

## Seminar in International Economics **26 November 2015**

### The trade and demand nexus: Do global value chains matter?

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Oesterreichische Nationalbank

This seminar series is an activity in the framework of FIW ('Forschungsschwerpunkt Internationale Wirtschaft'), which is a project designed to build a center of excellence in research on International Economics, funded by the Austrian Ministry of Science, Research and Economy (BMWFW).

# The trade and demand nexus: Do global value chains matter?

**WORK IN PROGRESS...**

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Joint work with Alexander Al-Haschimi, Frauke Skudelny (ECB)  
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wiiw Seminar in International Economics  
26 November 2015

# Overview

<b>1</b>	Motivation
<b>2</b>	Literature
<b>3</b>	Empirical set-up
<b>4</b>	Results
<b>5</b>	Concluding remarks

# Overview

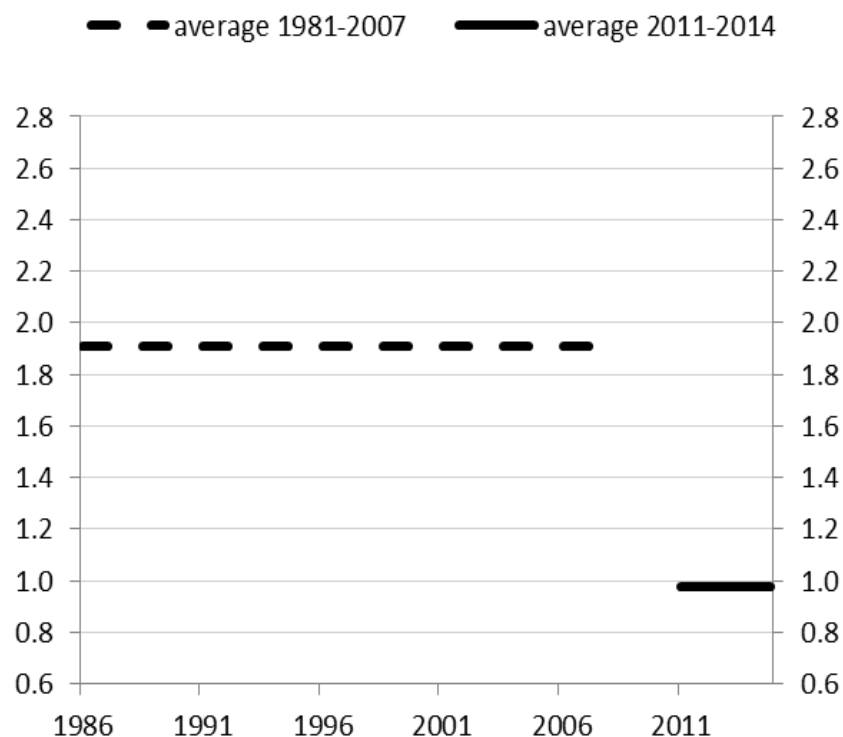
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# Motivation

**Puzzle 1: Trade grew consistently faster than GDP.**

**Puzzle 2: The trade-GDP ratio declined.**

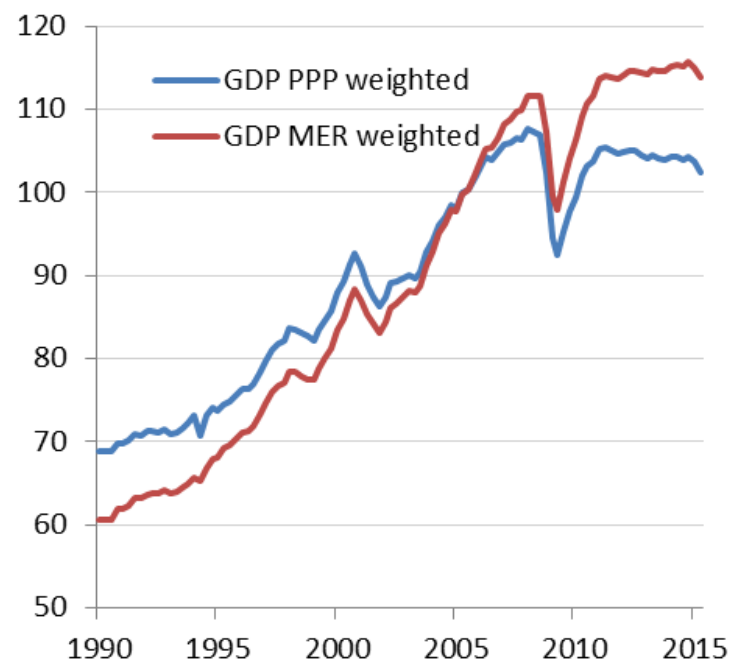
**Global import growth relative to GDP growth (in PPP)**



Source: ECB staff calculations.

**Global trade relative to GDP**

(ratio of world imports to world GDP, index 2005 = 100)



Source: National data.

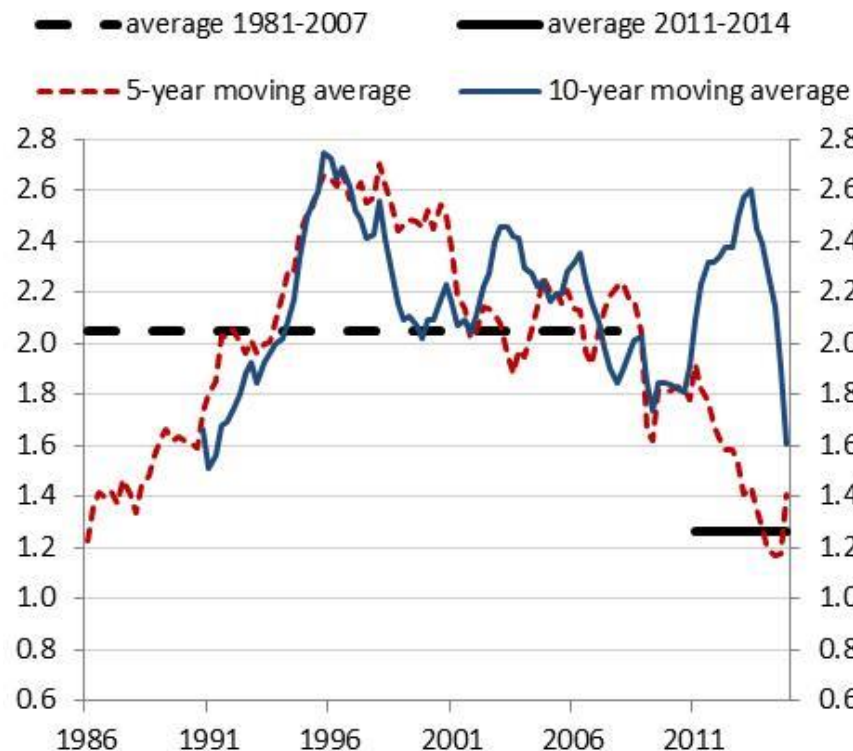
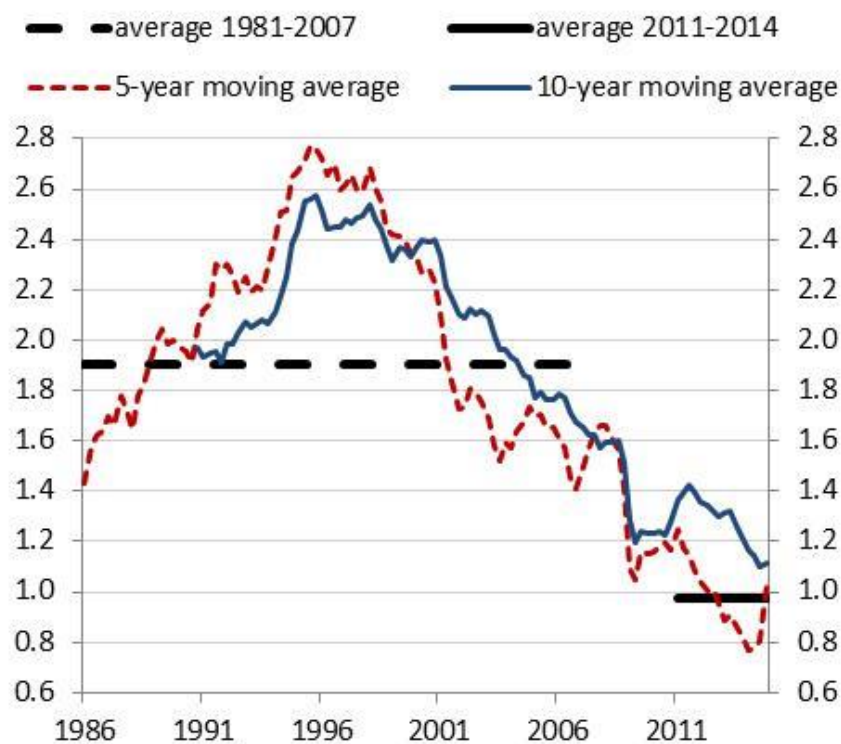
Notes: The last observation refers to 2015Q2.

# Motivation

**Puzzle 1: Trade grew consistently faster than GDP.**

**Puzzle 2: The trade-GDP ratio declined since the mid-90s.**

Ratio of global import growth to GDP growth  
(in PPP) (in USD)



Source: ECB staff calculations.

## Ratios of global import to GDP growth


Sample period	Ratio <sup>1</sup>	Trade variable	Output variable
1981Q1-2007Q4	1.9	Imports of goods and services	GDP (PPP)
2011Q3-2015Q2	0.8		
1981Q1-2007Q4	2.1	Imports of goods and services	GDP (MER)
2011Q3-2015Q2	1.1		
1951-2007	1.6	Merchandise exports	Merchandise production
1981-2007	2.0		
2011-2014	1.4		
1951-2007	1.6	Manufacturing exports	Manufacturing production
1981-2007	2.1		
2011-2014	1.5		

- Trade weak relative to GDP across various sectors and aggregation methods.
- Decline in trade growth geographically broad based

Sources: WTO, national data, Haver and IMF.

<sup>1</sup> Imports and GDP: quarterly data; exports and production, annual data.

## Motivation

- **Standard trade models failed to explain changes in trade-GDP growth ratio**
- **Reasons for these changes are unknown, cyclical or structural?** 
- **This paper analyses the role of GVCs in this context (= possible structural reason).**
- **We include indicators for the participation in GVCs in a standard import demand equation.**
- **Alternatively, one could analyse differences between gross and value added trade.**



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- **Yi (2001):**
  - Falling trade barriers too weak and too early to explain high trade growth, but vertical specialisation can explain the puzzle
- **Eaton, Kortum & Romalis (2011):**
  - During the crisis, spending shifted away from durable goods → composition effect hypothesis
- **Alessandria, Kaboski & Midrigan (2010); Altomonte, di Mauro, Ottaviano, Rungi & Vicard (2012); Bems, Johnson & Yi (2012):**
  - Disproportionally large inventories in GVC trade, higher sensitivity of trade to foreign income shocks, bullwhip effect → supply chain effect hypothesis
- **Constantinescu, Mattoo & Ruta (2015):**
  - decline in trade-GDP ratio started long before the crisis, thus reflecting longer term structural reasons
- **Ollivaud & Schwellnus (2015):**
  - No decline in the ratio with correct GDP measurement and treatment of intra-EU flows, thus weak global demand is responsible

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## Import demand function

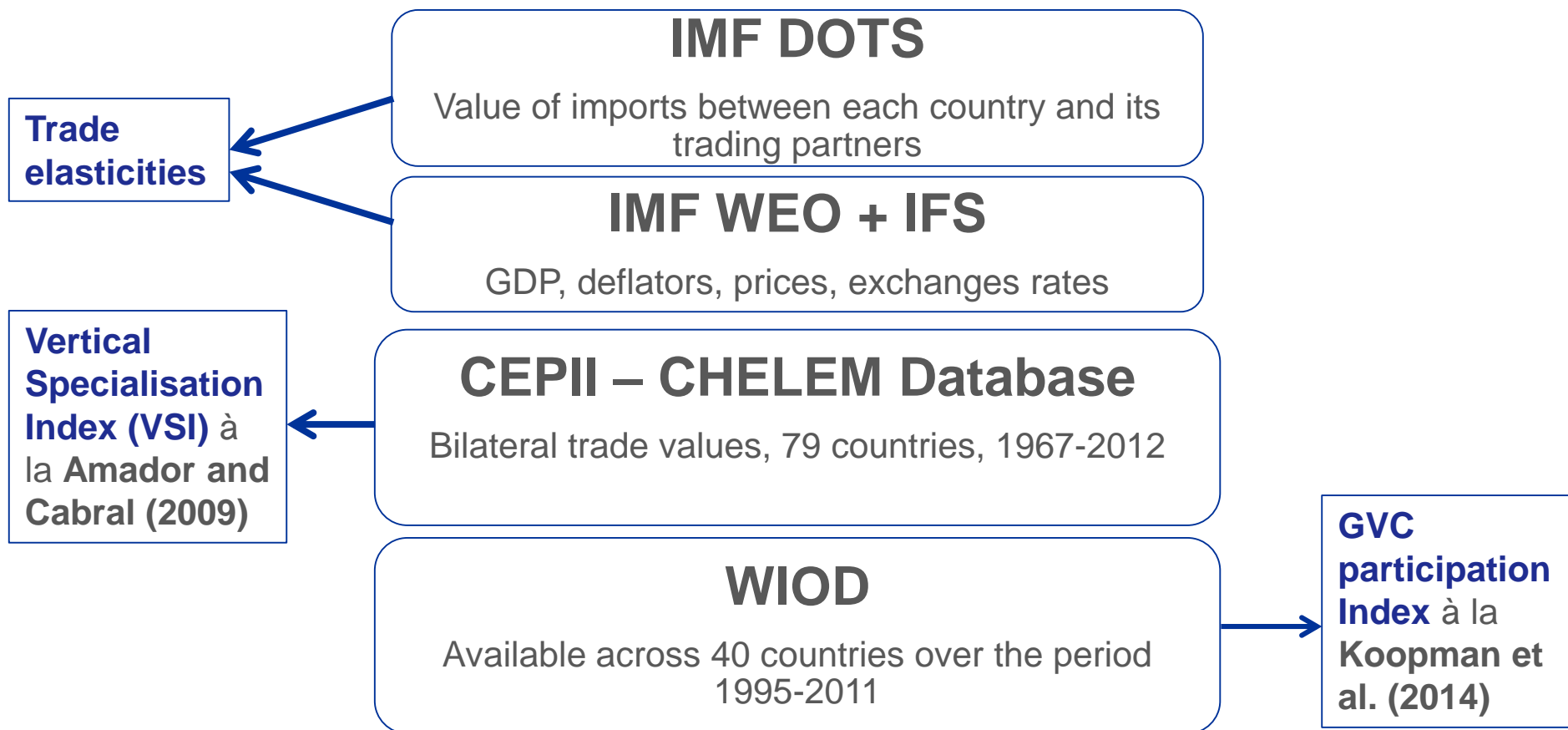
$$\ln(M_{ijt}) = \alpha_{ij} + \alpha_1 \ln(TFE_{it}) + \alpha_2 \ln\left(\frac{P_{jt}}{P_{it}}\right) + \alpha_3 \ln(ER_{ijt}) + \varepsilon_{ijt}$$

... augmented by an index of GVC participation:

$$\begin{aligned} \ln(M_{ijt}) = & \gamma_{ij} + \gamma_1 \ln(TFE_{it}) + \gamma_2 \ln\left(\frac{P_{jt}}{P_{it}}\right) + \gamma_3 \ln(ER_{ijt}) \\ & + \gamma_4 \ln(GVC\_part_{it}) + \varepsilon_{ijt} \end{aligned}$$

- 14 countries (7 advanced, 6 emerging)
- Estimations for 1980-2012 and 1995-2012
- 2 alternative GVC integration measures:
  - Vertical specialisation index (only backward integration)
  - GVC participation (based on decomposition of gross exports)

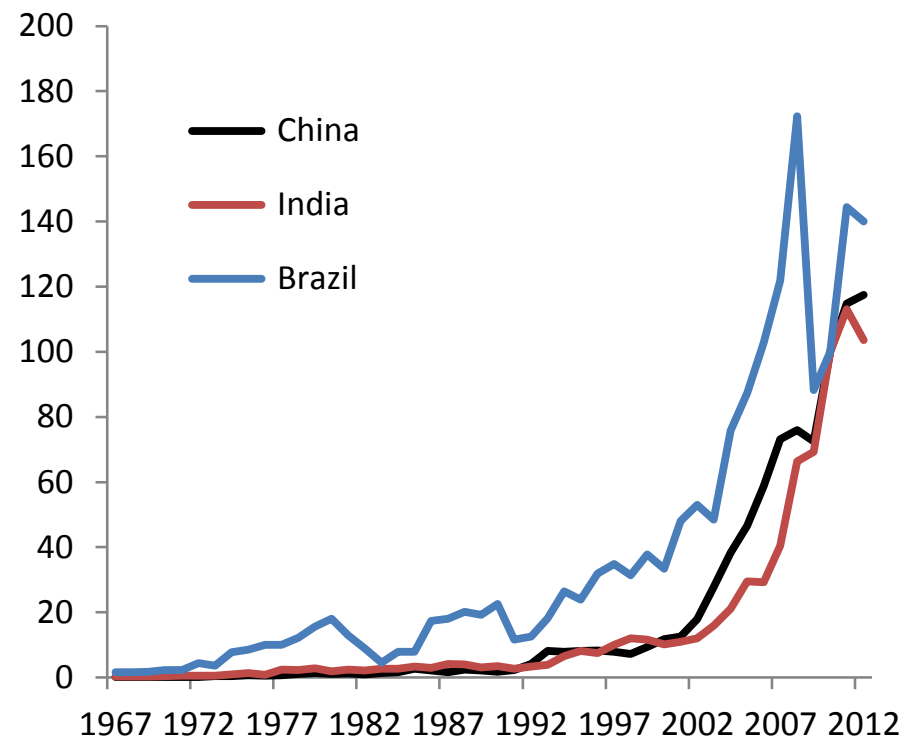
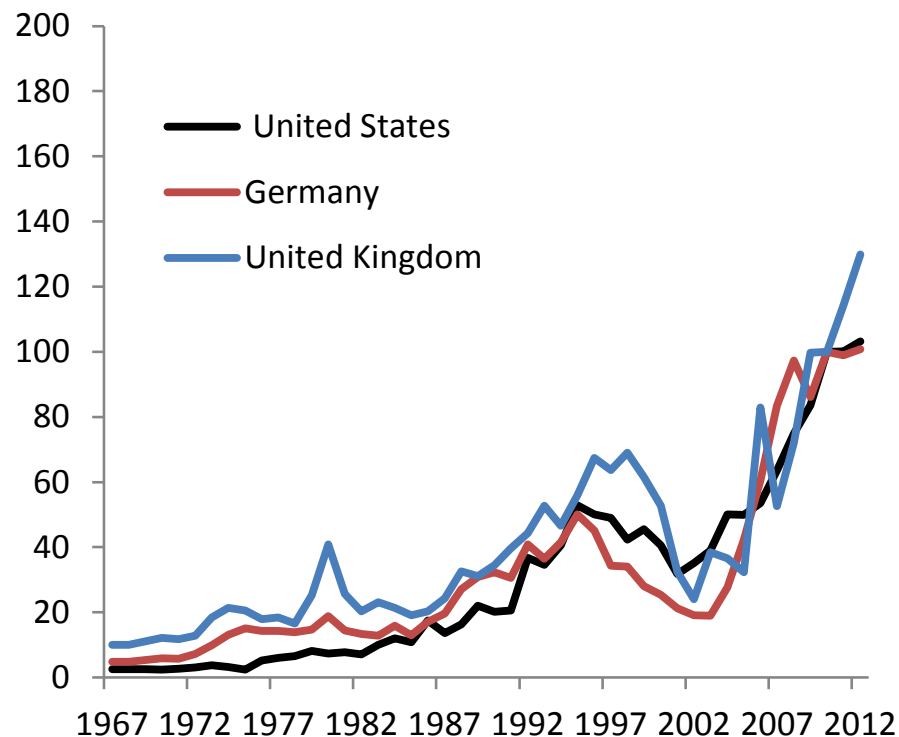
## Data sources



## We observe increasing vertical specialization, especially by EMEs

### Vertical Specialisation Index (VSI)

2010=100



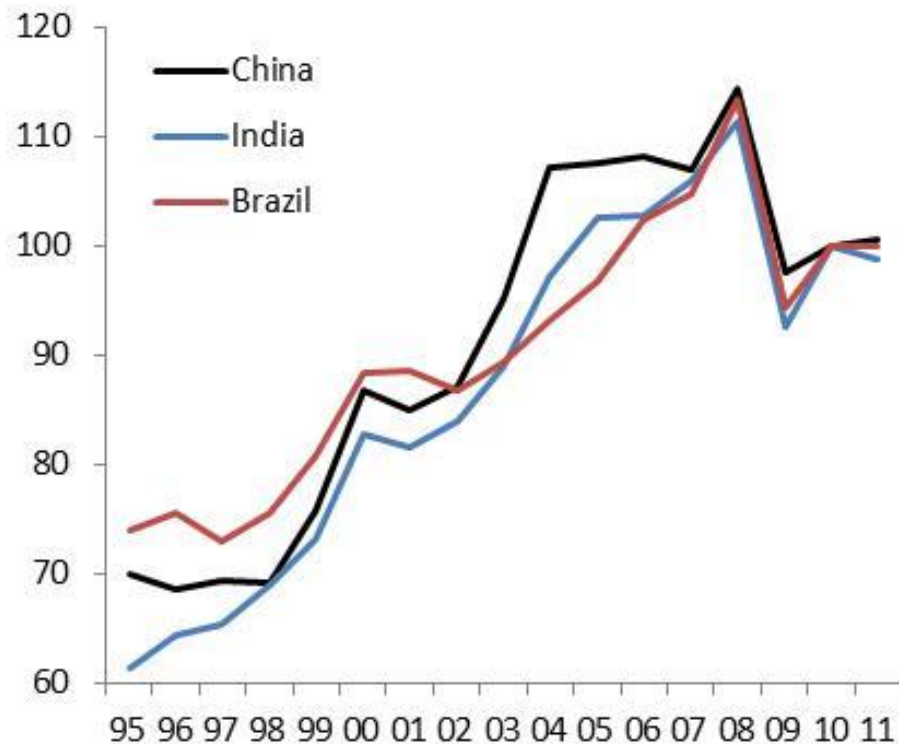
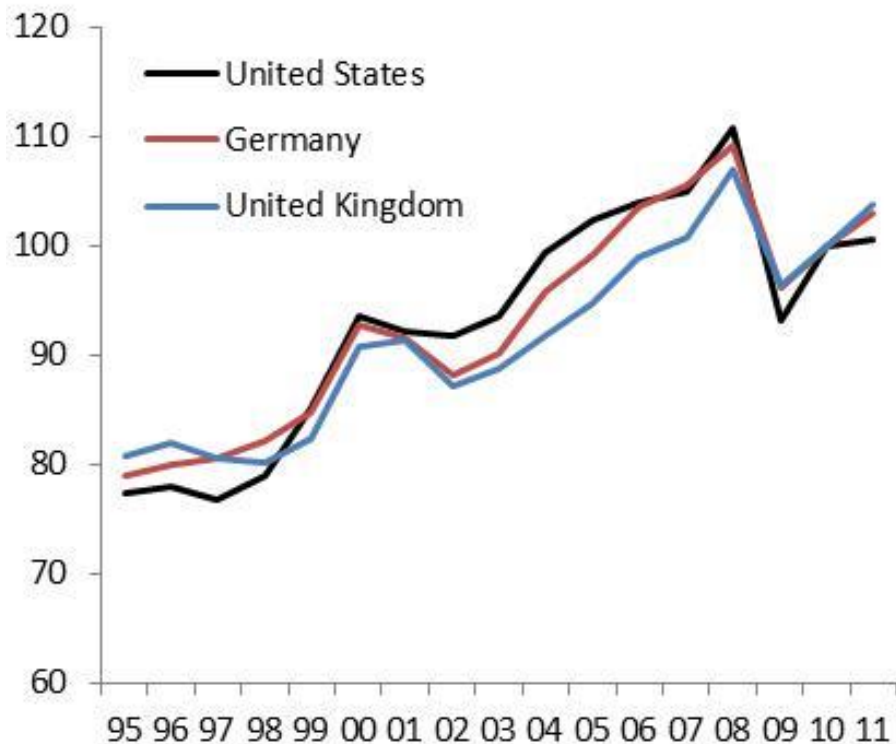
Source: update of Amador & Cabral, 2009.

## Global Crisis induced a reversal in GVC participation intensity

GVC participation index

$$GVC\ Participation_{it} = VS1_{it} + FV_{ijt}$$

2010=100



Source: authors' calculations based on WIOD.

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## Regression results for import values, 1995-2011

	Advanced economies Fixed effects with AR(1) dist.		Emerging economies Fixed effects with AR(1) dist.	
Lagged dep.				
TFE	1.51***	1.41***	1.42***	1.40***
<i>Long-term coef.</i>				
Relative prices	-0.02	-0.05*	-0.023	-0.06
<i>Long-term coef.</i>				
ER	0.43***	0.3***	0.40***	0.38***
<i>Long-term coef.</i>				
TFE*GVC_part		0.05***		0.03***
<i>Long-term coef.</i>				

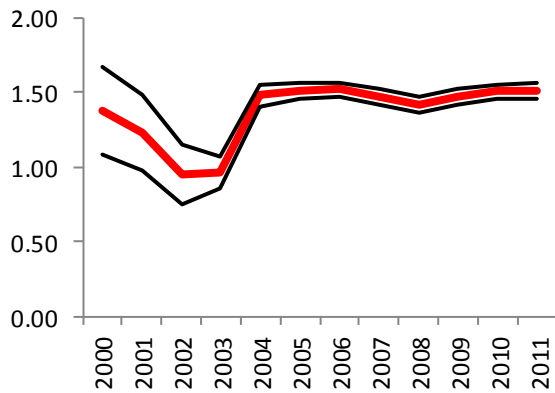
- Check for influence of prices -> deflate all variables
- Start estimation in 1980
- Estimate GVC participation separately and as interaction term

## Recursive estimates, including TFE\*GVC-part interaction term

**Fixed effects with AR, advanced economies**

recursive

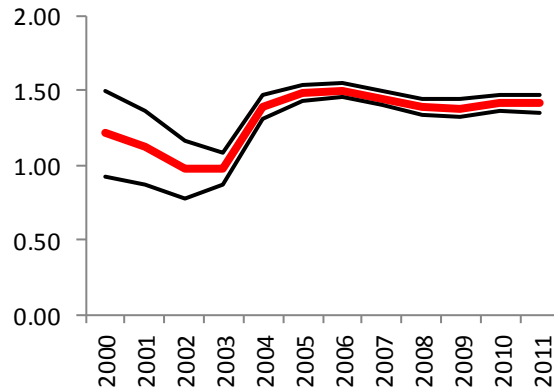
Intfe\_d



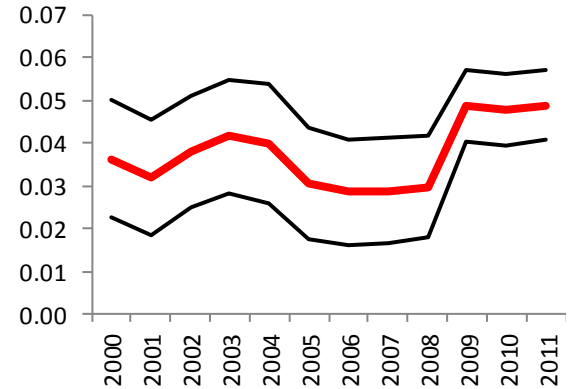
**with interaction term**

recursive

Intfe\_d



Intfe\_d\_part



**Fixed effects with AR, emerging economies**

recursive

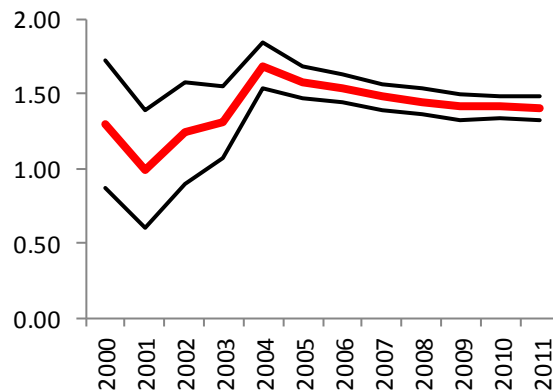
Intfe\_d



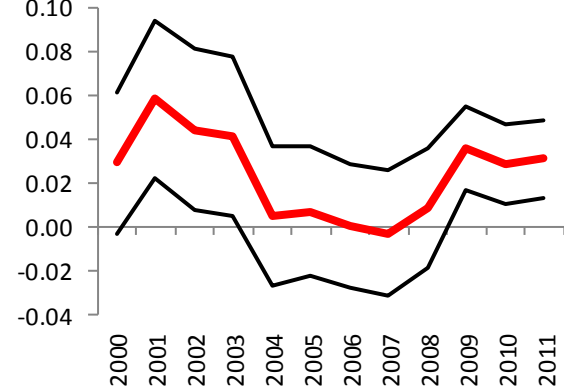
**with interaction term**

recursive

Intfe\_d



Intfe\_d\_part



## Regression results for import volumes, 1995-2011

### Advanced economies

### Emerging economies

1995-2012

<b>GDP</b>	2.63***	2.69***	2.62***	2.11***	1.32***	1.10***
<b>Rel. MP</b>	-0.74***	-0.73***	-0.73***	-0.73***	-0.69***	-0.67***
<b>ER</b>	-0.063**	-0.063**	-0.064**	-0.43***	-0.39***	-0.36***
<b>VSI</b>		0.060***			0.31***	
<b>GDP*VSI</b>			0.014***			0.069***
<b>total GDP &amp; interact</b>			2.66 (2.65-2.67)			1.33 (1.22-1.41)

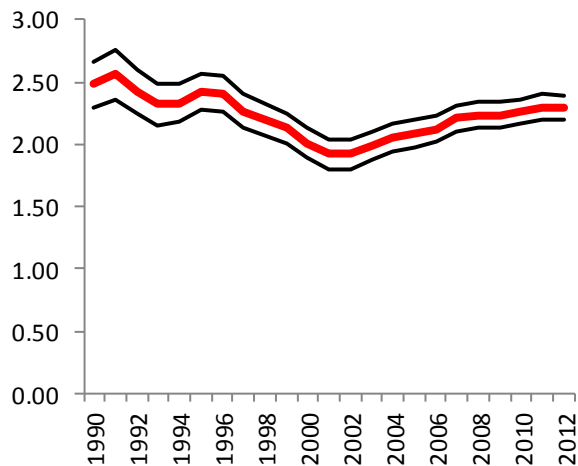
1980-2012

<b>GDP</b>	2.29***	2.08***	1.99***	2.13***	1.31***	1.04***
<b>Rel. MP</b>	-0.84***	-0.84***	-0.84***	-0.34***	-0.31***	-0.30***
<b>ER</b>	0.0028	0.0049	0.0058	-0.21***	-0.20***	-0.19***
<b>VSI</b>		0.085***			0.32***	
<b>GDP*VSI</b>			0.021***			0.075***
<b>total GDP &amp; interact</b>			2.06 (2.02-2.09)			1.25 (1.04-1.4)

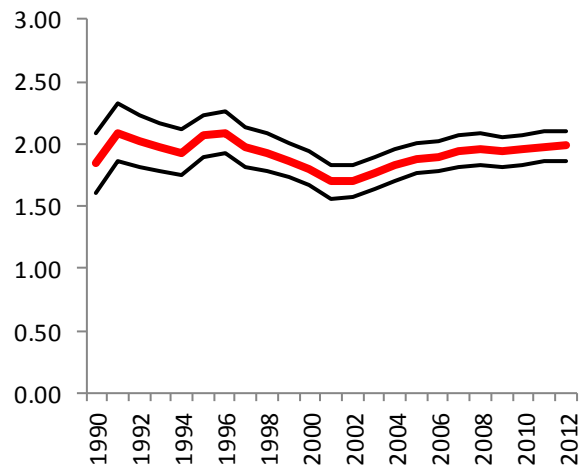
## Recursive estimates, including TFE\*VSI interaction

### Advanced economies

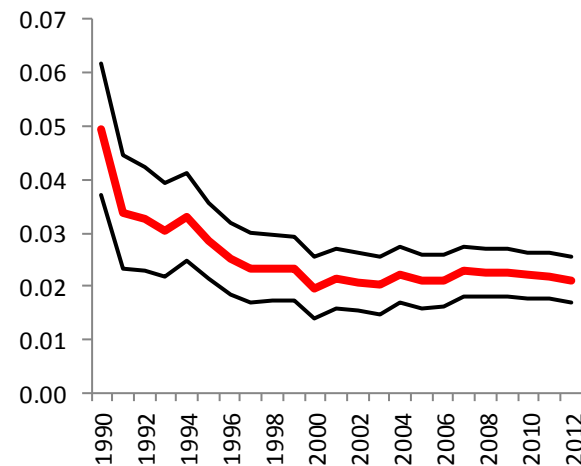
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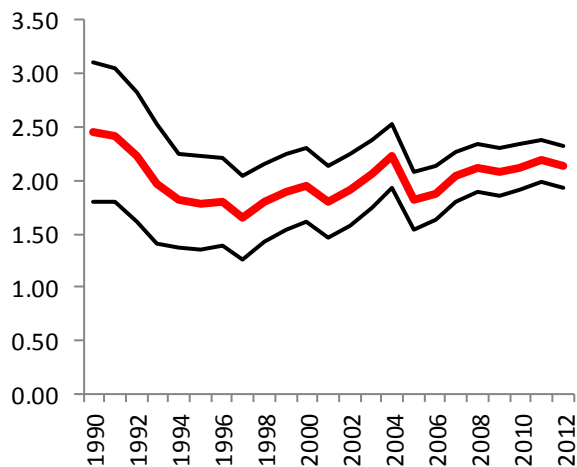


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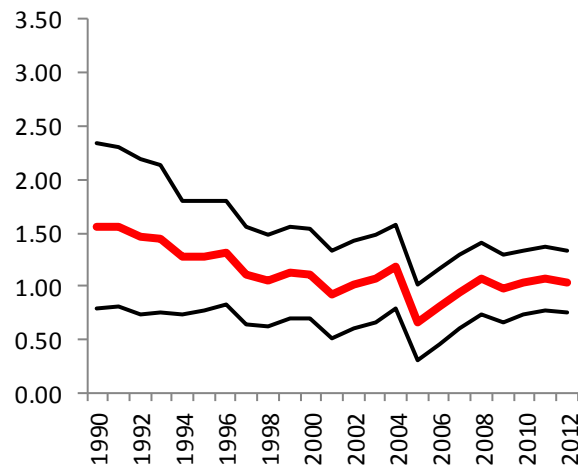


### Emerging economies

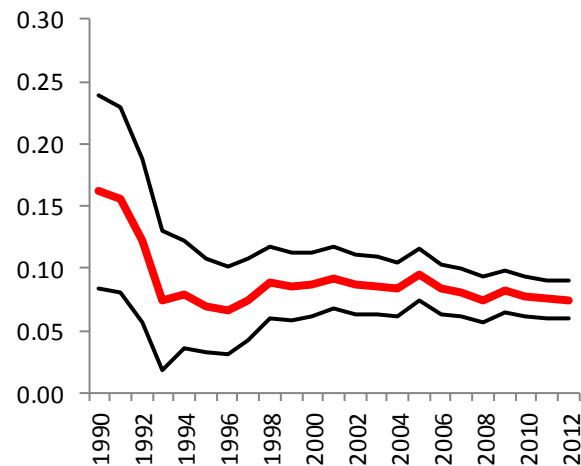
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## Conclusions and way forward

- **Countries with stronger involvement in GVCs tend to import more, beyond the effect of the demand variable**
- **Omitting these variables leads to higher estimates of income elasticities**
- **Sensitivity to GVC-participation higher in EMEs**
- **Among structural factors, a deceleration in the expansion of global value chains would have a dampening effect on trade.**
- **On the agenda: more (and proper) robustness checks, proper measurement of GVC participation, allow for time-varying effect of GVC-participation**

