



Present state and future prospects of cooperation between the People's Republic of China and Central and Eastern Europe in the field of automotive and related industries

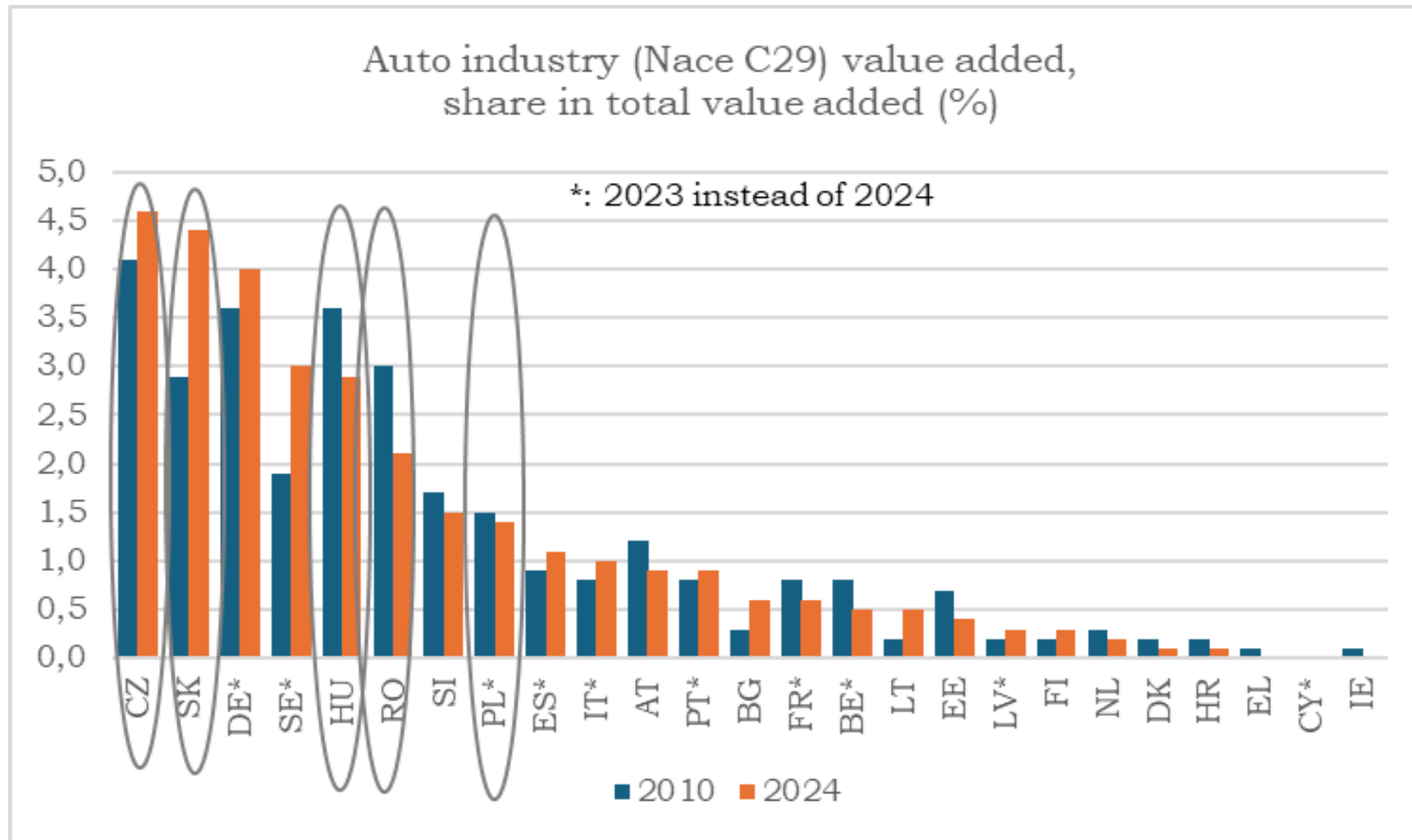
**Presentation on the preliminary results of the research of Kopint-Tárki for
China-CEE Institute
June 2, 2026**



Chapter 1

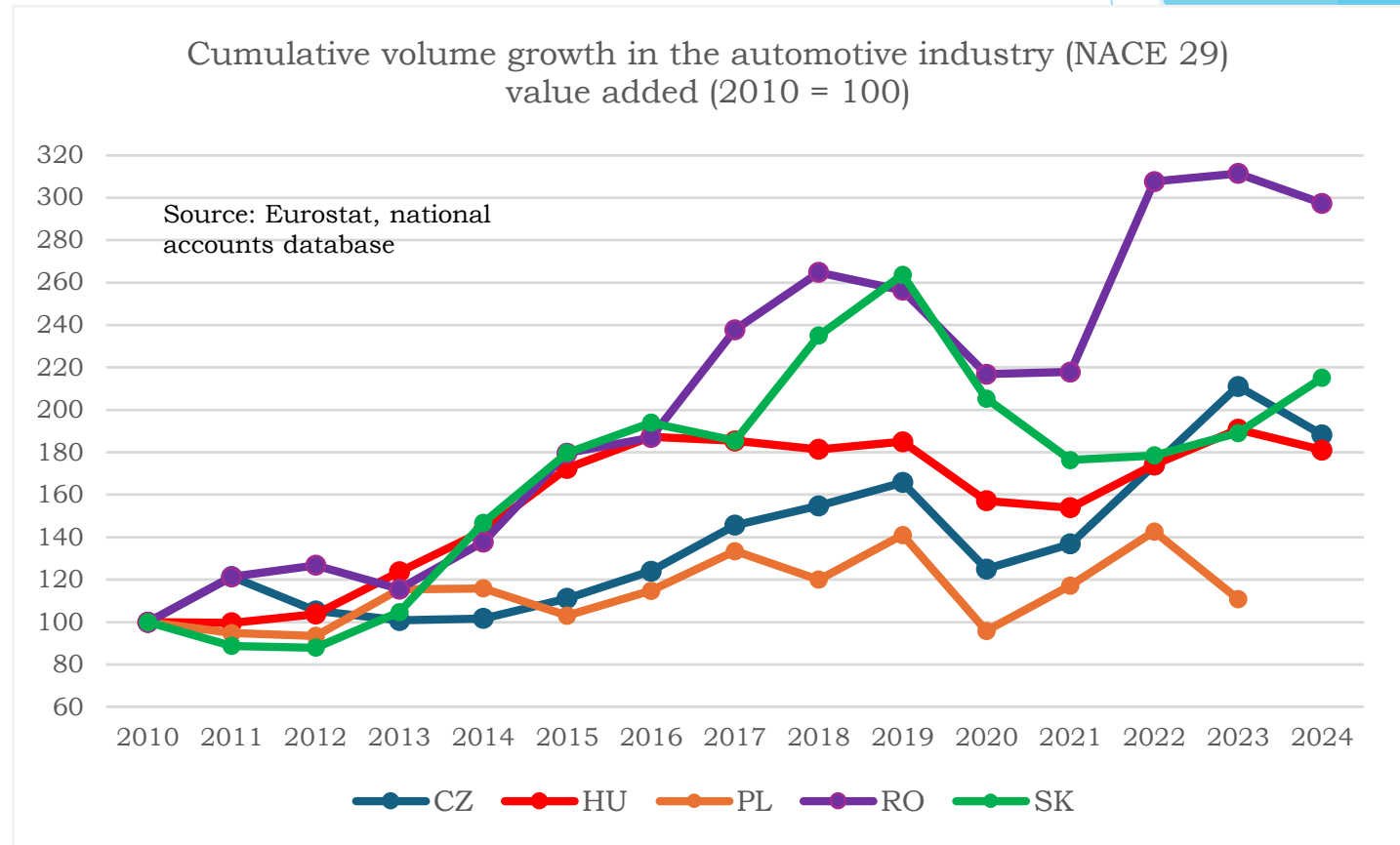
The Size and Composition of Automotive Industry Capacity in Central and Eastern European Countries

The auto industry share in GDP is outstanding in most CEE countries compared to other EU countries



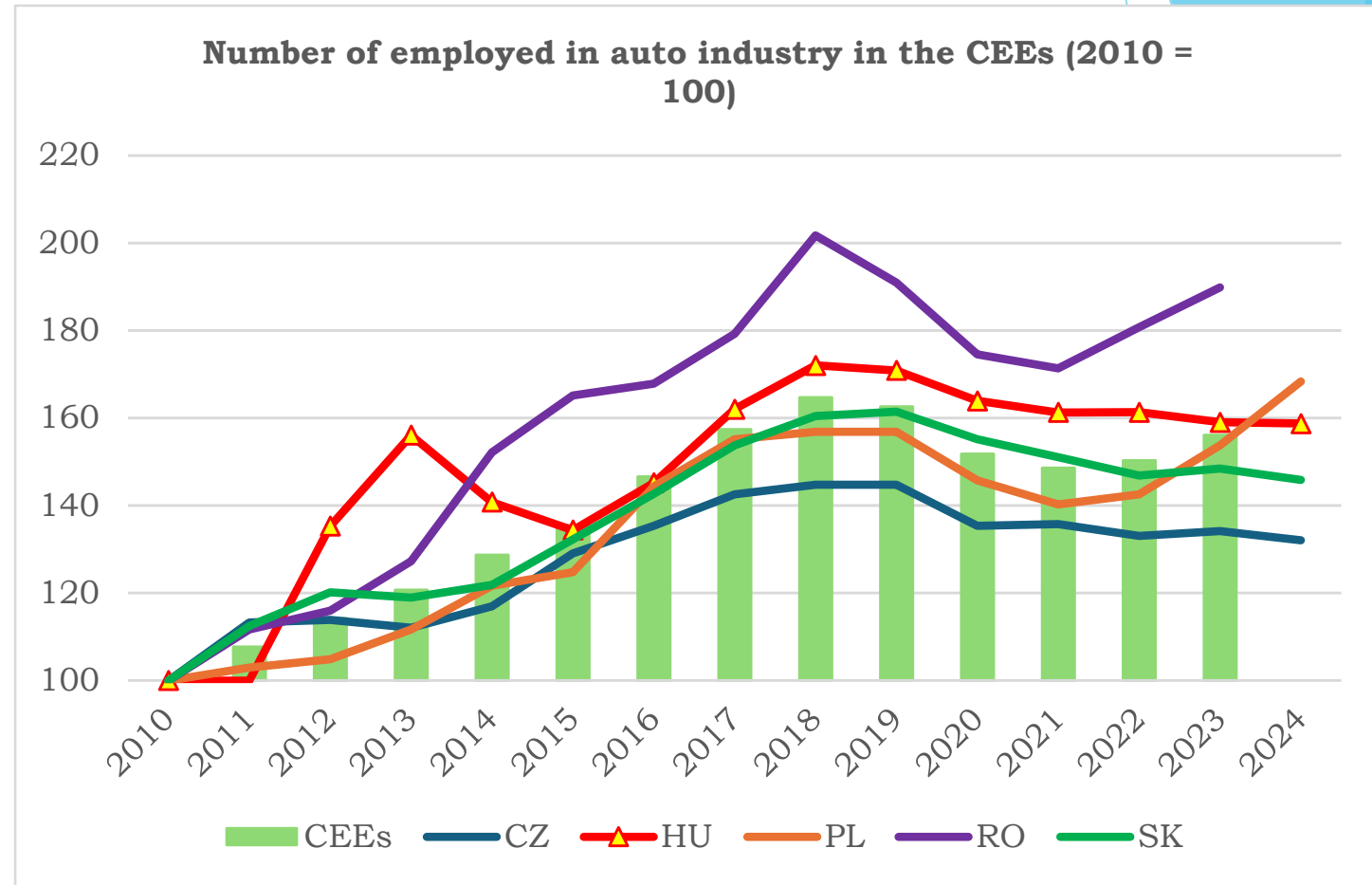
Varying real growth rates:

- ▶ Romania achieved the steepest and longest **value added growth**.
- ▶ Virtually no growth in Poland
- ▶ Substantial cumulative growth in the three other countries, with very different trajectories:
 - the Hungarian auto sector stopped growing after 2016;
 - Slovakia skyrocketed until 2019 then could not recover from the Covid shock
 - the Czech auto sector grew slowly but kept overcoming the temporary interruptions

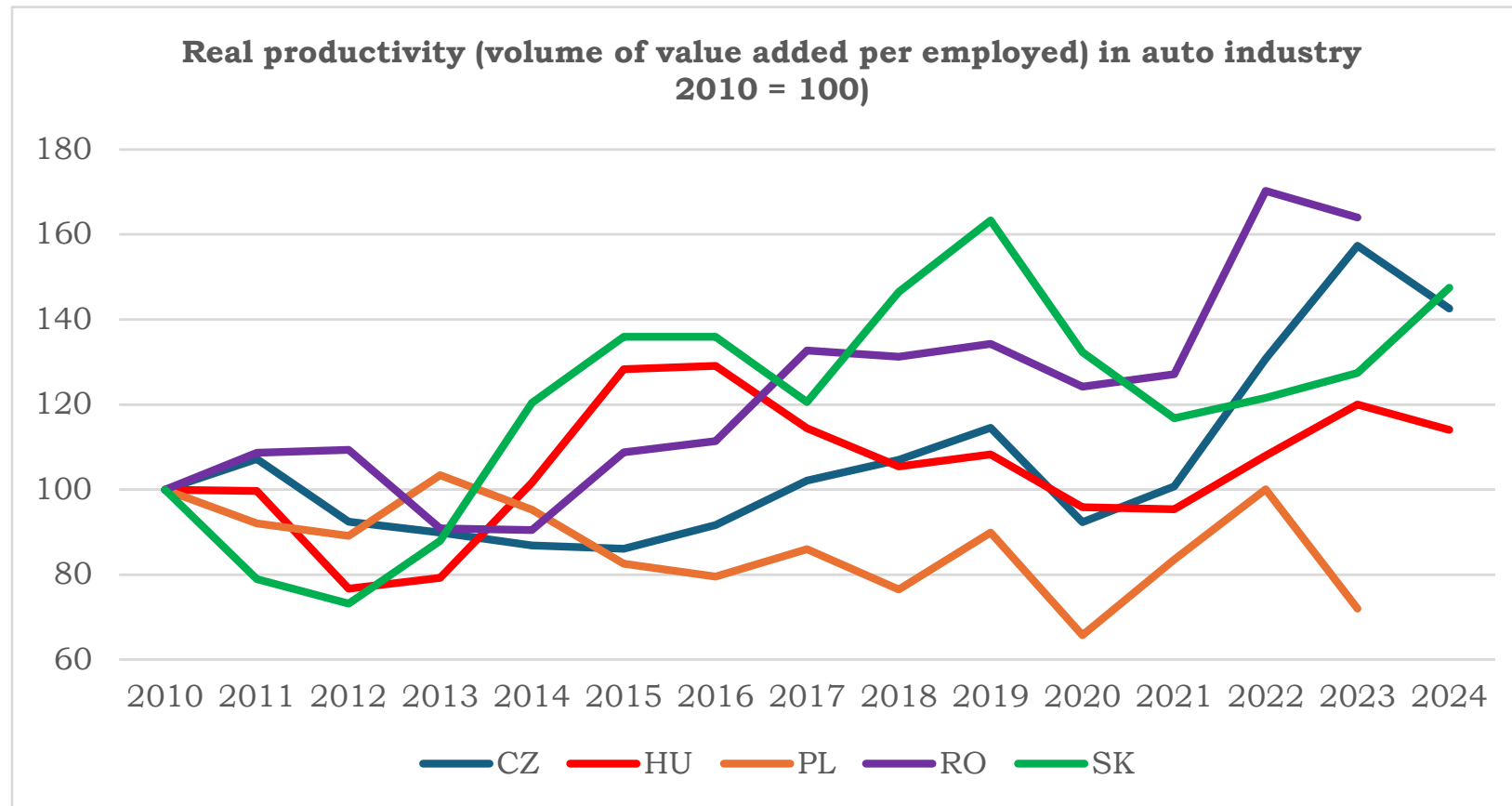


Employment in the auto industry

- Employment also grew substantially in the CEE auto sectors
- But this growth was much less steep than real value added growth in Czechia, Romania and Slovakia.
- It was also somewhat less steep in Hungary.
- The exception is Poland.

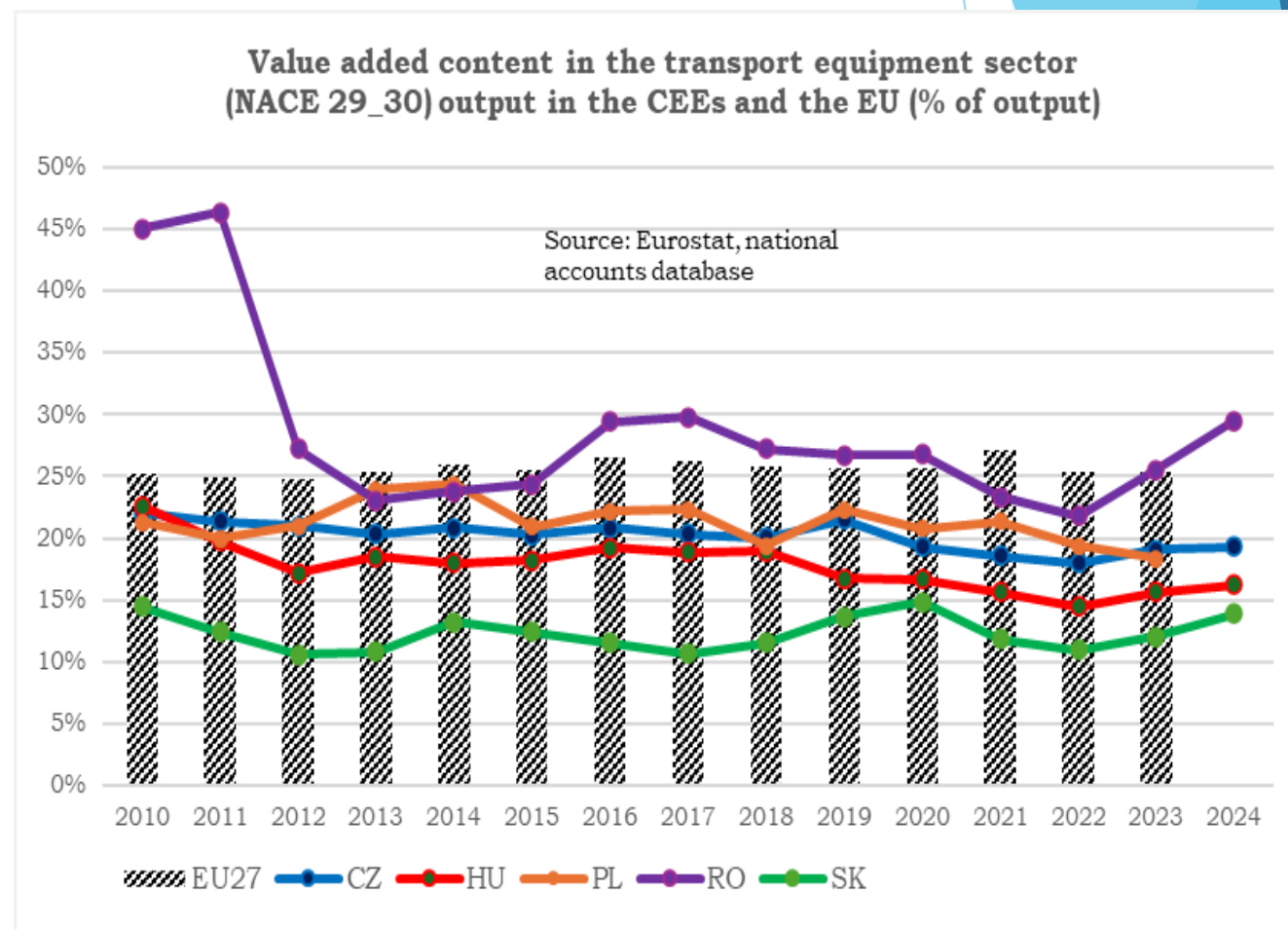


As a result: sizeable labor productivity growth in three countries: modest productivity growth in Hungary
productivity decrease in Poland



Main structural challenge

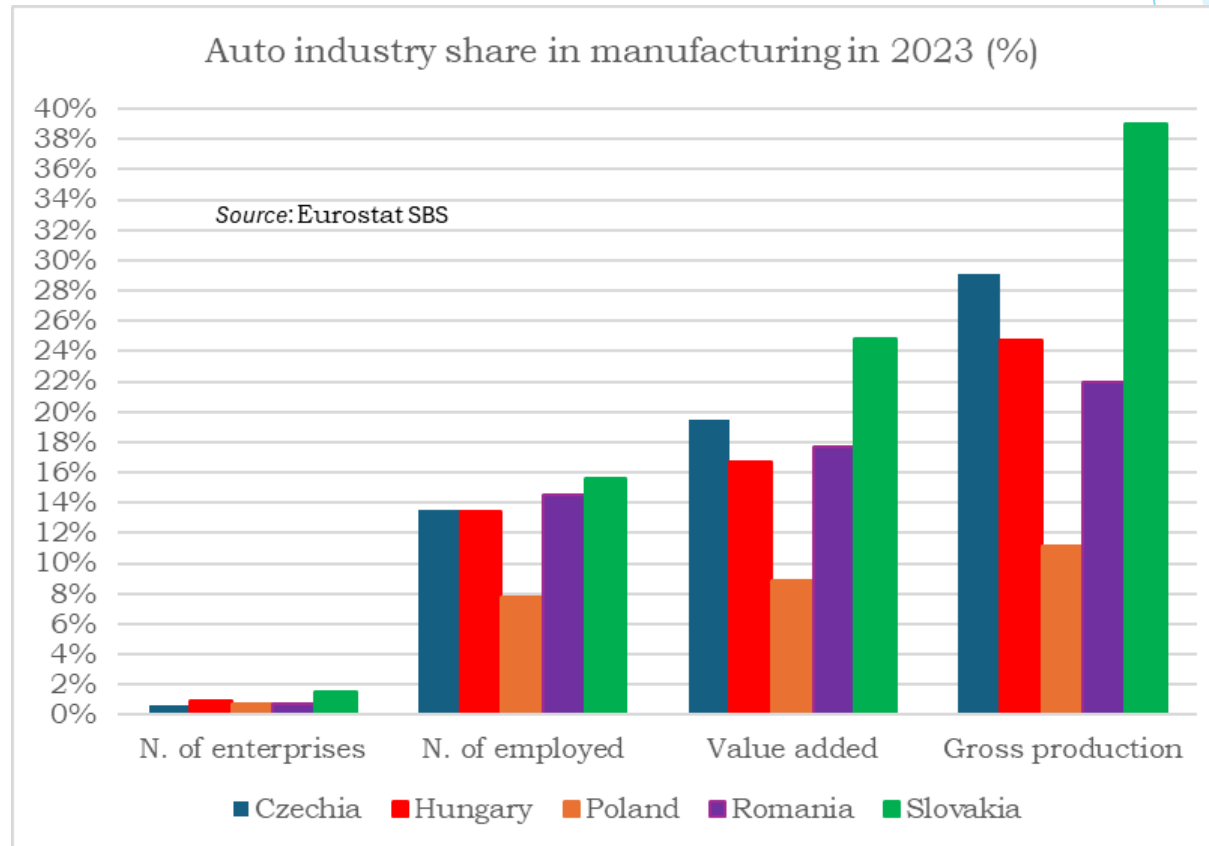
- ▶ The value added content of output in the transport equipment sector is lower than the EU average in the CEE countries,
- ▶ with the exception of Romania.
- ▶ ALSO
- ▶ The respective gaps between the EU and the CEEs **widened between 2010 and 2023**.
- ▶ The CEEs are stuck in the in the **lower segment of the „smile curve”**.



The motor vehicle sector is a crucial part of manufacturing—except in terms of the number of companies

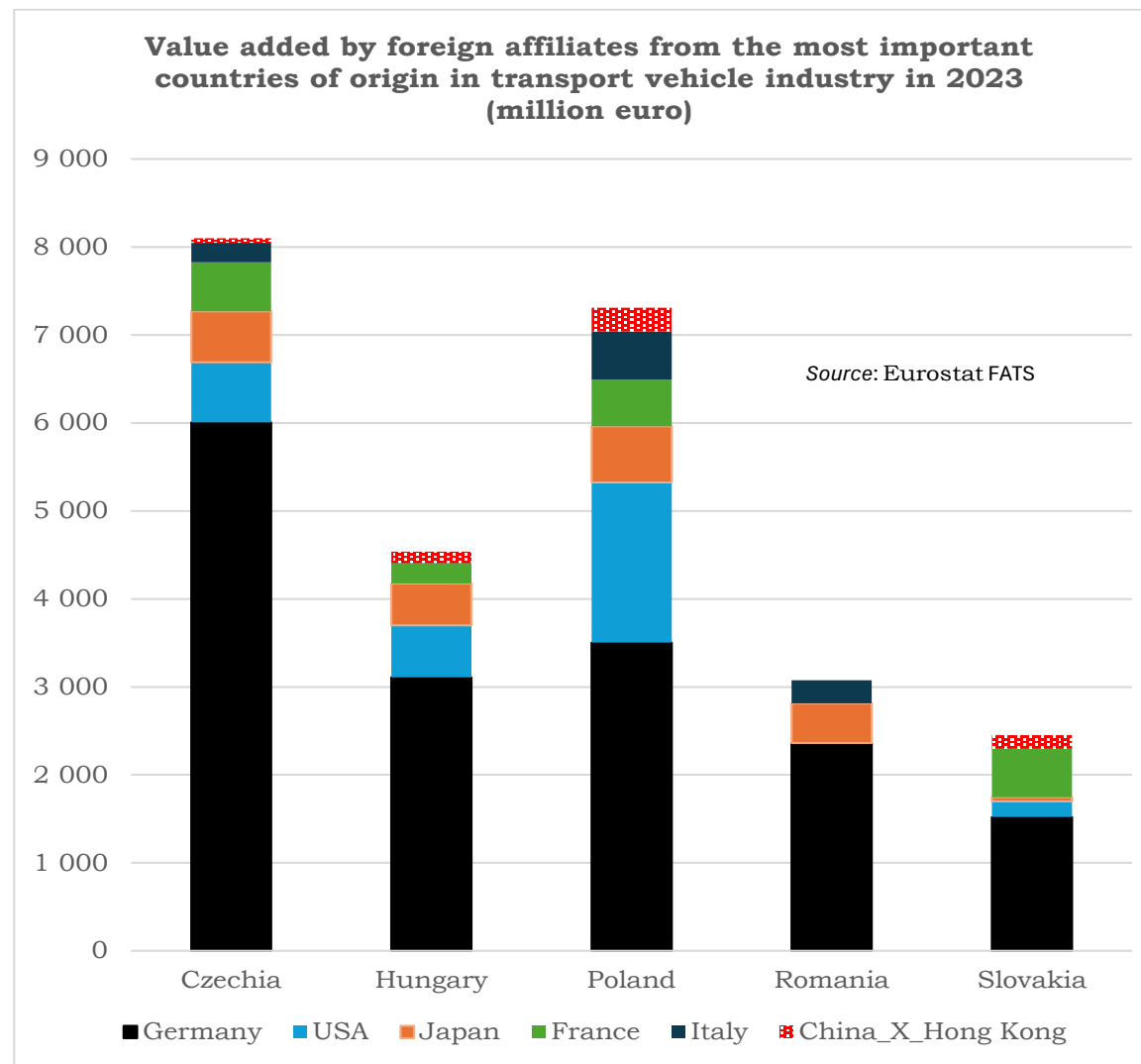
The auto industry is dominated by large firms to an unusual degree.

The numerical share of large firms within motor vehicle industry is outstanding among the EU member states in Czechia, Hungary and Romania.



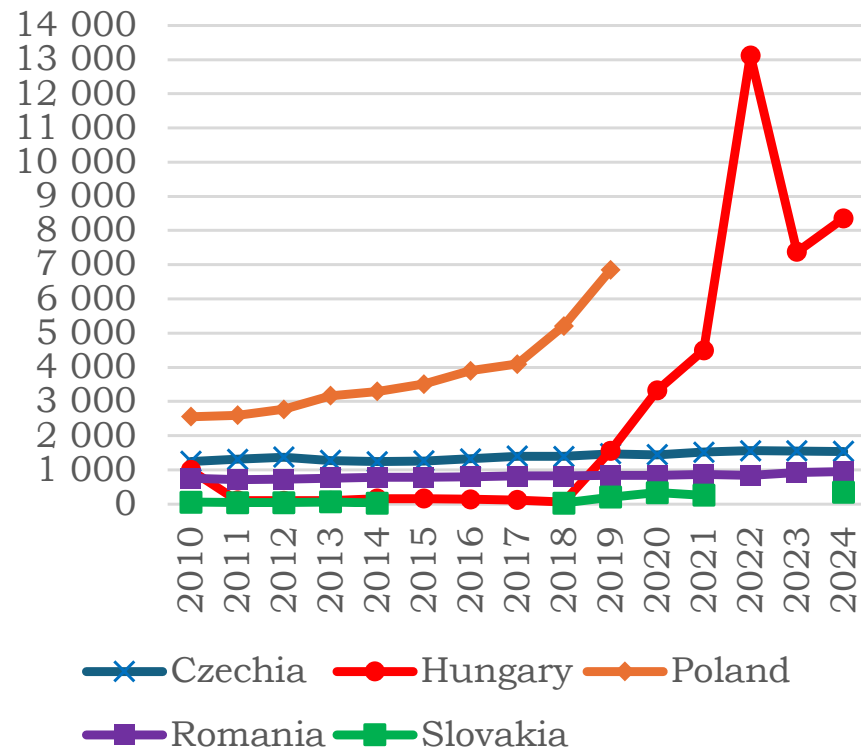
Germany was still the dominant origin country for foreign-controlled auto industry firms in 2023

- ▶ Other important countries were: the US, France, Japan, Italy.
- ▶ Chinese subsidiaries emerged as a segment to be reckoned with in Hungary, Poland and Slovakia.
- ▶ But up to 2023, they did not disrupt the leading role of Germany and other big „Western” economies as origin countries for foreign-owned companies.

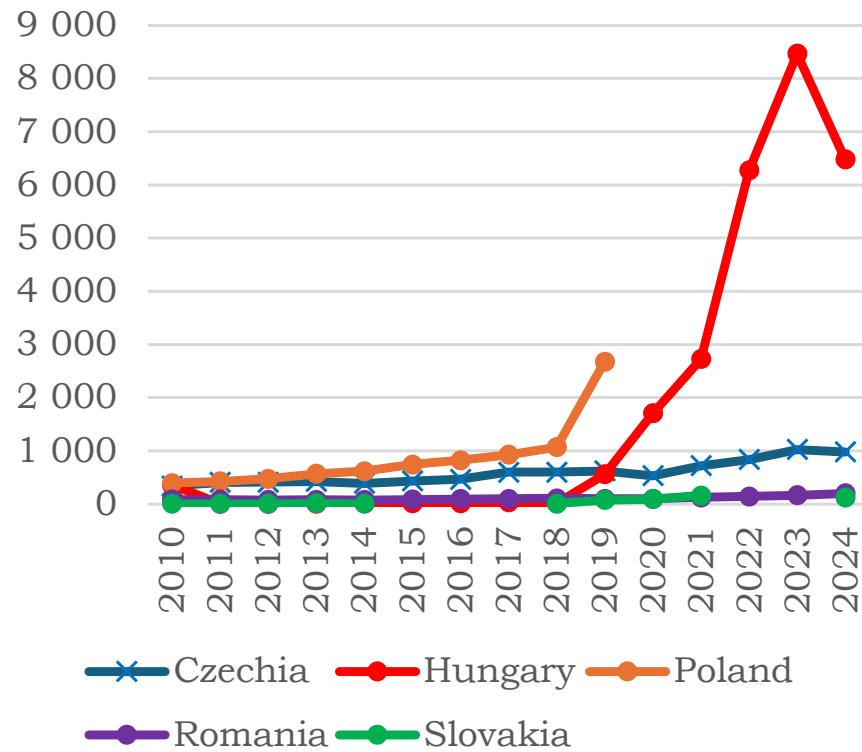


The battery manufacturing sector took off only in Hungary and Poland

Number of employed in battery industry in the CEEs



Turnover in battery industry in the CEEs (million EUR)



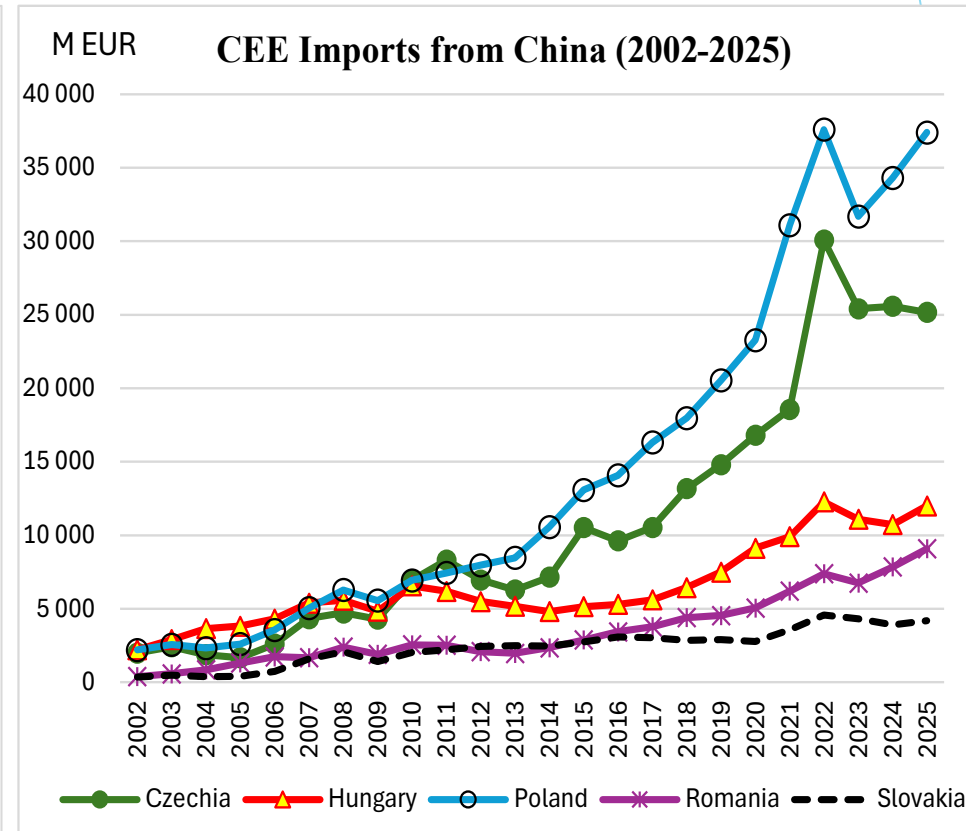
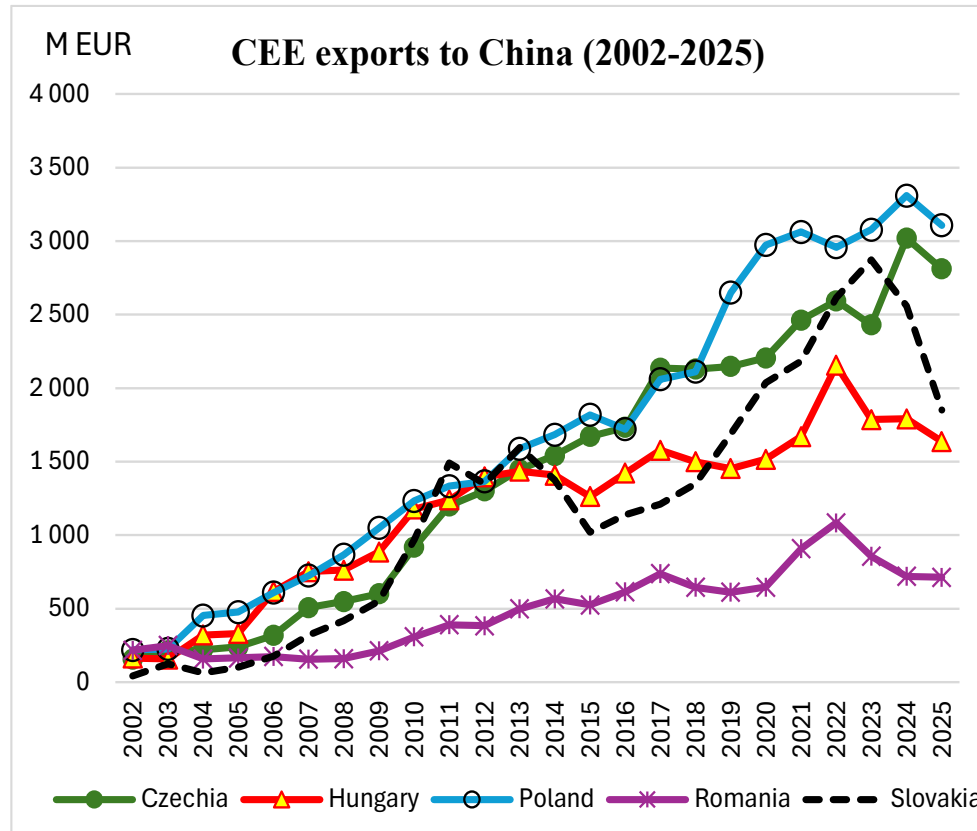


Chapter 2

Trade in automotive and related products between China and CEE

Global trade development between China and CEE

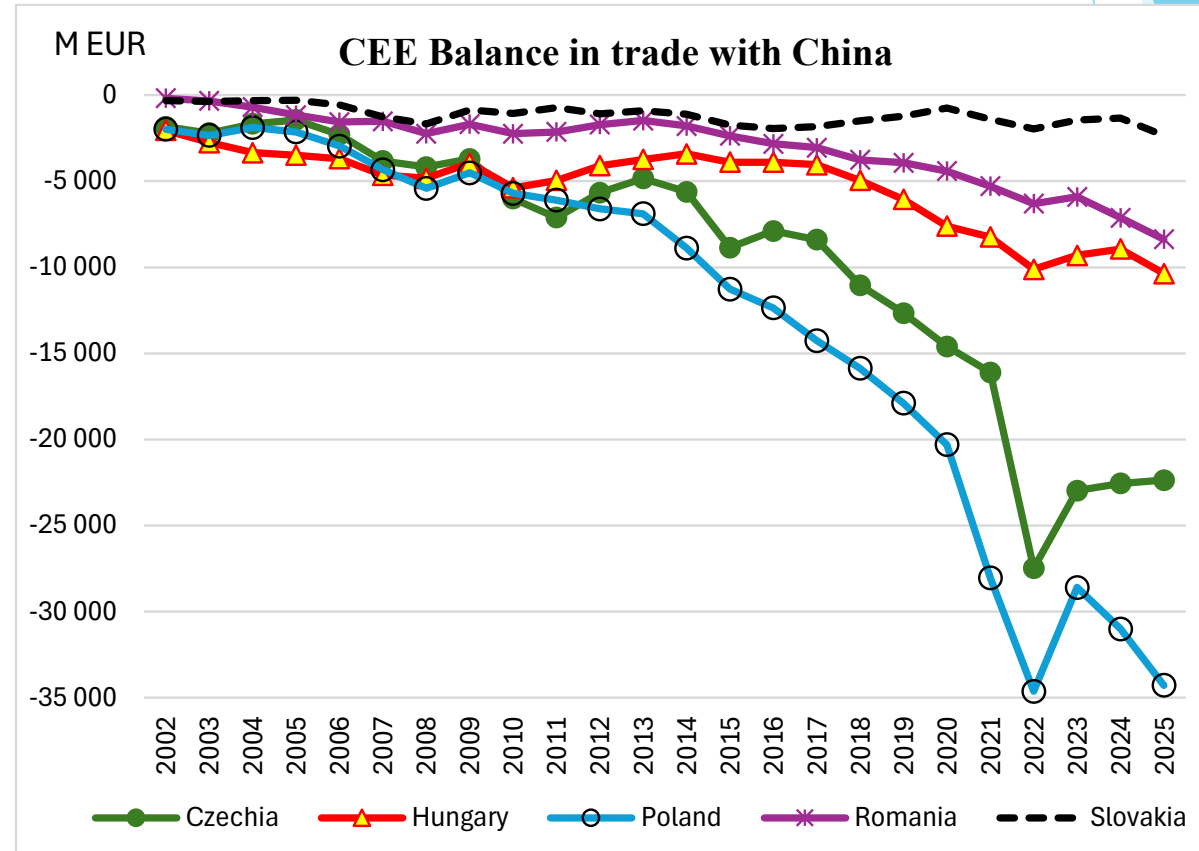
Trade between China and CEE has grown dynamically since the 2010s



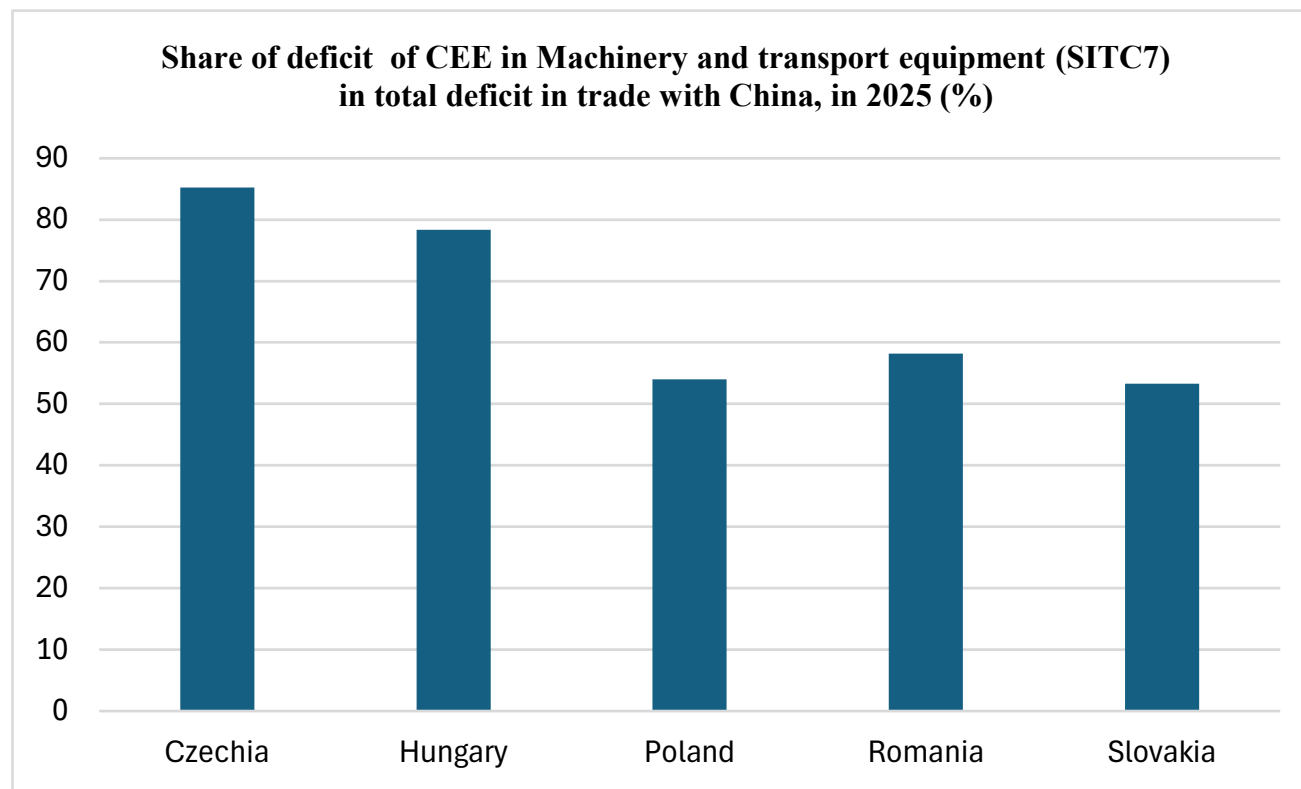
However, there are significant differences between CEE countries

Growing imbalances in China-CEE trade

Due to differences in the size and dynamics of imports and exports, trade between CEE countries and China is characterized by a growing deficit, albeit to varying degrees in individual CEE countries

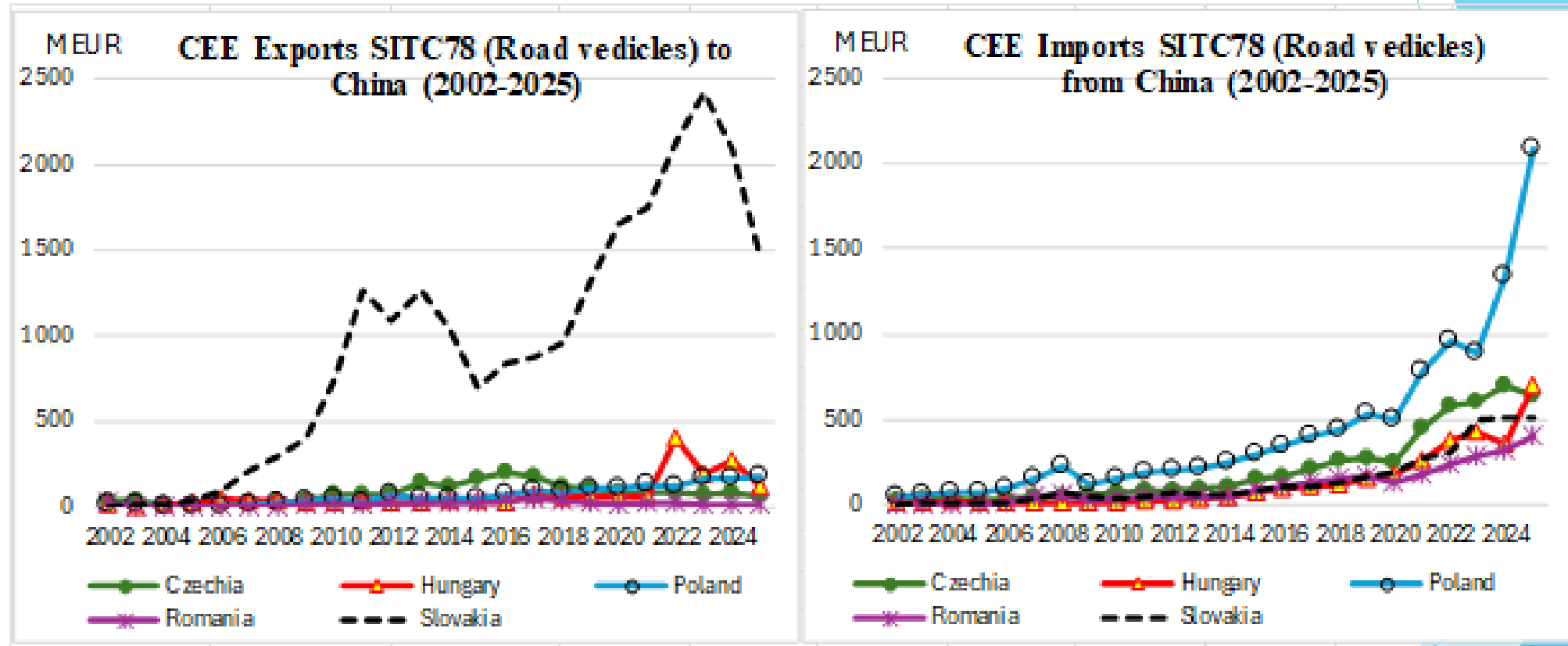


Trade balance in Machinery and transport equipment (SITC7)



The "Machinery and equipment" product group (SITC 7) plays a decisive role in CEE's **trade deficit** with China: 85% of the Czech Republic, 78% of Hungary and 50-60 % of Poland, Romania and Slovakia.

Trade in Road vehicles (SITC78)



Road vehicles (SITC78) play a minor role in exports of CEE to China, except for Slovakia. Their share in imports of CEE has been dynamically growing since 2020 with significant differences between CEE countries

Some preliminary conclusions

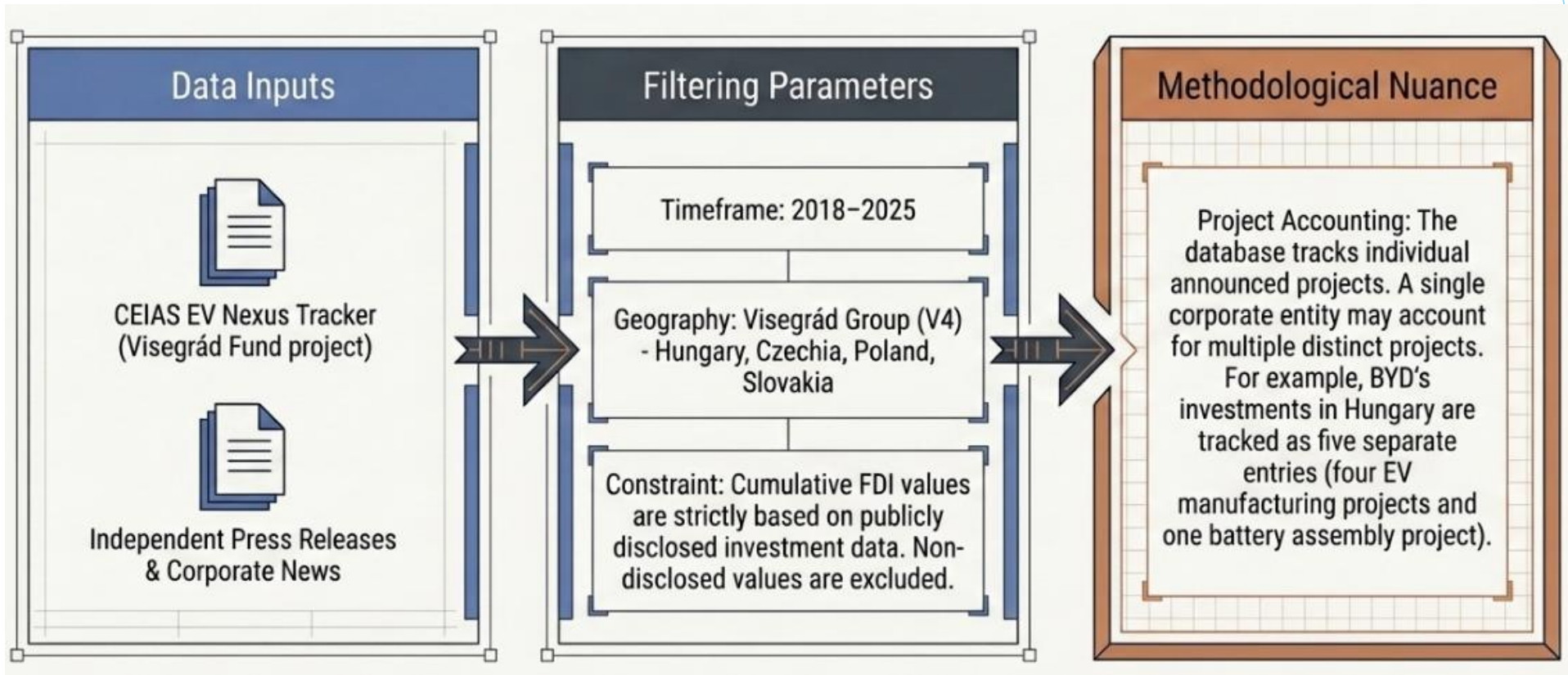
- ▶ The development of trade between CEE and China has been controversial in recent decades. Imports of CEE from China have grown much more rapidly than their exports to China. CEE's trade balance with China has deteriorated considerably, particularly that of Poland and the Czechia.
- ▶ The deterioration in the trade balance is primarily evident in trade in the machinery and transport equipment category (SITC7) and, within this, in Road vehicles (SITC78).
- ▶ The only exception is Slovakia, where exports of road vehicles have risen to a relatively significant level, while imports have remained modest.
- ▶ CEE exports are greatly hampered by the disparity in size between China and CEE countries. Small CEE countries are typically unable to generate the volume of exports required by the Chinese market. It should be noted that the above analysis captures only **direct** export-import trade, while CEE countries are integrated into global production chains at numerous points. Consequently, **indirect exports** – through integration into the production chains of major European exporting countries – play a greater role, which will be addressed in Chapter 4.



Chapter 3

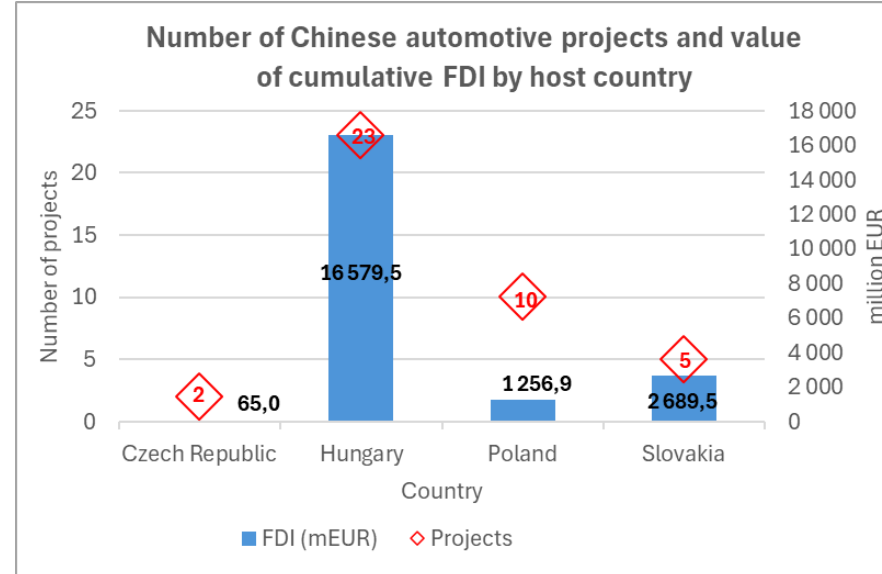
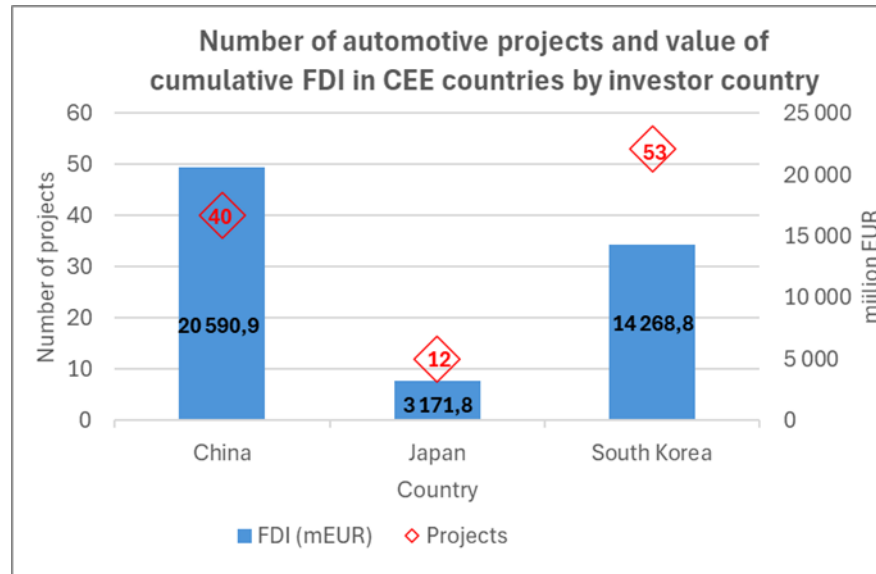
The State of Chinese Investment in the Central and Eastern European (V4) Electric Vehicle and Battery Industry

Empirical Foundation: Tracking East Asian FDI in the V4



- The data presented is based on the CEIAS EV Nexus Tracker database (<https://evnexustracker.ceias.eu/map/49>), which was created within the framework of the Visegrad Fund project
- Cumulative Foreign Direct Investment (FDI) values include publicly disclosed investment data from the 2018-2025 period

East Asian EV and Battery Investments in the V4 Region



- Between 2018 and 2025, total East Asian (Chinese, South Korean, and Japanese) investments in the V4 countries exceeded EUR 38 billion.
- China leads this competition significantly with 40 projects valued at approximately EUR 20.6 billion, well ahead of South Korea and Japan.
- Chinese investments in the electric vehicle and battery sectors, which designate Hungary as their primary regional target, encompass 23 projects with a total value of approximately EUR 16.6 billion, driven by major industry leaders such as CATL, BYD, Semcorp, and EVE Power

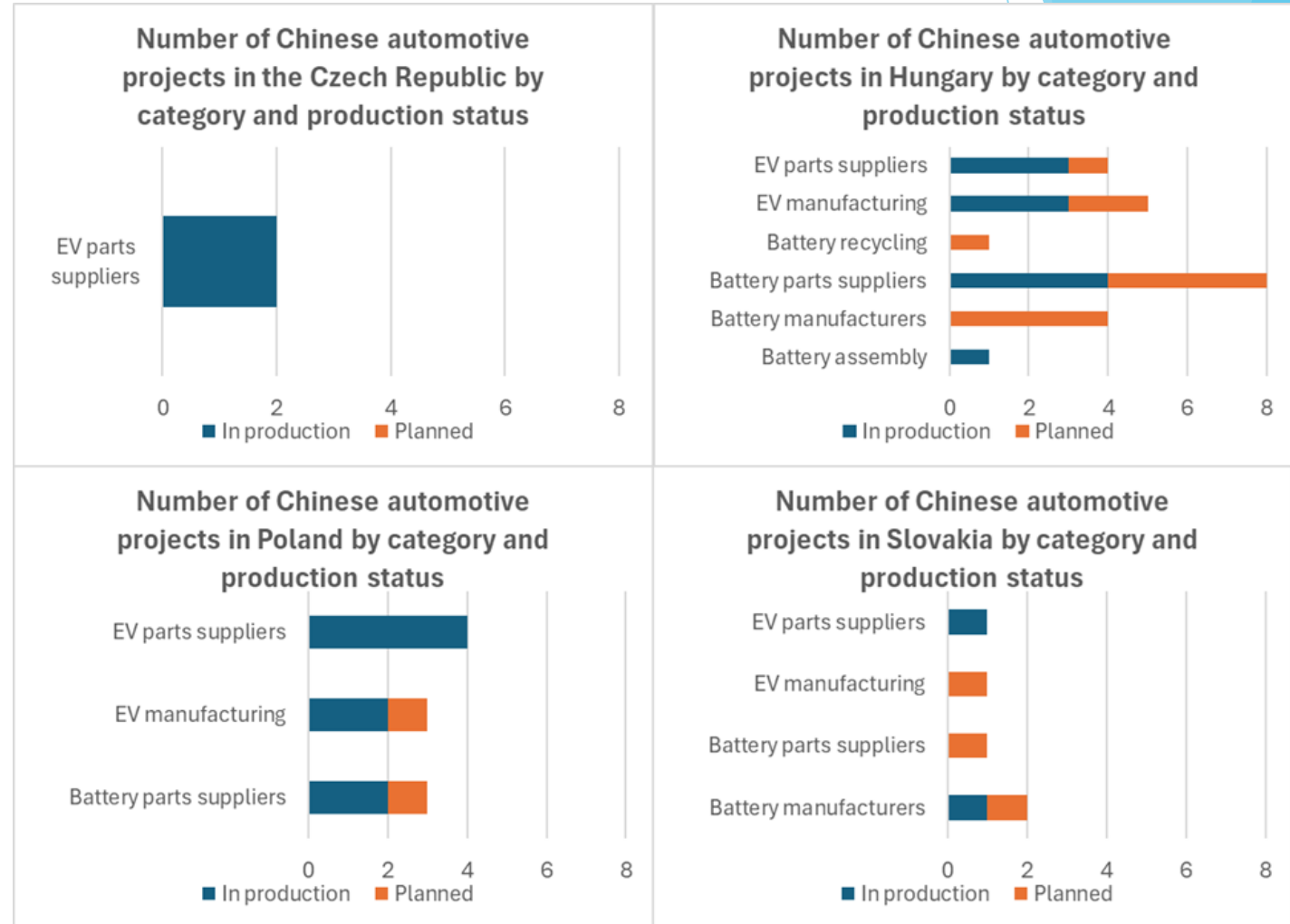
Hungary as the Primary Destination for Chinese FDI

	Hungary	Rest of V4 (Czechia, Poland, Slovakia)
Capital Share	Captures the overwhelming majority of Chinese EV/Battery mega-projects.	Captures only a fraction of the total deal flow.
Macroeconomic Policy	Highly open, aggressive FDI attraction strategy.	General, cautious, EU-aligned approach.
State Incentives	Exceptionally generous state subsidy and incentive packages.	Standardized, conservative incentive structures.
Structural Enablers	Favorable logistics positioning and existing deep automotive industry clusters.	Established auto clusters but higher regulatory hesitation.

- Among the V4 countries, Hungary is the primary target for China, hosting the vast majority of the examined Chinese projects
- This is driven by Hungary's favorable logistical location, existing automotive clusters, and a highly open economic policy with generous state incentives, unlike the more cautious approach of Czechia, Poland, and Slovakia

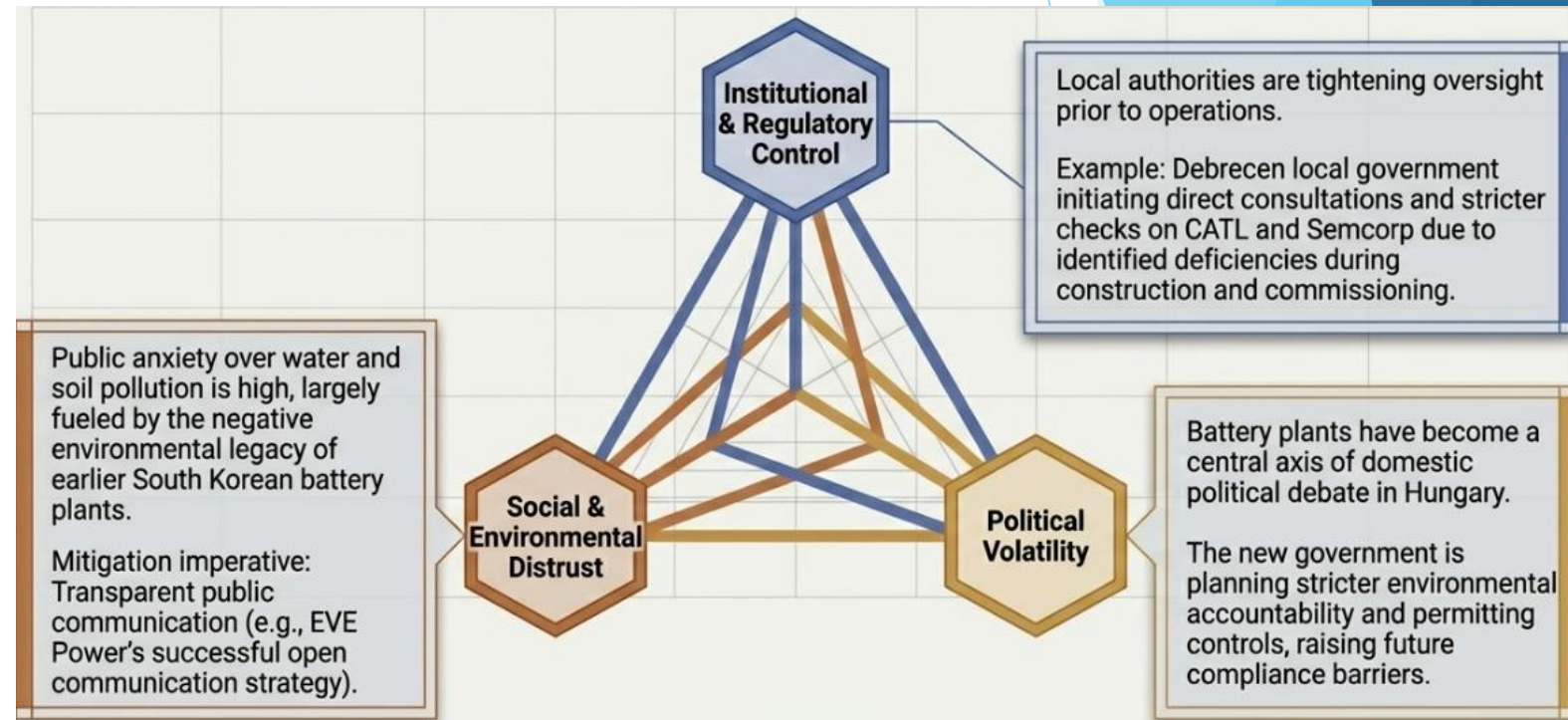
Current Implementation Status of Projects

- Despite the massive volume of announced Chinese investments, a significant portion of these projects are still in the preparatory phase
- Most battery industry projects, especially in Hungary, are currently in the planning, permitting, or construction stages, right before the start of serial production



New Political Mindset - Future Prospects & Risks

- Local authorities are tightening inspections and initiating direct consultations with investors due to identified shortcomings during the construction phase
- Public distrust and environmental concerns (such as soil and water pollution) pose significant hurdles, making transparent public communication essential for investors
- Political dimension: Battery factories have become central to domestic political debates in Hungary, which may lead to stricter environmental accountability and complicate future permitting processes
- Value chain weaknesses: To avoid the "semi-peripheral trap" of low value-added assembly, there will be increasing pressure to integrate research and development (R&D) activities and technology transfer into the region



Some preliminary conclusions

- Long-term success requires successful integration into the local economy and society, strict compliance with European regulatory standards, and the active development of local supplier bases and knowledge-intensive functions

Beyond Volume: Pure capacity expansion is no longer sufficient to guarantee success.

Regulatory Alignment: Strict, proactive adherence to evolving European and local regulatory standards.

Social Embedding: Proactive, transparent communication to secure the local social license to operate.

Knowledge Upgrading: Transitioning operations to include local supply chains and knowledge-intensive functions (R&D) to anchor long-term economic mutual benefit.



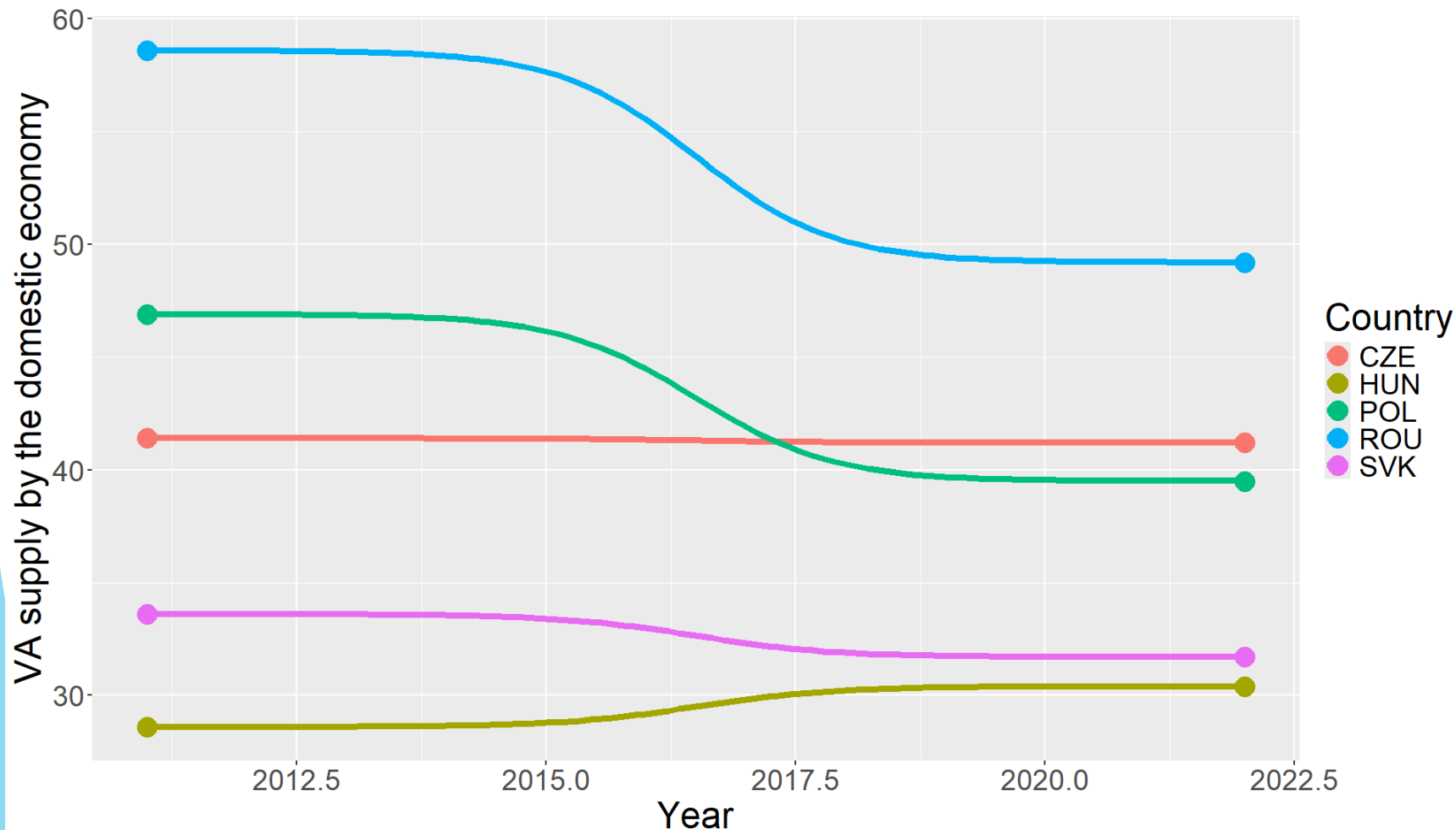
Chapter 4

Economic Ties Between Hungary and China and the Transformation of the Automotive Industry Value Chain (GVC)

The CEE automotive development

- ▶ Competitiveness trap: historical low-cost assembly model is getting exhausted.
 - ▶ 1990s: rapid FDI influx of European OEMs, cost arbitrage due to low labour and production costs
 - ▶ 2010s: deeply embedded automotive industry in CEE, rise of protectionism, emergence of industry 4.0
 - ▶ Today: low-cost strategy is not viable anymore, rising costs, labour shortage
- ▶ Despite expanding production volumes, domestic value-added is shrinking.
- ▶ Transition to EVs has accelerated a massive reliance on electronics industry, transferring supply chain dominance from Germany to China

VA supply by domestic economy to the automotive industry (C29)



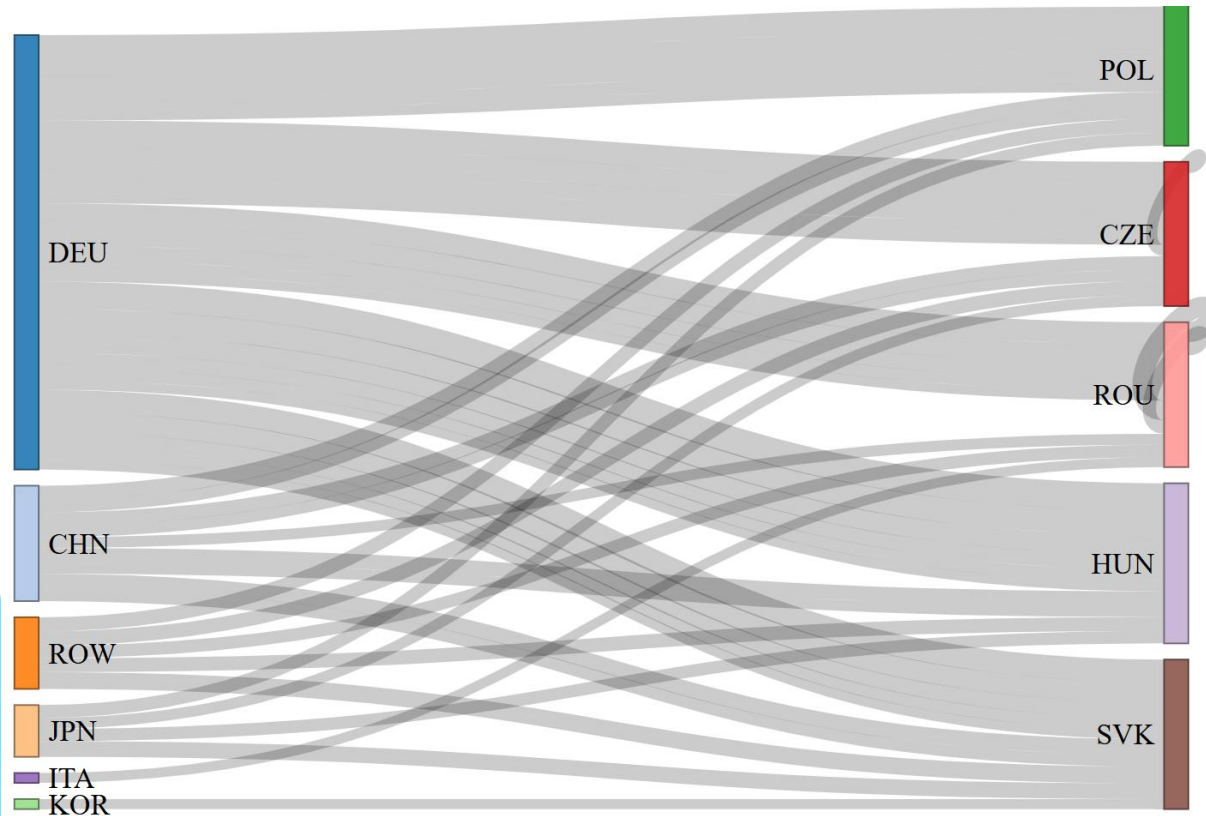
- ▶ Instead of deeper local integration OEMs maintain import-reliant supply network.
- ▶ Wholesale trade often captures more VA than actual manufacturing sectors: system built for profit repatriation rather than industrial integration

The EV revolution

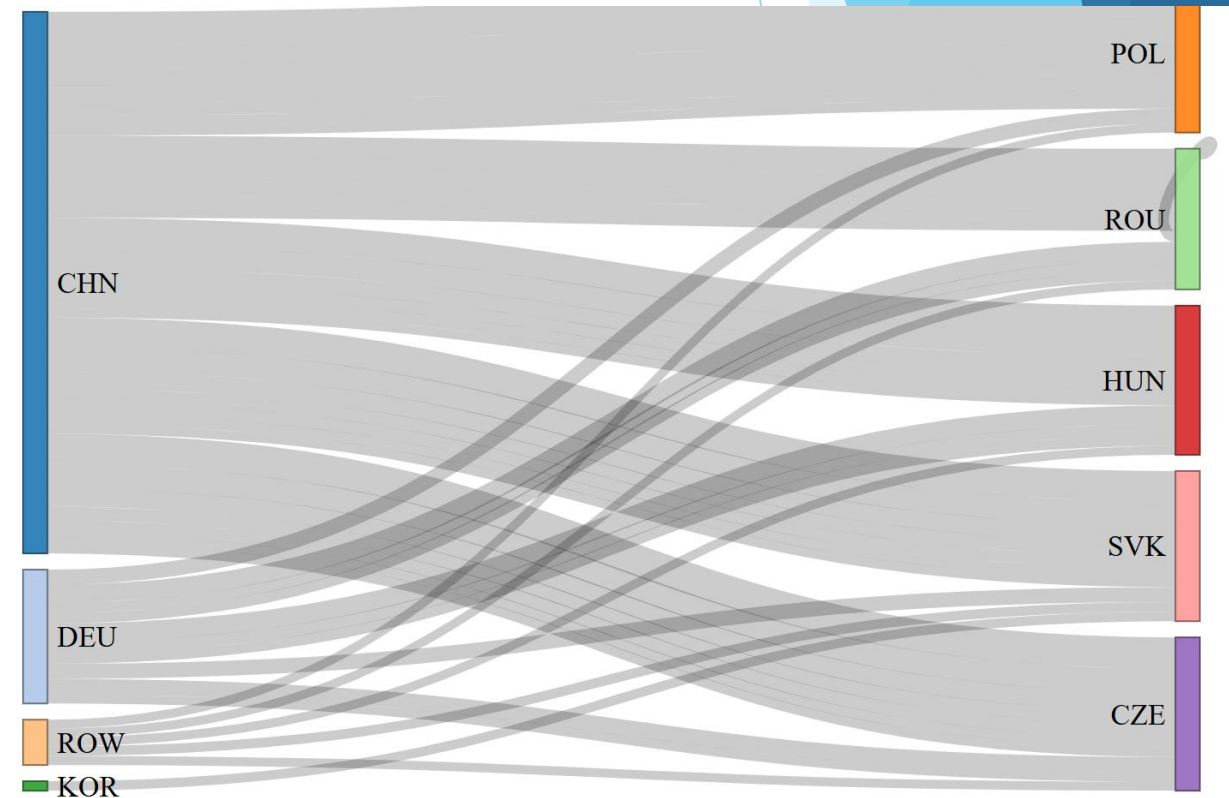
- ▶ Current supply chain is built on legacy components of classical mechanical cars - highly integrated into the CEE supply chains:
 - ▶ Combustion engines (AUDI)
 - ▶ Transmission and Gearboxes (Bosch)
 - ▶ Fittings, mechanical mounts (Continental)
- ▶ While EVs rely more on - (currently) lack of production capacities:
 - ▶ Electric batteries
 - ▶ Electronic data components
 - ▶ AI and sensor systems
 - ▶ These components account half of the production value

Massive changes in the electronic supply chain

2011



2022





Chapter 5

China and the R&D activities of the automotive and related industries in the CEE countries

History in a nutshell

- The automotive R&D system of both China and the CEE countries were primarily formed as a result of investments by multinational corporations.
- Even today, the economies of the CEE countries mainly specialize in manufacturing functions in global value chains.
- As a result, the dominant R&D types in the region are **production process development, product adaptation, testing and validation, and engineering support.**
- True "core" innovation typically takes place at the headquarters of companies. The CEE automotive R&D system is closely related to the Western European, especially the German, automotive industry.
- In China, the breakthrough came from the industrial policy programs announced by the government, especially the **"Made in China 2025" strategy**, indicating the automotive industry as one of the key development sectors.
- During the implementation of this strategy, the state has promoted the development of R&D in the automotive industry by a number of tools. E.g. direct R&D subsidies, tax incentives, support for the purchase of electric vehicles and financing of national innovation programs.

The main characteristics of R&D activities of the Chinese automotive industry

- One of the most important competitive advantages of the Chinese automotive industry stems from **rapid innovation**. Compared to traditional conglomerates, Chinese companies use much shorter development cycles and introduce new technologies more quickly.
- Chinese automakers are increasingly establishing **global R&D centers** to localize design and engineering.
- The Chinese R&D network heavily prioritizes electric vehicle (EV) technologies, autonomous driving, intelligent cockpit systems, and AI, aiming to leapfrog traditional ICE (Internal Combustion Engine) capabilities.
- The global network is supported by a **robust domestic innovation system** creating a "China Inside" ecosystem which can serve as a stable foundation for conquering the global market.
- **Moving beyond just exporting vehicles**, Chinese firms are investing in local engineering, design, and after-sales service centers to improve brand perception and meet local regulations.
- The shift toward smart, connected, and electric vehicles has allowed Chinese firms to leverage their domestic expertise in software and AI, **transforming the industry from low-cost manufacturing to high-value R&D**.

Present state of China-CEE automotive R&D relations

- Currently, R&D relations in automotive industries between China and CEE are of limited depth, but they are developing rapidly and are primarily based on **application-oriented** cooperation related to investments in the EV and battery industry.
- China-CEE automotive industry R&D relations did not basically start from independent research centers, but **appear** as an accompanying phenomenon of battery factories, EV production and supplier investments, **as a "by-product" of the production presence.**
- **In CEE** Chinese companies usually do not conduct basic research, **but engineering and applied R&D related to production.** Their typical areas are battery life optimization and recycling as well as the adaptation of production processes to EU standards.
- Regarding cooperation with universities, **target-oriented engineering and other professional training dominates** for the Chinese companies operating in the region. Their joint research activities are characterized by application-oriented cooperation. Research related to product development is still not taking place in CEE, but in China or Western Europe.

Present state of China-CEE automotive R&D relations (Cont.)

- In May 2025, BYD officially announced moving its European headquarters from the Netherlands to Budapest and establish a major European R&D base with three core functions:
 - European sales and after-sales management
 - Vehicle testing and homologation/certification
 - Localized model development and engineering for European customersUnfortunately, **as of May 2026 there is still relatively little public detail about this project.**
- China-CEE automotive R&D relations are not bilateral, but can be interpreted as **part of global value chain integration**. It is particularly important that Chinese investments are often linked to Western European car manufacturers having producing units in the region. This means that **China-CEE R&D relations are often realized indirectly** through the supplier network of Western European car manufacturers.
- Regarding the technical-scientific cooperation with China, it is important to emphasize that its management is not primarily carried out at central level, but at regional level. China's industrial policy is decentralized: **many key automotive cooperations are not coordinated by the central government, but by provincial governments and companies**. For this purpose, the China-CEEC Technology Transfer Virtual Center was established in Nanjing, for example.
(<https://cceec.tech/en/about.aspx?ac=1>)



Encouraging signs for the future

- Chinese investments play an increasingly important role in **stimulating Industry 4.0 adaptation** in the CEE region. The high automation level of Chinese manufacturing plants **serves as a benchmark for local partners**, and Chinese companies often support their suppliers with training programs, technological consulting, and engineering cooperation.
- Chinese companies with interests in CEE countries launch various training programs, cooperate with local universities, and **contribute to the development of their employees' digital skills** and other up-to-date knowledge.
- Chinese companies are increasingly cooperating with local universities, which strengthens human capital, supports applied research and promotes innovation.
- In the framework of the cooperation between China and the CEE countries, more and more **joint research projects, university partnerships, and mutual receptions of professors and students** are realized. On the basis of cooperation between universities, mutual scholarship programs operate and knowledge networks are strengthened.



Chapter 6

The European policy actions aimed at strengthening the competitiveness of the automotive industry – facing challenges from China

Why is a European strategy needed?

- The European automotive industry is a core engine of European prosperity.
- At present it faces an existential crisis due to electrification, digitalization, automation, and geopolitical pressures.
- It faces severe competition challenges, supply chain risks and dependencies on raw materials and battery imports, employment restructuring,
- It faces a loss of market share to Chinese and U.S. manufacturers, and dependency on Asian battery suppliers.
- Uncertain global environment: the conflict in the Middle East, the threat of an energy crisis, supply constraints due to the blocking of the Strait of Hormuz reviving inflation can sharpen competition problems of Europe, especially if the conflict with Iran exaggerates.
- Under these circumstances as well as a common European EV strategy as well as national EV strategies are of outstanding importance in the EEC region.

First steps of implementation of the common strategy

- A first step in this direction is the *Industrial Action plan for the European automotive sector* based on **five pillars**.
 - *Innovation and digitalisation*
 - *Clean mobility*
 - *Competitiveness and Supply Chain Resilience*
 - *Skills and Social Dimension*
 - *Boosting Market Access, ensuring a Level Playing Field, and Guaranteeing Economic Security*
- The „**Fit for 55**” programme launched in 2023, is a package of EU climate and energy policies aiming to help to achieve the **European Green Deals** goal of slashing net emissions by 55% by 2030, relative to 1990 levels.
- This target is a pace-setting milestone ahead of EU member states commitment to achieve **climate-neutrality** (net-zero emissions) by 2050. At the same time, it tries to **protect automotive industry** against the global competition.

National support measures to improve access to electric vehicles

- National governments implement different ways of supports and subsidies to make them more attractive for the population:
 - In some countries the purchase of electric vehicles is directly supported like in Germany or Poland.
 - in other countries the improvement of the related infrastructure and different tax reliefs are used.
- **Poland:** NaszEauto programme: direct subsidy program and infrastructure expansion.
- **Czechia:** financial support and subsidies, tax and regulatory incentives, charging infrastructure development.
- **Slovakia:** no specific support for the purchase of e-cars, however, owners of an electric car enjoy tax benefits.
- **Hungary:** the purchase of electric cars focuses in main line on enterprises. Supports from the RRF Funds under Programme **RRF-REP-10.10.1-24**.

Environmental impacts of electric vehicles – limits of implementing the EU strategy

- The environmental impact of electric cars is a complex issue that covers the entire life cycle of the vehicle, from manufacturing to recycling.
- Although their local emissions are zero, their global ecological footprint is influenced by several factors.
- Clean energy and clean industrialisation are political and economic priorities of the European Union. However, the transportation costs for imported clean energy (in the form of electricity or hydrogen) are much higher than for fossil fuels.
- An alternative way to fuel Europe's clean industrial sector would be to import energy-intensive primary tradeable products such as ammonia, methanol and reduced iron. The import of these products is cheaper than to import energy directly. Recycling of electric car batteries is also a key issue from the point of creating a circular economy.
- Thus, the strengthening Europe's own battery industry is of strategic importance, with a transparent recycling policy

Employment effects of the increased use of electric vehicles for the automotive industry

- In most analysis concerning the employment effects within the automotive industry, three relevant perspectives may be identified: the *sectoral dimension*, the *regional dimension*, and the *skills dimension*.

Structural shifts:

- *decline* in traditional powertrain jobs (engine machining, exhaust systems, fuel systems) and
- *growth* in battery production, power electronics, and software engineering.

Supply-chain reconfiguration:

- *fewer suppliers needed* for EVs, but
- *higher value added* in battery cell/pack production and electronics.

Regional concentration:

- EV and battery factories tend to cluster *near existing automotive hubs* (e.g., Hungary's Debrecen, Poland's Silesia, Slovakia's Bratislava region, Czechia's Mladá Boleslav).
- Regional and Supplier-Level Vulnerability

Skill transformation:

- *higher demand* for electrical engineering, digital competencies, automation/robotics, battery chemistry, safety protocols for high-voltage systems.
- labour challenge is not only job quantity, but *qualitative mismatch*.
- IMF, OECD, ETUI researchers stress the importance that without proactive labour market policies, the transition is a risk.

Cooperation challenges between China and the EU

- Impacts of sales of Chinese electric cars on the implementation of the European EV Strategy – conflicts of interests.
- The EU sees China as a partner for cooperation but at the same time as an economic competitor or a strong rival as well.
- Chinese cars have a lot of advantage: they are cheap, and they perform well.
- However, varying duties levied on imported e-cars from China push sale's prices upwards.
- On the market of used cars there is still mistrust surrounding lesser-known Chinese brands.
- The competition on behalf of Chinese producers provides a pressure for technological innovation.
- To offset the punitive tariffs introduced at the end of 2024, Chinese companies began building factories in Europe. A new type of competition.
- The so-called Industrial Accelerator Act is intended to bolster European industry against cheaper imports from Asia. *Made in Europe* requirements are controversial.
- Taken as a whole, the presence of Chinese manufacturers is essential to rapidly achieve the EU's ambitious decarbonization goals, but regulators are already seeking a stricter balance between environmental goals and the protection of European industry in 2026.



Chapter 7

Circular Economy

Circular economy

- Circular economy (CE) is generally defined as an economic system that aims to minimize waste and resource extraction by keeping products, materials, and components in use for as long as possible through reuse, repair, remanufacturing, refurbishment, and recycling.
- The circular economy is an economic system that replaces the "end-of-life" concept with reducing, reusing, recycling, and recovering materials in production, distribution, and consumption processes. In the context of electric vehicles (EVs) and batteries circularity is defined as the creation of closed-loop systems for battery materials and components.
- The objective is to reduce dependence on virgin critical raw materials such as lithium, cobalt, nickel, manganese, and graphite while extending battery life and recovering valuable materials.

Circular economy

- This chapter examines
 - how the circular economy can contribute to the competitiveness in CEE countries to the automotive and battery industries
 - how the CEE countries are moving beyond their traditional role as cost-competitive manufacturing locations
 - how circular economy models and Sino-CEE industrial cooperation can support the circular economy?

The convergence of Chinese investment and CEE industrial capabilities is giving rise to new business models, which create new revenue streams while reducing environmental impact, reinforcing the economic case for circularity:

- Battery-as-a-service (BaaS): extending battery lifecycles through leasing and reuse,
- Mobility as-a-service
- Second-life applications: repurposing EV batteries for grid stabilization.
- Urban mining: recovering valuable materials from end-of-life batteries.

Circular economy

- The shift from internal combustion engines to electric vehicles (EVs) fundamentally alters the material intensity and lifecycle dynamics of automotive production. While Europe faces supply risks due to import dependence, Chinese firms bring established expertise in battery manufacturing, recycling technologies, and integrated value chain management.
- The accelerating electrification of Europe's automotive industry is reshaping value chains around batteries, critical raw materials, and lifecycle management.
- Sino-CEE cooperation is increasingly at the forefront of the transformation, driven by large-scale battery investments.

Circular economy

- The European Union (EU) has proposed Battery Regulation that intends to ensure sustainability for batteries placed on the EU market, developing a robust European battery industry and value chain.
- The chapter reviews key EU policy initiatives (see table)

Year	Policy Name	Content
2019	European Green Deal	• Promotes the transition to electric vehicles, including a focus on sustainable EV battery recycling.
2020	Circular Economy Action Plan	• Supports research and development. • Provides funding for new battery recycling technologies. • Develops standards and guidelines for battery recycling.
2023	European battery regulation	• Makes batteries more sustainable throughout their entire life cycle.

Circular economy

- CEE the rapid deployment of battery gigafactories forms the backbone of emerging circular ecosystems.
- The focus of recent Chinese investment in Europe has shifted to the field of electric vehicles.
- Sino-CEE cooperation is central to this shift, providing capital, technology, and ecosystem integration.
- The largest investment is Contemporary Amperex Technology Co. Limited's (CATL) battery factory in Hungary.

	Operating battery factories	Planned battery factories
Czechia	MES, HE3DA, A123 Systems	Volkswagen Group (Skoda)
Hungary	CATL, Samsung SDI, SK Innovation, Inzi Controls	EVE, EcoPro BM, EVE Energy, GS Yuasa
Poland	LG Chem	LG Chem, Northvolt, SK Innovation, Enchem, Capchem, Daimler, Umicore, Durapower
Slovakia		InoBat, Wildcat Discovery Technologies

Circular economy (6/6)

- If successfully managed, the CEE-region can position itself as a leading hub for circular industrial transformation, where European sustainability goals and Chinese industrial expertise converge to reshape the future of mobility.
- Across the CEE-region, Sino-CEE cooperation is catalyzing a shift from fragmented production networks to integrated, circular industrial systems.
- The findings suggest that the transition toward circular economy models has the potential to significantly strengthen the resilience and competitiveness of the European automotive and battery sectors.
- Circular business models can reduce raw material dependency, support strategic autonomy, and create new industrial ecosystems across the CEE region.
- The chapter highlights that Sino-CEE cooperation plays an increasingly important role in accelerating technology transfer, recycling capabilities, and integrated battery value chains.
- The chapter concludes that CEE is transitioning from a cost-competitive manufacturing location to a strategic node in Europe's circular automotive value chains.

Further research points

- ▶ Scenario based value at risk modelling of the CEE automotive industry supply chains
- ▶ Government policy and funding mapping and analysis
 - ▶ Policies towards the automotive and battery industry as well as the circular economy (esp. battery recycle) of the new government is still unclear.
 - ▶ Policies towards the labour market is also unclear.
- ▶ Interviews with stakeholders to map market expectations in the short and medium run.
- ▶ Synthesis and recommendations.

Thank you for your attention!