

Participation and Position of Agrarian Sectors in Global Value Chains in Selected Countries in the Central and Eastern Europe

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Abstract: This article investigates the effects of fragmentation of production on the agrarian sectors in selected countries in Central and Eastern Europe (Czech. Rep., Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Rep., Slovenia, Bulgaria, Croatia and Romania) between 1995 and 2018. The participation index and the position index are used to evaluate the form of integration of the agrarian sectors in these countries into global value chains (GVC). The results suggest that most evaluated countries increased participation in GVC through the time period. EU membership led to increasing participation in GVC. Participation in agrarian global value chains has not expanded since the Great Recession. On average, the position of global value chains in these countries is shifting more downstream with a few outliers (e.g. Slovakia, Estonia, Latvia, and Croatia). The growing integration of the agrarian sectors in countries in the Central and Eastern Europe into the GVC increases the influence of the vertical division of labor/tasks and creates a new set of factors influencing the development of agrarian sectors in these countries.

Key words: fragmentation, value added, CEE countries, global value chain

JEL: F14, F15

Introduction

World trade and production are increasingly structured around “global value chains” (GVCs). A value chain identifies the full range of activities that firms undertake to bring a product or a service from its conception to its end use by final consumers and takes place in numerous locations in different countries (Gereffi, 2014). The food and agriculture sectors are no exceptions and are increasingly integrated into global value chains as well (De Backerand and Miroudot, 2013; Kowalski et al., 2015; Greenville et al., 2017; OECD, 2020; Montalbano and Nenci, 2020).

The research on firm GVC participation, including its drivers and implications for economies in general (e.g. Gereffi, 2014; Fernandes et al., 2020; Reddy et al., 2021), in countries of Central and Eastern Europe (Cieřlik et al. 2016; Cieřlik, 2017; Cieřlik 2019a; Cieřlik et al. 2019b) and specifically in agricultural and food sectors (e.g. Lim, 2021; Montalbano and Nenci, 2022) has experienced a rapid rise in the last decade.

Gereffi (2014) showed that contemporary globalization has been marked by significant shifts in the organization and governance of global industries. Furthermore, the organization of the global economy entered another phase, with transformations that are reshaping the governance structures of both GVCs and global capitalism at various levels. He concluded that there are various drivers behind these changes, like, i.e. (1) the end of the Washington Consensus and the rise of centers of economic and political power; (2) a combination of geographic consolidation and value chain concentration in the global supply base; (3) new patterns of strategic coordination among value chain actors and (4) a shift in the end markets of many GVCs accelerated by the economic crisis of 2008–09, which is redefining regional geographies of investment and trade. Fernandes et al. (2020) noted that the past decades have witnessed big changes in international trade with the rise of global value chains (GVCs) and some countries, such as China, Poland, and Vietnam rode the tide, while other countries, many in the African region, faltered. Fernandes et al. (2020) studied the determinants of countries' GVC participation using a panel database of more than 100 countries from 1990 to 2015. They found that factor endowments, geography, political stability, liberal trade policies, foreign direct investment and domestic industrial capacity are very important in determining GVC participation, and these factors matter more for GVC trade than traditional trade. Reddy et al. (2021) studied the relationship between financial constraints and firm participation in global value chains (GVC) in the Indian manufacturing sector for the period 2001–2016. They found that firms that were relatively more financially constrained were more likely to become a part of GVC during the studied period.

Cieślik et al. (2016) and Cieślik (2017) investigated the transformation of foreign trade in 10 CEE countries and gave special focus to the role these countries began to play in global value chains in the period between 2000 and 2009. They concluded that post-socialist countries differ in the levels of their participation in GVCs and countries that have stronger links with Western European countries, especially with Germany, are more integrated. Also, a large share of post-socialist countries' exports passes through Western European GVCs and most exporters in Central and Eastern Europe are positioned in downstream segments of production rather than upstream markets. Furthermore, Cieślik (2019a) analyzed the CEE countries' connections to production networks in the electronics industry

and found CEE states' dependence on Chinese electronics industry exports. She concluded that in electronics industry exports, the CEE countries have become more dependent on Chinese value added than on the EU's value added recently. Cieřlik et al. (2019b) evaluated the economic potential of CEE countries and also we assessed the role of CEE states in international production linkages. The authors tested the hypothesis that the higher economic potential expressed in a more business-friendly economy is found in countries most involved in GVC in the context of foreign trade exchange. Results indicated that the relation between economic potential and the involvement of GVCs is not obvious and depends on many factors.

Lim (2021) noted that since the mid-1900s, agricultural global value chains have grown rapidly and transformed the nature of agri-food production around the world, but little is known about how participation in agricultural GVCs changes the structure of participating economies. To address this shortcoming, he used a constructed panel dataset from 155 countries for the period 1991- 2015 and found that, in response to high agricultural GVC participation, both GDP and employment shares in the agricultural and services sectors increase, and that both factors decrease in the manufacturing sector. He concluded that modern agrarian economies are leapfrogging the manufacturing sector to directly develop their agriculture and services sectors through their participation in agricultural GVCs.

Montalbano and Nenci (2022) used measures of GVCs participation and positioning from the EORA panel data for the period 1995–2015 and tested their effects on changes in agriculture value added per worker. They found that changes in GVC participation are, on average and *ceteris paribus*, positively associated with changes in agriculture value added per worker. Mixed results were found on the effects of countries' positioning along the value chain.

In recent paper, Elia et al. (2021) have stressed that the COVID-19 pandemic is expected to trigger a reconfiguration of global value chains according to four alternative trajectories as reshoring, regionalization, replication, and diversification.

An evaluation of agriculture and food sectors in Eastern and Central European countries has not received similar attention. To fill this research gap, this study aims to investigate the effects of fragmentation of production on the agrarian sectors in selected

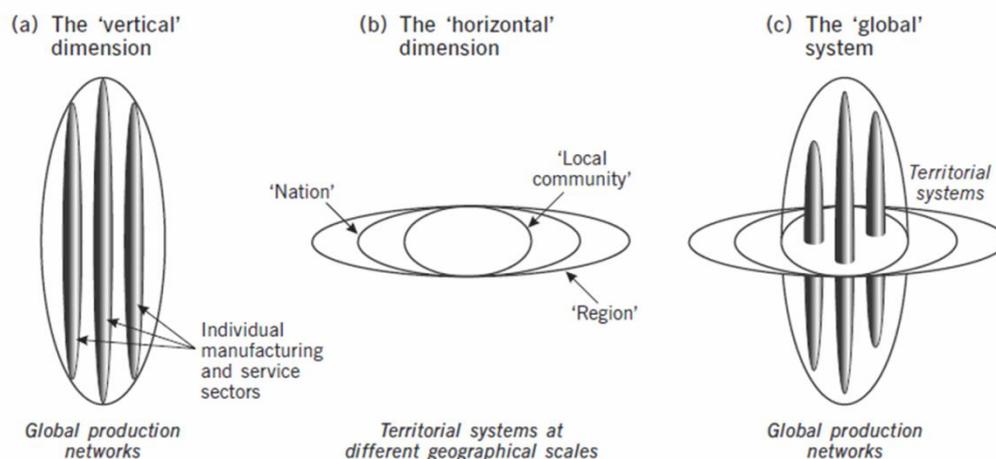
countries in Central and Eastern Europe between 1995 and 2018. In this study, we focus on the form of integration (participation and position) of the agrarian sectors in the global value chains of these countries.

Theoretical premises

Technological progress, cost, access to resources and markets, as well as trade policy reforms have facilitated the geographical fragmentation of production processes across the globe according to the comparative advantage of the locations (De Backerand and Miroudot, 2013).

According to P. Dicken, the production of any product involves a complex delivery of individual activities and transactions across space and time. Such a nexus of interconnected functions and operations through which goods and services are produced and distributed has become both organizationally and geographically more complex. Global value chains not only integrate firms (and parts of firms) into structures, which blurs traditional organizational boundaries, but also integrates national and local economies in ways which have enormous implications for their economic development (Dicken, 2011).

Figure 1. Interconnecting dimensions in a globalizing economy



Source: Dicken (2011)

Figure 1 captures the major dimensions of these relationships. Individual production networks can be regarded as vertically organized structures configured across increasingly extensive geographical scales. Cutting across these vertical structures are the territorially

defined political-economic systems which, again, are manifested at different geographical scales (Dicken, 2011). The growing integration of the sector/region in the GVC also increases the influence of this vertical system and creates new set of factors influencing the sector/region.

Methodology

Data comes from The Trade in Value Added (TiVA) database, 2021 edition (TiVa, 2022). TiVa is a collection of measures that can provide insights into global production networks and supply chains beyond what is possible with conventional trade statistics. The TiVA database contains a selection of principal indicators that track the origins of value added in exports, imports and final demand for the years 1995-2018. Indicators are available for 45 industries within a hierarchy based on ISIC Rev. 4. The indicators are derived from the 2018 version of OECD's Inter-Country Input-Output Database (Martins Guilhoto et al., 2022). Data for the following countries in the Central and Eastern Europe are available in the database: the Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Slovak (SK), Slovenia (SI), Bulgaria (BG), Croatia (HR), and Romania (RO).

The use of the international input-output table by TiVA allows decomposing gross trade into value added components. The decomposition of gross exports provides information about domestic value added (DVA), foreign value added (FVA) content of exports, and domestic value added sent to third economies (IV).

Domestic value added embodied in gross exports (DVA; or $EXGR_DVA_{c,i,p}$ in TiVA) refers to the domestic value added content of exports, by industry i in country/region c to partner country/region p and represents the exported value added that has been generated anywhere in the domestic economy (i.e. not just by the exporting industry).

Foreign value added embodied in gross exports (FVA; $EXGR_FVA_{c,i}$) refers to the value of intermediate goods and services that are embodied in a domestic industry's exports. The value added can come from any foreign industry upstream in the production chain.

Domestic value added sent to third economies (IV; $EXGR_DVAFXSH_{c,i}$) represents the country c domestic value added content embodied in the gross exports of industry i in foreign countries. It is often considered as a measure of 'forward linkages' in analyses of GVCs.

Following Koopman et al. (2010), Johnson and Noguera (2012), Borin and Mancini (2020), these metrics (DVA, FVA and IV) can be used to measure of GVC participation (1) and GVC position (2).

$$(1) \quad GVC_{participation} = \frac{FVA + IV}{Export_{gross}}$$

The GVC participation index indicates the share of country's export that is part of multi-stage trade process. The higher the value of index the higher is the country's participation in GVC.

The measure of GVC participation can be used together with the GVC position index. That allows indication of location (vertical specialization) of the country in the production chain.

$$(2) \quad GVC_{position} = \log \left(1 + \frac{IV}{Export_{gross}} \right) - \log \left(1 + \frac{FVA}{Export_{gross}} \right)$$

The positive value (IV is higher than FVA) means the country lies upstream in the GVC. The negative (IV is smaller than FVA) value signals the country lies downstream in the GVC. The country that exports raw materials or intermediate products lies upstream in the GVC; the country that uses a large portion of import intermediate products to produce final goods for export lies downstream in the GVC.

Results

The first potential consequence of a sector/country integrating into the global value chain is decreasing the share of domestic value added in its gross exports, indicating a larger proportion of foreign value added in gross export and stronger linkages within global value chains (Cieřlik et al. 2016). Figure 2 (a and b) presents the levels and changes in the share of domestic value added in the gross agrarian export of each selected country in the Central and Eastern Europe. The countries analysed showed different shares of domestic value added in the gross agrarian exports. Because of better visibility of similar and different trends among analysed countries, we present them in two graphs, divided into those that show a similar development (Fig. 2a) and outliers (Fig. 2b).

At the beginning of the period (1995), the highest share of DVA in the gross agrarian export (indicating lowest levels of integration into the GVA) was revealed in the case of Romania, Bulgaria, and Hungary. Contrary, the the lowest shares were revealed

in Slovakia and Estonia; indicating already higher levels of integration into the GVC before the accession into the European union when compared to other countries in the Central and Eastern Europe.

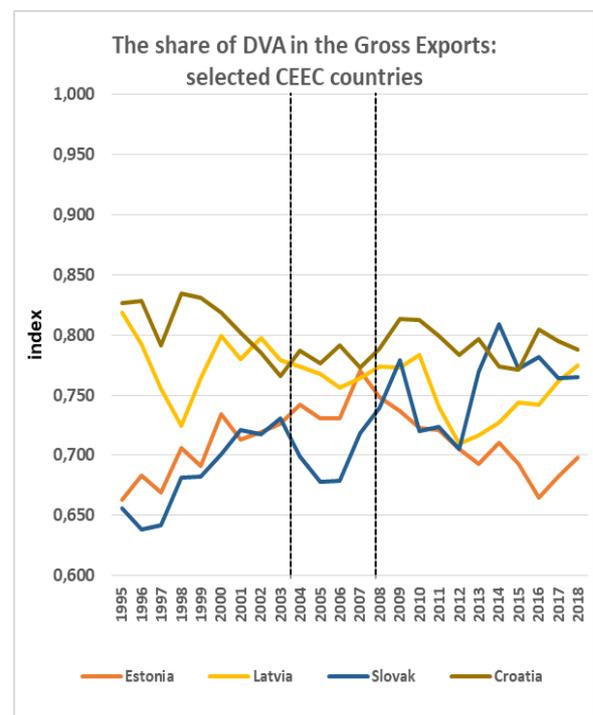
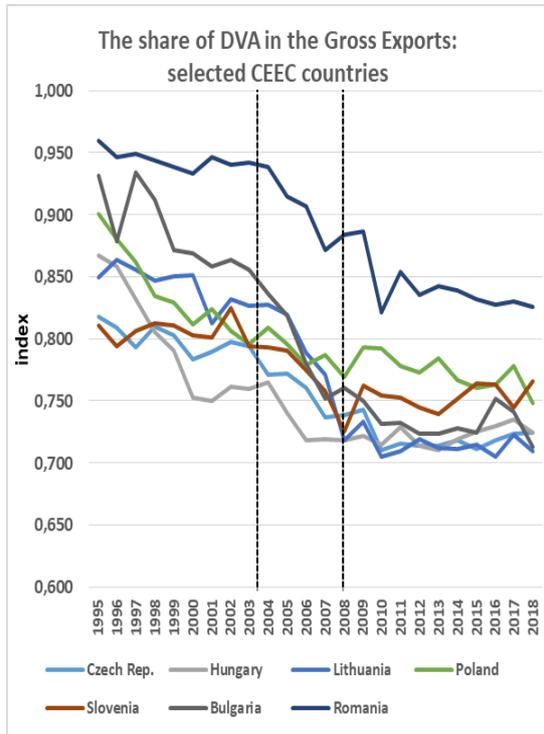
Selected countries also showed different trends and changes of domestic value added in gross agrarian exports during the period between 1995 and 2018.

Generally, group of countries consisting of the Czech Republic, Hungary, Lithuania, Poland, Slovenia, Bulgaria, and Romania showed an increasing share of foreign value added in their gross agrarian exports until the Great Recession (Fig. 2a). The accession into the European Union in 2004 enhanced the integration into the GVC as can be seen in the case of Slovenia, Czech Republic, and Lithuania. Since the Great Recession, the domestic value added in the gross agrarian exports has been stagnating. This suggests that since the Great Recession, agrarian sectors of these countries are not increasing its level of integration into the GVC anymore.

Figure 2. The share of Domestic value added (DVA) in the gross agrarian exports

a.

(b)



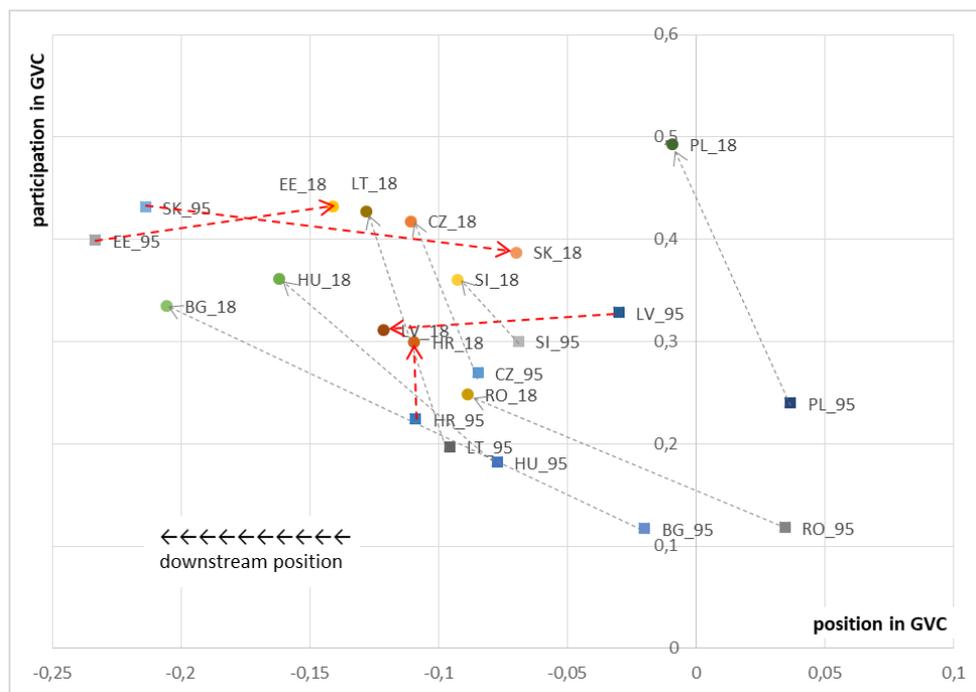
Source: own calculations, data from TiVA (<http://www.oecd.org/sti/ind/measuring-trade-in-value-added.htm>).

There are few outliers (Estonia, Latvia, Slovakia, and Croatia) among the analysed countries when compared to the previous group (Fig. 2b). Estonia diminished its integration into the GVC from 1995 to the Great Recession, but after the recession the trend is opposite and Estonia's share of DVA in the gross agrarian export is decreasing. Slovakia's share of DVA in the gross agrarian export fluctuates during the period, but reveals an increasing trend. Latvia shows periods of drops and stagnation of DVA in the gross agrarian export. Croatia's share of DVA in the gross agrarian export remains mostly the same since the beginning of millennia and there is no visible significant influence of accession into the European Union in 2013.

Although the share of DVA in the gross agrarian export already provides information about the level and change in integration into the GVC, the indicators of participation and position in GVC allow assessing the form of integration in more detail (Fig. 3).

Majority of analysed countries had increased its participation in GVC and had downstream position in the GVC in 1995 and also had moved more downstream during the period till 2018. In other words, countries in the Central and Eastern Europe started to use relatively a large portion of import intermediates to create its agrarian exports. There are few exeption to such a conclusion.

Figure 3. The shifting patterns of GVC participation and position



Source: own calculations, data from TiVA (<http://www.oecd.org/sti/ind/measuring-trade-in-value-added.htm>).

Poland and Romania were positioned upstream in the GVC in 1995, but these two countries have changed their relative position from the upstream one to the downstream one during the period, up until 2018.

Slovakia and Estonia are still positioned downstream in the GVC, but these two countries are relatively moving upstream. It potentially means that Slovakia and Estonia increasingly export raw materials or initially processed intermediate products.

Latvia is moving more downstream in the GVC as the majority of other countries the Central and Eastern Europe, but the level of participation slightly decreased. Croatia increased its participation in GVC, but its position remained same when compare 1995 and 2018.

Summary, recommendations

This study investigated the effects of fragmentation of production on the agrarian sectors in selected countries in the Central and Eastern Europe between 1995 and 2018. The focus was specifically on the form of integration (participation and position) of the agrarian sectors in the global value chains of these countries.

We found that agrarian sectors in countries in the Central and Eastern Europe differ in the levels of their participation in the GVC. A majority of analysed countries had increased agrarian sectoral participation in GVCs and had downstream position in the GVC. What is more, these countries had moved more downstream in the GVC during the period between 1995 and 2018. This means that agrarian sectors in these countries started to use relatively larger portion of imported intermediate products as inputs to produce its agrarian exports. These conclusions are in line with Cieřlik (2016, 2017, 2019b), who analysed the integration into the GVC at the level of overall economy in the Central and Eastern Europe.

The findings in this study can help inform agricultural trade policy makers when assessing the nature of liberalization and structural transformation of agrarian sectors in their countries, as well as when assessing the potential benefits and risks.

There are a few next steps for this research. First, the historical interpretations of the changing position in the GVC relative to our findings lead to additional questions to inquiry. For example, a country like Slovakia, where its share of DVA in gross exports increases as well as its position going from downstream to upstream may not be interpreted as simply moving away from focusing on processing nearly finished products in the GVC to early stages

of processing. Rather, with the growing share of DVA in the GVC over the period, it could mean that upstream parts of the the agrarian GVC are being added to the existing downstream portfolio of businesses in Slovakia, rather that a substitution away from downstream.

Furthermore, an increasing interest in Regional Value Chains (RVCs) (cf. Elia et al, 2021; Kersan-Škabić and Belullo, 2021) has gained momentum due to the increasing protectionism that has resurfaced among several global powers, as well as the need to have redundant regional and domestic supply chains for critical supplies exposed by the pandemic. Understanding the relative participation between Central and Eastern European countries to the rest of Europe vs the Rest of the World will be important for future strategic position of Central and Eastern European counties.

There is also space for further research in this area to identify the underlying factors influencing the participation and position, to asses the effects of participation and position in the GVC on structural transformation and change in productivity, etc.

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