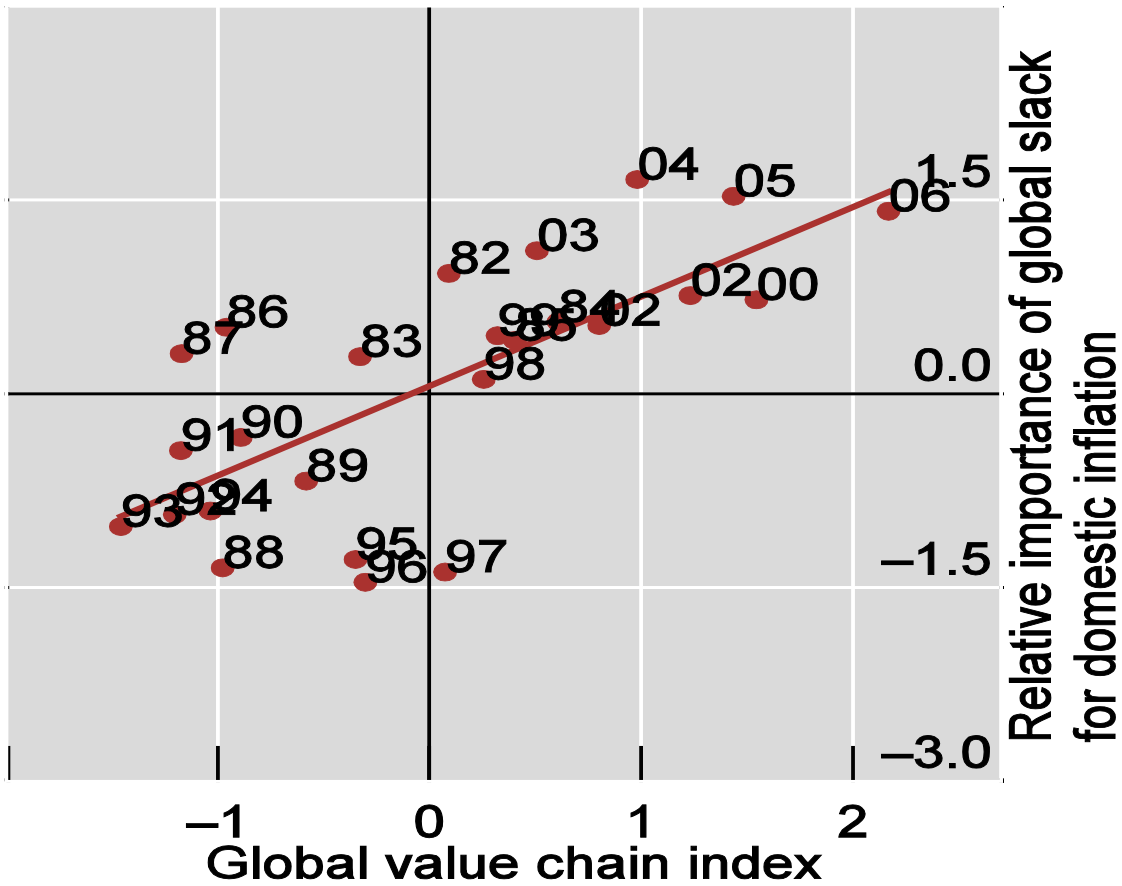
Limitations & Outlook

- **Auer, Levchenko, and Saure (2016) limited to PPI inflation & GC, but central banks care about CPI & Monetary Control**
- In a closely related work, Auer, Borio, and Filardo (2016) document that it is also related to **GI** for CPI inflation.
- Role of global output gap y_t^f for domestic inflation in an estimation following Borio and Filardo 2007:

$$\pi_t = \alpha * E_t[\pi_{t+1}] + \underbrace{\beta}_{\text{how important is local slack?}} * y_t^d + \underbrace{\gamma}_{\text{how important is foreign slack?}} * y_t^f + X_t + \varepsilon_t$$

*how important is
local slack?*

*how important is
foreign slack?*



- We also document this association in a panel regression including group fixed effects and time fixed effects
- Conditional on other measures of real and financial integration

Conclusion

- International input output linkages:
 - lead to sizeable spillovers, account for up to $\frac{1}{2}$ of GC, create/preserve tails risks in PPI,...
 - ...may also contribute to GI
- Agenda:
 - Need to pinpoint transmission from PPI to CPI
 - Transmission of small vs. drastic shocks
 - General issue of how to better quantify 'openness' and its impact on GC & GI when production processes are internationally contestable

If you are interested in this line of research, please be in touch!