

DOCUMENT DE TRAVAIL

DT/2012-18

Core labour standards and exports

Jean-Marc SIROEN

UMR DIAL 225

Place du Maréchal de Lattre de Tassigny 75775 • Paris Cedex 16 • Tél. (33) 01 44 05 45 42 • Fax (33) 01 44 05 45 45
• 4, rue d'Enghien • 75010 Paris • Tél. (33) 01 53 24 14 50 • Fax (33) 01 53 24 14 51

E-mail : dial@dial.prd.fr • Site : www.dial.prd.fr

CORE LABOUR STANDARDS AND EXPORTS

Jean-Marc Siroën
Université Paris Dauphine, LEDa
IRD, UMR 225 DIAL
siroen@dauphine.fr

Document de travail UMR DIAL

Novembre 2012

Abstract:

Core labour standards defined by the ILO in 1998 are universal, but applied very differently across countries. Compliance is much higher in high income countries. However, the causality between improved labour standards and economic growth remains a controversial issue. Export-led growth strategies might encourage developing countries to curb the process of standards improvement. In this way, they can raise the volume of their unskilled labour endowments (child and/or forced labour) in order to strengthen their comparative advantage over compliant countries and pursue "social dumping" strategies, which aim more directly at increasing competitiveness. We use a gravity model to assess the trade impact of curbing the level of compliance with core labour standards, distinguishing the effects on bilateral trade (geographical specialization) from the multilateral effects on all exports and imports. We show that, other things being equal, countries that meet the labour standards tend to trade more with each other, while non-compliant countries tend to trade more with compliant countries. These effects are identified mainly with respect to child labour and freedom of association. All other things being equal, countries that meet the labour standards tend to be less open than non-compliant countries, but differently depending on the standards, with a non-linear relationship for some of them. Less compliant countries, frequently the poorest ones, may simultaneously step up their trade and labour standards. For median countries, mainly the emerging countries, the level of compliance with labour standards is "optimal" from a mercantilist point of view. For the most compliant countries, the developed ones, their strict compliance with labour standards implies a trade shortfall.

Key words: Exports, International Trade, Labour Standards, ILO, Gravity Models.

Résumé

Les normes de travail fondamentales définies par l'OIT en 1998 sont universelles, mais différemment appliquées dans les pays. Leur respect est beaucoup plus élevé dans les pays à haut revenu. Toutefois, la causalité entre l'amélioration des normes de travail et la croissance reste un sujet débattu. Les stratégies de croissance par les exportations pourraient encourager les pays en développement à ralentir le processus d'amélioration des normes. Ils peuvent ainsi accroître leur dotation relative en travail non qualifié (travail des enfants et/ou forcé) pour renforcer leurs avantages comparatifs par rapport aux pays qui les respectent et poursuivre des politiques dites de "dumping social" qui visent encore plus directement à accroître leur compétitivité. Nous utilisons un modèle de gravité pour évaluer l'impact du commerce sur le respect des normes fondamentales de travail en séparant les effets sur le commerce bilatéral (spécialisation géographique) des effets sur l'ouverture multilatérale. Nous montrons que, toutes choses égales par ailleurs, les pays qui respectent les normes de travail tendent à échanger davantage entre eux alors que les pays qui ne les respectent pas tendent à échanger davantage avec les pays qui les respectent. Ces effets sont particulièrement nets avec le travail des enfants et la liberté d'association. Les pays qui respectent les normes de travail tendent à être moins ouverts que les pays qui ne les respectent pas, mais avec des différences selon les normes avec une relation non linéaire pour certaines d'entre elles. Les pays qui les respectent le moins, généralement les plus pauvres, améliorent simultanément leur commerce et leurs normes. Pour les pays intermédiaires en terme de respect des normes, principalement les pays émergents, le niveau de respect des normes de travail est "optimal" d'un point de vue mercantiliste. Pour les pays les plus respectueux, ce niveau élevé de normes conduit à réduire leur commerce.

Mots Clés : Exportations, Commerce international, Normes de travail, OIT, modèles de gravité.

JEL Code: F11, F13, F16, F43, F47, F51, J8

INTRODUCTION

The ILO *Declaration on Fundamental Principles and Rights* (1998) defines four core standards, embodied in eight conventions. These rights are considered to be universal and apply to all people and all member countries, regardless of the level of economic development. This Declaration was inspired by the World Summit for Social Development in Copenhagen (1995), which included seven agreements. Since little protection against child labour was included in the ILO conventions, a new convention was added to cover its worst forms (Convention 182). The four core labour standards, embodied in eight conventions, are:

- Freedom of association and the right to collective bargaining (Conventions 87 and 98);
- Elimination of all forms of forced or compulsory labour (Conventions 29 and 105);
- Elimination of discrimination in respect of employment and occupation (Conventions 100 and 111);
- Recommended minimum age for child workers (Convention 138) and the elimination of the worst forms of child labour (Convention 182).

There is a consensus about the positive correlation between the quality of labour standards and the level of development. Income per inhabitant is reportedly one of the drivers of compliance with core labour standards (Casella, 1996; Busse, 2004; Arestoff and Granger, 2003). Bazillier (2008) confirms the positive impact of core labour standards on long-run growth. However, the direction of causality and the transmission channels are still being discussed.

It is broadly considered that “growth is good for labour standards”. However, this assertion is not conclusive. It is based on a cross-section analysis with a long-run perspective and nothing is said about the influence of labour standards on growth. If low labour standards impede growth, we cannot expect an improvement in labour standards to bear out the initial assertion.

Endogenous growth models thus emphasize the positive role of accumulating production factors, especially human factors (Lucas, 1988; Romer, 1989). Child labour and poor health and safety conditions also combine to drive down the rate of human capital accumulation and, consequently, future growth rates. Likewise, the different forms of labour standards violation aim to or effectively do cut wages to below their equilibrium rate (marginal labour productivity). However, this distortion provides little incentive to the employer to invest in more capitalist processes of production, which burden productivity and keep growth rates down. According to Piore (1994), low investment in capital is a way of avoiding geographic concentration, which leads to dispersed industry and makes it more complicated to monitor work conditions. Aidt and Tzannatos (2002) believe that upholding workers' rights facilitates coordination and raises productivity by reducing the effects of labour/management conflict on production and helping small open economies to adjust more rapidly to economic shocks, and this at the lowest possible cost. Martin and Maskus (2001) show that, if the markets are competitive, it is more likely that freedom of association

will increase production and competitiveness by improving productivity. The freedom of association and collective bargaining are also often preferred to the introduction of a minimum wage, which can crowd out low productivity adult workers from the labour market and instead encourage the use of informal child labour (Basu, 2000; Dinopoulos and Zhao, 2007).

Trade openness must be included in the chain of causality. Some authors locate trade openness at the beginning of the process (Griswold, 2001): the best way to improve labour standards would be to encourage growth assumed as being stimulated by open trade¹. In this case, we speak of "endogenous" labour standards development: opening up trade encourages growth and income, which in turn helps to reduce poverty, raise real wages and improve compliance with labour standards. Any measure that reduces international trade would therefore be counter-productive. However, these predictions do not help to explain the persistence of differences in the levels of labour standards in countries with similar income levels. Neither has any immediate or significant improvement been observed in the level of standards in high-growth countries (India and China). Recent wage increases in China are due to collective worker actions, especially in the special economic zones.

Some studies explore the consequences of trade openness on labour standards. For example, Edmonds and Pavcnik (2002) show that the gradual relaxation of the rice export quota increased the relative price of this product and therefore the income of the rural population, reducing child labour in rural areas. Adversely, the increase in the rice price for consumers led to a deterioration in the situation in urban areas. Busse (2004) posits that opening up trade significantly reduces discrimination against women and child labour. Yet the impact of trade liberalization on forced labour and union rights is more ambiguous. However, Arestoff and Granger (2003) show that opening up trade has a negligible effect on the composite indicator for compliance with the ILO's four core labour standards. Edmonds and Pavcnik (2006) find a negative relationship from trade to child labour, which becomes statistically insignificant when cross-country income differences are controlled.

One of the most discussed issues is the temptation, for some countries that have rallied to export-led growth strategies, to slow down this endogenous process, and even to regress in terms of labour standards compliance, in order to reinforce their competitive advantage in an unfair "race to the bottom" or "social dumping"²

¹ In the 1990s, many studies consolidated the first link in the chain of causality: opening up trade encourages growth (Edwards, 1992, 1998; Dollar, 1992; Ben David, 1993; Sachs and Warner, 1995; Ades and Glaeser, 1999; Frankel & Romer, 1999; Irwin & Tervio, 2002; Wacziarg & Welsh, 2008). This causality has nonetheless been challenged by methodological criticism, notably by Rodriguez and Rodrik (2000) and Rodrik ed. (2003), who highlight the difficulty of measuring openness, and the combination of channels between trade openness and growth, which do not only transit by trade policies, but also by geography and institutions.

² "Social dumping", a term subject to some controversy, may be defined as an impingement of workers' rights for the purposes of boosting competitiveness in import and export markets alike. It works by putting pressure on wage costs and production costs. A strict definition would imply that such impingement is lower the "normal" practices in the producing country: violation of national legislation and exemptions granted to certain export industries.

process. We note that although the regulation of the world trade system pitches developed countries against developing countries, the “lose-lose” game mainly concerns South-South trade in that countries in the South are rivals competing for similar sectors on the international markets (Elliott, 2003). The risk here is of deteriorated terms of trade if enough countries simultaneously raise their supply. This concern is shared by trade unions and anti-globalist movements, but also by international organizations such as the ILO and the OECD, which keep a close eye on labour practices in export processing zones. Unfortunately, save some case studies, little comparative research has been conducted on this topic. The question is at the heart of the debate on the inclusion of a “social clause” in trade agreements. Under pressure mainly from developing countries, which denounced the protectionism of such a clause, the 1996 WTO Singapore Ministerial Conference denied any link between labour and trade. This assertion has to be checked. A non-significant relation would confirm it. A positive contribution of high labour standards to exports would open a window for rapid improvement in the less compliant countries. A positive relationship between core labour standard non-compliance and exports would not be enough to prove the existence of unfair labour practices, but it would make the capacity to contain labour standards to boost exports plausible.

The aim of this paper is to provide empirical elements in answer to the question: is the foreign trade of a country influenced by the level of its compliance with core labour standards?

In the first section, we review the theory and past empirical evidence on this relation between labour rights and trade. Section 2 presents the econometric strategy based on gravity models. Section 3 explains how the data have been collected. Section 5 delivers some evidence and we conclude in section 6.

1. THEORETICAL ISSUES AND PREVIOUS EMPIRICAL EVIDENCE

Many studies are based on the usual HOS theory, which presents the effects of labour standards on trade. If non-compliance with labour standards raises a country’s relative unskilled labour endowment, then that country’s comparative advantage in labour-intensive goods will be strengthened and we can expect more trade with capital- (or skilled labour) abundant countries. However, an increase in exports of low-skilled labour intensive goods might prompt a downturn in the terms of trade (see, for example, Brown, Deardorff and Stern, 1996).

We can reasonably consider that non-compliance with certain core labour standards, such as child labour and forced labour, increases a country’s relative low-skilled labour endowment. However, we can also consider a substitution effect of one labour category for another. Assuming that child labour and adult labour are totally interchangeable, the use of child labour may entail the exclusion of a proportion of the adult labour force from the market (Basu and Van, 1998; Hansson, 1981; Granger, 2003). Similarly, forced labour might be used alternatively to free labour. Lastly, if some categories of unskilled workers (adults, women) are replaced by other unskilled workers, such as children, the net effect on factor endowment is undetermined by the theory.

Moreover, the positive, if not ambiguous, effect of child and forced labour on unskilled labour endowments might also be counterbalanced by the violation of other labour standards. Although discrimination prevents certain categories of the population from having access to the labour market, it affects the quantity of labour used in production and the availability of unskilled workers. However, discrimination is also a facility for hiring segregated people in the informal economy with poorer labour conditions. Secondly, discrimination creates rigidity and affects productivity, thus preventing a more efficient allocation of resources and trade performances (Brown, Deardorff and Stern, 1996; Maskus, 1997; OECD 1996).

The role played by freedom of association and collective bargaining rights is a highly challenged aspect, mainly due to the effects of “closed shop” unions, widely thought of as negative, in some Latin American countries (Elliott, 2003). Nonetheless, the unions' legitimacy usually lies in the challenge they present to the excessive and abusive powers of employers, which are often inadequately regulated by the public authorities and advantaged by other core standard violations, such as forced labour and child labour. The monopsonic behaviour of the employer leads to the labour being underpaid (Granger, 2003; Martin and Maskus, 1999; Morici and Shulz, 2001; Shelburne, 2004). The firms that have a monopsonic recruitment advantage can ration out their labour demand, and, therefore, production and exports, in order to put pressure on the price of labour. Consequently, not all available unskilled workers will be hired, reducing the country's low-skilled labour endowment.

The consequences of the level of compliance with core labour standards on factor endowment are ambiguous and, consequently, so are the expectations of their influence on trade. Because the theory is ambiguous, only empirical studies might settle the issue. Early studies show the absence of a correlation between labour standards and the volume of trade (OECD, 1996, 2000; Mah, 1997; Raynauld and Vidal, 1998), but they do not use reliable indicators. The number of ILO conventions ratified by a country is the most frequently used indicator in empirical studies (Rodrik, 1998; Busse, 2003; Cooke & Noble, 1998). Yet the deviation between convention content and actual application is such that this indicator should be considered with caution (Chau & Kanbur, 2001).

Rodrik (1998) shows that timework and child labour contribute to a higher share of labour-intensive exports in total exports. Van Beers (1998) finds that labour standards influence trade in 18 OECD countries. Granger (2005) builds her own indicators for the four core labour standards and concludes that violation by Southern countries tends to raise the volume of North-South trade. These studies confirm the existence of a trade-labour linkage.

Many empirical and econometric studies focus on the specific case of freedom of association and collective bargaining, and its impact on trade and economic performance. They show that collective bargaining improves overall economic competitiveness (see, for example, Aidt and Tzannatos, 2002; Martin and Maskus, 2001). Nonetheless, the estimates by Galli and Kucera (2004) fail to reveal any definite connection between upholding union rights and exports of labour-intensive goods.

So far, the question has been tackled from a unilateral point of view: do countries respecting core labour standards trade more with the world? Trade relations concern instead country pairs and are influenced by bilateral trade costs such as tariffs, transport and insurance costs. Moreover, labour standards might influence these bilateral trade costs for a number of reasons. For example, preferential agreements may include provisions on labour standards. Bagwell & Staiger (1998) posit that two countries respecting labour standards should conclude more reciprocal tariff reductions, which imply lower trade costs. Our empirical study sets out to check whether labour standards affect bilateral trade relations as well as the total trade of countries.

2. METHODOLOGY

The factor endowment theory hypothesis is that countries violating labour standards should increase their relative endowment in unskilled labour trade compared with compliant countries. Furthermore, these non-compliant countries should be more competitive and trade more under the “social dumping” hypothesis than compliant countries (other things being equal), although a “lose-lose” game could cancel out the expected export value advantage.

A good framework is Anderson and van Wincoop's specification of the gravity model. Gravity models predict bilateral trade by the product of national incomes (GDP) and the distance between partners. Distance is a proxy for transport costs and the model may be "augmented" by other variables affecting bilateral trade costs. The model proposed by Anderson and van Wincoop (2003) introduces country fixed effects (export and import), which capture all unilateral effects, e.g. level of development and remoteness. They also impose unit income elasticity and the product of GDPs is then considered as a denominator of the independent variable, which is expressed in logarithm. The advantage is the circumvention of two difficulties: collinearity with country fixed effects in a cross-section analysis and a plausible endogeneity of GDPs with trade variables.

In a monopolistic competition framework, with full and exclusive specialization (one variety, one country), where consumers have a CES preference function with a common elasticity among all goods ($\sigma > 1$), the gravity equation can be written as:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \left(\frac{t_{ij} \Pi}{\Pi_i P_j} \right)^{1-\sigma} \quad (1)$$

$$P_j^{1-\sigma} = \sum_i \Pi_i^{\sigma-1} \theta_i t_{ij}^{1-\sigma} \forall j \quad (2)$$

$$\Pi_i^{1-\sigma} = \sum_j P_j^{\sigma-1} \theta_j t_{ij}^{1-\sigma} \quad (3)$$

Where X_{ij} are the exports from country i to country j , Y_i and Y_j are levels of GDP, Y_w is world GDP, θ_i is the income share of country i , and t_{ij} are costs associated with trade from country i to country j ($t_{ij} \geq 1$). $\Pi_i = P_i$ under the assumption of symmetric trade costs ($t_{ij} = t_{ji}$), and Equation 1 then becomes:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \left(\frac{t_{ij}}{P_i P_j} \right)^{1-\sigma} \quad (4)$$

Taking the above theoretical foundation, empirical investigations usually use proxies of trade costs and include other variables affecting bilateral trade (augmented variables). Price indexes P_i and P_j are "multilateral resistance" terms. They sum up the average trade resistance between a country and all its trading partners. Export and import country fixed effects are usually used to quantify "multilateral resistance" by taking into account unobserved variables. This isolates "bilateral" and "unilateral" variable effects (Feenstra, 2004). The equation to estimate is then:

$$\text{Log}(X_{ij}/Y_i Y_j) = \alpha_1 \text{Log}(D_{ij}) + \sum_k \alpha_k \Psi_{ijk} + \sum_l \beta_l Z_{ijl} + \sum_i \alpha_i DE_i + \sum_j \alpha_j DI_j + \varepsilon_{ij} \quad (5)$$

D_{ij} = distance between i and j ; Ψ_{ijk} = a matrix of k -vectors for mutual characteristics (language, border, trade agreement, factor endowment, etc.).

Z_{ijl} = the l bilateral variables of interest designed to measure the level of compliance with core labour standards;

DE_i (DI_j) = exporter (importer) fixed effects (dummy variable).

ε_{ij} = error term.

However, the choice of variables of interest as regards mutual compliance with labour standards by both partners raises a further issue for the cross-section estimates: unilateral variables such as income (GDP) and national labour standards level are perfectly collinear with country (exporter and importer) fixed effects. In (5), since all unilateral characteristics are controlled by fixed effects, we can work solely with bilateral (dyadic) variables, including variables covering heterogeneous relative factor endowments and labour standards compliance between each country pair, which influence bilateral trade in an HOS framework. Given that developed countries are also skilled-labour abundant and compliant with labour standards, we have to control for factor endowment heterogeneity to be sure of correctly isolating the effect of labour standards compliance differences.

In a second step, the effect of labour standards on overall trade is estimated by estimating the fixed effect variables on country-specific variables, including indicators of compliance with each type of labour standard.

Another econometric issue directly concerns the empirical methods used to estimate gravity equations. There is a long tradition of log-linearizing (5) and estimating the variables of interest by OLS. However, Santos Silva and Tenreyro (2006) show that heteroskedasticity is frequently underestimated by gravity models, even when a Huber-White estimator is used. Elasticities can then be highly misleading. To bypass these problems, Santos Silva and Tenreyro (2006) advocate testing trade variables in levels, i.e. testing X_{ij} instead of $\text{Log}(X_{ij})$, and using a robust Poisson Pseudo-Maximum Likelihood (PPML) estimator since it produces estimates robust to heteroskedasticity (Winkelmann, 2003). This equally superior method deals with zero trade flows that are lost in log transformation. However, PPML cannot distinguish the countries whose characteristics give them zero trade probability from those with positive trade potential that are simply not trading. This gives rise to the *over dispersion* problem in the model. The zero-inflated Poisson (ZIP) regression that

we use specifies first a logistic equation in order to determine whether trade probability is zero or not.

3. DATA

We use an “augmented” version of the basic gravity model, taking into account different trade cost components. The information on bilateral exports comes from the International Monetary Fund (*Direction of Trade Statistics*). GDP data are taken from the World Bank’s World Development Indicators. Distance ($dist_{ij}$) is the great arc circle kilometric distance between the two capitals of countries i and j (*CEPII database*). Contiguity ($contig_{ij}$) and colonial ties are also taken from CEPII’s Distance database. The common language data come from the *CIA World Factbook*. Dummies indicating common membership of a preferential trade agreement ($agreement_{ij}$) are from the WTO database.

We have a problem with the usual variables of common language and common colonial link. First, defining the common language is sometimes hit or miss in multilingual countries. Second, there is an obvious link between language and colonizer. So we use a new variable called “cultural distance” ($culdist_{ij}$), which takes the value 1 when two countries share the same language (at least one language deemed official by the *CIA* database) and/or had a colonizer-colonized link.

Since we believe the contribution of labour standards to labour endowments to be a transmission channel, we need to control for relative factor endowment. We use per capita GDP as a proxy for the unknown stock of capital or skilled labour, considering that this variable is positively correlated with the abundance of capital and skilled labour in the economy. In our HOS framework, we compare this proxy with the partner’s: the higher the value, the higher the bilateral trade. So $factorend_{ij}$ compares higher per capita GDP ($MaxGDPpercapita$) to lower ($MinGDP per capita$):

$$factorend_{ij} = MaxGDPpercapita/MinGDP per capita.$$

Few databases include compliance with labour standards as defined by the ILO declaration. Some cover the legislation without factoring in enforcement. Others focus on different labour aspects (minimum wage, for example)³ or merely certain standards. Papers have previously used Granger’s database (Granger, 2003, 2005; Granger and Siroën, 2010), which gives each separate core labour standard (child labour, forced labour, discrimination and union rights) a score from 1 (total non-compliance) to 4 (total compliance). The coding method is based on the use of a large amount of qualitative and quantitative information from various sources, such as the ILO, the US Department of Labor, the US Department of State and NGO reports.

However Granger’s database ranks only 65 countries. This restriction is due to the priority of keeping sources as diversified as possible. Bazillier (2007) prefers to expand the sample to 155 countries, even though this means reducing the number of sources used for scoring. He uses a similar method of scoring for the same period

³ See, OECD (1996), Rodrik (1996), Mah 1997, Van Beers (1998)

(end of the 1990s). The index scores the four core labour standards + the number of ratified ILO conventions from 1 (total compliance) to 5 (total non-compliance). He uses the MCA (Multiple Correspondence Analysis) method to build an aggregated index weighting the five indexes. Bazillier finds a close correlation between his own indicator and Granger's. We systematically apply the same methods to the same countries and verify that they give similar results in the following estimations even though the parameter values are quite different.

However, the introduction of a fifth ILO convention ratification indicator alongside the four core labour standards is highly debatable, not only due to the change of subject, but also because the number of ratifications is a misleading indicator of compliance with labour standards. For example, the USA has ratified just 14 conventions (only two of the eight "core" ILO conventions) while Myanmar has ratified 19. The Bazillier index has been rebuilt. We take the same weighting method (MCA) previously used by Bazillier. However, we exclude convention ratifications. Our index varies from 0 (worst compliance) to 1 (full compliance).

We use this aggregated index ($Agindex$) to proxy the "social distance" ($socdist_{ij}$) between i and j in the equation:

$socdist_{ij} = 1 + |Agindex_i - Agindex_j|$ (1 is added to avoid the nil value for equally scored countries). So, this indicator can range from 1 (perfect similarity between both countries) to 2 (total dissimilarity).

However, the social distance index only gauges social heterogeneity irrespective of labour practices. A pair of countries violating labour standards (0 in both countries) will have the same $socdist_{ij}$ value as a couple of compliant countries (1 in both countries). Although this choice is in line with the tested hypothesis that heterogeneity in relative factor endowment creates trade, we must also consider the hypothesis that the impact on trade is affected by compliance with labour rights. Two similarly compliant countries might trade differently than two non-compliant countries. Intra-industrial trade for differentiated goods, which is greater in compliant countries, is a consequence of factor endowment similarity, not of factor endowment heterogeneity. Unlike as previously, we then introduce two dummy variables: $respect_{ij}$ taking the value 1 when both countries comply with labour standards (if $Agindex > 0.75$ in i and j) and $norespect_{ij}$ when they do not ($Agindex \leq 0.75$). The reference is then the case in which one country complies and not the other. The hypothesis regarding the trade impact of factor endowments suggests a negative sign for the two variables. However, in view of intra-industrial trade between similar countries, i.e. non-HOS trade, something different would be found for countries that comply with the labour standards.

4. EVIDENCE

We first consider the bilateral trade effect of compliance with labour standards, e.g. the factor endowment effect. From (5), we estimate bilateral exports with the usual variables of geographic distance ($dist_{ij}$), common border ($contig_{ij}$), trade agreement ($agreement_{ij}$), cultural distance ($culdist_{ij}$), economic distance ($factorend_{ij}$) and our variables of interest. We use three methods of estimation: OLS ("pure" Anderson

and van Wincoop specification with unit income-elasticities and excluding nil values), PPML (including nil values) and ZIP (filtering nil values).

We first (table 1, columns 1 to 3) test the social distance indicator ($socdist_{ij}$), which is never significant. Note that the factor endowment indicator ($factorend_{ij}$) is significantly negative in OLS (col. 1), but significantly positive in the other two estimations: countries with greater factor endowment differences trade more (significantly at the 5% level).

The absence of a social distance effect on trade might be due to the fact that the factor endowment hypothesis comes into play differently when both countries comply with labour standards compared with when both violate them. We then introduce $respect_{ij}$ and $norespect_{ij}$, which are defined above. The full satisfaction of the factor endowment hypothesis would imply two negative signs because the reference is the heterogeneous case (one complies, the other not), which is assumed to increase differences in relative factor endowment as is a pro-trade effect. The three methods of estimation produce similar positive results, although the coefficients are more significant in OLS. Columns 2 (PPML) and 3 (ZIP) show that the factor endowments hypothesis does not hold ($respect_{ij}$ positive) for compliant countries: a pair of countries both with high labour standards will trade more with each other than with countries with low labour standards. Conversely, violating countries export more to compliant countries ($norespect_{ij}$ negative). Although these results considerably weaken the factor endowment hypothesis, they lend currency to the social dumping hypothesis.

Table 1 - Effects of labour standards compliance on bilateral exports

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	OLS $\ln(x_{ij}/GDP_i * GDP_j)$	PPML x_{ij}	ZIP x_{ij}	OLS $\ln(x_{ij}/GDP_i * GDP_j)$	PPML x_{ij}	ZIP x_{ij}
contig _{ij}	0.646*** (5.33)	0.579*** (7.12)	0.575*** (7.08)	0.624*** (5.14)	0.574*** (7.01)	0.569*** (6.97)
distcult _{ij}	0.821*** (13.28)	0.130* (1.81)	0.128* (1.78)	0.821*** (13.30)	0.135* (1.84)	0.132* (1.81)
ln(dist _{ij})	-1.399*** (41.44)	-0.630*** (19.09)	-0.632*** (19.14)	-1.415*** (42.19)	-0.629*** (18.95)	-0.631*** (19.01)
agreement _{ij}	0.750*** (8.86)	0.535*** (6.75)	0.528*** (6.70)	0.752*** (8.89)	0.542*** (6.91)	0.536*** (6.87)
ln(factorend _{ij})	-0.037** (2.24)	0.050** (2.20)	0.044** (1.93)	-0.065*** (4.04)	0.043** (1.98)	0.036* (1.68)
socdist _{ij}	-0.036 (0.34)	0.054 (0.40)	0.046 (0.34)			
respect _{ij}				2.163** (2.47)	1.036* (1.83)	1.010* (1.78)
norespect _{ij}				-2.513*** (2.88)	-1.144** (2.03)	-1.117** (1.97)
Constant	-38.647*** (55.21)	4.881*** (6.91)	4.960*** (7.01)	-37.962 (47.92)	6.069*** (13.93)	6.115*** (14.11)
R ²	0.43			0.43		
Wald Chi2			110798			109237
Observations	12772	17465	17465	12772	17465	17465
Country fixed-effects	yes	yes	yes	yes	yes	yes

Robust standard errors in parentheses, ***: 1%, **: 5%, *: 10%

In the theoretical part of the paper, we pointed up that although child labour and forced labour are expected to increase the endowment in unskilled labour, standards have ambiguous effects on trade for two main reasons: substitution effects (for example, child labour might reduce the demand for adults and tone down the expected increasing effect) and the nature of the violation (for example, restrictive monopsonistic demand for labour in the absence of trade unions affecting the low-skilled labour endowment).

Table 2 gives the coefficient of the previous variables of interest (the other coefficients are hardly affected), which are disaggregated at the level of each labour standard. We use the index for each labour standard (child labour, forced labour, discrimination, freedom of association), ranked from 1 (the best) to 5 (the worst). Social distance is again the difference in partner countries' *agindex* levels, similar to the computation method for *socdistij* in table 1. The social distance index for these new values ranges from 1 (full similarity) to 5 (total dissimilarity). In columns 2 and 3, a country is considered compliant with a labour standard if the index is 1 or 2, and non-compliant for values of 3 to 5. Results are given for ZIP estimations only.

Table 2 – Effects of each labour standard on bilateral exports (ZIP)

	First ZIP equation	Second ZIP equation	
	Social distance	Both respect	Both no respect
Child Labour (CL_{ij})	0.035	2.323***	-2.216**
Forced Labour (FL_{ij})	0.016	0.415	-0.551
Discrimination (Dis_{ij})	0.038**	1.789***	-1.985***
Freedom of Association (FA_{ij})	-0.033	1.070*	-1.062*

***: 1%; **: 5%; *: 10%

Social distance is only significant for discrimination. The coefficient of the respect-no respect dummies is consistent with the results found at the aggregated level (table 1, column 6). Two labour standards, child labour and discrimination, are highly significant, which is not the case for forced labour. Freedom of association is not very significant at all, even with the same signs. If countries violating labour standards tend to export more than compliant countries, this is mainly due to child labour and discrimination at work and, less clearly, to freedom of association.

Social distance takes the value 1 (same index), 2, 3, 4 or 5. An alternative to quantifying the influence of social distance is to introduce four dummy variables for each score, except 1, which is the reference (very close countries). Table 3 shows the results for the variable of interest only. It confirms that social distance has little effect on trade, but turns up an interesting result for child labour. Child labour differences act positively up to 3, but are increasingly negative for higher differences. We also note that discrimination is no longer significant.

Table 3 – Effects of bilateral differences between labour standards on bilateral exports (ZIP)

<i>Social distance</i>	Child Labour	Forced Labour	Discrimination	Freedom of association
1	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>
2	0.148**	0.030	-0.093	0.043
3	0.088	-0.183**	0.042	-0.102
4	-0.250**	0.110	0.079	0.019
5	-0.772***	0.174	0.121	-0.240

***: 1%; **: 5%; *: 10%

We can conclude that the effect of social distance on trade depends on the level of compliance with core labour standards. Proximity fosters trade in the presence of “good” labour practices and deters it in the presence of poor practices. The countries that violate the core labour standards can expect to foster their trade only with compliant countries. This differentiation explains why a measure of social distance that does not make this distinction, like our social distance indicator, finds opposite effects and is then not able to produce a significant result.

The estimations have hitherto concerned bilateral exports only. However, they give no clear information about each country’s overall volume of trade with the world. Anderson and van Wincoop (2003) believe that exporter and importer fixed

effects are good proxies for “multilateral resistance”, under which bilateral trade is not only influenced by “dyadic” variables affecting the couple, but also by idiosyncratic variables specific to a country, but affecting all bilateral relations. Baldwin and Taglioni (2006) consider that fixed effects reduce the risk of endogeneity. They include all omitted variables with an idiosyncratic dimension.

In a second step, we then estimate exporter and importer fixed effects derived from the previous gravity model. The first issue is to choose the “preferred” gravity estimator. In keeping with the recent literature, we opt for ZIP as the surest estimation method. Given that social distance ($socdist_{ij}$) is never significant, we exclude it from the equation (table 1, column 4) and continue through to the equation estimated in table 1, column 6. Theoretically, fixed effects are purged from the bilateral effects of labour standards. However, the index is built from the combination of unilateral variables, which might influence the fixed effects, which would not then reflect the entire influence of compliance with labour standards on trade with the world as a whole. We then extract fixed effects from a new gravity equation that does not include bilateral indexes of labour standards. The results may be compared with those obtained by the extraction of fixed effects from equation 6, table 1.

We introduce some unilateral variables: GDP_i , population (pop_i) and remoteness (landlocked countries: $landlock_i$). Usually, population is barely significant, but we prefer to keep it in order to control for economic development, usually proxied by per capita GDP, because:

$$\alpha \ln(GDP/pop) + \beta \ln(GDP) = (\alpha + \beta) \ln(GDP) - \alpha \ln(pop)$$

A variable contributing to higher fixed effects (lower multilateral resistance) is a pro-trade variable. If low labour standards help raise exports, then the hypothesis of “social dumping” as an instrument of a successful mercantilist “export-led growth” strategy may be deemed relevant. Import expectations are not so clear because social dumping might also be an instrument to protect the country from imports. However, mercantilism also implies facilitation for imported goods intended for transformation into final exports, which is typically the case with free and special trade zones, frequently criticized for their labour behaviour.

We first estimate the value of the aggregated index at country level ($Agindex_i$) using OLS (table 4). The index ranges from 0 (no compliance) to 1 (full compliance). It is quite frequent to find a non-linear relation between institutional variables (democracy, corruption, inequalities, etc.) and endogenous macroeconomic variables such as growth⁴ and trade⁵. We then also test a parabolic relation.

The regression using fixed effects extracted from a gravity model without bilateral labour standards only gives significant results in the non-linear relation with

⁴ For example, Barro (1996), Bazillier and Sirven (2008).

⁵ For example, Granger and Siroën (2005).

importer fixed effects: more compliance with labour standards raises imports up to a threshold of 0.65⁶ for the index.

When fixed effects are purged from mutual compliance with labour standards, the results are more significant for both linear and non-linear specifications. Improvements in labour standards tend to reduce imports and exports. More specifically, in keeping with the non-linear relation, improvements raise exports and imports only up to the fairly low index of 0.36 and 0.45 respectively.

Table 4 - Impact of compliance with labour standards on trade (fixed effects) (aggregated index)

Fixed effects extracted from	Gravity model without bilateral labour standards				Table 1, column 6			
	Export fixed effect	Export fixed effect	Import fixed effect	Import fixed effect	Export fixed effect	Export fixed effect	Import fixed effect	Import fixed effect
Ln(GDPi)	0.977*** (16.21)	0.986*** (16.15)	0.852*** (25,75)	0.868*** (26,76)	0.932*** (14.40)	0.966*** (15.28)	0.807*** (20.06)	0.848*** (24,70)
Ln(popi)	-0.101 (1.32)	-0.110 (1.43)	-0.111*** (2.67)	-0.128*** (3.14)	-0.046 (0.57)	-0.08 (1.01)	-0.057 (1.13)	-0.098** (2.28)
Landlocki	-0.264 (1.45)	-0.265 (1.45)	-0.466*** (4.65)	-0.469*** (4.83)	-0.280 (1.43)	-0.286 (1.51)	-0.483*** (3.97)	-0.490*** (4.78)
Agindexi	-0.248 (0.66)	1.026 (0.74)	0.293 (1.41)	2.517*** (3.42)	-1.703*** (4.20)	2.898** (2.02)	-1.171*** (4.64)	4.398*** (5.64)
Agindexi ²		-1.112 (0.95)		-1.942*** (3.14)		-4.018*** (3.33)		-4.863*** (7.43)
Constant	-20.674*** (24.71)	-21.035*** (22.90)	-17.317*** (37.72)	-17.948*** (36.79)	-19.976*** (22.24)	-21.282 (22.40)	-16.621*** (29.77)	-18.201*** (35.27)
Observations	137				137		137	
R ²	0.87	0.87	0.95	0.95	0.83	0.85	0.91	0.94

Robust standard errors in parentheses; ***, 1%; **, 5%; *, 10%

Once again, we have to deepen the analysis taking into account the different influence of each standard. Then, we regress the fixed effects on each labour standard from 1 (total compliance) to 5 (total non-compliance), firstly assuming a linear relation and secondly assuming a non-linear (parabolic) relation. A positive (negative) sign means that more non-compliance (compliance) fosters trade. Results are highly contrasted.

In both the linear and non-linear model estimates, the more robust relation with trade is observed for the forced labour variable. The more forced labour a country uses, the more this country exports and imports. If we consider the non-linear relation, the effect is inversed (lower standards = lower trade) on the index (1 to 5), maximizing trade at the level of 3.38 for exports and 3.60 for imports. Among the countries with a score of 4, we find Indonesia, Kenya, Morocco (and many Mediterranean countries), Malaysia, Russia, Singapore, etc., which have a very small margin to simultaneously improve both trade and labour standards.

⁶ Obtained by the maximization of the equation $2,517x-1,942x^2$

With respect to freedom of association, the evidence is different for export and import fixed effects. Concerning exports, the linear relation behaves well with a positive, significant sign (lower standards-higher exports) while the non-linear relation does not work. The linear relation is also significant for imports, but the non-linear regression greatly improves the quality of the test (F , R^2) with once again a U-inversed relation at the threshold of 3.88.

Table 5 – Impact on trade of compliance with each labour standard (fixed effects)

	Export fixed effect		Import fixed effect	
Child Labour (CL)	0.031	0.922***	0.040	0.953***
	(0.38)	(3.34)	(0.79)	(5.93)
Child Labour (CL ²)		-0.158***		-0.162***
		(3.36)		(5.92)
Forced Labour (FL)	0.177***	0.994***	0.144***	0.626***
	(2.60)	(3.30)	(3.44)	(3.34)
Forced Labour (FL ²)		-0.147***		-0.087**
		(2.78)		(2.64)
Discrimination (Dis)	0.094*	-0.152	0.120***	0.249
	(1.72)	(0.51)	(3.58)	(1.38)
Discrimination (Dis ²)		0.040		-0.021
		(0.85)		(0.73)
Freedom of Association (FA)	0.310***	0.582**	0.144***	0.675***
	(4.89)	(2.05)	(3.47)	(3.74)
Freedom of Association (FA ²)		-0.045		-0.087***
		(0.98)		(3.01)

Robust standard errors in parentheses; ***: 1%; **: 5%; *: 10%

The relation between trade and child labour is clearly of a U-inversed type with a maximum threshold of 2.92 and 2.94 respectively; among countries at the “quasi-maximum” of 3 – Bolivia, China, India, Morocco, Brazil, Vietnam, i.e. the emerging countries – this means that a different level of standards, higher as well as lower, would contract trade.

Only the linear specification gives significant results for discrimination with a positive relation: more discrimination-more trade.

The evidence shows that less compliant countries, frequently the poorest ones, may simultaneously raise trade and labour standards. For median countries, mainly the emerging countries, the level of compliance with labour standards is “optimal” from a mercantilist point of view and an improvement in labour standards might affect trade. For the most compliant countries, the developed ones, their high respect of labour standards implies a trade shortfall.

5. CONCLUSION

Labour standards and trade are not disconnected.

There is significant support for the factor endowment hypothesis when we consider non-compliant countries, which are more oriented towards trade with compliant countries than with closer countries. However, we do not find any

evidence for the opposite case: compliant countries prefer trading with similar countries in terms of worker rights.

We also find some evidence in favour of the mercantilist hypothesis, i.e. non-compliance with labour standards as a trade policy instrument used to stimulate exports and contain imports. However, for child and forced labour, the relation is non-linear. Increased compliance with labour standards raises international trade up to a threshold, around that where many emerging countries are situated, and reduces it above. Clearly, developed countries that adopt high standards will trade relatively less, all things remaining constant in terms of size (GDP and population), development level and geographic characteristics.

This evidence cannot be interpreted as being conducive to a containment of national labour standards at a medium level or an argument for lowering them in developed countries. The sustainability of export-led growth without an improvement in labour standards is highly questionable. If trade can drive growth, non-compliance with core labour standards can also curb a development process led by the more sustainable improvement in human capital. The political and social sustainability of such a mercantilist policy is another issue, as shown by the recent strikes in the Chinese Free Trade Zone.

References

- Ades, A. F., Glaeser E.L. (1994), "Evidence on Growth, Increasing Returns and the Extent of the Market", *Quarterly Journal of Economics*, 114(3), August.
- Aidt, T., Tzannatos, Z. (2002), Unions and collective bargaining: economic effects in a global environment. Directions in Development Series, The World Bank, Washington D.C.
- Anderson, J. E., van Wincoop, E. (2003), Gravity with Gravitas: A Solution to the Border Puzzle, *The American Economic Review*, 93, 170-192.
- Arestoff, F., Granger, C. (2003), « Le respect des normes de travail fondamentales : une analyse économétrique de ses déterminants », Cahiers de recherche EURISCO, 2003-08, Université Paris Dauphine
- Bagwell, K., Staiger, R.W. (1998), *The Simple Economics of Labor Standards and the GATT*, NBER Working Paper Series, No. 6604.
- Baldwin R., Taglioni D. (2006), "Gravity for Dummies and Dummies for Gravity Equations", NBER Working Paper, No. 12516, September.
- Barro, R., 1996, "Democracy and Growth", *Journal of Economic Growth* 1(1), March, 1-27.
- Basu, K. (1999), "Child Labor: Cause, Consequence, and Cure, with Remarks on International Labor Standards", *Journal of Economic Literature*, 37(3), 1083-1119.
- Basu, K. (2000), "The Intriguing Relation between the Adult Minimum Wage and Child Labour", *The Economic Journal*, 110 (1), 50-61.
- Basu, K., Van P. H. (1998), "The Economics of Child Labor", *The American Economic Review*, 88(3), 412-427.
- Bazillier, R. (2008), "Core Labour Standards and Economic Development: impact on long term per-capita income", *World Development*, 36(1), 17-39.
- Bazillier, R., Sirven, N. (2008), "Core Labour Standards and Inequalities, is there a social Kuznets curve?", *Journal of Development Studies*, 44(7), 881 - 902.
- Ben-David, D. (1993), "Equalizing Exchange: Trade Liberalization and Income Convergence", *Quarterly Journal of Economics*, 108, August, 653-679.
- Brown, D. K., Deardorff A. V., Stern R. M. (1996), "International Labor Standards and Trade: A Theoretical Analysis", in J. N. Bhagwati & R. E. Hudec (eds), *Harmonization and Fair Trade: Prerequisites for Free Trade?* Cambridge, US: Cambridge MIT Press.
- Busse, M. (2002), "Do Labor Standards Affect Comparative Advantage in Developing Countries?", *World Development*, 30(11), 1921-32.
- Busse, M. (2003), "Do transnational corporations care about labor standards?", *The Journal of Developing Areas*, 36(2), 39-56.
- Busse, M., Braun S. (2003), "Trade and investment effects of forced labour; an empirical assessment", *International Labour Review*, 142(1), 49-71.
- Casella, A. (1996), "On Standards and Trade: a Review of Simple Results", in Bhagwati & Hudec (eds.), *Fair Trade and Harmonization: Prerequisites for Free Trade?*, MA: MIT Press, Cambridge. Hansson, 1981.
- Chau, N. H., Kanbur R. (2001), "The Adoption of Labour Standards Conventions: Who, When and Why?", *C.E.P.R. Discussion Papers*, No. 2904.
- Cooke, W., Noble D. (1998), "Industrial Relation Systems and US Foreign Direct Investment Abroad", *British Journal of Industrial Relations*, 36(4), 581-509.
- Dinopoulos, E., Zhao, L. (2007), "Child Labor and Globalization", *Journal of Labor Economics*, 5(3), 553-79.

- Dollar, D. (1992), "Outward Oriented Developing Economies Really Do Grow More Rapidly: Evidence from 95 LDCs, 1976-1985", *Economic Development and Cultural Change*, 40, April, 523-544.
- Edmonds, E., Pavnicks, N. (2002), Does Globalization Increase Child Labour? Evidence from Vietnam, NBER, Working Paper Series, No. 8760.
- Edmonds, E., Pavnicks, N. (2006), "International Trade and Child Labor: Cross-Country Evidence," *Journal of International Economics*, 68(1), 115-140.
- Edwards, S. (1992), "Trade Orientation, Distortions and Growth in Developing Countries", *Journal of Development Economics*. 39, 31-57.
- Edwards, S. (1998), "Openness, productivity and growth: what do we really know?", *The Economic Journal*, 108, March, 383-398.
- Elliott, K.A. (2003), "Labor Standards and the Free Trade Area of the Americas", *Institute for International Economics*, WP 03-7, <http://www.iie.com/publications/wp/03-7.pdf>
- Feenstra, R.C., 2004, *Advanced International Trade. Theory and Evidence*, Princeton, Princeton University Press.
- Frankel, J.A., Romer, D. (1999), "Does trade cause growth?", *American Economic Review*, 89(3), June, 379-399.
- Galli, R., Kucera D. (2004), Labor Standards and Informal Employment in Latin America, *World Development*, 32(5), 809-828.
- Granger and Siroën, 2009, "Cases to include labour standards in WTO" in J.-ren Chen, Ch. Smekal & K. Socher eds. *Contributions to the Studies of International Institutions to Global Governance*, Innsbruck University Press.
- Granger, C. (2003), *Normes de travail fondamentales et commerce international*, PhD Dissertation, Université Paris-Dauphine, December 2003.
- Granger, C. (2005), « Normes de travail fondamentales et échanges sud-nord », *Economie internationale*, 101 (1), 47-62.
- Granger, C., Siroën J.-M. (2005), La clause sociale dans les traités commerciaux, in I. Daugareilh (ed.), *Mondialisation, travail et droits fondamentaux*, Brussels, Belgium: Bruylant and Paris, France: LGDJ.
- Granger, C., Siroën J.-M. (2006), Core Labor Standards in Trade Agreements. From multilateralism to bilateralism, *Journal of World Trade*, 40:5, 813-836.
- Griswold, D. (2001), Trade, Labor and Environment: how blue and green sanctions threaten higher standards, *Trade Policy Analysis*, 15, CATO Institute, August 2.
- International Labour Office (2002), *Every Child Counts. New Global Estimates on Child Labour*, Geneva, Switzerland.
- Irwin, D.A., Tervio, M. (2002), "Does Trade Raise Income? Evidence from the Twentieth Century", *Journal of International Economics*, 58(1), 1-18.
- Kucera, D. (2002), "Core Labour Standards and Foreign Direct Investment", *International Labour Review*, 141(1-2), 31-69.
- Lucas, R.E. (1988), "On the mechanics of economic development", *Journal of Monetary Economics*, No. 22, 3-42.
- Mah, J. (1997), "Core Labor Standards and Export Performance in Developing Countries", *World Economy*, 20(6), 773-785.
- Martin, W., Maskus, K. E. (2001), "Core Labour Standards and Competitiveness: Implications for global trade policy", *Review of International Economics*, 9(2), 317-28.
- Maskus, K. (1997), *Should Core Labor Standards Be Imposed Through International Trade Policy?*, Policy Research Working Paper, WPS 1817, Washington DC, US: The World Bank.

- Morici, P., Shulz E. (2001), *Labor Standards in the Global Trading System*, Washington DC, US: Economic Strategy Institute.
- OECD (1996), *Trade, Employment and Labour Standards: A Study of Core Workers' Rights and International Trade*, Paris, OECD.
- OECD (2000), *International Trade and Core Labour Standards*, Paris, OECD
- Piore, M. (1994), "International Labor Standards and Business Strategies", in Schoepfle, G. & K. SWINNERTON (ed.), *International Labor Standards and Global Integration: Proceedings of a Symposium*, U.S. Department of Labor, Washington D.C.
- Raynauld, A., Vidal, J.P. (1998), *Labour Standards and International Competitiveness: A Comparative Analysis of Developing and Industrialized Countries*, Cheltenham: Edward Elgar.
- Rodríguez, F., Rodrik, D. (2000), "Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence," in B. Bernanke and K. Rogoff (eds.) *Macroeconomics Annual 2000*. Cambridge, MA: MIT Press.
- Rodrik, D (ed.) (2003), *In search of prosperity. Analytic narratives on economic growth*, Princeton University Press.
- Rodrik, D.. (1998), "Globalisation and Labor, or if Globalization is a bowl of cherries why are there so many glum faces around the table?" in Daniel Cohen, Anthony J Venables, Andre Sapir, Richard Baldwin (eds), *Market Integration, Regionalism and the Global Economy*, Cambridge, UK: Cambridge University Press.
- Romer, P.M (1989), "Human capital and growth: theory and evidence", *Journal of Political Economy*, No. 98.
- Sachs, J. , Warner, A. (1995), "Economic Reforms and the Process of Global Integration", *Brooking Papers on Economic Activity*, 1, 1-118
- Santos Silva, J.M.C., Tenreyro S. (2006), "The Log of Gravity", *The Review of Economics and Statistics*, November, 88(4), 641-658.
- Shelburne, R. C. (2004), Wage Differentials, Monopsony Labor Markets, and the Trade-Labor Debate, *Journal of Economic Integration*, 19(1), 131-161.
- Siroën and al., 2008, "The Use, Scope and Effectiveness of Labour and Social Provisions and Sustainable Development Aspects in Bilateral and Regional Free Trade Agreements", Report for the European Commission, DG Employment.
- Thomas, C. (2002), "Trade-Related Labor and Environment Agreements?", *Journal of International Economic Law*, 5(4), 791-819.
- Van Beers, C. (1998), "Labour Standards and Trade Flows of OECD Countries", *The World Economy*, 21(1), 57-73.
- Wacziarg, R., Welch, K.H. (2008), "Trade Liberalization and Growth: New Evidence", *World Bank Economic Review*, 22: 187-231.
- Winkelmann, R., 2003. *Econometric Analysis of Count Data*, 4th ed. Berlin: Springer-Verlag.