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doi:10.1017/S1062798725100318

Techno-nationalism in Global Value Chains in the Technology Sector

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This article explores the concept of the 'Trump effect', defined by a technological disconnection and evaluated through alterations in export specialization among various economies. It scrutinizes if there were any shifts in the techno-nationalist trends of the EU, China and the US in terms of domestic value-added exports in technology sectors after 2017. The research covers the period from 1995 to 2020 and utilizes a fluctuating difference-in-differences approach. The findings suggest that technological global value chains (GVCs) were minimally affected by Trump's policies, showing scant evidence of significant disconnection in the economies under study. Consequently, the research underscores the robustness of GVCs against the measures taken by the Trump administration.

Introduction

Disruptions to global value chains (GVCs) have become more frequent and severe due to major global events, potentially fuelling trends toward deglobalization (Bermingham 2020). At the same time, new trends are emerging that aim to build more resilient GVCs, particularly in technology sectors (Todo 2022). In the current geopolitical context, the term 'decoupling' has been coined to describe the strategic separation of economies or GVCs.

The concept of decoupling gained momentum after Trump took office, when he announced measures aimed at increasing US self-sufficiency, which involved withdrawing from GVCs, especially those with China. Since then, a significant number of studies on decoupling have emerged. Many of them have examined the

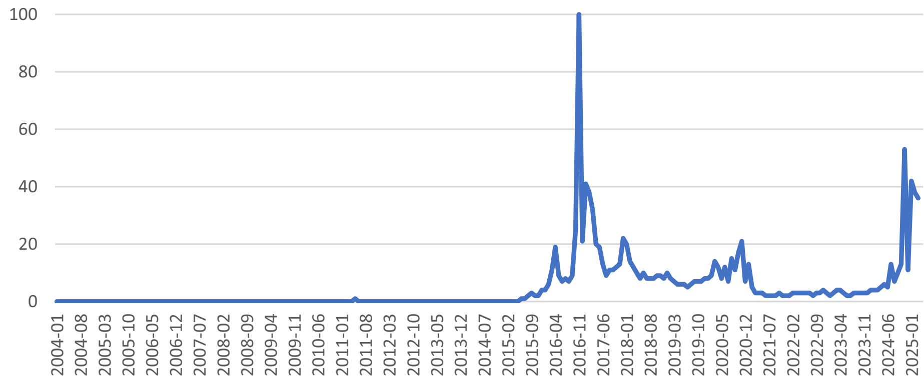

Figure 1. Popularity of the topic of the 'Trump effect' in 2004–2025.
Source: Google Trends (2025).

potential outcomes of a US–China separation (Eppinger *et al*. 2021; Witt *et al*. 2021), although most took a qualitative approach. Only a few have developed econometric models to forecast decoupling's effects on trade or GDP (Xiang and Yu 2021; Song *et al*. 2021; Bekkers and Góes 2022).

The connection between decoupling, protectionism, self-sufficiency, and shifts in GVCs was highlighted by Escaith (2022), emphasizing the role of geopolitical and institutional uncertainties in destabilizing GVCs. A key factor influencing decoupling is political action, in particular the actions of the Trump administration, the so-called 'Trump effect' (Figure 1). These actions have affected many areas, including migration, climate, security (Sagir and Mockabee 2023; Biedenkopf and Petri 2023) or financial markets (Essig *et al*. 2021; Guo *et al*. 2021). However, the main target of this policy were international trade and technology. Trump aims to reduce US dependence on China and thus reduce US domestic value in technological gross exports directed to China, which may mean redirecting it to domestic production. Such actions can be interpreted as a specific type of self-reliance – techno-nationalism.

Techno-nationalism links technological advances to national security and economic strength (Capri 2020; Xuetong 2020). Technological GVCs embody these trends, as advanced technologies are fundamental to the economic development (Holmström and Seppälä 2020). Recognizing the crucial role of technology in the US–China conflict (Table A1 in appendix), the authors sought to investigate whether techno-nationalist actions could indeed weaken technological GVCs not only in these two economies but also in other economies strongly linked to them, such as the EU. A key challenge in the study was determining a measure of techno-nationalism within GVCs in general. Therefore, we argue that a statistically significant decrease in technological export specialization means withdrawing domestic value added from technological GVCs and leads to techno-nationalism and finally to the decoupling. In this study, we use the terms decoupling and techno-nationalism interchangeably.

https://doi.org/10.1017/S1062798725100318 Published online by Cambridge University Press

The study aims to examine whether techno-nationalist tendencies have emerged in the economies of the EU (pre-Brexit), the US and China, as reflected in changes in export specializations after 2017, driven by the so-called 'Trump Effect'. The analysis focuses on five technological industries. Using OECD data and a time-varying difference-in-differences method (Cerruli and Venturini 2019), it evaluates shifts in countries' export structures resulting from these policies.

Excluding the introduction and conclusions, the rest of this article is divided into four sections: conceptual framework, contribution to knowledge, methodology, and discussion of the results.

Conceptual Basis of the Study

The concept of export specialization in foreign trade streams was significantly advanced by two seminal works: Balassa (1965) and Hummels *et al.* (2001), which delineated a distinct barrier between their respective approaches. The first approach fostered contemplation on trade between economies within the framework of specialization in conventional trade flows, focusing on final products and services. Conversely, the other approach expanded the discourse to encompass value-added streams and the phenomenon of production fragmentation.

Balassa (1965) defined specialization as a country focusing on a product when its export share exceeds that of other countries. This approach has been revised by scholars such as Vollrath (1989) and Hoen and Oosterhaven (2006). Studies, including those by Rousseau (2019) and Romalis (2004), have tested various indicators of specialization, while Hanson (2012) noted that exports from low- and middle-income countries are concentrated in a few products.

Hausmann *et al.* (2007) advanced Balassa's approach by introducing indicators that connect export products to productivity and GDP growth. Schott (2004) focused on endowment-driven specialization, highlighting quality differences in manufactured goods. However, Balassa's RCA index has limitations in interpreting results (Hinloopen and Van Marrewijk 2001) and in responding to trade policy shifts (Yi 2003).

An alternative approach emerged with GVCs (World Bank 2020), emphasizing fragmented production across economies (Gereffi and Fernandez-Stark 2011). Hummels *et al.* (2001) introduced 'vertical specialization in trade', measuring the domestic value added in exports, later expanded by Grossmann and Rossi-Hansberg (2008) and Antràs *et al.* (2012) into 'functional specialization' within GVCs, tied to the 'smile curve' (Shih 1996). This concept shows how pre- and post-production phases add more value than intermediate stages.

The 'smile curve' has been applied to GVCs by scholars such as Shin *et al.* (2012) and Baldwin *et al.* (2014). Timmer *et al.* (2019) and Stöllinger (2019) tested the framework using value-added and employment data. Integrating specialization with value-added flows, as seen in works by Timmer *et al.* (2013) and Wang *et al.* (2013), has helped avoid double-counting and clarified actual trade flows (Koopman *et al.* 2014).

Finally, technology's role in specialization has been explored through models such as 'core–periphery' and 'headquarters and factory economies' (Fujita *et al.* 1999; Baldwin and Lopez-Gonzalez 2015), with studies showing the link between specialization, technological change, and routine production activities (Reijnders and de Vries 2018). However, the complexity of technological change makes it hard to isolate from other factors shaping GVCs.

Contribution to Knowledge

Discussions on the impact of decoupling, particularly between China and the US, have been widely covered in both journalistic and academic sources (e.g., *The Economist* 2019; Tan and Yang 2021). These debates often reflect the authors' political stances and economic interests, especially in the technology sector (Bown 2020a; Wang and Lin 2021). However, few studies directly address the effects of decoupling on GVCs. Some research suggests that despite China's large market, there has been no major restructuring of GVCs (Trivedi 2023; Xuanmin 2022), although other studies note strengthened production ties in certain cases (Obe 2021).

This article explores structural changes in GVCs, focusing on the US, China, and EU countries engaged in technological GVCs. It is one of the first to examine techno-nationalism in the EU economies using the time-varying difference-in-differences (TVDIFF) method. The authors use a modified specialization index based on inter-industry flows, moving away from the 'smiling curve' due to its limitations (Timmer *et al.* 2019; Shih 1996). They argue that advancements in automation and robotization are polarizing the workforce, making the assumption that climbing the 'smile curve' equals higher value-added misleading (Harrigan *et al.* 2021; Acemoglu and Restrepo 2020). Instead, they propose that specialization within industries, rather than traditional business functions, will increasingly drive added value.

Technological firms typically are connected with a broad and dispersed network of suppliers. This enables them to find alternative sources in the case of disruptions in a particular region, thereby increasing the resilience of GVCs. Additionally, these firms invest heavily in R&D, which facilitates innovation and improvements in manufacturing. As a result, they introduce new solutions that minimize risk and enhance the flexibility of GVCs (Wang and Lin 2021). Moreover, intensive technological integration allows for the faster detection of and response to potential disruptions and increasing both the flexibility and resilience of GVCs (Xing *et al.* 2023; Baldwin 2016).

However, the technology industry does not operate in isolation, as interactions exist between technological and non-technological industries. Advanced technologies are now widely implemented in non-technological industries (Cieślik 2024b). This diffusion of technology fosters the development of more flexible and resilient GVCs. For example, the adoption of Industry 4.0 solutions in traditional industrial sectors allows for better integration and synchronization of production processes with GVCs (Kamble *et al.* 2018).

Our study contributes to the existing literature by examining whether technological GVCs in the EU, China and the US have proven to be resilient to geopolitical disruptions, especially Trump's administration policy. At the same time, we highlight the mutual interactions between technological and non-technological industries. This research is particularly important in the context of the theoretical approach that suggests technological GVCs should be more resilient than non-technological GVCs.

Method

The time-varying difference-in-differences (TVDIFF) method, as introduced by Cerulli and Ventura (2019), is used to quantify the impact of specific treatments over time. This study applies TVDIFF to examine the effects of Trump's policies from 2017 to 2020 on China and the technology sector, operationalizing the 'Trump effect' as changes in global export specializations. The methodology accounts for leading and lagging impacts associated with the decoupling process, treating the 'Trump effect' as a binary indicator (Athey and Imbens 2017; Callaway and Sant'Anna 2021).

The TVDIFF approach is represented as follows:

$$Y_{it} = \beta_{+1}D_{it-1} + \beta_0 D_{it} + \beta_{-1}D_{it+1} + \beta_{-2}D_{it+2} + X_{it}\gamma + \mu_{it}$$

In this equation: Y_{it} is the dependent variable (decoupling measure for the given sector), D_{it-1}, D_{it+2}, D_{it+2} are the dummies identifying the number of periods before (1) and after (2) the event/treatment. The coefficient β_{+1} captures anticipatory (leading) effects of the 'Trump effect' in the period before it occurs. The coefficient β_0 represents the contemporaneous effect during the period of the policy. The coefficient β_{-1} captures lagged effects in the period following the policy. X_{it} is a vector of exogenous control variables with associated coefficients γ, and μ_{it} represents the individual fixed effect.

The interpretation of each β coefficient depends on the period analysed:

- If $\beta_{+1} \neq 0$, the policy has an anticipatory effect in period $t-1$.
- If $\beta_0 \neq 0$, a contemporaneous effect is observed in period t.
- If $\beta_{-1} \neq 0$, a lagged effect is observed in period $t+1$.

We incorporate a Granger causality test to validate the parallel trends assumption to evaluate if D_{it} Granger causes Y_{it}. This ensures that trends in untreated observations serve as a reliable counterfactual for treated observations (Angrist and Pischke 2009). Fixed effects and time effects are also included. This model is estimated using fixed-effects regression, offering a robust framework to analyse policy impacts over time. The purpose of this methodology is to provide an alternative to classical analytical analysis of cointegration between significant trading partners.

https://doi.org/10.1017/S1062798725100318 Published online by Cambridge University Press

Table 1. RCA indices: descriptive statistics and panel unit roots test, 1995–2020.

Ratio	Obs	Mean	SD	Min	Max	IPS
Agriculture, hunting, forestry and fishing (A)	780	0.83	0.67	0.05	3.74	0.30
Mining and quarrying (B)	780	0.05	0.07	0.00	0.33	0.83
Computer, electronic and optical products (C26)	780	0.49	0.60	0.00	3.10	1.10
Electrical equipment (C27)	780	1.01	0.77	0.00	3.48	0.20
Machinery and equipment n.e.c. (C28)	780	0.98	0.83	0.01	3.44	–2.96*
Transport equipment (C29_30)	780	1.21	1.16	0.00	5.10	–2.07*
Electricity, gas, water supply, sewerage, waste and remediation activities (DE)	780	4.14	4.85	0.00	37.78	–0.50
Wholesale and retail trade; repair of motor vehicles (G)	780	1.44	0.42	0.33	2.42	1.51
Transportation and storage (H)	780	1.74	0.97	0.21	5.52	2.02
Accommodation and food service activities (I)	780	1.75	1.84	0.14	9.54	–0.40
Telecommunications (J61)	780	1.74	1.39	0.12	12.86	1.86
Computer programming, consultancy and information services activities (J62_63)	780	1.07	0.86	0.02	5.82	–2.02*
Financial and insurance activities (K)	780	1.98	3.12	0.06	17.70	–0.11
Real estate activities (L)	780	1.52	1.29	0.26	13.80	–0.81
Other business sector services (MN)	780	1.53	0.83	0.08	5.54	–0.21
Public admin, education, health and other personal services (OTT)	780	1.72	2.66	0.08	31.71	–0.09

Note: IPS: Im-Pesaran-Shin panel unit roots test; * significant at 0.05
Source: own elaboration

Data Description

In this study, we utilized data from the domestic value-added content of gross exports (EXGR_DVA) from the OECD database that track the origins of value added in exports for the years 1995–2020 for 28 EU countries, China and the US. Industry sectors at the single-digit classification level were selected for analysis. One sector, namely the construction industry (*F*), was excluded from the analysis due to substantial missing data across many countries. Using the EXGR_DVA indicator values, we calculated the revealed comparative advantage Index (RCA) (Balassa 1965), which assesses the relative specialization of country *R* in a given sector or industry concerning world exports, according to the following formula:

$$RCA_{iW}^{R} = \frac{x_{iW}^{R}/X_{W}^{R}}{x_{iW}^{W}/X_{W}^{W}}$$

where: x_{iW}^{R} is country *R*'s export of product/industry *i*, X_{W}^{R} is the country *R*'s total exports of all products/industries, x_{iW}^{W} is the world's exports of product/industry *i*, and X_{W}^{W} is the world's total export of all products/industries.

Descriptive statistics and the results of the panel unit roots test IPS (Im-Pesaran-Shim test) are presented in Table 1. The final panel unit root tests, IPS (Im *et al.*, 2003), indicated that almost all longitudinal series of RCA indices contain a unit root, necessitating the transformation of the series into stationary series by computing the first differences.

Discussion

Taking into account the primary focus of decoupling anticipated by the Trump administration, the phenomenon described in the article focuses on technological industries. According to the industry classification based on technological intensity developed by the National Science Foundation (2024), high technology intensity encompasses computer, electronic, and optical products (C26), while medium–high technology intensity comprises electrical equipment (C27), machinery and equipment, n.e.c. (C28), transport equipment (C29_30), and computer programming, consultancy and information services (J62_63), with the latter categorized as services.

The interpretation of changes in export specialization was structured into three parts. The first part examines the mutual interactions of changes in export specializations among technology industries. The second part investigates their responses to changes in export specializations in other industries, both simultaneous and delayed. The third part addresses the question of whether and to what extent changes in export specializations reacted to announcements made by the Trump administration regarding the disconnection of American technology (or even the entire West) from China. In the final part, in accordance with the assumptions of the study authors, an attempt was made to demonstrate whether the 'Trump effect' occurred, using individual effects estimable through the applied panel FE model (Table A2 in the appendix and Figure 2).

The significant interdependencies of the analysed technology industries were rather limited. When analysing the interconnections between technology industries, it is evident that both simultaneous and time-lagged responses occurred, with computer, electronic and optical products and machinery and equipment n.e.c. showing particularly strong reactions to lagged effects. Although the interdependencies between technology industries were generally positive, two exceptions were observed in their responses to the computer, electronic, and optical products sector. Machinery and equipment n.e.c. reacted negatively with a one-period lag, while computer programming, consultancy, and information services showed an immediate negative response, possibly reflecting shifting investments or competitive dynamics.

The 'Trump effect' was evident in two industries. In the computer, electronic, and optical products industry, a negative impact was seen in 2017, although it quickly diminished, which proves that the industry adapted to the new policy. In the computer programming, consultancy and information services, a positive significant impact occurred before Trump's decoupling activities, but this effect was also short-term. This early response can be attributed to the anticipation effect, as companies reacted to political signals, rising uncertainty, and early discourse on

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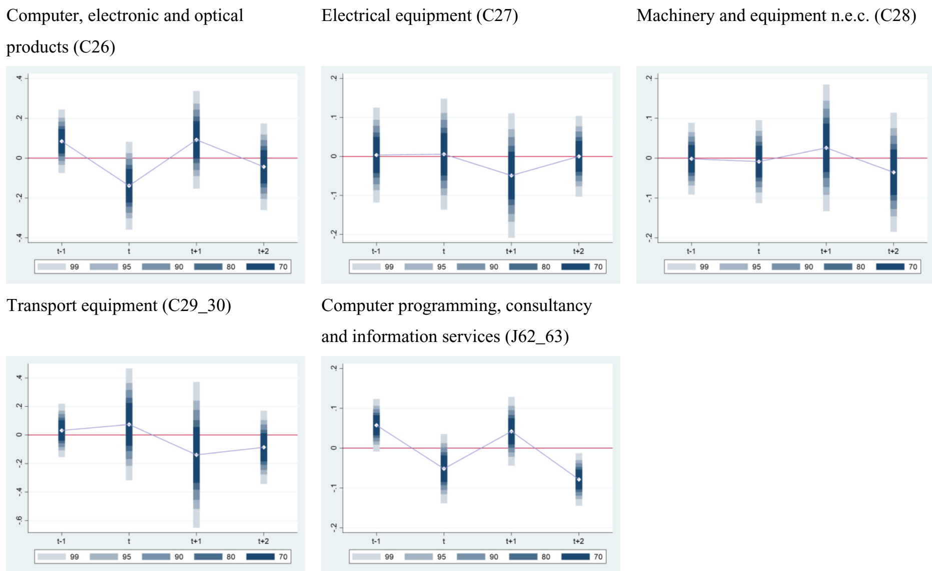

Figure 2. Pre- and post-'Trump effect' pattern in selected industries.

restructuring GVCs. Consequently, demand for digital infrastructure, IT consulting, and cybersecurity services increased even before actual policy actions took place. This selective impact on these industries can be linked to US policy targeting Chinese technology and the EU alignment to these politics as well as the EU's own strategy, 'de-risking' (European Parliament 2024; Edler 2024).

In the analysed industries, several sectors significantly influenced specialization changes, mostly yielding positive effects.

- Agriculture, forestry, and fishing positively impacted the electrical equipment; this is likely due to increased demand for modern agricultural machinery, which relies heavily on advanced electrical components.
- Mining and energy extraction negatively impacted computer, electronic, and optical products; this was owing to limited technological modernization within the extractive industries and their exposure to supply chain disruptions affecting critical raw materials used in electronics production.
- Electricity, gas, water supply, and waste positively influenced machinery and equipment owing to increased demand for specialized devices.
- Wholesale and retail trade; repair of motor vehicles had a positive impact on machinery and equipment. This stems from increased demand for logistics and warehouse infrastructure, automation technologies, and repair tools, as well as the sector's role in distributing industrial equipment.
- Transportation and storage negatively impacted computer, electronic, and optical products due to shifts in logistics, but positively affected computer programming, consultancy and information services; the negative impact is due to pandemic-related disruptions in global logistics and GVCs, which increased

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costs and delayed production; the positive effect was due to demand for digital logistics solutions, automation, and GVCs management software to cope with these new challenges.

- Accommodation and food service activities positively impacted computer, electronic, and optical products as well as computer programming, consultancy and information services; it stems from the sector's increasing demand for digital solutions, automation, and smart technologies, particularly in response to post-pandemic challenges and the trend of technological modernization.
- Real estate activities negatively impacted electrical equipment; this is owing to reduced construction activity and a tendency to limit investment in advanced electrical systems, thereby lowering demand for such equipment.
- Public admin, education, health and other personal services positively impacted electronic, and optical products and computer programming, consultancy and information services; this is owing to growing demand for digital infrastructure, medical technologies, remote learning tools, and public sector digitalization initiatives.

For the 'Trump effect', Ireland, Lithuania and Austria saw the largest increases in specialization for computer, electronic and optical products, while Portugal, Finland and Spain led for computer programming, consultancy and information services. Declines were most notable in Cyprus, Estonia, and Hungary for computer products and in Cyprus, Malta, and Latvia for computer programming, consultancy and information services.

The positive changes in specialization in domestic value added in Ireland and Austria are due to their strong roles in the global computer, electronic, and optical products industry. Ireland hosts major tech companies (Flynn 2022), while Austria is important in the semiconductor industry (Advantage Austria 2024). Both countries saw increased demand for technology value added, especially from China, and improved the general participation in technological GVCs. Ireland even improved its position in GVCs in relation to China, while Austria became more dependent on China (OECD 2024). Despite facing partial restrictions on imports, China has simultaneously increased its imports from these two economies. This reflects China's strategic efforts to mitigate GVC disruptions while maintaining access to critical innovations. Ireland and Austria have also experienced increased demand for technological products from other European countries that have been reducing their imports from China. Companies such as Intel Ireland or Austrian Kapsch Group have benefited from this, increasing domestic production as a result of higher demand from companies looking for alternative suppliers to China (BBC 2023). In turn, Lithuania, a key outsourcing hub, redirected exports to Europe after leaving the '17+1' format with China, successfully mitigating the decline in exports to China (Brînză 2023). Lithuanian companies are becoming more involved in technological GVCs, but with limited cooperation with China (this can be observed in the improvement of forward participation with Chinese GVCs and partly decoupling form China). For example, Lithuanian technology firms specializing in IoT (Internet of Things) devices (e.g. Teltonika) have, in some cases, partnered with Chinese manufacturers for key components. In the face of increased uncertainty and the tightening of US technology transfer policies, these firms have begun to reconsider their GVC strategy and began to limit their direct cooperation with Chinese partners by investing in local and regional suppliers and by diversifying their production networks.

In computer, electronic, and optical products, specialization declined in Cyprus, Estonia, and Hungary. In Cyprus, the focus shifted to financial and IT services (Cyprus Profile 2024). Moreover, it increased the engagement in Chinese GVCs. Estonia redirected exports from Russia to Western Europe, aligning more with the EU (Varnavskii 2022). Generally, these two countries have focused on developing GVCs within industries other than computer, electronic, and optical products, which explains the declines in specialization. Moreover, both economies slightly reduced reliance on Chinese value-added (OECD 2024). In Hungary, as relations with China have strengthened (Gáspár *et al*. 2023), GVCs with other economies have become weaker. As a result, Chinese value-added is increasingly replacing domestic value-added, leading to a decline in the country's specialization and backward engagement in technological GVCs (OECD 2024).

Portugal, Finland and Spain increased their specialization in computer programming, consultancy and information services. It was the result of increased demand from European economies that redirected their imports of these services from China. These positive changes were less pronounced compared with the computer, electronic, and optical products sector. Spain and Portugal decreased their two-sided GVCs participation with China (and increased engagement in European GVCs), which can be perceived as partly decoupling from China, while Finland increased engagement in both Chinese and European GVCs. A good example of this strategy concerns Nokia. China used to be Nokia's second-largest market. The company collaborated with Chinese telecommunications firms in the deployment of 5G technology. However, gradually, under the influence of restrictions imposed by Western economies, the company began to withdraw from the market after 2019 (Abels and Bieling 2023).

Conversely, Cyprus, Malta and Latvia experienced negative changes in specialization owing to increased competition, rather than US policies (Escaith and Khorana 2020). These economies had previously specialized in computer programming, consultancy and information services, relying heavily on outsourcing (Cyprus Profile 2024).

Based on corporate-level examples, it cannot be conclusively stated that EU countries are adopting a techno-nationalist stance. It is worth examining the actions of selected European firms in relation to China – considered, in line with Trump's agenda, the key partner from which economies should decouple.

German companies are particularly vulnerable to the pressure of decoupling. However, they have proved to adapt their strategies quite quickly to the new conditions, and their GVCs built with China have remained resilient (Germann *et al*. 2024). For example, Siemens intensified its engagement in China. In 2021, the company had almost 5000 employees working in R&D departments and centres in China. In 2023, the company announced an investment to expand its digital factory in Chengdu. Siemens collaborates with the Chinese government in technological development (Siemens 2017). In 2024, Volkswagen Group decided to sell off its factory in the Xinjiang region (Reuters 2024). At the same time, the company extended its partnership with the Chinese conglomerate SAIC Motor (Shanghai) until 2040 (Cawthon 2024). Generally, the company extends its operations in China (Hauss and Oemisch 2024). Infineon Technologies continues to maintain its presence in China. In 2024, it announced a partnership with Sinexcel Electric (Shenzhen) to enhance the efficiency of energy storage systems. Additionally, Infineon has factory in Wuxi and offices in Shanghai and Shenzhen (Infineon 2024).

ASML (the Netherlands) is taking a different approach. The company maintains cooperation with China, but in a highly controlled manner. It primarily sells older generations of lithography machines, while the most advanced EUV systems remain out of reach for the Chinese market due to strict export regulations and political pressures. Therefore, it can be said that ASML engages in cooperation with China, but within a limited scope dictated by regulatory requirements (Sterling 2023).

Schneider Electric (France) continues its collaboration with Chinese partners, expanding local production and launching joint projects in the fields of automation. In 2024, it announced an investment to expand its manufacturing facilities in Guangdong, while also emphasizing the strategic importance of strengthening innovation capabilities within the Chinese market (Schneider Electric 2024).

Ericsson (Sweden) continues operations in China, but it has stressed the need to diversify both its markets and supply chains by developing alternative manufacturing hubs in India and Eastern Europe (Leonard 2019).

The selected business strategies presented above are consistent with the conclusions of Wang and Lin (2021), Dadush (2023) or Gao *et al.* (2023). These studies prove that companies adapt to new conditions, but they also show that their GVCs are resilient to many external shocks.

Analysing changes in specializations, it cannot be completely denied that Trump's actions did not have any impact on technological relations between the US and China. These measures forced China to strive for greater self-sufficiency in selected industries, including the intensification of the 'Made in China 2025' programme, which aims to reduce reliance on the import of key components and technologies from the US. The Chinese government increased funding for domestic technology firms and encouraged the development of alternative technologies, such as its own operating system, HarmonyOS (Capri 2020). This shift is evident in the decline of the specialization index in computer, electronic and optical products, reflecting a turn toward techno-nationalism, as China became more self-reliant. At the same time, the modest decline in specialization confirmed that China did not decouple from technological GVCs completely but diversified them by relocating part of production to other economies (e.g., Vietnam or Malaysia) or developing its own manufacturing capabilities (e.g., SMIC reduces dependence on Intel or Qualcomm) (Kennedy 2020).

In the computer programming, consultancy, and information services, there were no signs of techno-nationalism. Moreover, China has increased its specialization in

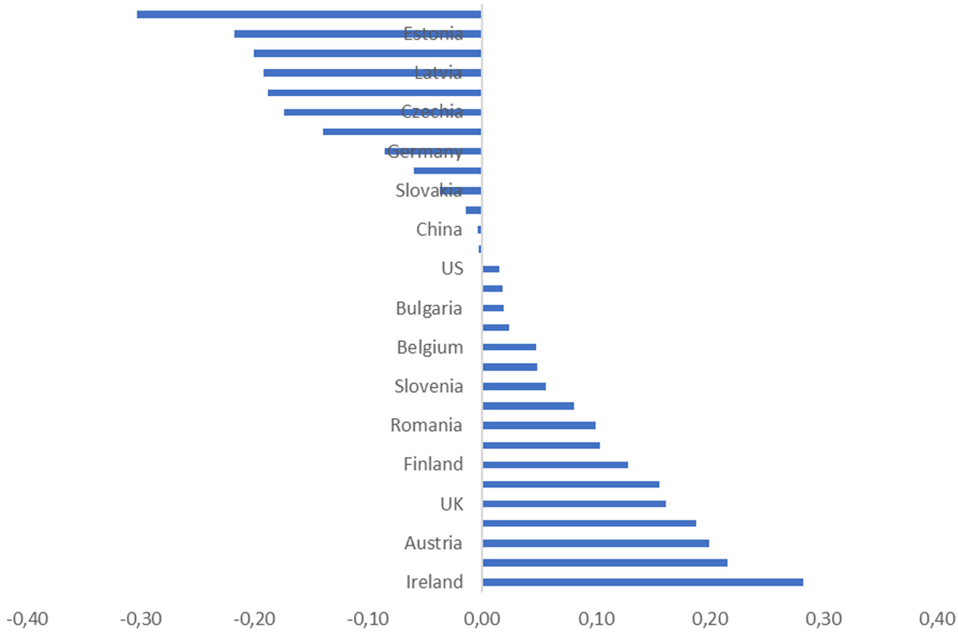

Figure 3. Changes in the specialization in computer, electronic and optical products in 1995–2020.
Source: Own calculations.

this area more than any other examined economy, demonstrating that it is resisting techno-nationalism trends and becoming increasingly integrated into GVCs. Similar tendencies are observed in the US, but the growth of engagement of domestic value added in GVCs is modest. This suggests redirection of domestic value-added exports, rather than a breakdown of GVCs (Trivedi 2023; Xuanmin 2022). The study confirms that technological GVCs have proven resilient, aligning with findings from Dadush (2023) and Todo (2022).

An analysis of two-sided GVCs' participation between the US and China further supports the study's findings, indicating that it is difficult to argue for full-scale techno-nationalism. In both analysed industries declines have been observed, but a larger decline in computer, electronic and optical products. These declines, however, were not driven by Trump-era policies but rather by a decade-long trend of an increasingly sophisticated Chinese advanced services industry. At the same time, the US has maintained a relatively stable level of value-added sourcing from China (OECD 2024).

Most EU economies recorded only minor changes in their GVC connections with China, which also indicates a limited impact of the 'Trump effect' (Figures 3 and 4). Another piece of evidence for the lack of clear technological decoupling of the EU from China is the share of Chinese value-added in EU technological exports. Analysing the share of the US and China in exports of domestic value-added in computer, electronic and optical products to the EU from 1995 to 2020, it can be

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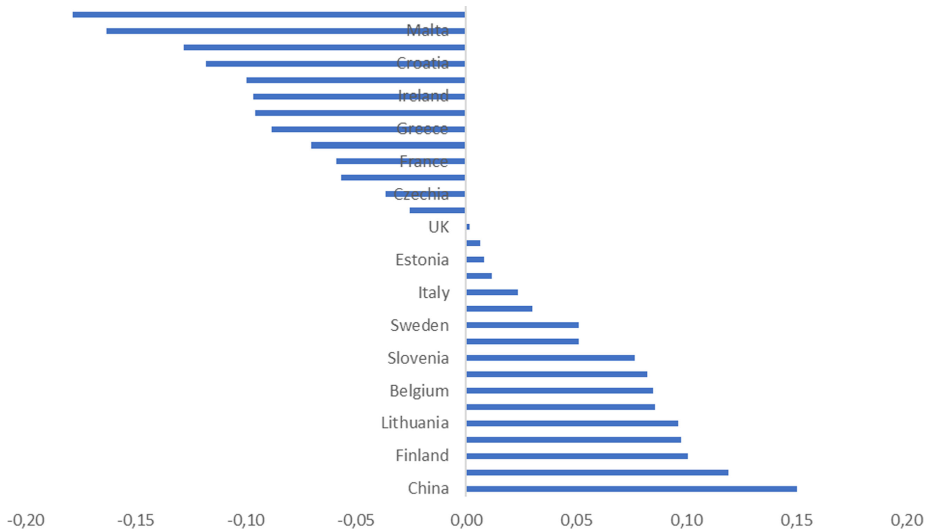

Figure 4. Changes in the specialization in computer programming, consultancy and information services in 1995–2020.
Source: Own calculations.

observed that the US share was initially higher, peaking around the year 2000, before experiencing a decline. Meanwhile, China's share showed steady growth, surpassing the US and continuing to rise sharply thereafter (Figure 5). Similar tendencies are present in computer programming, consultancy and information services and their dependency on China and the US. China has not yet surpassed the US, but it will likely do so soon (Figure 6). Considering the above, it becomes apparent that the EU is separating more from the US than from China.

Overall, the anticipated decoupling effect was limited or selective, with most countries experiencing increases in specialization, indicating GVCs remain intact. This reflects a low level of techno-nationalism and the lack of widespread decoupling from China, not only in the EU, but also in the US (Luo 2021).

Conclusions

This article examines decoupling and techno-nationalism as the partial disintegration of GVCs and increased reliance on domestic value-added exports in advanced technologies. It explores the 'Trump effect' and its impact on the EU, China and the US, revealing that despite political actions, technological GVCs have remained resilient. While some shifts occurred, no significant long-term changes in specialization were noted. Interactions between technology and non-technology industries were observed, and economies are increasingly reliant on China for value-added exports, pushing out the US in high-tech sectors (Gao *et al.* 2023; Bown 2020a).

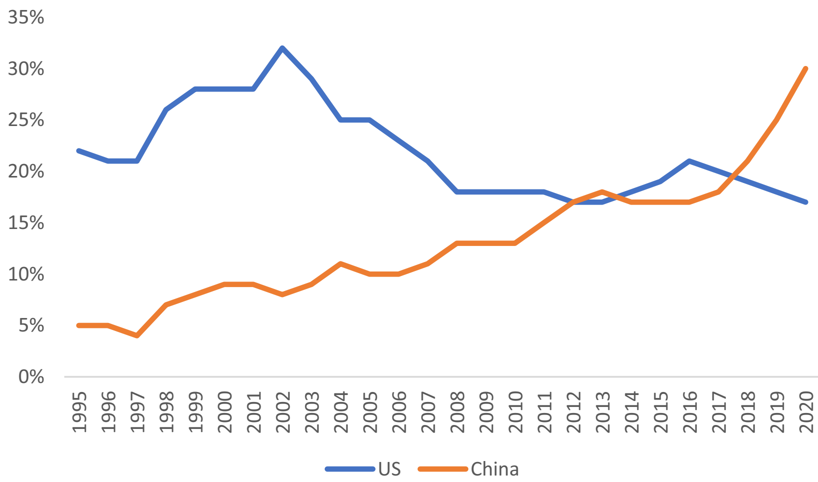

Figure 5. Share of the US and China in exports of domestic value added in computer, electronic and optical products to the EU (in %).
Source: Own calculation based on OECD (2024).

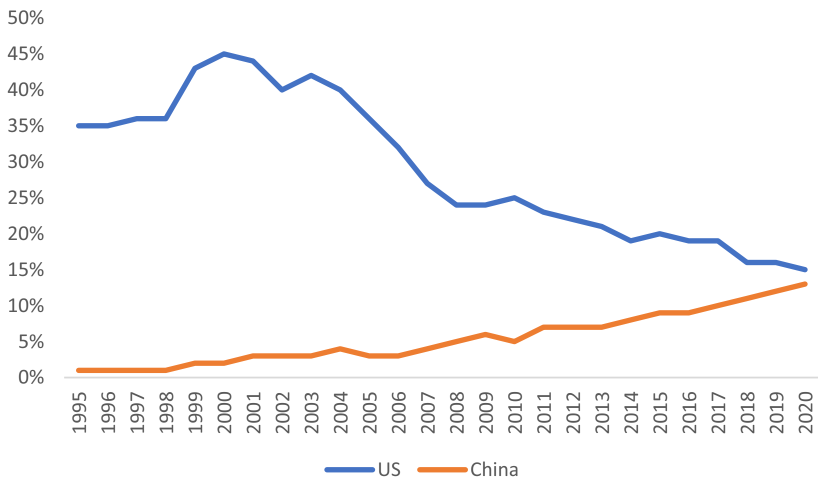

Figure 6. Share of the US and China in exports of domestic value added in computer programming, consultancy and information services to the EU (in %).
Source: own calculation based on OECD (2024).

Contrary to some opinions, the study found that global demand, product quality, and costs continue to drive technological GVCs, not national security or political concerns. The findings deny significant decoupling in technological sectors and proved that China is becoming a more critical partner for the EU in exporting advanced technologies. This aligns with research by Trivedi (2023), Xuanmin (2022), and Haavisto *et al*. (2022). It should be noted that complete separation is complicated and may be difficult to achieve due to the deep economic ties between these countries (Capri 2020; Cieślik 2024). The ability of companies to adapt to new conditions also plays a significant role (Dadush 2023).

Policy recommendations include strengthening GVCs through international cooperation, encouraging cross-industry collaboration, fostering innovation, and addressing national security concerns without overestimating political interventions. The study also highlights the limitations of focusing on a limited number of economies, data up to 2020, and the methodology, which may not capture the full effects of recent events such as the COVID-19 pandemic.

Supplementary material

To view supplementary material for this article, please visit https://doi.org/10.1017/S1062798725100318

Acknowledgements

The authors would like to express their sincere gratitude to the anonymous reviewers for all valuable comments and suggestions.

Funding

This article is the result of the research project 'Digital Silk Road as a network of technological connections between China and Europe within value chains: towards win-win or decoupling?' financed by the National Science Centre, Poland (UMO-2021/43/B/HS4/01079).

Declarations

The authors declare no conflict of interests.

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