

From Behind the Great Wall with (No) Strings Attached? Visegrád Group Vulnerabilities and Dependencies on Chinese Dual-Use Imports

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Abstract

This paper examines the dependence of the Visegrád Group (V4) economies on imports of advanced dual-use goods from China. Using frameworks of international political economy, economic security, and weaponised interdependence, dual-use items are treated as potential geoeconomic leverage. Vulnerability areas are identified through the analysis of trade in value added, intra-industry trade, and strategic import dependencies. The findings show a growing share of Chinese value added in V4 final demand and exports, reinforcing structural dependence in machinery, automotive, electronics, optics, and chemicals. On the one hand, weak comparative advantages and external vulnerabilities limit the V4's resilience and position in global value chains. On the other hand, however, the intensity of the intra-industry trade suggests untapped potential for upgrading domestic production of dual-use goods. Recommendations include strengthening national and EU capabilities in dual-use clusters, regionally coordinated development of R&D ecosystems, leveraging knowledge-intensive services, prioritising European content, and improving analytics to map critical nodes, as well as direct and indirect dependencies.

Keywords: dual-use, V4 economies, China, economic security, resilience

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Introduction

For many years, China's economic and technological power evolved under a low-profile approach, while the neoliberal globalisation paradigm simultaneously privileged low production costs within global value chains (GVCs). Together, these dynamics facilitated China's emergence as the "Factory of the World". This transformation was reinforced by its innovation-driven development strategy and industrial policy, which were based on the idea that China had a once-in-a-lifetime opportunity to get in on the ground floor of a technological revolution and vault into the leading ranks of economic and technological powers (Naughton 2021). During the same period, the European Union (EU) adhered to a stance of liberal pragmatism, prioritising economic benefits on the one hand, while expressing inconsistent reservations regarding human rights protection on the other (see Brown 2018; Fulda 2024). Under these conditions, a critical inflexion point went largely unnoticed: the relocation of environmentally and socially "dirty processes" translated into overdependence on Chinese inputs. As a consequence, this dependence has enabled China to leverage economic relations and its geostrategic priorities, including efforts to reconfigure the international order (see Blackwill and Harris 2016; Spalding 2022; Zenglein 2024; Sinkkonen 2025).

A clear manifestation of this asymmetry is the weaponisation of interdependencies through mechanisms such as the panopticon and chokepoint effect (Fjäder 2018; Farrell and Newman 2019). These dynamics of new threats intensify the quest for technological leadership, which in turn amplifies the geopolitical motivations to control critical elements of production networks. Escalations in trade tensions and the calibration of economic pressure also extend to dual-use goods. Against this background, efforts to restore the EU's innovation capacity and competitiveness (see Draghi 2024) encounter mounting obstacles, particularly in industries combining highly advanced, energy-efficient production with knowledge-intensive services.

In response to these challenges, the EU has begun to broaden its toolkit beyond mere export controls. The new mix aims at the adoption of an economic security strategy (European Commission 2023; see Rosén and Meunier 2023), safeguarding against economic coercion (ACI; see Szép 2024), the introduction of new tariffs, enhanced FDI screening, security of research and technology transfer, as well as provisions on critical raw materials (CRM). Importantly, growing awareness of vulnerabilities is accompanied by a more systemic diagnosis of bottlenecks and the identification of necessary countermeasures. Nevertheless, the formulation of comprehensive responses remains a significant challenge. Critics argue that this pattern reflects deeper problems, including power understood as a destructive ability not to learn, collective complacency, self-imposed circumvention of constraints, and a form of triadic thinking, wherein China is framed as a partner, competitor, and geopolitical rival (see Fulda 2024; Stec 2025).

Against this background of growing volatility and uncertainty, the international environment is undergoing a gradual shift towards sceptical liberalism (see Nissen and Dreyer 2024). This change may prove decisive for reshaping the practice of European strategic autonomy (see Helwig and Sinkkonen 2022), as its primary attention turns towards eroding interdependencies (see Roberts, Choer Morales, and Ferguson 2019). Within this context, the perception of both traditional and emerging threats reinforces

the return of industrial policy (see Evenett et al. 2024) as well as initiatives aimed at strengthening economic security and resilience.

These dynamics constitute a key dimension of the international economic policies of the Visegrád Group (V4) countries. Operating within their current development model, they seek to avoid being trapped in a (semi-)peripheral status and instead strive to strengthen their position within the EU and the global economy. Given the integration of V4 economies into European production networks (Vlčková 2018; Cieślik 2019), supply chain resilience is of critical importance to their long-term prospects. At the same time, however, new challenges and potential tensions are emerging. From a structural perspective, one such challenge stems from the growing similarity of Chinese exports and those originating from the V4 (Javorčík 2025; WTO 2025), which may intensify competitive pressures in key sectors.

The structure of the paper is as follows. Section 2 outlines the research objectives and methodological approach. Drawing upon a comprehensive literature review in Section 3, I situate the research question within the academic discourse, thereby providing a framework for contextualising novel findings in Section 4. These findings serve then as the basis for discussion and the formulation of policy recommendations in Section 5. The last section concludes.

Research Objectives and Methods

The research inquiry zeroes in on the V4's import dependencies on technologically advanced dual-use goods originating from China. The primary objective is to evaluate the potential ramifications of vulnerability. I argue that excessive exposure to uncertain supplies and disruptions may undermine the strategic autonomy of the EU while adversely affecting the structural competitiveness of the V4 economies. This vulnerability is also linked to their development pattern, which relies on trade openness and the inflow of foreign direct investment (see Nölke and Vliegenthart 2009; Bohle and Greskovits 2012). These are pivotal factors determining regional and global value chains as well as the position of the V4 economies.

Against this backdrop, this research is positioned at the intersection of international political economy, international economics, and economic security. It also aligns with the growing body of scholarship arguing that the boundaries between the traditional security agenda and economic matters have become increasingly blurred (see Drezner 2024). In this context, drawing on the theory of trade expectations (Copeland 2014), increased instability in strategic trade flows combined with asymmetries may elevate the likelihood of weaponised interdependence (Farrell and Newman 2019). Such conditions provide a rationale for both offensive measures, such as the diversification of supply sources, and defensive ones, including the regulation of access to domestic markets. Nevertheless, their implementation tends to give rise to a sequence of tensions typical of the security dilemma, as actions launched to enhance resilience may be interpreted as threats by other parties.

It is precisely within the nexus of trade and security competition that dual-use goods acquire particular relevance. Due to their military and civilian applications, they constitute an efficient tool to influence the developmental trajectories of existing partners/rivals. Disruptions and modified dynamics of so-called coopetition may directly affect national security outcomes (see Pandiyan and Schild 2025;

Svetlicinii and Su 2025). Moreover, the classification of dual-use goods overlaps with sectors of strategic importance for the EU's competitiveness, including defence, space, clean-tech, bio-tech, and med-tech, which may amplify systemic risks.

At the empirical level, the research draws on trade statistics sourced from the OECD (2025c), Eurostat (2025), and the International Trade Centre (ITC 2025). The analysis is conducted at the 6-digit level of data disaggregation (HS6). In order to identify areas of dependency and vulnerability related to dual-use goods, I triangulate complementary measures: the symmetrical revealed comparative advantage (SRCA); the Grubel-Lloyd Index (GLI), which captures the intensity of intra-industry trade and distinguishes between its horizontal and vertical components; the Herfindahl-Hirschman concentration index (HHI); diagnostics of strategic dependencies by the European Commission (2021); and the external vulnerability index (Garcia and Ho 2025).

By combining these methods, the analysis provides a comprehensive identification of dual-use product clusters wherein dependencies on China are most pronounced. According to the classification of the European Commission (2024), the list of dual-use goods comprises 1,251 HS8 items, which, upon aggregation to the HS6 level, results in 851 product categories. This classification is key to national security as it translates into the scope of export controls, considering the context of technological sovereignty, trade sanctions, the risk of their circumvention, and long-term implications for international peace. Within this set, a total of 140 HS6 clusters fall within strategic industries, while 603 clusters are classified as mid-tech (MT), mid-high-tech (MHT), and high-tech (HT) categories. This distribution underscores the technological intensity of the dependencies examined here.

However, the study is subject to certain methodological limitations. The emphasis placed on direct bilateral trade relations does not fully capture the complexity of production networks or the pressures which may be transmitted through multi-tiered supply chains. As noted by Šebeňa, Chan, and Šimalčík (2023), traditional bilateral trade statistics provide only an approximation of actual exposures; therefore, they tend not to reflect the true extent of exposure to China. In practice, the real level may be up to twice as high as that in officially reported figures. To address this, insights from Trade in Value Added (TiVA) covering direct and indirect links provide a more comprehensive picture.

Literature Review

Dual-use goods as a likely mechanism of pressure exerted by China towards the V4, viewed through the lens of the EU's strategic autonomy, remains insufficiently addressed within contemporary scholarship. The following literature review, therefore, seeks to map an interdisciplinary field that sits at the intersection of international political economy, security studies, and EU external economic governance. By reflecting on and synthesising related findings, I outline recent research paths, identify the gap motivating this inquiry, and highlight implications that are relevant to evidence-based public policy.

Against this background, the foundational premise of this investigation is articulated by Brown (2018), who argues that the EU did not adequately anticipate the implications of China's rise, which in turn contributed to the absence of a coherent policy for building substitution capacity and the pursuit of strategic

autonomy. As a result, contemporary policy responses often appear improvised and delayed rather than logically sequenced. This matters particularly for the V4 economies. Their weaker competitiveness, less advantageous position within GVCs, and fragile linkages between international companies and domestic suppliers and the R&D sector (see Vlčková 2018) increase their exposure to external shocks and supply-side disruptions. In other words, these structural features of the development model translate into specific vulnerabilities amidst increasingly contested external circumstances.

These vulnerabilities also become more salient as Chinese corporate presence and the share of Chinese value added expand (see Ciešlik 2019). In line with the logic of weaponised interdependence (Farrell and Newman 2018), a deeper integration into China-centred production and technology networks may narrow the room and scope for potential countermeasures, especially when critical hubs and chokepoints lie beyond the EU's direct influence. This observation motivates, in turn, a more explicit geoeconomic examination of uncertainties, vulnerabilities, and the potential ramifications of external coercion. Put differently, it points to the securitisation of economic policy (see Roberts, Choer Moraes, and Ferguson 2019) and the associated conceptual challenges posed to policy-making. The EU's integration historically rooted in openness to trade and cooperation has also fostered a political mindset in which deep interdependencies are treated as a default good. Consequently, even when tensions and negative spillovers become obvious, it appears to be exceedingly difficult to challenge established assumptions and dominant thought patterns for policy scripts. The debates thus continue to be framed, to a large extent, by the paradigm of post-liberal management of complex interdependencies (see Nissen and Dreyer 2024), rather than by a decisive turn towards more robust economic security toolkits and actions.

For this reason, this orientation translates into a two-pronged policy. On the one hand, it prioritises maintaining dialogue, strengthening diversification, and adopting strategies such as de-risking or friend-shoring. On the other hand, it can imply a degree of hesitancy: an intellectual and institutional inability to pursue more definitive remedies and responses when interdependencies become channels of coercion. As Poutala, Sinkkonen, and Mattlin (2022) noted, divergent member-state interests and the constraints on the European Commission's competences can undermine the capacity to mitigate and de-weaponise external pressures. At the same time, the EU often operates in its institutional "comfort zone", which entails a proficient institutionalisation of response mechanisms, e.g., through ACI regulations, thereby activating its own bureaucratic apparatus (see Freudlsperger and Meunier 2024; Szép 2024).

Nevertheless, a key uncertainty remains as to whether such signalling and the communication of deterrence will translate into consistent actions. As Hrynkiv and Lavrijssen (2024) argue, WTO security exceptions appear poorly suited to the nature of contemporary geopolitical tensions. It is, therefore, unsurprising that scholarly and policy attention is gradually shifting towards the identification of critical dependencies and the specification of coercive scenarios, as the escalation of disputes amplifies the risk of new retaliatory measures and erosion of the liberal international order.

Within this evolving landscape, the position of the V4 economies is unique. Their attractiveness for foreign investment inflows remains robust and could facilitate near-shoring strategies (see Guerrieri and Padoan 2024), which suggests an opportunity to relocate selected stages of production closer to the EU core. Nonetheless, the same pattern may also reinforce a dependent development based

on FDI-led industrial transformation. As Éltető, Sass, and Götz (2022) posit, such a model would deepen the dualism between foreign-owned subsidiaries and the domestic SME sector. Moreover, the emergence of technologically advanced industrial production, driven by robotisation and the AI revolution, alongside the weak local linkages with the R&D sector, may entrench import dependence on China for key inputs. Consequently, what appears as industrial upgrading may reproduce external reliance, thereby complicating the implementation of the EU's strategic autonomy.

This concern is reinforced by more granular evidence on specific supply relations. According to the ETNC/Merics report (Andersson and Lindberg 2024), Europe is significantly dependent on Chinese sources for a range of components and materials, including but not limited to magnets, lithium, and photovoltaic parts and accessories. In this context, the V4 economies can function as a bridge to the EU market for China (see Pavlínek 2025) and compete among themselves. They also identify and respond differently to Chinese engagement in the region (see Melnychuk and Pavliuk 2025). Importantly, emerging tensions should not be interpreted solely as a bilateral EU-China dynamic. They may also reflect US diplomatic pressure and the extraterritorial application of US legal frameworks designed to curb China's and Europe's growth in areas of perceived vulnerability, including dual-use domains (see NSS 2025; Pandiyan and Schild 2025). This geopolitical setting matters because it shapes the range of incentives, limitations, and risk perceptions that must be taken into account in decision-making.

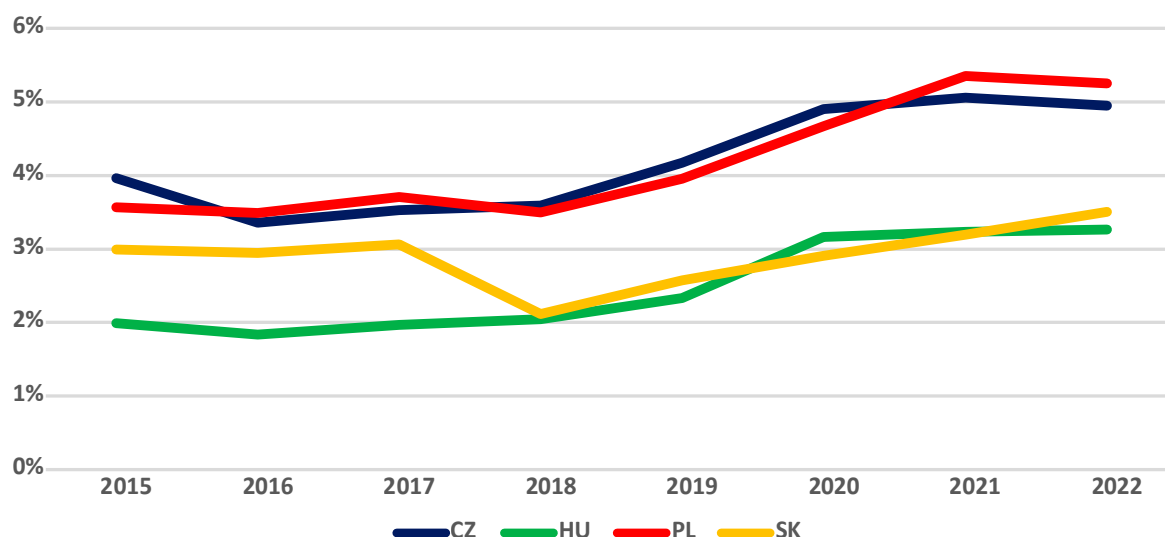
From this perspective, the stick-and-carrot approach suggests that green technologies may emerge as a salient area of both political pressure and technological inducements offered by China to the V4 countries. China's central position within these value chains amplifies the likelihood of creating bottlenecks, especially if V4 strategies aim to advance into segments of higher technological sophistication and complexity, which may also foster more intense intra-V4 rivalry. Higher exposure to import disruptions can thus be linked to limited substitution opportunities for components, stemming in part from the insufficient presence of local suppliers (see Qiu et al. 2025).

Furthermore, it is essential to recognise that the coercive throttling potential is gravitating towards deep tech domains such as AI, digital infrastructure, advanced materials, energy and chemical technologies. This shift broadens the discussion from narrow trade dependencies to questions about the degree and scope of supply diversification, as well as the capacity to promote frontier innovation and technological sovereignty, the latter being widely understood as a cornerstone of the EU's strategic autonomy (see Infuture Institute 2025).

Results

The dependence of the V4 economies on value added (VA) generated in China increased steadily between 2015 and 2022. To capture this tendency, I measure the share of Chinese VA in the total final demand for foreign VA in the V4 countries, with an adjustment that narrows the scope to industrial codes in which goods classified as dual-use are present (Chart 1). This refined approach covers categories B06, B07, and C19–C30 (see OECD 2025a; 2025b), thereby aligning the measurement more closely with the security-relevant dimension of trade dependencies. Both perspectives reveal that Chinese VA has become an important component of the V4's final consumption. Import dependence in terms of final demand is not evenly distributed across sectors; rather, it is

concentrated in particular categories that constitute the core areas of vulnerability: the manufacture of computer, electronic, and optical products (C26), the manufacture of electrical equipment (C27), the manufacture of machinery and equipment (C28), and the manufacture of chemicals and chemical products (C20).

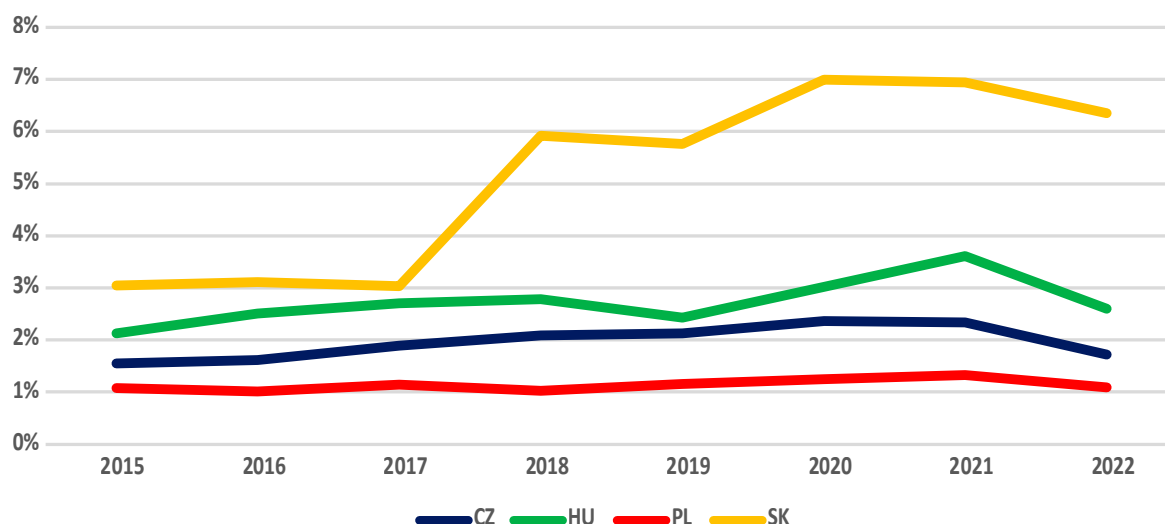


* Codes B06, B07 and C19–C30.

Chart 1. Share of Chinese value added from selected sectors* in the final demand for foreign value added in the V4 economies, 2015–2022

Source: own study based on OECD 2025a; 2025c.

Given that the development model of the V4 economies is largely driven by export performance and participation within GVCs, it is also necessary to move from sectoral identification to a trade-embedded perspective. Accordingly, I examine the share of Chinese VA from the above-mentioned categories in the value of gross exports (Chart 2), as this captures how upstream dependencies may determine the competitive potential of each economy. The results suggest that the structure of Chinese VA differs across the V4, which reflects their distinct specialisations. In Czech exports, Chinese VA originates from the manufacture of motor vehicles, trailers, and semi-trailers (C29), the manufacture of computer, electronic, and optical products (C26), and the manufacture of electrical equipment (C27). In Hungary, it is derived from C29 and C26 (as above). In Poland, the largest contributions come from the mining of metal ores (B07) and C27. In Slovak exports, Chinese VA derives mainly from C29.



* Codes B06, B07 and C19–C30

Chart 2. Share of Chinese value added from selected sectors* in the gross exports of the V4 economies, 2015–2022

Source: own study based on OECD 2025a; 2025c.

Based on these results, it becomes evident that market size in Poland and Czechia is a key factor behind the relatively greater importance of Chinese VA in final demand. By contrast, a different pattern emerges when the focus shifts from domestic consumption to export performance. In the case of gross exports, Slovakia and Hungary function as FDI-led production hubs and thus appear more exposed to potential disruptions in the supply of Chinese VA. Greater reliance on Chinese components in key export sectors, particularly automotive and electronics, may help contextualise differences in V4 foreign-policy orientations and risk tolerance. It may also, at least in part, explain the stronger preference in Hungary and Slovakia for a balancing strategy between the EU and China. Under such circumstances, managing political tensions may be driven by national interests and the imperative to safeguard domestic employment and industrial performance.

This mapping of exposure also strengthens the rationale for locating potential dependence on China in the dual-use domain within categories associated with medium- and high-technology intensity, such as components, equipment, and machinery, while also acknowledging the salience of raw materials, particularly in Poland. Crucially, these observations are matched by an evident trend: the relatively high share of dual-use goods in V4 imports from China between 2015 and 2024 (Chart 3).

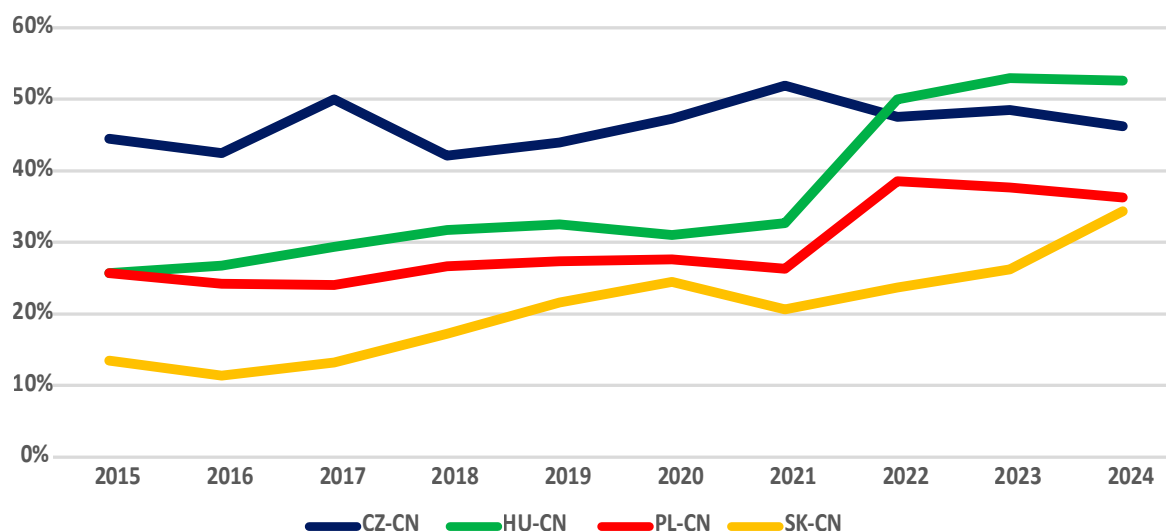


Chart 3. Share of dual-use goods in V4 imports from China, 2015–2024

Source: own study based on the ITC 2025 and the European Commission 2024.

Among the dual-use clusters, those accounting for the highest value of V4 imports from China are concentrated in the mechanical, electrical, and electronics industries. Thus far, the findings naturally lead to the question of whether the V4 economies possess competitive potential in the area of dual-use goods that could contribute to strengthening their economic resilience. To address this issue, two complementary approaches are proposed to identifying (dis)advantages. First, I employ a modified version of the symmetrical revealed comparative advantage indicator ($SRCA^*$), defined as the difference between export- and import-based advantages ($SRCA^* = SRCA_{exp} - SRCA_{imp}$), calculated at the 6-digit level of trade data disaggregation. Second, I examine the intensity and structure of intra-industry trade, distinguishing between vertical and horizontal components, at the 8-digit level of disaggregation. Taken together, these approaches allow to capture both competitive positions and the qualitative features of trade specialisation.

The results of the $SRCA^*$ analysis for dual-use goods point to a rather pessimistic assessment of the V4's current competitive position. Between 2020 and 2024, only 20–30% of all dual-use product clusters exhibited a revealed advantage. When the analysis is restricted to medium- and high-technology groups, the share declines further to 15–25% of all 851 dual-use HS6 MT, MHT, and HT clusters (see Chart 4). Narrowing the focus even more to sectors that are key to the EU's competitiveness and strategic autonomy (i.e., defence, space, clean-tech, bio-tech, and med-tech) yields the most sobering result: only 2–5% of clusters demonstrate a competitive advantage. These findings underscore the structural constraints faced by the V4 economies in leveraging dual-use production as a source of resilience.

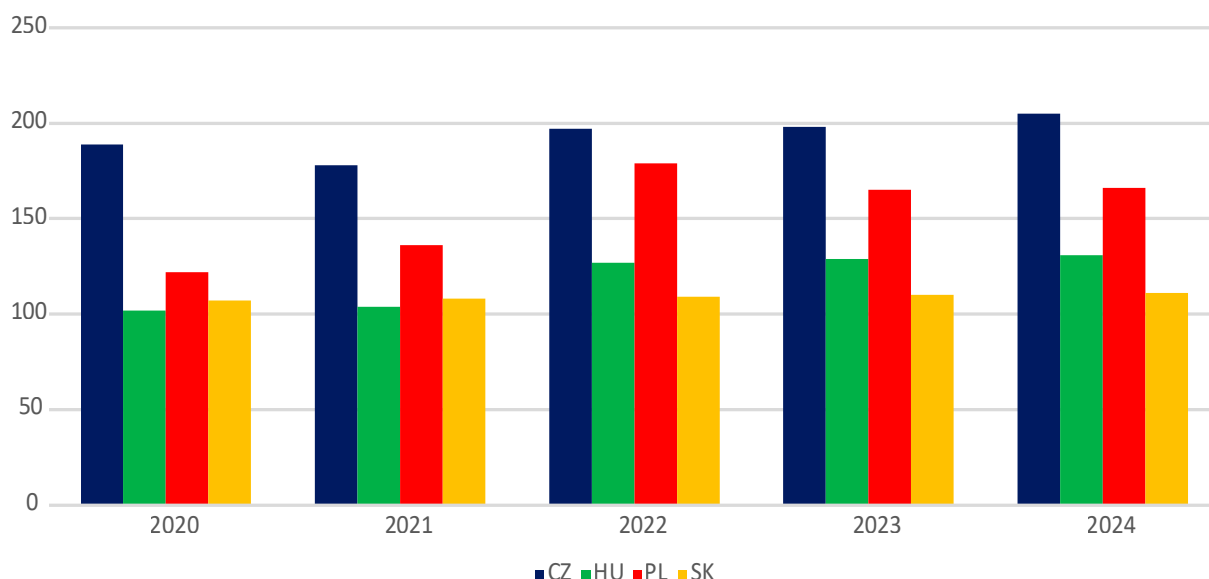


Chart 4. Number of dual-use HS6 clusters of medium- and high-technology intensity with a positive SRCA* in the V4 economies, 2020–2024

Source: own study based on the ITC 2025 and the European Commission 2024.

At the same time, however, country-specific dynamics suggest that external shocks can catalyse change and new opportunities for niche sectors. In the case of Czechia and Poland, the war in Ukraine has provided a significant impetus for transformations in selected segments of dual-use production and proven the capabilities of successful adaptation to external geopolitical circumstances. Among the clusters with the highest SRCA* values, there are drones, light aircraft, radio navigation equipment, firearms, howitzers, detonators, nitrocellulose, fuses, gunpowder stabilisers, and graphite electrodes. While these developments remain limited in scope, they shed light on areas in which demand and security rationales may intersect with emerging competitive potential.

Conversely, the dual-use clusters that appear most vulnerable to possible Chinese interference, i.e., those combining high turnover in total imports with the lowest value of the SRCA* index, include parts and accessories of automatic data-processing machines, electronic integrated circuits (CZ, HU), automatic portable data-processing machines, smartphones for wireless networks, parts suitable for use solely or principally with flat panel display modules (PL); and lithium-ion accumulators, and boards, cabinets, and similar combinations of apparatus for electric control (SK).

Taken together, this pattern suggests that advanced electronics and related components constitute the primary area of V4 vulnerability. This is particularly salient in the context of automation and robotisation, which increases the economy-wide relevance of such inputs not only for industrial production but also for everyday infrastructures and services. At the same time, the existing lack of competitive advantage in these segments should not provide justification for abandoning the development of domestic key competences. Instead, it highlights why capacity-building debates are central to economic security and strategic autonomy.

Building on this diagnosis, the next step in this study extends the analysis beyond trade values to incorporate quantities, as this enables us to estimate the intensity of intra-industry trade using the Grubel-Lloyd index (GLI). By comparing average export and import prices, I approximate product quality and distinguish

between vertical and horizontal trade. In combination, these measures provide a more detailed assessment of structural competitiveness in the V4's dual-use sectors.

The results (see Chart 5) indicate a relatively high level of structural competitiveness in the Czech economy (GLI > 70%), alongside a clear upward trend in the vertical high-quality trade category (i.e., exported goods are, on average, more expensive and thus proxied as higher quality than imported ones). A similar profile is also observed in Slovakia (GLI > 60%), where horizontal trade (i.e., comparable price/quality level in exports and imports) is more pronounced. By contrast, Hungary and Poland exhibit stagnation over the period covered by this study, with the GLI around 54–57%.

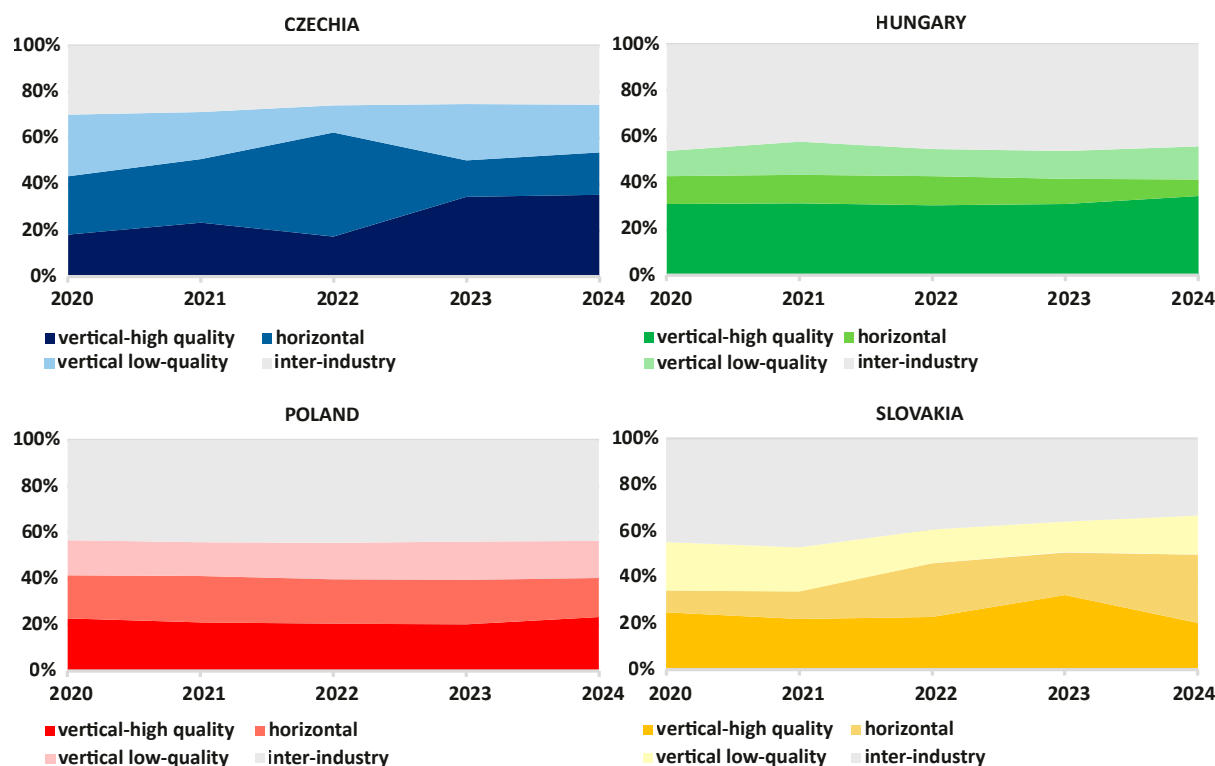


Chart 5. Intensity of intra-industry trade in dual-use goods of V4 economies, 2020–2024

Source: own study based on Eurostat 2025 and the European Commission 2024.

In identifying areas of heightened vulnerability, the analysis focuses on streams of vertical low-quality trade, where imported goods are of higher quality/value than exported products. This pattern signals likely constraints and asymmetric dependence. The results indicate that particular attention should be devoted to the machinery and electronics sectors. Across at least three V4 countries, recurrent categories include machines, mechanical appliances, and their parts, as well as electronic integrated circuits. Moreover, country-specific areas of potential vulnerability can also be identified. In Czechia, they include hard disk storage drives for automatic data-processing machines, industrial robots, and electrical apparatus for making connections to or in electrical circuits. In Hungary, vulnerability is concentrated in artificial graphite, while in Slovakia, it is found in machinery and apparatus for filtering or purifying air, apparatus for the transmission or reception of voice, images or other data, and cards incorporating one or more electronic integrated circuits.

Building on this analysis, the next stage of the study seeks to determine exposure to potential import disruptions from China through the diagnosis of strategic dependencies (SD),

following the methodology of the European Commission (2021). This approach combines three indicators: the import concentration index (the Herfindahl-Hirschmann index, HHI, with a benchmark threshold of 4000), the share of extra-EU-27 imports in total imports (threshold value of 0.5), and the ratio of extra-EU-27 imports to total exports (threshold value of 1.0). For the purpose of this analysis, I adopt a more conservative threshold of HHI = 2500 and focus on dual-use clusters in which China's share in imports exceeds 20%. This slight adjustment allows for a more sensitive identification of relevant dependencies.

The number of product clusters exhibiting strategic dependencies on China (see Chart 6) varies considerably across V4 economies. It is lowest in Slovakia and Czechia, and highest in Poland, where the number peaked at 75 clusters in 2022. In terms of persistent dependencies, Czechia recorded 7 clusters, Hungary 9, Poland 23, and Slovakia just 6. Once again, the common areas of exposure are concentrated in medium- and high-tech electronics, such as permanent magnets, parts suitable for flat panel display modules, lenses, prisms, mirrors, and other optical components, as well as organic chemistry, notably heterocyclic compounds with nitrogen hetero-atoms, which are critical to pharmaceutical production.

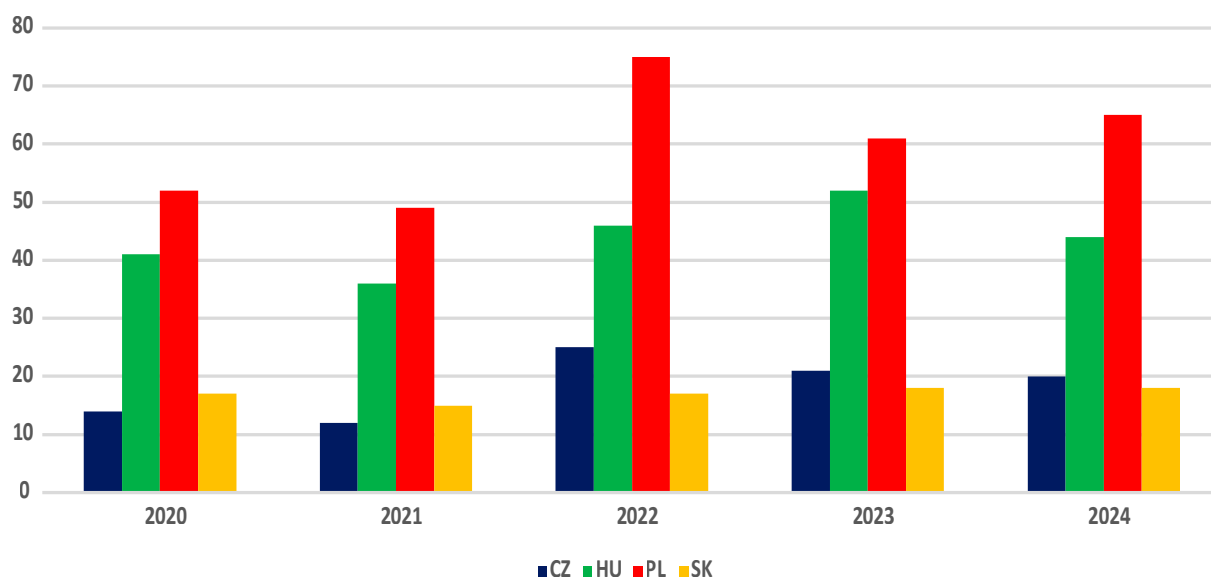


Chart 6. Number of dual-use HS6 clusters of strategic dependence on China in the V4 economies, 2020–2024

Source: own study based on Eurostat 2025 and the European Commission 2021; 2024.

From the perspective of the EU's strategic autonomy, these dependencies are most prevalent in the MT, MHT, and HT industries, as well as in the bio-tech sector. Taking into account the broader context of the green transition, additional vulnerabilities become apparent in components of energy-intensive industries. These vulnerabilities include diphenylamine and its derivatives, phosphides, germanium, and zirconium oxides, fluorosilicates, and imines and their derivatives. Such inputs are subsequently used in armaments production ranging from ammunition and rocket technologies to aircraft engines, radar systems, high-temperature protective coatings, military chemicals as well as in advanced electronics and optics, such as specialised semiconductors, optical fibres, LEDs, and lasers. This intersection of energy intensity,

technological sophistication and security importance highlights the systemic nature of dual-use dependencies.

Finally, I diagnose external vulnerabilities (EXVI) following the method of Garcia and Ho (2025). Conceptually, it partially synthesises the methods applied above by combining indicators of trade exposure with measures of international competitiveness. The assessment is thus organised around two dimensions: (1) exposure to supply disruptions, captured by import concentration (HHI) and the import-export ratio for a given commodity; and (2) competitive position in global markets captured by the classic RCA and price competitiveness approximated by the ratio of import and export prices. The EXVI ranges from 0 to 1 and is designed to identify dependencies *ex post*, i.e., on the basis of observed trade structures.

When assessing the V4 economies' vulnerability to imports from China using EXVI data for 2024, I focus only on clusters that meet three criteria: an EXVI value above the 95th percentile (critical vulnerability) or between the 80th and 95th percentiles (high vulnerability), and China's share of imports exceeding 20%. By doing so, there are 21 dual-use HS6 clusters for Czechia, 30 for Hungary, 42 for Poland, and 12 for Slovakia.

Discussion and Recommendations

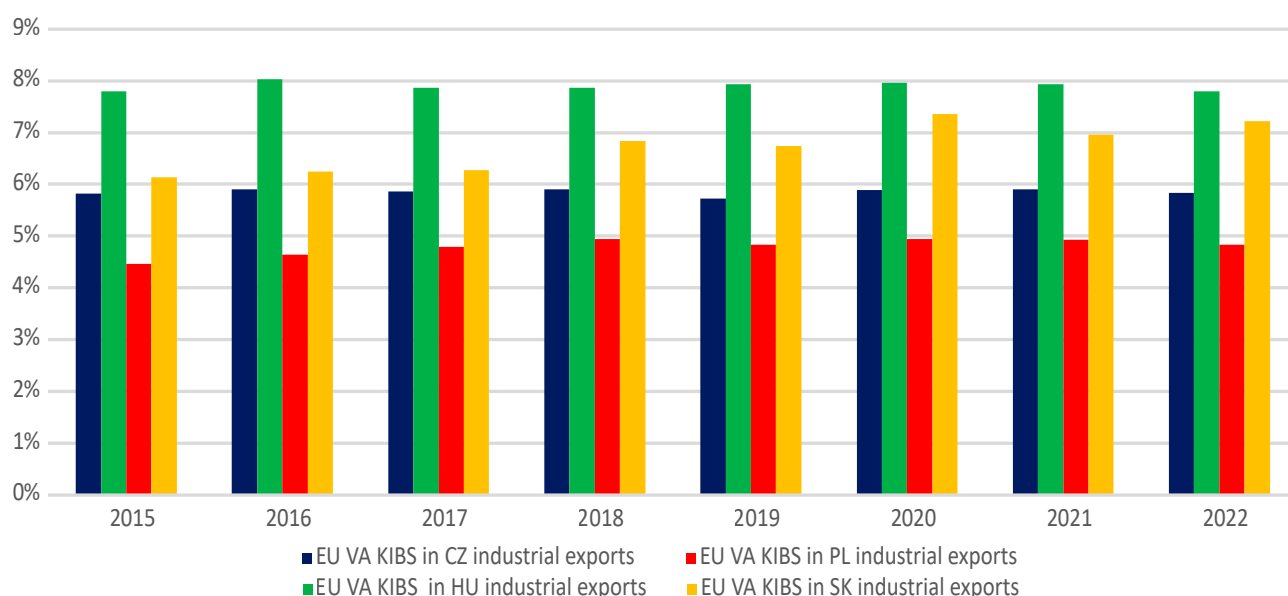
The results indicate that integration into GVCs has been accompanied by the V4 economies' growing dependence on Chinese VA, not only in final consumption, but also in gross exports, and, critically, in imported inputs. This reliance is relevant for sectors related to the digital and green transformations, as well as to the expansion of defence-production capacities. Against this background, the findings raise a fundamental question as to whether the EU's concept of open strategic autonomy represents a realistic approach to economic security policy or remains a mere normative postulate. Moreover, given the geopolitical configuration within the region, dependence on China may also serve as an indirect lever for Russia. Under these conditions, the weaponisation of asymmetries, especially in the domain of dual-use goods as a tool of economic statecraft, appears likely. Notably, European hydrogen and electromobility initiatives have not reduced dependence on Chinese components, while investments in battery factories and photovoltaic panels continue to rely on Chinese supplies (Stec 2025).

In such a context, policies that focus narrowly on innovation may prove unreliable and continue to leave societies exposed to unexpected consequences (see Winickoff and King 2025). Accordingly, debates on resilience mechanisms should extend beyond the integration of national risk audits (see Stec 2025) or the creation of additional frameworks such as the EU Critical Tech Observatory (see García-Herrero and Krystyanczuk 2025). The central challenge for the V4 economies lies in a misalignment of incentives, particularly those that entail short-term costs in resilience-building, thereby constraining the capacity to develop new solutions. Merely signalling desired changes through the proliferation of strategic documents has proven ineffective. An autonomous trajectory of technological development requires a more flexible policy and the ability to respond when a competitor, rival, or partner limits the available decision-making space. Finally, strengthening the competitiveness and resilience of the V4 economies depends

above all on innovative activity in the sectors most exposed to potential supply disruptions from China: automotive, mechanical, electronics, chemical, optical, and critical raw materials processing.

In this light, the effective pursuit of strategic autonomy requires a more nuanced understanding of what openness entails today. Therefore, I argue for stronger coordination of activities at the industry level. This could be achieved through the systematic exchange of experience and best practices during frequent meetings with industry associations, complemented by targeted facilitation and participation from representatives of public administration. This coordination would help reorient efforts towards “triple-A” supply chains: agile, adaptable, and aligned (OECD 2025a), thereby enhancing their flexibility and resilience. At the same time, calibrated preferences for the domestic production of high-tech components remain crucial. A demand-side impulse could mitigate the persistent problem of under-scaling within the EU (see García-Herrero and Krystyanczuk 2025; Guinea et al. 2025) and stimulate new R&D investments. In this sense, openness and selective industrial support should not be treated as mutually exclusive; rather, combining them would strengthen failing competitive potential in an increasingly contested geoeconomic environment. It is essential to recognise that China strives to deepen interdependencies via company-to-company partnerships to ensure that future restrictions carry more significant economic or political weight (see Pucek, Stoelinga, and Korteweg 2026; Shopov 2026).

Moreover, as industrial production becomes intertwined with the services, the V4 countries should improve the share of both domestic and European VA derived from the knowledge-intensive business services (KIBS) within their industrial exports (see Charts 7 and 8). This shift implies a stronger policy focus on embedding high-value services into manufacturing-based export models. In this context, programmes prioritising projects with high European VA could encourage investors to cooperate more closely with local suppliers of components and knowledge. This approach seems to be the logic underpinning the “Made in/with Europe” concept behind the Industrial Accelerator Act (European Commission 2026). Furthermore, consideration should also be given to the preferential use of a domestic VA criterion in public procurement and R&D spending. This can be combined with an assessment of supply-chain resilience, regional service capabilities, timely access to spare parts, and inventory-maintenance requirements. Further measures may integrate common V4 projects under the IPCEI framework, as well as tax incentives offering preferential rates for regional consortia developing intellectual property in the V4 countries. Finally, sectoral fast tracks tailored to firms in dual-use ecosystems that are central to V4 competitiveness and resilience would also be advisable.



* Excluding domestic VA.

Chart 7. Share of value added from the EU* from knowledge-intensive business services in the industrial exports of the V4 economies, 2015–2022

Source: own study based on OECD 2025a; 2025c.

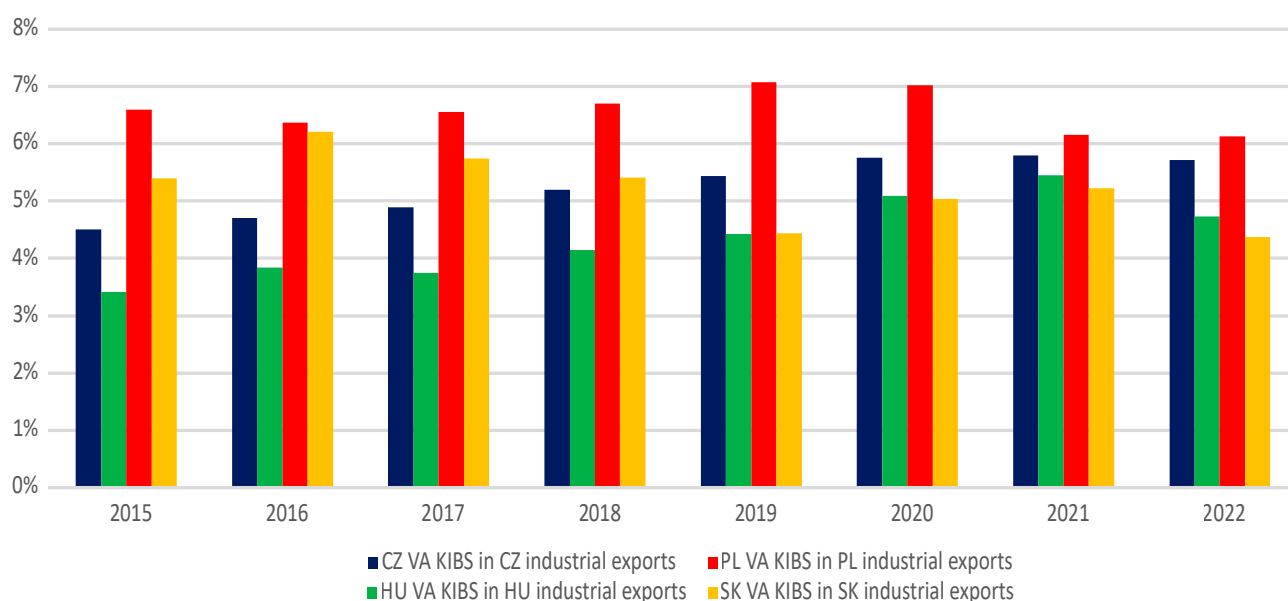


Chart 8. Share of domestic value-added from knowledge-intensive business services in the industrial exports of the V4 economies, 2015–2022

Source: own study based on OECD 2025a; 2025c.

At the same time, these proposals should be read against the inertia of production networks and the reality that GVC reconfiguration is inherently gradual. From the V4 perspective, the effectiveness of near- and friend-shoring as resilience-enhancing strategies will depend more on the quality of the “new playing field”. This includes a disciplined selection of R&D priorities, financing for dual-use innovations (see Ferriani, Albori, and Ristuccia 2025) complemented with appropriate infrastructure, and sustained investments in technological capabilities. A key uncertainty

concerns the feasibility of substituting Chinese suppliers with producers from “friendly” countries, which would incur the loss of some intangible assets and contracts. Thus, these efforts may also require an information campaign that reshapes prevailing perceptions of China: no longer as a low-cost provider of high-tech goods, but as an actor influencing key links in supply chains.

Finally, the development of analytical tools remains the cornerstone of EU and V4 economic security policy. The identification of critical dependencies, extending beyond dual-use goods, has become more demanding because of the complexity of GVCs. Simple diversification is rarely sufficient on its own. What is needed is the systemic mapping of key nodes, potential chokepoints, and areas in which a loss of control would be unacceptable, thereby clarifying what must be done, where, how, and when. This applies both to the construction of complex scenarios of potential geoeconomic coercion and to the day-to-day, low-profile implementation of recommendations emerging from security and resilience audits. To this end, strengthening analytical capacity in international trade is essential at the intersection of customs authorities, economic intelligence, and policy-oriented research agencies to identify shifts in trade patterns, verify buyers, and screen targeted deliveries. At the same time, a common database would facilitate information-sharing in cases of suspicious transactions. Ultimately, the objective should be not only to respond to crises as they arise, but also to build and demonstrate the capacity to set the agenda.

Conclusion

The absence of decisive action in response to growing pressure from China risks entrenching the peripheral development model of the V4 economies. Trade tensions and uncertainty concerning the potential weaponisation of economic relations create an incentive to reassess development strategies. In particular, technological spillovers at the domestic, V4, and European levels need to be prioritised. Given the pace of technological change, especially as driven by artificial intelligence, the availability of human capital, intellectual resources, and R&D capacities in the automotive, electronics, mechanical engineering, chemical, optical, and defence sectors constitute a fundamental prerequisite for enhancing innovation potential. They enable the generation of unique value added in dual-use domains by encompassing both industrial activities and knowledge-intensive business services.

From a governance perspective, the monitoring of V4 resilience should integrate quantitative indicator analysis with the identification of critical nodes, and an assessment of regulatory practices. Attention should be paid to technical standards, licensing regimes, the physical availability of original components, and access to high-quality substitutes. This approach would imply a return to a more active industrial policy, a shared consensus on priority areas, and an appropriate scale of public support. This, in turn, underscores the significance of coordination and cooperation among the V4 countries themselves. At the EU level, forward-looking measures aimed at reducing the risk of unwanted know-how transfer such as the screening of trade flows and foreign investments represent an important, albeit still limited, component of the EU’s economic security policy.

In this light, a central challenge for both the V4 and the EU is to regain agency namely, the capacity and political will to make autonomous choices under conditions of complex interdependence. A key dimension is developing a more accurate understanding of China’s strategy towards the region,

including the prospect of consolidating its position in the supply of dual-use goods and the identification of alternatives. Indirect linkages among the V4 economies through GVCs and their embeddedness in the German industrial ecosystem also highlight the relevance of in-depth analyses, as these links may transmit tensions in less visible ways. Consequently, the fundamental issue for Czechia, Hungary, Poland, and Slovakia is how to balance the short-term gains associated with cooperation with China against a long-term approach centred on economic security and resilience. This trade-off cannot be assessed solely at the level of bilateral relations.

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