A new indicator of Core Labour Standards

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Abstract

The paper develops a new methodology in order to build an aggregated index of core labour standards. Thanks to Multiple Correspondence Analysis, we aggregate different measures of the internationally recognized core labour standards in order to determine endogenously the weight of each variable in the scalar index.

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JEL classification: J80, C43

1   Introduction

There has been an international debate on the relations between core labour standards and international trade (Brown 2000), foreign direct investment (Kucera 2002) or economic growth (Bazillier 2005). However, a significant part of this literature use an unclear and vague definition of labour standards. To measure the effects of core labour standards, one of the fundamental issue is the definition of these standards, the data available to measure each of these standards, and the methodology chosen to aggregate the different standards.

So far, the empirical studies available in the literature use very heterogeneous definitions and measures of these standards. We can mention two main problems concerning the different measures of labour standards: a problem of definitions and a problem of difference between the law and the effective enforcement of these standards.

Concerning the first problem, we assume to focus only on the *core* labour standards (Prohibition of Child Labour, Freedom of association and collective bargaining, Prohibition of discrimination, prohibition of forced labour), as recognized by ILO (Declaration on Fundamental Principles and Right at Work) and by OECD (1996). OECD justifies these choices by two arguments: they are a fundamental part of the Human Rights and their respect carries more efficiency. ILO speaks about fundamental rights of workers which can be applied everywhere whatever the stage of development. Following these definitions, an

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index of core labour standards cannot take into account the *cost standards* (minimum wage, working time, social security...) , as defined by Aggarwal (1995).

We also assume to measure the effective enforcement of core labour standards and not the legislation concerning these standards. This *de facto* approach is preferred to the *de jure* consideration because of the frequent gap between the legislation and the reality (Child labour is illegal in a lot of countries but still exists). Of course, there is a link between legislations and enforcement of the norms. But it cannot be considered as the only way to measure it effectively. That is why we propose to take into account the ratification of ILO's convention only as a part of our global index.

Ghai (2003) proposes an alternative methodology. It is a very interesting approach based on the lack of decent works in several fields. However, the notion of decent work is broader than the one of fundamental rights of workers or the one of core labour standards. Kucera (2001) proposes a complete methodology to measure fundamental rights at work. We propose a complementary measure with an aggregation strategy.

Considering the existing problems in the literature concerning the measurement of these standards, this paper focuses on a new aggregated indicator measuring the effective level of core labour standards. We will first introduce the indicators measuring each of the standards and then present the scalar index.[1]

2 Presentation of the indicators

We propose five distinct indicators measuring child labour, freedom of association, forced labour and ratification of ILO's convention. Each of these indicators aggregates different sources of information in order to minimize the statistical bias or the lack of data. For each of these indicator, we build 5 categories in order to normalize each of the measures. A value of 1 indicates a very good level of labour standards, a value of 5 a very weak level.

2.1 Number of Conventions Ratified (NR)

We assume to take into consideration the number of conventions ratified as a proxy of the political will concerning the promotion of labour standards. We build a formula which gives a higher weight at the core conventions and takes a value between 0 and 1:

$$NR_{raw} = \frac{N_1 \times (N_2)^2}{11776} \tag{1}$$

With N_1 the total number of conventions ratified and N_2 the number of core conventions ratified. NR_{raw} will be equal to 1 if the country has ratified the 184 conventions and the 8 core conventions. We obtain a value for each country and then classify the countries into five categories. Because of a lack of critical values, the classification is done by quartile. NR=1 is the group of countries which has ratified the highest number of conventions[2].

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[1] Details of the indicator are available upon request.

[2] The maximum values is taken by Spain (0.695). The critical values are: 0.31 for the frontier between NR=1 and NR=2, 0.19 for the frontier between NR=2 and NR=3, 0.13 for the frontier between NR=3 and NR=4 and 0.05 for the frontier between NR=4 and NR=5

2.2 Child Labour (CL)

The most relevant measure of child labour is the percentage of children between 10 and 14 years old who works. However, there is an evident statistical bias for a significant number of countries. We consider a country with a very low percentage of children who goes to primary school has a very high probability to have a problem of child labour. Thus, we adjust the percentage of children between 10 and 14 years old who works by the percentage of children who does not go to primary school. This adjusted indicator is an attempt to correct the statistical bias. We then obtain the following formula:

$$CL_{adjusted} = \max('CLraw'; \frac{CL_{raw} + Percentage\ of\ children\ who\ does\ not\ go\ to\ primary\ school}{2}) \ (2)$$

With CL_{raw} the percentage of working children between 10 and 14 years old. The value we obtain is an ordinal value and cannot be seen as a 'percentage' of working children. We then classify the 165 countries into five groups. The critical values are chosen to determine characteristic groups[3].

2.3 Freedom of Association and Collective Bargaining (FA)

We take into account three sources of information: the unionization rate, the number of ILO conventions on freedom of association ratified by the country, and the civil rights Freedom House Indicator. Freedom of association can be seen in a quantitative or in a qualitative way. Our index must describe the two phenomena.

The Unionization rate (UR) gives an information on the level of freedom of association. However, it cannot be the only tool used to measure this standard. The unionization rate can be very high in countries in which freedom of association is weak (unique union, compulsory of union membership..) or low in countries in which freedom of association is good. Moreover, the data is only available for a few number of countries. Despite of this problem, it is the most reliable indicator concerning the quantitative aspect of freedom of association.[4]

The second indicator is the number of ratifications of ILO conventions on freedom of association (CFA). Six conventions[5] concern this standard)[6].

The Civil Rights index of Freedom House (FH) is the third instrument to measure freedom of association. It is broader measure of civil rights, not only on freedom of association at work. It includes freedom

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[3]Group 1 contains countries with adjusted CL between 0 and 1 (46 countries); Group 2 between 1 and 5 (31 countries); group 3 between 5 and 15 (36 countries); group 4 between 15 and 30 (24 countries) and group 5 higher than 30 (27 countries).

[4]We also propose a classification into 5 groups with 35%, 23%, 15%, and 8% as critical values. For countries without data on the unionization rate, UR takes the average value between the two other indicators.

[5]the Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87), the Right to Organise and Collective Bargaining Convention, 1949 (No. 98), the Collective Bargaining Convention, 1981 (No. 154) ; the Workers' Representatives Convention, 1971 (No. 135) ; the Rural Workers' Organisations Convention, 1975 (No. 141) ; and the Labour Relations (Public Service) Convention, 1978 (No. 151)

[6]If the country has ratified more than four of these conventions, it is included in group 1 (45 countries) ; three conventions in group 2 (37 countries) ; two conventions in group 3 (51 countries) ; one convention in group 4 (17 countries) and no convention in group 5 (15 countries)

of association and belief, rule of law and Human Rights, personal autonomy and Economic Rights. All these variables are correlated to the level of freedom of association which justify the use of this indicator[7]

The aggregated indicator of Freedom of Association (FA) is the average between UR, CFA and FH.

2.4   Discrimination (DISCRI)

We assume that discrimination is a multidimensional phenomena with a problem of discrimination in education linked to the problem of discrimination in employment. We measure the discrimination with five variables: differences in alphabetization rates, differences in schooling rates, differences in income, gender empowerment measure (GEM) of UNDP and female activity rate. Data are not available for all variables and all countries. The condition to measure DISCRI is to have, at least, two indicators available measuring both discrimination in employment and in education. DISCRI is then the simple mean of all the indexes available. We then classify the 155 countries into five groups (with 1.5, 2.5, 3.5 and 4.5 as critical values).

2.5   Forced Labour (FL)

The definition of forced labour used here is the following:*"Forced or compulsory labour" is defined as work or service exacted under the menace of penalty and for which a person has not volunteered.*

We use several sources: Busse and Braun (2003), Antislavery and ICFTU (2001), ILO (2001) and US Department of State (2002).

Busse and Braun (2003) built two indexes: one of the core form of forced labour (scale from 0-5) and another one for all forms of forced labour (scale from 0-9). Considering it is more crucial to focus here on the core form of forced labour, we propose the following formula:

$$FL_{raw} = FORCED1^2 + FORCED2 \tag{3}$$

With FORCED1 the indicator for core forms of forced labour and FORCED2 the indicator for all forms of forced labour. We then obtain values between 0 and 7.5 and we propose the following classification: FL=1 for countries with $FL_{raw} = 0$, FL=2 for countries with FL_{raw} between 0.5 and 1, FL=3 for countries with FL_{raw} between 1 and 2, FL=4 for FL_{raw} between 2.5 and 3.5, and FL=5 for $FL_{raw} > 3.5$.

For the missing values in the index of Busse and Braun (2003), we rebuilt a similar index thanks to the other sources of information, operating a distinction between core forms and all forms in order to obtain a comparable value.

3   The aggregated indicator of Core Labour Standards

The main goal is to find a correct measure of the *global* enforcement of core labour standards. The easiest way to obtain this would be to sum the different indexes. However, this choice is not completely

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[7]In order to keep the classification into five groups, we propose to have the following composition. The group 1 is the one in which countries have a FH rating between 1 and 2. The group , a FH rating of 3 ; the group 3, a FH rating of 4 ; the group 4, a FH rating of 5 ; and the group 5, a FH rating between 6 and 7.

satisfactory because it will introduce a bias in the global measure of these standards for two main reasons:

- Summing each index of each standard to obtain a scalar index would mean that each norm has the same explanatory power to explain the global level of workers right. We have a different hypothesis considering that the discriminating power of each standards could differ.

- We have to take into consideration the difficulty to obtain good data, without statistical bias for each standard. As we already noticed, there is a real problem of data and imperfect information. If we suppose the existence of a 'common tendancy', here the global enforcement of core labour standards, we have to isolate the effects of each standard of this common tendancy, and delete all the other effects (statistical bias or measure of a different information). Data analysis is a good tool to fulfill this kind of goal by isolating the common factors between different variables.

We have different indexes measuring different aspects of labour standards. We want to find a good and a global index of the level of enforcement of workers right and not the level of enforcement of each of these standards. The global level of workers right is unobserved. Multiple correspondence analysis can provide this measure.

3.1 Multiple Correspondence Analysis

Multiple Correspondence Analysis (MCA) is a mathematical technique allowing an analysis of different discrete variables by projecting on different axis the common information contained into these different variables. The goal is to reduce the number of dimensions minimizing the loose of information.

The variables (here each index of labour standard) are treated via their different modalities. In brief, correspondence analysis can only be used if it is possible to create one or several contingency table, in which the sums of rows and columns have a signification. If there are more than two variables, it is then possible to build a Burt Table which is a representation of all the contingency table of each two variables. MCA can then be defined as a correspondence analysis of the Burt Table. Contrary to the Principal Component Analysis, correspondence analysis studies the profiles, i.e. the set of relative frequencies of each modality and not their absolute weight. These values are used as weights (or masses) in the calculation of weighted distances. Mass affects the centroïd, i.e. the position of the middle of the cloud of points. The distances between different profiles (rows or columns) are calculated thanks to the Khi-2[8]. Then, with this specific definition of the distance, we use the same method as in a simple scatter of points analysis: MCA can reduce the number of dimensions thanks to projections on different planes. The goal is to minimize the loose of information (symbolized by the total inertia, which represents the global dispersion of the new scatter). The first axis is then defined by the one which has the highest inertia (see Benzecri (1992) or Greenacre (1984) for more details).

The attentive reader may rightfully ask why we decide to use *multiple correspondence analysis* and not

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[8]The choice of the Khi-2 distance is justified by the property of distributional equivalence. If we aggregate two identical rows profiles, we do not modify the distance between columns profiles. The distance between two row profils i_1 and i_2 is so defined by $d^2(i_1, i_2) = \sum_n^{j=1} \frac{1}{f_j} (\frac{f_{i_1 j}}{f_{i_1}} - \frac{f_{i_2 j}}{f_{i_2}})^2$

principle component analysis (PCA), generally used in this kind of studies[9]. To this attentive reader, we can answer that PCA is a method adapted for quantitative and continuous variables while correspondence analysis is used to analyze qualitative, discrete or ordinal values. A strong point of this method is that we can explore non-linear relations between variables, which is not possible with PCA. PCA can be seen as an analysis of correlation between variables. However, a null correlation between two variables does not mean that there is no relation between the variables but that the relation of first degree is null. MCA allows to explore the relations of degree higher than one, mainly because it is an analysis of the relations between different *modalities* and not *variables*.

3.2   MCA and the aggregated indicator of Core Labour Standards

Thanks to MCA, we have different axis explaining different aspects of the respect of core labour standards. The question is then how many axis (or factor) to retain in order to have a good description of the whole phenomena. For that, we study the inertia (or Eigenvalues) of the singular values. The percentage of explanation of the total inertia by the first singular value has to be sufficient in order to retain only one factor. In our case, the first factor has an inertia of 0.152, which explains 72.5% of the total inertia. We assume it is enought to retain only the first factor. It is then possible to endogenously determine the weight of each variable in the aggregated index of core labour standards. The weight of a variable is the sum of the absolute contribution (to the inertia of the first factor) for each modality. Consequently, our composite index (LS) is defined by the following formula:

$$LS = (0.1888 * NR) + (0.2426 * CL) + (0.2659 * FA) + (0.1266 * DISCRI) + (0.176 * FL) \quad (4)$$

The index is built for 155 countries. It gives an higher weight to standards reflecting a political will (freedom of association and child labour) and a lower weight to discrimination which reflects cultural or religious factors.

4   Conclusion

This index has two main strong points:

- It is based contrary to other empirical works on labour standards, on a clear definition of these standards supported by a real international consensus of international organizations, governments and scientists.

- The aggregation method improves qualitatively the index. Data analysis allows us not to take into consideration all the statistical bias or imperfection of the data.

We obtain an indicator measuring the *global* enforcement of core labour standards for a large number of countries. After the ILO Declaration on Fundamental Principles and Rights at Work, the government,

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[9]Correspondence analysis has been relatively little used in social science research in the United Kingdom or in the United States. However, the french scientists, for example, use much more this technique, following the work of Benzecri (1992)

Table 1: Indicators of Labour Standards: Descriptive Statistics

	NR	CL	FA	DISCRI	FL	LS
High Income Countries	2,45	1,48	1,87	2,42	1.57	1.97
Medium Income Countries	2,62	2,05	2,81	3,40	1.98	2.53
Low Income Countries	3,4	4,05	3,73	3,38	2.35	3,45
Arab States	3,53	2,6	4,6	4,8	2.6	3.59
East Asia and the Pacific	4,67	3	3,53	2,93	2.33	3.33
South Asia	3,67	3,33	3,83	4,83	4.5	3.92
Latin America and the Carribean	2,12	2,27	2,46	3.58	2.03	2.41
Sub-Saharian Africa	3,26	4,33	3,5	3,69	2.04	3.42
Eastern and Central Europe	2.58	1.67	2.75	1.62	1.83	2.15

employers' and workers' organization involved them self in the promotion of these four labour standards and not one among the four. It is then necessary to have a comprehensible tool to measure the level of these core labour standards in different countries. The next step will be to build a temporal index in order to have an evaluation of the *evolutions* of labour standards.

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