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Intra-Country Inequality and Involvement in GVCs:The Case of EU-28

Desigualdad intrapaís y participación en las cadenas de valor mundiales: el caso de la UE-28

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Abstract

Nowadays, production is configured around Global Value Chains, and countries' involvement in those has become important objectives for achieving economic upgrading. However, social outcomes are neither equally distributed between countries, nor among social classes within countries. Indeed, GVCs and the potential gains of countries' involvement in them, yield uncertain implications of the effects of globalization on inequality within countries. In this context, the aim of this work is to analyze the link between the performance of countries in GVCs (measured trough participation and position) and the levels of intra-country inequality. In more depth, we focus on Europe (specifically, EU28 countries), as it offers a wide and cohesive scenario of developed countries in which to test the effects of linking into GVCs on internal inequalities. We get a positive effect of participation in GVCs on increasing intra-country inequality, while more upstream positions are linked to decreases in

income inequality. Besides, if we differentiate by geographical area, Western and Southern European countries would achieve higher reductions in inequality than Northern countries by moving towards more upstream positions.

Keywords: Income inequality, global value chains, participation, position, EU-28.

Resumen

Hoy en día, la producción se configura en torno a las Cadenas Globales de Valor, y la participación de los países en ellas se ha convertido en objetivos importantes para lograr la mejora económica. Sin embargo, los resultados sociales no se distribuyen por igual entre los países ni entre las clases sociales dentro de los países. De hecho, las cadenas de valor mundiales y los beneficios potenciales de la participación de los países en ellas arrojan implicaciones inciertas de los efectos de la globalización sobre la desigualdad dentro de los países. En este contexto, el objetivo de este trabajo es analizar el vínculo entre el desempeño de los países en las CGV (medido a través de la participación y la posición) y los niveles de desigualdad intrapaís. Con más profundidad, nos centramos en Europa (específicamente, los países de la UE28), ya que ofrece un escenario amplio y cohesivo de países desarrollados en el que probar los efectos de la vinculación a las CGV sobre las desigualdades internas. Obtenemos un efecto positivo de la participación en las cadenas de valor mundiales en el aumento de la desigualdad dentro del país, mientras que las posiciones más ascendentes están vinculadas a la disminución de la desigualdad de ingresos. Además, si diferenciamos por área geográfica, los países de Europa Occidental y del Sur lograrían mayores reducciones en la desigualdad que los países del Norte al avanzar hacia posiciones más ascendentes.

Palabras clave: desigualdad de la renta, cadenas globales de valor, participación, posición, EU-28.

JEL Classification/ Clasificación JEL: D31, F15, O41.

1. Introduction

Intra-country inequality has been on the rise since the 1980s decade, especially in developed countries (Deaton, 2013; Piketty, 2014). This is true from the perspectives of both primary (ILO & OECD, 2015; Karabarbounis & Neiman, 2014) and personal income distribution (Alvaredo et al., 2013; Atkinson et al., 2011; Morelli et al., 2015). Among the possible explanations behind these contemporary increases in inequality, the literature mentions, namely, capital liberalization and the financialization of developed economies, which might have contributed to increasing income concentration (Atkinson, 2003; Chancel et al., 2022; Chancel & Piketty, 2021). However, the effects of the intensification of globalization processes during the last three decades should not be neglected here (Bourguignon, 2016; Lakner & Milanovic, 2016; Ravallion, 2018).

As a result of the intensification of globalization and the increasingly interconnected character of the world, the phases of production are internationally fragmented (OECD, 2011), in the sense that products are not entirely wholly in one country (Feenstra, 1998). Nowadays, production is configured around Global Value Chains (from now on, GVCs), and countries' involvement in those has become important new challenges for many developed and developing economies (Banga, 2016; Ojala et al., 2008). As a general definition, GVCs have been described as 'the full range of activities undertaken to bring a product or service from its conception to its end use and how these activities are distributed over geographic space and across international borders' (DFAIT, 2011: 86).

The engagement of countries in GVCs allows them to participate in global production, exploiting their comparative advantages, specializing in determined processes, and thus contributing to fostering the creation of employment and incentivizing the diffusion of innovation (Gereffi, 1995; Lladós-Masllorens et al., 2018; Meng et al., 2020; Rodrik, 2018; Selva & Medina, 2019). In general, a country's specialization in relatively upstream versus downstream production phases of GVCs has been related to higher value-added shares or, in other words, has brought about economic upgrades (Hagemejer & Ghodsi, 2017; Hummels et al., 2001; Kummritz et al., 2017).

However, recent literature has also highlighted that achieving economic upgrading cannot be taken neither as a sure result of involvement in GVCs (Bernhardt & Pollak, 2016), nor as a driver of social upgrading. In more depth,

it has also been pointed out that positive social outcomes are neither equally distributed between countries, nor among social classes within countries (Barrientos et al., 2011; Carballa Smichowski et al., 2021; Meng et al., 2020; Rossi, 2013). To put it other way, the organization of the global economy around GVCs and the potential gains of countries' involvement in them, yield uncertain implications of the effects of globalization on inequality within countries. In more detail, the process of globalization has generated an interesting debate concerning whether countries are net losers or winners as a result of their participation (Shepherd, 2013). Kaplinsky (2000) determined that integration in GVCs can yield complex and heterogeneous impacts on income distribution, while Dollar (2017) showed that the outcomes of this involvement are indeed unequally distributed among countries. A traditionally commented negative effect is that outsourcing of low-skilled occupations to developing countries as a result of international competition, provoking downward pressures on wages in developed countries (Krugman, 1995).

In this context, our work explores how the performance of countries in the GVCs conditions the levels of intra-country inequality or, in other words, to what extent both participation and the positioning of countries in the GVCs has allowed them to improve their social outcomes in terms of internal income inequality reductions. In more depth, we focus on Europe (specifically, EU-28 countries), as it offers a wide and cohesive scenario of developed countries in which to test the effects of linking into GVCs on internal inequalities.

Internal inequalities linked to GVCs in developed and developing countries regarding their involvement in global value chains have been recently considered in the literature, finding that a higher participation in GVCs leads to higher levels of intra-country inequality in the short run (Carpa & Martínez-Zarzoso, 2022; Duarte et al., 2022). Bolea et al. (2022), from a regional perspective in Europe, found significant heterogeneities in the way in which economies take advantage of their involvement in GVCs in terms of participation and positioning in these chains, opening the door for a more specific study of the economic outcomes of GVC participation in the EU countries and their distributional effects. In this context, this paper focus on the recent behaviour of the EU countries in GVCs, and the implications for intra-country income inequalities.

More specifically, along with the analysis of the relationship between participation in GVCs and inequality, following Antràs et al. (2012) and Antràs & Chor (2018), we pay particular attention to the role of position in GVCs. Thus, whereas participation gives insights on how commercial specialization yields economic outcomes from engaging in GVCs, position makes reference to the characteristics of production, being this productive specialization in certain stages a clear determinant of income distribution between labor and capital, thus affecting inequality. Hence, getting to know the specialization patterns in relation to GVCs can be helpful to ascertain the potential impact of this engagement in GVCs on income distribution. This results also offer more novelty, as the role of participation in inequality within countries has already been explored in the literature.

This paper suggests the use of a multiregional and multisectoral input-output framework to address these questions in order to capture how countries' structural, technological and commercial patterns affect their economic and social outcomes. This work aims to shed some light on the nature of inequality as a global phenomenon, exploring recent trends in a context of internationally fragmented production processes, configured around GVCs. Namely, the phenomenon of globalization, which has accentuated over the past few decades, implies that competition is an international process. The international distribution of production determines the way in which part of global value added or income is appropriated by each country (Autor et al., 2014; Eckel, 2008; Muñiz & Arias, 2014). Hence, the configuration and evolution of GVCs might be strongly related to the global distribution of income.

In this multiregional input-output framework, two different metrics have been used to capture countries involvement in GVCs, specifically, these measures approach participation and position in these chains. On the one hand, the concept of participation in GVCs refers to the capacity of a sector/country to integrate in these chains, through the generation of value added embodied in their exported goods and services. This degree of participation can be calculated from different perspectives. For example, we are using here the definition of participation as the share of exported value added embodied over the country's GDP per capita (Los et al., 2015), approaching in this way the gains derived from trade openness .

On the other hand, position defines a country's productive specialization regarding its 'upstreamness', or the distance of its production to final use, an upstream position meaning that a country is focused on the initial stages of production, namely, of primary products and intermediate inputs. On the contrary, a downstream position would imply closeness to final use, that is, a specialization on finalist goods rather than intermediate inputs. This can either be measured in terms of the distance of intermediate inputs to final demand (Antràs et al., 2012; Antràs & Chor, 2018), or by calculating the average propagation length of backward to forward linkages (Szymczak & Wolszczak-Derlacz, 2022). In our analysis, we are using the former.

Our paper builds on this literature and delves into the relationship between participation and position in GVCs, and their impact on intra-country inequality. More specifically, our paper aims to address whether the involvement of EU countries in GVCs, either in terms of participation or of more upstream/downstream positions, has allowed them to achieve a more equal internal distribution of income. In other words, to check not only if economic upgrading, understood as involvement in GVCs, has also brought about social upgrading, but also to analyze the specific ways of achieving a successful integration. To the best of the authors' knowledge, this is the first paper addressing the potential effects of participation and position in GVCs on intra-country inequality and focusing on EU-28, leaving a promising line of research ahead.

From an empirical perspective, this paper takes advantage of the extensive information provided by the November 2021 Release of the Inter-Country

Input-Output (ICIO) database, published by the OECD. These tables cover a long-run and relevant period of time (1995-2018), with a detail of 45 industries for 67 countries. See Section 3 below for a detailed list of the countries in our sample (EU-28 countries), and a classification according to the geographical criteria of the United Nations Geoscheme, that we used to classify our sample by an objective geographical criterion. As previous literature states (Bolea et al., 2022; Zhu et al., 2022), the configuration of GVCs has an important component of spatial dependence, so we believe that this territorial grouping by geographical proximity is thus justified.

The empirical strategy combines both the multiregional input–output approach for the definition of GVCs measures and the econometric estimation to capture the relationship between the proposed inequality measures and the variables referred to involvement in GVCs. Our endogenous variables include Gini indexes, that are synthetic measures of inequality within countries as well as the share of income held by the top 1% over the bottom 50% share, which is a complementary and transparent measure of intra-country inequality (Chancel et al., 2022; Piketty, 2022).

The rest of the paper is structured as follows. In Section 2, the methodology and data are presented. In Section 3, we discuss the main results of the analysis. First, a general overview concerning recent trends of inequality, according to the proposed measures of inequality are discussed. Second, the relationship between inequality and the measures of integration in GVCs is analyzed. Finally, Section 4 closes the paper with the main concluding remarks.

2. Methodology

2.1. Measures of countries' involvement in GVCs

For calculating position and participation in GVCs, we use a multiregional input-output (MRIO) model, with *m* countries, and *n* sectors in each country (Isard, 1951; Leontief, 1936, 1941; Miller & Blair, 2009). We start from the equilibrium equation shown in equation (1):

$$\mathbf{x} = \mathbf{A}\mathbf{x} + \mathbf{y} \rightarrow \mathbf{x} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{y} = \mathbf{L}\,\mathbf{y} \tag{1}$$

Where A is the matrix of technical coefficients, x is the output vector and is the vector of total final demand. Each element a_{ij}^{rs} represents the volume of intermediate input *i* sourced from country *r* that is needed to produce a unit of output *j* in country *s,* while each element l_{ij}^{rs} represents the worldwide final demand for products of the industry *i* produced in country *r*. Besides, $\mathrm{L} = (\mathrm{I} - \mathrm{A})^{-1} = (l_{ij}^{rs})$ is the well-known Leontief inverse in which each representative element captures all the production generated in sector *i* in country *r* to fulfil the demands of inputs incorporated in all the phases of the production chain and ending in final demand y_j^r. To aggregate the information at a country level,

the matrices and vectors in equation (1) are aggregated using a matrix of zeros and ones with the adequate structure and dimensions.

Now, an embodiments (or virtual trade flows) matrix must be defined as follows

$$\mathrm{E} = \hat{\mathrm{v}}(\mathrm{I} - \mathrm{A})^{-1}\hat{\mathrm{y}} = \hat{\mathrm{v}}\mathrm{L}\hat{\mathrm{y}} \tag{2}$$

Where is a diagonalized value-added vector per unit of output, and is the diagonalized final demand vector. This embodiments matrix shows the supply of factors by rows, and their use by columns, in this case at a country level. These matrices can be used to calculate value added embodied, which is done by summing by columns, obtaining a row vector ($\sum_r e^{rs}$) denoting value added embodied in final demand.

From here, participation can be calculated following Los et al. (2015). Let us remind that this definition of participation requires calculating a country's total value added embodied in exports and dividing it by its total value added (or GDP). For calculating value added embodied in exports, in the matrix of embodiments, we sum by columns value added exported ($\sum_s e^{rs}$ $s \neq r$), which yields a column vector representing gross participation of each country in international trade. This is later corrected by the country's economic size, that is, dividing by its total value added. The process is summarized in (3) below:

$$Par^r = \frac{\sum_{s \neq r}^{s} E^{r,s}}{GDP^r} \tag{3}$$

On the other hand, to calculate position in GVCs, we follow Antràs et al. (2012), which is computed as follows:

$$Pos^r = \frac{y^r}{x^r} + 2 * \frac{\sum_s a^{rs} y^s}{x^r} + 3 * \frac{\sum_s \sum_k a^{rk} a^{ks} y^s}{x^r} + 4 * \frac{\sum_s \sum_k \sum_t a^{rk} a^{kt} a^{ts} y^s}{x^r} + 5 * \frac{\sum_s \sum_k \sum_t \sum_d a^{rk} a^{kt} a^{td} a^{ds} y^s}{x^r} \tag{4}$$

According to this measure, the higher the value, the more upstream the position in which a country is involved in GVCs. That is, countries are more involved in the production of intermediate inputs. By contrast, lower values, occupying more downstream positions in GVCs, would denote closeness to final use. In other words, these are more involved in final goods and services[1].

1 Although it is common to measure position in this way, that is, as the distance to final demand, Antràs & Chor (2018) proposed another complementary measure based on the distance to primary inputs.

2.2. Intra-country inequality measures

As we commented before, in this paper we use tow measures of inequality. First, we consider Gini indexes for each country (Gini). These are calculated from the income data available in the World Income Database (WID), provided by UNU-WIDER. The specific formula for the Gini index used here is:

$$Gini = \left|1 - \sum_{k=0}^{k=n-1}(X_{k+1} - X_k)(Y_{k+1} + Y_k)\right| \quad (5)$$

where Y_k represents the accumulated proportion of income up to income category k, while X_k stands for the accumulated proportion of population up to income class k.

The second measure is the income share held by the top percentile over that of the bottom 50% (T1). This last measure it can be considered as a proxy of income concentration. It is extracted directly from UNU-WIDER.

2.3. Data and econometric strategy

Multiregional input-output tables are extracted from the OECD Inter-Country Input-Output (ICIO) tables, November 2021 Release. It is constituted by 67 countries, covering the period 1995-2018.

Dependent variables for our models are the two measures of inequality, which we correlate with our variables of interest, participation and position in GVCs.

These variables are complemented with a set of control variables which attempt to capture different mediating factors in the relationships studied. In particular, we include institutional variables that can explain part of the evolution of inequality in Europe. Namely, among the main variables that the literature considers as key in explaining inequality, we usually find employment (Karabarbounis & Neiman, 2014), education (Bertocchi & Dimico, 2014), international investment flows (OECD, 2008), social expenditures (Plagerson & Ulriksen, 2016), urban population (Young, 2013), or innovation (Law et al., 2020). Thus, we include employment (World Bank, estimated from ILO), enrollment rates in tertiary education, extracted from World Bank data, Foreign Direct Investment taken from World Bank data, expenditure in social protection (as % of GDP, extracted from Eurostat), the percentage of urban population, and patents to control for innovation (World Development Indicators).

In order to capture differences between group of countries, we distinguish four main geographical areas in EU-28 (South, East, West, and North). Dummy variables for the different areas are defined following Unites Nations Geoscheme, as can be seen shortly in Section 3. These are included summative to control for country effects and in a multiplicative way with the position. To avoid collinearity, we leave outside the estimation North, so all the interpretations must be done in reference to this area. We show the regression estimated in expression (6) where is the measure of inequality (either Gini o T1):

$$I = \alpha + \beta_1 * Pos + \beta_2(Pos * D_{south}) + \beta_3(Pos * D_{east}) + \beta_3(Pos * D_{west}) + Country\ effects + \beta_i Par + \cdots + \beta_j control_j + \varepsilon \quad (6)$$

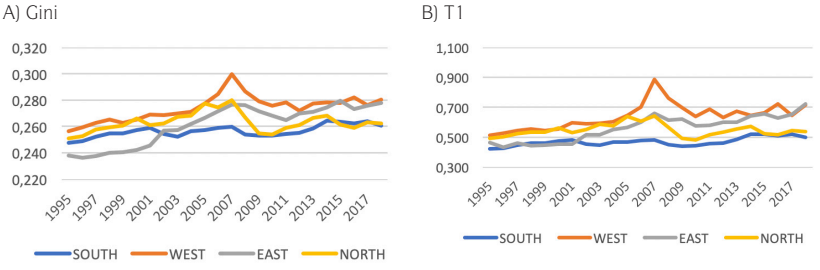
3. Results

3.1. An overview of inequality and position in GVCs

Before the analysis of our estimations, let us present an overview of the evolution of inequality in EU-28 countries. In Figure 1, we show the average evolutions of the Gini index and T1, in our four European macro-regions[2], from 1995 to 2018. Our work covers a wide timespan, which is also interesting from the globalization perspective. In fact, it practically captures in its entirety the second unbundling defined by Baldwin (2006), which started in the 1990s up until the 2008 crisis.

The highest values in Gini index and T1 at the end of the period are both found in Western and Eastern Europe. For the whole period, inequality increases in the four regions. However, let us note that Northern and Western Europe achieved decreases in inequality after the 2008 crisis, while it increased in Southern and Eastern Europe.

Figure 1. Evolution of Gini index (panel A) and T1 (panel B) by geographical areas

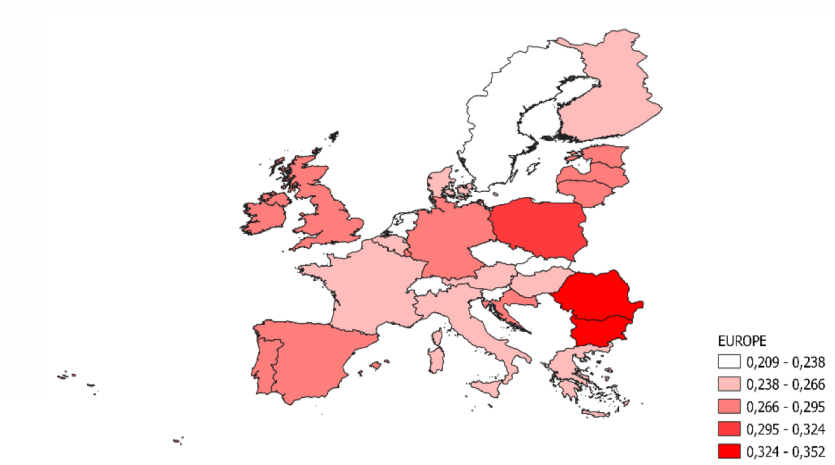


Source: Own elaboration.

Figure 2 shows the value of Gini index by countries in 2018. It is possible to find different levels of inequality within each of our four regions. In the South, Italy, Greece, Slovenia, and Malta achieve the lowest values, while Croatia, Spain, and Portugal show higher inequalities. In the case of Western Europe, Germany presents the higher Gini, while low values are found in France,

2 Our four EU-28 macroregions, which are instrumented according to United Nations Geoscheme, are: North (Denmark, Estonia, Finland, Ireland, Latvia, Lithuania, Sweden, and UK), West (Austria, Belgium, France, Germany, Luxembourg, and the Netherlands), East (Bulgaria, Czech Republic, Hungary, Poland, Slovakia, and Romania), and South (Croatia, Greece, Italy, Malta, Portugal, Slovenia, and Spain). Cyprus was eliminated from the sample, due to being classified as a Western Asia country.

Figure 2. Gini index by countries, 2018



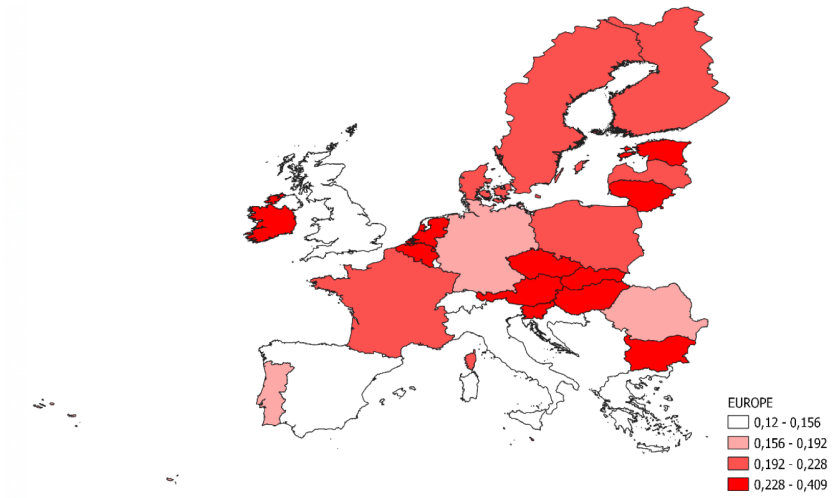
Source: Own elaboration.

Belgium, and specially the Netherlands. Meanwhile, in Eastern Europe, we find high inequalities in Poland, Romania, and Bulgaria. Nonetheless, it must be highlighted that Czech Republic and Slovakia show remarkable performances in terms of internal inequality, in contrast to their Eastern neighbors. Finally, in Northern Europe, UK, Ireland, and the Baltic countries show higher inequalities, while Sweden, Denmark, and Finland present lower disparities.

Now, we move on to Figure 3, which shows an overview of participation in EU-28 countries by 2018. Here, it can be first pointed out that participation in Southern Europe is low, meaning that these countries present a relatively low openness to trade, and are more focused in domestic markets. In the North, with the exception of the UK, all countries show a high participation, especially Ireland. Meanwhile, Western countries are generally open to foreign markets, with participation being higher in Belgium, the Netherlands, and Austria. Finally, participation in Eastern countries is also generally high in all countries, with the exception of Romania.

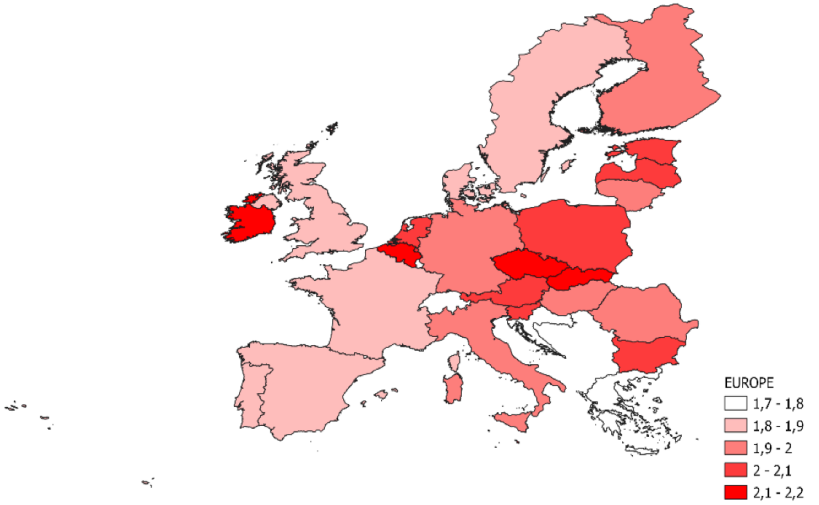
Finally, to end this descriptive analysis, Figure 4 shows a picture of countries position in GVCs in 2018. As it is expected, the most upstream countries, that is, more specialized in the first stages of global production chains are found in Eastern Europe, mainly Poland, Czechia, and Slovakia. In the North, Ireland, Estonia, and Latvia also occupy relatively upstream positions, while Belgium and the Netherlands are to be highlighted in the West. On the contrary, the most downstream positions appear in UK, Portugal, Croatia, Greece, France, Sweden, and UK. The cases of Portugal, Croatia, and Greece might be associated with tourism-oriented services, while in UK, Sweden, and France this is more related to high technology services. Finally, intermediate positions are occupied by countries such as Spain, Italy, Germany, and Denmark.

Figure 3. Participation in GVCs, 2018



Source: Own elaboration.

Figure 4. Position in GVCs, 2018



Source: Own elaboration.

3.2. Inequality and EU-28 countries involvement in GVCs

Once the main characteristics of the EU countries regarding their involvement in GVCs and inequality indexes are presented, in this section, we comment the results that we obtain from our econometric analysis. The objective is to study the relationship between our two measures of internal inequality and the two measures of involvement in GVCs (participation and position), as well as the factors mediating this relationship.

As endogenous variables, two indexes regarding inequality within countries have been considered. First, the Gini index, a traditional intra-country measure which ranges from 0 to 1, a higher value meaning more distance from an egalitarian distribution of income. Second, T1, which accounts for the relationship between the top 1% income over that of the 50% bottom, thus being a measure of income concentration. Note that while the first index is a general measure of intra-country inequality, the second is a complementary one, which refers to the tails of the distribution, that is, which focuses on the extremes: the richest versus the poorest groups within the countries.

Regarding the explicative variables, firs, we consider the two metrics regarding participation and position in GVC defined in the methodological section. Moreover, other relevant variables have been considered as controls. As mentioned in Section 2, we included variables tightly related to income distribution, covering such topics as education, investments, population, employment, innovation, and social expenditures.

The first column of Table 1 shows the results when Gini index is our endogenous variable, and the second column displays results for the case of T1 (top 1% income over 50% bottom).

Regarding first the results for the measure of participation in GVCs, we find a significant and positive relationship for the period and countries studied. In other words, increasing trade openness, which may imply an economic upgrading, is not necessarily translated into social upgrading, in terms of reducing income disparities within countries. This result is also in line with the literature, for instance, Carpa & Martínez-Zarzoso (2022), which found that a higher participation in GVCs yields increases in intra-country inequality in the short run. Thus, it is confirmed that, as was commented in the Introduction, economic upgrading does not necessarily leads to social upgrading (Barrientos et al., 2011; Bernhardt & Pollak, 2016; Carballa Smichowski et al., 2021; Marcato & Baltar, 2017; Rossi, 2013)

Let us now focus on the position variable, distinguishing first the total effect, and then looking into results by macro-regions. The general effect of position is negative, meaning that more upstream positions could help EU-28 countries to reduce their internal levels of inequality. This could be linked to that previous literature that was mentioned in the Introduction, finding that more upstream positions are usually related to higher results in terms of value added. Now, we can assert that these countries, besides generating and absorbing more value added, also achieve a more egalitarian distribution of these economic results.

We now move on to the regional dummies. Let us remark that we take the Northern region as the control group, due to it being the zone with a better performance in terms of inequality reductions since the 2008 crisis. A similar interpretation can be extracted from the country fixed effects dummies, which show that inequality is structurally higher in the West and the South (although the same cannot be confirmed for Eastern Europe). Here, we get significant and negative relations in both West (-0.0506 for Gini), and South (-0.111 for Gini, and -0.401 for T1) regions. These results show that more upstream positions are associated with higher reductions in inequality than in the North.

Thus, if these countries could upgrade by moving up the chains, they could achieve even better results than Northern countries in terms of social outcomes. Let us take as an example the case of Western Europe, with notable implications in these results, as it presented the worst performance in average along the period (see Figure 1), combined with a general level of downstreamness (see Figure 4). Moreover, we do not find any significant relationship for Eastern European countries. This could be related to the fact these countries are usually those of most recent integration to the European Union, and so might present a certain lag in their processes of convergence and integration into GVCs.

Finally, we move on to the analysis of control variables. Tertiary education, patents, social protection, and urban population are significant and with negative sign. That is, the higher the education focused on high-skilled occupations, the lower inequality, as this is usually translated into an equalization of opportunities. This result is compatible with Rodrīguez-Pose & Tselios (2009). Moreover, the sign of patents indicates that innovation has a positive effect on reducing inequality. In other words, the specialization in high-technology industries and services and the innovation culture helps to ensure that economic upgrading translates into social upgrading. It is also relevant that increasing social expenditures also helps to reduce internal inequalities, highlighting the role of the welfare state, which is not negligible in the case of Europe. Furthermore, a higher urban population also yields reductions in inequality, probably due to internal rural migrants increasing their life standards when moving to the city. On the contrary, foreign investment presents a positive sign. An analysis of this variable by regional blocks could yield different results, as these investment flows have been an important source of growth particularly for the Eastern EU countries, contributing to their international integration (Duarte & Serrano, 2021). A final comment refers to the variable capturing employment. This variable displays a positive and significant sign of the coefficient, meaning that employment growth in the period has been related to higher values of inequality. Note that this result tells us about a strong polarization in European labor markets between high- and low-skilled occupations, also associated to the expansion of the migration processes in Europe in the decades covered by the study. In other words, all other things constant, the way in which employment has grown in EU countries has been a driver of income inequality, being this result in line with the hypothesis of polarization in the labor markets, linked to the globalization processes (Comin et al., 2020).

Table 1. Estimations for Gini (1) and T1 (2)

VARIABLES	(1)	(2)
	Gini	T1
Par	0.0436*	0.494*
	(0.0256)	(0.253)
Position	-0.0729***	-0.840***
	(0.0114)	(0.131)
Pos_South	-0.111***	-0.401***
	(0.0154)	(0.139)
Pos_West	-0.0506**	-0.107
	(0.0210)	(0.208)
Pos_East	-0.0548	0.363
	(0.0348)	(0.226)
Terc_edu	-0.000616***	-0.00634***
	(6.93e-05)	(0.000655)
ln_emp	0.0105***	0.113***
	(0.00119)	(0.0140)
Patents	-3.54e-08***	-5.42e-07***
	(1.30e-08)	(1.77e-07)
Urban	-0.000480***	-0.00315***
	(8.83e-05)	(0.000969)
Soc_prot	-0.385***	-3.028***
	(0.0136)	(0.124)
ln_FDI	0.00666***	0.0584***
	(0.000944)	(0.00888)
EU_South	0.188***	0.555**
	(0.0305)	(0.275)
EU_West	0.0915**	0.155
	(0.0406)	(0.415)
EU_East	0.0751	-0.997**
	(0.0729)	(0.473)
Constant	0.510***	2.968***
	(0.0192)	(0.241)
Observations	1,495	1,495
R-squared	0.567	0.461

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

4. Conclusions

Inequality within countries has been recently increasing in the developed world, especially since the 1980s decade. This might be partially related to the intensification of globalization processes during the last three decades, affecting the international mechanisms of income distribution. More specifically, the manifestation of this phenomenon in the fragmentation of international production and the configuration of these processes in Global Value Chains (GVCs) might be of special importance. In other words, the fact

that goods are not entirely produced in one country, and the spatial diffusion of production phases, with different contributions to value added, might have played an important role in determining each country's share of global income, affecting so their internal distribution of income.

Thus, we are especially interested in analyzing whether this configuration of international production in GVCs is related to income inequality within countries. For achieving this purpose, we use a multiregional input-output framework combined with an econometric analysis. We use input-output tables from ICIO database, which covers the period 1995-2018 (thus capturing the recent years of intense globalization), and we focus on EU-28 countries. We do so because these constitute a representative sample of developed countries, which are structurally comparable among themselves, as well as for presenting diverse behaviors both in the evolution of inequality and their involvement in GVCs. For measuring internal inequalities, we use two traditional measures: Gini indexes and the proportion of income held by the top 1% in comparison to that held by the bottom 50%. Moreover, for measuring involvement in GVCs, we use another two measures: participation (considered as the proportion of a country's value added embodied in exports over its total value added) and position (a higher position meaning a more upstream character or, in other words, a phase of production more distanced to final use).

Our results show that, on the one hand, participation in GVCs have a positive effect on increasing intra-country inequality, which is in line with results from previous literature. This being so, gains derived from trade openness are equally distributed throughout the different social groups in EU-28 countries.

Concerning position in GVCs, the general effect for EU-28 countries is that more upstream positions are linked to decreases in income inequality. Hence, if moving up the chains can be considered a productive upgrade, these can drive to positive social outcomes, besides giving the opportunity of capturing a higher value added, as discussed in the literature. Curiously enough, Western Europe is the region with the worse performance in terms of internal inequality during the period studied, and with no prominent place in the upstream positions of the chains (with the exceptions of Belgium and the Netherlands). On the contrary, the Northern region showed an impressive performance in reducing inequalities, especially from 2008, which coincides with several countries being located in upstream positions (the Baltic countries, Ireland, and Finland).

Looking into regional results, Western and Southern European countries would achieve higher reductions in inequality than Northern countries by moving towards more upstream positions. This is an important result, meaning that potential benefits in terms of social outcomes could be obtained in these two regions by moving up the chains. Generally, Western and Southern countries occupy intermediate-to-downstream positions, so there is room for improvement. Meanwhile, no significant relations were found for Eastern countries.

Finally, our results also highlight the importance of some control variables in the reduction of inequality, such as tertiary education, innovation, social expenditures, or the percentage of urban population.

To sum up, our analysis shows that involvement in GVCs affect the internal distribution of income in EU-28 countries. Especially, the location of these countries in more upstream or downstream processes is not a trivial issue. In the international context, European countries are usually located in intermediate positions, and we have seen that positions in the extremes are more interesting for reducing inequalities (either downstream or upstream positions, depending on the geographical region). Thus, moving up or down as a block would be positive for Europe regarding the objective of tackling down the increases in intra-country inequalities. These different effects in the tails of the chains leave some insights for future research, as for example, the existence of potential non-linear relations that can explain these differential behaviors. Finally, the consideration of internal inequalities in the EU territories, that is, the consideration of sub-national scales (namely, at NUTS 2 level) in the analysis also leaves an open door for further research, for instance, into the inquiry of the structural and technological drivers of regional convergence or divergence in Europe.

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