



# Participation In GVCs and Industrial Competitiveness of CESEE Countries in the Pre-Covid 19 Era- Is There Room for Improvement?

Marina Jerinić<sup>1\*</sup>, Nebojša Stojčić<sup>2</sup>, and Mila Gadžić<sup>1</sup>

<sup>1</sup> University of Mostar, Faculty of Economics, Bosnia and Herzegovina

<sup>2</sup> University of Dubrovnik, Faculty of Economics and Business, Croatia

## Abstract

The ability of economies to grow and provide a better standard of living for their citizens depends on the international competitiveness of their businesses and industries. In the last two decades, especially after the global recession of 2007-2014, economic policymakers, academics and economic actors interested in sustainable growth and development in a globalised world have focused on ways to increase national competitiveness by strengthening countries' industrial potential. The integration of domestic producers into global value chains (GVCs) is seen as an opportunity to catch up with the industrialised countries. GVCs, a key feature of modern trade, involve the division of production into transnational tasks. Despite all this, a search in the keyword database Web of Science revealed a lack of academic research dealing with participation in GVCs and industrial competitiveness for the countries of the CESEE region. Therefore, global value chains and industrial competitiveness were analysed theoretically and empirically in this study. Statistical methods were used for data analysis, graphical representation and interpretation. The descriptive analysis assessed the position of BiH and the CESEE countries in the global value chains and their industrial competitiveness. Therefore, the focus of this paper is precisely to analyse the relationship between the mentioned variables and to obtain a basis for future research recommendations.

**Keywords:** global value chains (GVCs), manufacturing, industrialization intensity, CIP

## 1. Introduction

International trade and production in the 21st century are characterised by drastic changes in organisation and structure, with a marked potential for development, but also with crises and geopolitical changes and instabilities. Subsequently, disruptions such as political instability, wars, and the renewed trade war between the US and China have impacted the international economy in different ways. GVCs, a key feature of modern trade, involve the division of production into transnational tasks. The emergence of GVCs is referred to by many authors as the "New Paradigm" (e.g. Franssen, 2019). In this sense, the potential of an optimal combination of technology and know-how from industrialised

countries with cheap labour from least developed countries, emerging economies and developing countries is emphasised; in the sense of using knowledge to one's own advantage and developing according to the principle of "learning from the best".

In an era of challenges, industrialisation continues to be an important driver of progress and development, as it increases competitiveness in new technologies and knowledge (United Nations Industrial Development Organization, 2020). When it comes to industrialisation, GVCs and competitiveness, there is a lack of research in the Central, Eastern, and South-Eastern Europe - CESEE, particularly SEE part. The CESEE region is a very dynamic area with large fluctuations in economic progress, which are the result of its specific history, geography, politics and international relations. The region is characterised by the openness of the market, the importance of foreign investment (FDI), the transition to a market economy and major differences in industrial capacity and industrial competitiveness.

Global value chains are changing the international economic and political framework and in the 21st century are at the centre of academic debates, strategic documents of international institutions and the growth strategies of individual countries that have recognised their importance. As the concepts of GVC and industrial competitiveness should be closely intertwined, the main objective of this study is to analyse the relationship between industrial competitiveness and participation in GVC in the CESEE countries and to provide a basis for future research recommendations. The rest of the article is organised as follows: Section 2 reviews the academic literature on GVCs and their importance as well as industry competitiveness; Section 3 describes the research design; Section 4 presents the empirical results and discusses the main findings; and Section 5 provides conclusions and recommendations for future research.

## **2. Literature Review**

The literature review is divided into several subsections dealing with the development of the concept of GVCs, the opportunities and challenges of participating in GVCs and their measurement. The last two subsections deal with industrial competitiveness and its measurement.

### **2.1. Global Value Chains (GVCS) Evolution**

Global value chains are central to trade and investment in the 21st century (Gereffi & Kaplinsky, 2001; Baldwin & Venables, 2013; OECD, 2013; Engel & Taglioni, 2017). Advances in transport and technology have enabled the efficient distribution of production tasks across borders. With the fragmentation and expansion of global value chains (GVCs), the methodological framework of the GVC concept has also evolved. Bair (2005) traces GVC origins to the 1970s though some cite the French territorial development school of the late 1980s (Parrilli et al., 2013). Early terms like global commodity chains and value networks overlap. Academic development has led to the global commodity chain (GCC) approach, with a focus on global management (Gereffi & Korzeniewicz, 1994). Gereffi (1994) analysed chains from raw materials to final products. In the early 2000s, the concept of globally fragmented production was developed. A value chain encompasses all activities from concept to disposal (Gereffi & Kaplinsky, 2001). The study of value distribution led to the concept of global value chains (GVCs) which identifies value creation at each stage, including manufacturing and services (Gereffi et al., 2005). The concept of global value chains differs from the previous one because it encompasses the determinants of global industrial organization (Bair, 2005).

GVC research contrasts consumer-driven and producer-driven models (Gereffi & Kaplinsky, 2001), while more recent studies emphasise complex "networks" over "chains" (Coe et al.,

2008). The result of GVCs' is that more and more products are "manufactured in the world" (WTO, IDE-JETRO, 2017). Countries can participate in GVCs in different ways: Countries at the beginning of the production chain (upstream) import fewer semi-finished products and services, but export more of them than countries at the end of the chain (downstream). Countries can therefore participate in GVCs by using foreign inputs for their exports ("backward channel" participation) or they can be suppliers of intermediate goods and services that are used in the exports of other countries ("forward channel" participation). GVC analysis is crucial for income growth and the exploitation of globalisation (Kaplinsky & Morris, 2016). The expansion of GVCs increases the demand for intermediate goods and involves more institutions, firms, and workers in a complex division of labour. For developing countries, GVCs facilitate rapid learning, innovation, and industrial progress through trade, investment, and knowledge transfer (Humphrey & Schmitz, 2002).

The above implies that the industrial structure, employment structure and innovation intensity of small developing countries opening up to the international market (as well as others) are exposed to various positive and negative consequences of GVC inclusion. Pre-COVID19 research on international production fragmentation in the EU focuses on the EU 27 (excluding Croatia e.g. Leitner & Stehrer, 2014; Amador et al., 2015; Ederer & Reschenhofer, 2016; Grodzicki & Geodecki, 2016) or new member states (mainly CEE e.g. Kaminski & Ng, 2005; Timmer et al., 2013; Cieslik et al., 2016) to assess their GVC position. Croatia's role was examined by Kersan-Škabić (2017;2019), Orlić (2017) and Mikulić & Lovrinčević (2018). Research that deals exclusively with the CESEE countries is absent. The unique transition path of most of these countries (especially Bosnia and Herzegovina), makes it relevant to research the impact of integration into GVCs on economic outcomes in their context.

### **2.1.1. Opportunities and Challenges of GVCs Participation**

Research on global value chains highlights challenges in the areas of business motivation, industrial policy, logistics, and the link between investment and trade. Participation in the global value chain has an impact on development, and creates opportunities and obstacles that vary from country to country. Smaller, landlocked countries may have a different perspective than larger, coastal countries. The type of product, the industry, and the position of the company within the chain also influence the impact. For example, consumer electronics chains differ from agricultural chains. Regional trade agreements also have an impact on GVC trade patterns (Stephenson, 2016). GVCs can create opportunities for rapid technological learning and skills acquisition, as transactions and investments through GVCs are usually accompanied by quality control systems and standards that go beyond those of developing countries (Humphrey, 2014). In developing countries, GVCs can drive modernization and skills acquisition for export companies and the broader economy, as shown by China, Southeast Asia, and the Visegrad Group.

The global fragmentation of production harbours opportunities and challenges, particularly with regard to product safety in developing countries. Marucheck et al. (2011) propose solutions for operations management in the areas of regulation, life cycle management, traceability and supplier relationships, emphasising collaboration in the chain. The Indian automotive industry is an example of government, education and industry joining forces to improve integration in GVCs (Kumaraswamy et al., 2012). In Europe, the share of highly skilled labour in GVC income is growing faster (Timmer et al., 2013), while in developing countries GVC integration promotes productivity and economic progress (Pahl & Timmer, 2020; Jangam & Rath, 2021).

But not all studies emphasise the positive outcomes of GVC integration; GVCs can also promote the growth of income inequality (Kaplinsky, 2013). Selwyn (2019) marks GVCs as "chains of poverty" because of the leading companies' management's focus on maximising the profits making the situation even more difficult for the workers of Chinese textile industry. Issues of wages and rights of workers within the GVCs are addressed in a few studies (Feenstra & Hanson, 1996; Stringer et al., 2014; Lee et al., 2020 and Martinelli, 2021) but labour and inequality issues are overshadowed by GVC integration benefits. Another example is Raj-Reichert's (2019) fear that the Malaysian electronics industry is stuck in a "low-value trap" due to its dependence on foreign capital and poorly trained labour, which hinders upward mobility.

### **2.1.2. Measurement of GVCs Participation**

Thanks to the development of national and international input-output tables (IO tables), it has become possible to track value flows, which is not possible with simple gross data analysis. Accordingly, using national IO tables, Hummels et al. created the first (according to OECD, 2012) indicator for participation in GVCs in 2001. The indicator represents the degree of integration of a country in a vertically fragmented production process (in relative and absolute terms) and implies the import share of exports. GVC literature (e.g. Hummels et al., 2001; Koopman et al., 2010; Johnson & Noguera, 2012; Timmer et al., 2013; Banga, 2013) from the beginning uses two main channels of integration into global value chains: backward channel (indicating the share of foreign added value in the export value of the domestic industry) and forward channel (indicating the share of domestic added value in the value of foreign exports).

The indicators have continued to improve with the development of the regional IO tables and new databases (MRIO - EORA (UNCTAD), TiVA (OECD), WIOD and others - see Casella et al.; 2019, for a comparative analysis of available database), enabling value-added tracking and GVC research. Each of the available databases has advantages and disadvantages, so it is necessary to select among them for analysis those that are most suitable for particular research (Tukker & Dietzenbacher, 2013). Borin and Mancini (2015; 2019) suggest separating traditional trade from gross exports to approximate GVC trade. This GVC indicator: a) is between 0 and 1, b) is additive at all levels of trade aggregation, c) can be separated into "backward" (imported share of exports) and "forward" (share of domestic production in the importing country's exports). Belotti et al. (2021) improved the methodology of the GVC indicators.

## **2.2. Industrial Competitiveness**

Competitiveness can be defined from different points of view leading some authors to question the credibility of using the term in the economic sense (Krugman, 1996). Aiginger et al. (2013) redefine the concept of competitiveness as the ability of a country (a region, a location) to provide the population with goals that go beyond GDP-driven targets.

If we look at the international competitiveness of an economy, the dominant influence on its overall competitiveness is certainly industrial competitiveness, which is the basis of export competitiveness. Therefore, the analysis of competitiveness should be focussed on the industry level, on which public policies and trade agreements depend. When analysing industrial competitiveness, the focus is on a country's capacity to increase its presence in the international and national market through the development of industrial sectors and activities with higher added value and technological content, with the ultimate goal of increasing the general welfare of the population (UNIDO, 2013). Increasing industrial competitiveness can

promote a country's economic growth and development in various ways, mainly by stimulating the growth of domestic and foreign investment.

The ability to generate higher value added and the multiplier effect in job creation and new business start-ups, as well as spillover effects on other sectors, are just some of the reasons justifying the recent interest of economic policy makers in reindustrialisation (Lee, 2019). Much of the literature emphasises the "benefits of structural change" and the importance of manufacturing - which is usually seen as the primary "advanced sector" and thus the "growth engine" of the economy as a whole - for the growth process. In this context, Kaplinsky & Morris (2016) highlight the importance of systemic competitiveness, production efficiency, and understanding the entire value chain for global market success.

### **2.2.1. Measurement of Industrial Competitiveness**

From the macroeconomic and microeconomic aspects, competitiveness is measured by different indicators. Siudek and Zawajska (2014) provide an overview of authors and indicators used in competitiveness research from macro, meso and micro aspects. To overcome this shortcoming and capture the multidimensionality of the concept, composite indices are often used.

Thus, UNIDO ranks 152 countries according to the value of the Competitive industrial performance index - CIP Index (CIP Report, 2020). Different values of the index indicate significant differences in production and export capacities, technological progress and influence on global trade and value creation. The first dimension of the CIP index comprises capacity indicators. The second dimension of the CIP index includes indicators of technological progress, and the third dimension refers to the country's position in global trade in industrial products. The third dimension implies that industrial competitiveness can be increased through greater participation in international trade, better access to foreign capital, new investments in infrastructure or a stronger negotiating position in international agreements (UNIDO, 2021). For example, Lall (2003) used CIP index in analysis of the industrial competitiveness of 87 countries at different stages of development for the period from 1985- 2000 and confirmed the thesis that technologically more developed countries are more competitive internationally, with dynamic exports and GDP growth p.c.

## **3. Methods, Sample and Data Sources**

Synthesis, analysis, concretisation, and classification methods examined existing research on global value chains and industrial competitiveness, especially in less developed countries and the CESEE region. Descriptive analysis assessed the position of the CESEE member countries within global value chains and their industrial competitiveness (Appendix, Table1a). This study analyses the industrial competitiveness of Central, Eastern, and South-Eastern Europe - CESEE (excluding Turkey, CIS; due to different economic and historical contexts, similar to ECB analyses (2018), or data limitations; Kosovo, and Serbia) before COVID-19. The CESEE classification corresponds to that of the IMF (2016). The analysis covers 15 countries in 5 years for which UNIDO (available at <https://stat.unido.org>) and UNCTAD EORA (available at <https://worldmrio.com/>) data from 2014-2018 are used. The countries examined are: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Montenegro, Poland, Romania, Slovakia, Slovenia, TFYR Macedonia.

According to EORA database, FVA represent Foreign Value Added which is embodied in one country's exports (this corresponds to the Backward GVC participation component of the GVC participation index). DVA is Domestic Value Added which is embodied in this country's exports. DVX is Domestic Value Added of this country which is embodied in the

exports of other countries (this corresponds to the Forward GVC participation component of the participation index). Total value added embodied in this country's exports is equal to DVA+FVA. The GVC participation index for this country is equal to FVA + DVX. Values are in current year '000 USD (thousand US dollars) and their logarithmic values are used in regressions (see Appendix, Table 1 for Descriptive statistics).

We used a balanced panel data regression where dependent variable is industrial competitiveness and the independent variables are: GVC participation (but through forward and backward channel separately, thus differing two models), and capacity to produce and export (proxied by log of Manufactured Exports per capita -lnMX\_pc and Manufacturing Value Added Per capita Index- lnMVApC). Second dimension of CIP index, regarding technological progress, is used as a depended variable. It is proxied by the log of the export quality index (MXQual). Export quality measures the quality of the integration process of the country's manufacturing sector. A higher technological complexity of the exported goods also implies a higher quality of integration into the world market.

First, we visualised graphically CIP score and GVC participation through different channels (Figure 1 and Figure 2). After, we estimated two models (Eq. 1 and Eq. 2) as follows:

$$\ln\text{MXQUALindex}_{it} = \beta_0 + \beta_1 \ln\text{dvx}_{1it} + \beta_2 \ln\text{MVApC} + \beta_3 \ln\text{MXpc} + \mu_i + \varepsilon_{it} \quad (1)$$

$$\ln\text{MXQUALindex}_{it} = \beta_0 + \beta_1 \ln\text{fva}_{1it} + \beta_2 \ln\text{MVApC} + \beta_3 \ln\text{MXpc} + \mu_i + \varepsilon_{it} \quad (2)$$

Where:  $\ln\text{MXQUALindex}_{it}$  is the dependent variable for country  $i$  at time  $t$ ,  $\text{fva}$  proxies backward GVC and  $\text{dvx}$  forward GVC,  $\text{MVApC}$  index (production capacities) and  $\text{MX\_pc}$  (export capacities) are independent variables.  $\beta_0$  is the unknown intercept for each entity ( $n$  entity-specific intercepts).  $\beta_1$  and  $\beta_2$  are coefficients that show the influence of independent variables on dependent.  $\mu_i$  within-entity error term;  $\varepsilon_{it}$  overall error term. A fixed effects model is used to control for time-invariant variables that are not observed but may correlate with the predictor variables (there are good reasons to believe that the economic performance of countries can be influenced by their own internal characteristics: Type of government, political environment, cultural characteristics, type of public policy, etc., which is common when using macroeconomic data of different countries). However, to decide between fixed and random effects, we performed a Hausman test where the null hypothesis is that the preferred model is random effects and the alternative is fixed effects (see Green, 2008, Chapter 9). This test basically tests whether the unique errors are correlated with the regressors, with the null hypothesis being that they are not (Appendix, Table 2).

#### **4. Results and Discussion**

The descriptive statistics (Annex; Table 1a) show large fluctuations in performance, as measured by CIP score and GVC participation. In terms of industrial performance, the CIP score varies between 0.006 and 0.208, resulting in CIP ranks of 16 (Czech Republic) and 129 (Montenegro). Czech Republic, Hungary, and Slovakia lead in medium- and high-tech manufacturing value added. Bosnia and Herzegovina has a significant manufacturing share in GDP, but low technological advancement, indicating a resource- and labour-intensive manufacturing base with low value added. These differences are understandable for various reasons: historical development, proximity and (non-)membership of the EU, different timing of entry into the GVCs and different economic structures. The indicators show that industrial capacity in Bosnia and Herzegovina, Albania, Macedonia and Montenegro is low compared to the countries of the CEE region, which could be an indirect response to the problems of low employment and low living standards, as well as the slow catching-up process with more competitive countries.

Given the higher industrial competitiveness of Slovakia and the Czech Republic, it is important to emphasise examples of active policies. According to Taglionni and Winkler (2016) CzechInvest (CI) in the Czech Republic recognized local supplier networks as key for foreign direct investment post-EU accession. Their pilot program in electronics trained suppliers, resulting in 15 new contracts worth USD 46 million. CI expanded this program to other industries. In 2007, Renault-Dacia moved design and development to Renault Technologie Roumanie (RTR) in Romania. The CIP score and the two proxies for the GVC participation channels (for each channel separately) are presented graphically.

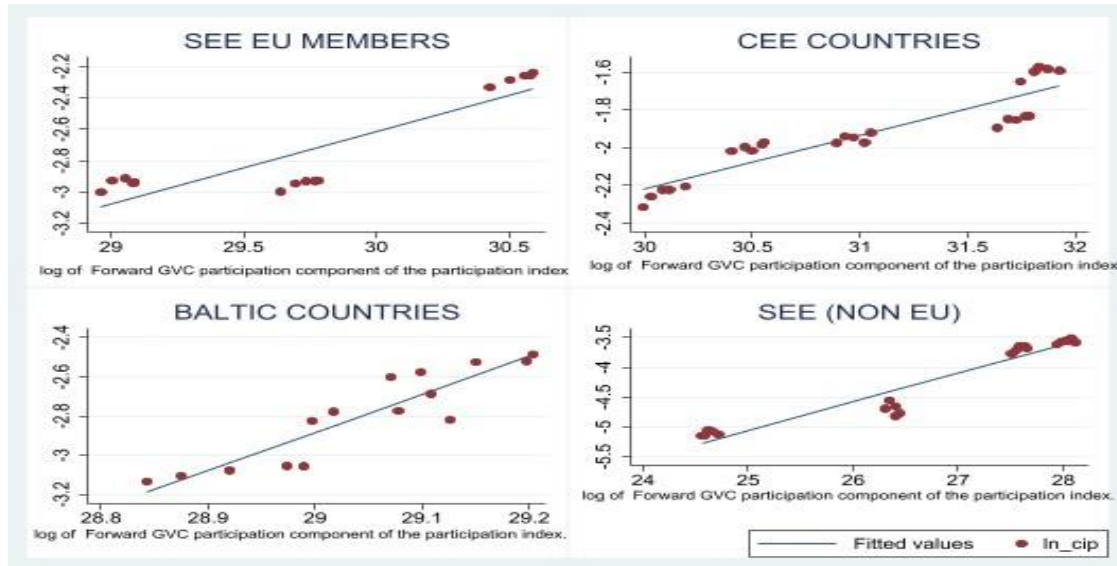


Figure 1: CIP score and “forward” GVCs participation of CESEE subregions  
 Source: authors according to UNCTAD EORA and UNIDO CIP Index Database

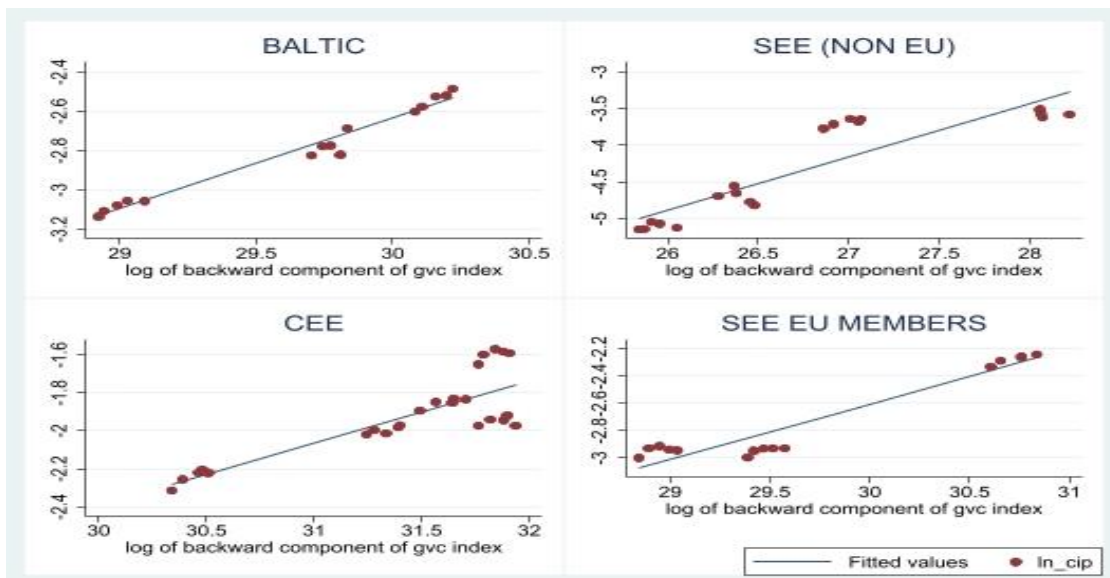


Figure 2: CIP score and “backward” GVCs participation of CESEE subregions  
 Source: Authors according to UNCTAD EORA and UNIDO CIP Index Database

As shown in Figure 1 and Figure 2, a positive relationship between the CIP score and the two GVC participation channels is evident, although not equally clear for each subregion. This could mean that higher GVC participation has led to better industrial performance of selected countries in the pre-COVID19 period, but causality models should be tested for this kind of conclusion, here we can only speak of a positive relationship. To improve the model, as already mentioned, two further independent variables were added, with export quality

representing industrial competitiveness. Hausman tests ( $p=0.0302$  for Model 1,  $p=0.0084$  for Model 2) favour fixed effects models.

*Table 1. Fixed Effects Regression estimations - Model 1 and Model 2*

	(1)	(2)
	ln MXQual	ln MXQual
ln_dvx	-0.735** (0.007)	
ln_MXpc	0.621*** (0.000)	0.576*** (0.000)
ln_MVApc	-0.0119 (0.891)	-0.0411 (0.582)
ln_fva		-0.548** (0.004)
_cons	15.87* (0.034)	10.87* (0.038)
N	75	75
R-sq	0.603	0.611
adj. R-sq	0.484	0.495
p-values in parentheses * $p<0.05$ , ** $p<0.01$ , *** $p<0.001$		

*Source: Authors according to UNCTAD EORA and UNIDO CIP Index Database*

Table 1 shows an inverse relationship between GVC participation and export quality in CESEE. A 1% increase in (forward/ backward) GVCs participation correlates with a 0.73% / 0.54% decrease in export quality. However, this is only one dimension of the complex CIP and the consideration of other dimensions can lead to a positive relationship if all dimensions are taken into account. Moreover, manufacturing firms in underdeveloped countries usually use labour and natural resources as their main competitive advantages when participating in GVCs. They therefore limit themselves to low-value, resource-intensive processing and manufacturing contracts. This may explain why MVApcindex isn't significant in either model, while values of Manufactured Exports pc (Table 1a Appendix) suggest these countries are low-value-added GVC factories. Fang, Wei, Zhang & Zhi (2023) found that GVC participation in China impacts export product quality via competition and improved imported inputs. This example shows that countries should strive for forward integration, but only when they are mature enough. Until then, backward integration is crucial for high quality imported inputs, that benefit the export performance of CESEE countries through learning and reinforcement effects for better export performance later on. Without that kind of backward GVC's involvement countries will be captured in low value-added activities with no development perspective.

## **5. Conclusion**

This study analyses participation in GVCs and industry competitiveness in CESEE countries using a value-added trade approach. Previous literature recognises the role of restructuring and manufacturing as a driver of growth, with participation in GVCs seen as a key instrument. Thus, we question the assumed positive correlation between GVC participation and industrial competitiveness in CESEE, an area that requires further research. Despite the limitations, the findings recommend policy measures to promote GVC participation and barrier-free trade.

## 5.1. Policy Implication

Opening up to global value chains (GVCs) brings both benefits and drawbacks for small developing countries' industrial structure, employment, and innovation. The focus should be on integrating GVCs into the broader economy to maximize knowledge spillovers, technology transfer, and value creation. GVC integration must also improve livelihoods through more jobs, higher incomes, and better living conditions. This study informs future research on GVC restructuring due to geopolitical shifts, including opportunities for developing countries via friendshoring/nearshoring. Bosnia and Herzegovina, and other non-EU CESEE countries, can leverage their location to benefit from this restructuring and accelerate industrial development. Based on the success of Central and Eastern European, to boost growth in South East Europe, policy makers should focus on the following:

1. Strengthening local businesses, improving infrastructure, and promoting a business-friendly climate for better GVC integration;
2. Prioritise investment in technology, logistics, education, and SME support;
3. Promote trade/investment, attract partners, develop human capital and strengthen institutions for higher GVC participation.

## 5.2. Limitations and Recommendations for Future Research

Future studies should analyse how geopolitical changes and the restructuring of GVC (friendshoring, nearshoring) can promote the development of Bosnia and Herzegovina and extend the analysis of industrial competitiveness beyond a single dimension by using dynamic models with more variables, including causality (e.g., GMM) and lagged variables. Further research is also needed on specific factors that may shape GVC integration. An important limitation of this study is unavailable data. Updated, publicly available data on value creation beyond 2018 would allow the post-COVID impact to be analysed. Despite all its limitations and simplicity, the authors believe that this study provides a good basis for future research.

## References

- Aiginger, K., Bärenthaler-Sieber, S. and Vogel, J. (June 2013). Competitiveness under New Perspectives. WWWforEurope Working Paper. No. 44. WIFO Studies, WIFO, number 47019. [Online]. Available: [https://www.wifo.ac.at/wp-content/uploads/upload-6924/sw\\_2013\\_WWWforEurope\\_WP44\\_47019\\_-1.pdf](https://www.wifo.ac.at/wp-content/uploads/upload-6924/sw_2013_WWWforEurope_WP44_47019_-1.pdf)
- Altenburg, T. (2006). Governance Patterns in Value Chains and their Development Impact, *The European Journal of Development Research*, 18 (4), 498–521. <https://doi.org/10.1080/09578810601070795>
- Amador, J., Cappariello, R. and Stehrer, R. (2015). Global value chains: a view from the euro area. *ECB Working Paper*. [Online]. No. 1761. Available: [www.ecb.europa.eu](http://www.ecb.europa.eu). <https://doi.org/10.1111/asej.12050> or <https://doi.org/10.2139/ssrn.2576685>
- Bair, J. (2005). Global Capitalism and Commodity Chains: Looking Back, Going Forward. *Competition & Change*, 9(2), 153-180. <https://doi.org/10.1179/102452905X45382>
- Baldwin, R. and Venables, A. J. (2013). Spiders and snakes: offshoring and agglomeration in the global economy. *Journal of International Economics*, 90, 245–254. <https://doi.org/10.1016/j.jinteco.2013.02.005>
- Banga, R. (2013). Measuring Value in Global Value Chains. *UNCTAD Background Paper*, Geneva: United Nations.

- Belotti, F., Borin, A. and Mancini, M. (2021). *icio: Economic analysis with intercountry input–output tables. Stata Journal*, 21 (3), 708-755. <https://doi.org/10.1177/1536867X211045573>
- Borin, A. and Mancini, M. (2015) Follow the value added: bilateral gross export accounting. Temi di discussione (Economic working papers) 1026. Bank of Italy, Economic Research and International Relations Area. <https://doi.org/10.2139/ssrn.2722439>
- Borin, A. and Mancini, M. (2019). Measuring What Matters in Global Value Chains and Value-Added Trade. Policy Research working paper, no. WPS 8804; WDR 2020 Background Paper. Washington, D.C.: World Bank Group. <https://doi.org/10.1596/1813-9450-8804>
- Casella, B., Bolwijn, R., Moran, D.D. and Kanemoto, K. (2019). Improving the Analysis of Global Value Chains: The UNCTAD-Eora Database. *Transnational Corporations Journal*, 26 (3), 115-14. <https://doi.org/10.18356/3aad0f6a-en>
- Cieslik, E., Bieganska, J. and Sroda-Murawska, S. (2016). The intensification of foreign trade in post-socialist countries and their role in global value chains. *Acta Oeconomica*, 66 (3), 465– 487. <https://doi.org/10.1556/032.2016.66.3.5>
- Coe, N. M., Dicken, P. and Hess, M. (2008). Global production networks: realizing the potential. *Journal of Economic Geography*, 8 (3), 271–295. <https://doi.org/10.1093/jeg/lbn006> <https://doi.org/10.1093/jeg/lbn002>
- ECB Economic Bulletin. (2018). Real convergence in central, eastern and south-eastern Europe. Issue 3 / 2018. [Online]. Available at: [https://www.ecb.europa.eu/pub/pdf/other/ecb.ebart201803\\_01.en.pdf](https://www.ecb.europa.eu/pub/pdf/other/ecb.ebart201803_01.en.pdf)
- Ederer, S. and Reschenhofer, P. (2016) Growth Patterns and Trade Imbalances in the EMU. A Global Value Chain Analysis. WIFO Working Papers, No 509, WIFO.
- Engel, J. and Taglioni, D. (2017). The middle-income trap and upgrading along global value chains. Global Value Chain Report [Online]. Washington D.C.: The World Bank Group, 119-139. Available: <http://documents.worldbank.org/curated/en/200681521003568933>
- Fang, X., Wei, Z., Zhang, Y. and Zhi, Y. (2023). “Does global value chain engagement improve export quality? Evidence from Chinese manufacturing firms”, *Economic Research-Ekonomska Istraživanja*, 36(1). <https://doi.org/10.1080/1331677X.2023.2180054>
- Feenstra, R. C. and Hanson, G. H. (1996). Globalization, Outsourcing, and Wage Inequality. *American Economic Review* 86 (2), 240–45. <https://doi.org/10.3386/w5424>
- Fernandez-Stark, K. & Gereffi, G. (2019). Global value chain analysis: a primer (second edition). In: Stefano Ponte, Gary Gereffi & Gale Raj-Reichert (Eds.), *Handbook on Global Value Chains* (pp. 54-76). Edward Elgar Publishing. <https://doi.org/10.4337/9781788113779.00008>
- Franssen, L. (2019). Global Value Chains and Relative Labour Demand: A Geometric Synthesis of Neoclassical Trade Models. *Journal of Economic Surveys*, 33(4), 1232-1256. <https://doi.org/10.1111/joes.12320>
- Gereffi, G. (1994). The Organization of Buyer-Driven Global Commodity Chains: How US Retailers Shape Overseas Production Networks. In G. Gereffi, & M. Korzeniewicz (Eds.), *Commodity Chains and Global Capitalism* (pp. 95-122). Westport, CT. Greenwood Press.

- Gereffi, G. and Kaplinsky, R. (2001). Introduction: Globalisation, Value Chains and Development. *IDS Bulletin*, 32 (3), 1–8. <https://doi.org/10.1111/j.1759-5436.2001.mp32003001.x>
- Gereffi, G., Humphrey, J. and Sturgeon, T. (2005). The Governance of Global Value Chains. *Review of International Political Economy*, 12 (1), 78–104. <https://doi.org/10.1080/09692290500049805>
- Greene, W. (2008). *Econometric Analysis*, New Jersey: Prentice Hall.
- Grodzicki, M. J. and Geodecki, T. (2016). New Dimensions of Core-Periphery Relations in an Economically Integrated Europe: The Role of Global Value Chains. *Eastern European Economics*, 54 (5), 377–404. <https://doi.org/10.1080/00128775.2016.1201426>
- Hummels, D., Ishii, J. and Yi, K.-M. (2001). The nature and growth of vertical specialization in world trade. *Journal of International Economics* 54, 75–96. [https://doi.org/10.1016/S0022-1996\(00\)00093-3](https://doi.org/10.1016/S0022-1996(00)00093-3)
- Humphrey J. and Schmitz, H. (2002). How does insertion in global value chains affect upgrading in industrial clusters. *Regional Studies* 36 (9), 1017–1027. <https://doi.org/10.1080/0034340022000022198>
- Humphrey, J. (2014). Internalisation theory, global value chain theory and sustainability standards. In Van Tulder, R., Verbeke, A., & Strange, R. (Eds.). *International Business and Sustainable Development* (pp. 91–114). Bingley, UK: Emerald Group Publishing Limited. [https://doi.org/10.1108/S1745-8862\(2013\)00000008010](https://doi.org/10.1108/S1745-8862(2013)00000008010)
- International Monetary Fund (2016). Central, Eastern, and Southeastern Europe How to Get Back on the Fast Track. Available: <https://www.imf.org/en/Publications/REO/EU/Issues/2017/01/07/Central-Eastern-and-Southeastern-Europe#>
- Jangam, B. P. and Rath, B. N. (2021). Does global value chain participation enhance domestic value-added in exports? Evidence from emerging market economies. *International Journal of Finance & Economics*, 26 (2), 1681–1694. <https://doi.org/10.1002/ijfe.1871>
- Johnson, R.C. and Noguera, G. (2012). Accounting for Intermediates: Production Sharing and Trade in Value Added. *Journal of International Economics*, 82 (2), 224 –36. <https://doi.org/10.1016/j.jinteco.2011.10.003>
- Kaminski, B. and Ng, F. (2005). Production disintegration and integration of Central Europe into global markets. *International Review of Economics & Finance*, 14 (3), 2005, 377–390. <https://doi.org/10.1016/j.iref.2004.12.008>
- Kaplinsky, R. (2013). *Globalization, poverty and inequality: Between a rock and a hard place*. John Wiley & Sons.
- Kaplinsky, R. and Morris, M. (2016). Thinning and Thickening: Productive Sector Policies in The Era of Global Value Chains. *Eur J Dev Res*, 28, 625–645. <https://doi.org/10.1057/ejdr.2015.29>
- Kersan-Škabić, I. (2017). Assessment of EU member states' positions in Global Value Chains. *Eastern Journal of European Studies*, 8 (2), 5–24.
- Kersan-Škabić, I. (2019). The drivers of global value chain (GVC) participation in EU member states. *Economic research-ekonomska istraživanja*, 32(1), 1204–1218. <https://doi.org/10.1080/1331677X.2019.1629978>

- Koopman, R., Powers, W., Wang, Z. and Wei, S.J. (2010). Give Credit Where Credit is Due: Tracing Value Added in Global Production Chains. *NBER Working Papers Series*, No. 16426. <https://doi.org/10.3386/w16426>
- Krugman, P. (1996). Making sense of the competitiveness debate. *Oxford review of economic policy*, 12 (3), 17-25. <https://doi.org/10.1093/oxrep/12.3.17>
- Kumaraswamy, A., Mudambi, R., Saranga, H. and Tripathy, A. (2012). Catch-up strategies in the Indian auto components industry: Domestic firms' responses to market liberalization. *Journal of International Business Studies*, 43(4), 368-395. <https://doi.org/10.1057/jibs.2012.4>
- Lall, S. (2003). Industrial success and failure in the globalizing world, Working Paper No102, Oxford Department of International Development.
- Lee, K. (2019). *The Art of Economic Catch Up: Barriers, Detours, and Leapfrogging In Innovation Systems*. Cambridge University Press. <https://doi.org/10.1017/9781108588232>
- Lee, S.H., Mellahi, K., Mol, M.J. and Pereira, V. (2020). No-Size-Fits-All: Collaborative Governance as an Alternative for Addressing Labour Issues in Global Supply Chains. *Journal of Business Ethics*, Springer, 162 (2), 291–305. <https://doi.org/10.1007/s10551-019-04198-5>
- Leitner, S.M. and Stehrer, R. (2014). Trade Integration, Production Fragmentation and Performance in Europe - Blessing or Curse? A Comparative Analysis of the New Member States and the EU-15. wiiw Research Reports 397, The Vienna Institute for International Economic Studies, wiiw.
- Martinelli A. (2021). Collectivism, individualism and solidarity in global value chain restructuring in the Global North: Workers' resistance in the Swiss machinery industry. *Economic and Industrial Democracy*, 43(3), 1391-1419. <https://doi.org/10.1177/0143831X211009958>
- Maruchek, A., Greis, N., Mena, C. and Cai, L.N. (2011). Product safety and security in the global supply chain: Issues, challenges and research opportunities. *Journal of Operations Management*, 29 (7-8), 707–720. <https://doi.org/10.1016/j.jom.2011.06.007>
- Mikulić, D. and Lovrinčević, Z. (2018). The import content of Croatian economic sectors and final demand. *Economic research-Ekonomska istraživanja*, 1(31), 2003-2023. <https://doi.org/10.1080/1331677X.2018.1480967>
- OECD (2012). Mapping Global Value Chains. TAD/TC/WP/RD(2012)9. [Online]. Available: [https://www.oecd.org/dac/aft/MappingGlobalValueChains\\_web\\_usb.pdf](https://www.oecd.org/dac/aft/MappingGlobalValueChains_web_usb.pdf)
- OECD (2013). Interconnected Economies: Benefiting from Global Value Chains. OECD Publishing, Paris. [Online]. Available: <https://doi.org/10.1787/9789264189560-en>
- Orlić, E. (2017). Determinants of global value chain participation in CESEE. In Gnan,E. & Kronberger,R. (Eds.). *Schwerpunkt Außenwirtschaft 2016/2017 Direktinvestitionen: Trends, Erklärungsfaktoren, Barrieren* (213-228). Vienna: Facultas Verlags- und Buchhandels AG facultas.
- Pahl, S. and Timmer M. P. (2020). Do Global Value Chains Enhance Economic Upgrading? A Long View. *The Journal of Development Studies*, 56 (9), 1683-1705. <https://doi.org/10.1080/00220388.2019.1702159>

- Parrilli, M. D., Nadvi, K. and Wai-Chung Yeung, H. (2013). Local and Regional Development in Global Value Chains, Production Networks and Innovation Networks: A Comparative Review and the Challenges for Future Research. *European Planning Studies*, 21(7), 967-988. <https://doi.org/10.1080/09654313.2013.733849>
- Raj-Reichert, G. (2019). Global Value Chains, Contract Manufacturers, and the Middle-Income Trap: The Electronics Industry in Malaysia. *The Journal of Development Studies*, 56, 1-19. <https://doi.org/10.1080/00220388.2019.1595599>
- Selwyn, B. (2019). Poverty chains and global capitalism. *Competition & Change*, 23 (1), 71–97. <https://doi.org/10.1177/1024529418809067>
- Siudek, T. and Zawojcka, A. (2014). Competitiveness in the Economic Concepts, Theories and Empirical Research. *Acta Scientiarum Polonorum – Oeconomia*, 13, 91-108.
- Stephenson, S. (2016). *Trade Governance Frameworks in a World of Global Value Chains: Policy Options*. E15 Expert Group on Global Value Chains: Development Challenges and Policy Options – Policy Options Paper. E15Initiative. Geneva: International Centre for Trade and Sustainable Development (ICTSD) and World Economic Forum.
- Stojcic, N. and Matic, M. (2024). A journey toward global value chain upgrading: Exploring the transition from backward to forward integration. *Technology in Society*, 76. <https://doi.org/10.1016/j.techsoc.2023.102435>
- Stringer, C., Simmons, G., Coulston, D. and Whittaker, D. H. (2014) Not in New Zealand's waters, surely? Linking labour issues to GPNs. *Journal of Economic Geography*, 14(4), 739–758. <https://doi.org/10.1093/jeg/lbt027>
- Taglioni, D. and Winkler, D. (2016). Making Global Value Chains Work for Development. Trade and Development; World Bank. [Online]. Available: <http://hdl.handle.net/10986/24426> <https://doi.org/10.1596/978-1-4648-0157-0> [https://doi.org/10.1596/978-1-4648-0157-0\\_fm](https://doi.org/10.1596/978-1-4648-0157-0_fm)
- Timmer, M. P., Los, B., Stehrer, R. and de Vries, G. J. (2013). Fragmentation, incomes and jobs: Analysis of European competitiveness. *Economic Policy*, 28 (76), 613–661. <https://doi.org/10.1111/1468-0327.12018>
- Tukker, A. and Dietzenbacher, E. (2013). Global Multiregional Input–Output Frameworks: An Introduction and Outlook. *Economic Systems Research*, 25 (1), 1-19. <https://doi.org/10.1080/09535314.2012.761179>
- UNIDO (April 2021). Competitive industrial performance report 2020. United Nations Industrial Development Organization. [Online]. Available: <https://stat.unido.org/publications-and-documents/competitive-industrial-performance-report-2020>
- World Bank Group; IDE-JETRO; OECD; UIBE; World Trade Organization (2017). Global Value Chain Development Report 2017 : Measuring and Analyzing the Impact of GVCs on Economic Development. Washington, DC: World Bank. [Online]. Available: [https://www.wto.org/english/res\\_e/booksp\\_e/gvcs\\_report\\_2017.pdf](https://www.wto.org/english/res_e/booksp_e/gvcs_report_2017.pdf) <https://doi.org/10.1596/978-92-870-4125-8>

## Appendix

Table 1a. Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Min	Max	p1	p99	Skew.	Kurt.
year variable	75	2016	1.424	2014	2018	2014	2018	0	1.7
dvx	75	1.530e+13	2.070e+13	4.630e+10	7.350e+13	4.630e+10	7.350e+13	1.662	4.456
va exp	75	4.867e+13	5.810e+13	3.200e+11	1.880e+14	3.200e+11	1.880e+14	1.248	3.166
fva	75	2.041e+13	2.410e+13	1.670e+11	7.410e+13	1.670e+11	7.410e+13	1.068	2.616
gvc	75	3.580e+13	4.340e+13	2.130e+11	1.450e+14	2.130e+11	1.450e+14	1.219	3.056
dva	75	2.820e+13	3.560e+13	1.530e+11	1.200e+14	1.530e+11	1.200e+14	1.541	4.085
cip	75	.08	.057	.006	.208	.006	.208	.557	2.301
cipRank	75	55.2	32.828	16	129	16	129	.975	2.927
ImWMT	75	.003	.004	0	.014	0	.014	1.409	3.734
ImWMT index	75	.022	.027	0	.098	0	.098	1.421	3.791
ImWMVA	75	.001	.002	0	.007	0	.007	1.922	5.97
ImWMVA index	75	.005	.007	0	.026	0	.026	1.922	5.975
INDint index	75	.413	.167	.106	.706	.106	.706	-.041	2.171
MHVash	75	.306	.141	.045	.594	.045	.594	.242	2.272
MHVash index	75	.393	.184	.052	.794	.052	.794	.279	2.352
MHXsh	75	.486	.189	.036	.765	.036	.765	-.606	2.69
MHXsh index	75	.531	.212	.039	.929	.039	.929	-.486	2.683
MVApc	75	1983.507	1329.77	211.891	4912.545	211.891	4912.545	.492	2.439
MVApc index	75	.095	.066	.009	.276	.009	.276	.632	2.854
MVAsh	75	.148	.054	.038	.249	.038	.249	-.304	2.434
MVAsh index	75	.433	.165	.098	.749	.098	.749	-.298	2.438
MXpc	75	6473.937	5167.475	323.43	18296.285	323.43	18296.285	.59	2.055
MXpc index	75	.214	.17	.009	.554	.009	.554	.56	1.965
MXQual index	75	.692	.161	.217	.935	.217	.935	-.907	3.535
MXsh	75	.836	.12	.386	.955	.386	.955	-1.819	6.291
MXsh index	75	.853	.124	.394	.977	.394	.977	-1.792	6.172
CNTRY	75	8	4.35	1	15	1	15	0	1.789
country id	75	8	4.35	1	15	1	15	0	1.789
ln fva	75	29.502	1.894	25.841	31.936	25.841	31.936	-.507	2.117
ln dvx	75	29.21	1.91	24.558	31.928	24.558	31.928	-.783	3.185
ln va exp	75	30.468	1.801	26.492	32.867	26.492	32.867	-.631	2.552
ln gvc	75	30.092	1.866	26.085	32.608	26.085	32.608	-.595	2.448
ln dva	75	29.945	1.773	25.754	32.419	25.754	32.419	-.721	2.956
ln cip	75	-2.885	.997	-5.146	-1.57	-5.146	-1.57	-.861	2.887
est eq fe	75	1	0	1	1	1	1	.	.
est eq re	75	1	0	1	1	1	1	.	.
region id	75	2.533	1.095	1	4	1	4	.07	1.7

Table 2. Hausman tests

### Hausman (1978) specification test

	MODEL 1	MODEL 2
	Coef.	Coef.
Chi-square test value	8.933	11.72
P-value	.03	.008