

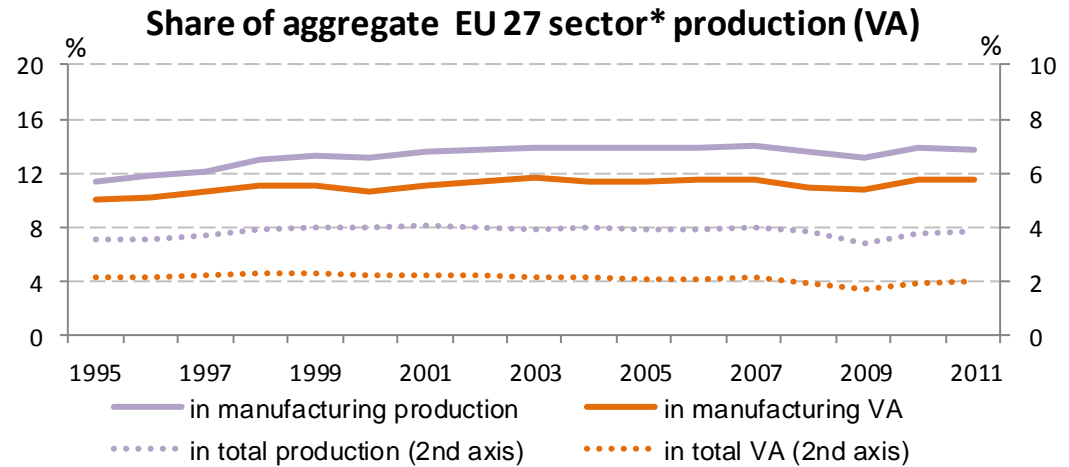
# The competitiveness of the European automotive industry

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# Motivation #1

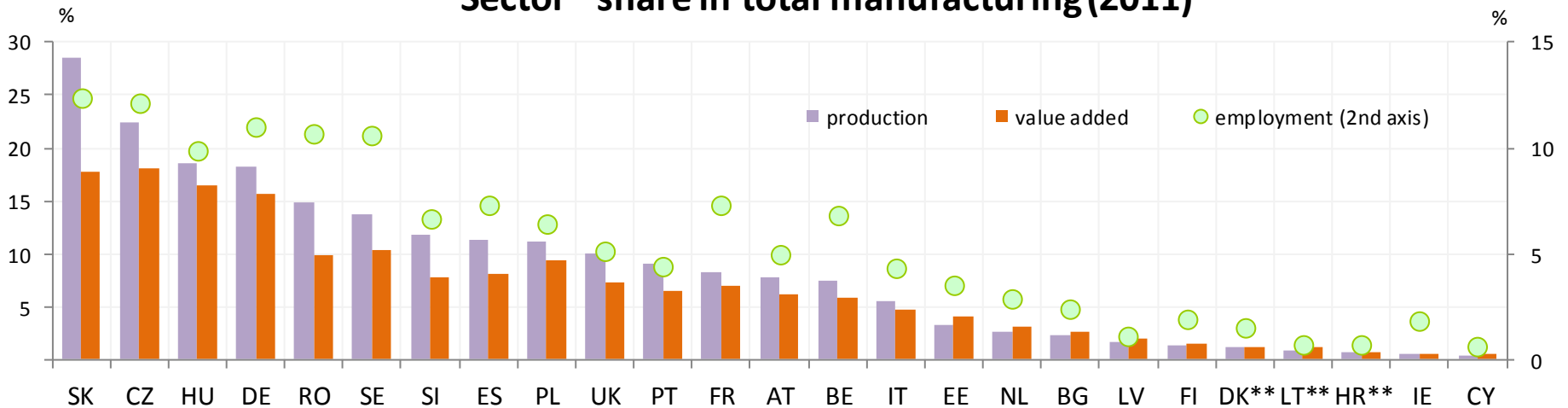
➤ The automotive sector has a high relevance in many European countries, in terms of both output and employment



\*) sector = transport equipment

Source: WIOD, authors' calculations

## Sector\* share in total manufacturing (2011)



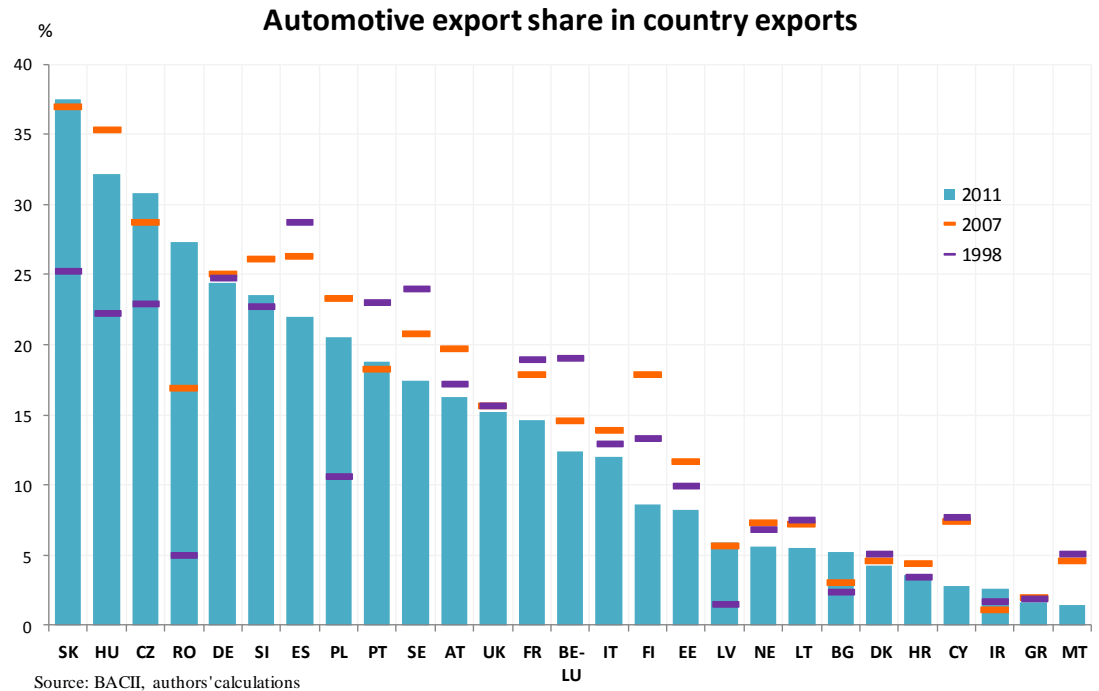
\*) sector = manufacture of motor vehicles, trailers and semi-trailers

\*\*) values for 2010

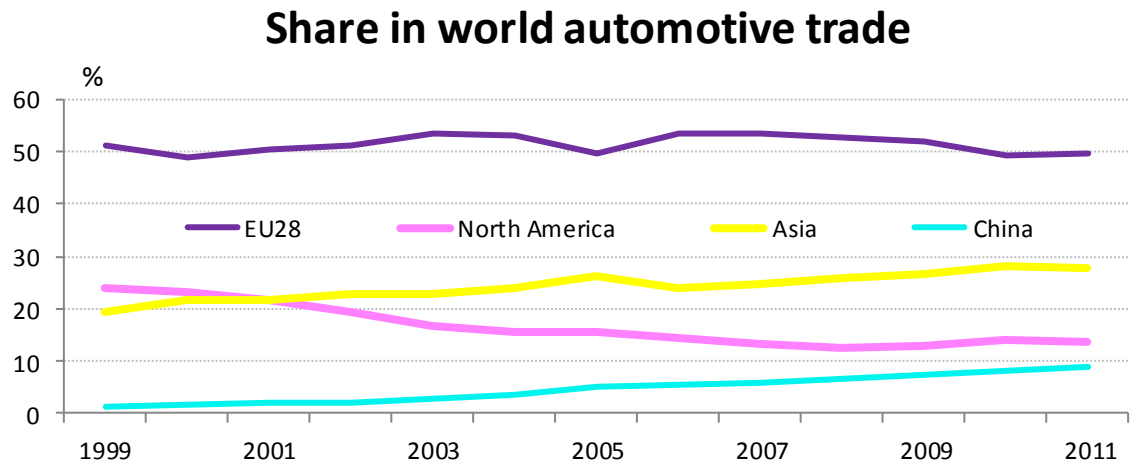
Source: Eurostat

# Motivation #2

➤ This industry is also relevant for EU countries from an international trade perspective



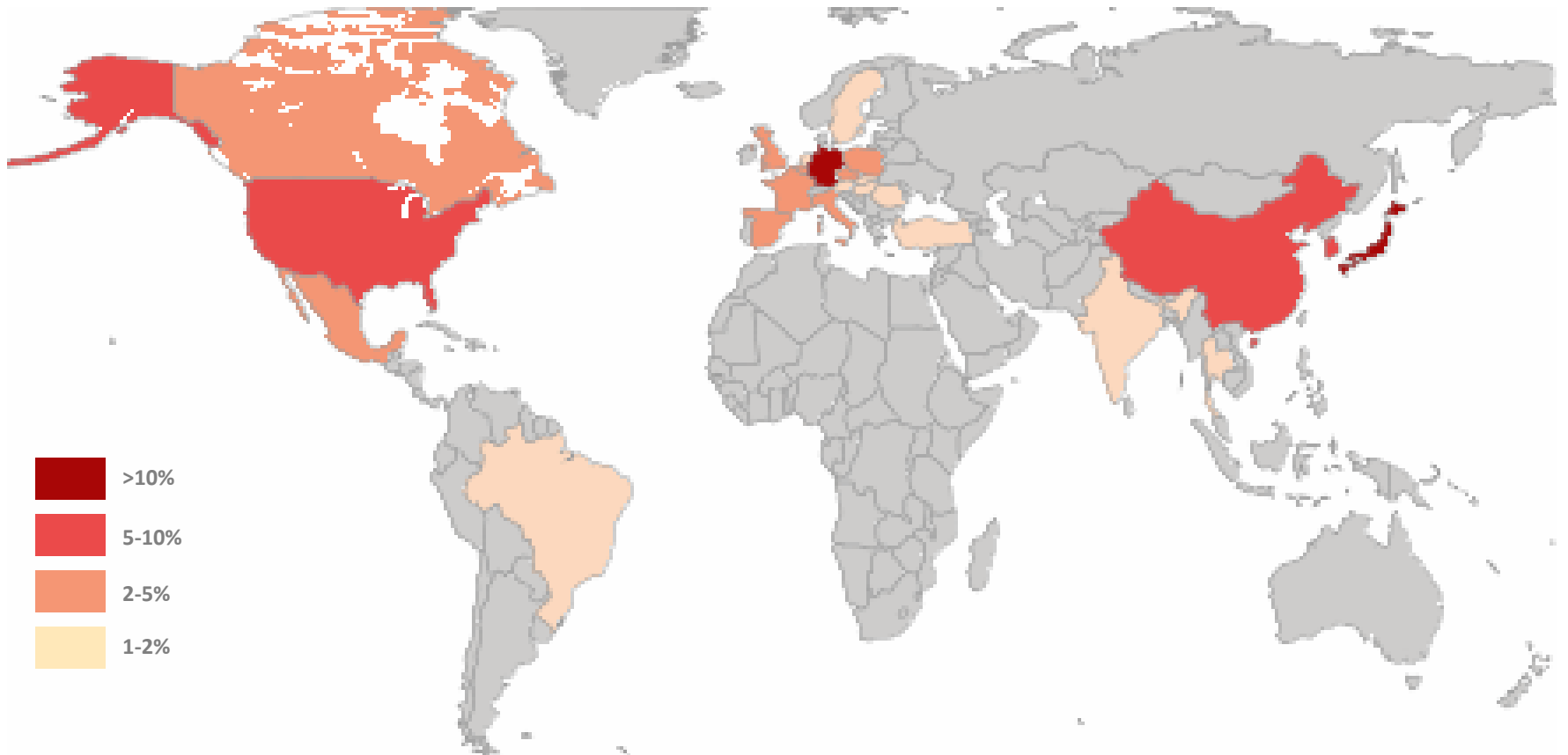
➤ EU countries are highly representative in world automotive trade



North America: Canada, Mexico, USA  
 Asia: China, Japan, Korea, India, Thailand

Source: BACII, authors' calculations

# The most important automotive exporters (2011): EU countries are included



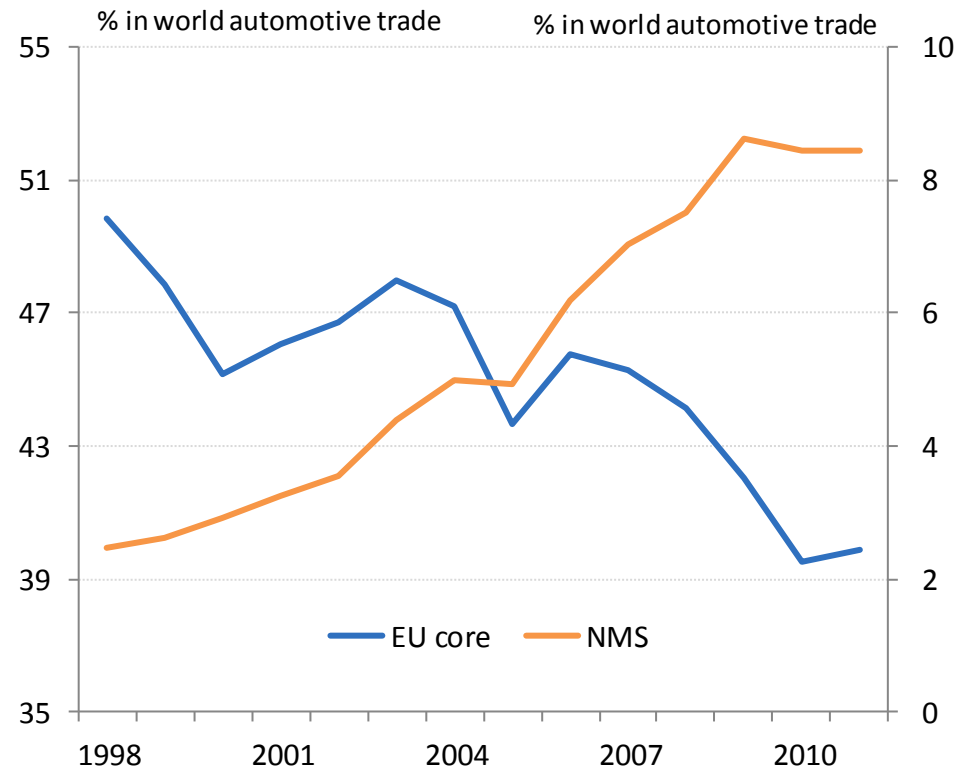
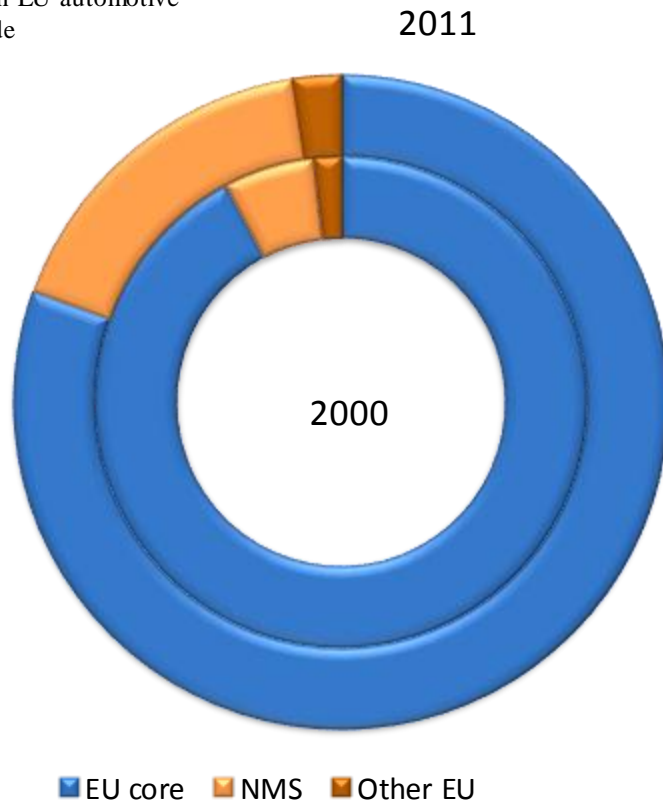
Country	Share of world exports (%)
Romania	0.9
Brazil	1.0
India	1.1
Turkey	1.3
Sweden	1.3
Austria	1.3
Slovakia	1.3
the Netherlands	1.6
Thailand	1.7
Hungary	1.8
Poland	2.0
Czech Rep.	2.4
Belgium and Luxembourg	2.6
Canada	2.9
Italy	3.1
Spain	3.3
UK	3.5
Mexico	4.2
France	4.2
Rep. of Korea	5.0
USA	6.6
China	8.9
Japan	10.9
Germany	18.1

Source: BACII, authors' calculations

# However, in terms of market share, different patterns appear within the EU

- EU core countries' automotive export share is on a downward path, even if they further account for the bulk of EU automotive exports

% in EU automotive trade

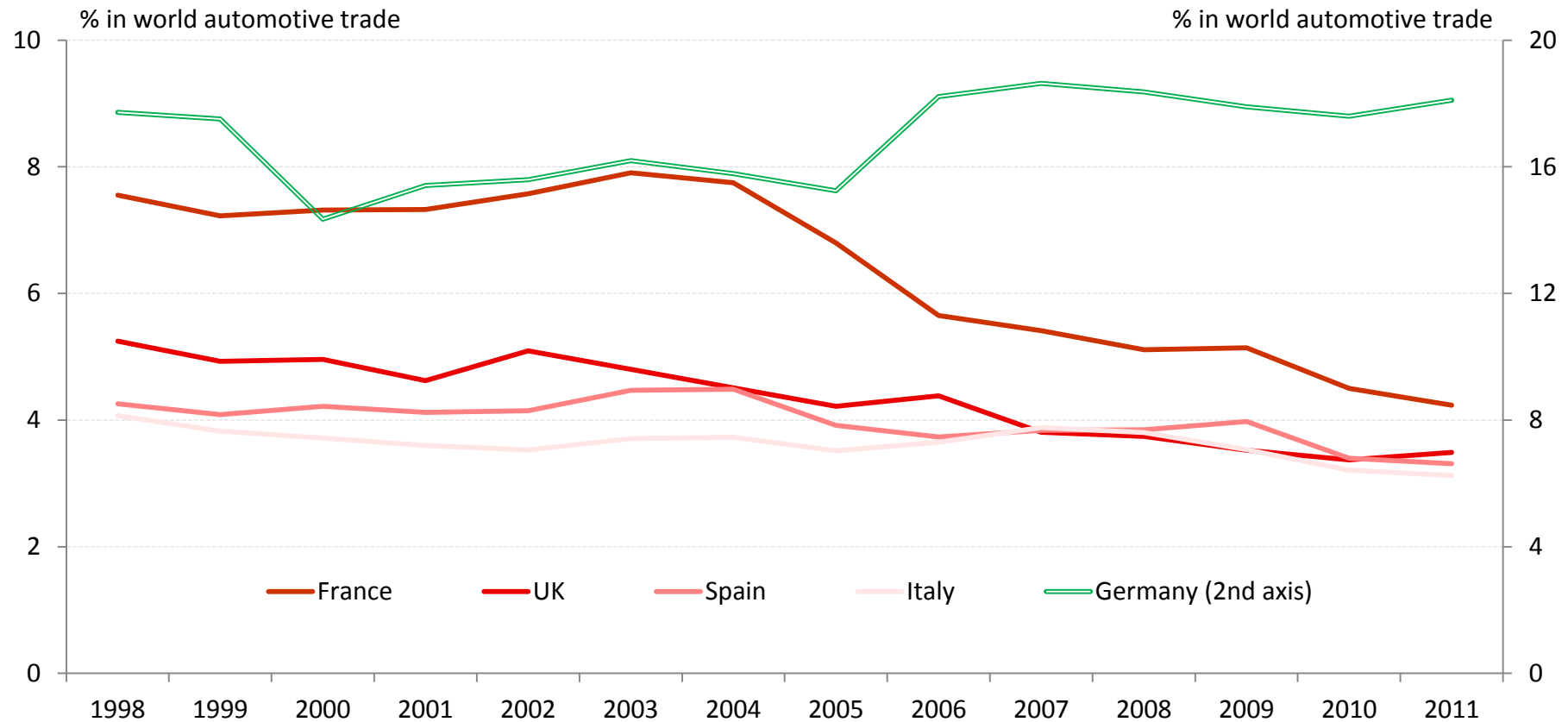


**EU core:** AT, BE (LU), DE, ES, FI, FR, IT, NL, PT, SE, UK

**NMS:** CZ, HU, PL, RO, SK

# Moreover, there is some heterogeneity within the EU core group

- Most countries witness market share losses, except for Germany – the main exporter



Source: BACII, authors' calculations

## **This evolution is usually associated with outsourcing and externalization of production, as firms are more integrated in GVCs**

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- [Sturgeon, Van Biesebroeck and Gereffi \(2008\)](#) and [Sturgeon and Van Biesebroeck \(2011\)](#), among others, discuss the evolution and the main features of international automotive production
- [di Mauro, Plamper and Stehrer \(2013\)](#) point out that higher integration of firms into GVCs is often made the culprit of adverse economic developments such as output drop and job shedding

# In this paper...

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- We analyze the competitiveness of the European automotive industry, by attempting:
  - to identify the main competitors of the EU automotive exporters, gaining knowledge about the countries that might increase their market share at the expense of the EU core
  - to assess the benefits that countries get from participating in automotive global value chains
- In doing so, we heavily build on a number of methodologies that have been discussed / developed / improved in *CompNet* WS 1 and WS 3
- Our study consists of two parts – a “classical” analysis, based on trade flows, and a “GVC-based” analysis, which takes into account countries’ integration into global value chains



# I. “Classical” analysis – The competition pressure indicator

- Benkovskis (2012) uses this methodology to identify Latvia’s main competitors
- The pressure exerted by a competitor on a certain country:

a) in a certain market:

$$P_{Country}^{Competitor, 3rdCountry, Good} = \frac{X_{Country, 3rdCountry, Good}}{X_{Country}} \cdot \frac{M_{3rdCountry, Competitor, Good}}{M_{3rdCountry, Good}}$$

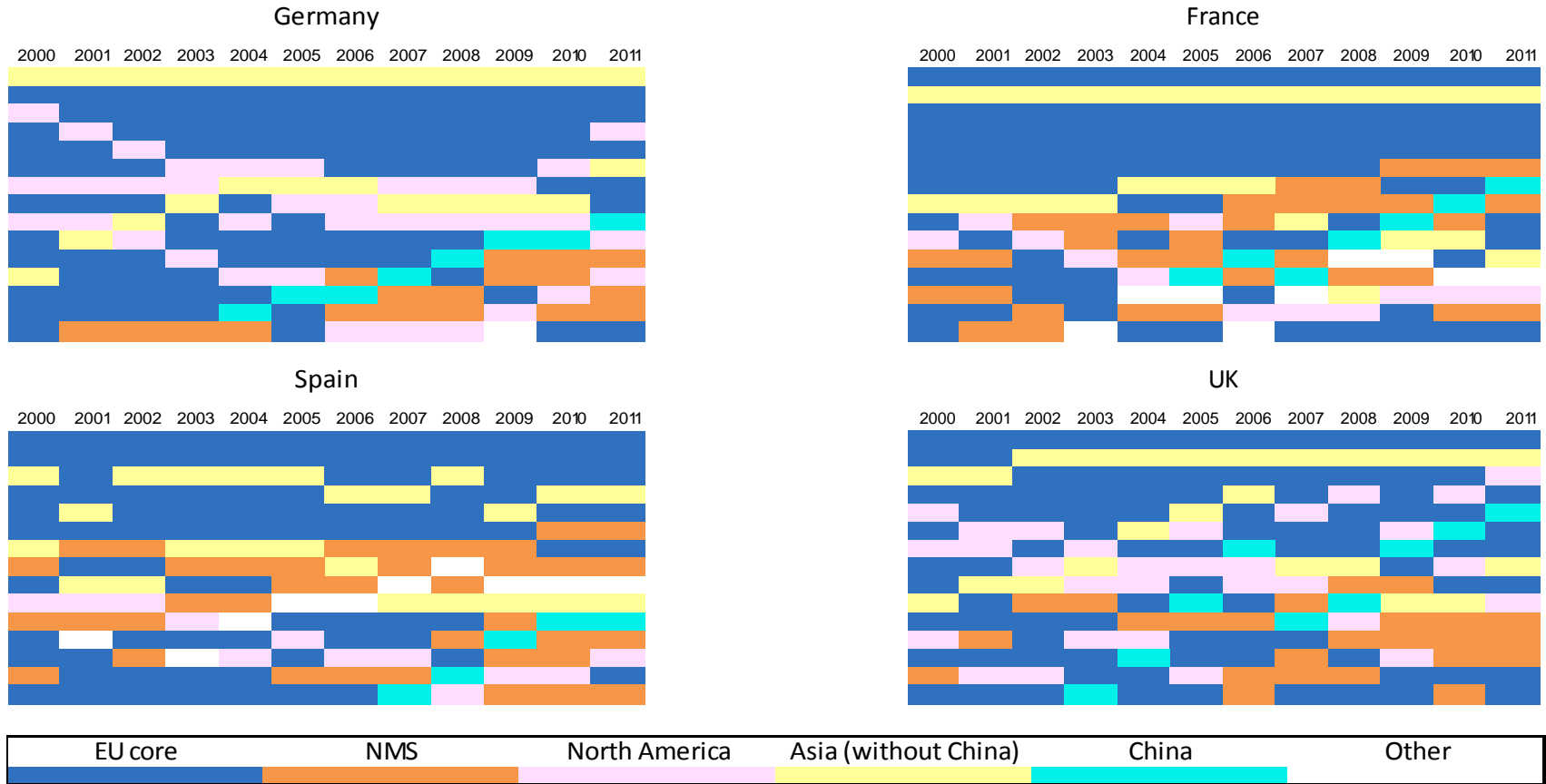
*Basic level indicator*

b) overall:

$$P_{Country}^{Competitor} = \sum_{3rdCountry} \sum_{Good} P_{Country}^{Competitor, 3rdCountry, Good}$$

*Aggregate level indicator*

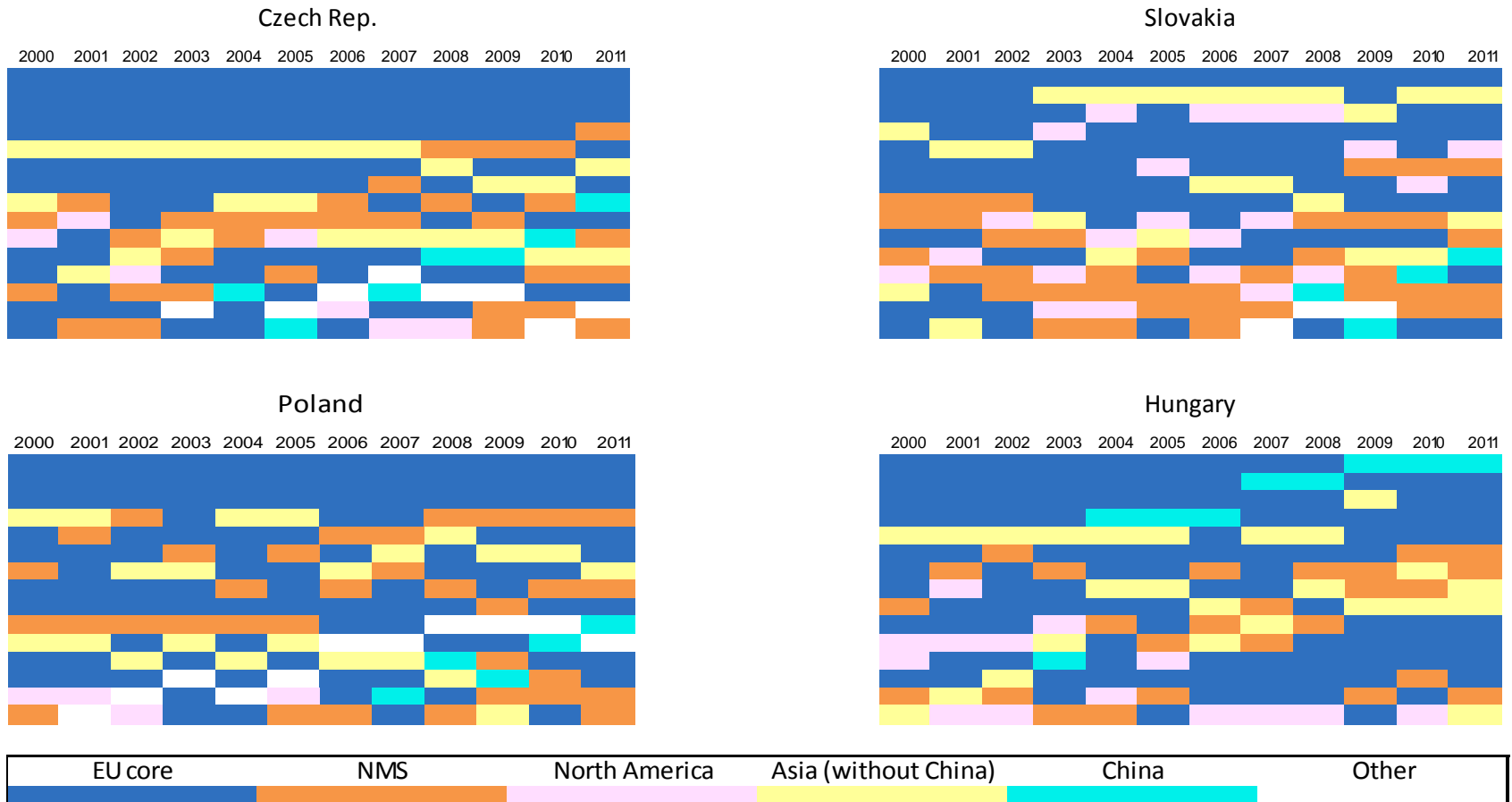
# Main competitors of EU core (4) countries in the auto sector



Source: BACII, authors' calculations

- EU core countries are seriously competing against each other, yet other groups are also important
- Pressure from North America is more acute in Germany and the UK
- Pressure from the NMS is more acute in France and Spain
- China has been gaining importance as a competitor

# Main competitors of NMS (4) countries in the auto sector



Source: BACII, authors' calculations

- The NMS are mainly competing against EU core countries, Asia and each other
- Growing pressure from China, very strong in Hungary

# Competition pressure analysis – main results

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- There is strong intra-EU competition in the automotive sector. An overall conclusion would be that EU countries mainly compete against other EU countries. However, the other groups (especially Asia) also pose significant threats
- The increasing importance of the NMS as competitors in the cases of France and Spain suggests a possible market share drain
- China's competitor role has been growing over time in all the analyzed countries. The UK (in the EU core (4) group) and Hungary (in the NMS (4) group) face the strongest competition from China
- Slovakia has the most "diversified" group of competitors among the NMS (4)

## II. GVC analysis: focuses on Value Added (VA)

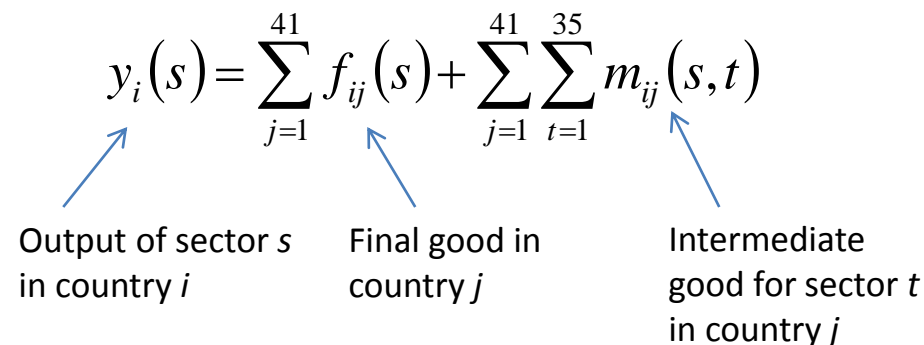
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- The link between production and exports, on the one hand, and country benefits (income, jobs), on the other, is *not* 1:1
- “The foreign content share in gross exports has almost doubled on average since 1970” (IMF, 2013)
- “Increasing fragmentation of production across borders is changing the nature of international competition. As a result, conventional indicators of competitiveness based on gross exports become less informative and new measures are needed” (Timmer et. al, 2013)
- “Gross exports as reported in trade statistics may fail to capture the value actually created in an economy by the production of its exports” (Amador, Cappariello and Stehrer, 2013)

# Auto industry performance in terms of value added (VA)

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- Our goal is to trace the contribution of national and foreign sectors to final goods production in the automotive sector
- We rely on the WIOD database, which contains World Input Output Tables, as well as other indicators (see [Timmer \(2012\)](#) for a detailed description)
  - 40 economies (EU27 + other 13 countries) + rest of the world
  - 35 sectors per economy, our focus is on the *transport equipment* sector (aggregation of *manufacture of motor vehicles, trailers and semi-trailers* – NACE 1.1 code 34 – and *manufacture of other transport equipment* – NACE 1.1 code 35)
- Input-Output Analysis methodology ([Timmer et al., 2013](#))

$$y_i(s) = \sum_{j=1}^{41} f_{ij}(s) + \sum_{j=1}^{41} \sum_{t=1}^{35} m_{ij}(s,t)$$


Output of sector  $s$  in country  $i$

Final good in country  $j$

Intermediate good for sector  $t$  in country  $j$

# Input – Output Analysis methodology (continued)

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➤ Switching to matrix use:

$$a_{ij}(s,t) = \frac{m_{ij}(s,t)}{y_j(t)} \quad \longrightarrow \quad A = (a_{ij}(s,t))_{1435 \times 1435}$$

global intermediate input  
coefficients matrix

$$y = (y_i(s))_{1435 \times 1}$$

$$f_i(s) = \sum_{j=1}^{41} f_{ij}(s) \quad \longrightarrow \quad f = (f_i(s))_{1435 \times 1}$$

$$y = A \cdot y + f \Leftrightarrow y = (I - A)^{-1} \cdot f$$

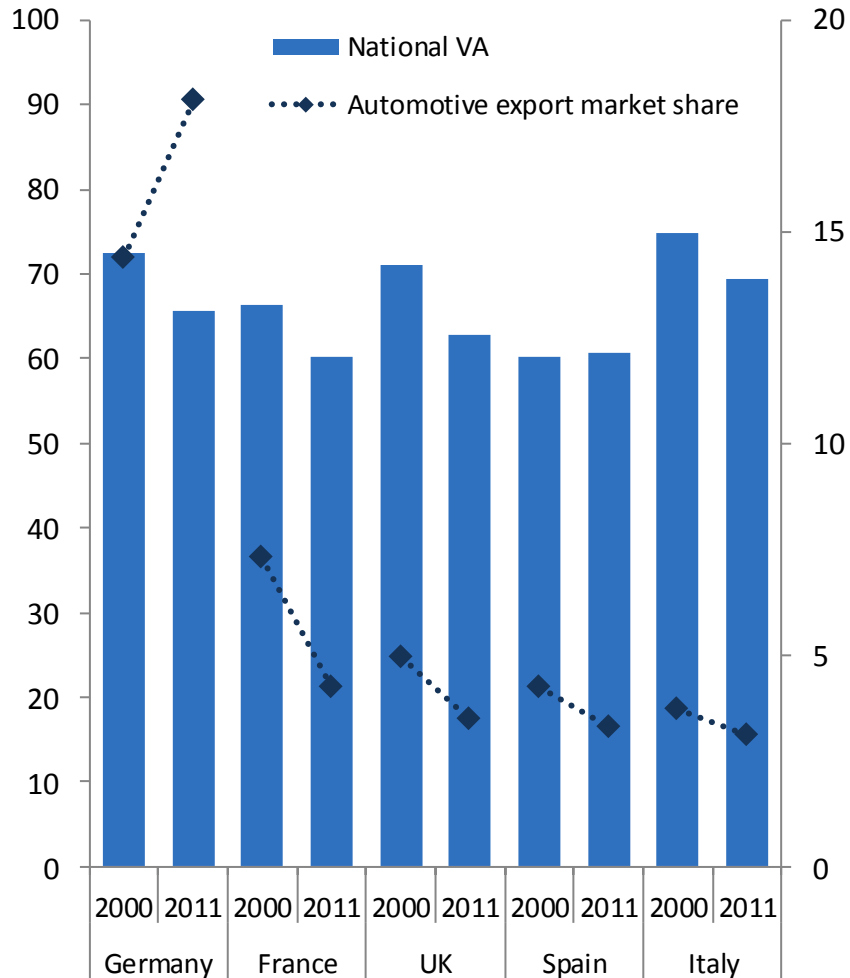
➤ Value added:  $p_i(s) = \frac{va_i(s)}{y_i(s)} \quad \longrightarrow \quad p = (p_i(s))_{1435 \times 1} \quad \longrightarrow \quad \hat{p} = \text{diag}(p)_{1435 \times 1435}$

$$va = (va_i(s))_{1435 \times 1}$$

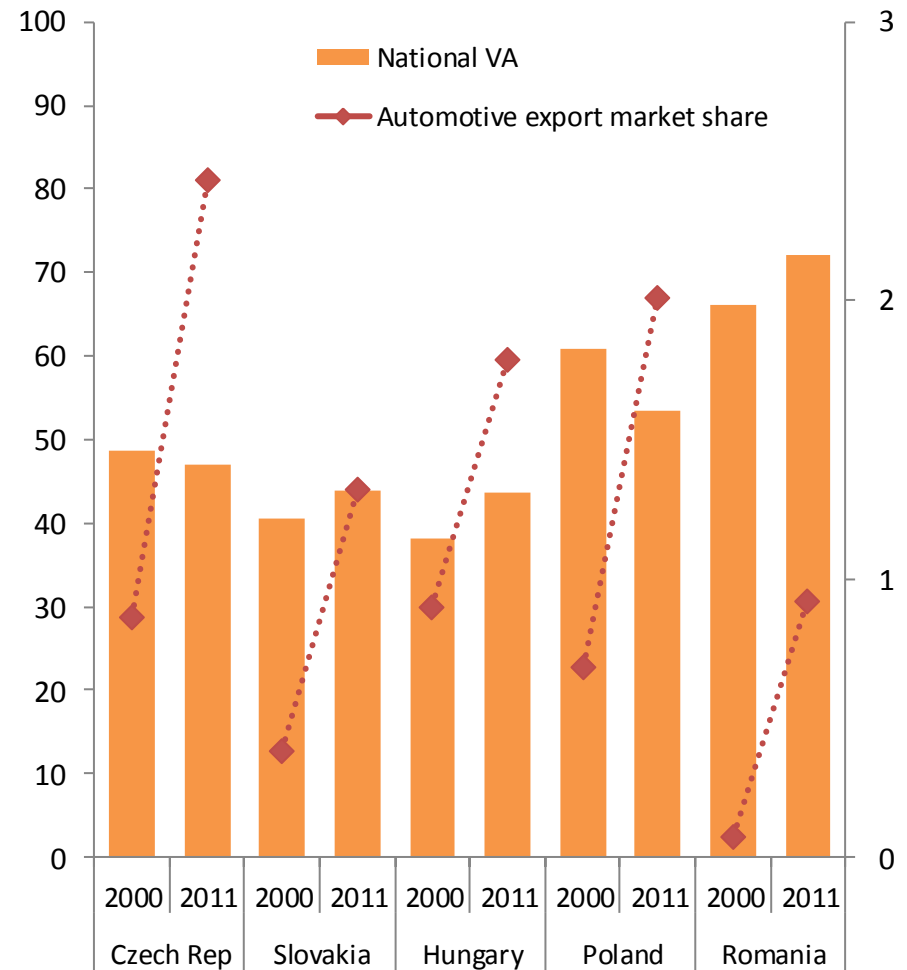
$$va = \hat{p} \cdot y = \hat{p} \cdot (I - A)^{-1} \cdot f$$

# Despite diminishing automotive market shares, national VA in the main EU core automotive exporters is larger than in most NMS

## EU core (5)



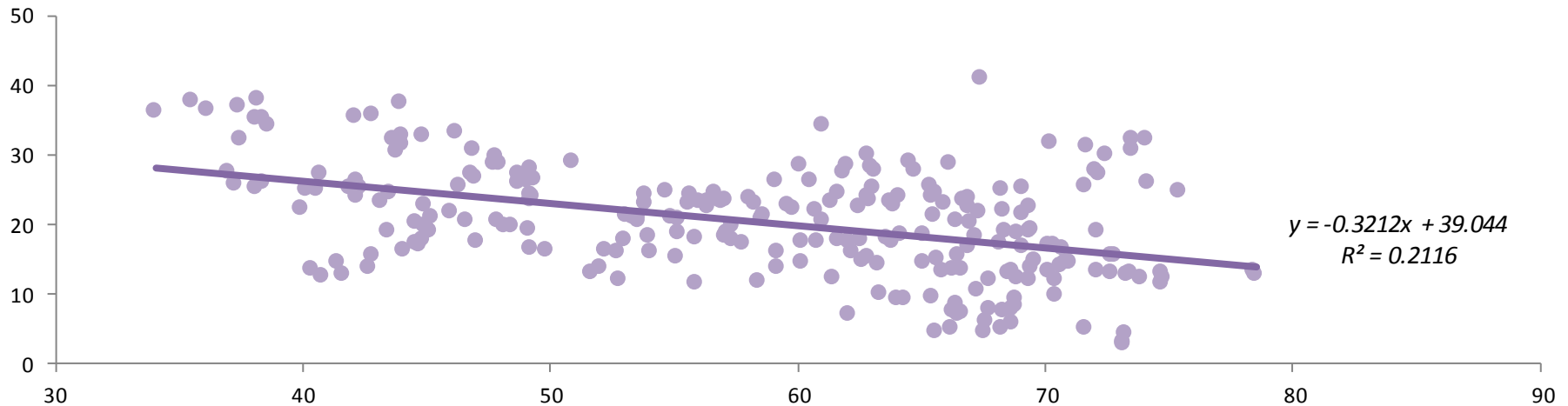
## NMS



Source: WIOD, authors' calculations



# Negative correlation between export performance and national VA in the automotive sector in the EU countries...



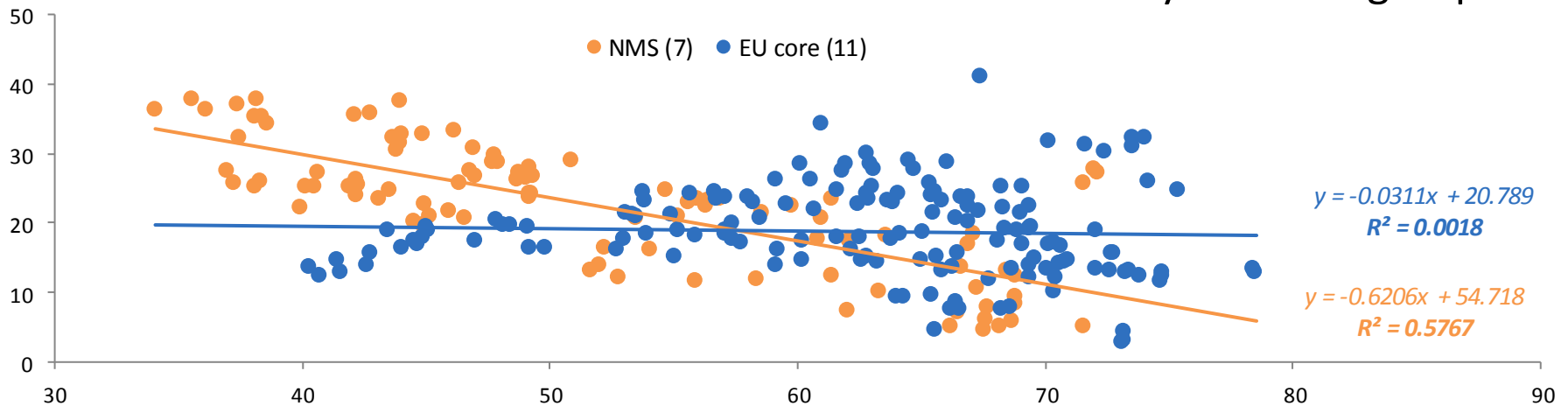
Ox: National VA (% of national transport equipment final good production)

Oy: Country automotive exports, share in total country exports, from 2000 to 2011

Country sample: BE (LU), CZ, DE, EE, ES, FR, IT, CY, HU, AT, PL, PT, RO, SI, SK, FI, SE, UK

Source: BACII, WIOD, authors' calculations

...which is induced by the NMS group

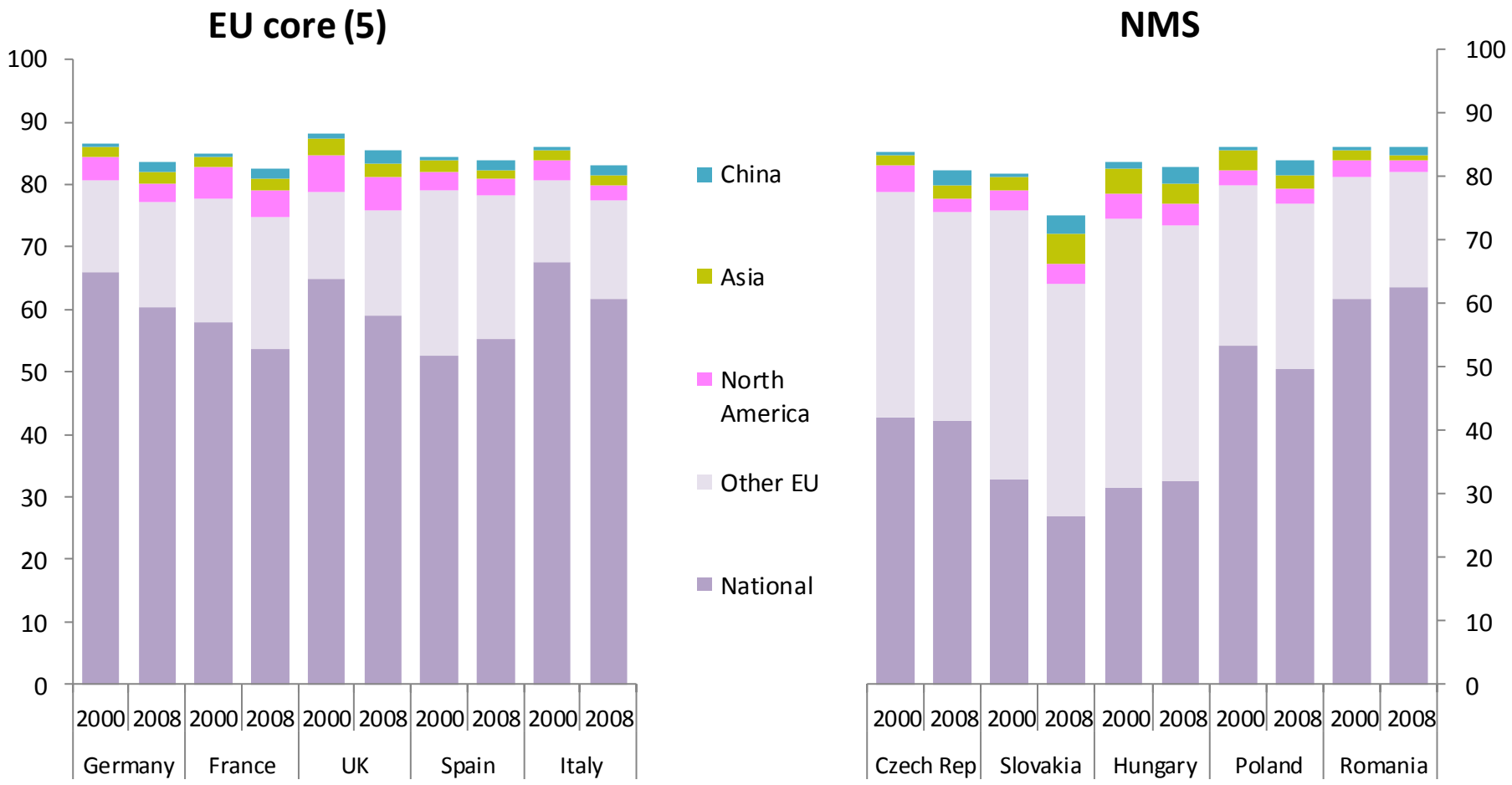


# Automotive industry performance from the perspective of GVC income and GVC jobs

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- GVC income and GVC jobs are direct measures of the benefits arising from participation in a global value chain
- GVC income refers to the compensations received by production factors
- $\text{GVC income} = \text{Compensation of L} + \text{Compensation of K}$
- Similar data source and methodology as in the case of VA

# Low values of GVC income in some countries of the NMS group



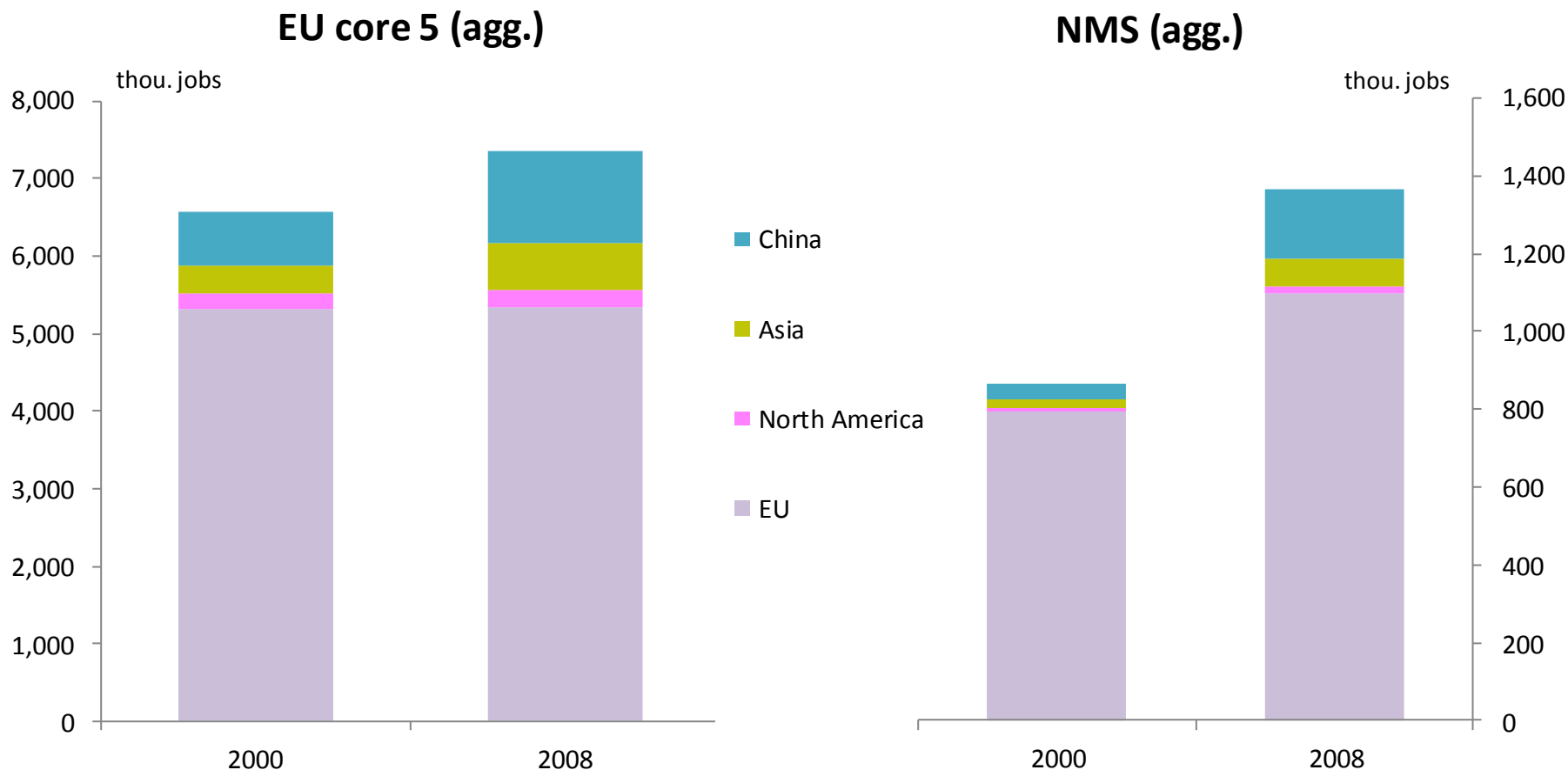
Source: WIOD, authors' calculations

➤ In all cases, most of the GVC income is kept within the EU



➤ EU countries are competing against each other for GVC income

# In terms of jobs, China seems to be an important benefactor of production externalization



Source: WIOD, authors' calculations

- However, lack of correlation with GVC income evolution suggests specialization in low-skilled jobs

# GVC integration analysis – main results

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- Despite worsening market shares, the weight of national VA in total VA for the countries in the EU core 5 is higher on average than in the EU NMS group
- In the case of the NMS, a good export performance is negatively correlated with national VA (relative to total VA)



- For the NMS, the higher the market share, the smaller the ratio between country benefits, on the one hand, and production and exports, on the other
- Most of GVC income is being kept within the EU, which means that EU countries are competing against each other
- The number of Chinese jobs associated with the EU automotive production has risen, but Chinese GVC income is still reduced

## Concluding remarks

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- EU countries are mainly in competition with each other in the automotive industry. There is a possible drain of market share between some states of the EU core and some NMS
- Good export performance (in the case of NMS) may constitute a sign for a reduced ratio between national and total VA
- China's importance as a competitor has been growing. It has gained a consistent number of jobs from participating in the European automotive GVCs, however, the lack of correlation with GVC income suggests that these jobs are low-skilled
- Further research relies on fully exploiting the CompNet WS 1 and WS 3 indicators, as well as the potential of the WIOD database

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