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Abstract

Do trade agreements with labor provisions affect trade differently from those without such provisions? Are their effects heterogeneous with respect to the level of development of the countries involved and the labor intensity of goods traded? In this paper we implement a state-of-the-art structural gravity model with intra-national trade and allow for heterogeneous effects depending on the level of enforceability of labor provisions (weak vs. strong provisions), sector (labor vs. non-labor intensive goods), members' development level (North vs. South), and combinations of the three dimensions. We show that, overall, the trade effects of trade agreements with labor provisions are larger than those without. However, we also find that while exports from the South to the North display a significant increase after a signature of a trade agreements with no or weak labor provisions, this is not the case if strong labor provisions are included in the agreement, and that such difference tend to be larger for labor-intensive goods.

Keywords: international trade, trade agreements, labor provisions, structural gravity models.

JEL classification: F13, F14, F16.

Resumen

¿Los acuerdos comerciales con disposiciones laborales afectan al comercio de manera diferente a como lo hacen aquellos sin tales disposiciones? ¿Son sus efectos heterogéneos con respecto al nivel de desarrollo de los países involucrados y la intensidad laboral de los bienes comercializados? En este trabajo implementamos un modelo de gravedad estructural de última generación con comercio intranacional y permitimos efectos heterogéneos según el nivel de aplicabilidad de las disposiciones laborales (provisiones débiles vs. fuertes), el sector (bienes intensivos en mano de obra vs. bienes no intensivos en mano de obra), nivel de desarrollo de los miembros (Norte vs. Sur), y combinaciones de las tres dimensiones. Mostramos que, en general, los efectos sobre el comercio de los acuerdos comerciales con disposiciones laborales son mayores que los que no las tienen. Sin embargo, también encontramos que, si bien las exportaciones Sur-Norte muestran un aumento significativo después de la firma de un acuerdo comercial sin disposiciones laborales o con disposiciones laborales "débiles", esto no sucede si se incluyen disposiciones laborales "fuertes" en el acuerdo, y que tal diferencia tiende a ser mayor para los bienes intensivos en mano de obra.

Palabras clave: comercio internacional, acuerdos comerciales, disposiciones laborales, modelos de gravedad estructural.

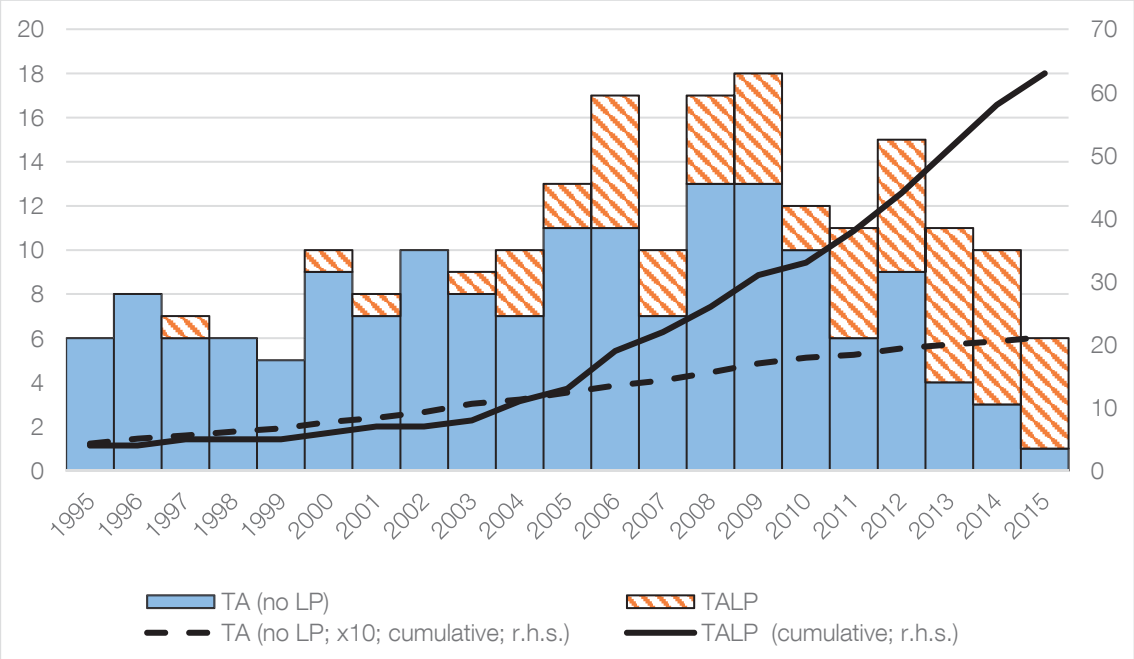
Códigos JEL: F13, F14, F16.

1. Introduction

Do trade agreements with labor provisions affect trade differently from those without such provisions? Are their effects heterogeneous with respect to the level of development of the countries involved and the labor-intensity of goods traded?

Tying trade to labor rights and other labor-related provisions has been a "long-standing contentious issue" in World Trade Organization talks (Summers, 2001). However, since the deadlock of WTO-wide negotiations in the early 2000s, both the overall number of trade agreements and the amount of those including labor provisions, i.e. legal clauses meant to promote labor market and working conditions and reinforce labor rights in the signatory countries,[1] increased steeply (see Figure 1).

Figure 1: Trade agreements with labor provisions, 1995-2015



Note: "TALP" identifies trade agreement with labor provisions. "TA (no LP)" identifies all the rest of trade agreements. Columns represent the number of trade agreements signed in the corresponding year. The line represents the cumulative number of trade agreements with labor provisions in force. "TA (no LP)" cumulative should be multiplied by ten to obtain the number of "TA (no LP)" in force. The year represents the year of entry into force.
Source: Authors' elaboration on WTO RTA and Horizontal Depth database.

Labor provisions included in trade agreements are expected to affect the ability of exporting through different channels, linked to both production costs and productivity. On one side, the inclusion of labor provisions in a trade agreement may increase the

[1] This means the inclusion in the treaties of references to core labor standards and other ILO instruments, and mechanisms for enforcement, implementation and cooperation. Their incorporation into the agreements is usually done through specific "social" or "labor" chapters, or side-agreements. For further details, see Raess and Sari (2020).

cost of labor, to comply with higher standards, and consequently dampening exports' competitiveness (Busse, 2002). On the other side, labor provisions may have beneficial effects on labor productivity (e.g. OECD, 2013; ILO, 2017), by the means of a variety of factors: from higher worker satisfaction to lower rates of accidents at work, from stimulating innovation and investment in human capital by firms to enhance their governance. Further, enhancing labor provisions may influence foreign demand, as far as consumers and firms from importing economies are concerned with human and worker conditions in exporting economies. These effects are strongly emphasized in Carrère et al. (2017).[2]

Indeed, despite a number of recent scholarly efforts (e.g. ILO, 2016; Carrère et al., 2017; Jinji and Kamata, 2020), the sign and size of the effect of trade agreements with labor provisions on trade is still unclear, and object of discussion in both academic and policy environments.

To contribute to this ongoing debate, we estimate a state of the art structural gravity model with consistently estimated intra-national trade flows, to further explore the effects of trade agreements with labor provisions on bilateral exports. In our analysis, we differentiate between non-enforceable (or weakly enforceable, henceforth "weak") and legally enforceable (henceforth, "strong") labor provisions, and explicitly allow for heterogeneity with respect to both the sector (labor vs. non-labor intensive goods) and the level of development of each country (North vs. South).

In line with previous research, our results show that, on average, trade agreements with labor provisions have larger (positive) effects on bilateral manufacturing trade flows, compared to trade agreements with no labor provision. However, our novel contribution is to uncover and explore the heterogeneity both across sectors and level of development. Importantly, we show that while exports from the South to the North display a significant increase after the entry into force of a trade agreements with no (or weak) labor provisions, this is not the case if strong labor provisions are included in the agreement. This difference tends to be larger in labor-intensive sectors.

Our study contributes to two different strands of the literature. First, our paper complements the research focused on the new generation of trade agreements, i.e.

[2] Using highly disaggregated trade data (HS 6 digit), Nicita and Murina (2017) and Timini and Conesa (2018) provide additional evidence in the direction of the possible existence of such channel for the specific case of sanitary and phytosanitary (SPS) measures.

"deep" trade agreements (Orefice and Rocha, 2014; Kohl et al., 2016; Osnago et al., 2017; Ahcar and Siroën, 2019; Osnago et al., 2019; Boffa et al., 2019; Brandi et al., 2020; Heid and Vozzo, 2020; Laget et al., 2020), by expanding the understanding of the impact of trade agreements with labor provisions on trade flows. Second, by taking a more fine-grained approach and using sectoral trade data, our contribution speaks to the literature on the impacts of trade agreements on trade. Our paper shows that sectoral data is important in studying the relation between trade agreements and trade flows given the substantial heterogeneity the aggregate flows hide. To the best of our knowledge, we are the first in implementing such approach for trade agreements with labor provisions specifically.

The remainder of the paper is organized as follows: Section 2 summarizes the literature on the effects of trade agreements with labor provisions; Section 3 describes the data and the empirical strategy used; Section 4 presents and discusses the results (including a battery of robustness tests), and Section 5 concludes.

2. Literature review: trade agreement, labor provisions and standards, and trade

The nature of the relationship between trade and labor standards is a long-standing and widely debated topic. Given its widening policy relevance and the increasing availability of data, there is a large and growing body of literature on the issue.

Previous contributions fall mostly in two main groups. On one side, a number of contributions have focused on analyzing the relationship between trade agreements with labor provisions and countries' labor standards or other labor market conditions (such as minimum wage, unemployment benefits, etc.; see, e.g. Kamata, 2014; Kamata, 2015; and Martinez-Zarzoso and Kruse, 2019). Most studies show mixed results, with trade agreements with labor provisions influencing only certain labor market and working condition indicators (e.g. minimum wage, unemployment rate, composite/proxy measures of labor rights).

On the other side, various studies have investigated the effect of labor standards and provisions on trade flows. Previous research has shown empirically that a change in nation-wide labor standards have heterogeneous effects on the trade performance of a country. Busse (2002) and Busse and Braun (2004) indicate that forced and child labor increase the endowment of labor, positively affecting exports by reinforcing exporters'

comparative advantage, particularly in labor-intensive goods. Using a "naïve" gravity model,[3] Kucera and Sarna (2006) find that labor rights (and specifically trade union rights) have a strong positive relationship with total bilateral manufacturing exports. However, they also show that this strong association would be concentrated in non-labor-intensive products. In their analysis, exports of labor-intensive goods show either a zero or negative association with labor rights.

Relatedly, in parallel with the analysis on and understanding of the so-called "deep" trade agreements,[4] the research on the effects of trade agreements with labor provisions on trade is developing fast. However, the literature has so far provided mixed evidence.

Using a "naïve" gravity model, ILO (2016) find that both trade agreements with and without labor provisions have positive effects on bilateral merchandise exports, and while the point estimate of the former group is larger than that of the latter, they are not statistically different. Additionally, ILO (2016) does not find support for differential effects related to the level of development ("North" and "South"). However, the analysis by ILO (2016) suffers from some important shortcomings as neither multilateral trade resistances (MTRs), i.e. exporter's and importer's overall "market thickness" (Fally, 2015), nor unobservable bilateral time invariant trade costs are controlled for.[5] The biases arising from their exclusion are discussed in Baldwin and Taglioni (2007), Baier and Bergstrand (2007), and Egger and Nigai (2015), and summarized in Yotov et al. (2016). Particularly, accounting for unobservable bilateral time invariant trade costs allows to better control for endogeneity, which is expected to bias the "trade agreement effect" estimates upwards, as countries may be more likely to sign a trade agreement with large (rather than small) trade partners. The recent sensitivity analysis conducted by Ahcar-Olmos and Rodriguez-Barco (2020) confirm the existence and direction of such bias. Additionally, the failure of properly accounting for the asymmetric nature of such bilateral trade costs is another source of bias. As argued by Waugh (2010), this is

[3] Head and Mayer (2014) explains in detail what a "naïve" gravity model means. In short, the most important characteristic of a "naïve" gravity is that it does not take into account explicitly the multilateral trade resistances, something that Baldwin and Taglioni (2007) demonstrate as a potential source of bias. However, we should acknowledge that, at the time, Kucera and Sarna's (2006) approach was the standard in the literature.

[4] The expression "deep trade agreements" refers to trade agreements including different sets of provisions other than tariff reductions. For a comprehensive analysis of the evolution and characteristics of deep trade agreements, see Mattoo et al. (2020).

[5] The standard approach in the literature is to include the former as exporter-time and importer-time fixed effects, and the latter as (directional) pair fixed effects.

particularly important for directional estimates, and especially "South-North" vs. "North-South" trade, as exporters from the "South" systematically incur in higher trade costs relative to exporters from the North.

Differently from ILO (2016), Carrère et al. (2017) effectively control for MTRs, but only include observable (symmetric) bilateral trade costs (such as distance, contiguity, common language, etc.), and decide to tackle endogeneity issues related to trade agreements by restricting the sample to those country pairs with a trade agreement in force. They further reduce the sample by income levels to estimate three out of four geographical combinations: North-North, South-South and South-North (but not North-South). They find that, overall, trade agreements with labor provisions do not have different effects from their control group (trade agreements without such provisions) on manufacturing exports. However, the authors do find a differential (positive) effect in the case of South-North exports. Given the reduced sample used for their analysis, it is unclear whether these findings are generalizable and comparable to the rest of the gravity literature.

Kamata (2014) uses OLS estimation techniques to estimate a pseudo-gravity model in first differences that departs from the rest of the gravity literature (and incurs in several potential sources of biases mentioned in Baldwin and Taglioni, 2007). Kamata's model explains total real bilateral trade flows with exporter's and importer's GDP, two lagged trade agreement dummies, and year fixed effects. On the basis of the results of this model, Kamata (2014) argues that trade agreements with labor provisions have smaller effects, if any, on "South-to-North" exports (with respect to a trade agreement without labor provisions).

Jinji and Kamata (2020) use both OLS and poisson pseudo-maximum likelihood estimation strategy and include intra-national trade flows, a relatively recent advance in the gravity literature, to estimate the effect of a trade agreement with labor provisions on bilateral manufacturing exports. Apart from using own estimates of intra-national trade flows,[6] they depart from the literature by using real export values and lagged (instead of contemporaneous) trade policy variables. With these settings, Jinji and Kamata (2020) show seemingly counterintuitive results.[7] On the one hand, in their

[6] While Jinji and Kamata (2020) acknowledge that they use gross output data from UNIDO, it is not clear how they deal with the considerable number of missing data in the UNIDO database.

[7] Given the possible biases in OLS estimations arising from heteroscedasticity, we focus on poisson pseudo-maximum likelihood estimation results. However, the OLS results are similarly puzzling.

poisson pseudo-maximum likelihood estimations they find that trade agreements with legally enforceable labor provisions have larger positive effects on trade than agreements with no such provisions. These effects are mostly concentrated in North-North trade, possibly capturing the "European Union effect". On the other hand, trade agreements with weak (i.e. non-legally enforceable) labor provisions tend to have a smaller impact (w.r.t agreements with no such provisions), if any. The impact on North-North trade would be negative. Limited explanations are offered on the possible drivers of these results.

Previous contributions have pushed forward our understanding of the nature and characteristics of trade agreements with labor provisions and already offered some insights on their effects on trade, whose size and direction are however still debated. Due to the advances in structural gravity models and availability of more detailed data, we are able to provide a novel perspective on this contested issue.

In this context, we tackle a number of issues so far remained unaddressed in the literature. First, we aim to provide unbiased estimates of the effect of trade agreements with labor provisions on bilateral trade flows. To do so, we implement a state of the art structural gravity model, with theory-coherent MTRs, unobservable asymmetric bilateral time invariant trade costs, and intra-national trade estimated in a consistent way. Second, we allow for heterogeneous effects of trade agreements with labor provisions, by checking if their impact depends on the countries and sectors involved. Accounting for the level of development of the countries involved is relevant given the heterogeneous level of labor standards particularly for North-South and South-North trade relations, as large differences exist among trade partners' regulations and provisions, and economies in the South tend to have fewer labor rights (see Figure A.1 in the Appendix). Estimating sectoral gravity equations (labor-intensive vs. non-labor intensive sectors; and ISIC two-digit sectors) is an important step as trade agreements with labor provisions may have heterogeneous effects on production factors (labor vs. capital).

3. Methodology and data

3.1. Data

Trade data are from the "International Trade and Production Database for Estimation" (ITPD-E). This database contains yearly bilateral trade flows for 243 countries and 120

(four-digit International Standard Industrial Classification [ISIC] rev.3) manufacturing sectors since the year 2000, constructed in an homogeneous and consistent way, and includes intra-national trade flows.[8] Note that in the ITPD-E, flows are reconciled, and the value of exports from *i* to *j* in *t* is equal to the value of *j*'s imports from *i*. For further details, we refer to Borchert et al. (2020).

Trade agreements information is retrieved from the World Bank Horizontal Depth Database (Hofmann et al., 2017), which provides data on the content of trade agreements, including the coverage of labor provisions. The World Bank Database not only includes information on whether or not a trade agreement includes reference to labor provisions, but also whether or not these provisions are legally enforceable. We exploit this additional information in our analysis.

Bilateral distance, WTO and EU membership, are taken from the geography database by CEPII; the measure of "depth" of a trade agreement from Dür et al. (2014), and tariffs from the World Bank World Development Indicators. All these variables are used in robustness checks. Summary statistics are reported in Table A.1 in the Appendix.

3.2. Empirical strategy

We follow Anderson and van Wincoop (2003), Baier and Bergstrand (2007), Head and Mayer (2014), and Yotov et al. (2016) in implementing a state-of-the-art structural gravity model to assess the effect of trade agreements with labor provisions on exports flows. Gravity models explain bilateral trade flows by transaction costs and economic size, while controlling for MTRs and endogeneity issues. There are several theoretical properties of structural gravity models that allow us to maintain a simple empirical framework even if considering labor intensive and non-labor intensive sectors: indeed, structural gravity controls for country-specific factors such as the level of productivities (Ricardian comparative advantage through technology differences), or the level of factor endowments (Heckscher-Olhin comparative advantage through endowment differences). To this extent, Deardoff (1998) and Eaton and Kortum (2002) respectively show that also in a Heckscher-Olhin or Ricardian framework, the gravity equation is

[8] While the database also includes agricultural, mining and service data, we limit our analysis to manufacturing trade for the following reasons: to ensure comparability with similar studies (e.g. Busse, 2002; Busse and Braun, 2004) and across sectors (as, e.g., agricultural sectors are not codified using ISIC classification); to cope with the lack of information on the labor intensity of agricultural production (both within agricultural sectors, and between, e.g., agriculture and manufacturing). Trade in services is often treated separately due to their different nature (see, e.g., Anderson et al., 2018).

practically identical,[9] and including capital-labor ratio (or other similar measures such their difference) would not be warranted by the theory. Additionally, as summarized by Feenstra and Taylor (2017), such measures of factor endowment ratios do not deliver consistent results if there are more than two production factors (e.g. land, labor and capital) or if different types of labor exist. Additionally, gravity models are separable (Anderson and van Wincoop, 2004; Anderson and Yotov, 2010): this means that a theory-consistent gravity equation can be estimated separately for each sector or by pooling sectors together (while adapting bilateral costs and MTRs to the existence of sectors).[10] We therefore perform different sets of estimations, using aggregate bilateral trade, and separating exports of goods of different labor intensity. We use the classification applied by Busse (2002) and Busse and Braun (2004), based on OECD (2001), and widely adopted by studies dealing with trade and labor intensity. This classification divides products from the Standard International Trade Classification (SITC) into two categories: labor-intensive and non-labor intensive products. Using this information, we link products to four-digit ISIC rev. 3[11] (see Table A.2 in Appendix for more details). This dichotomous classification helps us in understanding whether there are any differences across these two broadly-defined sectors. In this sense, and to alleviate the computational burden, we aggregate the ITPD-E data up to the aforementioned two sectors: labor intensive and non-labor intensive goods.[12] However, as a robustness test, we will complement the analysis by running (two-digit ISIC) sector-level regressions, to both ensure the validity of our aggregation and check if a more disaggregated analysis can provide additional insights (by treating labor intensity in a more continuous way).

In all our specifications, we use a poisson pseudo-maximum likelihood estimating procedure, as proposed by Santos Silva and Tenreyro (2006), to properly address the presence of zeros and heteroscedasticity, two features typical of trade data.

[9] As demonstrated by Arkolakis et al. (2012), and summarized in Yotov et al. (2016), "a large class of models generate *isomorphic* gravity equations" (p. 13).

[10] For more details on other aspects of gravity models, we refer to Baldwin and Taglioni (2007) and Yotov et al. (2016).

[11] We use the conversion tables available from Eurostat to translate SITC codes in ISIC. Importantly, the classification by Busse (2002) and Busse and Braun (2004) is based on three-digit SITC codes. In most of the cases, a three-digit SITC code can be univocally linked to a single four-digit ISIC code. When this is not possible (roughly 25% of the codes used in the Busse classification), the most frequent four-digit ISIC code is used.

[12] The original ITPD-E data for manufacturing corresponds to more than 34.6 million observations.

Our more conservative specification can be written as follows:

$$X_{ijt} = \exp\left(\beta_0 + \beta_1 TA_{ijt} + \delta_{it} + \gamma_{jt} + \omega_{ij}\right) + \varepsilon_{ijt} \qquad (1)$$

where X_{ijt} are manufactured exports (either aggregate, labor intensive or non-labor intensive) of country *i* to country *j* at time t. Following Yotov (2012), Dai et al. (2014) and Larch et al. (2018), X_{ijt} include intra-national (i.e. domestic) trade flows (X_{ijt}, ∀ *i*=*j*). In this way, we account for possible domestic-to-international trade diversion effects. Indeed, a trade agreement alters both relative costs among foreign markets (members vs. non-members) and between the domestic market and the markets of foreign signatory partners. TA_{ijt} is a dummy variable and it is equal to 1 when countries *i* and *j* have a trade agreement in force at time t, and zero otherwise, independently of the provisions included in the agreement. In equation (1) then, we are simply measuring the "average treatment effect" of signing a trade agreement on trade. In line with structural gravity theory (Anderson and van Wincoop, 2003), we include exporter-time (δ_{it}), importer-time (γ_{jt}) fixed effects, to properly control for MTRs (as their omission can introduce a bias in the estimates of [trade policy] elasticities), and directional-pair fixed effects (ω_{ij}). Importantly, the latter control for asymmetric trade costs and trade imbalances (Waugh, 2010). ω_{ij} is consistent with Baier and Bergstrand (2007) strategy to deal with trade policy endogeneity. Finally, we follow Egger and Tarlea (2015) and use three-way clustered standard errors (by exporter, importer, and time).

We then proceed to gradually disentangle the "average" trade agreement effect in different categories, separating by labor provisions (existence and strength) and development (North vs. South) characteristics.

In equation (2) below, we use equation (1) as a starting point, and allow for heterogeneous effects of trade agreements with and without labor standards. We do so by splitting the TA_{ijt} dummy in two:

$$X_{ijt} = \exp\left(\beta_0 + \beta_1 TA\_noLP_{ijt} + \beta_2 TA\_LP_{ijt} + \delta_{it} + \gamma_{jt} + \omega_{ij}\right) + \varepsilon_{ijt} \qquad (2)$$

Here, TA_noLP_{ijt} is a dummy variable, and it is equal to 1 when countries *i* and *j* have a trade agreement without labor provisions in force at time t, and zero otherwise. TA_LP_{ijt} is also a dummy variable, and it is equal to 1 when countries *i* and *j* have a trade agreement with labor provisions in force at time t, and zero otherwise. This means that

both coefficients β_1 and β_2 represent the "level" increase in bilateral trade due to TA_noLP_{ijt} and TA_LP_{ijt} respectively. The sum of the two variables captures the universe of trade agreements in our sample (TA_{ijt}).

We further separate trade agreements with labor provisions in two groups: one with non-legally enforceable labor provisions, such as vague reference to some guiding principles or based on weak legal language (e.g. "should encourage"; "recognize the importance"; "shall work jointly to encourage and support"); and the other with legally enforceable labor provisions. These two groups are already codified differently in the Horizontal Depth database.[13]

$$X_{ijt} = \exp\left(\beta_0 + \beta_1 TA\_noLP_{ijt} + \beta_2 TA\_LP\_WEAK_{ijt} + \beta_2 TA\_LP\_STRONG_{ijt} + \delta_{it} + \gamma_{jt} + \omega_{ij}\right) + \varepsilon_{ijt} \quad (3)$$

Here, TA_noLP_{ijt} is defined as above. $TA\_LP\_WEAK_{ijt}$ is a dummy variable that is equal to 1 when countries *i* and *j* have a trade agreement with weak labor provisions in force at time t, and zero otherwise. In the same fashion, $TA\_LP\_STRONG_{ijt}$ identifies trade agreements with strong labor provisions.

We then allow for heterogeneous effects of trade agreements depending on the level of development of trade agreement members. More in details, we follow Boffa et al. (2019) and Heid and Vozzo (2020) and separate countries into advanced and emerging and developing countries. Following the extant literature on similar subjects (i.e. trade and development, see Melitz, 2003; Anson et al., 2005; Montout and Zitouna, 2005; UNCTAD, 2006; Aleksynska and Havrylchyk, 2013; Vicard, 2013; Disdier et al., 2015), we label these two groups "North" and "South". The "North" corresponds to high-income OECD or EU members.[14] We separate then the exports relations in four groups: North-North, South-South, North-South, and South-North. The directional separation of North-South and South-North is important given the heterogeneity in the burden that labor provisions may pose for exporters in the North and in the South (see, e.g., UNCTAD, 2013; Disdier et al., 2015). As above, all the coefficients are interpretable as "level" effects.

[13] For further details on the methodology used for assembling the Horizontal Depth database, please refer to Hofmann et al. (2017).

[14] Given our period of analysis, 2000-2015, and in line with most of the literature analyzing a similar period, we label as "North" high-income OECD or EU members, more precisely: Australia, Canada, Iceland, Israel, Korea (Rep. of), Japan, New Zealand, Norway, Switzerland, United States, and EU members. We prefer not to separate EU members between "North" and "South" as the EU has a common trade policy stance, known as "Common Commercial Policy" or "EU Trade Policy". Main results, however, are not sensible to the inclusion of the EU "New Members States" (i.e. 2004 accession) in the "South".

4. Results

4.1. Main results

The main results from the structural gravity model estimated with poisson pseudo-maximum likelihood techniques are presented in Table 1. Our first result (Column 1.a), in line with most research, we find that, on average, trade agreements (TA_{ijt}) boost bilateral trade between members, by approximately 10% (i.e. 100*[$e^{\beta^{TA}} - 1$]). On average, this effect is mostly concentrated on non-labor intensive products (Column 1.b and 1.c). When we separate trade agreements between those without (TA_noLP_{ijt}) and those with labor provisions (TA_LP_{ijt}) (Columns 2.a-2.c), and then further isolate trade agreements with weak ($TA\_LP\_WEAK_{ijt}$) and strong labor provisions ($TA\_LP\_STRONG_{ijt}$) (Columns 3.a-3.c), we find that the trade effect of agreements with strong provisions (that includes the EU) outperforms the others, particularly for non-labor intensive goods. These results are in line with those of a recent strand of the literature arguing that "new generation" agreements tend to have larger economic impacts with respect to the rest (Kohl et al., 2016; Ahcar and Siroën, 2019; Laget et al., 2020). In Columns 4.a-4.c and Columns 5.a-5.c, we further disentangle the effects by level of development of the trade agreement members. When doing so, we uncover the existence of important heterogeneity across type of agreements and level of development of its members. North-North trade flows increase as a consequence of both trade agreements without labor provisions ($TA\_noLP\_NN_{ijt}$) and those with strong labor provisions ($TA\_LP\_STRONG\_NN_{ijt}$). However, such effects tend to be concentrated on non-labor intensive goods for the latter. North-South exports increase as a result of the entry into force of any of the three types of trade agreements considered (without [$TA\_noLP\_NS_{ijt}$], with weak [$TA\_LP\_WEAK\_NS_{ijt}$], or with strong labor provisions [$TA\_LP\_STRONG\_NS_{ijt}$]). These effects are concentrated in non-labor-intensive goods. South-North exports show very different patterns depending on the type of trade agreement signed: trade agreements without labor provisions ($TA\_noLP\_SN_{ijt}$) boost South-North exports of labor-intensive goods; trade agreements with weak labor provisions ($TA\_LP\_WEAK\_SN_{ijt}$) promote South-North non-labor-intensive exports; whereas trade agreements with strong labor provisions do not have any positive effect on South-North exports ($TA\_LP\_STRONG\_SN_{ijt}$). In other words, this means that there is a substantial difference among trade agreement types in terms of trade creation. This is

Table 1: Trade agreements with labor provisions and trade flows

	TA			TA_noLP and TA_LP			TA_noLP, TA_LP_WEAK and TA_LP_STRONG			Col. 2 + North-North; North-South; South-North; South-South			Col. 4 + North-North; North-South; South-North; South-South		
	1			2			3			4			5		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
VARIABLES	tot. manuf.	lab. int manuf.	non-lab. int. manuf.	tot. manuf.	lab. int manuf.	non-lab. int. manuf.	tot. manuf.	lab. int manuf.	non-lab. int. manuf.	tot. manuf.	lab. int manuf.	non-lab. int. manuf.	tot. manuf.	lab. int manuf.	non-lab. int. manuf.
TA_{ijt}	0.0972**	-0.0002	0.121***												
	(0.0411)	(0.102)	(0.0377)												
$TA\_NO\_LP_{ijt}$				0.0505	-0.0415	0.0777	0.0509	-0.0417	0.0785						
				(0.0761)	(0.172)	(0.0552)	(0.0765)	(0.172)	(0.0558)						
TA_LP_{ijt}				0.143***	0.0434	0.163**									
				(0.0544)	(0.0505)	(0.0665)									
$TA\_LP\_WEAK_{ijt}$							0.104	0.123***	0.0938						
							(0.0675)	(0.0430)	(0.0713)						
$TA\_LP\_STRONG_{ijt}$							0.175***	0.00814	0.227***						
							(0.0642)	(0.0640)	(0.0739)						
$TA\_NO\_LP\_NN_{ijt}$										0.138*	0.106	0.123	0.142**	0.106	0.127
										(0.0735)	(0.0873)	(0.0797)	(0.0707)	(0.0870)	(0.0792)
$TA\_LP\_NN_{ijt}$										0.119*	0.0812*	0.127			
										(0.0691)	(0.0486)	(0.0824)			
$TA\_LP\_WEAK\_NN_{ijt}$													0.00759	0.109**	-0.00878
													(0.0421)	(0.0472)	(0.0428)
$TA\_LP\_STRONG\_NN_{ijt}$													0.215***	0.0701	0.255***
													(0.0742)	(0.0651)	(0.0796)
$TA\_NO\_LP\_NS_{ijt}$										0.148**	0.0366	0.170***	0.149**	0.0395	0.170***
										(0.0607)	(0.146)	(0.0510)	(0.0598)	(0.145)	(0.0511)
$TA\_LP\_NS_{ijt}$										0.254**	0.0534	0.263**			
										(0.123)	(0.0979)	(0.116)			
$TA\_LP\_WEAK\_NS_{ijt}$													0.347*	0.114	0.351**
													(0.178)	(0.179)	(0.164)
$TA\_LP\_STRONG\_NS_{ijt}$													0.134**	0.0317	0.145**
													(0.0596)	(0.103)	(0.0611)
$TA\_NO\_LP\_SN_{ijt}$										0.0983**	0.333***	0.0640	0.106**	0.335***	0.0713
										(0.0479)	(0.0971)	(0.0545)	(0.0489)	(0.0970)	(0.0570)
$TA\_LP\_SN_{ijt}$										-0.0132	0.0761	-0.00930			
										(0.0789)	(0.105)	(0.0777)			
$TA\_LP\_WEAK\_SN_{ijt}$													0.139**	0.200	0.118*
													(0.0567)	(0.146)	(0.0612)
$TA\_LP\_STRONG\_SN_{ijt}$													-0.177**	-0.0775	-0.159*
													(0.0770)	(0.115)	(0.0883)
$TA\_NO\_LP\_SS_{ijt}$										-0.0487	-0.309	0.0195	-0.0481	-0.308	0.0206
										(0.140)	(0.218)	(0.111)	(0.140)	(0.218)	(0.111)
$TA\_LP\_SS_{ijt}$										0.282***	-0.0954	0.421***			
										(0.0609)	(0.0822)	(0.0877)			
$TA\_LP\_WEAK\_SS_{ijt}$													0.342***	0.151***	0.376***
													(0.0738)	(0.0462)	(0.0913)
$TA\_LP\_STRONG\_SS_{ijt}$													0.262***	-0.166*	0.436***
													(0.0860)	(0.0925)	(0.106)
EXPORTER-TIME FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
IMPORTER-TIME FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
DIR. PAIR FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	669,633	587,744	656,783	669,633	587,744	656,783	669,633	587,744	656,783	669,633	587,744	656,783	669,633	587,744	656,783

Note: Poisson regressions. Dependent variable: Bilateral exports. Fixed effects and constants not reported for the sake of simplicity. Standard errors (in parentheses) are clustered at the exporter, importer and time level. ***p < 0.01, **p < 0.05, *p < 0.1

evident in the case of South-North exports: trade agreements with labor provisions tend to curb exports of the South, especially when labor provisions are legally enforceable. These results echo the findings of other papers looking at the effects of the "new generation" of trade agreements on South-North total manufacturing trade, such as Disdier et al. (2015) and Anson et al. (2005), focusing on standard harmonization and rules of origins respectively. The authors of the two paper find that the non-tariff measures contained in the "new generation" agreements act as a brake to trade expansion, partially or totally undoing traditional trade promoting effects. Finally, trade agreements with labor provisions ($TA\_LP\_WEAK\_SS_{ijt}$ and $TA\_LP\_STRONG\_SS_{ijt}$) are promoting South-South trade. However, the positive effects of those with strong labor provisions ($TA\_LP\_STRONG\_SS_{ijt}$) are concentrated in non-labor intensive goods. Generally, our findings show that trade increase along the line of traditional trade theory: trade liberalization induces countries to specialize in the production of goods in which they enjoy a comparative advantage. This advantage could emerge, mainly, from differences in both the relative factor endowments (*a la* Heckscher-Ohlin) and the institutional and regulatory frameworks (Nunn and Trefler, 2014; Baghdadi et al., 2013). Such advantages are reduced in the case that trade liberalization policies have conditions, i.e. labor provisions, attached.

4.2. Robustness tests

In our robustness checks we focus on disentangling potential confounding factors so to reduce our concerns for possible omitted variable bias. The results of an alternative set of specifications are reported in Table 2.

Therefore, we tackle the possible existence of confounding factors related to unobserved time-varying bilateral trade costs by including additional variables with variation at the exporter-importer and time level in the regression. In brief, we account for: the "depth" of the trade agreement, i.e. an index accounting for provisions other than labor included in the trade agreement; WTO membership of the pair; importer tariffs; or the "EU effect". Additionally, we also follow Bergstrand et al. (2015) and implement three alternative specifications by including: a time-varying bilateral distance effect, i.e. an interaction between bilateral distance and year dummies; a time-varying "globalization effect", i.e. an interaction between the "international border"[15] and year dummies; and a combination of the two.

[15] The international border dummy is equal to 1 if exporter is different from the importer, and 0 otherwise.

Our main results do not change across specifications. Specifically, while the sign of certain variables may change due to the very high number of fixed effects inserted in the regressions, the difference between the effect of trade agreements without labor provisions and those with (strong) labor provisions on exports from the South to the North remain stable across all specifications: the $TA\_noLP\_SN_{ijt}$ effect tend to be larger than that of $TA\_LP\_STRONG\_SN_{ijt}$, and particularly so for labor-intensive exports.

More in details, in Column 1, we include an index that measures the "depth" of a trade agreement, by summarizing relevant chapters, clauses and provisions included in the agreement other than labor provisions. In this way, we make sure – in the best possible way – that the effect captured by our trade agreement dummies is not reflecting other provisions. We use the (normalized) additive index proposed by Dür et al. (2014),[16] a standard approach used by research on similar issues (e.g. Egger et al., 2015; Brandi et al., 2020). The index takes into account whether or not a trade agreement includes substantive provisions across its most relevant policy areas: tariffs (reduction to zero, with only few exceptions allowed), standards, services, investment, public procurement, competition, and intellectual property rights. Importantly, as mentioned above, the index does not include labor provisions. While in the literature there is no consensus yet on the sign and significance of "depth", we note that in our sample the "depth" of a trade agreement does not have a significant effect on bilateral manufacturing trade.

In Column 2, we take into account WTO membership, by including a dummy variable that is equal to 1 if both the exporter and the importer are WTO members at time t, and zero otherwise. The WTO dummy is not significant. This is not surprising considering a number of issues: first, our sample starts in 2000, and the multilateral trading system has achieved little results since; second, Esteve-Pérez et al. (2020) recently argue that the average WTO effect on trade is not significantly positive, although this may be only covering very heterogeneous effects (Felbermayr et al., 2020).

In Column 3, we include tariffs. We use applied tariff data, simple mean for manufacturing products.[17] The tariffs coefficient can be expressed in terms of trade elasticity of substitution $\sigma = -\beta_{TARIFF}$. The value of σ (3.6) that can be extracted from

[16] Results are robust to the alternative measure proposed by Dür et al. (2014), which relies on latent trait analysis.

[17] We also use interchangeably applied tariff data (weighted mean); and MFN (both simple and weighted mean) for manufacturing products in a set of alternative regressions (not reported in the text). Main results are not sensible to these changes.

the regression corresponding to total bilateral manufacturing trade is very close to the value indicated by Bajzik et al. (2020) as a result of a meta-analysis of the literature, and Bernard et al. (2003) estimation results.

In Column 4, we separate the EU, a special type of trade agreement with labor provisions. Even if we previously took into account the existence of deep trade agreements, we separate the EU to provide a further "accuracy check" on our estimates. In line with the literature, the EU (enlargement) effect (EU_{ijt}) is large, positive, and significant for total bilateral manufacturing trade, and larger than the average trade agreement effect (TA_{ijt} in Column 1.a, Table 1).

In Column 5 we include an interaction between bilateral distance and year dummies. In this way we allow bilateral distance effect to have a time-varying effects. This allows to disentangle reductions in bilateral trade costs that are not strictly related to the signing of a trade agreement, but rather to a wider process of trade integration.

In Column 6, we insert an interaction between the international border variable, defined as a dummy that take value 1 if the bilateral trade relation is international, i.e. if the exporter is different from the importer, and 0 otherwise, and year dummies. Such interaction allows to capture any time-varying effect that affect intra-national (domestic) and international trade differently. In short, this would allow to discern the trade agreement effect from "globalization-related" trade effects, i.e. general reductions in international trade costs occurring over time and unrelated to the trade agreement.

In Column 7 we enter in the regression the two effects simultaneously.

Additionally, we complement the analysis by running individual (two-digit ISIC) sector-level regressions, to both ensure the validity of our aggregation (based on Busse, 2002) of labor-intensive and non-labor intensive sectors. With this further robustness check, we also consider if a sector-specific analysis can provide additional insights.

For sake of brevity, we report the full regression results in Table A.3 in the Appendix, together with complementary visual and descriptive analysis (Figure A.2 and Figure A.3, and text thereafter), but we summarize the main points of this robustness check here.

The sector-level findings reinforce our main conclusion: the effect of trade agreements without labor provisions on exports from the South to the North is larger than that of trade agreements with strong labor provisions, especially in labor-intensive sectors (for

Table 2: Trade agreements with labor provisions and trade flows, robustness tests

	Depth			WTO membership			Tariffs			EU effect			Distance trend			International border * year			Dist. tr. + Int. bord.*year		
	1			2			3			4			5			6			7		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
VARIABLES	tot. manuf.	lab. int manuf.	non-lab. int. manuf.	tot. manuf.	lab. int manuf.	non-lab. int. manuf.	tot. manuf.	lab. int manuf.	non-lab. int. manuf.	tot. manuf.	lab. int manuf.	non-lab. int. manuf.	tot. manuf.	lab. int manuf.	non-lab. int. manuf.	tot. manuf.	lab. int manuf.	non-lab. int. manuf.	tot. manuf.	lab. int manuf.	non-lab. int. manuf.
TA_NO_LP_NN$_{ijt}$	0.0825	0.0403	0.0947	0.142**	0.106	0.127	0.132*	0.0928	0.118	0.140**	0.106	0.124	0.0554	-0.0505	0.0485	0.0987	0.0375	0.0848	0.0797	-0.0204	0.0737
	(0.103)	(0.121)	(0.111)	(0.0705)	(0.0872)	(0.0792)	(0.0716)	(0.0927)	(0.0796)	(0.0702)	(0.0872)	(0.0791)	(0.0942)	(0.119)	(0.102)	(0.0800)	(0.0958)	(0.0904)	(0.0942)	(0.126)	(0.104)
TA_LP_WEAK_NN$_{ijt}$	-0.0714	0.0202	-0.0517	0.00810	0.110**	-0.00823	0.00157	0.107**	-0.0143	0.00735	0.109**	-0.00908	-0.103**	-0.118	-0.109**	-0.0495	-0.00470	-0.0616	-0.0734*	-0.0669	-0.0787*
	(0.0762)	(0.156)	(0.0761)	(0.0429)	(0.0476)	(0.0419)	(0.0333)	(0.0474)	(0.0412)	(0.0308)	(0.0475)	(0.0347)	(0.0496)	(0.127)	(0.0542)	(0.0444)	(0.0720)	(0.0491)	(0.0400)	(0.110)	(0.0450)
TA_LP_STRONG_NN$_{ijt}$	0.166**	0.0173	0.229**	0.215***	0.0702	0.256***	0.203***	0.0612	0.242***				0.187***	0.0347	0.229***	0.132**	-0.0213	0.173**	0.141**	-0.000631	0.177**
	(0.0847)	(0.105)	(0.0891)	(0.0742)	(0.0651)	(0.0796)	(0.0740)	(0.0647)	(0.0794)				(0.0711)	(0.0582)	(0.0769)	(0.0666)	(0.0550)	(0.0714)	(0.0684)	(0.0569)	(0.0739)
TA_NO_LP_NS$_{ijt}$	0.108	-0.00236	0.147**	0.149**	0.0355	0.170***	0.109*	0.0253	0.128**	0.151**	0.0400	0.172***	0.0980	-0.0817	0.127**	0.0993	-0.0612	0.126**	0.0943	-0.0857	0.123**
	(0.0820)	(0.182)	(0.0708)	(0.0595)	(0.142)	(0.0508)	(0.0622)	(0.155)	(0.0528)	(0.0601)	(0.144)	(0.0516)	(0.0635)	(0.149)	(0.0515)	(0.0716)	(0.150)	(0.0619)	(0.0717)	(0.155)	(0.0611)
TA_LP_WEAK_NS$_{ijt}$	0.277*	0.0366	0.313**	0.347*	0.114	0.351**	0.320*	0.0755	0.325*	0.347*	0.114	0.351**	0.287	-0.0377	0.300*	0.311	0.00924	0.320*	0.303	-0.0277	0.315*
	(0.149)	(0.196)	(0.143)	(0.178)	(0.179)	(0.164)	(0.192)	(0.192)	(0.177)	(0.178)	(0.179)	(0.164)	(0.208)	(0.159)	(0.175)	(0.189)	(0.178)	(0.174)	(0.193)	(0.167)	(0.179)
TA_LP_STRONG_NS$_{ijt}$	0.0630	-0.0434	0.106	0.135**	0.0318	0.146**	0.138**	0.0407	0.151***	0.133**	0.0311	0.143**	0.108	0.0164	0.120	0.124*	0.0269	0.136*	0.121	0.0253	0.135
	(0.0814)	(0.193)	(0.0792)	(0.0599)	(0.103)	(0.0621)	(0.0565)	(0.108)	(0.0563)	(0.0622)	(0.103)	(0.0642)	(0.0811)	(0.111)	(0.0797)	(0.0750)	(0.109)	(0.0737)	(0.0897)	(0.115)	(0.0901)
TA_NO_LP_SN$_{ijt}$	0.0643	0.287**	0.0486	0.105**	0.334***	0.0706	0.0752	0.316***	0.0340	0.106**	0.335***	0.0711	0.0412	0.279***	0.00621	0.0421	0.291***	0.00389	0.0344	0.280**	-0.00134
	(0.0732)	(0.121)	(0.0835)	(0.0489)	(0.0968)	(0.0572)	(0.0480)	(0.0966)	(0.0548)	(0.0491)	(0.0969)	(0.0566)	(0.0545)	(0.0975)	(0.0653)	(0.0561)	(0.111)	(0.0645)	(0.0622)	(0.112)	(0.0701)
TA_LP_WEAK_SN$_{ijt}$	0.0724	0.132	0.0816	0.139**	0.199	0.118**	0.0959*	0.181	0.0689	0.138**	0.199	0.117**	0.0614	0.121	0.0440	0.0714	0.144	0.0497	0.0546	0.123	0.0358
	(0.0957)	(0.187)	(0.102)	(0.0568)	(0.146)	(0.0598)	(0.0547)	(0.137)	(0.0584)	(0.0577)	(0.146)	(0.0591)	(0.0669)	(0.147)	(0.0777)	(0.0613)	(0.134)	(0.0683)	(0.0723)	(0.143)	(0.0747)
TA_LP_STRONG_SN$_{ijt}$	-0.246**	-0.148	-0.198	-0.176**	-0.0769	-0.159*	-0.202***	-0.0828	-0.188**	-0.177**	-0.0776	-0.159*	-0.223**	-0.176	-0.205	-0.194**	-0.111	-0.178*	-0.214**	-0.161	-0.193
	(0.112)	(0.168)	(0.123)	(0.0775)	(0.115)	(0.0893)	(0.0749)	(0.108)	(0.0892)	(0.0770)	(0.114)	(0.0892)	(0.104)	(0.122)	(0.127)	(0.0783)	(0.106)	(0.0913)	(0.107)	(0.130)	(0.131)
TA_NO_LP_SS$_{ijt}$	-0.0791	-0.338	0.00319	-0.0488	-0.309	0.0198	-0.108	-0.367*	-0.0385	-0.0479	-0.308	0.0208	-0.0677	-0.310	-0.00855	-0.0711	-0.324	-0.00665	-0.0859	-0.324	-0.0282
	(0.152)	(0.255)	(0.116)	(0.140)	(0.217)	(0.111)	(0.141)	(0.219)	(0.112)	(0.140)	(0.218)	(0.111)	(0.137)	(0.232)	(0.117)	(0.129)	(0.205)	(0.103)	(0.146)	(0.227)	(0.127)
TA_LP_WEAK_SS$_{ijt}$	0.294***	0.0948	0.349***	0.342***	0.150***	0.376***	0.279***	0.138***	0.306***	0.342***	0.151***	0.376***	0.275***	0.0858	0.312***	0.289***	0.0875	0.321***	0.279***	0.0748	0.316***
	(0.0875)	(0.125)	(0.103)	(0.0735)	(0.0461)	(0.0913)	(0.0701)	(0.0434)	(0.0871)	(0.0739)	(0.0461)	(0.0912)	(0.0739)	(0.0676)	(0.0914)	(0.0852)	(0.0608)	(0.0983)	(0.0953)	(0.0750)	(0.108)
TA_LP_STRONG_SSijt	0.220**	-0.214	0.414***	0.264***	-0.166*	0.439***	0.265***	-0.162**	0.452***	0.263***	-0.166*	0.437***	0.0255	-0.240	0.0844	0.199***	-0.255***	0.376***	0.00473	-0.239	0.0608
	(0.100)	(0.152)	(0.111)	(0.0849)	(0.0923)	(0.104)	(0.0784)	(0.0809)	(0.0951)	(0.0860)	(0.0925)	(0.106)	(0.209)	(0.252)	(0.215)	(0.0711)	(0.0949)	(0.0866)	(0.226)	(0.244)	(0.235)
DEPTH$_{ijt}$	0.0783	0.0881	0.0426																		
	(0.0822)	(0.150)	(0.0809)																		
WTO$_{ijt}$				0.0703	0.0842	0.0732															
				(0.123)	(0.134)	(0.128)															
TARIFF$_{ijt}$							-3.592***	-1.876	-3.938***												
							(1.270)	(1.447)	(1.320)												
TA_LP_STRONG_NN_noEU$_{ijt}$										-0.00352	-0.0104	-0.00918									
										(0.0749)	(0.118)	(0.0806)									
EU$_{ijt}$										0.248***	0.0765	0.298***									
										(0.0757)	(0.0665)	(0.0796)									
EXPORTER-TIME FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
IMPORTER-TIME FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
DIR. PAIR FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
DISTANCE*YEAR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	NO	NO	NO	YES	YES	YES
INTL. BRDR. * YEAR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
Observations	669,633	587,744	656,783	669,633	587,744	656,783	473,677	427,221	466,729	669,633	587,744	656,783	607,491	538,660	596,919	669,633	587,744	656,783	607,491	538,660	596,919

Note: Poisson regressions. Dependent variable: Bilateral exports. Fixed effects and constants not reported for the sake of simplicity. Standard errors (in parentheses) are clustered at the exporter, importer and time level. ***p < 0.01, **p < 0.05, *p < 0.1

example in sectors such as manufacturing of textile, ISIC 17, and of wearing apparel, ISIC 18).

To summarize, our main results do not vary across specifications, and sector-level regressions are in line with and support the results based on more aggregate export data. In particular, the effect of trade agreements without labor provisions on exports from the South to the North is larger than that of trade agreements with strong labor provisions, and particularly so for labor-intensive exports.

5. Conclusions

During the last decades, we have witnessed a proliferation of trade agreements incorporating specific provisions related to labor rights and working conditions. These agreements may have different economic consequences than the rest. Indeed, trade agreements with labor provisions may affect the "institutional comparative advantage" (Nunn and Trefler, 2014) of (labor abundant) countries. Due to the increasing relevance of bilateral (rather than WTO-wide) trade integration, this can have important repercussions on the evolution of global trade flows and economic interconnections.

Our paper contributes to this literature by testing empirically the effect of trade agreements with labor provisions on bilateral trade flows. We allow for heterogeneous effects depending on the level of enforceability of labor provisions (weak vs. strong provisions), sector (labor vs. non-labor intensive goods), level of development (North vs. South), and combinations of the three dimensions. We do so by implementing a state-of-the-art structural gravity model with intra-national trade.

In line with previous research, our results show that, on average, trade agreements with labor provisions have larger (positive) effects on aggregate bilateral manufacturing trade flows, with respect to trade agreements without them. However, our novel contribution is to uncover an important degree of heterogeneity both at the sector and members' development level. Importantly, we show that while exports from the South to the North display a significant increase after a signature of a trade agreements with no or non-enforceable labor provisions, this is not the case if strong labor provisions are included in the agreement. Such difference tends to be larger for labor-intensive goods. This represents an important contribution on the consequences of trade agreements with labor provisions on South-North trade relations, above and beyond those on other non-tariff measures (Anson et al., 2005; Disdier et al., 2015).

Such finding provides also some interesting insights both for policy-makers and the academic community. In terms of policy implications, for an exporter from the South, on one hand, the signing of a trade agreement without labor provisions with an importer in the North implies large, positive and significant effects on its exports, particularly of labor-intensive goods. On the other hand, if the same trade agreement includes strong labor provisions, this is likely to have no positive effect on South-North exports.

In terms of venues for further research, the effect of trade agreements with labor provisions should be investigate in more detail, leveraging the availability of firm-level information. Besides, exploring the relation between changes in different aspects of trade policy and the evolution of the industrial structure and export composition could offer crucial contributions for guiding policy choices in the future.

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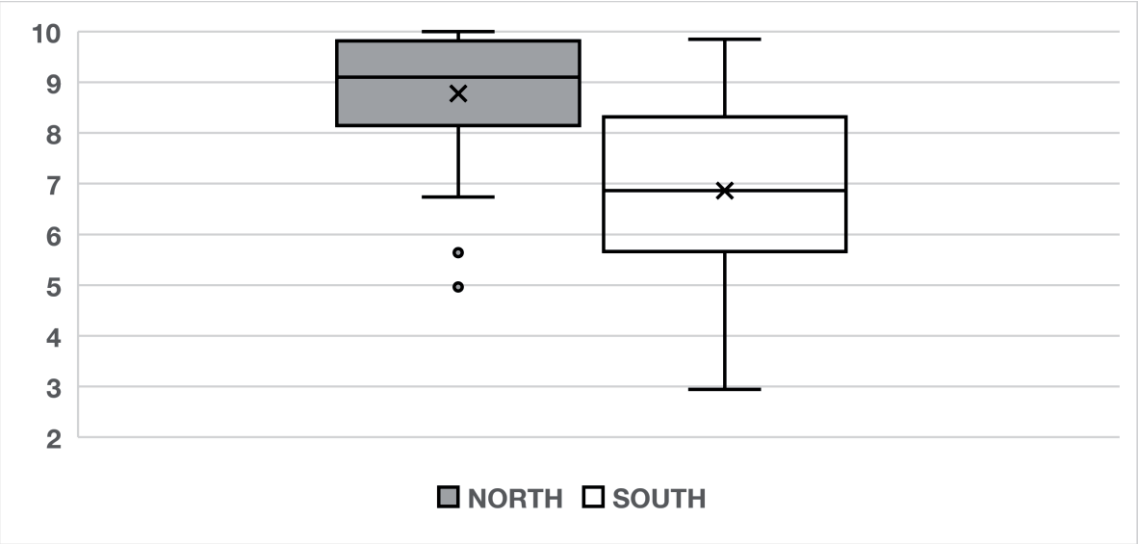
Appendix

FIGURE A.1 Labor rights in the North and in the South



Note: The figure shows the Kucera and Sari (2019) synthetic indicator for freedom of association and collective bargaining rights in law and practice for the year 2000 (the first year of our sample). Importantly, the original indicator has an inverse relationship with the level of labor rights: it ranges between 0 and 10, being 0 the best score and 10 the worst score. We linearly transform the index to have a direct relationship between labor rights and the indicator level (best score: 10; worst score: 0). See http://labor-rights-indicators.la.psu.edu/about for more details on the index. North and South are defined as in the text.
Source: Authors' elaboration on Kucera and Sari (2019).

TABLE A.1 Summary statistics

VARIABLE	OBSERVATIONS	MEAN	ST.DEV.	MIN	MAX
Exports (aggregate)	672,791	547.72	25620.88	0	9214964
Exports (lab. Int.)	672,791	63.72	2931.12	0	1001829
Exports (non-lab. Int.)	672,791	483.99	22769.96	0	8213136
TA_{ijt}	672,791	0.096	0.294	0	1
$TA\_NO\_LP_{ijt}$	672,791	0.059	0.236	0	1
TA_LP_{ijt}	672,791	0.036	0.187	0	1
$TA\_LP\_WEAK_{ijt}$	672,791	0.009	0.095	0	1
$TA\_LP\_STRONG_{ijt}$	672,791	0.027	0.163	0	1
$TA\_NO\_LP\_NN_{ijt}$	672,791	0.0017	0.041	0	1
$TA\_LP\_WEAK\_NN_{ijt}$	672,791	0.0004	0.020	0	1
$TA\_LP\_STRONG\_NN_{ijt}$	672,791	0.0162	0.126	0	1
$TA\_NO\_LP\_NS_{ijt}$	672,791	0.0122	0.110	0	1
$TA\_LP\_WEAK\_NS_{ijt}$	672,791	0.0011	0.034	0	1
$TA\_LP\_STRONG\_NS_{ijt}$	672,791	0.0045	0.065	0	1
$TA\_NO\_LP\_SN_{ijt}$	672,791	0.0122	0.110	0	1
$TA\_LP\_WEAK\_SN_{ijt}$	672,791	0.0011	0.034	0	1
$TA\_LP\_STRONG\_SN_{ijt}$	672,791	0.0044	0.066	0	1
$TA\_NO\_LP\_SS_{ijt}$	672,791	0.0332	0.179	0	1
$TA\_LP\_WEAK\_SS_{ijt}$	672,791	0.0063	0.079	0	1
$TA\_LP\_STRONG\_SS_{ijt}$	672,791	0.0022	0.047	0	1

TABLE A.2 List of labor-intensive goods (as in Busse, 2002)

COMMODITY	SITC code	ISIC code (correspondence)
Fabric and textile yearn	65	1711; 1721; 1722; 1723; 1729; 1730; 1810; 2109; 2430; 2519; 2610; 3699
Glassware, glass and pottery	664-666	2610; 2691
Bedding and furniture	82	1721; 3610
Handbags and travel goods	83	1912
Apparel	84	1730; 1810; 1820; 2519; 2520
Footwear	85	1920
Games, toys, baby carriages, and sporting goods	894	3693; 3694; 3699

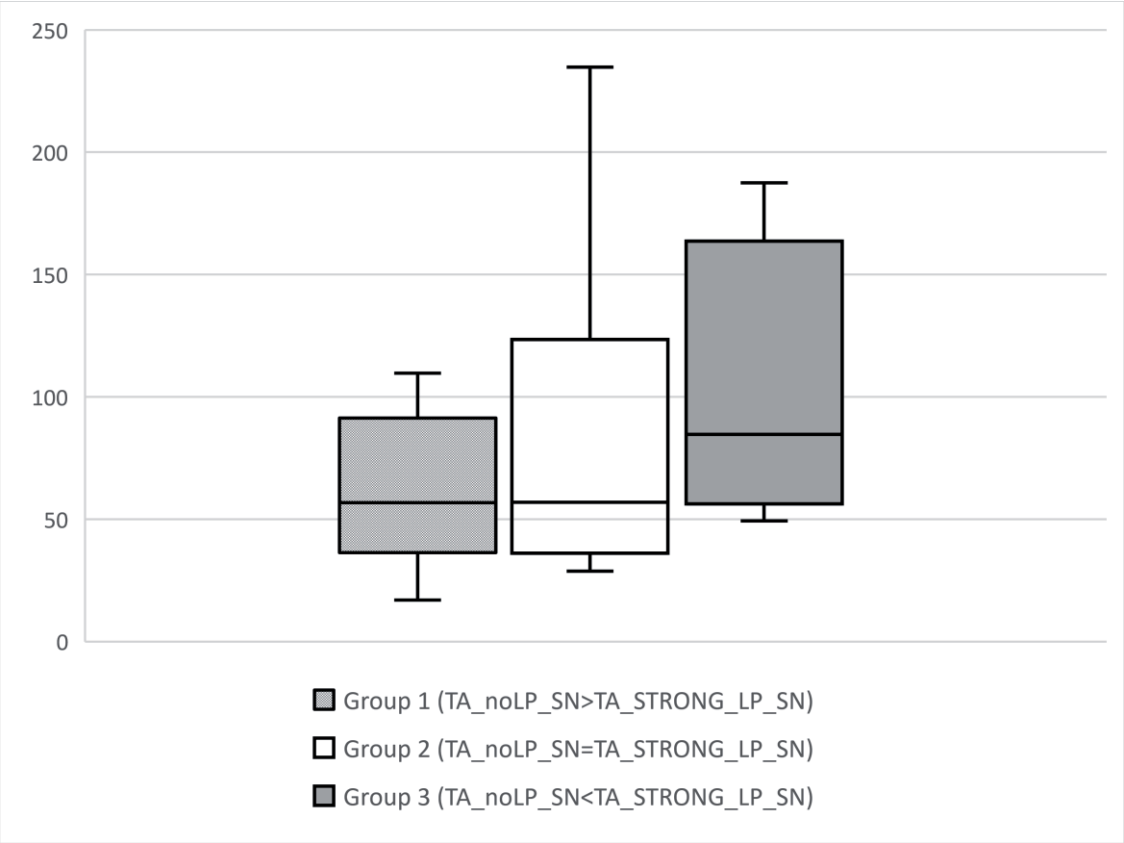
Note: We use the conversion tables available from Eurostat to translate SITC codes in ISIC. Importantly, the classification by Busse (2002) is based on three-digit SITC codes. In most of the cases, a three-digit SITC code can be univocally linked to a single four-digit ISIC code. When this is not possible (roughly 25% of the codes used in the Busse classification), the most frequent four-digit ISIC code is used.
Source: Authors' elaboration on Busse (2002).

Table A.3: Trade agreements with labor provisions and trade flows, two-digit ISIC.

	1	2	3	4	5	6	7	8	9	10	11
	ISIC sector 15	ISIC sector 16	ISIC sector 17	ISIC sector 18	ISIC sector 19	ISIC sector 20	ISIC sector 21	ISIC sector 22	ISIC sector 23	ISIC sector 24	ISIC sector 25
VARIABLES	*Manuf. of food products and beverages*	*Manuf. of tobacco products*	*Manuf. of textiles*	*Manuf. of wearing apparel; dressing and dyeing of fur*	*Tanning and dressing of leather; manuf. of luggage, handbags, saddlery, harness and footwear*	*Manuf. of wood and of products of wood and cork, except furniture; manuf. of articles of straw and plaiting materials*	*Manuf. of paper and paper products*	*Publishing, printing and reprod. of recorded media*	*Manuf. of coke, refined petroleum products and nuclear fuel*	*Manuf. of chemicals and chemical products*	*Manuf. of rubber and plastics products*
TA_NO_LP_NN$_{ijt}$	0.127**	1.893***	0.146	0.240	-0.0703	-0.214	-0.408	-0.0473	0.385**	0.245***	-0.0119
	(0.0500)	(0.182)	(0.137)	(0.211)	(0.216)	(0.208)	(0.259)	(0.135)	(0.152)	(0.0578)	(0.0536)
TA_LP_WEAK_NN$_{ijt}$	0.0994**	0.143	0.0727	-0.335*	0.324***	-0.0155	0.0624	0.142	0.624***	0.0872	0.122
	(0.0463)	(0.164)	(0.103)	(0.197)	(0.0958)	(0.121)	(0.137)	(0.0944)	(0.111)	(0.106)	(0.0800)
TA_LP_STRONG_NN$_{ijt}$	0.608***	1.721***	0.100	-0.0702	-0.0834	0.127*	0.174**	0.0840	0.196	0.347**	0.243**
	(0.134)	(0.344)	(0.110)	(0.173)	(0.175)	(0.0756)	(0.0846)	(0.160)	(0.137)	(0.141)	(0.105)
TA_NO_LP_NS$_{ijt}$	-0.0887	0.482**	0.181	-0.772**	-0.348	0.197	0.0108	-0.00430	0.472***	0.146*	0.121
	(0.0730)	(0.237)	(0.168)	(0.340)	(0.269)	(0.136)	(0.0698)	(0.102)	(0.100)	(0.0813)	(0.0772)
TA_LP_WEAK_NS$_{ijt}$	0.197**	0.0491	0.130	0.390	0.185	-0.266	0.0172	-0.0755	0.353	0.104	0.0793
	(0.0873)	(0.172)	(0.190)	(0.469)	(0.240)	(0.218)	(0.128)	(0.183)	(0.217)	(0.122)	(0.0707)
TA_LP_STRONG_NS$_{ijt}$	0.140	-0.412*	0.195	-0.0742	0.0166	0.0290	0.189*	0.000218	0.301	-0.0638	0.183**
	(0.123)	(0.236)	(0.151)	(0.290)	(0.116)	(0.148)	(0.102)	(0.100)	(0.198)	(0.0795)	(0.0851)
TA_NO_LP_SN$_{ijt}$	0.119	0.414	0.322*	0.610***	0.322***	0.268**	0.0511	-0.134	0.115	0.139	0.207***
	(0.0731)	(0.312)	(0.182)	(0.197)	(0.109)	(0.119)	(0.0679)	(0.144)	(0.114)	(0.0905)	(0.0647)
TA_LP_WEAK_SN$_{ijt}$	0.216***	0.264	0.181	0.276	0.319	0.555***	0.0334	-0.0366	0.0123	0.150	0.235***
	(0.0606)	(0.440)	(0.149)	(0.182)	(0.212)	(0.117)	(0.127)	(0.142)	(0.170)	(0.0964)	(0.0599)
TA_LP_STRONG_SN$_{ijt}$	0.0640	-0.0175	-0.0803	-0.129	0.303***	0.192*	0.201*	-0.217**	-0.609***	0.160**	0.487**
	(0.0865)	(0.203)	(0.181)	(0.136)	(0.104)	(0.115)	(0.119)	(0.0848)	(0.145)	(0.0641)	(0.207)
TA_NO_LP_SS$_{ijt}$	0.133	0.383	-0.208	-0.739**	-0.796***	-0.299*	-0.159	-0.152*	-0.00757	0.0920	-0.0357
	(0.0966)	(0.282)	(0.163)	(0.327)	(0.296)	(0.153)	(0.147)	(0.0907)	(0.0731)	(0.0780)	(0.199)
TA_LP_WEAK_SS$_{ijt}$	-0.149	-0.136	0.208***	-0.0319	0.221**	0.415**	0.157*	-0.154	0.405	0.0159	0.118
	(0.187)	(0.368)	(0.0790)	(0.0957)	(0.0869)	(0.204)	(0.0849)	(0.196)	(0.418)	(0.0730)	(0.101)
TA_LP_STRONG_SS$_{ijt}$	0.562***	1.117***	0.0343	-0.770***	-0.426***	-0.0360	0.0580	0.173	0.197	0.544***	0.346***
	(0.151)	(0.417)	(0.156)	(0.254)	(0.143)	(0.0520)	(0.162)	(0.159)	(0.165)	(0.156)	(0.111)
EXPORTER-TIME FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
IMPORTER-TIME FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
DIR. PAIR FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	497,868	217,084	473,186	470,725	404,975	364,900	386,290	418,931	298,311	504,961	477,843

VARIABLES	ISIC sector 26 *Manuf. of other non-metallic mineral products*	ISIC sector 27 *Manuf. of basic metals*	ISIC sector 28 *Manuf. of fabricated metal products, except machinery and equipment*	ISIC sector 29 *Manuf. of machinery and equipment n.e.c.*	ISIC sector 30 *Manuf. of office, accounting and computing machinery*	ISIC sector 31 *Manuf. of electrical machinery and apparatus n.e.c.*	ISIC sector 32 *Manuf. of radio, television and comm. equipment and apparatus*	ISIC sector 33 *Manuf. of medical, precision and optical instr., watches and clocks*	ISIC sector 34 *Manuf. of motor vehicles, trailers and semi-trailers*	ISIC sector 35 *Manuf. of other transport equipment*	ISIC sector 36 *Manuf. of furniture; manuf. n.e.c.*
TA_NO_LP_NN$_{ijt}$	0.559***	0.0297	0.369	0.177	-0.0877	0.492**	-0.326*	-0.0907	-0.0807	0.416**	0.755**
	(0.163)	(0.113)	(0.317)	(0.121)	(0.174)	(0.232)	(0.169)	(0.118)	(0.0574)	(0.165)	(0.382)
TA_LP_WEAK_NN$_{ijt}$	0.0793	0.151	0.316***	0.157***	0.0763	0.144	-0.457***	0.0796	0.242*	0.138	-0.258**
	(0.0714)	(0.236)	(0.0577)	(0.0457)	(0.140)	(0.129)	(0.0748)	(0.200)	(0.147)	(0.141)	(0.121)
TA_LP_STRONG_NN$_{ijt}$	0.186**	0.358***	0.331***	0.0835	0.370**	0.216	0.0680	0.293**	0.00403	-0.261	0.470***
	(0.0878)	(0.0945)	(0.0790)	(0.138)	(0.158)	(0.139)	(0.130)	(0.125)	(0.145)	(0.168)	(0.126)
TA_NO_LP_NS$_{ijt}$	0.0263	0.508	0.0303	0.0542	-0.115	0.0406	0.00975	0.0799	0.173	-0.189	0.238
	(0.112)	(0.337)	(0.0575)	(0.0616)	(0.1000)	(0.0781)	(0.0532)	(0.0750)	(0.126)	(0.167)	(0.202)
TA_LP_WEAK_NS$_{ijt}$	-0.0555	0.669***	0.125	-0.000141	-0.444**	-0.119	0.0765	0.257***	-0.0153	-0.426**	0.672***
	(0.0931)	(0.126)	(0.0911)	(0.0470)	(0.199)	(0.173)	(0.202)	(0.0564)	(0.0831)	(0.202)	(0.213)
TA_LP_STRONG_NS$_{ijt}$	-0.142**	0.0835	0.149	0.0608	0.468***	0.272**	0.191*	0.0975	0.172*	-0.296	-0.117
	(0.0701)	(0.0637)	(0.0944)	(0.0660)	(0.149)	(0.126)	(0.107)	(0.0701)	(0.0956)	(0.193)	(0.125)
TA_NO_LP_SN$_{ijt}$	0.147	0.0984	0.304**	0.136**	-0.118	0.0753	-0.178*	0.121*	0.128	0.289*	0.0338
	(0.109)	(0.0927)	(0.124)	(0.0540)	(0.160)	(0.105)	(0.0998)	(0.0667)	(0.128)	(0.166)	(0.0884)
TA_LP_WEAK_SN$_{ijt}$	-0.0407	0.571***	0.243*	0.201*	-0.0688	0.0676	-0.305**	0.365**	0.00737	0.432*	0.219*
	(0.150)	(0.157)	(0.144)	(0.113)	(0.214)	(0.125)	(0.138)	(0.168)	(0.117)	(0.256)	(0.122)
TA_LP_STRONG_SN$_{ijt}$	-0.263*	-0.0115	0.331***	0.479***	-0.314***	0.444***	0.0435	-0.197	0.543***	-0.0557	0.137
	(0.146)	(0.166)	(0.110)	(0.129)	(0.0684)	(0.158)	(0.280)	(0.133)	(0.168)	(0.404)	(0.193)
TA_NO_LP_SS$_{ijt}$	-0.0896	0.0740	-0.0445	-0.0747	-0.359**	-0.143	0.0544	-0.273**	0.348***	0.0844	-0.721**
	(0.150)	(0.0941)	(0.141)	(0.131)	(0.162)	(0.129)	(0.171)	(0.117)	(0.133)	(0.250)	(0.316)
TA_LP_WEAK_SS$_{ijt}$	0.0286	0.724***	0.191**	0.120**	0.312***	0.207**	0.325*	-0.0680	0.706***	-0.130	-0.0214
	(0.0818)	(0.206)	(0.0795)	(0.0544)	(0.0961)	(0.102)	(0.193)	(0.0815)	(0.180)	(0.283)	(0.0914)
TA_LP_STRONG_SS$_{ijt}$	-0.201*	0.468***	0.160	0.326***	1.010*	0.394***	0.936***	0.673**	0.706***	0.294***	0.276
	(0.112)	(0.116)	(0.120)	(0.111)	(0.561)	(0.115)	(0.268)	(0.342)	(0.122)	(0.106)	(0.194)
EXPORTER-TIME FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
IMPORTER-TIME FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
DIR. PAIR FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	408,929	385,949	482,820	514,455	417,367	480,005	453,422	445,665	452,194	352,221	475,656

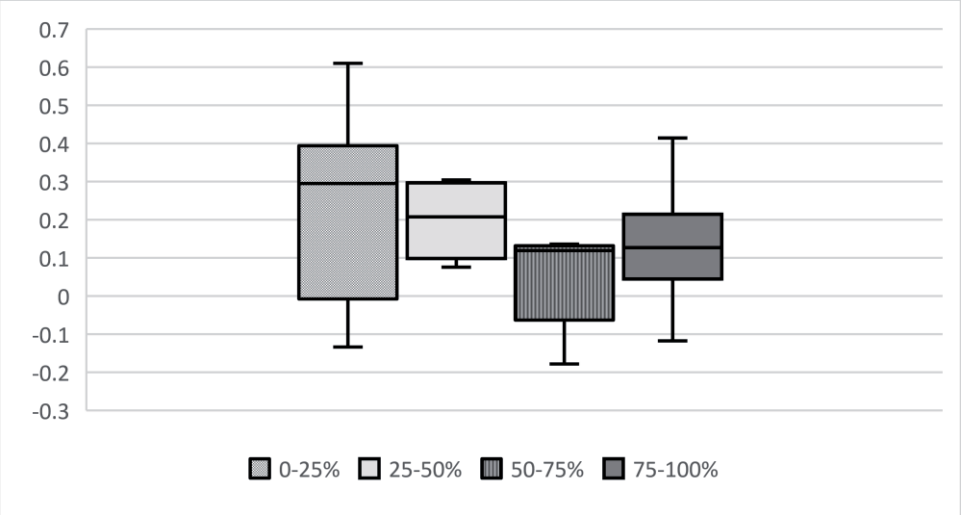
FIGURE A.2: Association between capital intensity and South-North trade agreement effects



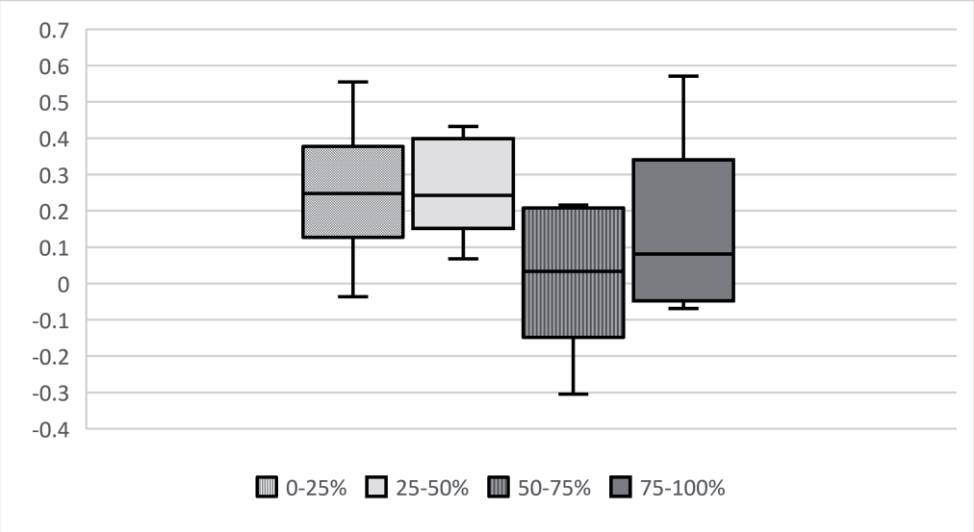
Note: "Group 1" includes those sectors where the TA_noLP_SN effect is positive and significant, and the TA_STRONG_LP_SN effect is either not statically significant or negative and significant. It also includes sectors where the TA_noLP_SN effect is not statistically significant and the TA_STRONG_LP_SN effect is negative and significant. "Group 2" includes those sectors where the TA_noLP_SN and TA_STRONG_LP_SN are both positive and significant, both not statistically significant, or both negative and significant. "Group 3" includes those sectors where the TA_STRONG_LP_SN effect is positive and significant, and the TA_noLP_SN effect is either not statically significant or negative and significant. It also includes sectors where the TA_STRONG_LP_SN effect is not statistically significant and the TA_noLP_SN effect is negative and significant. ISIC sector 23, "manufacture of coke, refined petroleum products and nuclear fuel" is excluded. Capital intensity is calculated as capital per employee. See text for further details.

FIGURE A.3: Association between South-North trade agreement coefficients and capital intensity

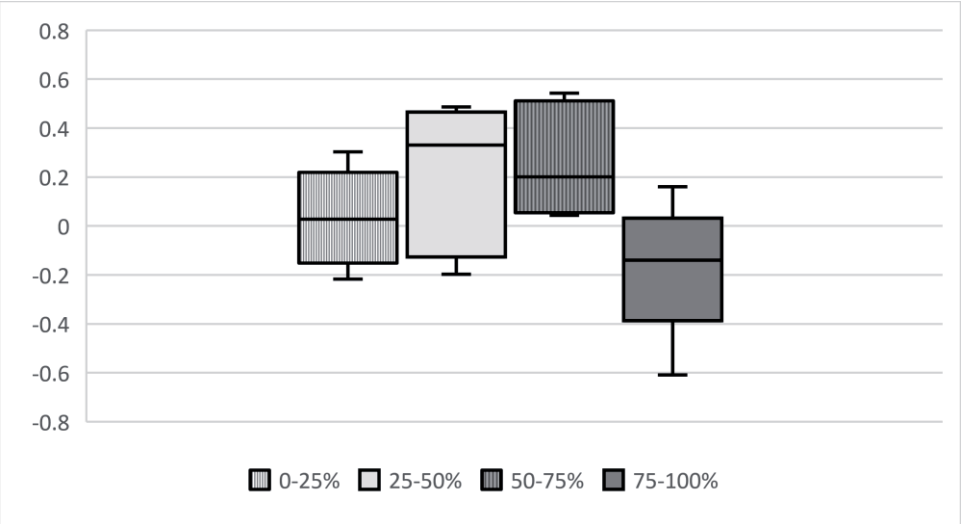
a. Trade agreements without labor provisions (TA_noLP_SN)



b. Trade agreements with "weak" labor provisions (TA_LP_WEAK_SN)



c. Trade agreements with "strong" labor provisions (TA_LP_STRONG_SN)



As stated in Section 4.2, our sector-level regressions (see Table A.3) support the findings of a larger effect of trade agreements without labor provisions on exports from the South to the North with respect to that of trade agreements with strong labor provisions, and especially so for labor-intensive sectors.

Figure A.2 and Figure A.3 provide two visual summaries of the information contained in Table A.3 for South-North trade agreements. In both figures, we associate the sector-level capital-intensity (capital per employee) with the effects of trade agreements with and without labor provisions on trade.

More in details, in Figure A.2, we compare the distributions of the interquartile ranges of sector-level factor intensity for three mutually exclusive groups of South-North trade agreement effects.[18] The first group, labelled "Group 1", contains sectors where the effect of trade agreements without labor provisions are "stronger" than those of trade agreements with strong labor provisions. The second group, labelled "Group 2" contains sectors where the effects are "similar". The third group, labelled "Group 3", contains sectors where the effect of trade agreements without labor provisions is "weaker" than that of trade agreement with strong labor provisions.

More precisely, "Group 1" includes those sectors where the TA_noLP_SN effect is positive and significant, and the TA_STRONG_LP_SN effect is either not statically significant or negative and significant. It also includes sectors where the TA_noLP_SN effect is not statistically significant and the TA_STRONG_LP_SN effect is negative and significant. "Group 2" includes those sectors where the TA_noLP_SN and TA_STRONG_LP_SN are both positive and significant, both not statistically significant, or both negative and significant. "Group 3" includes those sectors where the TA_STRONG_LP_SN effect is positive and significant, and the TA_noLP_SN effect is either not statically significant or negative and significant. It also includes sectors where the TA_STRONG_LP_SN effect is not statistically significant and the TA_noLP_SN effect is negative and significant. The advantages of this classification lie on its mutually exclusive categories and on its computational ease, as the categories can be directly and manually calculated from Table A.3.

[18] The box plot reported in Figure A.2 shows the distribution of factor intensity for each group defined as in the text. For each group, the graph shows the median (the line within the box), the 25^{th} and 75^{th} percentile range (the limits of the box), and the upper and lower adjacent values (lines emerging from the box, above and below respectively).

Sector-level factor intensity is computed following Bustos (2011): we build a measure of factor intensity for each two-digit ISIC industry using the NBER-CES Manufacturing Industry Database that correspond to the capital to labor ratio.[19] Therefore, the lower the number, the lower the capital intensity (and the higher the labor intensity), and vice versa. We take 1995 as reference year for calculations.[20]

Then, Figure A.2 provides a simple graphical representation of the association between capital intensity and the South-North trade agreement effects, showing that "Group 1" effects tend to be associated with industries with higher level of labor intensity (i.e. lower level of capital intensity), such as, for example, manufacturing of textiles, wearing apparel, luggage, and footwear, or leather-related industries. "Group 3" effects tend to be associated with industries with lower level of labor intensity (i.e. higher level of capital intensity), such as, for example, manufacturing of chemical products. "Group 2" effects are associated with industries whose labor intensity lies somewhat in the middle. In Figure A.3, we compare the distributions of the interquartile ranges of trade agreement coefficients from sector regressions divided by quartiles of sector capital intensity.[21] Figure A.3 shows two important features in support of our main findings. First, the relation between the distribution of coefficients and the capital intensity within the same type of agreement. In the case of trade agreements without labor provisions (Figure A.3a), the median effect is decreasing with capital intensity. In other words, the effects of these treaties tend to be larger in sectors with higher labor intensity (lower capital intensity). In the case of trade agreements with strong labor provisions (Figure A.3c), the relationship is increasing: the effects of these treaties tend to be larger in sectors with lower labor intensity (higher capital intensity). In the case of trade agreements with weak labor provisions (Figure A.3b), the relation is similar to that of trade agreements without labor provisions, however the pattern is fuzzier.

[19] The NBER-CES Manufacturing Industry Database provides data on the real capital stock in millions of 1987 dollars ("CAP" variable in the database) and number of employees ("EMP" variable in the database) per industry. As in Bustos (2011), factor intensity is then calculated CAP/EMP.

[20] We can assume that 1995 values are plausibly exogenous, as our sample starts only five years later, in 2000.

[21] The box plot reported in Figure A.3 shows the distribution of coefficients for each type of trade agreements: 3.a shows the coefficients relative to trade agreements without labor provisions; 3.b shows the coefficients relative to trade agreements with "weak" labor provisions; 3.c shows the coefficients relative to trade agreements with "strong" labor provisions. For each group, the graph shows the median (the line within the box), the 25th and 75th percentile range (the limits of the box), and the upper and lower adjacent values (lines emerging from the box, above and below respectively).

Second, the relation between the distribution of coefficients in the same quartile of capital intensity across different type of agreements. The effects of trade agreements for sectors in the first quartile of the distribution of capital intensity, i.e. more labor intensive sectors, tend to be higher for trade agreements without labor provisions, and lower for trade agreements with strong labor provisions. As expected, the opposite is true for sectors in the third quartile of the distribution of capital intensity, i.e. more capital intensive sectors.

There is one exception to what we discussed above, the effects of trade agreements for sectors in the fourth quartile of the distribution of capital intensity, i.e. the group including the most capital intensive sectors. For sectors with very high capital intensity, the median effect of any type of trade agreement (without, with weak, and with strong labor provisions) is very close to zero. This finding can be rationalized recalling the (very) limited importance (and international competitiveness) of very high capital intensive sectors in emerging and developing economies. Therefore, for such sectors, the change in the "institutional comparative advantage" granted by a trade agreement would not be enough to guarantee significant changes in exports.

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