THE CHANGING GEOGRAPHY AND SPATIAL STRUCTURE OF THE EUROPEAN AUTOMOTIVE INDUSTRY

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PRESENTATION OUTLINE

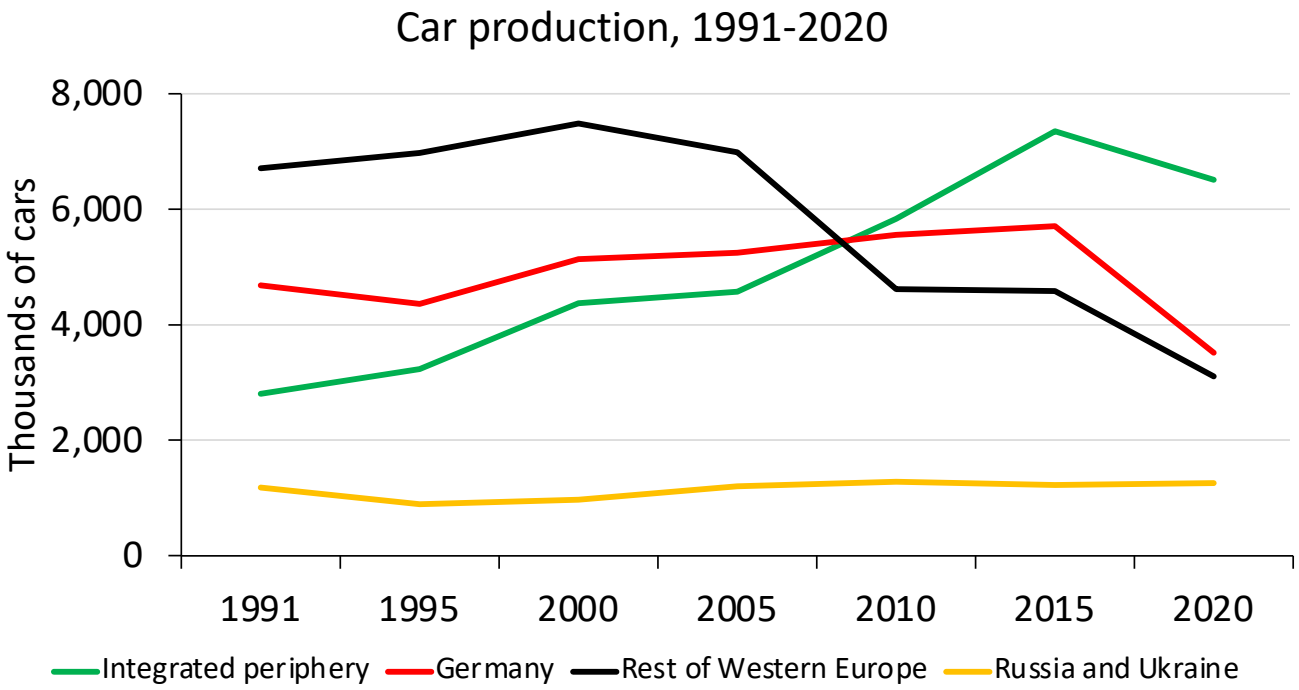
- Changes in the geography of production in the European automotive industry, 2005-2016
- The core-periphery structure of the European automotive industry, 2003-2017
- The likely effects of the transition to electromobility in the automotive industry of East-Central Europe

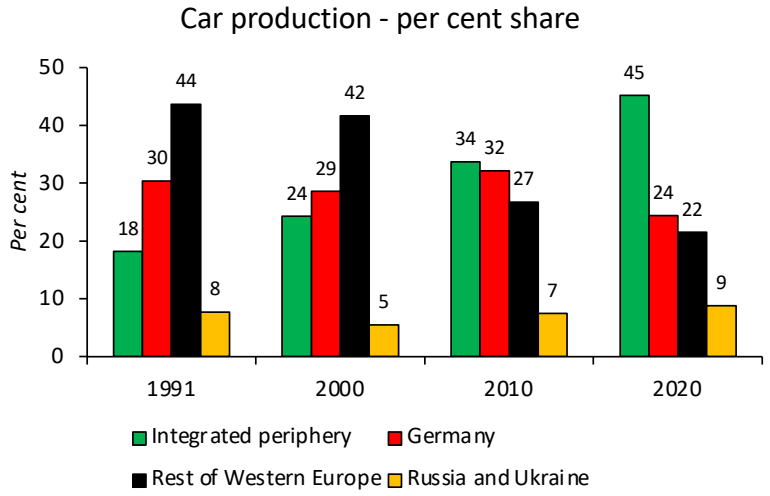
CONCEPTUALIZATION OF THE GEOGRAPHIC CHANGE IN THE EUROPEAN AUTOMOTIVE INDUSTRY

- The theory of uneven development in the context of GPNs/GVCs
- Production drawn to superior locations with the potential of a higher rate of profit: labor surplus and lower wages
  - The influx of profit-seeking capital resulting in growth
- Excess profit opportunities do not last
  - Growth exhausts labor surplus and increases wages ultimately lowering the rate of profit
  - Constant search for new areas with labor surplus and lower wages
  - The geographic expansion of the automotive industry into peripheral areas

CHANGES IN THE GEOGRAPHY OF PRODUCTION IN THE EUROPEAN AUTOMOTIVE INDUSTRY

- Gradual expansion of the automotive industry from core areas in Western Europe by integrating peripheral regions since the 1960s

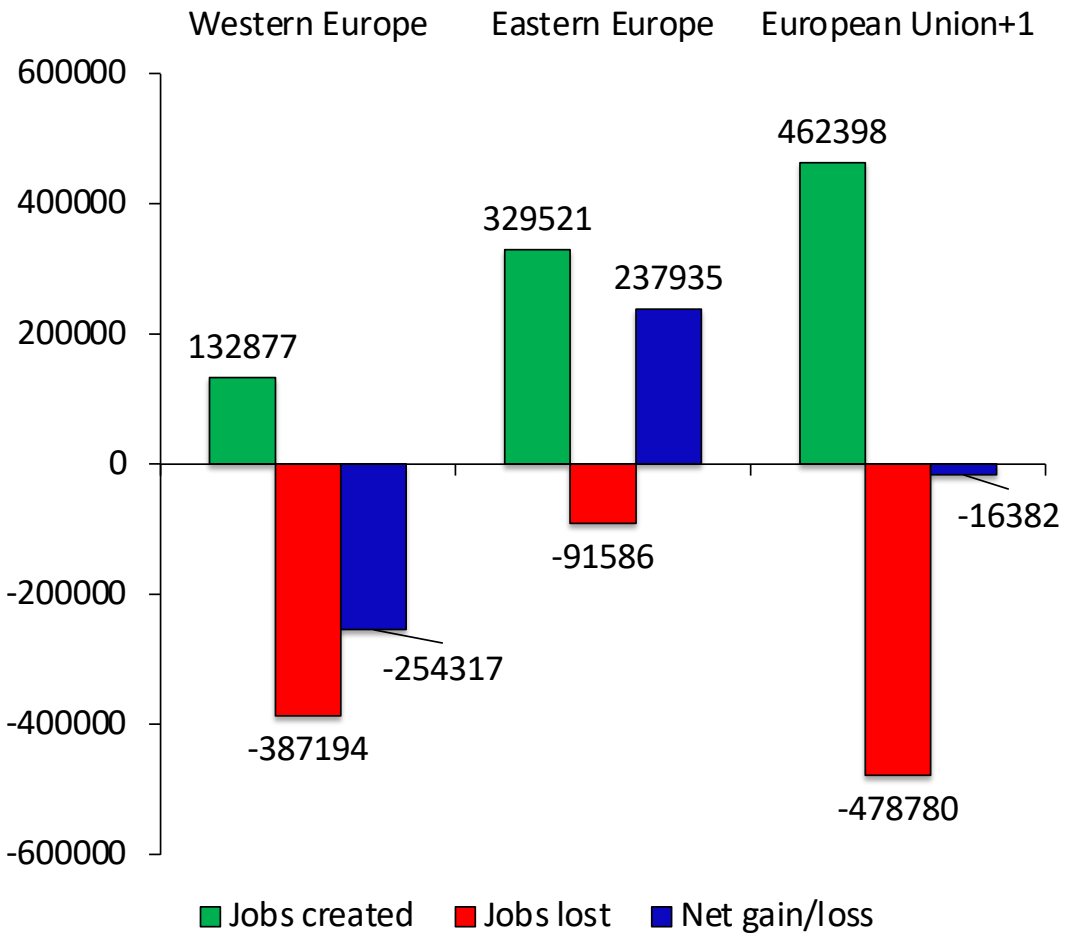




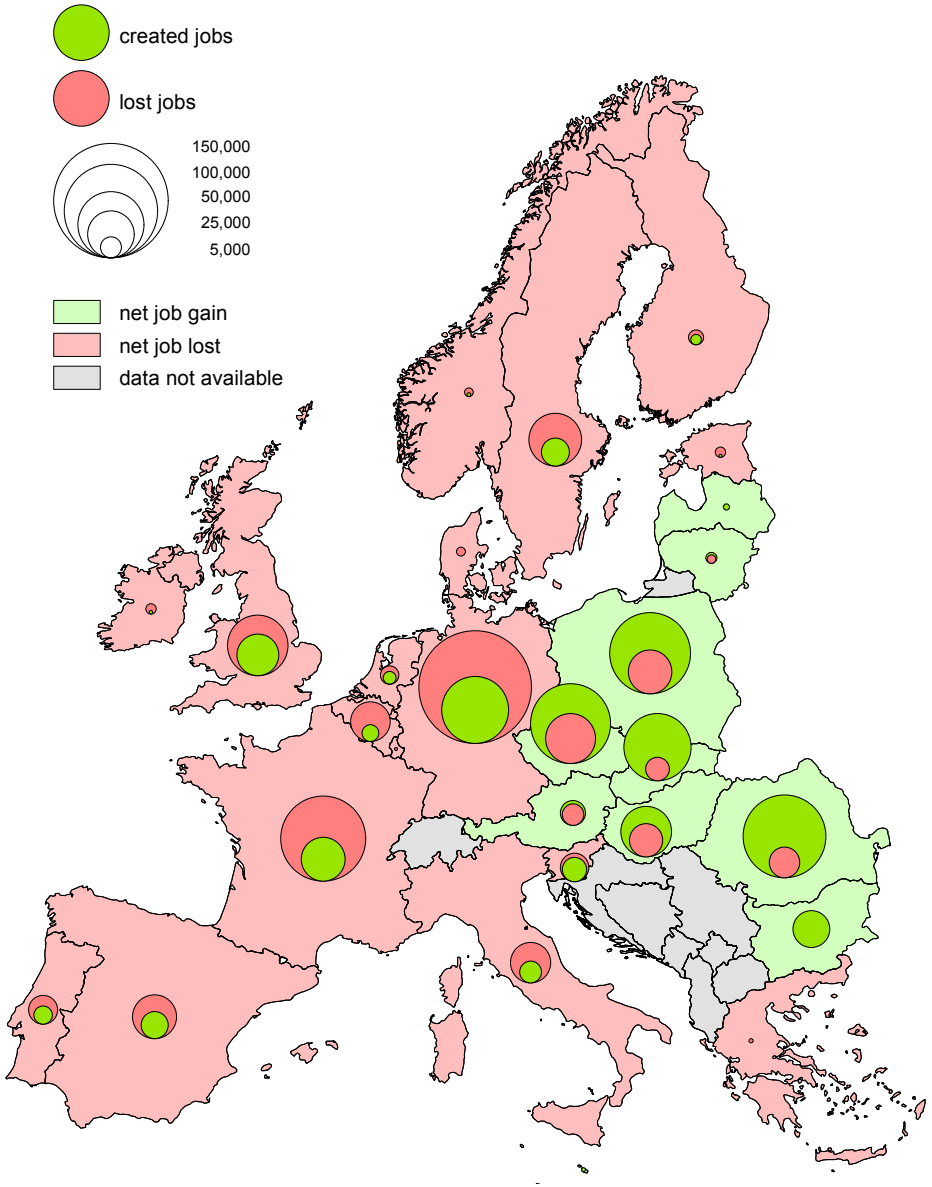
Integrated periphery includes ECE, Spain, Portugal, Turkey and Morocco
Data: OICA (2021), USDT (2017)

RESTRUCTURING OF THE EUROPEAN AUTOMOTIVE INDUSTRY, 2005-2016

- 2,124 restructuring events in large and medium-sized firms
  - 462,398 jobs created and 478,780 jobs lost for a net loss of 16,382 jobs



The job creation and job loss in the European automotive industry, 2005-2016.
Source: Calculated from ERM (2017).

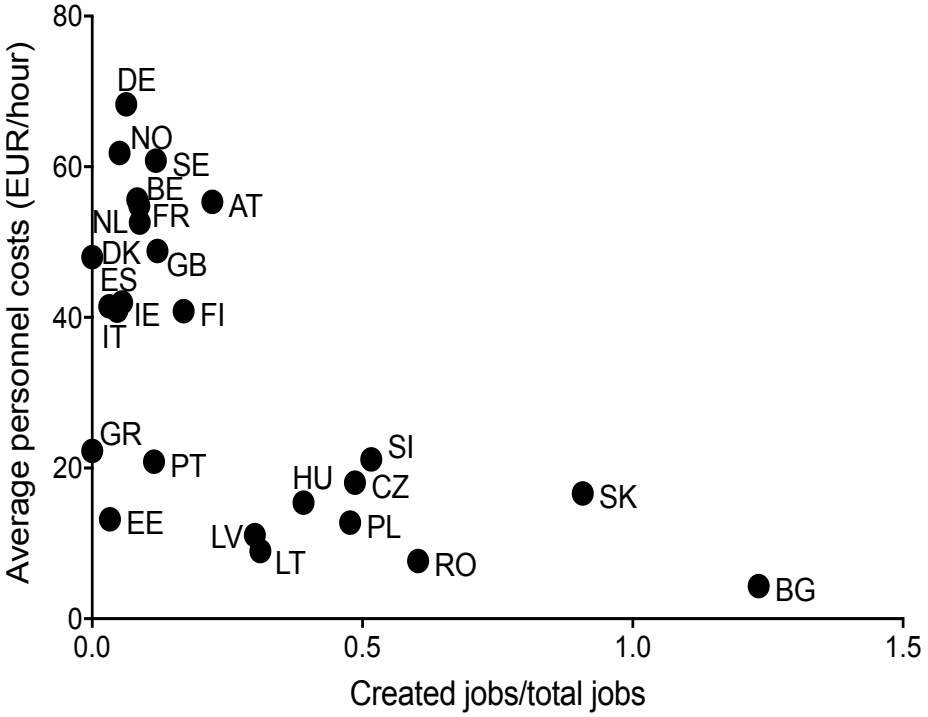


JOB CREATION AND JOB LOSS BY LARGE AND MEDIUM-SIZED FIRMS IN THE EU AND NORWAY, 2005-2016

- Job gains in the east European integrated periphery (except for Slovenia and Estonia)
- Job losses in the rest of Europe (except for Austria)
  - Including older integrated peripheries

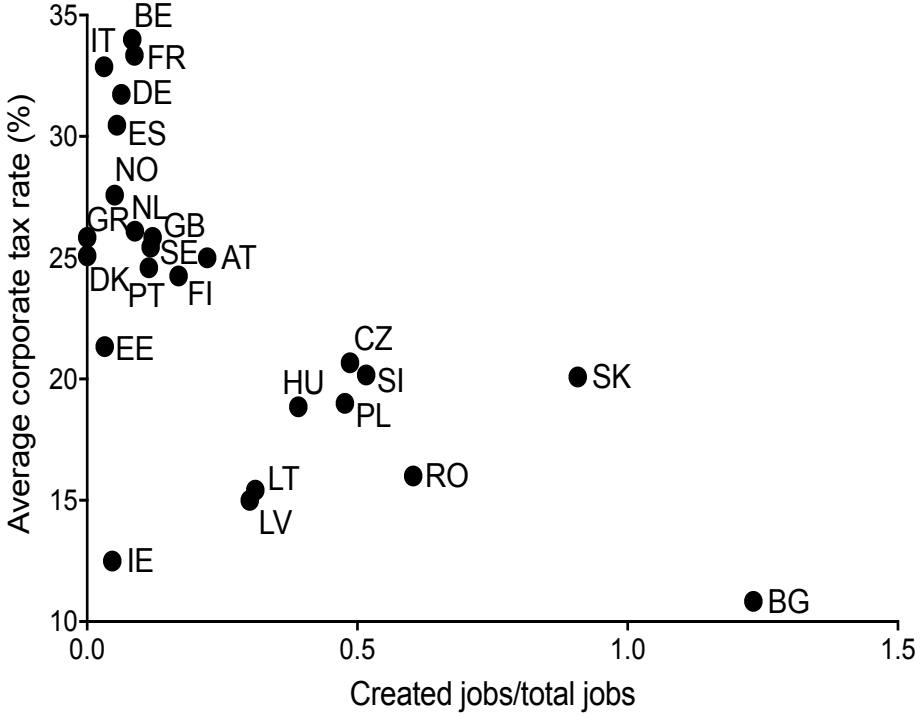
JOB CREATION STRONGLY RELATED TO WAGES AND CORPORATE TAXES

The relationship between 2005-2015 average personnel costs in the automotive industry and 2005-2016 jobs created in the automotive industry



Pearson correlation coefficient at the 95% confidence interval: P (two-tailed) = 0.0007, r = -0.6323, N = 25.

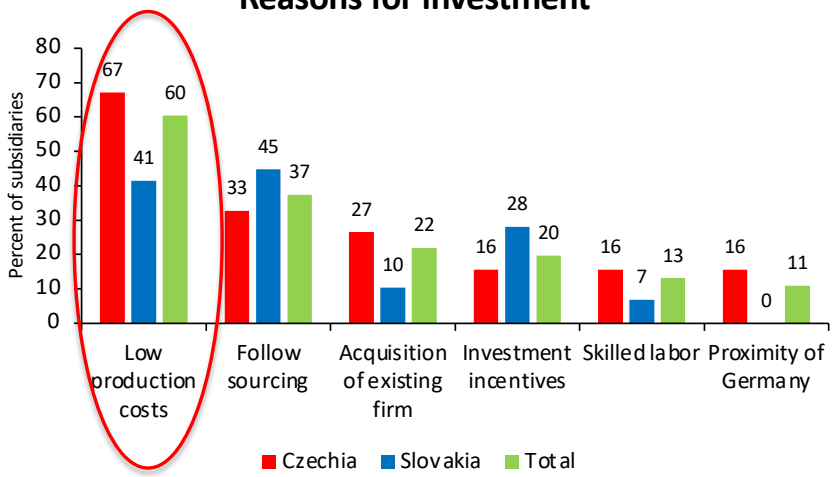
The relationship between 2005-2016 average corporate tax rates and 2005-2016 jobs created in the automotive industry



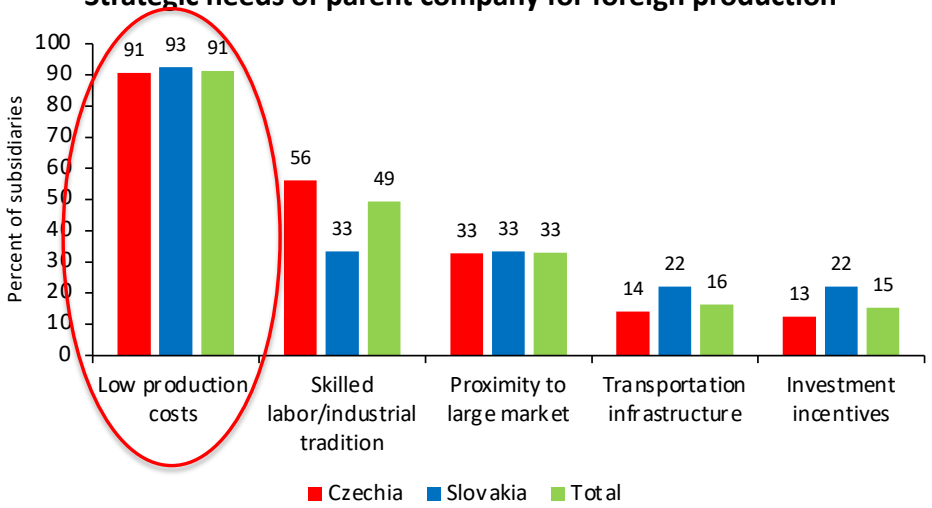
Pearson correlation coefficient at the 95% confidence interval: P (two-tailed) = 0.0007, r = -0.6327, N = 25.

RESULTS OF INTERVIEWS WITH FOREIGN-OWNED FIRMS

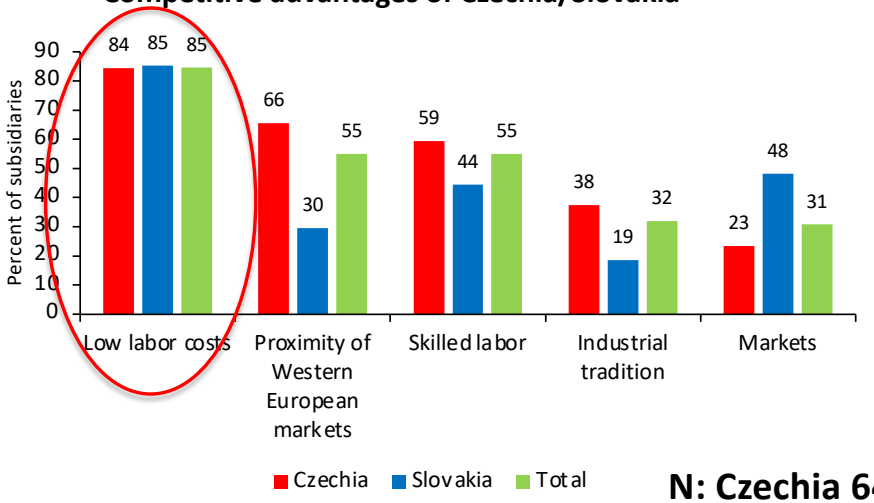
Reasons for investment



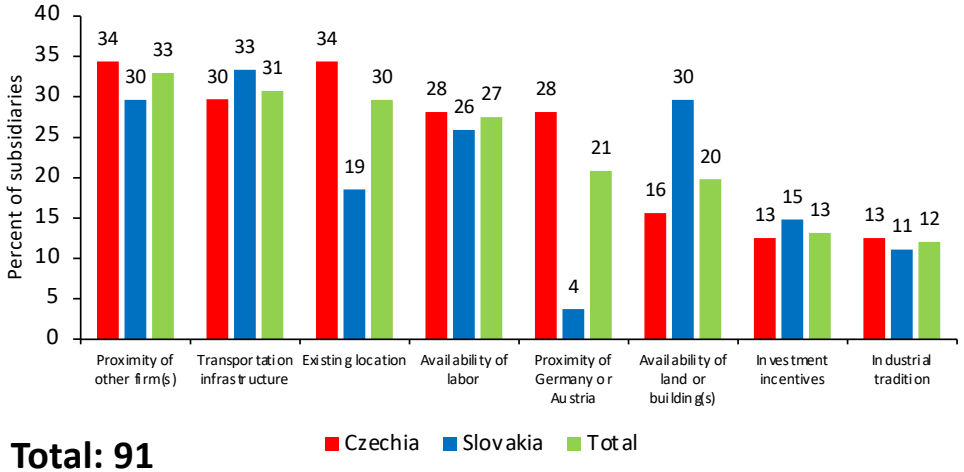
Strategic needs of parent company for foreign production



Competitive advantages of Czechia/Slovakia



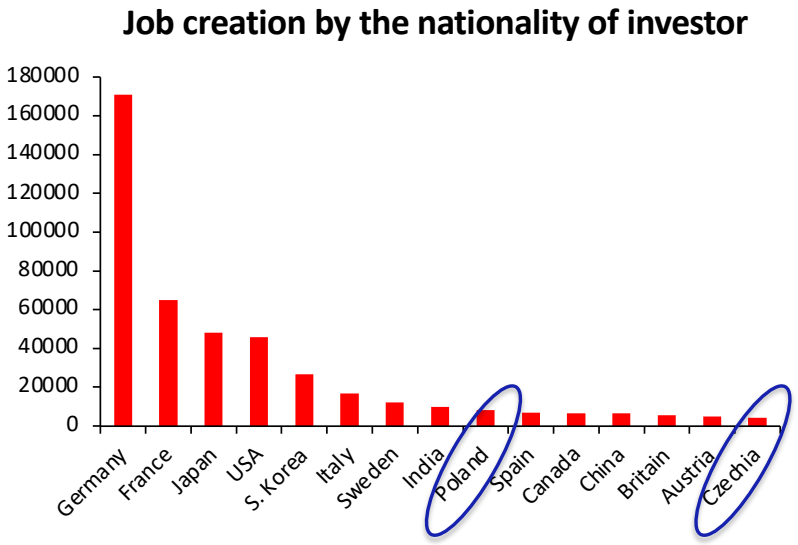
Reasons for location choice

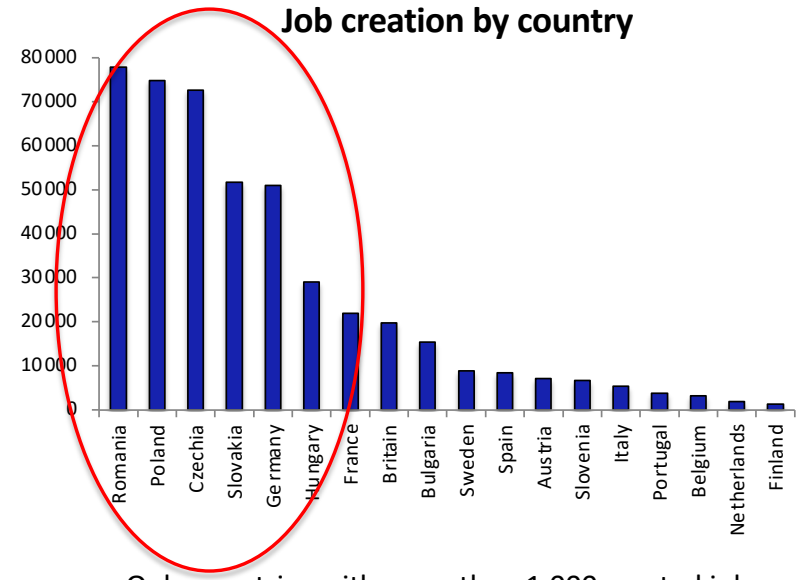


N: Czechia 64, Slovakia 27, Total: 91

JOB CREATION DRIVEN BY CORE COUNTRY TNCs

- 81% of all jobs by firms from 5 countries
  - France, Germany, Italy, Japan, South Korea, USA
- **German** firms: 37% of the EU+1 total
  - 72% of jobs created abroad, of which 93% in Eastern Europe
- **French** firms: 14% of the EU+1 total
  - 71% of jobs created abroad, of which 92% in Eastern Europe



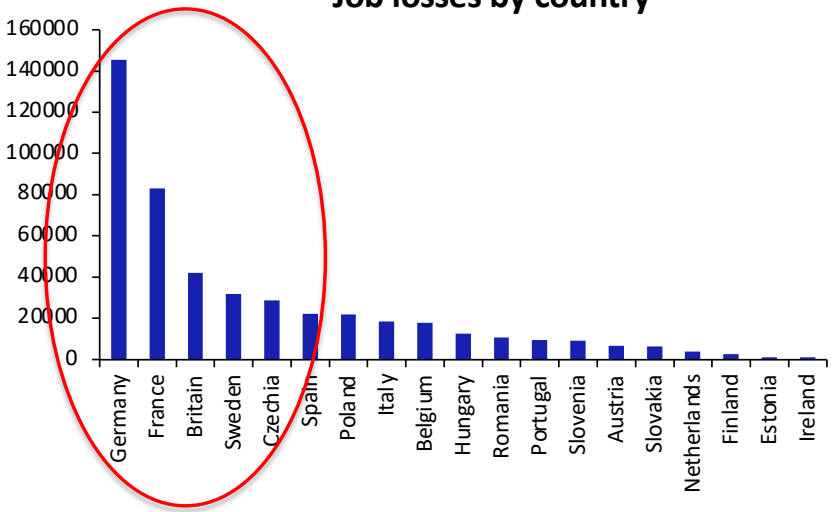


Only countries with more than 1,000 created jobs

JOB LOSSES ALSO DRIVEN BY CORE COUNTRY TNCs

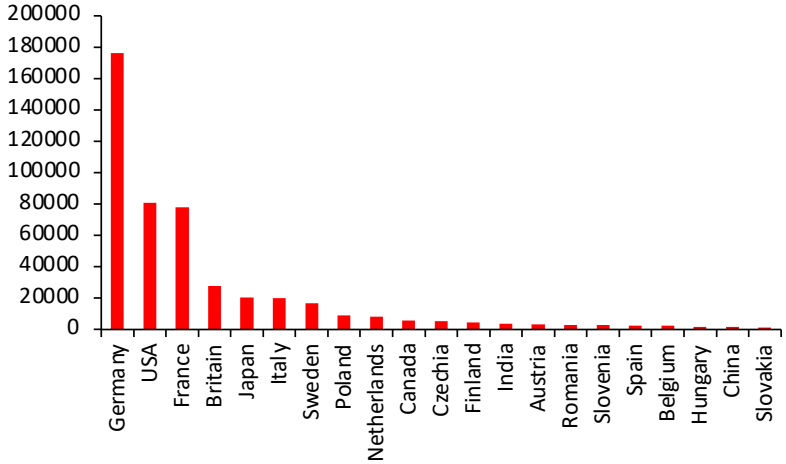
- 80% of total job losses by German, American, French, British and Japanese firms
  - **German firms**: 37% of the EU+1 total, 84% of job losses in Germany (but 72% of new jobs created abroad)
  - **French firms**: 25% of the EU+1 total, 88% of job losses in France (but 71% of new jobs created abroad)
  - **Job losses in domestic economies, job creation abroad**: an increasing internationalization of production

Job losses by country



Only countries with more than 1,000 jobs lost

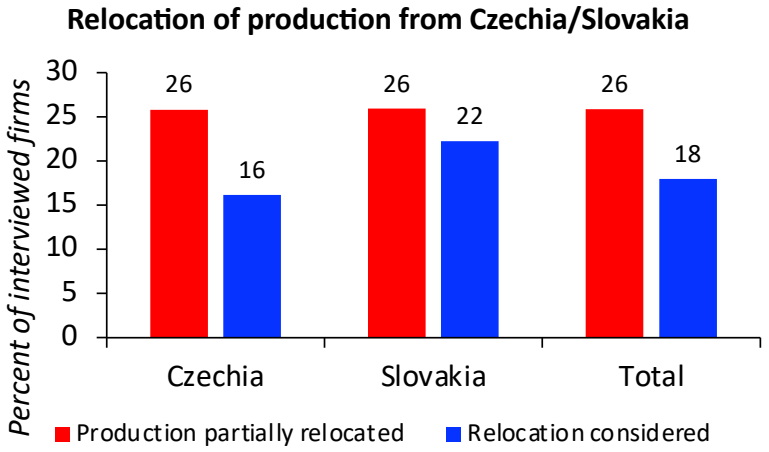
Job losses by parent economy of firm's owner



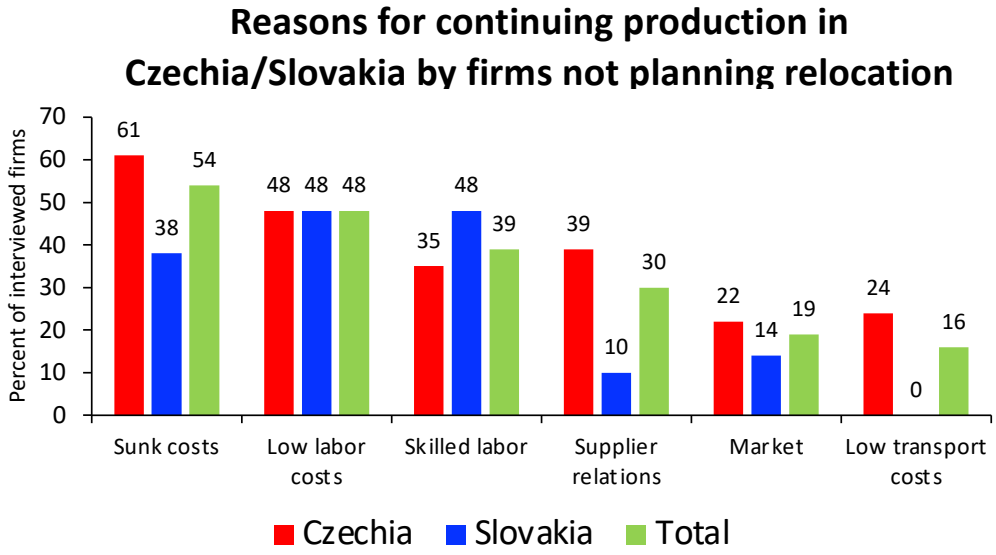
Only countries with more than 1,000 jobs lost

TEMPORARY LIMITS OF GROWTH IN INTEGRATED PERIPHERIES

- Sources of growth get exhausted: labor shortages and increasing wages
  - Decreasing rate of profit
- Growth will gradually move to regions with lower wages and labor surplus
  - Labor intensive activities
  - Southeast Europe
  - North Africa



N: Czechia 62, Slovakia 27



N: Czechia 46, Slovakia 21

HOW HAVE THESE CHANGES AFFECTED THE CORE-PERIPHERY STRUCTURE OF THE EUROPEAN AUTOMOTIVE INDUSTRY? THEORETICAL AND CONCEPTUAL BACKGROUND

- Friedmann's core-periphery model
- Harvey's theory of the spatio-temporal fix and uneven development
- GVC and GPN perspectives
- Divisions of labor in spatial systems

DIFFERENT FUNCTIONS RECEIVE DIFFERENT ECONOMIC REWARDS IN THE CORE, SEMIPERIPHERY, AND PERIPHERY

- **Core regions**: higher value-added, knowledge-intensive, decision-making activities and control functions
  - Complex activities based on highly-skilled labor, such as the assembly of high-end models and components requiring complex knowledge
- **Peripheral regions**: lower value-added routine production functions
  - Export-oriented assembly of inexpensive mass market models and simple components, weak presence of strategic functions
- **Semiperipheral regions**: zones with a mixture of core and peripheral processes, in which neither core nor peripheral processes dominate

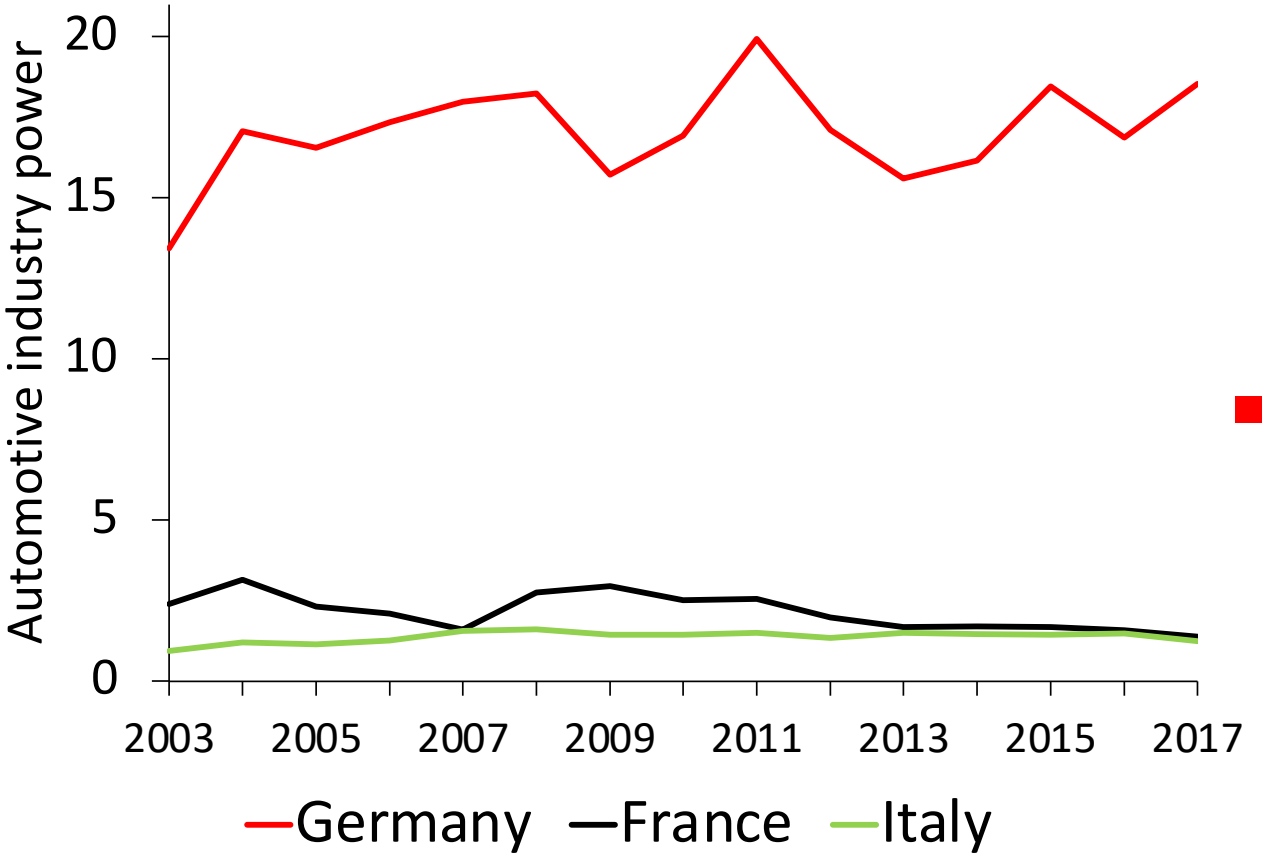
METHODOLOGY

- Determining the **automotive industry power** (AIP) of individual countries (2003-2017)
  - Trade-based **positional power** in automotive GPNs
    - The aggregate positional power of country firms in the automotive industry based on bilateral national trade data with automotive products
    - Higher positional power in the core than in the periphery
  - **Ownership and control power**: the degree of foreign control - low in the core, high in the periphery
    - Authority-dependency relationships: cores dominate peripheries
  - **Innovation power**: the degree of innovation
    - Higher rates of innovation in the core than in the periphery

DELIMITING SPATIAL CATEGORIES BY CLUSTER ANALYSIS

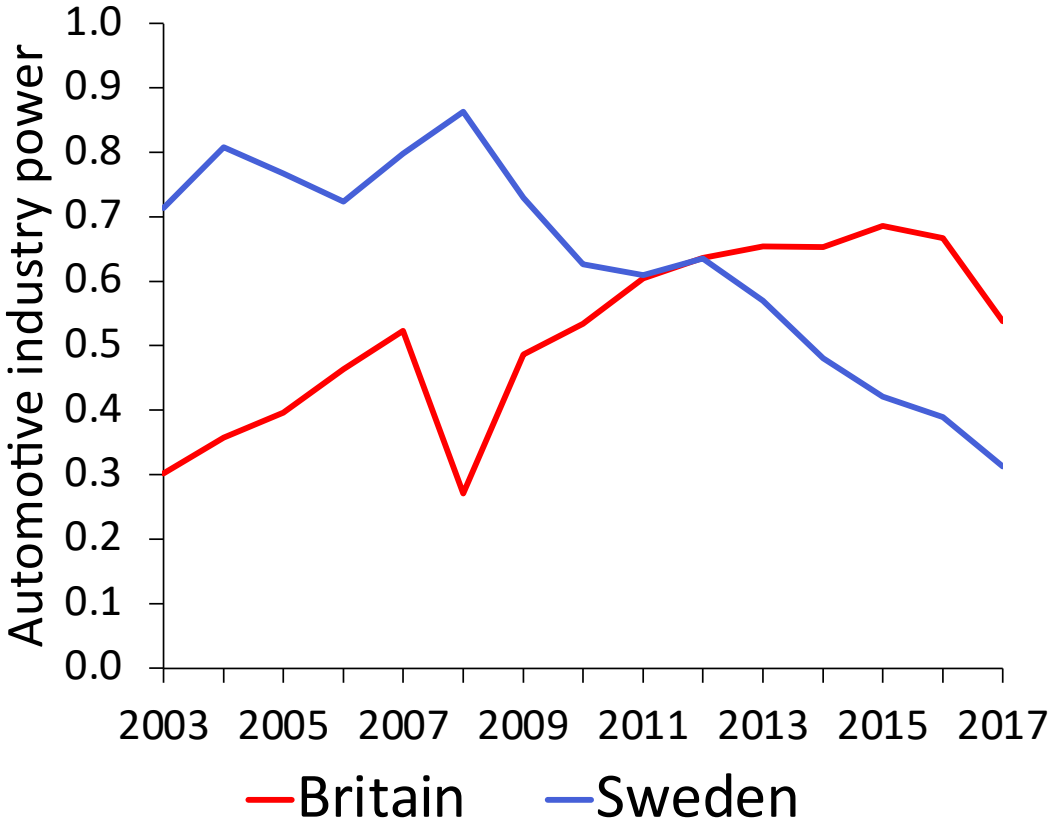
- The K-means cluster analysis applied on the descendent order of the natural logarithm of average AIP values
- Five clusters for the 2003-2017, 2003-2007, 2008-2012 and 2013-2017 periods
- A higher-order core, lower-order core, semiperiphery, periphery and lower-order periphery
  - Stable position: a country in the same cluster during all three five-year periods
  - Unstable position: changing position
    - Stable and unstable core, semiperiphery and periphery

STABLE CORE



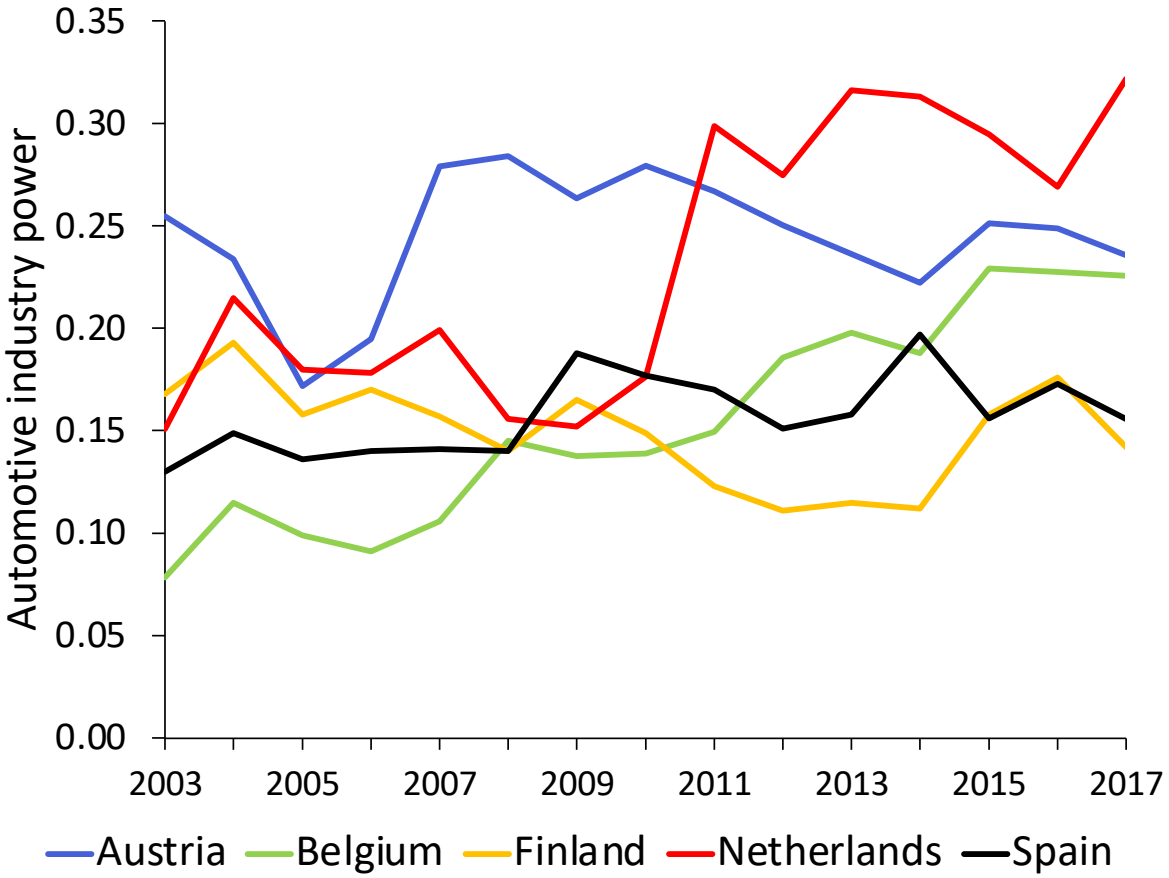
- A strongly dominant position of **Germany**
  - A higher-order core region
  - Highest PP, lowest IFC, 2nd highest Innovation index (II)
- **France** and **Italy**: much weaker lower-order cores
  - France: the 2nd strongest PP and 3rd lowest IFC in the EU
  - Italy: the weakest AIP but closed the gap with France

UNSTABLE CORE



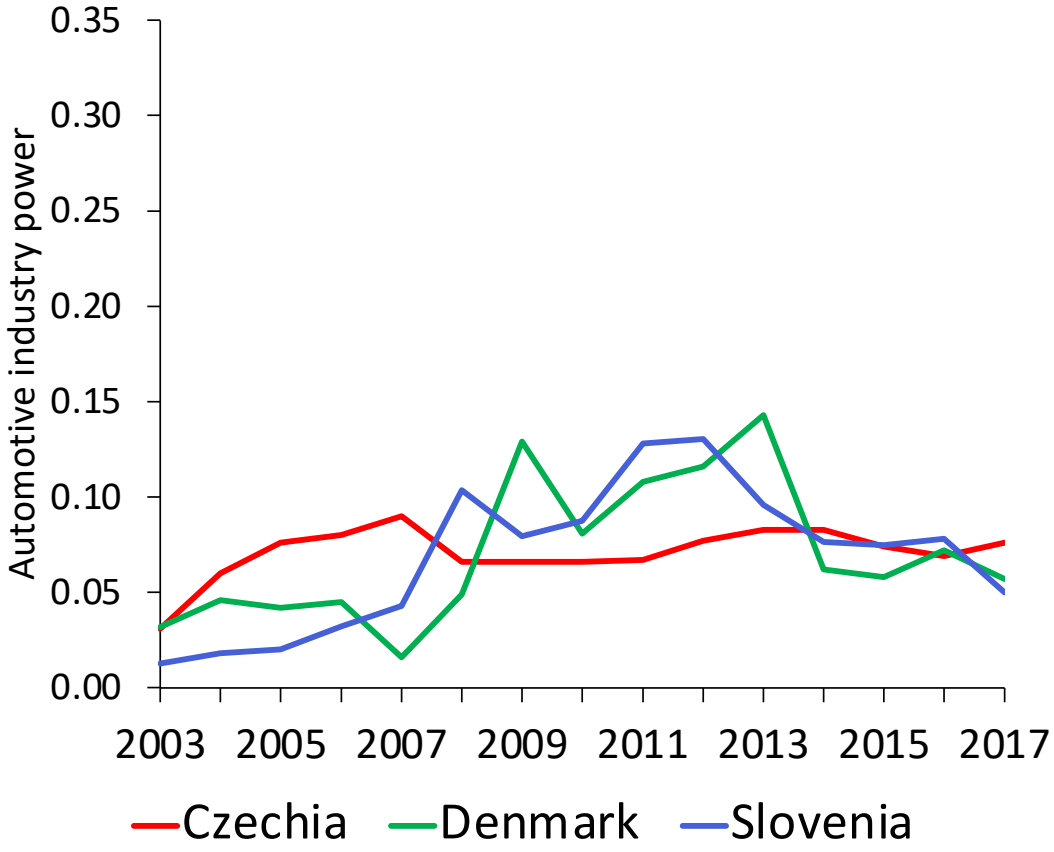
- Borderline position, but trending to the semiperiphery
- **Sweden**: the highest index of innovation except for 2007 and 2008
- **Britain**: strong positional power and strong innovation combined with a high IFC, negative effects of Brexit

STABLE SEMIPERIPHERY



- Geographically concentrated in Western Europe
- A high degree of foreign control (except Finland)
- Weaker positional power than Germany and France
- Variable strength of innovation activities

UNSTABLE SEMIPERIPHERY



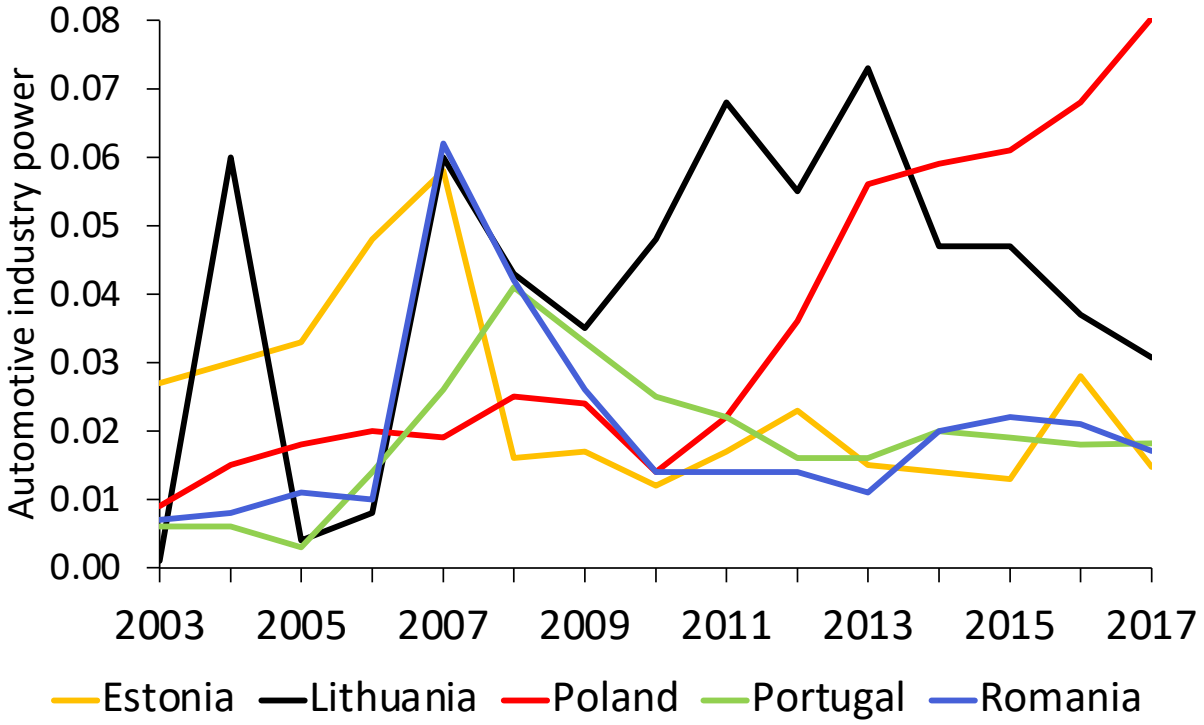
- A borderline periphery-semiperiphery position
- The AIP significantly lower than the AIP of the stable semiperiphery
- Trending towards the periphery rather than semiperiphery
  - Ranked as the semiperiphery only during 2008-2012

PERIPHERY

- The largest number of countries
- The highest degree of foreign control
- The lowest innovation index
- Mostly low (but increasing) positional power
- The stable and unstable periphery

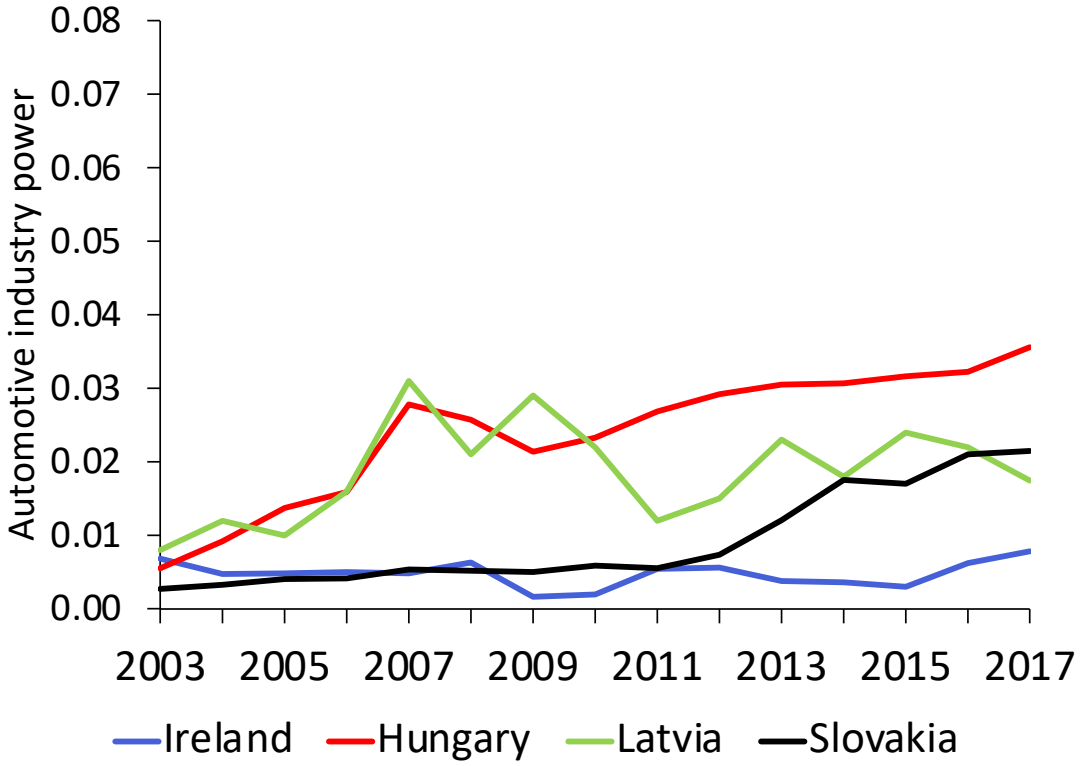
Index of innovation	***Average 2003-2017***	**Index of foreign control**	***Average 2003-2017***
Sweden	97.6	Germany	14.6
Germany	88.4	Italy	20.3
Austria	62.0	France	22.8
Britain	50.8	Finland	28.4
France	47.7	Denmark	33.5
Italy	46.6	Slovenia	53.7
Netherlands	44.0	Sweden	56.9
Finland	28.3	Estonia	64.5
Slovenia	21.3	Netherlands	68.0
Portugal	18.8	Lithuania	68.8
Spain	18.7	Ireland	72.6[1]
Czechia	18.4	Austria	77.3
Denmark	18.1	Latvia	78.1
Ireland	16.0	Spain	78.4
Lithuania	15.3	Portugal	79.3
Belgium	14.9	Britain	80.0
Estonia	12.5	Belgium	81.0
Hungary	11.1	Romania	82.8
Romania	10.5	Poland	83.6
Latvia	10.0	Bulgaria	85.0
Poland	7.1	Czechia	91.8
Slovakia	4.2	Hungary	93.1
Bulgaria	1.1	Slovakia	95.6

STABLE PERIPHERY



- **Poland**: rapid growth of the AIP since 2010
- **Romania**: rapid growth in PP but the relative decrease in innovation and increase in foreign control
- **Portugal**: weak PP but a stronger position of its domestic sector and an above average index of innovation among peripheral countries

UNSTABLE PERIPHERY



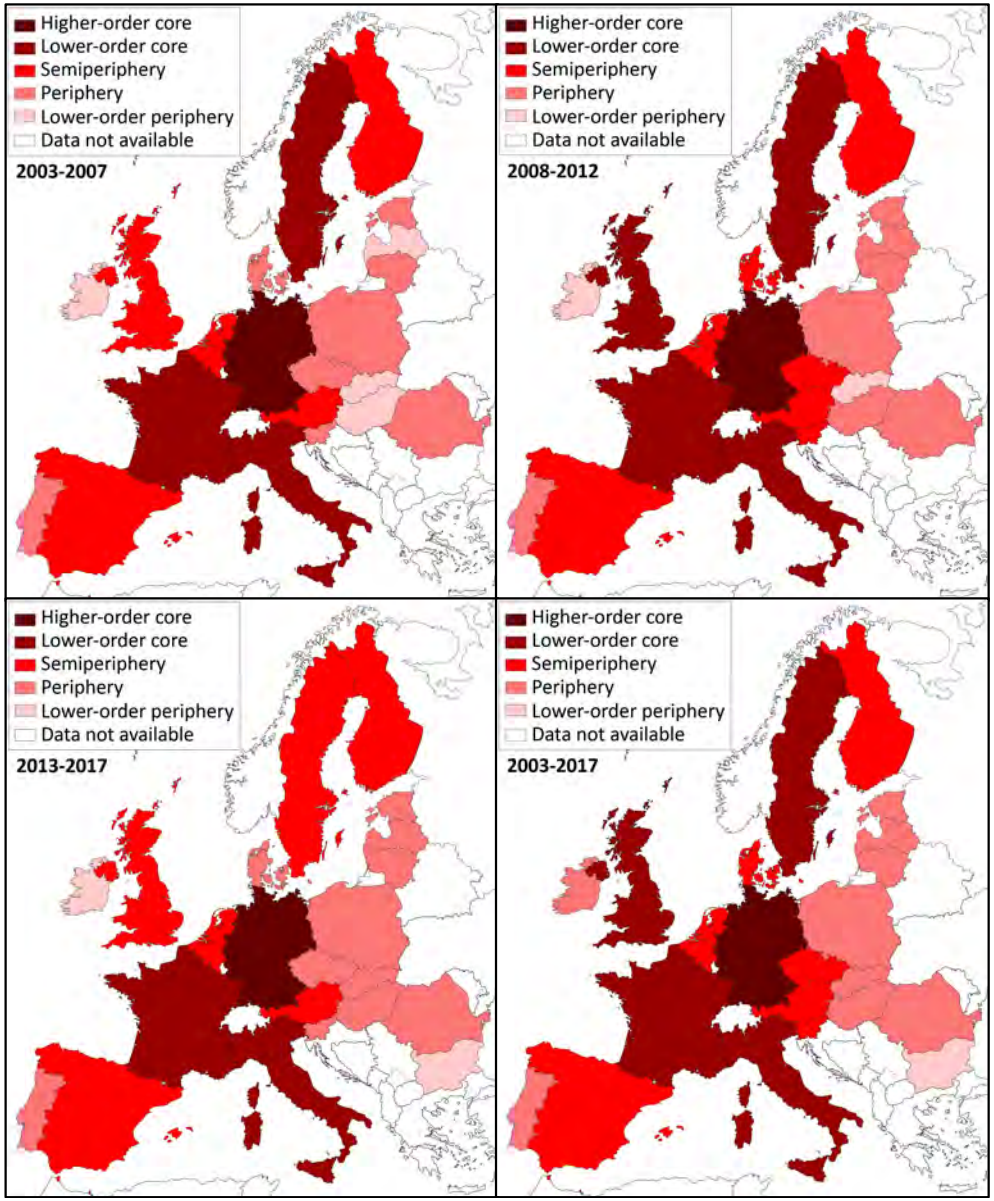
- **Hungary** and **Slovakia**: rapidly increasing PP and AIP driven by large increases in the export-oriented production but the highest IFC in the EU and among the lowest index of innovation
- **Ireland** and **Latvia**: small automotive industries
  - Ireland: lowest 2003-2017 PP

Table 2. Classification of countries into spatial zones in the European automotive industry system delimited by the cluster analysis based on the natural logarithm of average values of automotive industry power (AIP) during 2003–2007, 2008–2012, 2013–2017 and 2003–2017.

2003–2017					2003–2007					2008–2012					2013-2017				
		Cluster	Distance				Cluster	Distance				Cluster	Distance				Cluster	Distance	
1	Germany	1	0.000	HC	1	Germany	1	0.000	HC	1	Germany	1	0.000	HC	1	Germany	1	0.000	HC
2	France	2	.331	LC	2	France	2	.583	LC	2	France	2	.845	LC	2	France	2	.059	LC
3	Italy	2	.135	LC	3	Italy	2	.054	LC	3	Italy	2	.292	LC	3	Italy	2	.059	LC
4	Sweden	2	.162	LC	4	Sweden	2	.529	LC	4	Sweden	2	.391	LC	4	Sweden	3	.778	SP
5	Britain	2	.305	LC	5	Britain	3	.802	SP	5	Britain	2	.746	LC	5	Britain	3	.748	SP
6	Austria	3	.296	SP	6	Austria	3	.005	SP	6	Austria	3	.698	SP	6	Netherlands	3	.127	SP
7	Netherlands	3	.275	SP	7	Netherlands	3	.202	SP	7	Netherlands	3	.458	SP	7	Austria	3	.110	SP
8	Belgium	3	.096	SP	8	Finland	3	.639	SP	8	Spain	3	.179	SP	8	Belgium	3	.222	SP
9	Spain	3	.089	SP	9	Spain	3	.275	SP	9	Belgium	3	.124	SP	9	Spain	3	.543	SP
10	Finland	3	.054	SP	10	Belgium	3	.085	SP	10	Finland	3	.050	SP	10	Finland	3	.779	SP
11	Slovenia	3	.255	SP	11	Czechia	4	.020	P	11	Slovenia	3	.234	SP	11	Slovenia	4	.856	P
12	Czechia	3	.265	SP	12	Estonia	4	.970	P	12	Denmark	3	.448	SP	12	Czechia	4	.774	P
13	Denmark	3	.290	SP	13	Denmark	4	.352	P	13	Czechia	3	.726	SP	13	Denmark	4	.759	P
14	Lithuania	4	.341	P	14	Lithuania	4	.446	P	14	Lithuania	4	.735	P	14	Poland	4	.604	P
15	Poland	4	.261	P	15	Slovenia	4	.047	P	15	Portugal	4	.096	P	15	Lithuania	4	.255	P
16	Hungary	4	.130	P	16	Romania	4	.577	P	16	Hungary	4	.084	P	16	Hungary	4	.006	P
17	Estonia	4	.117	P	17	Poland	4	.508	P	17	Poland	4	.050	P	17	Latvia	4	.565	P
18	Romania	4	.021	P	18	Latvia	5	.455	LP	18	Romania	4	.163	P	18	Slovakia	4	.583	P
19	Portugal	4	.003	P	19	Hungary	5	.604	LP	19	Latvia	4	.292	P	19	Portugal	4	.644	P
20	Latvia	4	.019	P	20	Portugal	4	.252	P	20	Estonia	4	.411	P	20	Romania	4	.687	P
21	Slovakia	4	.286	P	21	Ireland	4	.433	P	21	Slovakia	5	.162	LP	21	Estonia	4	.776	P
22	Ireland	4	.568	P	22	Slovakia	5	.149	LP	22	Ireland	5	.162	LP	22	Ireland	5	.314	LP
23	Bulgaria	5	0.000	LP	23	Bulgaria				23	Bulgaria				23	Bulgaria	5	.314	LP

Source: Author.

HC: higher-order core; LC: lower-order core; LP: lower-order periphery; P: periphery; SP: semiperiphery.



The core, semiperiphery and periphery of the European automotive industry delimited by the cluster analysis based on the natural logarithm of average values of automotive industry power during 2003-7, 2008-12, 2013-17 and 2003-17.

THE EFFECTS OF THE TRANSITION TO EVs IN ECE

- Transition to EVs is unavoidable
- It will have **significant effects for the automotive industry of ECE**: its structure, employment etc.
  - Significant restructuring of the automotive industry is likely
- It will not fundamentally change the existing spatial structure of the European automotive industry despite significant restructuring
  - It might reinforce the existing trends

THE EFFECTS OF THE TRANSITION TO EVs

- ECE is not and will not be a center of innovation for electromobility
- Core areas: a center of innovation for electromobility
- The transition driven by core-based TNCs
- The transition will be faster in core areas and the rest of Western Europe than in peripheral areas, especially ECE
  - A slower introduction of mass production of EVs in ECE than in Western Europe is likely

THE EFFECTS OF THE TRANSITION TO EVs

- Production of cars with combustion engines will continue longer in ECE than in Western Europe
  - Newer, more modern factories
  - Lower production costs
  - Older technologies continue longer in peripheral locations according to the product life cycle model
- **The drive for profit will prevail in the long run**
  - Lower cost locations will continue to be attractive

THE EFFECTS OF THE TRANSITION TO EVs

- Continuing location advantages of ECE for the automotive industry
  - Low wages compared to Western Europe
  - Geographic location: proximity of the West European market
  - Membership in the EU
  - ECE will continue to be an attractive location for potential new EV assembly plants (e.g., Chinese) and the production of battery cells and components

CONCLUSION

- The European automotive industry is in a constant state of flux
  - The geographical expansion into new areas and restructuring in the existing locations
- Large national differences in labor costs and corporate taxes were the main driving force behind the geographic restructuring of the European automotive industry between 2005 and 2016

CONCLUSION

- The increased internationalization of the European automotive industry
  - The geographic change in the European automotive industry driven by investment/disinvestment activities of automotive TNCs
- The significantly enhanced role of foreign firms (large ‘global’ suppliers) and the weakening role of domestic firms
- The geographic change in Europe was mainly driven by TNCs based in the global automotive industry core countries
- Rapid growth in integrated peripheries does not last

CONCLUSION

- Mostly stable positions of countries in the core-semiperiphery-periphery spatial hierarchy during the 2003-2017 period
- The spatial structure of the European automotive industry will remain stable in the foreseeable future despite the transition to EVs
  - It is unlikely that the core countries, especially Germany, will lose their core position
  - It is unlikely that semiperipheral countries will advance into the core
  - The most likely changes are potential transitions of the most advanced peripheral countries into the semiperiphery

More details can be found in these two published articles

Thank you for your attention