POLICY PAPER

From Zero to Hero?

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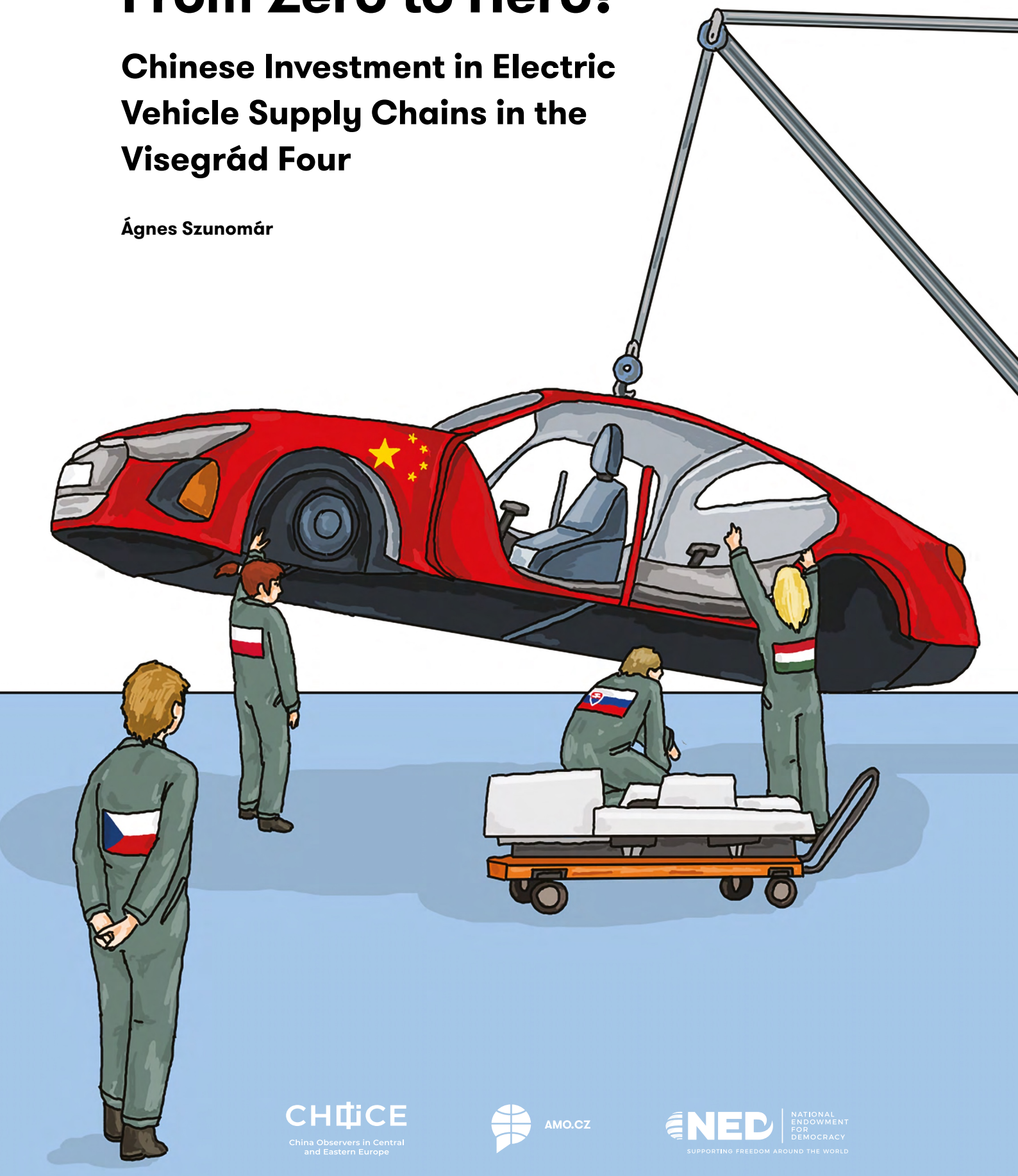
Ágnes Szunomár



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Summary

- This paper analyzes the recent trend of Chinese investments in the electric vehicle (EV) supply chains in the Visegrád Four (V4) countries of Czech Republic, Slovakia, Hungary and Poland.

- China has not only gained a foothold in the electric vehicle industry but has become one of the most important players globally. Accordingly, it wants to penetrate global markets, including the European one, with its own EVs, and also be close to other EV manufacturers to supply them with EV components, including batteries, via its own companies.

- To penetrate the European market, optimize transaction costs and avoid potential tariffs and other trade barriers, China seeks to create production centers on the continent, especially in countries (1) with a strong track record in automotive assembly, (2) where other automotive manufacturers have production activity and (3) where the major European car manufacturers are located nearby. By meeting all the criteria mentioned above, the V4 countries seem to be an ideal platform – and springboard for the broader European market – for Chinese EV manufacturers.

- Europe is investing billions of euros in electromobility, from encouraging car manufacturers to produce EVs, to supporting the sales of these vehicles, and to installing charging stations. Although the EU is currently investigating whether Chinese EV companies have benefited from illegal subsidies, it is difficult to imagine that this ambitious strategy could be implemented without the Chinese companies currently leading the EV sector, at least in the short term.

- V4 countries – though to a varying degree – are highly dependent on the automotive industry. While China is moving up the value chain, thanks to its technological innovations and batteries, the V4 countries' activities are slowly being squeezed out. Further development of the automotive industry in the V4 region can only be ensured if a large proportion of EV and EV component manufacturers are located here.

- Chinese companies have been investing in the V4 since the early 2000s. Chinese FDI flowed, though modestly, into automotive-related manufacturing even before the arrival of major Chinese EV companies, but it has mainly been in the sector of automotive spare parts manufacturing connected with the traditional automotive supply chains.

- More Chinese investments related to the EV industry have been announced in the V4 in recent years. Although many of these projects are still in the construction, planning or announcement phase, a clear pattern is already emerging: the bulk of Chinese EV-related investment in the V4 so far has been concentrated in the battery segment, with Hungary clearly being the number one location.

- The attractiveness of Hungary is, at least in part, due to the generous state support offered to companies in return for investing in the country. However, state financial incentives also helped to attract Chinese EV investments into other V4 countries.

- Company case studies show that Chinese EV manufacturers chose the V4 region as it offers good logistics and transport connections with the rest of Europe and access to a wide supplier base.

- Since the shift to EV production is largely reliant on foreign investment, the V4's growth will continue to be a dependent growth and will not improve these countries' highly vulnerable position in the automotive supply chains. The four company case studies also suggested that the chances for local suppliers to be involved are not very high but could nevertheless improve over time. One reason for the limited involvement is the lack of experience, another is that EVs are much less component-intensive to produce than conventional cars.

- EV companies' presence in the V4 creates certain challenges: in addition to the lack of opportunities for local suppliers, the local workforce may be crowded out by cheaper guest workers. Pollution is a particular problem in relation to battery production. These challenges are, however, not specific to China, but apply to all players of the EV industry.

- R&D activities are usually not typical features of (Chinese) investments in the V4 region, as investors usually bring only assembly. Yet, some of the Chinese EV companies, such as Volvo and NIO, are planning R&D activity too, in the V4. These types of activities may also have the potential to involve local expertise, and there is also a greater chance of technological spillovers.

Recommendations

- Imports of Chinese carmakers have been rising for several years, and so has the share of Chinese brands in the European EV market. Besides investigating China's support to the EV industry, EU policymakers should seek reciprocal trade terms with China on EV-related trade and pursue a comprehensive strategy for the development of Europe's indigenous EV industry.

- A wider penetration of EVs in Europe could also be facilitated, notably by improving the charging infrastructure. In addition, similarly to China and the US, Europe too, needs to invest heavily in next generation battery technologies.

- European countries should also be aware that many of the critical raw materials for battery production originate from China, which could pose additional risks if China restricts access to them. Europe could improve its position by looking for alternative sources of raw material supply, for example in Africa or Latin America, and boosting its own mining and recycling activities, as proposed by the Critical Raw Materials Act (CRMA).

- As the Chinese EV companies investing in the V4 region do not want to supply individual V4 countries, but rather the (mainly German) automotive companies operating in the region, the V4 governments should not compete for these investments, but partner and coordinate their policies and negotiate with the Chinese EV companies on the basis of a common V4 strategy, thus achieving both economies of scale through specialization and more favorable investment terms.

- V4 governments should also aim to support EV-related technology locally by creating joint research institutes, training engineers and skilled workers, and incentivizing R&D activities of local companies.

- When granting state support to certain Chinese companies investing in the V4, governments should be more aware of the scope of the activities they support, ensuring that local companies can participate, potentially also in higher value-added activities. For example, at least part of the state support should be specifically linked to R&D cooperation (involving local universities, and knowledge centers) to ensure technological spillover effects.

- Since the EV industry typically involves the use of completely new technologies, which in the case of battery production can even be hazardous to human health and the environment, local residents need to be informed in a timely and more comprehensive way about the details of the manufacturing process affecting them.

Introduction

From the early 1990s onwards, the Central and Eastern European (CEE) region's economic catching up has been largely driven by traditional sectors of the economy, dynamic exports, investments from abroad and the advantages of low labor costs. CEE countries have attracted significant amounts of foreign direct investment (FDI) in the automotive sector that has become a key driver of many of the CEE countries' – including the V4 countries' – economic growth and has led these countries' integration into global value chains (GVCs).[1] By participating in the manufacturing of internal combustion engine vehicles (ICEVs), V4 countries have become prominent and indispensable players in the European automotive supply chain, providing geographical proximity, manufacturing know-how and low wages. These factors were key to ensuring the competitiveness of original equipment manufacturers (OEMs), from Germany in particular.[2]

While the extent of CEE countries' catching up processes varies greatly – EU member states are more developed while countries in the Western Balkans are lagging behind – a rather general phenomenon is that many of the above-mentioned drivers are gradually becoming depleted: economic growth has slowed down and the previously successful foreign direct investment (FDI)-led development model is becoming exhausted.[3] In parallel, the automotive industry is slowly transitioning from ICEVs to electric vehicles (EVs), accompanied by a technological transformation that also affects supply chains.[4]

CEE, including the V4 countries, is bound to face the adverse effects of the above-mentioned transformations: with technologically different and increasingly sophisticated labor-saving solutions, the inflow of new greenfield investments slows down, thus, the impetus of catching up driven by GVC-integration weakens.[5] Economies that have been following a manufacturing-led development model will be able to maintain their current position only if they fulfill higher requirements in terms of production capacity, functional capabilities, local supplier base and infrastructure.[6]

Many CEE countries have taken steps to induce these processes, but the FDI-led growth model cannot be fully – and immediately – abandoned. Engaging in EV supply chains seems to serve as a good alternative for countries that have been major players in the automotive industry in the past, even if they are lower down the value chain: the future is clearly electromobility, in line with global climate goals and EU directives, while the necessary manufacturing bases as well as workforce are available through the automotive experience of the region.[7]

For the same reasons, EV manufacturers are also interested in manufacturing in established locations. However, these automakers or OEMs are not just those – German, French, US, Japanese or South Korean – companies that have been investing in CEE's automotive sector, but also new players which have emerged. China, in particular, has not only gained a foothold in the EV industry but has become one of the most important players globally. Accordingly, it wants to penetrate the European

market with its own EVs (such as BYD, Nio, Xpeng or Volvo), and be close to other EV manufacturers to supply them with EV components, including batteries, via its own companies (such as CATL, SEMCORP, Shenzen Kedali or EVE Power). In order to do so, China must create European production centers, especially in countries with a strong track record in automotive assembly, where other automotive OEMs have production activity and where the major European car manufacturers are located nearby. By meeting all the criteria mentioned here, the V4 seems to be an ideal platform – and springboard for the broader European market – for Chinese EV manufacturers.

Europe's ambitious climate goals will require a lot of EVs in the coming years, which at first glance may seem like a win-win situation. On the one hand, the EU wants to see at least 30 million electric vehicles on Europe's roads, which requires a massive and fast transformation of the car industry. On the other hand, Chinese companies are capable of producing these vehicles, or the various components – batteries, in particular – to a high standard. However, Chinese exports of lower-priced EVs (around 20 percent lower than European prices) and the massive increase in Chinese manufacturing capacity pose a direct threat to the European car industry.[8] As a result, the EU has recently launched an anti-subsidy investigation into imports of EVs from China to determine whether Chinese EV makers are benefiting from illegal subsidies and whether these subsidies may be causing economic harm to European EV manufacturers.[9]

The purpose of this paper is to examine Chinese investments in electric vehicle supply chains in the V4, that is to address the potential, role and impact of Chinese EV manufacturers in the V4 region and the challenges they pose at the local and regional level. To understand the root causes, current status and possible consequences of the Chinese presence in the EV industry in the V4 region, we need to look at the issue in all its complexity. Therefore, following this introduction, the paper starts with a summary of the development of the V4 automotive industry in retrospect (Chapter 1) and provides a brief explanation of how the EV supply chain differs from the traditional ICEV supply chain (Chapter 2). Next, it presents the patterns and trends of Chinese investment in the V4 (Chapter 3) and analyzes the Chinese presence in the EV sector by using case studies of EV-related Chinese investments already made or underway (Chapter 4). Subsequently, the paper provides concluding comments and elaborates on policy implications (Chapter 5).

Automotive Industry in the V4 in Retrospect

The automotive industry plays an important role in Europe's economy, providing direct and indirect jobs to 13.8 million Europeans, representing 6.1 percent of total EU employment and accounting for 7 percent of the European Union's (EU) GDP.[10] The EU is one of the world's largest car-producing regions, however, the automotive industry has increasingly shifted eastwards over the last two decades: The Western European car market stagnated between 1990 and 2000 and further growth could only be achieved through geographical expansion. CEE proved (and continues) to be an ideal location for expansion, as the economies of these countries were growing rapidly, economic growth and increasing prosperity allowed more consumers to buy cars, and wage levels were considerably lower than in Western Europe, granting significant cost savings for car manufacturers.[11] The countries with the largest automotive industries in the CEE region are the Czech Republic, Poland, Slovakia and Hungary: that is, the countries of the V4. Therefore, the following sub-sections briefly present the V4 automotive industries' basic parameters, including the most important data and foreign companies present in these countries.

CZECH REPUBLIC

The Czech car industry has a relatively long history, with Škoda being founded in 1895 and becoming the country's largest industrial company by 1920, bought by Volkswagen in 1992. The number of cars produced in the country has grown rapidly from around 400,000 cars in 1999 to 1.25 million in 2022. As a result, Czechia has the largest automotive industry in the CEE region and it is among the countries with the highest car production per capita (after Slovakia).[12]

Today, the automotive industry is the most important industrial and export segment in Czechia, accounting for around 25 percent of total Czech exports and up to half a million jobs overall, representing 31 percent of industrial production and 26 percent of Czech manufacturing. While the automotive industry accounts for 6 percent of GDP, industry supply chains bring the total share of the automotive industry in the Czech economy to around 9 percent of GDP. The segment is one of the most important in the region, with around 90 percent of cars produced here being exported, mainly to Germany.[13] There are three main car manufacturers in the country: Škoda, Hyundai and Toyota-PSA.

The electric vehicle segment accounted for more than 11 percent of total vehicle production in 2022, with a total of 134,944 electric cars and 56 electric buses, mainly by Škoda and Hyundai, reflecting the rising demand for environmentally friendly vehicles.[14]

HUNGARY

The Hungarian automotive industry has expanded significantly in recent years due to several factors: first, foreign, mainly German manufacturers are investing heavily in the country, second, increasingly more models are being relocated here, with more and more spare parts manufacturers being present in Hungary, third, the government is supporting the automotive industry through various measures, including financial incentives for investors.[15]

As a result of the above, the sector is constantly evolving. Hungary produced 0.44 million cars in 2022. In this year the Hungarian automotive industry generated about 21 percent of the country's total exports,[16] 33 percent of industrial production and around 28 percent of Hungarian manufacturing. There are 500 companies in the sector, employing around 100 thousand people in the country.[17] While vehicle manufacturing makes up around 5-6 percent of Hungarian GDP, together with automotive suppliers it accounts for 8-9 percent.[18] Most cars and car parts are produced by German companies, and 90 percent of the production is exported. The four leading manufacturers operating in Hungary are Audi, Mercedes, Opel, and Suzuki.

In the past few years, Hungary has transformed itself into a potential EV powerhouse with German car manufacturers, such as Mercedes, Audi and BMW investing heavily in EV production and South Korean, and recently also Chinese companies investing in battery manufacturing. As a result, Hungary already ranks fourth globally in EV battery production (which will certainly continue to improve in the coming years with Chinese CATL's investment).

POLAND

Poland has one of the most diversified economies and export structures in the CEE region. As a result, its reliance on the automotive industry is also one of the lowest in the region. Still, the automotive industry is a key sector for the Polish economy too, being the second largest in CEE after the Czech Republic, and therefore it has an impact on the region's economy.[19]

Like the other CEE countries, Poland exports a lot of cars – the automotive industry accounted for about 13.5 percent of the value of exports in 2022 – which is advantageous in many ways, but the fact that around 80 percent of cars manufactured here are sold in Western Europe creates a dependency and, consequently, a vulnerability. This vulnerability was also reflected in the aftermath of the 2008 economic crisis, which saw a decline in economic activity in Western Europe, and thus a decline in car production in Poland and, at the same time, in the Polish economy.

In 2022, when a total of 0.45 million motor vehicles were produced by Polish automotive plants,[20] the automotive industry accounted for 8 percent of Poland's GDP, and 11 percent of the country's industrial production. There are more than 1,000 companies and suppliers in the industry, employing together around 187 thousand people. Major companies with a significant presence in the Polish automotive sector include Fiat, Opel, Toyota, Volkswagen, MAN, Volvo and Scania.

With the presence of, among others, LG Energy, the most significant battery producer in Europe by far, Poland is also heavily involved in the production of lithium-ion batteries (in 2022 these accounted for over 2 percent of all Polish exports): currently ranked 2nd in the world after China and ahead of the US.[21]

SLOVAKIA

The Slovak automotive industry has a long history, but the real success story and growth started in 1991, with Volkswagen setting up a manufacturing plant in the country. The industry has been flourishing ever since. Perhaps the only factor hindering further progress is the inability to recruit enough skilled workers to match the capacity expansion, as there are not enough people looking for jobs. However, this is a challenge more and more CEE countries are facing nowadays.

Slovakia has the highest car production per capita in the world, that is 184 cars per 1,000 inhabitants, with 1 million cars produced in 2022. The automotive industry employed 176 thousand people directly in 2022, while the aggregated employment increased to 261,000 people. There are four main car manufacturers: Volkswagen, KIA, PSA and Jaguar Land Rover. The share of the automotive industry in total industrial production is the highest in the region: at around 50 percent.[22] The share of the automotive industry in Slovakia's total exports is similarly high, 42 percent,[23] while the industry accounts for 13 percent of GDP, which is also exceptional within the V4 as well as globally.[24]

As regards the shift from ICEVs to EVs, foreign firms are driving the transition in Slovakia: besides VW, Jaguar and PSA's EV models manufactured here, Chinese

TABLE 1: SELECTED CHARACTERISTICS OF V4 AUTOMOTIVE INDUSTRIES (2020)

	Czechia	Hungary	Poland	Slovakia
Number of enterprises	1,100	500	1,700	790
Production value (million EUR)	44,520	26,100	32,100	27,900
Wages and salaries (million EUR)	3,200	1,800	3,400	1,500
Persons employed	175,000	95,000	210,000	79,000
Share of production value in manufacturing total (%)	27	26	10	40
Share of value added in manufacturing total (%)	18	17	9	23
Share of export in total exports (%)	30	17	24	19

Source of data: Eurostat (figures have been rounded). Data for the years after 2020 were not available in Eurostat, but were available from other sources, these we refer to in the text above.

majority-owned Volvo is planning to start its 500,000-capacity production of pure EVs in 2026 in Eastern Slovakia. Due to the significant embeddedness of the automotive industry and its important role in Slovakia's economy, the country is currently among the top European producers of EVs behind only Germany and France.[25]

It is important to note that the V4 countries are among Europe's most economically exposed countries to China, thanks to their indirect trade links, mainly through Germany. In essence, this indirect trade relationship means that although the V4 countries export relatively few products directly to China, their trade exposure to China is still significant because of their embeddedness in German value chains, with indirect exports (i.e. via third countries, Germany in particular) to China accounting for a larger share of their total exports. Both direct and indirect exports are mainly concentrated in car manufacturing and machinery: according to CEIAS's calculation, Slovakia's final (direct and indirect combined) demand exposure to China is the highest in the V4 (5.3 percent), followed by Czechia (5.1 percent), Hungary (3.9 percent) and Poland (3.3 percent).[26]

From Internal Combustion to Electric: Shifting Supply Chains?

As stated above, the internationalization of the automotive industry initially started with the entry of automotive companies into foreign markets with just a few affiliates, but this was gradually replaced by global value chains, that is, the full range of value-creating activities (from design to production, from marketing to distribution, etc.), spread across a wide geographical area, between several companies and many workers. This has meant the emergence of supply chains, that is, global production and distribution networks, that seek to maximize efficiency by exploiting both local and global advantages. As a result, the lower value-added processes – such as assembly, spare parts manufacturing – have been outsourced to subsidiaries hosted by countries with lower labor costs, such as the V4. The production of higher added value – such as design, planning and marketing – has typically remained centralized at the parent company.[27]

These chains of production and distribution have operated relatively smoothly for decades and have even gradually expanded. However, the expansion of EVs is having a profound impact on automotive supply chains for at least two reasons and could therefore negatively affect suppliers of spare parts and affiliates focusing on assembly in particular.

The first reason is that in mechanical terms, ICEVs are much more complex than EVs. One example is that EV motors comprise far less components than traditional ICEVs: an EV motor literally has only a few moving parts, while a four-cylinder internal combustion engine has more than a hundred.[28] Another example is that most EVs have single-speed transmissions and therefore have no need for turbo- or superchargers. The second reason is that in the case of ICEVs, the value-added share of component suppliers is usually around 50-55 percent, while for EVs it is only 35-40 percent. Batteries alone could account for up to 50 percent of the value of an EV. In other words, the share of each additional component (chassis, body and interior parts) in the value of the car decreases. In itself, this would not necessarily be a problem, but batteries are now mainly produced by companies outside the traditional automotive supply chain, which means new competition for traditional suppliers.[29]

And what does all this have to do with China and the V4? While China is moving up the value chain, thanks to its technological innovations and batteries, the V4 countries' former automotive activities are slowly being squeezed out. This is, of course, a long process, ICEVs and their components will be produced in V4 factories for some time to come, but the shift is inevitable. Further development of the automotive industry in the V4 region can only be ensured if a large proportion of EV and EV component manufacturers are located here.[30] But, as mentioned above, these companies are typically outside the traditional automotive supply chain and China's position among them is increasingly dominant.

Patterns and Trends of Chinese Investment in CEE

Although China considers the broader CEE as a bloc, some countries indeed seem to be more popular investment destinations than others: the V4 countries host more than 70 percent of the total Chinese OFDI to the broader CEE region. The reason for this distribution is twofold.[31] On the one hand, Chinese companies prefer to establish or purchase company sites in EU member states to avoid trade barriers. On the other hand, China is playing it safe. It targets countries that have already attracted investments from elsewhere like the US, Japan, or Germany, in particular. This is particularly true in industries such as electronics and automotive, where the target region has significant manufacturing experience.

Within the V4 region, Hungary, Czechia, and Poland have received the bulk of Chinese investment since the early 2000s, with Slovakia lagging behind. By 2021, V4 countries had accumulated more than $5.5 billion in Chinese FDI, with Hungary receiving the majority for both stock and flow data. Interestingly, the numbers of companies exhibit a somewhat opposite trend: Poland has the highest number of Chinese companies, followed by Hungary and the Czech Republic and Slovakia. That is, Hungary has the highest stock of FDI from China, while it hosts only a third as many Chinese companies as Poland. The explanation is relatively simple: Hungary

TABLE 2: CHINESE FDI STOCK IN V4 IN ABSOLUTE TERMS (IN MILLION USD) AND AS A PERCENTAGE OF TOTAL INWARD FDI STOCK, 2013–2021

		2013	2014	2015	2016	2017	2018	2019	2020	2021
Czechia	million USD	136	204	371	794	1,101	1,012	1,501	770	760
	%	0.1	0.2	0.3	0.7	0.7	0.6	0.9	0.4	0.4
Hungary	million USD	–	1,268	1,952	1,934	1,989	2,636	2,786	3,479	–
	%	–	0.6	1.0	0.8	0.8	1.5	1.2	1.0	–
Poland	million USD	641	502	928	707	848	935	1,223	1,418	1,556
	%	0.3	0.2	0.5	0.4	0.4	0.4	0.5	0.6	0.6
Slovakia*	million USD	35	38	15	27	36	25	41	16	60
	%	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1

*Source: OECD, 2023, *For Slovakia, ultimate investor data was not available, therefore we used OECD immediate data there.*

mainly hosts large multi-nationals from China, with each of these investments having a relatively high value, while the rest of the V4 countries mainly host smaller Chinese companies.

Based on OECD statistics, Chinese yearly FDI flows are relatively inconsistent throughout the entire CEE region, which probably means that FDI flows are connected to one or two big business deals per year. Disinvestments are less characteristic for the majority of the analyzed V4 countries; however, one big disinvestment did take place in the Czech Republic in 2018, probably as a result of financial problems in one particular Chinese company, CEFC China Energy, the major Chinese investor in the country.

Chinese investments are still dwarfed by, for example, German MNEs' investments in these countries. When calculating percentage shares, one can find that Chinese FDI stock is around or below 1 percent of total inward FDI stock in the V4 countries. It is above 1 percent only in the case of Hungary. Western European investors are still responsible for more than 70 percent of total FDI stock in the V4, while companies from the United States or Japan and South Korea are typically more important players than those from China.

One notable phenomenon is that most East Asian – including Chinese – companies tend to invest in the V4 via intermediary countries or companies instead of directly. Consequently, East Asian FDI in all V4 countries is considerably more substantial according to the data on the ultimate owners' home country rather than the data on the immediate owners' home country.

The main entry modes of and sectors targeted by Chinese investment are similar in all CEE countries, although they are more diverse in the most popular V4 target countries. Chinese investors typically target secondary and tertiary sectors in the V4. Initially, their investment flowed mostly into manufacturing, but over time, services have also attracted investment. The main Chinese investors targeting the V4 countries are primarily interested in telecommunications, electronics, chemicals, and automotive. Regarding their entry modes, first, Chinese companies have carried out greenfield and brownfield projects, but a few mergers and acquisitions (M&A) also occurred later on, especially after the global economic and financial crisis of 2008. It must be noted, however, that CEE countries – unlike countries in Western Europe – do not offer many M&A opportunities, since the number of successful, globally competitive companies is much lower. Among the investing Chinese companies, we can find both privately owned and state-owned enterprises.

There has been automotive-related manufacturing in the V4 region through previous Chinese investment even since before the arrival of Chinese EV companies, but it has mainly been automotive spare parts manufacturing. Recent research that went down to company level identified a total of 36 automotive investments in the V4 region before 2021.[32] Four of these were in the Czech Republic, seven in Hungary, eight in Slovakia and seventeen in Poland. However, the majority of these investments were small, that is, below €10 million, with only seven investments above this amount. As Table 3 shows, even these relatively bigger investment projects were more connected with the traditional automotive supply chains, that is, not related to EV supply chains. The only exception was BYD's electric bus plant in Komárom, Hungary. It is only after 2021, that is, in the last year or two, that EV companies have started to gain a foothold in the V4 region.

TABLE 3: SELECTED CHINESE FDI PROJECTS INTO THE V4 AUTOMOTIVE SECTOR (ABOVE 10 MILLION EUR), 2021

Country	Investing company	Year	Amount (EUR million)	Type
Czechia	Beijing West Industry (BWI Group)	2016	27	n/a
Czechia	Yanfeng Automotive Interiors	2017	57	greenfield
Hungary	BYD	2008 + 2017	16 + 20	brownfield
Hungary	Joyson Safety Systems	2018	60	M&A
Hungary	Chevron Auto	N/A	49	greenfield
Poland	Fabryka Lozysk Tocznych SA	2013	73	n/a
Poland	RCC Rokita	2019	22	joint venture

Source: "Chinese Investment in Central and Eastern Europe Data Set," Central and Eastern European Center for Asian Studies, Budapest, 2021.[33]

EV-related Chinese Investments in the V4

As indicated above, China has a competitive advantage in many areas of the EV industry. As a result, a number of Chinese EV brands are ready to break into major automotive markets, including Europe. These companies are following clear paths to expand their market reach, which include fostering relationships with local dealers and suppliers, adjusting their pricing strategy to compete with traditional car manufacturers in the region, and building local factories. This not only helps these Chinese companies to save costs and avoid possible EU tariffs and quotas but also opens up opportunities for them to integrate into local automotive supply chains.

As mentioned above, the V4 region is a natural host for automotive manufacturing activities and the Chinese have already recognized that. When Chinese EV-related investments would appear was only a matter of time, and where in the region depended mainly on the receptiveness of each country, both to the EV industry in general and to China, and Chinese FDI in particular. The V4 countries have typically recognized the challenges of the EV industry, as described above, and have taken the first steps to adapt. Hungary and Poland are leading the way in this respect within the V4 region: as of August 2022, 13.3 percent of the European capacity of lithium battery gigafactory projects was in CEE, of which Hungarian and Polish capacity accounted for a significant share (5.5 and 4-9 percent of the European total, respectively).[34] The recently announced €7.34 billion investment by Chinese CATL in Hungary will further increase this share. In terms of attracting Chinese FDI, there is less consistency across the V4: in parallel with the EU approach, most V4 countries often have reservations about a Chinese presence in the economy, while Hungary alone is extremely open to Chinese investments.[35]

The table below summarizes those Chinese investments related to the EV industry announced in the V4 in recent years. Although many of the projects are still in the construction, planning or announcement phase, a clear pattern is already emerging. First, eleven of the eighteen projects are related to battery manufacturing, while out of the remaining seven projects three are related to the manufacturing of other EV components, three to vehicle assembly (cars or buses) and only one to software development. Second, twelve out of these eighteen projects have been implemented or are in the pipeline in Hungary, four in Poland, two in Slovakia, while no major project in the Czech Republic has been identified. In other words, the bulk of Chinese EV-related investment in the V4 so far has been concentrated in the battery segment, with Hungary clearly being the number one location.

The attractiveness of Hungary, in addition to the already mentioned level of openness, is also due to the generous state support offered for companies in return for investing in Hungary (which the Hungarian government makes available to many, not

TABLE 4: CHINESE EV-RELATED FDI PROJECTS IN THE V4

Company	Location	Date of announcement *	Amount (in EUR)	Product	(Expected) date of the start of production	Jobs (to be) created
BYD	Hungary, Szeged	2023, December	n.a.	electric cars	n.a.	n.a.
BYD Electric Bus & Truck Hungary Ltd.	Hungary, Fót	2023, June	26.4 million	battery	failed	100 in the first round, more later
BYD Electric Bus & Truck Hungary Ltd.	Hungary, Komárom	2016	16.4 million	electric buses	in operation since 2017	300
CATL	Hungary, Debrecen	2022, August	7.3 billion	battery	trial production phase expected to start in early 2025	9,000
EVE Power	Hungary, Debrecen	2023, May	1 billion	battery	2026	around 1,000
Gotion (CN) with InoBat (SK)	Slovakia, Šurany	2023, November	1 billion (est.)	battery	2026	1,500
Guotai Huarong	Poland, Oława	2020	38.6 million	electric car battery components (electrolytes)	in operation since 2022	100
Halms Hungary Ltd.	Hungary, Debrecen	2022, September	43 million	battery components	operational from late 2022	300
Huayou Cobalt	Hungary, Ács	2023, June	1.3 billion	battery components (cathode material)	2025 trial production, 2026 mass production	900
NIO Power Europe Ltd.	Hungary, Biatorbágy	2022, July	14.5 million	battery swapping stations	production started within a few months of the announcement	few hundred
Sanhua	Poland, Tychy	2023, December	37-48 million (est.)	electric car components	2025	350
SEMCORP Hungary	Hungary, Debrecen	2021, September	183 million	battery foil	operational from the first quarter of 2023	440
Shenzen Kedali Industry	Hungary, Gödöllő	2020, December	37.3 million	battery components	in several phases between 2021-2024	330
Sunwoda Mobility Energy Technology Co., Ltd.	Hungary, Nyíregyháza	2023, July	1.5 billion	battery	end of 2025	few thousand
Tuopu	Poland, Poznań	2021, April	30 million	electric car components	in operation	450
Volvo	Slovakia, Valaliky	2022, July	1.2 billion	electric cars	2026	12,000 (including internal and external staff)
Volvo	Poland, Kraków	2023, February	?	technology center	end of 2023	initially 120, 500-600 by 2025
a yet unnamed company	Hungary, Western Hungary	2023, June	18.5 million	car interior components for EVs	n.a.	200

Source: own compilation based on press releases, company reports.

** Publication in the press, usually following a report by a public official.*

TABLE 5: STATE SUPPORT GRANTED TO SELECTED CHINESE EV-RELATED INVESTMENTS IN HUNGARY (IN EUR)

Company	State support (in EUR)
BYD (Komárom)	2.4 million
CATL	845 million
EVE Power	37 million
Halms Hungary Kft	4 million
Huayou Cobalt	132 million
Nio Power Europe Kft	4.5 million
SEMCORP Hungary	34 million
Shenzen Kedali Industry	3.4 million

Source: own compilation based on press releases and government reports.

only Chinese, investors). The table above shows the amount of state support granted to Chinese companies in connection with individual investment projects.

In order to get a more nuanced picture of Chinese investment in the EV segment in the V4 region, four Chinese EV-related investments are examined in more detail below. In line with the above trends, three of these are/will be located in Hungary, and one in Slovakia. While two are related to battery production, the other two involve vehicle assembly.

BYD

BYD, an acronym for "Build Your Dreams", is a privately-owned company, established by Wang Chuanfu in 1995 in Shenzhen. During its first years, the company specialized in the production of rechargeable batteries for mobile phones and expanded its business to the automotive sector only in the early 2000s. Nowadays the company operates in three business sectors: electronic parts manufacturing, conventional auto making, and electric battery and vehicle manufacturing.[36]

In Europe, BYD's first wholly-owned bus factory is located in Komárom, Hungary. The investment was originally a brownfield FDI project, that is the factory – which used to be in a Korean company's ownership and supplied microchips to the nearby Nokia factory – was taken over in 2008 and converted into a bus factory in 2016.[37] A local employee who was interviewed remembered that the idea of converting the factory to bus production first came up in 2015 when BYD won a tender in Hungary.[38] The motivation was simple: the factory was well located to supply the European

markets and – through bus manufacturer Ikarus – Hungary had a long tradition of bus production.

As mentioned by many during the interviews, localization of products is a key element of the company's international expansion, as consumer needs vary greatly from country to country. According to a senior employee,[39] the aim was to move from "designed in China, manufactured in Hungary" to "designed in Hungary, manufactured in Hungary." In his opinion, the buses produced in Komárom were already of better quality than those produced in the Chinese plant, and it is better if the buses sold in Europe are designed by European staff rather than Chinese. It took the factory a few years, but now 30-50 percent of the spare parts are coming from Europe, compared to 20 percent around the time the factory started.[40] Some 80-90 percent of the local site's employees are Hungarian, the management team includes both local and Chinese managers, with Chinese expats from time to time.

Although the company has been manufacturing in Hungary for a relatively long time, it has not typically produced for the Hungarian or the broader CEE market but primarily targeted the more developed parts of Europe (such as the Netherlands, Belgium, Sweden, Italy and the UK). In the past, the management of the Hungarian subsidiary also complained that there is little local interest in ordering buses manufactured here.[41] In recent years, however, there has been some progress in this regard and BYD has managed to win larger orders from Hungary. As a result, now there are over 70 pure-electric buses in service or on order in 10 Hungarian cities.[42] The increase in Hungarian orders is likely linked to the development of the Hungarian government's National Battery Industry Strategy 2030[43] and the recognition that BYD has become an indispensable player globally. During his recent trip to China, Prime Minister Orbán visited BYD's headquarters and met its founding chairman.[44]

Although so far, the Hungarian public has had no objections to BYD's activities in Hungary, as these have not been harmful in any way, in the summer of 2023 a €26 million investment was announced for the construction of a battery assembly plant in Fót, Hungary, which BYD would have built. Since this announcement was preceded by similar news related to other Chinese battery plants to be built in Hungary, and there were also many complaints about South Korean battery plants already operating in the country, the public was well aware of the potential dangers and protested against BYD's project in Fót intensely. Although it is not known to what extent the protests played a role, the investment planned for Fót was eventually withdrawn, so BYD has not (for now) brought a battery assembly plant to Hungary.

However, according to a December 2023 announcement,[45] a brand new electric car manufacturing and production center will be established in Szeged, Hungary, to serve the European market. BYD, which will create thousands of new jobs, will set up its entire manufacturing process in Szeged, with the exception of battery production and chemical activities. The exact details are not yet known, but according to media reports,[46] 224 rounds of negotiations preceded the decision and the Hungarian government will provide financial support for the investment, but the amount will only be disclosed after the European Commission's approval. The factory will be built in phases and is expected to boost local supply chains.

GEELY/VOLVO

Geely Holding was founded in 1986 by Li Shufu, also known as Eric Li, the company's current chairman, in Taizhou city, Zhejiang Province. The privately-owned company initially produced refrigerator components and started its automotive business in 1997. Currently located in Hangzhou, the company has over forty manufacturing and assembly plants, eight R&D centers, and six design centers across North America, Europe, China, Southeast Asia and manages several car brands, including among others Geely Auto, Volvo Cars and Lotus.[47]

Volvo, one of Sweden's largest companies, was founded in 1927 and operated in the automotive industry from its early beginnings but gradually expanded into other manufacturing sectors during the twentieth century. The Gothenburg-based car manufacturer Volvo Cars was part of AB Volvo until 1999, when it was sold to Ford Motor Company. Ford announced its loss-making subsidiary was up for sale shortly after the outbreak of the global economic and financial crisis of 2008, and sold it to Geely Automobile in 2010. According to the agreement, Geely retained the Volvo brand even after the acquisition, and the company's headquarters, production plants and development center could remain in Sweden, although additional plants were also opened in China.

Volvo Cars currently has two production sites in Europe, in Ghent, Belgium and Torslana, Sweden. In the summer of 2022, after almost 60 years, the company announced that it would open a third production plant in Europe: in Valaliky industrial park, near Košice, Slovakia. The company claims the plant will help meet the ongoing demand for electric vehicles and capture future growth potential: in line with Volvo Cars' goals of becoming fully electric by 2030 and climate neutral by 2040, the new plant will exclusively produce electric cars.[48] Volvo's plant will be Slovakia's fifth car plant with a €1.2 billion greenfield investment. Construction work began in 2023, equipment and production lines will be installed in 2024, while production is scheduled to begin in 2026. According to the company plans, more than 500,000 electric cars will be produced annually, providing thousands of new jobs in the region.[49]

The investment decision was undoubtedly based on Slovakia's extensive experience in the automotive industry, while the location was chosen as it offers good logistics and transport connections with the rest of Europe and access to a good supplier base. The announcement of the investment was received positively by the locals, considering that it is a well-known company still not primarily identified with China, and that the production of electric cars can also ensure the long-term sustainability of the Slovak automotive industry. Volvo emphasized that incentives offered by the Slovak government were a key factor in the decision to locate the plant in Košice.[50] Although no information was made public about the exact nature and extent of these incentives, what is known is that the Slovak government has allocated more than €280 million for financing and related investments in the Valaliky industrial park.[51] Since it is believed that Slovakia may have competed with Hungary for the investment, the Slovak government probably had to dig deep into its pockets.[52]

Although it is not yet known to what extent local suppliers will be able to participate in the plant's operation, it is at least promising that the Slovak Investment

and Trade Development Agency has published a call for suppliers in the field of manufacturing, property and environmental services, HR, IT and corporate services.[53]

CATL

The company's predecessor, Amperex Technology Limited (ATL) was founded by Zeng Yuqun, also known as Robin Zeng in 1999 and initially manufactured lithium-polymer batteries based on licensed technology but later developed its own battery designs. Zeng sold ATL to the Japanese company TDK but stayed with and managed the company as a subsidiary. Contemporary Amperex Technology Co. Limited, abbreviated as CATL, started as a spin-off of ATL. In 2011, Zeng along with other Chinese investors bought an 85 percent stake in TDK's battery development business for EVs, which became CATL, founded in Zeng's hometown, Ningde, Fujian Province. The remaining share of TDK was bought out in 2015.[54]

One important impetus for the company's development – and today's successes – came directly from the German car industry: German car manufacturers started to think about the future of electric car production and the main bottleneck was battery supply. BMW, for example, visited a number of battery manufacturing companies in order to find suppliers, and reached out to several companies from Bosch to ATL.[55] Ultimately, potential orders from BMW played an important role in the founding of CATL. An even more significant driving factor was the support of the Chinese state. China was one of the first countries to support the development of EVs as far back as 2001 through the so-called "863 Program for Strategic Technology Development," while the 12th Five Year Plan (2011–2015) already identified the EV industry as one of the seven strategic emerging industries.[56]

Thanks to Chinese subsidies and its own innovations, CATL has become the largest battery manufacturer and global leader in new energy innovative technologies. CATL employs 120,000 workers around the world and has 13 plants worldwide, including in China, the United States and Japan. Although CATL had strong business cooperation with European car manufacturing companies from the beginning, supplying them with batteries, it did not have a European production plant for a long time. The first European plant, which is relatively small in terms of capacity, was opened at the end of 2022 in Arnstadt, near Erfuhrt, Germany.[57] In the same year a plant with a much larger capacity was announced: with an investment of €7.3 billion, the company will create a 100 GWh facility in Debrecen, Hungary, which will thus be able to supply the Volkswagen Group, BMW and Stellantis[58] and others. The plant is set to become Hungary's largest greenfield investment project ever.[59]

Based on interviews, similarly to the investments of South Korean battery manufacturers (such as Samsung and SK Batteries) that have recently appeared in Hungary, the investment of CATL is also connected with the growing demand for EVs on the European market.[60] As a result, major Asian EV companies are bringing their production to Europe to supply German and other automotive industry players. Hungary is therefore on CATL's radar mainly because of the presence of a number of German car manufacturers who are increasingly moving towards EV production. Besides the access to a good supplier base, Hungary also offers good logistics and transport

connections with the rest of Europe, including the rest of CEE in particular, where other – German, French, Japanese, US, etc. – car manufacturers are located. The interviewed senior official confirmed that the active role of the Hungarian state was also important in the investment decision: the Hungarian Investment Promotion Agency was very active throughout the process, the state support offered was very generous (the German plant did not receive such an incentive), and the traditionally good Sino-Hungarian political relations were also seen as an important factor.

The project is being implemented in the Southern Industrial Park in Debrecen, on a total area of 221 hectares, and the overall project consists of three phases. The company currently owns a 109-hectare site, of which approximately 60 percent will be used for the first phase of the project, followed by the second phase on the remaining land. The third phase is still under negotiation, and the company has an option to purchase land in the Industrial Park – if the option is exercised, the total area will be increased to 221 hectares. Although construction work has barely begun (module production starts in late 2024, cell production in 2025, while CATL expects its Debrecen plant to be fully completed within four to five years), the controversy surrounding the establishment of the factory has already become heated.

The main complaints concern the environmental impacts of the investment. Locals are afraid of soil and air pollution, but also of wasting water resources (battery production is very water-intensive due to the cooling process, and local water resources are running out anyway). Whatever the claims of independent experts commissioned by the government or the company, the majority of the population does not believe them, as CATL would be installing a brand new technology for which there is no experience yet.[61] A further complaint is about the land occupied by the factory, which is being sold off and concreted over at the expense of farmland.[62]

Another controversy regards the workforce. Production will be almost fully automated, yet CATL currently expects to employ around 9,000 (however, it was mentioned during an interview that they will not necessarily reach this amount unless they expand their scope of activities, e.g., towards raw material production and/or recycling). For the time being CATL is recruiting locally (not only in Debrecen, but within a radius of about 60 km). As there are labor shortages in Hungary, the inflow of temporary workers from Southeast Asia has been a source of concern for the Hungarian public. This has not yet been the case for the Debrecen factory but there have been similar examples in other factories of Filipino (and Turkish) workers arriving in large numbers, causing outrage – by their mere appearance alone – in the small towns where they were accommodated. There are also fears that these temporary agency workers may be sought for long-term employment as they may prove cheaper and more exploitable than local workers.[63]

Others argue that the opportunities for local companies to become involved as suppliers are minimal, precisely because of the lack of expertise in the battery manufacturing process. It was pointed out during an interview that this was basically the case when ICEV manufacturers arrived in the 1990s, i.e. domestic companies were initially unable to participate, but that this changed later. The example of BYD, described above, is a case in point: within a few years, the proportion of European and Hungarian suppliers has indeed increased. At the same time, EV production requires far fewer components than ICEVs, and this is particularly true of battery production,

which is an area where local suppliers are unlikely to be able to make much headway in the long term. In fact, there are two R&D-related areas where there is at least a little prospect of local involvement: battery life extension and battery recycling. There is no official documentation available on this, but hopefully cooperation in these areas was brought up between the company and the Hungarian government when discussing the €845 million state support.

NIO

NIO is a Chinese start-up founded in 2014 by Li Bin, also known as William Li. The company is based in Shanghai and specializes in the design and manufacture of EVs but also aims to achieve continuous technological breakthroughs and innovations, such as its autonomous driving technology and its famous battery swapping technology, the Battery-as-a-Service (BaaS) scheme.[64] With the company's battery swapping technology, NIO vehicle users can simply stop by a Power Swap station to exchange their dead batteries for new ones, providing a more convenient experience than the traditional plug-in charging method (NIO claims each battery swap process only takes 3 minutes).[65] According to the company's website, NIO has deployed 2,000 Power Swap Stations in China, 3,281 charging stations, and 19,098 chargers, in addition it has over 940,000 third-party chargers. In Europe, NIO has 27 Power Swap Stations, 11 Power Charger Stations, and over 500,000 third-party chargers.

To meet its need to build battery swap stations in Europe, NIO announced in the summer of 2022 that it would set up its first European plant in Biatorbágy, near Budapest, Hungary, highlighting that the 14.5 million euros investment would create hundreds of jobs in the region. The construction of the plant did not take much time as operations started already in September the same year. The plant was able to start production so quickly as the project was not a classic greenfield investment, that is, no factory was built, but the company moved into a 10,000 m2 hall of CTP Budapest West's logistics park. The Biatorbágy plant hosts, among others, the production and after-sales services of battery swap stations, training activities and the research and development of energy products.[66] NIO plans to produce here 240 battery swap stations annually[67] the bulk of which are exported to those European markets where NIO's EVs are sold.

Yang Chow, NIO's vice president said during a press conference that they have received a lot of support from the Hungarian government (including €4.5 million). He also stressed that Hungary is "relatively cheap, very friendly" and close to their main markets. From the Hungarian location they will be able to provide training and technical support for the whole of Europe.[68] In addition to Hungary's favorable location and proximity to European markets, CATL's announcement to invest in Hungary may also have played a role. Although NIO is about to start producing its own lithium-ion battery packs in China in the second half of 2024, currently CATL is Nio's sole supplier of batteries for cars and battery swapping stations.[69]

Unlike in CATL's case but similarly to BYD's or Volvo's investment, NIO's project has not caused any public controversy, as neither environmental issues nor guest worker problems are linked to the project. In this case too, however, there is not

much local added value linked to production: the technology and production methods are Chinese, components are coming from China, while manufactured products are mainly exported. However, it should be stressed that R&D and training activities are atypical features of (Chinese) investments in the region, as investors typically do not bring R&D, but only assembly. These types of activities may also have the potential to involve local expertise, and there is also a greater chance of technological spillover effects.

Conclusion

China recognized the potential of electromobility two decades ago and has been consciously developing this segment using enormous resources. As a result, it has become a leader in the global EV market, not only selling more than twice as many EVs as Europe and the US combined, but also enjoying a significant competitive advantage in almost every area of the EV value chain. While China excels, European carmakers are facing adverse effects: not only are they being squeezed out of the Chinese market, but sooner or later they will also be overtaken at home by Chinese competitors, who will this time not only be cheaper but also qualitatively stronger. The automotive-dependent economies could suffer the consequences the most.

Given the strategic importance of the automotive industry for the European economy - as well as the EU climate goals, including the 2035 zero-emission goals - electromobility is no longer a question to be decided, but the way forward. Europe must therefore adapt somewhat to the new challenges by accepting investments related to EV assembly, investing in next-generation battery technologies and developing a better charging infrastructure. We are past the point of no return, containment is no longer working: European car makers are overly dependent on their Chinese suppliers, while the acceptance of Chinese brands is also growing rapidly in Europe.

Chinese EV companies have gained a foothold in Europe in a relatively short period of time and this trend is set to continue. They are targeting their investments mainly at countries where the automotive industry is traditionally strong, including the V4. Chinese investment in EV supply chains in the V4 is indeed increasing, but not in a balanced way: (1) there have been recent investments in three out of the four countries, but only one V4 country, Hungary, has seen a major increase; (2) the majority of projects are related to battery production, a smaller share to vehicle assembly, while R&D activity is negligible; (3) local suppliers have little chance of getting involved, at least for the time being, due to the lack of experience and the reduction of components required in the EV production process compared to ICEVs.

In fact, for V4 countries, the EV industry presents a number of challenges. In addition to the lack of opportunities for local suppliers, local workers may be crowded out by cheaper guest workers. Pollution is a particular problem in relation to battery production, but there are also questions about the role these newly built battery plants will play if a new technology other than that of the current lithium-ion batteries appears on the market. These challenges are, however, not specific to China, but apply to all players of the EV industry.

Since the shift to EV production is largely dependent on foreign investment, the V4's growth will continue to be a dependent growth and will not improve these countries' highly dependent position in the automotive supply chains. Based on the contexts reviewed in this paper, the scenario that either the EV industry in general, or China in particular will provide the V4 countries with a way up the value chains does not seem likely at the moment: V4 countries will continue their assembling

activity, albeit with fewer components, which may have longer-term negative effects, especially for local spare parts suppliers. This may change somewhat over time, with more companies getting involved in various segments of production as they gain the necessary knowledge and experience. Chinese EV companies operating in the V4 seem open to cooperation in the field of R&D activities, such as battery life extension and recycling, which could be a good opportunity for local universities and knowledge centers in the longer run, potentially inducing technological spillovers.

The EU is investing hundreds of billions of euros in electromobility: pushing car manufacturers to produce EVs, boosting sales of these vehicles, and supporting the installation of a million charging stations by 2025. Although the EU is investigating whether Chinese EV companies have benefited from illegal subsidies, it is hard to imagine that this ambitious plan could be carried out without the Chinese companies currently leading the EV sector, at least in the short term. Besides, it is doubtful how successful the EU investigation can be as it is not enough for the Commission to prove that the Chinese state subsidized Chinese EV companies, it must also prove that there is a direct threat of injury to European industry and that there is a causal link between the two. And while the former is easy to demonstrate, the latter will be much more difficult to prove.[70]

At least some of the V4 countries seem to consider that it is still better to enable Chinese investment in European car assembly than to have Chinese electric car imports flooding European markets, as in this way the region can generate more added value. In order to avoid being left behind economically and technologically, V4 countries do not really have a choice when it comes to whether or not to get involved in EV manufacturing processes. However, they do have a certain degree of choice as to how they get involved and with whom they cooperate. While others have not yet fully decided, Hungary has rushed ahead and chosen a strategy of not being selective at all, neither in terms of activities nor in terms of investors. Whether it is the right strategy is beyond the scope of this analysis, but time will definitely tell.

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Footnotes

1 Ágnes Szunomár, "To connect or not to connect? Responding to the Digital Silk Road in Central and Eastern Europe," *European Journal of International Management,* forthcoming, https://www.inderscience.com/info/ingeneral/forthcoming.php?jcode=ejim#108818.

2 John J. Szabó, Andras Deák, Andrea Szalavetz and Gábor Túry, *The future of the European automobile industry Is zero-carbon possible with zero job loss? Country Study: Hungary 2022* (Brussels, Belgium: European Trade Union Institute, 2022), https://www.etui.org/sites/default/files/2022-08/Is%20zero-carbon%20possible%20with%20zero%20job%20loss%20-%20Hungary%20-%20Sazbo.pdf.

3 Magdolna Sass and Andrea Szalavetz, "Crisis and Upgrading: The Case of the Hungarian Automotive and Electronics Sectors," *Europe-Asia Studies* 65, no. 3, (2013): 489-507, https://www.tandfonline.com/doi/full/10.1080/09668136.2013.779463.

4 Petr Pavlínek, *Dependent Growth: Foreign Investment and the Development of the Automotive Industry in East-Central Europe* (Cham, Switzerland: Springer, 2017), https://link.springer.com/book/10.1007/978-3-319-53955-3.

5 Andrea Szalavetz, "Digital transformation – enabling factory economy actors' entrepreneurial integration in global value chains?," *Post-Communist Economies* 32, no. 6 (2020): 771-792, https://www.tandfonline.com/doi/full/10.1080/14631377.2020.1722588.

6 Mary Hallward-Driemeier and Gaurav Nayyar, T*rouble in the Making?: The Future of Manufacturing-Led Development* (Washington D.C., United States: World Bank, 2017), http://hdl.handle.net/10986/27946.

7 Whether maintaining growth based on assembly activity - which analysts refer to as "the trap of low value-added manufacturing concentration"- is economically sound for these CEE countries is not the subject of this paper, but it is perhaps worth noting that the author of this paper also argues that the aim should be to shift the structure of production towards higher value-added sectors and higher technology. See Péter Ákos Bod, "Átmeneti ütemvesztés vagy a közepes jövedelem csapdája. Kommentár a magyar gazdaságfejlesztési teendőkhöz (Temporary loss of momentum or the middle-income trap. Commentary on the Hungarian economic development agenda)," *Gazdaság és Pénzügy* 2, no. 1 (2015), https://bankszovetseg.hu/Public/gep/2015/bod%20peter%20akos%202-17uj.pdf.

8 Camille Boullenois, Agatha Kratz, and Reva Goujon, "Opening Salvo: The EU's Electric Vehicle Probe and What Comes Next," *Rhodium Group*, October 2023, https://rhg.com/research/opening-salvo-the-eus-electric-vehicle-probe-and-what-comes-next/.

9 "Commission launches investigation on subsidised electric cars from China," European Commission, October 4, 2023, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_4752.

10 "Automotive Industry," European Commission, https://single-market-economy.ec.europa.eu/sectors/automotive-industry_en.

11 Peter Pavlínek, "Transition of the automotive industry towards electric vehicle production in the east European integrated periphery," *Empirica* 50, (2023): 35-73, https://link.springer.com/article/10.1007/s10663-022-09554-9.

12 Iveta Černá et al, *GVCs in Central Europe - A Perspective of the Automotive Sector after COVID-19* (Bratislava, Slovakia: Vydavateľstvo Ekonóm, 2022), https://gvcsv4.euba.sk/images/PDF/monograph.pdf.

13 "Key sectors - Mobility," CzechInvest, 2019, https://www.czechinvest.org/en/Key-sectors/Mobility.

14 "Despite extensive challenges in 2022, a total of 1.25 million vehicles were produced in the Czech Republic," AutoSAP, January 2023, https://autosap.cz/en/aktualita/pres-rozsahle-vyzvy-roku-2022-bylo-v-ceske-republice-vyrobeno-celkem-125-mil-vozidel/.

15 Iveta Černá et al, *GVCs in Central Europe - A Perspective of the Automotive Sector after COVID-19* (Bratislava, Slovakia: Vydavateľstvo Ekonóm, 2022), https://gvcsv4.euba.sk/images/PDF/monograph.pdf.

16 "Hungary motor vehicle production," CEIC, https://www.ceicdata.com/en/indicator/hungary/motor-vehicle-production.

17 "Automotive industry in Hungary - statistics & facts," Statista, https://www.statista.com/topics/8122/automotive-industry-in-hungary/.

18 Rhiannon Edwards, "Hungary's automotive industry: moving on, moving up," CIB Bank, March 21, 2022, https://www.cib.hu/en/Maganszemelyek/our_world/growing-business/automotive.html.

19 Iveta Černá et al, *GVCs in Central Europe - A Perspective of the Automotive Sector after COVID-19* (Bratislava, Slovakia: Vydavateľstvo Ekonóm, 2022), https://gvcsv4.euba.sk/images/PDF/monograph.pdf.

20 "Poland motor vehicle production," CEIC, https://www.ceicdata.com/en/indicator/poland/motor-vehicle-production.

21 "Poland recharges its batteries," Ministry of Economic Development and Technology, October 12, 2023, https://www.trade.gov.pl/en/news/poland-recharges-its-batteries/.

22 "Slovakia Automotive Electric Vehicles Action Plan," Official Website of the International Trade Administration, October 25, 2023, https://www.trade.gov/market-intelligence/slovakia-automotive-electric-vehicles-action-plan.

23 Ibid.

24 Devin Haas, "Economy in focus: Slovakia," *Emerging Europe*, August 17, 2023, https://emerging-europe.com/news/economy-in-focus-slovakia/.

25 Nolan Theisen and Slavomir Hubatka, *Slovakia: An Automotive Industry Perspective* (Bratislava, Slovakia: Globsec, 2021), https://euagenda.eu/upload/publications/slovakia-an-automotive-industry-perspective.pdf.

26 Martin Šebeňa, Thomas Chan and Matej Šimalčík, *"Hidden links: V4's final demand exposure toward the Chinese market,"* (Bratislava, Slovakia: CEIAS, 2023), https://ceias.eu/wp-content/uploads/2023/10/V4-exposures-paper_FINAL.pdf.

27 Timothy Sturgeon, Johannes Van Biesebroeck and Gary Gereffi, "Value chains, networks and clusters: reframing the global automotive industry," *Journal of Economic Geography* 8, no. 3 (May 2008): 297-321, https://academic.oup.com/joeg/article/8/3/297/941684.

28 "Merge ahead: Electric vehicles and the impact on the automotive supply chain," PWC, https://www.pwc.com/us/en/industries/industrial-products/library/electric-vehicles-supply-chain.html.

29 Ibid.

30 Joanne Perry, "CEE: At the heart of Europe's electric future," *Automotive Logistics*, October 16, 2019, https://www.automotivelogistics.media/electric-vehicles/cee-at-the-heart-of-europes-electric-future/39387.article.

31 Ivana Karásková, Alicja Bachulska, Agnes Szunomár and Stefan Vladisavljev (eds.), *Empty shell no more: China's growing footprint in Central and Eastern Europe* (Prague, Czech Republic: Association for International Affairs, 2020), https://chinaobservers.eu/wp-content/uploads/2020/04/CHOICE_Empty-shell-no-more.pdf.

32 Tamás Matura et al., "Chinese Investment in Central and Eastern Europe Data Set," *Central and Eastern European Center for Asian Studies*, April 2021, https://www.china-cee-investment.org/the-dataset.

33 Ibid.

34 Peter Pavlínek, "Transition of the automotive industry towards electric vehicle production in the east European integrated periphery," *Empirica* 50, (2023): 35-73, https://link.springer.com/article/10.1007/s10663-022-09554-9.

35 Ivana Karásková, Alicja Bachulska, Agnes Szunomár and Stefan Vladisavljev (eds.), *Empty shell no more: China's growing footprint in Central and Eastern Europe* (Prague, Czech Republic: Association for International Affairs, 2020), https://chinaobservers.eu/wp-content/uploads/2020/04/CHOICE_Empty-shell-no-more.pdf.

36 "Hello! We are BYD!", Official Website of BYD, December 29, 2022, https://www.byd.com/eu/blog/Hello-we-are-BYD.html.

37 Pál Nyiri et al, "Truly a European company': a Chinese auto maker's strategies of Europeanisation," *Asia Pacific Business Review*, 2022, https://www.tandfonline.com/doi/full/10.1080/13602381.2022.2093535.

38 Interview for previous research with BYD representative, 2020-2021.

39 Interview for previous research with BYD representative, 2020-2021.

40 Pál Nyiri et al, "Truly a European company': a Chinese auto maker's strategies of Europeanisation," *Asia Pacific Business Review*, 2022, https://www.tandfonline.com/doi/full/10.1080/13602381.2022.2093535.

41 Interview for previous research with BYD representative, 2020-2021.

42 "BYD Awarded a Major Order for eBuses in Hungary," Official Website of BYD, April 4, 2022, https://bydeurope.com/article/419.

43 "Nemzeti Akkumulátor Iparági Stratégia / National Battery Industry Strategy 2030," Ministry of Innovation and Technology of Hungary, September 29, 2022, https://cdn.kormany.hu/uploads/document/c/c6/c61/c61e79e054c555b6e11fad171e99d0ad691a2b81.pdf.

44 "Viktor Orbán met the head of BYD," *Portfolio*, October 19, 2023, https://www.portfolio.hu/gazdasag/20231019/a-byd-vezerevel-targyalt-orban-viktor-646583.

45 "BYD to Build A New Energy Passenger Vehicle Factory in Hungary for Localised Production in Europe," Official Website of BYD, December 22, 2023, https://www.byd.com/eu/news-list/BYD_to_Build_A_New_Energy_Passenger_Vehicle_Factory_in_Hungary_for_Localised_Production_in_Europe.html.

46 "BYD, World's Top Electric Car Manufacturer to Build European Factory in Szeged", *Hungary Today*, December 22, 2023, https://hungarytoday.hu/byd-worlds-top-electric-car-manufacturer-to-build-european-factory-in-szeged/.

47 "Zhejiang Geely Holding Group – A Global Mobility Technology Enterprise," Official Website of Geely, https://zgh.com/locations/?lang=en.

48 "Volvo Cars gears up for long-term sustainable growth with new Slovakia electric car manufacturing plant," Official Website of Volvo Cars, July 1, 2022, https://www.media.volvocars.com/global/en-gb/media/pressreleases/302778/volvo-cars-gears-up-for-long-term-sustainable-growth-with-new-slovakia-electric-car-manufacturing-pl-5.

49 "Volvo Cars hodlá zdvojnásobit kapacitu chystané továrny na Slovensku," *České Noviny*, September 13, 2023, https://www.ceskenoviny.cz/zpravy/2413042?_.

50 "Volvo is coming, Slovakia to end up with fifth carmaker," *The Slovak Spectator*, July 1, 2022, https://spectator.sme.sk/c/22951744/volvo-is-coming-slovakia-will-get-the-fifth-carmaker.html.

51 "Construction of the Volvo plant in Eastern Slovakia officially starts," *ÚjSzó*, February 20, 2023, https://ujszo.com/kozelet-regio/hivatalosan-is-elindult-a-volvo-kelet-szlovakiai-gyaranak-epitese.

52 András Kósa, "Volvo factory failed in Hungary, company goes to Slovakia," *Azonnali*, July 1, 2022, https://azonnali.hu/cikk/20220701_elbukta-a-volvo-gyarat-magyarorszag-szlovakiaba-megy-a-ceg.

53 Róbert Turza,"Top investment makes itself known. Volvo casts its net and grabs its first suppliers," November 24, 2022, *Hospodárske Noviny*, https://hnonline.sk/finweb/ekonomika/96052967-top-investicia-o-sebe-dava-vediet-volvo-rozhadzuje-siete-a-chyta-prvych-dodavatelov.

54 Tamás R. Mészáros, "The flagship of Chinese industrial policy arrives in Hungary, for which a separate strategy has been developed in Brussels," *G7*, August 30, 2022, https://g7.hu/vallalat/20220830/a-kinai-iparpolitika-zaszloshajoja-erkezik-magyarorszagra-amelyre-brusszelben-kulon-strategiat-dolgoztak-ki/.

55 Henry Sanderson, "How CATL Became China's Electric Vehicle Battery King," *Time*, September 29, 2022, https://time.com/6217992/china-electric-vehicle-catl/.

56 Ágnes Szunomár et al., "State-powered electromobility: the role of the state in the development of the electric car industry in China," *Külgazdaság 67,* no.7-8, (2023):66-94, https://kulgazdasag.eu/article/1665.

57 "CATL's German plant kicks off cell production," Official Website of CATL," December 21, 2022, https://www.catl.com/en/news/1046.html.

58 "CATL considers third battery plant in Europe," *Automotive News Europe*, September 23, 2022, https://europe.autonews.com/suppliers/catl-considers-third-battery-plant-europe.

59 "CATL's New Battery Plant To Become Hungary's Largest Greenfield FDI Project Ever," Official Website of the Hungarian Investment Promotion Agency, August 12, 2022, https://hipa.hu/news/catl-s-new-battery-plant-to-become-hungary-s-largest-greenfield-fdi-project-ever-/.

60 Interview with CATL representative, October 2023.

61 "The installation of even a single battery factory in our region poses a particular risk to citizens," *Debreciner*, October 12, 2023, https://www.debreciner.hu/cikk/15029_tersegunkben_kiemelt_kockazatot_jelent_az_nezve_akar.

62 "Debrecen is letting polluting factories set up in the city without an independent environmental programme since 2015," *Debreciner,* August 5, 2023, https://www.debreciner.hu/cikk/14504_debrecen_ugy_engedi_letelepedni_a_kornyezetterhelo_a.

63 András Zimon, "Do the people of Debrecen live in fear of guest workers?," *Frisshírek*, September 22, 2023, https://frisshirek.hu/cikk/20230922_a-debreceniek-felelemben-elnek-a-vendegmunkasok-miatt.

64 "NIO Launches Battery as a Service," August 20, 2020, Official Website of NIO, https://www.nio.com/news/nio-launches-battery-service.

65 "Introducing NIO," *Investor Insight Asia*, August 12, 2022, https://www.investorinsights.asia/post/introducing-nio.

66 "NIO Power Europe Plant to Commence Operation," Official Website of NIO, July 29, 2022, https://www.nio.com/blog/nio-power-europe-plant-commence-operation.

67 Ron Klein, "Chinese CEO says why he loves Hungary," *Világgzadaság*, September 26, 2023, https://www.vg.hu/cegvilag/2023/09/a-kinai-vallalatvezeto-kimondta-miert-szereti-magyarorszagot-szep-gyujtemeny.

68 "Vice President of Chinese Automotive Giant Praises Hungary," *Hungary Today*, September 27, 2023, https://hungarytoday.hu/vice-president-of-chinese-automotive-giant-praises-hungary/.

69 "Exclusive: EV maker Nio plans new 40 GWh battery plant in China - sources," *Reuters*, February 24, 2023, https://www.reuters.com/technology/ev-maker-nio-plans-new-40-gwh-battery-plant-china-sources-2023-02-24/.

70 Camille Boullenois, Agatha Kratz, and Reva Goujon, "Opening Salvo: The EU's Electric Vehicle Probe and What Comes Next," *Rhodium Group*, October 23, 2023, https://rhg.com/research/opening-salvo-the-eus-electric-vehicle-probe-and-what-comes-next/.