

EU Firms participation in GVC: Bliss or curse after COVID?

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ABSTRACT

Europe may be less affected from the COVID-related hit on Global value chains (GVC), since most of the action takes place within the continent. This column assesses whether the story is generally true when we bring it at the regional level. To do so, we simulate how GVC disruptions – proxied by a hypothetical limitation of trade outside the EU - would shrink the GVC overall participation. Not surprisingly, we uncover that there is a strong regional dimension, which does not necessarily reflect the respective countries impacts. Using the CompNet dataset we compute how such disruptions could potentially affect individual regions productivity. This is particularly critical to ascertain as EU institutions attempts to device best strategies to allocate post-COVID recovery support.

INTRODUCTION

The disruption of Global Value chains (GVC) operations are widely seen as a major negative side effect of the COVID-19 epidemic (Baldwin, 2020), particularly for their impact on firm productivity (Syverson and di Mauro, 2020). Within Europe, firms’ participation to GVC is high and particularly so in regions/countries located in the central and eastern part of the continent, including Finland and the Balkan states.

Using WIOD input output tables connected with the CompNet (2020) dataset, we simulate how a hypothetical restriction of trade on final and intermediate goods **outside Europe** would shrink the GVC overall participation by firms located in individual European regions, and therefore their productivity. This is indicative on the extent in which GVC participation by EU firms is prevalently an EU or truly global matter.

1. OVERALL GVC PARTICIPATION IN THE EU

To measure EU firms integration in GVCs we use the so-called “GVC participation index” developed by Koopman et al. (2011), which takes into account two factors: (i) the extent in which exporters depend on foreign suppliers for intermediate inputs (i.e. the share of foreign VA in exports), and (ii) the share of

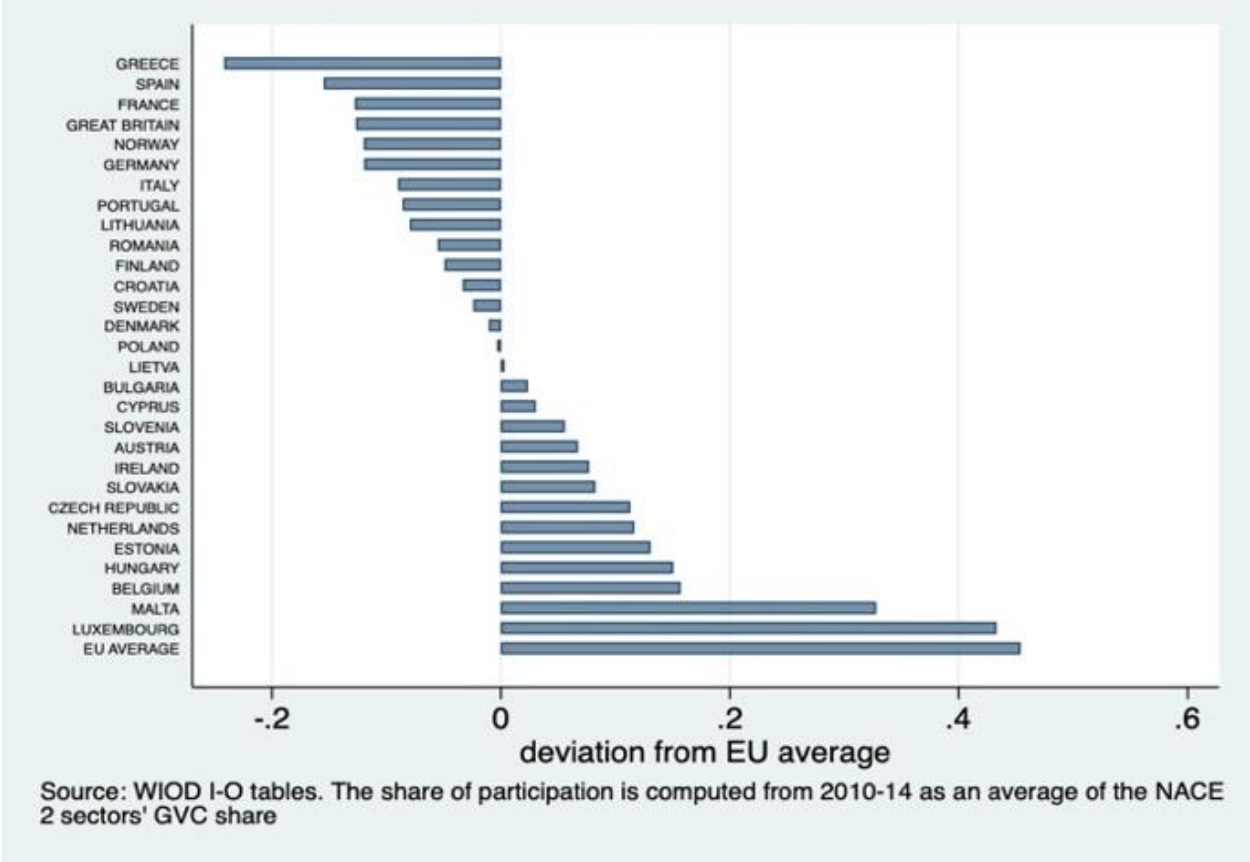
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domestic VA contained in foreign exports to third countries. Figure 1 gives a snapshot of the overall GVC participation of European firms: it amounts to just over 40 percent for the EU as a whole (histogram at the bottom), but varies greatly across countries – well above the average for Malta and Luxembourg, as well as Belgium and a number of Eastern European countries; below average for Greece as well as Spain, France and Germany.

Figure 1 – GVC Participation in the EU

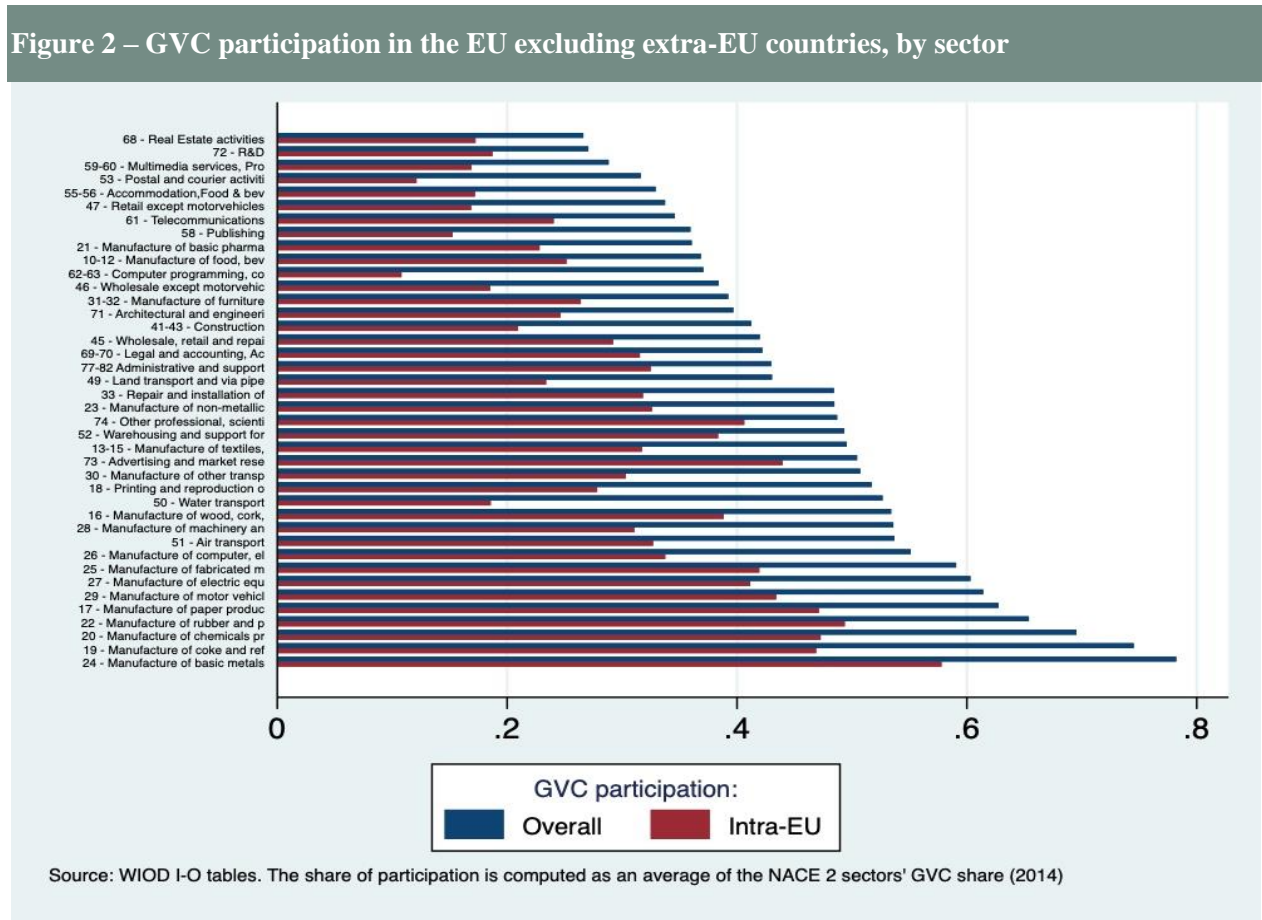


2. THE REGIONAL EXPOSURE TO GVC DISRUPTIONS

We proceed in two stages, computing the exposure to GVC disruptions first at the sector and thereafter at the regional level.

GVC shock. Drawing from the WIOD (Timmer et al., 2015) - which provides information on the foreign value added content of bilateral trade flows from individual EU countries to all their respective counterparts - we build a routine that distinguishes between the Domestic Value Added (DVA) content of total exports and the portion of Extra-EU Import Value Added in each country-sector pair (Borin and Mancini, 2019). By excluding the latter portion, we obtain an indicator of GVC participation which considers only Value Chains in existence within the EU. Obviously, the resulting picture is rather extreme since we entirely net out countries such as China and USA that are central hubs in GVCs (Baldwin, 2020); still, the within-EU indicator can be indicative of the (upper bound) economic impact of a disruption in the supply chains.

Figure 2 proxies the extent of the impacts at the sector level¹. Two groups of sectors appear to be particularly affected: i) the most internationalized manufacturing sectors (basic metals, rubber, chemical products, etc.), and ii) a few high value-added service sectors (e.g.: computer programming, engineering).

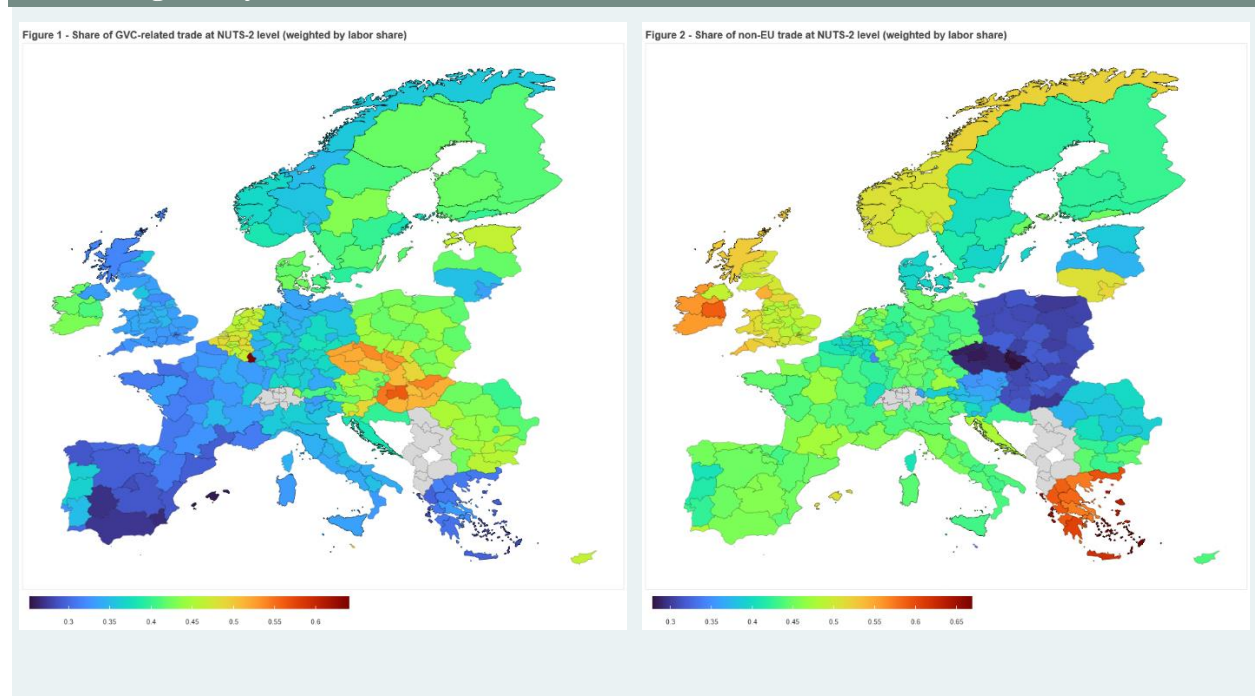


¹ To proxy the Intra-EU GVC participation we simply exclude from the list of trade partners extra-EU countries. This is just a lower bound of the possible GVC exposure, but it helps us visualizing the heterogeneity at the sector level.

Regional impacts. Measuring the degree of embeddedness in GVC at the EU regional level is not an easy task, since the relevant measures of trade flows are mostly collected at the country and sector level. In order to proxy it, we weight the GVC participation at the sector level by the relative importance of each sector at regional level in the EU (using Eurostat SBS data on the regional distribution of economic activities). In particular, we normalize the weight for employment in region i in order not to give more importance to those regions in which employment is larger.

Figure 3 (left panel) reports the regional exposure to GVC disruptions as proxied by the respective **overall exposure** to GVC. The panel on the right represents instead the **share of such exposure due to extra-EU GVC related activities**. Regions in red are the ones which are relatively most affected by GVC disruptions, both overall (in line with their overall GVC participation; left panel) and with respect to extra-EU trade.

Figure 3 – Overall GVC participation (left) vs GVC participation non-EU related² (right) at NUTS-2 level (weighted by labor share)



Overall, there appear to be clusters of regions which are remarkably integrated in GVC across different countries, e.g. most of the regions pertaining to central and Eastern European countries, Ireland or the Netherlands.

² EU27 plus Norway and UK

The panel on the right, however, shows that concentrating to the non-EU GVC participation would have a much more concentrated and possibly modest impact, overall. Three are the main results:

- 1) As expected, most of central and eastern Europe ceases to be “red”, since the nature of the GVC participation for such regions is almost exclusively within Europe (see the large “blue area” on the right panel).
- 2) On the other hand, most of the Italian and German regions, as well as Spanish and French ones, appear to be hit relatively more severely by the GVC shock (from “blue” to “green”).
- 3) This is particularly so for Greek regions, which actually turn red, pointing to the fact that their GVC participation is mostly extra-EU.

3. The regional impacts on productivity of GVC disruptions

In line with the classic intuition that more productive firms are more export-intensive, when firms participate in GVC they also tend to be more productive too, possibly because internationalization of production processes improves the overall resource allocation, or simply as a result of self-selection (Crisuolo and Timmis, 2017). Empirically, using firm-level based information out of the CompNet (2020) dataset, we run a regression of aggregate labor productivity at the region-sector level on our GVC participation indicator, including a complete set of fixed effects and control variables.³ The estimations yield a positive and highly significant elasticity of GVC participation on aggregate labor productivity (one standard deviation increase in GVC participation implies an increase in (log) aggregate labor productivity of 0.7).

Table 1 Estimated elasticities of labour productivity to GVC participation at the regional level

	(1)	(2)	(3)	(4)
VARIABLES	Labor productivity	Labor productivity	Labor productivity	Labor productivity
GVC participation	11.16***	11.43***	9.164***	9.528***

³ We include country, time, regional and 2-digit sector fixed effects. As control variables, we include the average firm size at the sector level, the average ratio of capital and intermediates to number of employees.

	(0.824)	(1.004)	(0.968)	(0.942)
Average firm size		-0.000428	0.00139	0.000152
		(0.00129)	(0.00172)	(0.000209)
Ratio of Capital to Employees		0.000251	-2.83e-05	6.68e-06
		(0.000389)	(0.000136)	(2.12e-05)
Ratio of Intermediates to Employees		-0.000110	5.72e-05	-2.54e-05
		(0.000141)	(9.97e-05)	(3.31e-05)
Country FE	NO	NO	YES	YES
Sector FE	NO	NO	YES	YES
Year FE	NO	NO	YES	YES
Regional FE	NO	NO	YES	YES
Risk class FE	NO	NO	NO	YES
Constant	0.0248***	0.0295**	-0.00752	0.0105**
	(0.00796)	(0.0140)	(0.0206)	(0.00397)
Observations	30,671	17,868	17,868	18,188
R-squared	0.858	0.858	0.957	0.909

Standard errors clustered at the sector level in parentheses. Regression weighted by the number of employees in a region x sector x year x country. Risk class defined according to INAIL classification (average between exposition to the virus and proximity risk).

*** p<0.01, ** p<0.05, * p<0.1

In order to derive the estimated loss in productivity at the regional level, we combine such elasticity with the relative GVC exposure to extra-EU GVCs computed using WIOD I-O tables. With respect to the previous analysis - where we computed a pure regional index - we change the weighting scheme using the share of employees in region i and sector j over the number of employees in the whole EU in sector j .⁴ This is done in order to take into account the differences in the employment of the European regions.

⁴ Note that, while data on GVC participation are updated from WIOD up to 2014, data on regional weight refer 2017. This is due to the fact that several countries exhibit missing or imprecise values in the SBS dataset before 2017. However, this is not a major problem since the regional distribution of sectors does not change much in few years, as checked with available countries.

Table 2 below provides the estimated impact on EU regional productivity. For presentational reasons we show only the most and least affected cases, but a full documentation is available at request.

Table 2 – Estimated aggregate productivity losses at the regional level (average of 2-digit industry level)

NUTS2		Estimated decrease	NUTS2		Estimated decrease
Île de France	(FR10)	-26,82	Martinique	(FRY2)	-0,10
Lombardia	(ITC4)	-12,57	Guadeloupe	(FRY1)	-0,10
Oberbayern	(DE21)	-8,75	Dytiki Makedonia	(EL53)	-0,10
Köln	(DEA2)	-8,13	Prov. Luxembourg (BE)	(BE34)	-0,09
Comunidad de Madrid	(ES30)	-7,84	Valle d'Aosta/Vallée d'Aoste	(ITC2)	-0,09
Cataluña	(ES51)	-7,38	Voreio Aigaio	(EL41)	-0,06
Stuttgart	(DE11)	-6,56	Guyane	(FRY3)	-0,03
Veneto	(ITH3)	-6,04	Ciudad Autónoma de Melilla (ES)	(ES64)	-0,03
Lazio	(ITI4)	-5,64	Ciudad Autónoma de Ceuta (ES)	(ES63)	-0,02
Düsseldorf	(DEA1)	-5,57	Åland	(FI20)	-0,02

Note: The table is constructed using estimated elasticities of GVC participation on labor productivity indicators out of the CompNet (2020) dataset. The mechanic estimated loss concerns the decrease in GVC related trade case in the extreme scenario of a trade restriction within the EU.

The mechanic impact varies from some 26 per cent in Île de France to almost zero in several small regions across countries of the continent.

4. Conclusions

The strong share of GVC participation by EU firms **within the continent** has the potential of sheltering those firms by severe global disruptions in supply chains, provided of course that borders remain fully open within the EU. This is not generalized across EU regions however and not entirely true overall, as shown

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by the measured impact of the admittedly dramatic simulation of cutting the extra-EU arm of such chains altogether. Mapping such impacts at the regional level is important as EU institutions consider allocation of EU funds to foster post-COVID recovery.

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