Journal of Development Studies,
Vol. 44, No. 7, 881–902, August 2008

Routledge
Taylor & Francis Group

Is There a Social Kuznets Curve? The Influence of Labour Standards on Inequality

RÉMI BAZILLIER* & NICOLAS SIRVEN**
*LEO, Université Orléans, France, **Capability and Sustainibility Centre – VHI, University of Cambridge, UK

Final version received December 2006

ABSTRACT *This study empirically investigates the impact of core labour standards on income inequality for a range of 90 countries from 1990–2000. A synthetic index of labour standards is computed by means of a Multiple Correspondence Analysis and no significant correlation is found with the Gini index. One of the reasons pointed out is that the effective implementation of core labour standards depends on the quality of the country's political and legal systems. Using instrumental variables in a TSLS model, we found an inverse 'U' shaped curve between the new endogenous index of core labour standards and income inequality.*

I. Introduction

Globalisation is commonly described as a phenomenon bringing together threats and opportunities, raising fears and hopes. In order to prevent its undesirable aspects, most developed countries recently argued for a social clause in international trade regulation, particularly based on the application of labour standards. Such a clause is thought to have a significant impact on gains from trade and may also foster economic and social progress, especially for underdeveloped countries. Palley (2004) thus claims that core labour standards can correct distortions in labour markets and change the pattern of incentives shifting economies on to a 'high road path' of economic development. On the other hand, an increasing number of developing countries complain about a form of 'hidden protectionism' as the application of labour standards raises the cost of unskilled labour and, therefore, weakens their comparative advantage (Bhagwati, 1995). Development outcomes are at the heart of this controversial debate. The empirical literature on this topic established that labour standards tend to promote international trade (Brown, 2000), foreign direct investment (Kucera, 2002), economic coordination (Aidt and Tzannatos, 2003),

Correspondence Address: Nicolas Sirven, Fellow Research Associate, Capability and Sustainability Centre – VHI, University of Cambridge, UK. Email: ns399@cam.ac.uk

ISSN 0022-0388 Print/1743-9140 Online/08/070881-22 © 2008 Taylor & Francis
DOI: 10.1080/00220380802150714

productivity (Brown et al., 1996; OECD, 1996; Maskus, 1997) and long-term per-capita income (Bazillier, 2008).

Studies focussed on other dimensions of development seem to concur with these results, for instance countries with strong labour standards are associated with a more equal income distribution (see Emerson and Dramais, 1988; Rama, 2003). Saint-Paul (1999) explains this phenomenon by the role labour market institutions play as a system of redistribution (taxation of workers to the benefit of non-workers) which helps fill the gap between lower and higher wages. Furthermore, fundamental labour rights can create a space for discussion between employees and employers so that the share of the product dedicated to the first group may increase (Palley, 2005). This mechanism – often mediated by trade unions at the national level – could contribute to the decrease of countries' income inequalities (Bivens and Weller, 2003). Checchi and Penalosa (2005) argue that an increase of the minimum wage contributes to a decrease of the wage gap in OECD countries. The enforcement of core labour standards (Palley, 1999) or the presence of trade unions and a collective bargaining framework (Aidt and Tzannatos, 2003) are correlated with a more equal income distribution. Buchele and Christiansen (2003) find a similar result for OECD countries using a 'workers' rights' index.

However, despite the abundant references in favour of labour standards, it seems there is no obvious consensus in the literature establishing their undisputable role in reducing inequalities. For instance, Vanhoudt (1997) emphasised that active employment policies in OECD countries raise the share of income of the lowest quintile but have no impact on the Gini coefficient. Rama (2003) established that collective bargaining is much less efficient than a social security system to reduce inequalities, whereas the ratification of ILO's core labour standards is found to have no impact on income distribution. Things are getting worse in developing countries where a strong implementation of labour standards is suspected to reinforce the dualism of the economy. More precisely, an increase in inequalities between protected and non-protected workers would arise from the switch of a significant part of the work force from the formal sector to the informal sector (Harrison and Leamer, 1997; Maskus, 1997).

This apparent contradiction in the literature recalls another debate on inequalities. Seminal work by Kuznets (1955) suggests that initial economic growth raises the level of inequality before a diffusion effect helps reduce the income gap. Although the interpretation of the Kuznets curve is still debated, it is widely acknowledged that an inverse 'U-shaped' curve describes the relationship between economic growth and income inequality (Ahluwalia, 1976; Papanek and Kyn, 1986; Campano and Salvatore, 1988; Bourguignon and Morrison, 1990; Anand and Kanbur, 1993; Bourguignon, 1994; Milanovic, 1995; Jha, 1996; Cornia, 2004). We believe that a curvilinear relation here could be invoked to reconcile divergences in the empirical literature on the effects of labour standards on income inequality. The aim of this study is to empirically test for the existence of a Kuznets curve between labour standards and income inequality for a sample of 90 countries between 1990 and 2000. Due to the effective application of labour standards hypothesised to depend on each country's institutional framework, our methodology is to endogenise the index of labour standards using the countries' social characteristics as instrumental variables in an econometric model.

The paper is structured as follows. Section II deals with conceptual issues and proposes five variables to compute an aggregate index of labour standards. Section III explores the relationship between this index and the Gini index for the available sample of countries. The lack of consistent results is discussed and thought to arise from the lack of distinction between effective and ineffective application of labour standards. Section IV offers a correction to this bias with a two-stage least-squares model. The relevancy and validity of the instruments are then examined. Conclusions are drawn in section V.

II. Definition and Measure of Labour Standards

Labour standards broadly refer to the global principles and rules governing work and professional conditions (OECD, 1996). One of the main consequences of such an encompassing definition is that labour standards are multifaceted and a wide range of heterogeneous alternative measures can be derived from it. However, there now seems to be an international consensus[1] that certain core rights should be globally recognised and protected (Leary, 1996). We focus on these core labour standards so as to retain five variables and use them to compute an aggregate index through multiple correspondence analysis.

Core Labour Standards

The ILO (Declaration on Fundamental Principles and Right at Work) and OECD (1996) recognise four core labour standards: (1) prohibition of forced labour; (2) freedom of association and the right to organise and bargain collectively; (3) elimination of child labour exploitation; and (4) non-discrimination in employment. OECD justifies the choice of these four standards because they are a fundamental part of the Human Rights, and their application provides more economic efficiency. Moreover, ILO asserts that these fundamental worker's rights have a universal value because they can be applied in any country, whatever the stage of development. These arguments make the core labour standards an appropriate concept to carry out international comparisons of their effect on economic and social outcomes.

Following this relative international consensus on core labour standards, we will build four variables measuring, in turn, child labour (CL), freedom of association and collective bargaining (FA), non-discrimination (DISCRI) and forced labour (FL). Notice these four norms correspond to eight ILO conventions.[2] In order to extend the information about these conventions, we also take into consideration the number of ILO ratifications (NR). Each of these five indicators is evaluated from different sources of information, with the aim to minimise statistical problems (Kucera, 2001; Ghai, 2003; Granger, 2005). Data and calculation methodology are taken from Bazillier (2008). A set of five ordinal variables is obtained, given that countries were classified into five groups in order to have homogeneous data.

In detail,[3] the index of the number of ratifications (NR) is composed of both the number of ILO conventions and the number of *core* ILO conventions ratified by the country. Notice the latter is given a higher weight with respect to the focus on core labour standards. The index of child labour (CL) corresponds to the number of working children between 10–14 years old. Although this statistic is generally

considered a good proxy for the level of child exploitation, Bescond et al. (2003) assert that it also brings in a strong statistical bias for a significant number of countries. Going along with them, we adjust the previous variable by the percentage of children who do not attend primary school. Freedom of association (FA) takes into account both quantitative and qualitative aspects of freedom of association through the rate of unionisation, the number of ILO conventions on freedom of association ratified by the country, and the Freedom House Indicator of civil rights. The principle of non-discrimination (DISCRI) is assessed using the ratio of literate women to men, ratio of girls to boy in primary and secondary education,[4] difference in income, the gender empowerment measure of UNDP, and the female activity rate.[5] We focus on gender discrimination. The index of forced labour (FL) is taken from Busse and Braun (2003), where missing data are completed using alternative sources such as Antislavery and ICFTU, 2001; ILO, 2001; US Department of State, 2002.

An Aggregated Index of Core Labour Standards

At this stage, the challenge is to compute an aggregate index of core labour standards from the five former ordinal variables described. The methodological issue should deal with four main concerns. First, assuming the homogeneity of the variables, it would be interesting to bring to light the expected 'common trend' among the five indexes of core labour standards. Second, it is important to settle on the different weights associated to each variable in the computation of the aggregated index. Third, the method should be relevant for the analysis of ordinal data. Taking all this into account, it seems that *multiple correspondence analysis* is the optimal method to use. Fourth, we have to take into consideration the difficulty in obtaining good quality data, without statistical bias for each standard. If we suppose the existence of a 'common trend' (the general enforcement of core labour standards), we have to isolate the effects for each standard coming from this common tendency and delete all other effects (statistical bias or measures based on different information). The Multiple Correspondence Analysis (MCA) appears to be a particularly suitable statistical technique.[6]

Results of the MCA are summarised in Table A2 (see Appendix). Three main comments can be made. Firstly, it is very interesting to see that the first factor (F1) explains by itself about 72.5 per cent of the total inertia. Put differently, F1 synthesises much more information on the five variables of core labour standards than the accumulation of all other factors. According to the scree test (Cattell, 1966), this 'gap' between F1 and the other factors lets us think that countries' coordinates on the first axis are a good proxy for the global application of core labour standards. Secondly, all low items have negative values and their sign changes when they indicate a higher degree of core labour standards. In other words, there is no non-linear effect among the five variables used; they all evolve in the same direction along the first factor. This confirms the homogeneity of the data and the choice of F1 as the aggregate index of core labour standards. Item coordinates on the first axis are then re-defined using linear extrapolation in the [0,1] interval for homogeneity of the index. Thirdly, it appears that the choice of the number of ILO ratifications is consistent with the four other labour standards because its weight (18.9 per cent) is

very close to one-fifth. Note that the weight of a variable is the sum of the absolute contributions (to the inertia of F1) of each item. Forced labour (17.6 per cent) is thus close to average weight, whilst freedom of association (26.6 per cent) and child labour (24.3 per cent) are the most discriminating variables. The fact that non-discrimination (12.7 per cent) seems to play the less important role may be because discrimination depends on factors (culture, religion, and so forth) much less related to labour standards than any other variables.

III. Extended Standard Model for Inequality

The previous scalar index of core labour standards is introduced in an econometric model with usual determinants of inequalities. Several specifications are tested but, the lack of any significance of our aggregate index leads to the discussion of a potential bias in the methodology.

Specification of the Model

A large part of the empirical literature on inequalities uses the Gini coefficient to estimate income distribution at the national level. One of the main difficulties with such a statistic is that it is quite costly to carry out exhaustive individual income studies, especially in developing countries. As a consequence, robust data on inequality are not available for all countries and all periods. Of course, it could be possible to use data from surveys carried out by some authors – in a particular country, at a particular date – and to combine them with other similar sources (for example, updates from the WIDER 2006 database). However, the lack of consistency between these sources (different sub-populations surveyed, different results, and so forth) makes the aggregation of data quite hazardous. This is why we opt for the *World Development Indicators* (WDI) set up by the World Bank and widely acknowledged as a thorough database. All the variables used in model (1) are thus averages of values taken from the WDI between 1990 and 2000. The model is:

$$y = W\delta + u \tag{1}$$

where y is the column-vector of the Gini coefficient for each country. W is the matrix of independent variables with the first column comprising 1s; δ is the column-vector of coefficients to be estimated associated to matrix W and $u \sim \mathrm{N}(0,1)$ the error term with usual assumptions. Altered specifications of W let us test different assumptions on the determinants of inequality. As a first step, it seems important to check for the existence of a Kuznets curve. Therefore, Model I follows a standard specification where the Gini index is regressed on (i) the logarithm of average income per capita (GDP) in constant dollars (1990) in PPP; (ii) Ln GDP squared; and (iii) on some control variables in order to test for the stability of the model.

Among many control variables, the empirical literature suggests a better level of education or more education expenditures can reduce inequalities (Sylvester, 2000, 2002, 2003). Nevertheless, if only a small part of the population can attend

secondary school, this inequality of *access* to the educational system may lead to income inequality and may reinforce social inequalities (Sen, 1992). As a consequence, we assume that a growing relative gap between primary and secondary school enrolment may have a positive impact on inequality.[7] Divergences in countries' income inequality may also be enhanced by openness to trade (Wood, 1997) and arable land surface – as a proxy for natural resources endowment (Bourguignon and Morrison, 1998; Deininger and Squire, 1998). Lastly, regional dummies for sub-Saharan Africa and Latin America are introduced in order to take into account the important development gap of these regions.[8]

Alternative specifications can be derived from this general model. The aggregate index of core labour standards is introduced to obtain Model II, and its squared value is then inserted in model III. Model IV retains the two previously added index and control variables but omits GDP variables so as to avoid possible autocorrelation between income per capita and the core labour standards index (see Table 1). Concerning the method of estimation itself, different statistical tests confirm the presence of heteroscedasticity among the residuals[9] In this case, it is recommended to use the Newey and West (1987) robust variance-covariance matrix to overcome problems dealing with non-spherical disturbances.

A Potential Bias

Results of the OLS regressions are given in Table 1. Diagnostic tests are supportive and the proportion of explained variance is between 56 and 60 per cent. Results are satisfactory in Model I, where all variables are both significant and with the theoretically expected sign. It is especially interesting to see that the two income variables support the existence of a Kuznets curve, with a turning point estimated around $9,650 per capita (in 1990 constant USD PPP). This figure concurs with the empirical literature. Concerning control variables in Model I, the assumption on the relative educational gap seems to be validated, as well as the effect of natural resources endowment on the level of inequality. Wood's (1997) hypothesis on the role of trade openness is only partially confirmed. One of the explanations rests on the fact that the use of the Newey-West consistent estimator notably reduces the level of significance of this variable. Finally, all other things being equal, regional dummies for sub-Saharan Africa and Latin America indicate these regions have a higher level of inequality than can be explained by the control variables.

Models II and III still confirm the existence of a Kuznets curve, yet with a lower level of significance for income variables. It is striking that the aggregate index of core labour standards does not seem to have any linear or curvilinear correlation with the average Gini index. Model IV indicates that this result still remains even if the GDP variable and its squared term are removed. Hence, the conclusion to be drawn concurs with Vanhoudt's (1997) analysis establishing that labour standards have no significant influence on the Gini index. This finding leads to the most pessimistic hypothesis and even refutes most empirical and theoretical studies.

At this stage, our approach should be reassessed and several methodological aspects of our aggregate index of core labour standards have got to be taken into account. First, the specification of the model could be a source of problem since the level of inequality may conversely be a determinant of labour standards enforcement

Table 1. OLS[a] estimates of income inequality

	Model I		Model II		Model III		Model IV	
Dep. Var.: Gini	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Constante	−90.39*	−1.88	−82.55*	−1.63	−74.43	−1.41	27.75***	6.87
Ln GDP/t	26.46**	2.4	24.59**	2.11	22.45*	1.84		
(Ln GDP/t)^2	−1.44**	−2.25	−1.30*	−1.89	−1.18*	−1.67		
Turning Point[b]	*9650.08*		*12680.85*		*13415.09*			
Labour standards			−3.99	−0.73	7.07	0.58	16.48	1.42
(Labour standards)^2					−11.19	−1.02	−17.63*	−1.72
Education gap	0.15***	2.6	0.13*	1.85	0.12*	1.76	0.1	1.82
Trade openness	3.05*	1.85	2.94*	1.72	2.90*	1.66	4.20**	2.09
Arable land	4.51**	2.25	4.48**	2.18	4.39**	2.05	4.68**	2.02
Sub-Saharan Africa	12.40***	4.51	12.92***	4.19	12.35***	3.74	7.77***	3.22
Latin America	10.50***	5.15	11.33***	4.68	10.87***	4.42	11.10***	4.73
Observations	90		90		90		90	
Adj. R^2	0.59		0.59		0.6		0.56	
F (sig.)	22.55	(0.000)	20.71	(0.000)	19.49	(0.000)	27.73	(0.000)

Notes: ***1 per cent significant, **5 per cent significant, *10 per cent significant.
a. Results corrected of heteroscedasticity and autocorrelation thanks to Newey-West estimator (1987). b. Constant dollars (1990), in PPP per capita.

(Grootaert and Kanbur, 1995; Maskus, 1997; Arestoff and Granger, 2003). Put differently, we could face a bias of endogeneity. This assumption is confirmed by statistics using the Davidson and McKinnon (1989) tests of endogeneity for models II and III. Second, the way the aggregate index of core labour standards is computed might give a misleading idea of the reality. For instance, taking into account the number of ILO ratifications (NR) is quite different from the real enforcement of these norms in the country. Calderón et al. (2004) make a clear distinction between contractual engagements of states to improve working conditions (*de jure* norms), and the concrete actions they carry out to effectively apply these standards (*de facto* norms). Hence, huge disparities may arise between legislation and enforcement of these norms. This distinction is very important for developing countries where institutions are weak (Squire and Suthiwart-Narueput, 1997; Biffl and Isaac, 2002). To sum up, the previous empirical analysis should now take into consideration: (i) the country's capacity to effectively apply core labour standards; and (ii) the hazardous endogeneity bias between inequality and labour standards.

IV. Instrumental Variables Model for Inequality

The two potential bias stressed above can be corrected at the same time if an endogenous index of effective core labour standards can be defined. In other words, the index should be defined outside the model as an output of a system that guarantees the application of *de jure* standards. From a technical point of view, the use of a Two-Stage Least-Squares (TSLS) model appears to be appropriate. The challenge is to find out which instrumental variables are determinants of effective core labour standards but have no direct effect on inequality. This methodological enquiry aims at last to lead to a new look at the effects of labour standards on the Gini coefficient.

The Model and Assumptions

Assume that y is the column vector of Gini coefficients; Y is the matrix containing the aggregate index of labour standards as computed by MCA, and its squared value. Assume that matrix X corresponds to W in equation (1) augmented with instrumental variables defined below. Coefficients to be estimated from matrixes Y and X are respectively γ and β. Notice $\varepsilon \sim \mathrm{N}(0,1)$ stands for the error term with usual assumptions. The two steps of the TSLS procedure can be described here using this notation. Variables in Y are respectively regressed on all variables of X and predictions are saved. These predictions are then put together with variables of X as OLS regressors in an equation where the dependent variable is γ. The general form of a TSLS model is the following:

$$y = Y\gamma + X\beta + \varepsilon \tag{2}$$

At this point, the specification of the model still only depends on the choice of instruments to be included in X. In order to select these variables, a preliminary set of potential candidates has to be developed from theoretical insights. The approach we follow relies on the assumption that: *if a* favourable *institutional framework*

guarantees ratifications of international conventions on core labour standards, the effectiveness of labour standards will thus be reinforced. Three main arguments help justify this hypothesis.

First, the political situation of a country appears to be a fundamental determinant of the effectiveness of labour standards. There is, for instance, a consensus in political science to recognise a link between democracy and human rights (Carothers, 1994; Fox and Nolte, 1995; Davenport and Armstrong, 2004). Moreover, ILO (1998) argues that the expansion of democracy is the best way to ensure freedom of association. In other words, one of the most striking principles that ensures the respect and effective application of labour standards in a country deals with *democratic institutions* in a broader way. As a consequence, we propose to introduce different proxies as potential instrumental variables. They are: a combined index of democracy[10] (*POLITY*), the competitiveness of executive recruitment[11] (*XRCOMP*), and the operational independence of chief executive (*XCONST*). We also propose to retain the status of non-elites, due to the fact that this sub-population has a higher probability to claim for labour standards. Two more proxies are thus suggested: an index of competitiveness of participation[12] (*PARCOMP*), and a measure of openness of executive recruitment[13] (*XROPEN*). All these five variables are taken from Gleditsch (2003).

Second, *de facto* labour standards also seem to be influenced by social regulation and institutional framework. We use the Miles et al. (2000) index of regulation of the economy (*EFREGUL*) and the Estes (2000) index of social progress (*WISP*). We also assume that access to information as measured by the (log of) average number of radios per 1,000 population (*LNRADIO*) and the average number of people reading newspapers (*NEWSPAPER*) – taken from the 1990–2000 WDI database – captures ability to provide information on the social environment that labour standards are applied in.

Third, a growing part of the literature indicates that legal origins influence the way labour standards are applied at the national level. Chau and Kanbur (2001: 12) argue that: 'In the context of labor standards, legal origin may thus influence the natural labor standard (i) directly via the ideological bias it imposes on the relative importance of the State vis-à-vis the individual, and (ii) indirectly via its influence on the performance of government to protect the rights of individuals and government efficiency.' La Porta et al. (1998) find that Scandinavian origin (*SCANDIN*) guarantees a better efficiency of the juridical system and the rule of law. The enforcement of these labour standards will thereby be easier in these countries. Notice that civil code (*CIVIL*) and socialist heritage (*SOCIALIST*) are also introduced as instruments with reference to the common law system. All dummy variables on legal origins are taken from the *Global Development Network growth database*.

Relevancy and Orthogonality of Instruments

The selection of adequate instruments for the TSLS procedure is a crucial step. Staiger and Stock (1997) indeed show that TSLS estimators can be badly biased and can produce confidence intervals with severely distorted coverage rates when instruments are weakly correlated with the endogenous regressors (conventional asymptotic results fail even if the sample is large). The condition for efficient

estimators is that the matrix of instrumental variables (IVs) denoted here by z_i, must satisfy the usual conditions of being: (i) correlated with x_i (*Relevancy*), and (ii) uncorrelated with ε_i (*Orthogonality*).[14] So, in order to address the concern about the weakness of our instruments, partial *F-Tests* of joint significance of the instruments and partial R^2 for the first-stage regressions are carried out to initially test for relevancy. The *Hansen Test of Over-identifying* is usually performed to test for orthogonality. However, due to several methodological limitations underlined in the literature,[15] we opt for an alternative methodology recommended by Arcand et al. (2004). They suggest (i) repeating the *Hansen Test* using various combinations of instruments, and (ii) implementing the *Difference Hansen Test*.[16]

Table 2 shows results for relevancy. It is noticeable that only four out of the 11 variables appear to be significantly correlated with the level of core labour standards. As a consequence, the indexes of competitiveness of participation (*PARCOMP*), executive constraint (*XCONST*), social progress (*WISP*), and Scandinavian origins (*SCANDIN*) are the only ones to be retained. Table 3 sums up the test-statistics of validity associated to these four instruments. As a first step, *Hansen Tests* on the variable sets (2), (3), (7) and (11) suggest to reject the validity of all these instruments, given a confidence threshold of 15 per cent. Nevertheless, as this result is biased by the relative weaknesses of the simple *Hansen Test*, the *Difference-Hansen Test* indicates that only *XCONST* and *WISP* should be excluded.

Table 2. Instruments relevance

	MCA		MCA^2	
Endogeneous variable	F-Stat	Partial R^2	F-Stat	Partial R^2
1. Combined polity score (Polity)	6.71 (0.01)	0.07	7.96 (0.00)	0.06
2. Competitiveness of participation	9.83 (0.00)	0.11	5.58 (0.02)	0.06
3. Executive constraints (Xconst)	8.6 (0.00)	0.1071	12.22 (0.00)	0.09
4. Openness of executive recruitment (Xropen)	0.48 (0.48)	0.004	0.76 (0.76)	0.005
5. Competitiveness of executive recruitment	3.27 (0.07)	0.04	3.57 (0.06)	0.03
6. ln (Radio)	0.2 (0.65)	0.002	0.01 (0.91)	0.00001
7. WISP	13.69 (0.00)	0.22	15.81 (0.00)	0.24
8. Efregul	0.88 (0.35)	0.01	1.83 (0.18)	0.02
9. Civil	4.27 (0.04)	0.04	5.59 (0.02)	0.06
10. Socialist	2.31 (0.13)	0.01	3.6 (0.06)	0.01
11. Scandin	11.92 (0.00)	0.03	24.98 (0.00)	0.13

Note: P-values in parentheses.

Table 3. Instruments validity and relevance

Excluded instruments	Hansen-test	Diff-Hansen	Subsets of instruments tested	Partial R^2	F-Stat
(2), (3), (7) and (11)	7.877	0.665	(2)	0.3	10.08
	(0.02)	(0.42)		0.34	13.45
(2), (3), (7) and (11)	7.877	4.963	(3)	0.3	10.08
	(0.02)	(0.02)		0.34	13.45
(2), (3), (7) and (11)	7.877	4.587	(7)	0.3	10.08
	(0.02)	(0.03)		0.34	13.45
(2), (3), (7) and (11)	7.877	0.511	(11)	0.3	10.08
	(0.02)	(0.47)		0.34	13.45
(2), (7) and (11)	3.014			0.3	13.48
	(0.08)			0.33	16.29
(2), (11) and (1)	7.036			0.15	7.66
	(0.01)			0.2	12.25
(2), (11) and (4)	2.662			0.15	7.64
	(0.10)			0.19	11.25
(2), (11) and (5)	3.861			0.15	7.68
	(0.05)			0.19	11.34
(2), (11) and (6)	2.783			0.15	7.64
	(0.10)			0.19	11.36
(2), (11) and (8)	1.586			0.15	7.81
	(0.20)			0.2	11.58
(2), (11) and (9)	0.023			0.17	8.17
	(0.88)			0.21	12.71
(2), (11) and (10)	0.706			0.18	10.96
	(0.40)			0.21	14.21
(2), (9), (10) and (11)	0.697	0.549	(2)	0.2	8.48
	(0.71)	(0.55)		0.22	11.6
(2), (9), (10) and (11)	0.697	0.002	(9)	0.2	8.48
	(0.71)	(0.96)		0.22	11.6
(2), (9), (10) and (11)	0.697	0.673	(10)	0.2	8.48
	(0.71)	(0.41)		0.22	11.6
(2), (9), (10) and (11)	0.697	0.00	(11)	0.2	8.48
	(0.71)	(0.99)		0.22	11.6
(2), (8), (9), (10) and (11)	1.926	1.181	(8)	0.2	7
	(0.59)	(0.28)		0.24	9.71

Note: P-values in parentheses. For columns Partial R^2 and F-Stat, the first line is the statistic for MCA, the second one for MCA^2.

The fact that only two instruments (*PARCOMP* and *SCANDIN*) are valid implies that another variable (respecting the conditions of relevancy and orthogonality) has got to be added if we want to test for the validity of the instrument subsets (2) and (11). So for the test procedure to be complete, we first test for the validity of instruments (2), (7) and (11). Results in Table 3 point out that although the subset is relevant, it is not valid (non-orthogonal). Unfortunately here the *Difference-Hansen Test* cannot be used because the model is just identified. The inclusion of *EFREGUL*, *CIVIL* and *SOCIALIS* allows having valid subsets of instruments to perform the *Difference-Hansen Test* – on instruments (2), (9), (10) and (11). This

confirms the validity of each instrument used. Notice that the inclusion of *EFREGUL* in this subset does not change the results of orthogonality tests, even if the Hansen statistic falls.

Results

Thanks to the previous tests of validity and relevance of the instruments, it is possible to propose different estimations concerning the determinants of inequality. The aggregate index of core labour standards and its squared value are instrumented with various subsets of variables: (2) and (11); (2), (9) and (11); (2), (10) and (11); (2), (9), (10) and (11); (2), (8), (9), (10) and (11). TSLS estimates in Table 4 indicate that endogenous variables of core labour standards are both significant in all of these five models. The sign of these two variables indicates a curvilinear relationship with the Gini index. This result is markedly different from the absence of effects for labour standards in the extended standard model (model I). We argue this is so because the new indexes do not deal anymore with 'core labour standards' but, rather, with the *effective* application of these standards. In other words, this does confirm our hypothesis on the role of the institutional environment as a key factor for successful labour standards-based policy.

Other determinants of inequality have less significant influence than labour standards. This is often the case in TSLS, especially when using the Newey-West robust estimator. This might explain why p-values associated with trade openness and educational gap generally remain just under the 10 per cent level. Though dummies for sub-Saharan Africa and Latin America are significant, the absolute lack of significance of GDP variables should be explained. As Bazillier (2008) has shown, core labour standards are related to long-term income per capita, so one could hypothesise that those two variables share some common information. The endogenisation of the former could have given it more 'strength' than it used to have (in model I), so the influence of labour standards comes to the fore in place of GDP variables. Table 5 shows results of a final estimation omitting GDP variables. The models appear to be stable for any subset of instruments. The curvilinear influence of labour standards on the Gini index is confirmed, and other determinants of inequality are found to be slightly more significant.

Whatever the model is, the level of inequality follows a curve that reaches its maximum in the interval (0.52, 0.58) on a 0 to 1 scale. These figures indicate for instance that countries like Brazil or South Africa are situated near the turning point. The presence of an inverse 'U-shaped' curve – in any of our TSLS estimations – lets us think of a 'social' Kuznets curve. We obviously take for granted that the interpretation of the classic Kuznets curve (by Kuznets himself and others) is now rejected within the community of economists, and we do acknowledge that many studies have proposed new interesting interpretations of the statistical evidence. Nevertheless, we believe that illuminating the underlying mechanisms of the inverse 'U-shape' curve between endogenous core labour standards and inequality may be helpful for policy debate. From this 'classic' point of view, inequality may rise at the very first stage of effective implementation of labour norms because of the duality of the economy. Indeed, *de facto* norms will enhance the cost of unskilled labour and will, therefore, lead to relocate a significant part of the active population in the

Table 4. TSLS[a] estimates of income inequality

	Model I		Model II		Model III		Model IV		Model V	
Dep. Var.: Gini	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Constante	−70.97	−1.12	−69.7	−1.1	−64.51	−1.07	−65.37	−1.08	−51.79	−0.84
Ln GDP/t	20.85	1.45	20.55	1.42	19.39	1.41	19.6	1.41	16.06	1.14
(Ln GDP/t)^2	−1.21	−1.36	−1.18	−1.32	−1.08	−1.26	−1.1	−1.27	−0.87	−1.01
Turning point[b]	*5608*		*5867*		*7774*		7522		9860	
Labour standards	59.95**	2.14	58.90**	2.1	50.80*	1.93	51.27	1.93	54.80**	2.03
(Labour standards)^2	−51.43***	−3.01	−51.13***	−2.98	−47.10***	−2.86	−47.14***	−2.85	−52.05***	−2.83
Turning point[c]	*0.5828*	*0.576*		*0.5393*		*0.5439*			*0.5264*	
Education gap	0.16*	1.82	0.16*	1.84	0.14*	1.72	0.14*	1.77	0.14*	1.65
Trade openness	3.09	1.63	3.07	1.63	2.98*	1.64	2.99*	1.64	3.23*	1.73
Arable land	4.14*	1.85	4.14*	1.85	4.15*	1.85	4.14**	1.86	3.59*	1.73
Sub-Saharan Africa	8.58**	2.42	8.69**	2.46	9.44***	2.71	9.38***	2.7	8.67**	2.6
Latin America	6.50*	1.67	6.67*	1.72	7.70**	2.06	7.61**	2.04	7.74**	2.09
Observations	90		90		90		90		90	
Adj. R^2	0.5		0.51		0.54		0.53		0.53	
F (sig.)	51.46	(0.000)	47.01	(0.000)	55.26	(0.000)	47.95	(0.000)	35.35	(0.000)

Notes: ***1 per cent significant, **5 per cent significant, *10 per cent significant. a. Results corrected of heteroscedasticity and autocorrelation thanks to Newey-West estimator (1987); b. Constant dollars (1990), in PPP per capita; c. Value of LS index.
Instruments used. Model I (2) and (11) ; Model II (2), (9) and (11) ; Model III (2), (10), (11) ; Model IV (2), (9), (10) and (11) ; Model V (2), (8), (9), (10) and (11).

Table 5. TSLS[a] estimates of income inequality

	Model I		Model II		Model III		Model IV		Model V	
Dep. Var.: Gini	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Constant	16.53*	1.91	16.80*	1.95	17.99**	2.17	17.97**	2.15	16.76*	1.81
Labour standards	63.86***	2.99	63.39***	2.93	59.33***	2.79	59.35***	2.77	67.60***	3.02
(Labour standards)^2	−55.18***	−3.77	−55.10***	−3.85	−52.28***	−3.6	−52.27***	3.63	−58.41***	−3.86
Turning point[c]	*0.5786*		*0.5751*		*0.5674*		*0.5677*		*0.5786*	
Education gap	0.17*	1.72	0.17*	1.73	0.16*	1.67	0.16*	1.69	0.17*	1.76
Trade openness	3.73*	1.95	3.73*	1.95	3.77**	1.97	3.77**	1.97	4.00**	2.04
Arable land	4.14*	1.77	4.15*	1.77	4.20*	1.8	4.20*	1.8	3.58*	1.68
Sub-Saharan Africa	6.25**	2.43	6.28**	2.45	6.42**	2.55	6.42**	2.55	5.50**	2.09
Latin America	7.19**	2.15	7.72**	2.19	7.67**	2.34	7.66**	2.35	6.91**	2.02
Observations	90		90		90		90		90	
Adjusted R^2	0.47		0.48		0.49		0.49		0.47	
F-Stat	60.05	(0.000)	57.5	(0.000)	57.83	(0.000)	52.3	(0.000)	46.01	(0.000)

Notes: ***1 per cent significant, **5 per cent significant, *10 per cent significant. a. Results corrected of heteroscedasticity and autocorrelation thanks to Newey-West estimator (1987); b. Constant dollars (1990), in PPP per capita; c. Value of LS index.
Instruments used: Model I (2) and (11); Model II (2), (9) and (11); Model III (2), (10), (11); Model IV (2), (9), (10) and (11); Model V (2), (8), (9), (10) and (11).

informal sector or shadow economy. However, a continuous investment in effective labour standards should counter-balance this effect in the long run due to the diffusion of the norms to the socially unprotected sector.

This interpretation could be illustrated using figures taken from Table 4. If South Africa moves from its initial position on the turning point (0.57) to reach the average level of OECD countries (0.77), the Gini index would decrease by about 11 per cent. On the other hand, if a poor country, for example Lesotho, improves its level of effective labour standards (0.37) up to the level of a richer country, such as South Africa (0.57), the level of income inequalities in the former country would thus rise by nearly 15 per cent. From a policy argument perspective, the 'classic' interpretation of this social Kuznets curve here points out that the promotion of labour standards in developing countries may thus be contested because it could raise inequality in the short-term.

V. Conclusion

This paper proposes a new interpretation of contradictory results in the empirical literature on labour standards' effects on income inequality. The apparent divergences may be analysed in the light of an inverse 'U-shaped' curve establishing that a low degree of effective implementation of labour standards increases inequality, whereas a high degree of implementation reduces the value of the Gini coefficient.

From a theoretical perspective, an interpretation of this social Kuznets' curve may be given in the light of dualistic economies. It is indeed widely acknowledged in the literature that a modern sector and an informal one coexist in most developing countries. The improvement (introduction and enforcement) of labour standards in the modern sector may raise the labour costs and thus give some producers the incentive to avoid formal contracts. An increase in inequalities between protected and non-protected workers would thus come from the switch of a significant part of the workforce from the formal sector to the informal sector (Harrison and Leamer, 1997; Maskus, 1997). However, Singh and Zammit (2003) suggest that in the long run, countries experiencing a change in the structure of their economy, that is a bigger share of the modern sector, are more likely to improve labour standards since a larger part of the population works in the modern sector: 'Fast economic growth speeds up these phenomena leading to greater employment in the formal economy and there is usually much improvement in both core and other labour standards' (Singh and Zammit, 2003: 12).

This main finding of a 'social' Kuznets curve relies on the fact that the national institutional framework tends to guarantee the effectiveness of these standards. More precisely, the influence of labour standards on income inequality is not merely linked to the political will of countries or the adoption of ILO conventions, but mostly depends on the broader social and political context that gives the people means to make these norms enforced. For instance, participatory democracy appears to be a major guarantee of the implementation and respect of core labour standards. Notice that this last point adds an additional twist, which is that democracies seem to enforce labour standards better.

Acknowledgements

We would like to thank Farid Touabal (CES-CNRS) for very helpful comments on a previous version of this paper.

Notes

1. See the conclusions of the Social Summit in Copenhagen 1995, the WTO declaration in Singapore 1996, and the ILO declaration on fundamental rights of workers 1998.
2. Core conventions are the eight conventions corresponding to the four core labour standards (conventions 87 and 98 on freedom of association, 29 and 105 on the contribution of forced labour, 138 and 182 on the prohibition of child labour, 100 and 111 on the principle of non-discrimination).
3. See Table A1 (see Appendix) for descriptive statistics of each variable.
4. Ratio of literate women to men and ratio of girls to boys in education are the official indicators used to measure the achievement of goal 3 of the Millenium Development Goals: 'promote gender equality and empower women'.
5. This variable is used by Busse and Spielmann (2006). It is also a part of the Standardized Index of Gender Equality (SIEGE) built by Dijkstra (2002). Ghai (2003) argues the employment rates reflect disparities between females and males concerning the employment access. It is also one of the indicators proposed by Anker et al. (2003) and Bescond et al. (2003). More precisely, the labour market's participation of women reflects gender inequality more than discrimination (see Busse and Spielmann, 2006).
6. For more details, see Benzecri, (1992) and Greenacre (1984). Notice that the aggregate index values for each country are available by request at: Remi.Bazillier@malix.univ-paris1.fr
7. We define a variable called: GAP_EDU=(Secondary school enrolment – Primary school enrolment)/(Primary school enrolment).
8. See Appendices A3 for descriptive statistics and A4 for a correlation matrix of all these variables.
9. This problem often arises from the aggregation of heterogeneous data from developed and developing countries.
10. Combined Polity Score: computed by subtracting AUTOC (Autocracy Score: general closeness of political institutions) from DEMOC (Democracy Score: general openness of political institutions).
11. The extent to which executives are chosen through competitive elections.
12. The extent to which non-elites are able to access institutional structure for political expression.
13. Opportunity for non-elites to attain executive office.
14. The main problem of this test is that it is based on the strong hypothesis that at least one instrument in the instrument set is exogenous (Wooldridge, 2002). Moreover, its power is particulary low in the presence of weak instruments (Baum et al., 2003).
15. The main problem of this test is that it is based on the strong hypothesis that at least one instrument in the instrument set is exogenous (Wooldridge, 2002). Moreover, its power is particulary low in the presence of weak instruments (Baum et al., 2003).
16. The *Difference-Hansen Test* provides a statistic that represents the difference between two Hansen statistics; the first one being associated with the unrestricted specification (which includes the instruments 'under suspicion'), and the second one, being associated with a restricted model (which uses only 'non-suspect' instruments).

References

Ahluwalia, M.S. (1976) Inequality, poverty and development. *Journal of Development Economics*, 3(4), pp. 307–342.

Aidt, T. and Tzannatos, Z. (2003) Unions and collective bargaining. Mimeo, The World Bank, Washington, DC.

Anand, S. and Kanbur, R. (1993) The Kuznets process and the inequality-development relationship. *Journal of Development Economics*, 40(1), pp. 25–52.

Anker, R., Chernyshev, I., Egger, P., Mehran, F. and Ritter, J.A. (2003) Measuring decent work with statistical indicators. *International Labour Review*, 142(2), pp. 147–177.

Antislavery and ICFTU (2001) Forced labour in the 21st century. Working Paper, Antislavery International, Brussels and London.

Arcand, J., D'Hombres, B. and Gyselinck, P. (2004) Instrument choice and return to education, new evidence from Vietnam. Mimeo, CERDI, Université d'Auvregne, France.

Arestoff, F. and Granger, C. (2003) Le respect des normes de travail fondamentales : une analyse économétrique de ses determinants. Cahier de recherche EURISCO, 2003–08, Université Paris Dauphine.

Baum, C.F., Schaffer, M.E. and Stillman, S. (2003) Instrumental variables and GMM: estimations and testing. *Stata Journal*, 3(1), pp. 1–31.

Bazillier, R. (2008) Core labour standards and development, impact on long-term income. *World Development*, 36(1), pp. 17–39.

Benzecri, J.-P. (1992) *Correspondence Analysis Handbook* (New York: Marcel Dekker).

Bescond, D., Chataignier, A. and Mehran, F. (2003) Seven indicators to measure decent work: an international comparison. *International Labour Review*, 142(2), pp. 179–211.

Bhagwati, J. (1995) Trade liberalization and fair trade demands: addressing the environmental and labour standards issues. *The World Economy*, 18(6), pp. 745–759.

Biffl, G. and Isaac, J. (2002) How effective are ILO's labour standards under globalization? IIRA/CIRA 4th Regional Congress of the Americas Centre for Industrial Relations, 25–29 June, University of Toronto.

Bivens, J. and Weller, C. (2003) Rights male might. Ensuring worker's rights as a strategy for economic growth. *EPI Issue Brief*, 192, pp. 1–7.

Bourguignon, F. (1994) Growth, distribution, and human resources, in: G. Ranis (ed.) *En Route to Modern Growth, Essays in Honor of Carlos Diaz-Alejandro* (Washington, DC: Johns Hopkins University Press), pp. 43–69.

Bourguignon, F. and Morrison, C. (1990) Income distribution, development and foreign trade: a cross-sectional analysis. *European Economic Review*, 34(6), pp. 1113–1132.

Bourguignon, F. and Morrison, C. (1998) Inequality and development, the role of dualism. *Journal of Development Economics*, 57(2), pp. 233–257.

Brown, D. (2000) International trade and core labour standards: a survey of the recent literature. OECD Labour Market and Social Policy Occasional Papers, No. 43, OECD Publishing.

Brown, D.K., Deardorff, A.V. and Stern, R.M. (1996) International labour standards and trade: a theoretical analysis, in: J. Bhagwati and R. Hudec (eds.) *Fair Trade and Harmonization: Prerequisites for Free Trade?* (Cambridge, MA: MIT Press), pp. 227–280.

Buchele, R. and Christiansen, J. (2003) Worker rights and socio-economic performance in advanced capitalist economies. Annual Meetings of URPE, 3–5 January, Washington, DC.

Busse, M. and Braun, S. (2003) Trade and investment effects of forced labour: an empirical assessment. *International Labour Review*, 142(1), pp. 49–71.

Busse, M. and Spielmann, C. (2006) Gender inequality and trade. *Review of International Economics*, 14(3), pp. 362–379.

Calderón, C., Chong, A. and Valdés, R. (2004) Labor market regulations and income inequality: evidence for a panel of countries. Working Paper 514, Research Department, Inter-American Development Bank.

Campano, F. and Salvatore, D. (1988) Economic development, income inequality, and Kuznets' u-shaped hypothesis. *Journal of Policy Modeling*, 10(2), pp. 265–280.

Carothers, T. (1994) Democracy and human rights: policy allies or rivals? *The Washington Quarterly*, 17(3), 109–120.

Cattell, R. (1966) The scree test for the number of factors. *Multivariate Behavioral Research*, 1(2), pp. 245–279.

Chau, N.H. and Kanbur, R. (2001) The adoption of international labor standards conventions: who, when and why? Mimeo, CEPR Discussion Papers 2904, London.

Checchi, D. and Garcia Penalosa, C. (2005) Labour market institutions and the personal distribution of income in the OECD. IZA Discussion Paper No 1681.

Cornia, G.A. (ed.) (2004) *Inequality, Growth and Poverty in an Era of Liberalization and Globalization* (Oxford: Oxford University Press).

Davenport, C. and Armstrong, D.A. (2004) Democracy and the violation of human rights: a statistical analysis from 1976 to 1996. *American Journal of Political Science*, 48(3), pp. 538–554.

Davidson, R. and MacKinnon, J.G. (1989) Testing for consistency using artificial regressions. *Econometric Theory*, 5(3), pp. 363–384.

Deininger, K. and Squire, L. (1998) New ways of looking at old issues: inequality and growth. *Journal of Development Economics*, 57(2), pp. 259–287.

Dijkstra, G. (2002) Revisiting UNDP's GDI and GEM: towards an alternative. *Social Indicators Research*, 57(3), pp. 301–338.

Emerson, M. and Dramais, A. (1988) *What Model for Europe?* (Cambridge, MA: MIT Press).

Estes, R. (2000) Weighted index of social progress. Mimeo, School of Social Policy and Practice, University of Pennsylvania.

Fox, G. and Nolte, G. (1995) Intolerant democracies. *American Journal of International Law*, 36(1), pp. 1–70.

Ghai, D. (2003) Decent work: concepts, models and indicators. *International Labour Review*, special issue, 142(2), pp. 113–145.

Gleditsch, K.S. (2003) Modified polity P4 and P4D data, Version 1.0, accessed at: http://privatewww.essex.ac.uk/~ksg/polity.html.

Granger, C. (2005) Normes de travail fondamentales et échanges Sud-Nord. *Economie Internationale*, 101(1), 47–62.

Greenacre, M. (1984) *Theory and Application of Correspondence Analysis* (London: Academic Press).

Grootaert, C. and Kanbur, R. (1995) Child labor: an economic perspective. *International Labour Review*, 134(2), pp. 187–203.

Harrison, A. and Leamer, E.E. (1997) Labor markets in developing countries: an agenda for research. *Journal Of Labor Economics*, 15(3), Part 2: S1–19.

ILO. *See* International Labour Organization.

International Labour Organization (1998) Understanding right at work. Declaration on Fundamentals Principles and Rights at Work, International Labour Organization, Geneva.

International Labour Organization (2001) Stopping forced labour. Working Paper, ILO, International Labour Conference 89th Session 2001, Report I (B), Geneva.

Jha, S. (1996) The Kuznets curve, a reassessment. *World Development*, 24(4), pp. 773–780.

Kucera, D. (2001) Measuring fundamental rights at work. *Statistical Journal*, 18(2–3), pp. 175–186.

Kucera, D. (2002) Core labour standards and foreign direct investment. *International Labour Review*, 141(1–2), pp. 31–69.

Kuznets, S. (1955) Economic growth and income inequality. *American Economic Review*, 45(1), pp. 1–28.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R.W. (1998) Law and finance. *Journal of Political Economy*, 106(6), pp. 1113–1155.

Leary, V. (1996) Worker's rights and international trade: the social clause, in: J. Bhagwati and R.E. Hudec (eds) *Fair trade and Harmonisation: Prerequisites for Free Trade* (Cambridge, MA and London: MIT Press), pp. 177–230.

Maskus, K.E. (1997) Should core labor standards be imposed through international trade policy? World Bank Policy Research Working Paper, no. 1817.

Milanovic, B. (1995) Poverty, inequality and social policy in transition economies. Research Paper No 9, Transition Economics Division, The World Bank, Washington DC.

Miles, M., Holmes, K., Eras, A., Shaeffer, B. and Kim, A. (2000) The 2000 index of economic freedom. Mimeo, Heritage Foundation.

Newey, W. and West, K. (1987) A simple positive semi-definite, heteroscedasticity and autocorrelation consistent covariance matrix. *Econometrica*, 55(3), pp. 703–708.

OECD. *See* Organisation for Economic Co-operation and Development.

Organisation for Economic Co-operation and Development (1996) *Trade, Employment and Labour Standards: A Study of Core Worker's Right and International Trade* (Paris: OECD).

Palley, T.I. (1999) The economic case for international labor standards: theory and some evidence. Working Paper E025, AFL-CIO, Washington, DC.

Palley, T.I. (2004) The economic case for international labour standards. *Cambridge Journal of Economics*, 28(1), pp. 21–36.

Palley, T.I. (2005) Labour standards, democracy and wages: some cross-country evidence. *Journal of International Development*, 17(7), pp. 1–16.

Papanek, G. and Kyn, O. (1986) The effect on income distribution of development, the growth rate and economic strategy. *Journal of Development Economics*, 23(1), pp. 55–65.

Rama, M. (2003) Globalization and workers in developing countries, in: R. Hasan and D. Mitra (eds) *Trade and Labor: Issues, Perspectives and Experiences from Developing Asia* (Amsterdam: North-Holland), pp. 19–64.

Saint-Paul, G. (1999) Towards a theory of labor market institutions. Mimeo, Universitat Pompeu Fabra, Barcelona.

Sen, A.K. (1992) *Inequality Re-Examined* (Oxford: Clarendon Press).

Singh, A. and Zammit, A. (2003) Globalisation, labour standards and economic development, in: J. Michie (ed.) *The Handbook of Globalisation* (Cheltenham: Edward Elgar), pp. 191–215.

Squire, L. and Suthiwart-Narueput, S. (1997) The impact of labor market regulations. *World Bank Economic Review*, 11(1), pp. 119–144.

Staiger, D. and Stock, J.H. (1997) Instrumental variables regression with weak instruments. *Econometrica*, 65(3), pp. 557–586.

Sylvester, K. (2000) Income inequality, education expenditures and growth. *Journal of Development Economics*, 63(2), pp. 379–398.

Sylvester, K. (2002) Can income expenditures reduce income inequality. *Economics of Education Review*, 21(1), pp. 43–52.

Sylvester, K. (2003) Enrolment in higher education and changes in income inequality. *Bulletin of Economic Research*, 55(3), pp. 249–252.

US Department of State (2002) *Human Rights Country Reports, 2002* (Bureau of Democracy, Human Rights and Labour, US Department of State).

Vanhoudt, P. (1997) Do labor market policies and growth fundamentals matter for income inequality in OECD countries? *IMF Staff Papers*, 44(3), pp. 356–373.

Wood, A. (1997) Openness and wage inequality in developing countries: the Latin American challenge to East Asian conventional wisdom. *World Bank Research Observer*, 11(1), pp. 33–57.

Wooldridge, J. (2002) *Econometric Analysis of Cross-Section and Panel Data* (Cambridge, MA: MIT Press).

Appendix

Table A1. Descriptive statistics of variables included in the scalar index of core labour standards

N = 155 countries	Ratifications ILO	Child labour	Freedom of association	Non-discrimination	Forced labour
Frequencies of modalities					
Highest	21,94	28,39	20,00	20,00	46.45
High	21,29	18,71	20,65	16,13	28.39
Medium	20,65	21,94	19,35	16,77	07.10
Low	17,42	15,48	21,29	19,35	10.96
Lowest	18,70	15,48	18,71	27,75	07.10
Total	100	100	100	100	100
Correlation matrix					
ILO ratifications	1				
Child labour	0,364**	1			
Freedom of association	0,461**	0,474**	1		
Non-discrimination	0,073	0,355**	0,282**	1	
Forced labour	0,293**	0,286**	0,399**	0,282**	1
Weight used in the scalar index					
Arithmetic mean	0,200	0,200	0,200	0,200	0,200
MCA	0,189	0,243	0,266	0,127	0,176

Note: **indicates 5 per cent significant.

Table A2. MCA summary

N = 155 Countries	Principals	F1	F2	F3	F4
	Eighen value	0.512	0.320	0.294	0.276
	Per cent total inertia	0.725	0.108	0.066	0.043
	Per cent cum. total inertia	0.725	0.833	0.942	0.967
Variables	Items	Coord. (F1)	QLT	Test Value	CTR (per cent)
ILO's ratifications (NR)	Highest	1.236	0.429	8.129**	13.094
	High	−0.061	0.001	−0.395	0.031
	Medium	−0.316	0.026	−1.997**	0.803
	Low	−0.267	0.015	−1.523	0.486
	Lowest	−0.782	0.141	−4.656**	4.474
	Total				18.888
Child labour (CL)	Highest	1.087	0.468	8.490**	13.102
	High	0.330	0.025	1.962**	0.794
	Medium	−0.580	0.094	−3.812**	2.880
	Low	−0.731	0.098	−3.884**	3.237
	Lowest	−0.838	0.129	−4.451**	4.250
	Total				24.263
Freedom of association (FA)	Highest	1.388	0.482	8.613**	15.066
	High	0.492	0.063	3.115**	1.954
	Medium	−0.543	0.071	−3.304**	2.235
	Low	−0.698	0.132	−4.506**	4.057
	Lowest	−0.670	0.103	−3.990**	3.285
	Total				26.597
Non-discrimination (DISCRI)	Highest	0.909	0.207	5.641**	6.461
	High	0.159	0.005	0.865	0.159
	Medium	0.292	0.017	1.627	0.560
	Low	−0.500	0.060	−3.040**	1.892
	Lowest	−0.576	0.127	−4.425**	3.592
	Total				12.664
Forced labour (FL)	Highest	0.678	0.399	7.836**	8.347
	High	−0.327	0.042	−2.557**	1.188
	Medium	−0.809	0.050	−2.775**	1.816
	Low	−0.727	0.065	−3.166**	2.265
	Lowest	−1.197	0.109	−4.104**	3.972
	Total				17.588

Note: ** indicates 5 per cent significant.

Table A3. Descriptive statistics

	Mean	Standard deviation	Minimum	1st Quartile	2nd Quartile	3rd Quartile	Maximum	Skewness	Kurtosis
Labour standards	0.44	0.28	0.00	0.20	0.38	0.67	1.00	−0.97	0.53
(Labour standards)^2	0.26	0.28	0.00	0.04	0.14	0.43	1.00	0.23	1.16
GINI	42.55	10.20	24.70	35.30	40.56	50.31	70.66	−0.57	0.33
GDP/t	3605.29	3873.05	203.85	771.20	1751.65	5395.26	14034.60	−0.20	1.14
Education gap	36.05	29.31	−30.40	19.04	43.60	56.87	92.13	−0.52	2.44
Trade openness	54.08	36.69	15.00	33.88	46.27	62.62	282.34	15.46	3.28
Arable land	0.28	0.33	0.00	0.11	0.20	0.34	2.71	30.23	4.87
LN (Radio)	5.55	0.99	3.41	4.90	5.56	6.30	7.66	−0.75	−0.19
POLITY	4.67	5.88	−7.00	−1.00	7.50	9.00	10.00	−0.87	−0.86
PARCOMP	3.61	1.17	0.00	3.00	4.00	5.00	5.00	−0.36	−0.57
XCONST	5.22	1.89	1.00	3.00	6.00	7.00	7.00	−1.05	−0.61
XROPEN	3.54	1.22	0.00	4.00	4.00	4.00	4.00	4.00	−2.40
XRCOMP	2.24	1.05	0.00	1.00	3.00	3.00	3.00	−0.47	−1.01
Dummy variables	N	Percentage	Rel. freq.						
Sub-sahara Africa	28	31.11	0.31						
Latin America	21	23.33	0.23						
Civil law	51	56.67	0.57						
Former socialist countries	2	2.22	0.02						
Scandinavian tradition	4	4.44	0.04						

Table A4. Correlation matrix

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
GINI	A	1																			
Labour standards	B	*–0.34*	1																		
(Labour standards)^2	C	*–0.42*	*0.97*	1																	
LN GDP/t	D	*–0.33*	*0.74*	*0.73*	1																
(LN GDP/t)^2	E	*–0.36*	*0.75*	*0.74*	*1.00*	1															
Gap edu	F	*0.58*	*–0.76*	*–0.79*	*–0.75*	*–0.77*	1														
Trade openness	G	0.08	0.05	0.04	0.17	0.17	–0.08	1													
Arable land	H	0.01	*0.23*	*0.22*	0.19	0.20	*–0.25*	–0.11	1												
Latin America	I	*0.44*	0.06	–0.01	0.05	0.02	*0.23*	–0.03	–0.05	1											
Sub-Sahara Africa	J	*0.31*	*–0.40*	*–0.41*	*–0.68*	*–0.65*	*0.44*	–0.07	–0.01	*–0.37*	1										
POLITY	K	–0.06	*0.59*	*0.57*	*0.57*	*0.57*	*–0.42*	0.01	0.14	*0.27*	*–0.51*	1									
PARCOMP	L	–0.19	*0.72*	*0.68*	*0.67*	*0.68*	*–0.60*	–0.03	0.18	0.12	*–0.43*	*0.83*	1								
XCONST	M	–0.12	*0.58*	*0.57*	*0.61*	*0.60*	*–0.41*	0.00	0.14	*0.23*	*–0.56*	*0.94*	*0.75*	1							
XROPEN	N	0.04	*0.25*	*0.25*	*0.38*	*0.37*	*–0.17*	0.11	0.06	0.21	*–0.46*	*0.54*	*0.44*	*0.58*	1						
XRCOMP	O	–0.05	*0.48*	*0.46*	*0.51*	*0.51*	*–0.34*	0.08	0.10	*0.27*	*–0.55*	*0.91*	*0.70*	*0.86*	*0.75*	1					
LNRADIO	P	*–0.35*	*0.69*	*0.67*	*0.80*	*0.81*	*–0.68*	0.13	*0.21*	0.16	*–0.61*	*0.46*	*0.60*	*0.48*	*0.36*	*0.43*	1				
WISP	Q	*–0.43*	*0.79*	*0.79*	*0.92*	*0.93*	*–0.75*	0.11	0.15	–0.20	0.14	0.05	–0.10	0.07	–0.04	0.04	–0.05	1			
EFregul	R	0.11	*–0.51*	*–0.48*	*–0.71*	*–0.72*	*0.52*	*–0.25*	–0.12	–0.03	*0.41*	*–0.40*	*–0.48*	*–0.42*	*–0.25*	*–0.37*	*–0.67*	*–0.64*	1		
Ex-pays socialistes	S	–0.11	–0.01	–0.01	–0.04	–0.05	0.00	–0.05	–0.01	–0.08	–0.10	–0.11	–0.14	–0.06	0.06	–0.04	0.03	0.07	0.12	1	
Trad. Scandinavian	T	*–0.37*	*0.43*	*0.52*	*0.32*	*0.33*	*–0.41*	0.00	0.05	–0.12	–0.14	0.20	*0.26*	0.20	0.08	0.16	*0.29*	–0.15	–0.16	–0.03	1
Civil law	U	0.09	–0.09	–0.12	–0.06	–0.07	0.05	*–0.30*	–0.16	*0.27*	–0.04	–0.10	0.04	–0.13	–0.01	–0.10	–0.08	0.14	0.14	–0.17	*–0.25*

Note: In italic, significant values, alpha = 0,050 (bilateral test).