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Abstract

This paper investigates the impact of greater involvement in global value chains (GVCs) on inward greenfield FDI. The data spans from 2005 to 2015 and covers 64 host countries. This is one of the few studies examining the effect of GVCs on FDI, and one of the only studies, to our knowledge, at the industry level. We find that overall, greater involvement in GVCs brings in more greenfield manufacturing FDI. However, the results are mixed across sectors. For example, a strong relationship is found in the "basic metals" and "rubber and plastics" sectors, but little or no impact seems present in "electronics". As suggested by Baldwin and others, the effects are very strong in North America, East Asia and Europe, but virtually non-existent in other areas of the world.

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1. Introduction

In the past four decades or so, MNEs have played a leading role in shaping foreign direct investment (FDI) decisions and global value chains (UNCTAD, 2013; Helpman, Melitz, and Yeaple, 2004). As a result, in the past two decades or so, international trade fragmentation has intensified with the rise of FDI flows. While there are many studies examining FDI as a determinant of global value chain (GVC) participation, research in the opposite direction is scarce. Yet, from anecdotal evidence at least, some firms are, indeed, enticed to invest more in countries that are more integrated into GVCs. But this may not be occurring in all sectors, and even if GVCs draw in more inward FDI, the benefits may be either long-lasting, or short-lived. Amendolagine *et al* (2018) writes,

"…achieving high levels of GVC involvement is not a guarantee of attracting FDI with high sourcing potential. Countries and sectors with high GVC involvement may attract footloose investments, should they offer foreign investors low-cost inputs and other export incentives."

So, it is important to identify first, whether or not greater GVC participation does indeed draw in more FDI and second, if so, in what industries. There are only a few papers that look at GVC participation driving more FDI and these are all at a very aggregate (country) level. To the best of our knowledge there is, as of yet, no industry-level investigation into the degree in which GVC participation is a determinant of greater FDI.

In the literature, many papers investigate the determinants of FDI by including various gravity-type variables as well as financial and institutional variables which differ across countries (see Chakrabarti (2001), Di Giovanni (2005), Blonigen and Piger (2014) *inter alia*). These studies are based on cross-country analysis which generally confirms their hypotheses. However, this

aggregate approach may overlook the heterogeneity of industry and firms since MNEs, not countries, make investment decisions.

There are many reasons for the investment activity of MNEs. Some activity is "horizontal" FDI with the goal of increasing their sales in a new foreign market (i.e., "market-seeking"). Another type of FDI is "vertical" FDI or "export-platform" FDI, representing efficiency-seeking that hopes to minimize costs by taking advantage of lower input costs in the FDI-recipient countries, and then shipping back to home countries or to a third country. This efficiency-seeking investment is intertwined with the notion of "global value chains" (GVCs) which involve intermediate products crossing borders many times. Antràs (2020, p. 5) defined GVCs as consisting "…of a series of stages involved in producing a product or service that is sold to consumers, with each stage adding value, and with at least two stages being produced in different countries. A firm participates in a GVC if it produces at least one stage in a GVC". Hence, we can also view drivers of FDI from a GVC perspective in addition to traditional determinants. That means MNEs must decide where to locate their activity by taking into consideration the value-added activities comprised in a GVC (UNCTAD, 2013; World Bank, 2017).

Establishing a link between GVC participation and FDI is difficult not only because of the potential reverse causality between GVC participation and FDI, but also the complex nature of the FDI type itself.[1] MNEs can access a new foreign market and produce locally either through setting up their new own plant (Greenfield) or acquiring an existing facility (Merger & Acquisitions - M&A). As documented in the literature review which follows, GVCs generally play a more important role in greenfield FDI than in M&A, hence, our paper will analyze greenfield FDI.

[1] We discuss and address issues of potential endogeneity later in the paper.

In theory, one can hypothesize that a country's degree of GVC participation may either facilitate or hinder FDI. Let's begin with facilitation. That is, a country with higher GVC participation may attract more FDI for at least two reasons. First, especially with the efficiency-seeking form of FDI, the decision of where a multinational should invest *some* of its international value chain is becoming "increasingly specific to GVC segments" (Martinez-Galan and Fontoura, 2019). A country may have a particularly high labor productivity to wage ratio (Jones and Kierzkowski, 2015) in *a single "task" or segment of the value chain* which makes it appealing to place a "fragment" of one's own value chain in that country. Countries that already have a large GVC presence in that particular industry and/or task (e.g. final assembly in electronics, semiconductor testing in Malaysia, etc.) may attract other, new firms who want to take advantage of this existing local absolute advantage. Relatedly, there may also be local economies of scale in various intermediate inputs (physical goods or services) due to the existence of similarly global-minded firms already operating there. Second, a host country with a high level of GVC participation may provide access to a greater number and greater variety of export partners for the MNE and ultimately greater access to the global market.

In contrast, there are several possible reasons why deeper involvement in global value chains may prevent or reduce inward FDI. One example may be the case in which the host country has a high GVC participation level, but is located in the early stages of the production process, i.e., in an upstream position where its exports will become the intermediate input in further subsequent production. Such kinds of intermediate inputs may come from raw materials sourced locally. In the case of natural resources, government intervention may be aimed at preventive foreign exploitation of the resource. Conversely, at the other end of the spectrum, the inputs may come from products with high technology content and/or proprietary know-how. One can imagine a

country that is a world leader in automobiles or electronics who exports high-end inputs. The host country's government may implement policies that dissuade foreign entry in these industries in an effort to limit competition and/or to protect the know-how of their national champions. These conditions may explain why a host country has a high degree of "forward" GVC participation, but this has not been accompanied by an increase in foreign investment. There is a final reason which may be more applicable to small, yet very open countries. Because a small country is likely to have fewer domestic sources of inputs, they may have to rely more heavily on imported inputs which are not readily available domestically. As such, a high "backward" GVC participation rate may be a sign of weakness, rather than strength to the prospective foreign investor. Likewise, on the export side, a small country may be primarily an export-platform with a negligible domestic market for the foreign investor to serve. So, again a high "forward" GVC participation rate may be sometimes seen as a detractor of inward FDI. Recently, several attempts to address the question of how GVC participation affects FDI have been made empirically and theoretically (e.g., Martinez-Galan and Fontoura, 2019; Carril-Caccia and Pavlova, 2020; George *et al*, 2021), but no firm conclusions have been reached. This article provides the first answer to this question at the industry level.

In this paper we are interested in two questions, namely, one, whether an empirical analysis relying on disaggregated data at the industry level is consistent with the existing results based on aggregate country-level data, and two, how does the effect of GVC participation on FDI vary across industries and regions? To answer these questions, we do not consider firm-level decisions, but instead take a country-level perspective by using data at the industry level to examine the importance of GVC participation as the location determinant of inward bilateral greenfield FDI. Our results have several policy implications which are laid out in our conclusion.

2. Literature Review

Deciding how to best serve foreign markets is one of the main challenges of MNEs. MNEs may opt to export or produce goods in the recipient country under FDI. If a MNE decides to invest, it has two ways: establish a new firm (greenfield investment) or acquire an existing firm (M&A). The dominant choice of FDI mode differs across the globe. According to the World Bank (2020), M&A is the main mode in developed countries and the EU-15, representing 69% of total inward FDI by volume. In contrast, greenfield investment accounts for 85% of inward FDI in lower-income countries in the past decade or so.

Which investment mode is more influenced by GVC participation? While it is certainly possible that the level of GVC participation has at least some influence on international M&A decisions, the link is not at all clear. Head and Ries (2008) argue that some, but certainly not all FDI decisions may be the "buy or build" variety. That is to say, the firm decides whether to buy (acquire) an existing factory to expand production in the local (i.e. host) market or, instead, to build a brand-new factory (greenfield) in the host country. However, they argue that this binary decision may not always be the primary motivating factor for M&A. Indeed, *many M&As are financial decisions* to wrest corporate control of the foreign firm in an attempt make that firm more profitable (e.g. Renault's acquisition of Nissan in 1999). M&A decisions may result from either motivations of finance or expanded production, whereas greenfield FDI's main motivation is typically to expand production. As such, this study will only focus on the effect of GVC on greenfield FDI decisions. Indeed, the ADB (2016) finds that for the case of a lower-income country, greenfield FDI tends to be more GVC-linked than M&A-style FDI since M&As are relatively more market-seeking. As such, we will only examine greenfield FDI.

Investigating the degree in which GVCs draw in more FDI is clouded by the presence of likely reverse causality. That is, it is very likely that more FDI activity brings about larger participation in global-value chains. As a part of a growing literature that investigates the expansion of GVCs as a consequence of FDI, several papers including Lopez Gonzalez (2016), UNCTAD (2013) *inter alia* find evidence that more FDI will, indeed, bring about a country's deeper participation into GVCs. By increasing interactions with MNEs, by continuing to learn from them, and through increased labor mobility from MNEs to domestic firms (i.e., FDI spillover effects), domestic firms can produce higher-quality or more complex products, and in turn, improve overall firm performance and the capacity of export. As the result, the host country becomes more integrated into GVCs. One must consider and address this possible reverse causality to obtain a better estimate of the effect GVC on FDI.

There are few existing studies on the potential effect GVCs can have on inward FDI. While Martinez-Galan and Fontoura (2019) focus on aggregated FDI inward stocks and Carril-Caccia and Pavlova (2020) focus on M&A, George *et al.* (2021) focus on greenfield FDI. All of these papers find that the higher the GVC participation of countries, the higher the inward investment. While an important finding, the common feature of these papers is that they all use country-level data. Their results may be biased since they suffer from the heterogeneity of industries. They also likely suffer from the reverse causality problem mentioned above. In this paper, we hope to get more definitive answers by using more disaggregated data, specifically industry-level data. This will also mitigate the problem of reverse causality to a large extent. Moreover, and just as important in our opinion: the three studies above use the Koopman *et al.*'s (2014) GVC participation index, which has several drawbacks. We feel that by exploiting the superior properties of the Borin's (2019) GVC participation measures which we document later

in the data description, we can provide a more accurate picture of the relationship between bilateral FDI and GVC across countries, sectors, and regions.

A country with a high level of GVC participation is one that is deeply involved in international production through exports and re-exports. It may have one of several possible characteristics, for example: a) have a labor force specializing in distinct activities in the GVC(s); b) have lower production and labour costs; c) possess technological know-how and; d) have relatively easy access to international markets or certain partners. Braconier, Norback and Urban (2005) highlight that the country with higher capacity of producing intermediates goods is likely to attract vertical FDI since these goods can be used in the later stages of the production process. Medvedev (2012) found that the country with a wider number of export partners can better attract export-platform FDI. Therefore, from the motivation of vertical FDI and export-platform FDI, MNEs opt to invest by building new affiliates in such countries as this can facilitate access to global markets and integration in the global economy. Although Braconier, Norback & Urban (2005) and Medvedev (2012) provide evidence that countries with the above characteristics attract more FDI, these papers do not directly quantify the impact of GVC participation on FDI.

Carril-Caccia and Pavlova (2020) show that there are two cases where countries with higher GVC participation can have lower inward M&A activity. First, M&A activities from so-called developed countries to developing countries are easily hindered by foreign competition in final products. Second, if the host and source countries involved are developed countries, M&A will be easily hindered by competition through the import of intermediate goods. The reason is that the more intermediate imports from different countries, the higher the competition, leading to lower expected profits. However, thus far, there have been no studies that found that GVC

participation mitigates or reduces greenfield FDI. This may be because it only occurs in some industries and cannot be seen at the aggregate level.

The region in which the FDI is occurring may also make a difference. Baldwin (2011) argues that GVCs are not a global phenomenon but are instead located in one of only three regions without any considerable connection between them, namely: Europe, North America, and East Asia and the Pacific. Although this is important observation if true, there are no empirical studies analyzing how the effects of GVCs involvement on FDI vary by region. The analysis of Carril-Caccia and Pavlova (2020) examined the relationship across different the levels of income (i.e., developed or developing country), and George *et al.* (2021) focused only on emerging economies. In contrast, our research will investigate the relationship across the above three regions delineated by Baldwin (2011) and other regions as well.

3. Data and Methodology

3.1. Data

The two main variables we are interested in are FDI activities and the measure of participation in global value chains. Our data spans from 2005 to 2015 covering 15 manufacturing industries as shown in Table 1. Table 2 presents the list of 64 host countries in which there are 36 OECD countries and 28 non-OECD countries. There are 88 source countries in our sample (see details in Appendix 2, Table A2).

Regarding the FDI variable, we utilize bilateral FDI data from the Financial Times "fDi Markets". It includes all worldwide greenfield investment transactions data that took place from 2003 to 2017. The main characteristics of the database include "Capital Investment" in US dollars, "Jobs Created", "Industry Activity" (such as "Manufacturing", "Business Services",

"Retail", "Extraction", etc.). In addition, the database also contains information on the Name of Firm, Industry code, Host Country and Source Country. In this paper, we aggregate all transactions and all firms to an industry level under ISIC 2-digit categories.[2] Among the various types of "Industry Activity", we only retain the FDI projects which have "Manufacturing" to make sure that we focus on greenfield firms producing goods related to an international production network. In contrast, we drop other activity including "Retail", "Business Services", "Sales", etc. We measure FDI activity in dollars of capital as a share of GDP, in which GDP is taken from the World Development Indicators.

Table 1. Industry Category

Industry	ISIC Rev. 4-2digit
Food products, beverages and tobacco	10, 11, 12
Textiles, wearing apparel, leather and related products	13, 14, 15
Wood and products of wood and cork	16
Paper products and printing	17, 18
Chemicals and pharmaceutical products	20, 21
Rubber and plastic products	22
Other non-metallic mineral products	23
Basic metals	24
Fabricated metal products	25
Computer, electronic and optical products	26
Electrical equipment	27
Machinery and equipment, nec	28
Motor vehicles, trailers and semi-trailers	29
Other transport equipment	30
Other manufacturing	31, 32, 33

[2] The original FT database had its own industry codes which were, in turn, converted into ISIC codes. See Valacchi, Doytch and Yonzan (2021) for more details. The FT database has its weaknesses, but it has an incredible level of detail, is very global in its country coverage and has a reasonably long time series. For a good evaluation of its pros and cons see Belderbos *et al.* (2016).

To account for a country-sector's GVC participation, we use the database provided by Belotti, Borin, and Mancini (2020).[3] These data are computed following the methodology discussed in Borin and Mancini (2019). It is now available in the World Integrated Trade Solution (WITS). Data calculated rely on the 2018 version of ICIO OECD that spans from 2005 to 2015. Since our study is only looking at GVC participation index measuring international fragmentation production sharing, we only take into account manufacturing industries and drop agriculture-related industries and services.

[3] We downloaded the data through the Stata command icio.

Table 2. List of Host Countries

	OECD countries		Non-OECD economies
AUS	Australia	ARG	Argentina
AUT	Austria	BRA	Brazil
BEL	Belgium	BRN	Brunei Darussalam
CAN	Canada	BGR	Bulgaria
CHL	Chile	KHM	Cambodia
CZE	Czech Republic	CHN	China (People's Republic of)
DNK	Denmark	COL	Colombia
EST	Estonia	CRI	Costa Rica
FIN	Finland	HRV	Croatia
FRA	France	CYP	Cyprus [2]
DEU	Germany	IND	India
GRC	Greece	IDN	Indonesia
HUN	Hungary	HKG	Hong Kong, China
ISL	Iceland	KAZ	Kazakhstan
IRL	Ireland	MYS	Malaysia
ISR	Israel [1]	MLT	Malta
ITA	Italy	MAR	Morocco
JPN	Japan	PER	Peru
KOR	Korea	PHL	Philippines
LVA	Latvia	ROU	Romania
LTU	Lithuania	RUS	Russian Federation
LUX	Luxembourg	SAU	Saudi Arabia
MEX	Mexico	SGP	Singapore
NLD	Netherlands	ZAF	South Africa
NZL	New Zealand	TWN	Chinese Taipei
NOR	Norway	THA	Thailand
POL	Poland	TUN	Tunisia
PRT	Portugal	VNM	Viet Nam
SVK	Slovak Republic		
SVN	Slovenia		
ESP	Spain		
SWE	Sweden		
CHE	Switzerland		
TUR	Turkey		
GBR	United Kingdom		
USA	United States		

In this paper, we use three GVC-related trade indices, namely, GVC participation, GVC backward participation, and GVC forward participation as the share of total exports for FDI recipient countries. As depicted in Figure 1, total exports consist of two main components: GVC

participation and traditional-style trade (i.e., trade that only crosses one border), in which GVC participation is the sum of GVC backward and GVC forward participation.

The first measure, GVC participation, accounts for value-added that crosses at least two stages being produced in different countries. On other words, it means it has been re-exported at least once before being absorbed into final demand.

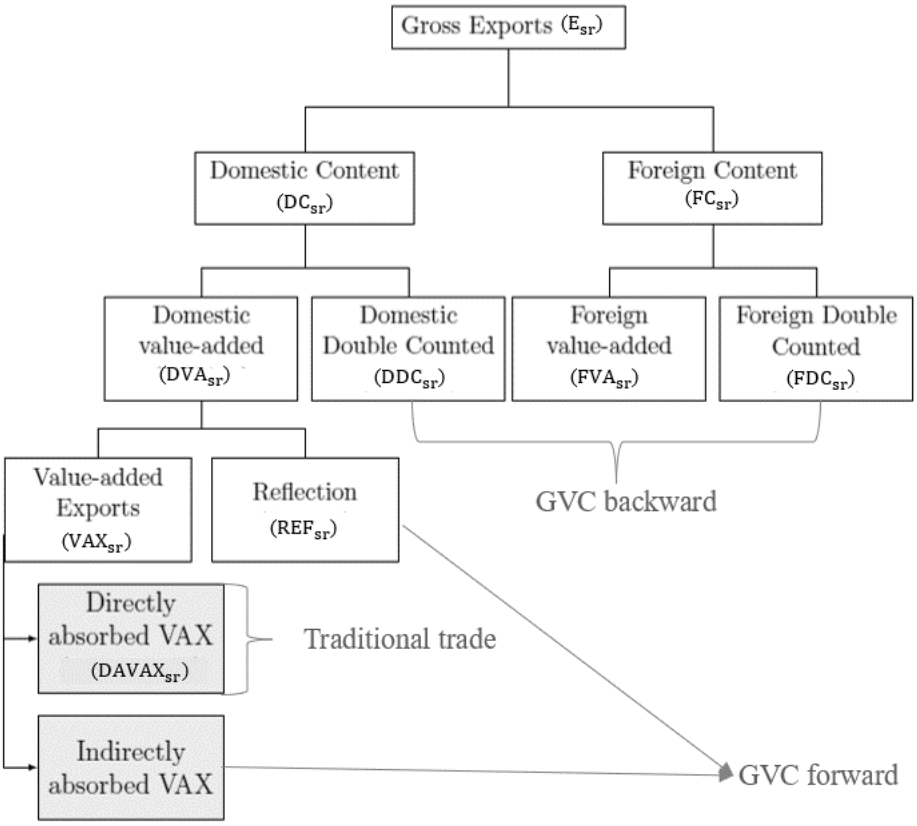
Borin *et al.* (2019) extended the decomposition of Koopman *et al*. (2014) by creating a new component, namely value-added directly absorbed by the importing country without any other re-exports $\mathrm{DAVAX_{sr}}$ (as shown in Figure 1). It can capture "traditional type of trade" that only crosses one border. Thus, this new component captures the value-added generated in a country and which is absorbed directly by the importer country without any further re-export for any other processing stage abroad or at home. This measure cannot be obtained either from the decomposition by Koopman *et al*. (2014) or from similar breakdowns of bilateral exports proposed in the literature (e.g. Wang *et al.*, 2018). Therefore, there are two ways to compute GVC participation according to the Borin method. Firstly, GVC participation is the sum of all value-added crossing at least two borders consisting of domestic double counted ($\mathrm{DDC_{sr}}$), foreign value-added ($\mathrm{FVA_{sr}}$), foreign double counted ($\mathrm{FDC_{sr}}$), indirectly absorbed VAX, and reflection ($\mathrm{REF_{sr}}$). The second approach eliminates the traditional-style trade part ($\mathrm{DAVAX_{sr}}$) from total exports ($\mathrm{E_{sr}}$). The equations in Appendix 1 are the mathematical framework representing the decomposition of bilateral and sectoral gross exports. The details of each term shown in Figure 1 are shown in equations and Table A1 in Appendix 1.

Secondly, following the framework proposed by Hummels *et al*. (2001) to measure Vertical Specialization, Borin *et al.* (2019) define the GVC backward participation component

corresponding to the import content of exports. As a result, the exporting country is at a later stage of production.

Thirdly, the forward GVC component measures the part of domestic goods that are not fully absorbed in the importing country and instead are processed and re-exported. Hence, the exporting country is at the early stage of production.

Figure 1. Value-added Decomposition of Total Exports based on Koopman *et al.* (2014), Extended by Borin and Mancini (2019)

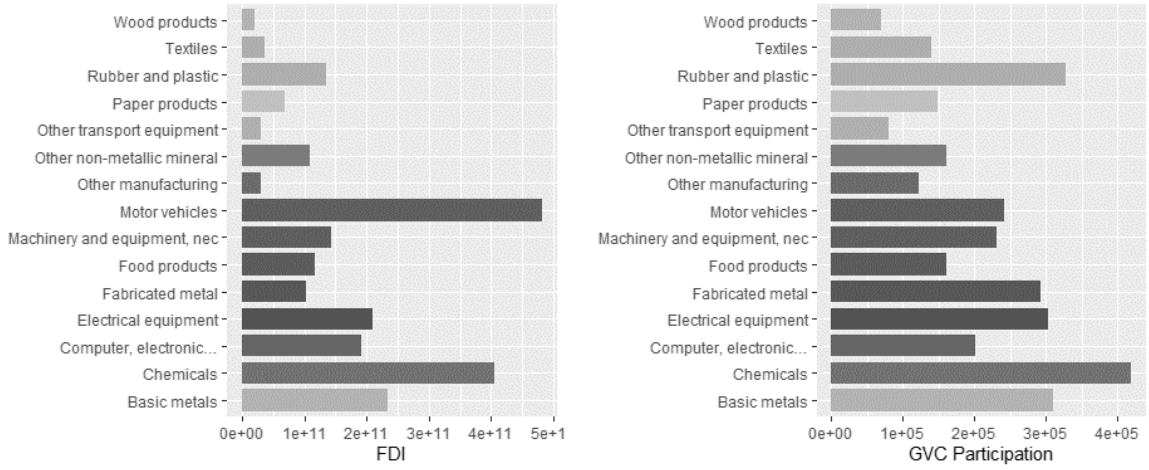


The use of the Borin *et al.* (2019) method more accurately captures GVC participation, in our view. Firstly, by modifying the inverse Leontief matrix, they quantify GVC participation using

a consistent, end-to-end source-based approach while the existing literature such as Koopman *et al.* (2014) and Wang *et al.* (2018) mix both "sink" and "source" approaches. Furthermore, Borin's allocation approach of value-added across countries when analyzing total exports decomposition differs from that of Koopman *et al.* (2014) and Wang *et al.* (2018). Specifically, while Koopman *et al.* (2014) and Wang *et al.* (2018) only define double-counting under the world perspective as value-added that crosses borders more than once, Borin *et al.* (2019) have various approaches including the "world" perspective, the "country" perspective and the "bilateral" perspective (Miroudot and Ming, 2020). Their country perspective approach defines double-counting as value-added that crosses borders of the exporting country more than once. Since we deal with the research question from a country perspective, more specifically, the exporting country receiving FDI, the Borin *et al.* (2019) country-perspective approach is more appropriate for our case.

Figure 2 shows the distribution of FDI activity and GVC participation by the industrial sectors cumulatively from 2005 to 2015. "Chemical products" is an important sector for both FDI activities and GVC-related trade. "Motor vehicles" are the dominant sectors receiving FDI while "Rubber and plastic" is one of the most active sectors in GVCs.

Figure 2. FDI and GVC by Industry, cumulative from 2005-2015



3.2. Methodology

We now proceed with the methodology. As with other studies on the relationship between FDI and trade, we use a gravity-style model with fixed effects to examine FDI's determinants. There are many variations of fixed effects in a gravity model because this framework takes account of not only time-invariant multilateral resistance terms (MRT) but also time-varying MRT (Anderson and van Wincoop 2003). Baltagi, Egger and Pfaffermayr (2003), and Baier and Bergstrand (2007) argued for estimating the structural gravity equation with a full set of fixed effects including bilateral-pair fixed effects, source country-time fixed effects, and host country-time fixed effects since that control for many types of unobserved heterogeneity. An industry-level study for cross-section data by Blonigen *et al.* (2020) is comprised of a set of fixed effects: country-pair fixed effects, source country-by-industry fixed effects, and host country-by-industry fixed effects. To accommodate for our industry-level analysis with panel data, in addition to country-pair fixed effects, sector-specific fixed effects, and time-specific fixed effects, we extend by using multi-dimensional fixed effects, namely country-industry-time effects.

Since we use industry-level bilateral FDI data by year, there is a problem that many pairs of countries do not generate FDI flows in every year. Therefore, these observations enter with a zero value. Santos Silva and Tenreyro (2006) argued that gravity equation estimations can be improved using their Poisson Pseudo-Maximum Likelihood (PPML) estimator to deal with the presence of zero values. Moreover, while OLS would be inconsistent in the presence of heteroskedasticity in the error term which is especially likely in the case of sectoral data, the PPML estimator overcomes this problem as well (Lee and Ries (2016); Martínez-Zarzoso *et al.* (2020)). Therefore, our baseline specification for the gravity-style model of FDI uses the PPML estimator as follows:

$$\boldsymbol{GrFDI_{ijkt} = exp[\beta_0 + \beta_1 PartGVC_{jkt-1} + \varphi_{ij} + \delta_{ikt} + \gamma_k + \theta_t] * \varepsilon_{ijkt}} \quad \text{(Eq. 1)}$$

where *k* is the manufacturing industry, *i* denotes FDI source country, *j* denotes FDI recipient country, *t* denotes year from 2005-2015. $\boldsymbol{GrFDI_{ijkt}}$ is measured in capital as a share of GDP for FDI from the source country *i* to the destination country *j* in industry *k* in year *t*. $\boldsymbol{PartGVC_{jkt-1}}$ measures the engagement degree of the recipient country *j* in industry *k* in the cross-country production network. We lag the GVC variable for one period. Also note that the left-hand variable is at a more granular level than the right-hand side GVC variable. Both of these features should minimize the effect of endogeneity and reverse causation.

Regarding fixed effects, country-pair fixed effects ($\boldsymbol{\varphi_{ij}}$) control for the time-invariant gravity variables such as transaction costs to invest, distance between two countries, whether two countries have a common border, common language, and whether a country is landlocked. As a result, we do not include these conventional time-invariant variables in our specification. Moreover, as argued by Baier and Bergstrand (2007), country-pair fixed effects also mitigate the endogeneity which can occur if unobserved errors are correlated with explanatory variables. Year dummies ($\boldsymbol{\theta_t}$) control for all common shocks to all country pairs and industries, such as changes in world demand, technological change, and oil price shocks. Sector-specific fixed effects ($\boldsymbol{\gamma_k}$) account for global trends that vary by sector. Source country-industry-time fixed effects ($\boldsymbol{\delta_{ikt}}$) control for time-variant changes, for example, policy changes, market shocks, etc. in a specific industry in the source country.

Alternatively, we also examine $\boldsymbol{BackGVC_{jk,t-1}}$ and $\boldsymbol{ForGVC_{jk,t-1}}$ as in Equation 2 to measure the effect of country-industry GVC backward participation and forward participation, respectively. The elasticity of these two variables will show how a country's position in a GVC affects investment.

$$\boldsymbol{GrFDI_{ijkt} = exp\left[\begin{matrix}\beta_0 + \beta_1 BackGVC_{jk,t-1} + \beta_2 ForGVC_{jk,t-1} \\ + \varphi_{ij} + \delta_{ikt} + \gamma_k + \theta_t\end{matrix}\right] * \varepsilon_{ijkt}} \quad \text{(Eq. 2)}$$

4. Empirical Results

4.1. Full Sample

Table 3 presents the PPML results for the full sample. The left-hand side variable is FDI in capital as a share of GDP. The GVC participation measure is the main right-hand side variable along with country-pair fixed effects, source country-industry-year fixed effects, industry and year dummies (column 1 for Eq.1). Overall, the coefficient of GVC participation is positive and statistically significant at a greater than 1% level of significance. This means more trade through GVCs will increase FDI inflows. This result is consistent with existing studies (e.g., Martinez-Gala *et al.* (2019), Carril-Caccia and Pavlova (2020), George *et al.* (2021)) using country-level data.

In column 2 we present results separately GVC into forward and backward types. The greater elasticity for GVC forward participation than for the backward GVC participation suggests that a country which is in an earlier position of the production stage appears to be attract more FDI.

Table 3. PPML Results for Full Sample

	PPML

Variable	(1)	(2)
$PartGVC_{jk,t-1}$	0.0506***	
	(0.00984)	
$ForGVC_{jk,t-1}$		0.0952***
		(0.0268)
$BackGVC_{jk,t-1}$		0.0547***
		(0.0116)
Constant	15.35***	14.50***
	(0.607)	(0.894)
Country-Pair FE	Yes	Yes
Source country-Industry-Year FE	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Observations	54,890	54,890

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

4.2. Industry-specific Results

Next, we investigate the effect of GVC as a FDI determinant by industry. We divide the sample into fifteen sub-samples corresponding to fifteen industries. For each industry, we apply Equation 1 and Equation 2.

Table 4a and Table 4b report the results from the two main equations using the PPML estimator for each of the fifteen industries in our sample. All the estimation includes country-pair fixed effects, year fixed effects, and source country-year fixed effects. The results are heterogeneous and depend on the sector. For the "Basic metals", "Rubber and plastic", and "Other manufacturing" industries, the elasticity of GVC participation is positive and significant. The effect in the case of "Other manufacturing" shows the largest elasticity. In contrast, the variable is significant and negative for "Machinery and equipment". For other sectors, GVC-related trade has no significant impact on greenfield FDI.

Table 4a. PPML Results by Industry

	Food		Textiles		Wood		Paper products		Chemicals		Rubber and Plastic		Other non-metallic mineral		Basic metals	
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
$PartGVC_{jk,t-1}$	0.0141		-0.0309		-0.0602		0.00690		0.0109		0.242*		0.0423		0.0912**	
	(0.0446)		(0.0381)		(0.0857)		(0.0487)		(0.0262)		(0.136)		(0.0447)		(0.0361)	
$ForGVC_{jk,t-1}$		-0.188		-0.198		0.00779		-0.0823		0.0108		0.133		-0.00496		0.107*
		(0.300)		(0.151)		(0.190)		(0.0923)		(0.0258)		(0.316)		(0.0815)		(0.0626)
$BackGVC_{jk,t-1}$		0.00900		-0.0347		-0.0548		0.0101		0.0121		0.224*		0.0453		0.0864**
		(0.0428)		(0.0383)		(0.0848)		(0.0494)		(0.0571)		(0.125)		(0.0454)		(0.0364)
Constant	17.04***	18.21***	-1.492	-0.0873	-0.402	-1.512	-3.930*	-2.589	16.44***	16.38***	2.322	4.612	15.55***	15.78***	10.44***	10.47***
	(1.775)	(2.127)	(1.707)	(2.301)	(3.653)	(4.143)	(2.288)	(2.655)	(1.881)	(3.518)	(8.436)	(8.460)	(2.173)	(2.192)	(2.611)	(2.629)
Country-Pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Source Country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,493	4,493	2,562	2,562	809	809	2,330	2,330	6,629	6,629	4,937	4,937	3,336	3,336	3,754	3,754

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

Table 4b. PPML Results by Industry (continued)

	Fabricated metal		Computer, electronic and optical		Electrical equipment		Machinery and equipment		Motor vehicles		Other transport equipment		Other manufacturing	
Variable	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
$PartGVC_{jk,t-1}$	0.108		0.0149		0.0374		-0.370*		-0.0489		0.110		1.459***	
	(0.177)		(0.0470)		(0.0512)		(0.218)		(0.0601)		(0.0757)		(0.140)	
$ForGVC_{jk,t-1}$		0.0594		0.186		0.175		-2.344***		0.620		-0.315**		-1.645
		(0.203)		(0.120)		(0.186)		(0.799)		(0.625)		(0.150)		(1.057)
$BackGVC_{jk,t-1}$		0.111		0.0426		0.0351		-0.726**		0.00695		0.0823		1.326***
		(0.176)		(0.0447)		(0.0631)		(0.326)		(0.112)		(0.0619)		(0.116)
Constant	10.54	11.00	18.37***	13.31***	16.79***	15.36***	35.81***	66.05***	20.15***	13.34	9.293**	13.30***	-47.41***	-31.57***
	(10.48)	(10.40)	(2.978)	(3.963)	(3.072)	(4.828)	(11.83)	(20.34)	(2.969)	(8.777)	(3.679)	(3.018)	(6.031)	(7.180)
Country-Pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Source country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,733	4,733	2,801	2,801	4,736	4,736	4,243	4,243	4,009	4,009	1,149	1,149	2,423	2,423

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

Regarding the effect of GVC backward and forward linkages, the position of the host country both at the later stage of production and at the early stage of production has a positive and significant impact on attracting FDI only for the "Basic metals", similar to the effect of GVC participation in general. The results for the "Machinery and equipment" industry are significantly negative. The elasticity of the GVC backward variable is positive and significant for "Rubber and plastic" and "Other manufacturing". Although "Other transport equipment" has no significant

effect in the case of overall GVC trade, it becomes a negative and significant effect when they become more integrated into GVCs as measured by the forward linkage.

To explain the negative elasticity in the "Machinery and equipment" industry and "Other transport equipment", we may consider the position of the host country in two cases: one is in upstream specialization, the other is in downstream specialization. In the first case of upstream specialization, the host country is not only an active participant in fragmented international production by providing know-how for its foreign subsidiaries but is also likely a competitor in the same industry in the source country. Therefore, the host country's government may limit the greenfield factories of the home country to reduce foreign competition in the domestic market and protect their proprietary technology. In contrast, in the case of downstream specialization, the host country relies heavily on import inputs. Repeated importation (that is, an input which has crossed a border more than once) may increase the price of the final product, which may be subject to import taxes, causing the investor's profit to decrease. Hence, this host country may not be as attractive a destination for MNEs.

Table 5. PPML result by regions in the Electrical equipment industry

	Whole Sample		**Three-Region Sub-sample** • Europe and Central Asia • East Asia and Pacific • North America		**Two-Region Sub-sample** • Europe and Central Asia • East Asia and Pacific	
Variable	(1)	(2)	(3)	(4)	(5)	(6)
$PartGVC_{jk,t-1}$	0.0374		0.0376		0.0371	
	(0.0512)		(0.0570)		(0.0571)	
$ForGVC_{jk,t-1}$		0.175		0.151		0.150
		(0.186)		(0.171)		(0.171)
$BackGVC_{jk,t-1}$		0.0351		0.0318		0.0313
		(0.0631)		(0.0665)		(0.0664)
Constant	16.79***	15.36***	16.78***	15.79***	16.81***	15.82***
	(3.072)	(4.828)	(3.423)	(4.779)	(3.425)	(4.776)
Country-Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Source country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,736	4,736	3,645	3,645	3,274	3,274

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

Table 6. PPML result by regions in the Computer, electronic and optical industry

	Whole Sample		Three-Region Sub-sample • Europe and Central Asia • East Asia and Pacific • North America		Two-Region Sub-sample • Europe and Central Asia • East Asia and Pacific	
Variable	(1)	(2)	(3)	(4)	(5)	(6)
$PartGVC_{jk,t-1}$	0.0149		0.00495		0.00480	
	(0.0470)		(0.0555)		(0.0559)	
$ForGVC_{jk,t-1}$		0.186		0.173		0.175
		(0.120)		(0.129)		(0.128)
$BackGVC_{jk,t-1}$		0.0426		0.0340		0.0337
		(0.0447)		(0.0542)		(0.0545)
Constant	18.37***	13.31***	19.00***	13.96***	19.01***	13.94***
	(2.978)	(3.963)	(3.519)	(4.520)	(3.541)	(4.513)
Country-Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Source country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,801	2,801	2,121	2,121	1,872	1,872

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

As shown in Table 5 and 6, the results for the Electronics and Electrical equipment industries are positive but not statistically significant even though they are known to be active in global production chains. That said, the increase in FDI in the electronics industry may stem not from the level of global production integration of that industry in the host country, but instead may depend on other factors. Or perhaps the sample period from 2005-2015 does not adequately capture the effect of this industry which has been global for many decades and is well-established.

4.3. Region-specific Results

In Table 7, we divide the sample by regions of the FDI recipient country. There are five main regions including Europe and Central Asia, East Asia and the Pacific, North America, South Asia and Sub-Saharan Africa. We then apply two PPML specifications to each region.

Perhaps because of insufficient observations, we find no evidence of a relationship between FDI and GVC in South Asia nor in Sub-Saharan Africa. This is consistent with the conclusion of several studies (Baldwin, 2011; OECD *et al.,* 2014) that GVCs are not a global

phenomenon but instead occur mainly in three regions. Specifically, GVC participation is positively associated with greenfield FDI flows in Europe (including Central Asia), East Asia and the Pacific, and North America.

In addition, we tried to combine a 3-region sub-sample including Europe and Central Asia, East Asia and Pacific and North America and other subsamples consisting of two among these three regions. We then examined each subsample by industry. The results are similar to the worldwide data sample by industry.

Table 7. PPML Results by Regions

	Europe and Central Asia		East Asia and Pacific		North America		Latin America and Caribbean		Middle East and North Africa	
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$PartGVC_{jk,t-1}$	0.0153**		0.0309**		0.0979***		-0.00878		0.0510	
	(0.00718)		(0.0126)		(0.0214)		(0.0155)		(0.0344)	
$ForGVC_{jk,t-1}$		-0.00575		0.0460		0.0622***		0.0590**		0.260***
		(0.0177)		(0.0335)		(0.0232)		(0.0244)		(0.0283)
$BackGVC_{jk,t-1}$		0.0164**		0.0321**		0.160***		-0.0187		0.00807
		(0.00737)		(0.0152)		(0.0304)		(0.0154)		(0.0237)
Constant	-3.867***	-3.615***	16.58***	16.30***	-9.009***	-10.41***	-2.793***	-3.317***	-3.909**	-6.151***
	(0.382)	(0.449)	(0.775)	(1.158)	(0.968)	(1.130)	(0.632)	(0.651)	(1.580)	(0.986)
Source country-Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,591	22,591	9,755	9,755	1,214	1,214	3,520	3,520	505	505

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

4.4. Robustness Checks

Since our left-hand side variable ($\boldsymbol{GrFDI_{ijkt}}$) is more narrowly defined than the right-hand side variable ($\boldsymbol{PartGVC_{jkt-1}}$), the reverse causality effect may not be that serious. Therefore, we feel that the one period lag of GVC participation variables may be sufficient to deal with reverse causality.[4]

[4] To further rule out reverse causality effects, we undertake a reverse PPML estimation by regressing GVC participation on FDI inflows. The results are positive, but insignificant even at a 10% level of significance.

However, we still want to address other possible sources of endogeneity. As such, we first re-estimate Equation 1 using a system-GMM estimator by dropping the zero-valued bilateral FDI observations from the sample. A system-GMM estimator allows us to use both the lagged levels of endogenous variables as instruments in the equation in first differences and the lagged differences as instruments for the equation in levels. The condition for this estimator is that, even if the unobserved country-specific effect is correlated with the regressors' level, it is not correlated with their difference. We then instrument both FDI and GVC with GMM-style instruments. We follow Roodman (2006) and put them into the instrument matrix in different forms. Since the GVC variable is not strictly exogenous, standard treatment is to use one or more lags, while the FDI variable is likely to be endogenous, and so in this case, standard treatment is to use two or more lags. Although this standard treatment is quite powerful, it automatically chooses how many lags is suitable for them.

Table 8. System-GMM Results for the Full Sample

	GMM	
VARIABLES	(1)	(2)
$lnFDI_{ijk,t-1}$	0.000414	-0.00322
	(0.0301)	(0.0291)
$lnPartGVC_{jk,t}$	-0.258	
	(1.058)	
$lnPartGVC_{jk,t-1}$	1.324*	
	(0.702)	
$lnForGVC_{jk,t}$		0.0533
		(0.232)
$lnBackGVC_{jk,t}$		0.430**
		(0.183)
$lnForGVC_{jk,t-1}$		-0.182
		(0.236)
$lnBackGVC_{jk,t-1}$		0.381***
		(0.145)
Constant	-2.299	-3.787***
	(2.168)	(1.064)
Observations	5,898	5,898
Host country FE	Yes	Yes
Source country FE	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Instruments	256	320
AR(1) (P-value)	0.000	0.000
AR(2) (P-value)	0.175	0.167
Hansen test (P-value)	0.958	0.834

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

Overall, the GVC participation and GVC backward coefficients are positive and significant, but the results are not significant for the GVC forward participation variable (Table 8). In addition,

the AR (1) test rejects the null hypothesis that there is no first-order correlation while the AR (2) test cannot reject the second-order correlation among residuals. The Hansen test cannot reject the validity of the set of instruments. Therefore, all the tests support the validity of the GMM estimator.

5. Conclusion

In this paper, our main contribution is in examining the relationship between greenfield FDI and trade through GVCs at the sectoral level. To our knowledge, this has not yet been done. We find that the higher level of engagement in a GVC, the more greenfield investment the country receives. Our findings, which rely on disaggregated data at the industry level is consistent with the results in the extant literature based on aggregate country-level data.

Although we find that GVC participation, both backward and forward linkages, is positively associated with inward greenfield FDI flows, the effect are heterogeneous and depend on the sector and the region. Among all sectors, the "Basic metals" industry has a strong positive impact in the case of both forward and backward linkages. Surprisingly, though conventional wisdom suggests that the electronics industry is one of the most active industries in global production chains, the result is positive, but not statistically significant.

For policymakers, if the host country is in the later stages of production in "Basic metals", and "Rubber and plastic", policymakers may be well-advised to increase, improve and upgrade related infrastructure and/or introduce newer (de-) regulation which facilitates more GVC activity into these sectors. However, any such effects may be more pertinent to countries located in Europe and Central Asia, East Asia and Pacific, North America and less so for South Asia and Africa, at least at this time. In contrast, "Machinery and equipment" does not seem to be a key sector for GVC-driven FDI policy.

A further investigation with different data sets and methods, for example with firm-level data, would be an interesting complement to this study.

Appendix 1. Method of Gross Export Decomposition

$$
\begin{aligned}
E_{sr} = {} & V_s (\mathrm{I} - A_{ss})^{-1} Y_{sr} && \text{(T1)} \\
& + V_s (\mathrm{I} - A_{ss})^{-1} A_{sr} (\mathrm{I} - A_{rr})^{-1} Y_{rr} && \text{(T2)} \\
& + V_s (\mathrm{I} - A_{ss})^{-1} A_{sr} (\mathrm{I} - A_{rr})^{-1} \textstyle\sum_{j \neq r,s}^{G} Y_{rj} && \text{(T3)} \\
& + V_s (\mathrm{I} - A_{ss})^{-1} A_{sr} (\mathrm{I} - A_{rr})^{-1} \textstyle\sum_{j \neq r,s}^{G} A_{rj} \sum_{k}^{G} \sum_{l \neq s}^{G} B_{jk} Y_{kl} && \text{(T4)} \\
& + V_s (\mathrm{I} - A_{ss})^{-1} A_{sr} (\mathrm{I} - A_{rr})^{-1} Y_{rs} && \text{(T5)} \\
& + V_s (\mathrm{I} - A_{ss})^{-1} A_{sr} (\mathrm{I} - A_{rr})^{-1} \textstyle\sum_{j \neq r,s}^{G} A_{rj} \sum_{k}^{G} B_{jk} Y_{ks} && \text{(T6)} \\
& + V_s (\mathrm{I} - A_{ss})^{-1} \textstyle\sum_{j \neq s}^{G} A_{sj} B_{js} E_{sr} && \text{(T7)} \\
& + \textstyle\sum_{t \neq s}^{G} V_t B_{ts}^{g} Y_{sr} && \text{(T8)} \\
& + \textstyle\sum_{t \neq s}^{G} V_t B_{ts}^{g} A_{sr} (\mathrm{I} - A_{rr})^{-1} Y_{rr} && \text{(T9)} \\
& + \textstyle\sum_{t \neq s}^{G} V_t B_{ts}^{g} A_{sr} (\mathrm{I} - A_{rr})^{-1} \sum_{j \neq r,s}^{G} Y_{rj} && \text{(T10)} \\
& + \textstyle\sum_{t \neq s}^{G} V_t B_{ts}^{g} A_{sr} (\mathrm{I} - A_{rr})^{-1} \sum_{j \neq r}^{G} A_{rj} \sum_{k}^{G} \sum_{l}^{G} B_{jk} Y_{kl} && \text{(T11)} \\
& + \textstyle\sum_{t \neq s}^{G} V_t B_{ts}^{g} \sum_{j \neq s}^{G} A_{sj} B_{js} E_{sr} && \text{(T12)}
\end{aligned}
$$

$\mathrm{DAVAX_{sr}}$ = (T1) + (T2); Indirect absorbed VAX = (T3) + (T4); $\mathrm{VAX_{sr}}$ = $\mathrm{DAVAX_{sr}}$ + Indirect absorbed VAX; $\mathrm{REF_{sr}}$ = (T5) + (T6); $\mathrm{DDC_{sr}}$ = (T7); $\mathrm{FVA_{sr}}$ = (T8) + (T9) + (T10) + (T11); $\mathrm{FDC_{sr}}$ = (T12); $\mathrm{DVA_{sr}}$ = $\mathrm{VAX_{sr}}$ + $\mathrm{REF_{sr}}$ + $\mathrm{DDC_{sr}}$ + $\mathrm{FVA_{sr}}$ + $\mathrm{FDC_{sr}}$

Source: Authors' illustration, based on Borin et al. (2019)

$$
\begin{aligned}
E_{sr} = {} & V_s (\mathrm{I} - A_{ss})^{-1} Y_{sr} && \text{(T1)} \\
& + V_s (\mathrm{I} - A_{ss})^{-1} A_{sr} (\mathrm{I} - A_{rr})^{-1} Y_{rr} && \text{(T2)} \\
& + V_s (\mathrm{I} - A_{ss})^{-1} A_{sr} (\mathrm{I} - A_{rr})^{-1} \textstyle\sum_{j \neq r,s}^{G} Y_{rj} && \text{(T3)} \\
& + V_s (\mathrm{I} - A_{ss})^{-1} A_{sr} (\mathrm{I} - A_{rr})^{-1} \textstyle\sum_{j \neq r,s}^{G} A_{rj} \sum_{k}^{G} \sum_{l \neq s}^{G} B_{jk} Y_{kl} && \text{(T4)} \\
& + V_s (\mathrm{I} - A_{ss})^{-1} A_{sr} (\mathrm{I} - A_{rr})^{-1} Y_{rs} && \text{(T5)} \\
& + V_s (\mathrm{I} - A_{ss})^{-1} A_{sr} (\mathrm{I} - A_{rr})^{-1} \textstyle\sum_{j \neq r,s}^{G} A_{rj} \sum_{k}^{G} B_{jk} Y_{ks} && \text{(T6)} \\
& + V_s (\mathrm{I} - A_{ss})^{-1} \textstyle\sum_{j \neq s}^{G} A_{sj} B_{js} E_{sr} && \text{(T7)} \\
& + \textstyle\sum_{t \neq s}^{G} V_t B_{ts}^{g} Y_{sr} && \text{(T8)} \\
& + \textstyle\sum_{t \neq s}^{G} V_t B_{ts}^{g} A_{sr} (\mathrm{I} - A_{rr})^{-1} Y_{rr} && \text{(T9)} \\
& + \textstyle\sum_{t \neq s}^{G} V_t B_{ts}^{g} A_{sr} (\mathrm{I} - A_{rr})^{-1} \sum_{j \neq r,s}^{G} Y_{rj} && \text{(T10)} \\
& + \textstyle\sum_{t \neq s}^{G} V_t B_{ts}^{g} A_{sr} (\mathrm{I} - A_{rr})^{-1} \sum_{j \neq r}^{G} A_{rj} \sum_{k}^{G} \sum_{l}^{G} B_{jk} Y_{kl} && \text{(T11)} \\
& + \textstyle\sum_{t \neq s}^{G} V_t B_{ts}^{g} \sum_{j \neq s}^{G} A_{sj} B_{js} E_{sr} && \text{(T12)}
\end{aligned}
$$

Traditional $\mathrm{trade_{sr}}$ = (T1) + (T2); GVC $\mathrm{forward_{sr}}$ = (T3) + (T4) + (T5) + (T6); GVC $\mathrm{backward_{sr}}$ = (T7) + (T8) + (T9) + (T10) + (T11) + (T12); GVC $\mathrm{trade_{sr}}$ = GVC $\mathrm{forward_{sr}}$ + GVC $\mathrm{backward_{sr}}$

Source: Authors' illustration, based on Borin et al. (2019)

Table A1: Definition of Decomposition Terms

T1	DVA in final exports directly absorbed by direct importer
T2	DVA in intermediate exports directly absorbed by direct importer
T3	DVA in intermediate exports used by the direct importer to produce final exports for third countries
T4	DVA in intermediate exports used by the direct importer to produce intermediate export for final completion and final absorption of third countries
T5	DVA in intermediate exports used by the direct importer to produce final exports returned home country
T6	DVA in intermediate exports returned home country via intermediate from the direct importer and intermediate and final good from third countries
T7	Double counting in source-based framework as intermediate shipped abroad that re-enter in exports from s to r
T8	FVA in final exports directly absorbed by direct importer
T9	FVA in intermediate exports directly absorbed by direct importer
T10	FVA in intermediate exports used by the direct importer to produce final exports for third countries and home country
T11	FVA in intermediate exports used by the direct importer to infinite produce further for final exports absorbed by home, the importer and third countries
T12	Double counting in source-based framework as intermediate shipped abroad that re-enter in exports from s to r

Source: Authors' illustration, based on Borin, *et al*. (2019)

Appendix 2

Table A2. List of Source Countries

Angola	Egypt	Lithuania	Serbia
Argentina	Estonia	Luxembourg	Singapore
Armenia	Finland	Macedonia FYR	Slovakia
Australia	France	Malaysia	Slovenia
Austria	Germany	Malta	South Africa
Azerbaijan	Greece	Mauritius	South Korea
Bahrain	Guatemala	Mexico	Spain
Barbados	Hong Kong	Monaco	Sri Lanka
Belarus	Hungary	Morocco	Sweden
Belgium	Iceland	Myanmar	Switzerland
Bermuda	India	Netherlands	Syria
Bosnia & Herzegovina	Indonesia	New Zealand	Taiwan
Brazil	Iran	Nigeria	Thailand
Bulgaria	Ireland	Norway	Trinidad & Tobago
Canada	Israel	Oman	Tunisia
Cayman Islands	Italy	Pakistan	Turkey
Chile	Japan	Peru	UAE
China	Jordan	Philippines	Uganda
Colombia	Kazakhstan	Poland	Ukraine
Congo (DRC)	Kenya	Portugal	United Kingdom
Costa Rica	Kuwait	Qatar	United States
Croatia	Kyrgyzstan	Romania	Uruguay
Cyprus	Latvia	Russia	Venezuela
Czech Republic	Lebanon	Samoa	Vietnam
Denmark	Liechtenstein	Saudi Arabia	Zimbabwe
Dominican Republic			
Ecuador			

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