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Rethinking trade union density: A new index for measuring union strength

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Abstract

Although trade union density is the most influential and most commonly used indicator to map trade union strength, comparing between countries and time, the author argues that trade union density is lacking both specificity and comparability. Additionally, many studies on industrial relations neglect developing countries. Therefore, the paper offers a new concept based on a combination of different theoretical approaches that identify determinants of trade union strength involving developing countries. On that basis, the author creates a novel, composite index that is better at capturing trade union strength than previous indices. First evaluations of this collective labour force index, which covers the years 2000 to 2016 in 72 countries, show that it is quite capable of doing so.

1 | INTRODUCTION

The most influential and commonly used comparative measure of trade union strength is union density (e.g. Crouch, 2017, p. 49; Flanagan, 1999, p. 1165; Visser, 2006, p. 38; Western, 1997, p. 15). Union density quantifies the share of union members in all gainfully employed persons. In research, the share is frequently utilised to draw comparisons over time and between countries. However, I argue that the comparability of trade union density and its use is highly problematic for two main reasons: conceptual narrowness and regional bias. Therefore, in this paper, I propose a new measure of union strength. This measure overcomes the two central

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shortcomings of the existing approach in two ways. One is to take a more detailed examination of the determinants of union strength, and the other is to explicitly include developing countries.

First, a detailed examination of the determinants is necessary because union density is a more multifaceted phenomenon than can be captured by the mere share of union members. On the one hand, union density may be high in some countries where labour movements are not able to exercise authority in politics and at the workplace when it comes to improving the material, social and legal position of their members. We can exemplify this logic by looking at China. In 2008, the All-China Federation of Trade Unions had a membership rate of 184% (International Labour Organization [ILO], 2018). This high rate not only illustrates that non-working people get included in China's official statistics. Additionally, it is questionable whether the All-China Federation of Trade Unions actually places the interests of its workers and the protection of their rights in the foreground. On the other hand, unionisation in some countries may be nominally low, but trade unions might nonetheless exercise authority in politics and at the workplace. France is a prime example for this contradiction. Its trade union density levels off at merely 8% in the 2000s (*ibid.*). Nevertheless, the power of French labour movements is considered to be strong and independent of the actual number of members (Bean & Holden, 1994, p. 7).

We can also observe in other countries that 'the very concept of membership and of what it means to take a membership card does not translate across countries' (Visser, 1991, p. 99). Thus, there are different incentive structures for membership and different ranges of union influence: There are countries with independent unions, countries with rather monopolistic union representation (as in Cuba) and countries that ban unions (as Saudi Arabia does). There are unions that predominately operate and negotiate either centralised, decentralised, sectoral or with a single employer. Unions with closed shop agreements (as in Canada or the United States) or unions that govern unemployment benefits (as in Denmark). Eventually, there are different modes of labour market regulation: Reaching consensus in decision-making in either bipartite (as in Germany) or tripartite arenas (as in Mauritius), negotiations in some countries can be rather conflictual/pluralist (as in France) or rather institutionally consensual/corporatist (as in the Scandinavian countries). To conclude, union membership and the functions of a union itself differ between states in ways that go beyond density rates. The concept of union density as a measure for trade union strength is quite frankly to narrow.

For the second shortcoming, I argue that the disproportionate focus of industrial relations research on affluent democracies adversely affects the idea of broad comparability. Labour movements in non-industrialised countries seem to be neglected by research (see Lawrence & Ishikawa, 2005, p. 3 f.; Martin & Brady, 2007, p. 579). If anything, industrial relations in developing countries get analysed in terms of case studies or the comparison of a small number of countries. Comparatively little is known about union strength in non-industrialised countries due to a lack of quantitative data on industrial relations (Bazillier, 2008, p. 18). Considering the international division of labour and the increasing involvement of developing countries in the world market, the status of dependent workers and the perception of the potential that labour movements can unfold should not be overlooked.

To address these research gaps, my paper explores how the strength of trade unions can be captured in a comparative way and with the inclusion of developing countries. Assuming that trade union strength is a multifaceted phenomenon, various manifestations of this strength are therefore systematically assessed at different levels in a variety of countries hereafter. The

ultimate goal of this paper is to create an index that is capable of quantifying these manifestations and making them comparable.

2 | PREVIOUS RESEARCH

Union density is a good indicator of labour movements being able to attract mass support and to mobilise for industrial action (Golden et al., 1999, p. 189). Union density is also able to map changes in the ‘legal-political, social, and economic environment of labor unions’ (Visser, 2006, p. 38) displayed by large variations in that indicator. But that only holds true for analysing the state of trade unions in one country—that is, inner-state comparisons.

As for the lack of conceptual narrowness, trade union density as a measure for cross-national comparisons is not capable of drawing valid conclusions. Why? Particularly because the functions of trade union vary from country to country, as do the conditions of membership, the mode of operation and regulation. Due to different underlying organisational, political and societal systems of worker representation, the level of union density in one country is not transferable and, in this sense, not directly comparable with that of another country. At the same time, the share of employees engaged in a trade union does not give information about the assertiveness or power of a trade union—two elements that are at the heart of studying the effects of trade union density.

Other authors have come to the same conclusion. Over 40 years ago, Armstrong et al. (1977) already concluded that, as a proxy variable for trade union power, union density encounters both statistical and conceptual problems (ibid., 92). They subsequently put forward a claim for ‘the development of a more detailed theoretical analysis of the sources, weapons and objectives of union power’ (ibid., 98). Rather theoretically motivated, Kirkbride’s (1985) main argument is that the concept of power is a lacuna in industrial relations theory (ibid., 265). Kirkbride states that ‘[d]ensity of membership may enable power to be exercised, but it fails to describe the sources or basis of that power in terms other than weight of numbers’ (ibid., 273). Some years later, Kelly (1998) comes to a similar conclusion and remarks that ‘[p]ower is perhaps one of the most widely used concepts in the field of industrial relations but at the same time [...] one of the least well understood’ (ibid., 5). As a proxy for trade union power, he regards union density as unreliable and possibly invalid (ibid., 10). Similarly, Flanagan (1999) explains that union density ‘captures neither the scope nor the intensity of union influence’ (ibid., 1172). Due to sufficiently varying factors across countries which determine trade union power, he especially suggests to refrain from cross-national comparisons (ibid., 1166). Visser (2006), who prominently developed a database on institutional characteristics of trade unions and other features related to the labour market for 55 countries (ICTWSS), does not refuse the use of trade union density completely. If, he states, union density as an expression of union strength is ‘defined and measured in a comparable way, it [...] provides a useful comparative indicator’ (Visser, 2006, p. 38). Having said this, he underlines that union density as a full measure is inadequate. In this sense of not telling the whole story, Visser accordingly advocates to include other relevant indicators of union strength, such as bargaining coverage, into industrial relations analyses.

Still, research so far either ignores or overlooks these conceptual and methodological constraints. Contrary to the above cited and other critics, trade union density surprisingly remains the most commonly used and most influential measure. Most researchers use this measure by referring to this commonness or influence and pointing out that it is the only measure available

(see Crowley, 2004, p. 400; Scruggs & Lange, 2002, p. 129 ff.) or treat union density and union power synonymic (see Crouch, 2017, p. 54; Golden et al., 1999, p. 189; Traxler et al., 2001, p. 79). Others are aware of the inadequacies of using trade union density—most notable the difficulty of cross-national comparisons—but incorporate a few more factors in their analysis (e.g. Korpi, 1983, p. 39 ff.; Visser, 1992, p. 17). This usually happens in form of including the collective bargaining coverage or by measurements of corporatism, centralisation or the Ghent system.

In fact, it is difficult to use a more comprehensive indicator because there is no applicable alternative, especially when it comes to developing countries. But this is precisely another limitation of industrial relations research: The focus on affluent democracies (see Crouch, 2017; Scruggs & Lange, 2002; Visser, 2006).¹ Within industrialised countries, the difficulty of comparability already exists. Including non-industrialised countries in the analysis creates an even more complex picture. Indicators such as corporatism or the Ghent system, which can be part of the analysis of trade union strength, are not applicable because such structures usually do not exist.

However, there have been approaches in industrial relations research that counter the conceptual and methodological constraints as well as the limitation to industrialised countries and thus offer alternatives to union density. Apart from studies using individual-level data from the World Values Survey (WVS) to trace determinants of trade union power or membership (see Kerrissey & Schofer, 2018; Martin & Brady, 2007), there are two studies that have created indexes that measure trade union strength alternatively and cross-nationally. On the one hand, there is McGuire's (1999) labour strength index (LSI) for 16 Latin American and East Asian countries in the mid-1990s.² His approach is to combine union density, collective bargaining coverage, the dominant level of collective bargaining and the ratification of six major ILO conventions into a single index. This paper will follow a related approach, although here further influencing factors and countries are included and the way of compilation into an index is somewhat more advanced. On the other hand, there is Rudra's (2002) potential labour power (PLP) index, which measures possible union power resources in a country due to its mobilisable dependent employees in 53 least developed countries from 1972 to 1995. This happens by dividing the number of skilled workers by the number of unskilled and relative to surplus labour as per cent of working-age population. Thus, 'PLP decreases as the number of low-skilled workers increases relative to skilled workers, and as surplus labor expands' (ibid., 426). The name of the index is therefore to be understood literally, in that it is actually about potential. However, both indices did not include developed and developing countries at the same time and, more importantly, are no longer up to date.

In sum, there is a gap in research on industrial relations of methodological and conceptual nature. Therefore, and for building a bridge to the beginning of this section, the following section addresses 'a more detailed theoretical analysis of the sources, weapons and objectives of union power' (Armstrong et al., 1977, p. 98).

3 | CAPTURING TRADE UNION STRENGTH

Density is not equal to strength. What is trade union strength then? As stated before, industrial relations research is lacking of a universal theoretical concept or definition (cf. Kelly, 1998, p. 9; Kirkbride, 1985, p. 265). Therefore, I will reconcile several studies that define union strength or rather its sources. My approach for this endeavour was to collect empirically and theoretically

derived information, that is, factors that positively or negatively affect union strength. In doing so, I concentrated on the factors that find much mention in the relevant literature dealing with both developed and developing countries. In addition to the factors presented shortly, these were variables such as strikes and lockouts, leftist governments, inflation or debt levels. However, statistical tests of all variables revealed that they do not help to explain the global variance in union strength.

For pursuant to this theoretical step, I statistically tested all potential factors in order to ensure that a correlation is not spurious but systematic. Therefore, I created a proxy of trade union strength and collective bargaining coverage through addition. The assumption behind this compilation is that these two indicators initially come closest to the concept of union strength to be measured. Whereas union density exemplifies the potential bargaining pressure unions in a given country can assert in case they strike, collective bargaining coverage illustrates the effectiveness of collective negotiations (see Flanagan, 1999, p. 1165; Lawrence & Ishikawa, 2005, p. 19; Visser, 2006, p. 38 f.). They thus form the bottom line in two different spheres. In the literature, these two indicators are treated as the prerequisite of union leverage (Visser, 2006, p. 38 f.).

Although it has been explained in depth why union density is error-prone, I utilise it, in conjunction with another indicator, in order to approach the concept of strong unions statistically. So, in a sense, I am using the Visser's (2006) approach to conjunct trade union density and collective bargaining coverage. What drives me to use such a proxy is that I do not want to leave the selection of influencing factors to theory alone. That is, the identification of the factors takes place both theoretically and statistically. For the latter, I need a proxy to detect simple correlations. Both the review of theoretical concepts and my empirical analysis in a first step have shown that union strength is significantly determined by nine factors that I assign to an *associational*, *structural* and *institutional* dimension (cf. Dörre, 2017; Silver, 2003; Wright, 2000).

3.1 | Associational strength

A first approximation for the classification of trade union strength in dimensions is Wright's (2000) categorisation. Wright assumes that the strength arising from the formation of workers in collective organisations constitutes what he terms associational strength (*ibid.*, 962). This power dimension derives primarily from trade union density, as it arises from the association of workers in trade unions, cooperatives or political parties (see *ibid.*; Traxler et al., 2001, p. 74). Dörre (2017, p. 108) adds that this form of power also requires the readiness for conflict, the ability to mobilise and the inner commitment of members. Silver (2005, p. 30 f.) also points out that associational strength is made up of different forms of power. In line with these extensions, I supplement trade union density with two others determinants of associational strength.

I have previously outlined the difficulties in using *union density*. The focus of criticism, however, was the exclusive use of the term and its synonymisation with union strength. But as one influential factor among others, union density represents a piece of the puzzle in explaining union strength. The rationale behind the influence of membership is, with an increasing number of people who are potentially willing to down tools and engage in a strike, unions can exert more negotiating pressure on employers (see Golden et al., 1999, p. 189). Trade unions with a large number of paying members are also able to comprehensively support their members, to mobilise additional members, legally protect their members, and do lobbying in order to become more involved in legislative initiatives (see Ebbinghaus & Visser, 1999, p. 135 f.;

McGuire, 1999, p. 11; Wallerstein, 1989, p. 481). Therefore, trade union density is, among other factors, related to union strength.

One of the most popular additional measures of union strength alongside union density is the collective bargaining coverage (Golden et al., 1999, p. 202; Kelly, 1998, p. 54; Mosley & Uno, 2007, p. 927; Visser, 2005, p. 367). This follows from the fact that the share of workers covered by collective agreements is able to showcase the influence of trade unions in promoting working and salary conditions of dependent employees on labour markets. If compared with union density, collective bargaining coverage therefore appears to rather indicating the effectiveness of collective organisations, whereas density exhibits potential union bargaining pressure (cf. Visser, 2005, p. 367).

Eventually, *centralised collective bargaining* fosters stronger trade unions (cf. Bean & Holden, 1994, p. 7; Crouch, 2017, p. 54; Scruggs & Lange, 2002, p. 138). By negotiating and extending agreements industry- or nation-wide, centralised bargaining is claimed to increase employers' acceptance of trade union in their firm (Checchi & Visser, 2005, p. 6; Wallerstein & Western, 2000, p. 359) and lower union costs due to a dispersion across different sectors (Western, 1997, p. 8). At the same time, centralisation may 'reinforce the government's interests in maintaining strong unions' because of 'its potential macro-economic benefits' (Scruggs & Lange, 2002, p. 138).³

3.2 | Structural strength

In contrast to associational strength and according to Wright (2000, p. 962), *structural strength* arises 'from the location of workers within the economic system' (see also Checchi & Visser, 2005; Silver, 2005; Wallerstein & Western, 2000). Western (1997, p. 7) also describes the structural logic of union growth as depending on the market power of workers, which faces similar impacts of capitalistic labour markets across times and places. Wright (2000, p. 962) further notes that this dimension of worker's power 'results directly from tight labor markets or from the strategic location of a particular group of workers within a key industrial sector'. Therefore, I will introduce the labour force participation rate, the sectoral composition and the presence of democracy as structurally contributing to trade union strength.

As Wallerstein (1989) puts it, '[s]ize matters because union power in collective bargaining depends on the proportion of substitutable workers who will respect a strike, while the costs of recruitment depend in part on the absolute number to be recruited' (ibid., 494). For the interpretation of the employment-to-population ratio, the ILO (2015, p. 10) states that a high share of the population in employment may indicate that there are few unemployment or social security benefits or an abundance of low-skilled jobs. Conversely, a low ratio may indicate that more people are unemployed or not part of the working population. What is relevant for unions in this context is that the cost of organising increases as the size of the labour force increases (Wallerstein & Western, 2000, p. 360). Thus, in smaller labour markets, the increase is easier and cheaper to achieve (Lewkowicz & Lewczuk, 2018, p. 39). In this sense, trade union strength is therefore depended on the *labour force participation rate* (see also Checchi & Visser, 2005, p. 12; Piazza, 2001, p. 424; Wallerstein, 1989, p. 494; Western, 1997, p. 119).

The presence of trade union varies between industries. Therefore, the sectoral composition of the economy generates a structural condition for trade union strength. As it is less likely that workers are organised in some sectors, union strength is negatively affected in economies in which these sectors constitute a large proportion. Following the industrialisation argument,

trade unions in most countries experienced a boost as agriculture declined. Because it is more difficult for several reasons to organise workers in smaller, scattered farms or those which are subsistence farmers, a large *agriculture* sectors impede strong trade unions (cf. Martin & Brady, 2007, p. 566; Wallerstein, 1989, p. 491; Western, 1997, p. 16).⁴

A last structural condition on trade union strength is established by *democracy*. If we think about the strength of trade unions worldwide in a comparative way, it becomes clear that there are structures that stand in the way of their exercise. Authoritarian states often suppress trade unions because, as we can see in the history of many states, some of them actively participate in the democratisation process (Martin & Brady, 2007, p. 565; Visser, 2005, p. 404 f.). Democratic societies on the other hand give people the opportunity to actively participate in civic life, to associate and to articulate their interests openly. Labour movements can therefore operate more successfully in democracies (cf. Kerrissey & Schofer, 2018, p. 430; Martin & Brady, 2007, p. 565; Mosley & Uno, 2007, p. 934; Rudra, 2002, p. 431 f.; Visser, 2005, p. 404 f.).

3.3 | Institutional strength

‘[I]nstitutions can assist the growth of labour movements in good times and bad’ (Western, 1997, p. 120). With this statement in his seminal book, Western describes the relevance of institutions for trade unions being powerful and stable in the face of time-varying fluctuations—especially of an economic nature (see also Hyman, 2001; Lewkowicz & Lewczuk, 2018). Dörre (2017, p. 108) seems to grasp this dimension of power in the same way when he writes that institutional power fixes and standardises the results of negotiations or conflicts and preserves them when the balance of power changes. The best way to preserve results of negotiations or conflicts is thus by means of regulations, contracts or laws. The understanding of institutions used here as rules that provide the possibility of sanctions thus echoes North’s (1990).⁵ The following regulations have a collective character, to which all employees of a country can refer to and which were arguably fought for by trade union movements.

The compliance with *ILO’s core labour standards* is the yardstick for measuring the assertiveness and recognition of trade unions on an international comparative basis. Of all ILO conventions, the governing body has identified eight as fundamental. These deal with freedom of association and the right to collective bargaining, forced or compulsory labour, child labour and discrimination. Here, too, union strength is not directly generated. But to put it in the words of McGuire (1999, p. 11), ‘the number of ILO conventions ratified indicates something about the legal and practical obstacles that unions may face in exercising economic and political influence’. The ratification of these central norms therefore serves as an indication of which norms, according to the tripartite structure of the ILO, states, employers’ associations and trade unions consider to be fundamental to their own labour movements (Martin & Brady, 2007, p. 566; McGuire, 1999, p. 11).⁶

Likewise, national regulations, provided by labour law, collective agreements or codetermination, reflect the extent to which collective actors were able to assert and institutionalise the interests of dependent employees (cf. Dörre, 2017, p. 103; Lewkowicz & Lewczuk, 2018, p. 43). For the more workers’ rights can be legally enshrined and protected, the better trade unions were able to enforce them in legislative procedures or collective bargaining. As shown by an empirical assessment of major influences of trade union strength, two regulations account for cross-national variance. These are *hiring and firing* and *hours regulations*.

Trade union strength, as it has just been presented through various theoretical approaches and in its various dimensions, is therefore an aggregated concept. It is also conceivable that other factors have additional explanatory power. For instance, the size of the informal sector, the service sector, the skill mix of the workforce, the access of union representatives to the workplace or the like. Unfortunately, there is virtually no data available in this regard, and I am talking primarily in relation to developing countries. So the choice of variables is also shaped by the tradeoff between having as much coverage as possible by the indicator but also having as much explained variance, say depth, as possible.

Table 1 sums up the individual factors discussed and the direction in which they affect union strength. Table A.1 also contains graphs showing the bivariate relationship between the factors and the proxy from union density and collective bargaining coverage. Although these factors have been identified here as determinants of union strength, they may be equally reinforcing. That is, more ratified ILO conventions can be an outcome of union strength. In this way, a broader base of strength can ensure that individual factors are strengthened, so that it is possible to think in terms of a cycle here.

4 | THE COLLECTIVE LABOUR FORCE INDEX: METHODOLOGY AND RATIONALE

These factors that significantly influence trade union strength and help explain international variance are now being compiled into a composite index. That collective labour force index (CLF) is intended to serve as a (better) alternative to trade union density. Its name not only refers to the strength of trade unions per se but should also illustrate the strength of the respective trade unionists and dependent employees in general who benefit from a strong advocacy of their interests.

As stated before, I have selected the factors in two consecutive steps: a thorough literature review and statistical tests of the possible variables using simple correlation methods with a proxy of trade union density and collective bargaining coverage. The nine variables presented above proved to be the most robust (see Figure A.1 for the bivariate correlations and Table A.2 for the description of the variables). For the aggregation into an index, I z-standardised the variables by adjusting the means and standard variations of each variable to make their units

TABLE 1 Components and expected relationships

Dimension	Factor	Effect
Associational	Union density	+
	Collective bargaining coverage	+
	Collective bargaining centralisation	+
Structural	Labour force participation rate	–
	Share of employees in agriculture	–
	Democracy	+
Institutional	Ratification of ILO core labour standards	+
	Hiring and firing regulations	+
	Hours regulations	+

comparable. Because the variables relating to agriculture and the participation rate in the labour market negatively correlate with union strength, I have reversed them. I have done this with the aim of ensuring that all variables are pointing in the same direction so that higher values are associated with greater union strength.

4.1 | Weighting and aggregation

Central to the aggregation of indices is weighting, that is, determining what percentage of each indicator is included in the composite index. The weighting is based on principal component analyses (PCA). This procedure decomposes the variance of variables that are thought to best represent a latent construct, in our case the strength of unions. The decomposed variance of these variables is then used to construct linear combinations, that is, weights, with the goal of maximising the variation of the newly constructed principal components. Accordingly, it is an objective method for combining a set of variables into a single variable that best represents the original data (Gwartney et al., 2018, p. 7). As Gwartney et al. (ibid.) and Dreher (2006, p. 1093) point out, this method is particularly suitable when several sub-components measure different elements of a main component. This is the case for my index, as will be shown below.

First, I performed a PCA with all nine variables. The result shows that three components explain more than 65% of the variation in the data, that is, in the construct of union strength to be measured (see Table A.1). This is because the first three components have an eigenvalue above 1, which is a quality criterion according to the Kaiser–Guttman rule (see Vyas & Kumaranayake, 2006, p. 460). After the components have been rotated orthogonally for better interpretability, the component loadings show that the theoretically derived proximity of the variables to each other (within the associative, structural and institutional dimension) is also statistically valid (see Table A.1). In other words, the variables that have theoretically been assigned to a dimension beforehand load most strongly on either one of the three components. According to the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy, which specifies a value above 0.5 to be acceptable (Kaiser, 1974, p. 35), the present KMO value above 0.7 also justifies the performance of a PCA.

The proximity of the variables among the dimensions, which becomes visible through the loading of the components within the eigenvectors, led me to not only obtaining the first component. Rather, I obtained the first three component scores as new variables. This threefold approach offers the possibility to take a differentiated look at the performance of states in the respective dimensions and to detect variances here. I therefore aggregated three sub-indices (CLF_{asso} , CLF_{struc} and CLF_{insti}). These sub-indices are uncorrelated among each other and have been panel normalised using the following formula $((V_i - V_{min}) / (V_{max} - V_{min}) * 10)$, where V_{min} and V_{max} are drawn from the values overall years. Accordingly, the sub-indices consist of a scale from 0 to 10, with higher values indicating greater union strength. Subsequently, I estimated the overall CLF index from the sub-indices using another PCA. Here, too, the values have been panel-normalised and correspond to the scaling just mentioned. This procedure provides the following weighting, which can be found in Table 2.

To take a closer look at the structure of the data, the translation of the weights in formulas or linear combinations is also quite intriguing. The scores, that is, indices, were obtained as a weighted sum of standardised variables:

TABLE 2 Components of the CLF index and their weights

Dimension	Weight
Associational	35%
Union density	31%
Collective bargaining coverage	23%
Collective bargaining centralisation	18%
Structural	30%
Labour force participation rate	15%
Share of employees in agriculture	29%
Democracy	24%
Institutional	35%
Ratification of ILO core labour standards	17%
Hiring and firing regulations	22%
Hours regulations	15%

Note: The weights are rounded and were obtained using PCAs. Within the individual dimensions, only those values are displayed that load most heavily on the respective sub-index (accordingly, adding up the displayed values does not result in 100%). The remaining variables are listed in the formulas below and in Table A.1. How strongly the sub-indexes load on the overall index is shown in bold.

$$CLF_{asso} = 0.6913 * density + 0.5227 * coverage + 0.4252 * central - 0.0795 * partici + 0.1479 * agri - 0.1133 * demo + 0.1036 * cls - 0.0898 * hirefire - 0.0906 * hours \quad (1)$$

$$CLF_{struc} = 0.0338 * density + 0.1124 * coverage - 0.1351 * central + 0.3531 * partici + 0.6653 * agri + 0.5678 * demo - 0.1834 * cls - 0.0713 * hirefire + 0.1990 * hours \quad (2)$$

$$CLF_{insti} = -0.1536 * density + 0.1540 * coverage + 0.3066 * central - 0.3189 * partici - 0.1591 * agri + 0.1165 * demo + 0.4548 * cls + 0.5858 * hirefire - 0.4099 * hours \quad (3)$$

$$CLF = 0.5949 * CLF_{asso} + 0.5186 * CLF_{struc} + 0.6141 * CLF_{insti} \quad (4)$$

In addition to the weighting table, these formulas show in more detail with which keys the individual variables contribute to the composition of the indices. Note that the other six variables are included in the calculation of each sub-indicator but to an inconsiderable extent. The sub-indices then contribute to a similar extent to the overall index, which is almost normally distributed. Unfortunately, as data for the nine variables concerned are not available for all countries and as data are not available for all countries in all years, index values are not equally represented. In principle, the CLF index, as mentioned with gaps, covers the period 2000 to 2016 and 72 countries.

4.2 | Assessment

In order to control whether the CLF index is valid and does not deviate fundamentally from other measures that represent a similar construct, I correlated the CLF with such measures. Table 3 shows that there are fairly strong correlations. Unfortunately, it is not possible to include genuine alternative indices for measuring union strength, that is, McGuire's (1999) LSI or Rudra's (2002) PLP, because these indices end in the time series where the CLF begins. Therefore, I have chosen to work with proxies, which give an impression of the representation of union strength. They correlate and are all significant on a 0.01 level.

Although union density is also integrated in the overall index, the rather low correlation suggests that the CLF differs from this indicator. The corporatism measure of Visser (2016), which shows a solid correlation with the CLF, is also included. However, given that this indicator measures a specific manifestation of industrial relations, the correlation shows that the CLF is not misguided. The global rights index of the International Trade Union Confederation (2019) represents respect for workers' and trade union rights. It thus also provides information on the enforcement capabilities of collective actors in a country. The Economist Intelligence Unit's (2019) democracy index obviously does not measure collective representation of interests in the narrower sense but serves as a proxy for the possibility of political participation, protest and for an open political opportunity structure (Doucouliagos et al., 2018, p. 287 f.; Kerrissey & Schofer, 2018, p. 430; Martin & Brady, 2007, p. 564 f.).

In addition to this assessment, I replicated a well-known study that uses union density as a variable (see Tables A.3 and A.4). The aim of this procedure is to demonstrate that this index produces similar results and is therefore valid. I followed the empirical analysis by Dreher and Gaston (2007). They investigate the effect of globalisation on unionisation in 17 OECD countries between 1980 and 1999. The major change compared with Dreher and Gaston is that I do not use union density as the dependent variable but the CLF. The result of the regression analyses is that the CLF gives broadly similar findings. That is, almost the same variables, including the control variables, are significant, and the correlations go in the same direction as in the original study. Similar to that study social globalisation in particular correlates negatively with deunionisation, under control of other factors. In addition, the CLF also correlates positively with economic globalisation. The idea that greater economic integration leads to stronger unions is quite comprehensible (see, e.g., Oskarsson, 2002; Scruggs & Lange, 2002). This exciting result, which provides a supplement to Dreher and Gaston, should be studied by further investigation.

TABLE 3 Correlations between the CLF and alternative indicators

	Collective labour force index	Trade union density (ILO, 2018)	Corporatism index (Visser, 2016)	Global rights index (ITUC, 2019)^a	Democracy index (EIU, 2019)
Trade union density	0.5872 (72)				
Corporatism index	0.8229 (39)	0.3957 (41)			
Global rights index	0.6587 (67)	0.4430 (91)	0.5507 (37)		
Democracy index	0.5855 (72)	0.3236 (98)	0.2115 (41)	0.5351 (135)	

Note: All correlations are significant at $p < 0.01$. Number of countries in parentheses.

^aAs the index rates countries on a scale from 1 to 5 with 1 indicating *sporadic violations of rights* and 5 indicating *no guarantee of rights*, the scaling was reversed so that better respect for rights imply stronger collective labour force.

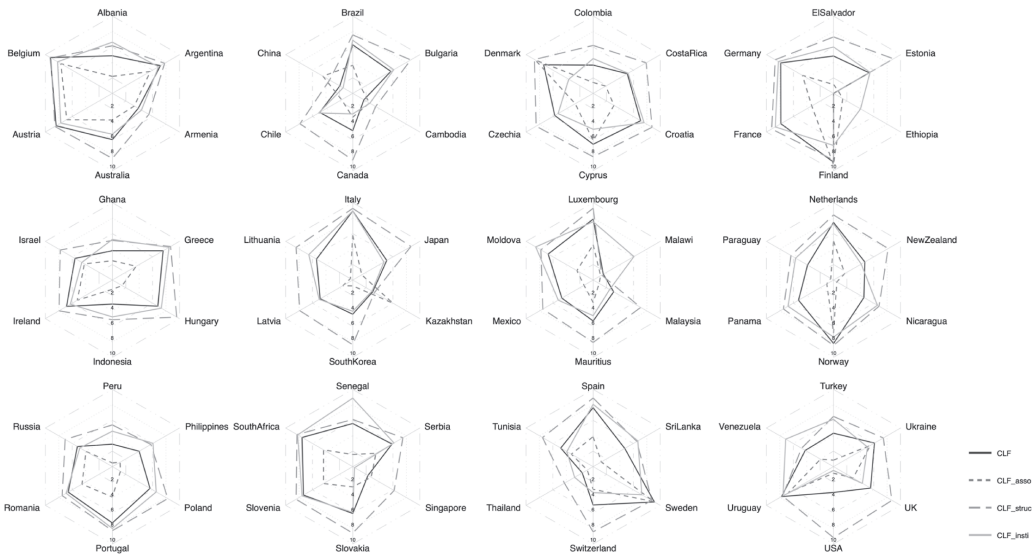
The world map (see Figure A.2) shows the distribution and coverage of the index. The values are based on the averages over the years 2000 to 2016. Unfortunately, due to data availability, I was only able to calculate the CLF for about 37% of the countries in the world. The more variables that were used, the more countries were excluded because one or the other indicator was not available. Thus, the combination of nine variables is subject to the requirement of the largest possible variance explained by the same variables worldwide. The CLF accordingly moves between sufficient depth of the construct to be measured, but also in the desire of breadth to cover as many countries as possible and especially developing countries. In total, the CLF provides information on 36 developed economies, 7 economies in transition and 29 developing economies. Thus, half of the countries represented are non-industrialised. However, an expansion of the CLF with coming years will certainly provide for a broader coverage.

According to the ranking on average over all years (see Figure A.3), the countries offering the world's strongest collective labour force are Belgium and Sweden with a CLF scores above 9. These results are driven by the countries' high degree of labour market regulation, high degree of industrialisation and a strong performance in all tiers of associational strength. Italy comes in third place, which in addition to good structural and institutional performance, has a widespread collective bargaining coverage and a high degree of centralisation. In the following ranks, we have the other usual suspects, meaning countries that according to union density are considered to be strong. However, countries such as France, which ranks 9th, offer an interesting picture. Here, the pluralistic system of French industrial relations is taken into account, in which employees can nevertheless very well assert their demands. This assertiveness, which is not only measured by the number of union members, is now made visible by the CLF. In contrast, China ranks 68th. This makes it apparent that it takes not only a strong membership base but also other enabling resources, conditions and a supportive infrastructure to speak of a strong collective labour force.

As far as the interaction of the individual dimensions is concerned, Figure 1 shows very well how the individual countries perform and that the composite index is not driven by the dominance of a single dimension. This corresponds to the multidimensionality of union strength as established in the theory section. It also takes into account the fact that the determinants of strength have an additive nature.

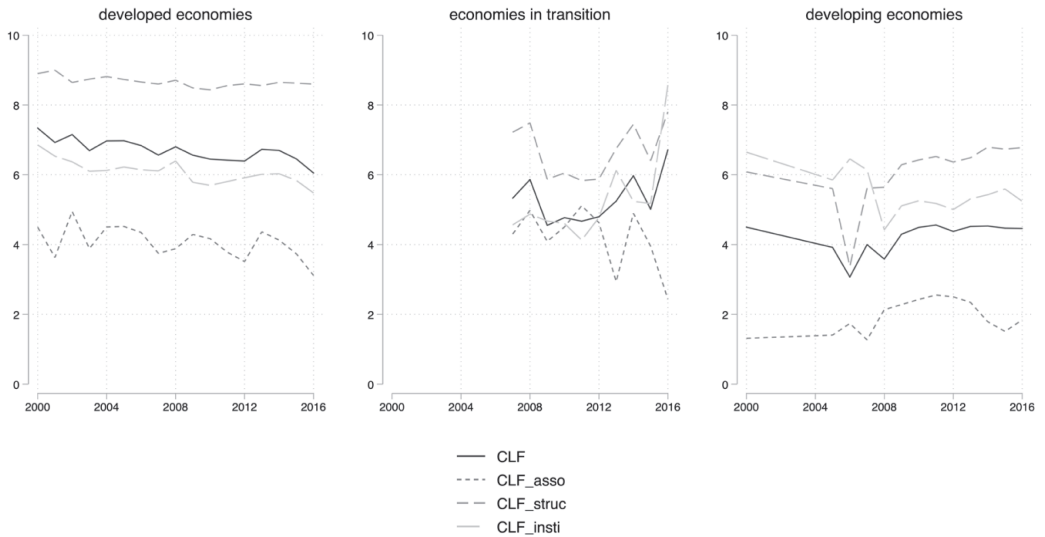
What is interesting to look at here, among other things, are the outliers. Looking at the structural dimension on the one hand, it becomes visible that this dimension is relatively strongly represented in most countries. This means that participation in the labour market and the size of the agricultural sector offer favourable conditions. Exceptions are Albania, Armenia, Cambodia, China, Colombia, Ethiopia, Ghana, Malawi, Peru, Philippines, Senegal, Thailand, Sri Lanka and Venezuela. These outliers (CLF_{struc} under 5) are most likely driven by large agricultural sectors that hamper collective labour strength. On the other hand, there are countries whose institutional sub-index outperforms the others. Namely Albania, Ethiopia, Ghana, Malawi, Moldova, Philippines, Senegal and Venezuela. In these countries, workers' and trade union rights are thus more strongly institutionalised than they are implemented, especially through the associational aspect.

In view of the explicit goal of this research project, the inclusion of developing countries, these two groups of outliers are an interesting observation. It seems that the developing countries listed have a legal infrastructure at the institutional level that safeguards workers' interests. Sceptics may argue that the ratification of ILO's core labour standards is window dressing or that regulations are only on paper. Here, it should be pointed out that the argumentation above shows that here, too, there is a need for collective actors who are allowed to formulate interests



Note: The radar plots show the performance of all countries in the sample in the overall indicator and in the individual sub-indicators. For each country, looking from the name to the center of the radar, the CLF values obtained in each case can be found. The scale ranges from 1 to 10, with higher values being associated with greater union strength.

FIGURE 1 Distribution of the CLF and its sub-indices



Note: The overall indicator as well as the sub-indicators are summarized on average for the respective development levels and their evolution is depicted over time.

FIGURE 2 Trends in the CLF and its sub-indices over time and by development status

and are able to enforce them. In developing countries, there is certainly the potential for trade union strength. This may not surprise some readers. However, as I have said, this does not seem to be reflected in the academic debate. Nevertheless, these countries are lagging behind in terms of the associational dimension and structural components.

This more differentiated picture alone, which provides a broader perspective on developing countries, justifies the use of the CLF, which consists of nine indicators. Using union density alone or in combination with the collective bargaining coverage rate, we would not have been able to obtain such a picture. By using the theoretical considerations of the strength of unions, which are based on Wright's (2000) threefold foundation, it was thus possible to show how different countries are in this respect and what power resources the various countries have.

The potential of developing countries is also exhibited in Figure 2. Here, the temporal trends in the performance of the CLF and its sub-indices are presented according to their respective development status, which is based on the UN classification (United Nations, 2020, p. 165 f.). The figure shows that the overall index has fallen slightly in developed economies and has an all in all positive trend in economies in transition and developing countries. After lows in the mid-2000s, the latter have improved steadily. The developments in these groups are mainly driven by an improved institutional structure and a strengthened structural aspect. Overall, however, the associational aspect in particular is in decline.

5 | CONCLUSION

The strength of collective labour power is in decline. At least in more industrialised countries. This finding, which has been analysed in this article, is in line with other evaluations of the future of class and trade unions in affluent democracies (Brady, 2007, p. 73; Ebbinghaus & Visser, 1999; Wallerstein & Western, 2000). Developing and transition countries, by contrast, are slowly catching up with the higher level that industrialised countries basically have. This is one of the results generated with the help of a novel index, the collective labour force (CLF) index, which allows to analyse the degree of assertiveness of unions and workers from 2000 to 2016 in 72 developed and developing countries.

The construction of this index is motivated by the insufficiency of the trade union density indicator. The latter is equated with union strength in research on industrial relations and beyond and is used to draw comparisons over time and between countries. However, because union strength is a more multifaceted phenomenon than can be expressed in terms of the mere proportion of union members in a country, it must include more factors that have been shown to belong to an associational, structural and institutional dimension. These factors help trade unions and dependent workers to assert their interest in improving the socio-economic situation at the workplace and at national policy level.

Of course, this index cannot address all problems of analysing trade union strength. A major sticking point is the incomplete availability of data, which also makes the CLF patchy. For a not inconsiderable part of the countries of the world, this means that they are not included in the CLF. Certainly, other variables that could have been used to explain the phenomenon could also have been included. Under the condition of a slim design and given the large explanatory power of the variance provided by the nine variables included in the CLF, this aggregated index is still valid.

So far, as I said, there have been two noteworthy attempts to provide alternative indicators of union density with a focus on developing countries. This research project is now a new attempt that challenges the exclusive use of union density and offers a measure that includes countries of different income levels. The theoretical critique of the use of this indicator, which has its origins in the 1970s, must be accompanied by an empirical proposal that offers an alternative. The CLF certainly does not terminate the use of union density. That is not the goal

either. If this only sparks a renewed debate around the criticism of the synonymisation of union density with union strength, and if the multidimensionality of the latter is more strongly recognised, this paper will have served its purpose.

For comparative analyses of the power of workers and trade unions can not only help to understand and explain the nature and variations of trade unions. What they can do is also to shed light on the social, political, and economic developments of societies and markets co-moderated by labour movements. In times of an increasingly smaller and faster turning world in terms of developments that can be roughly attributed to globalisation, this seems to be of particular relevance. After all this work is a first step towards questioning the use of trade union density and offering an alternative to it. Subsequent analytical studies will follow, which put the CLF index into a larger context and test specific arguments and theories which, for example, have so far been tested by means of trade union density.

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ENDNOTES

- ¹ See for a critique of the exclusive focus on industrialised countries Lawrence and Ishikawa (2005) as well Martin and Brady (2007).
- ² McGuire also calculated this index for 93 countries in 1998. Unfortunately, this paper is not accessible.
- ³ For comments critical of centralised collective bargaining, see Hassel (2015).
- ⁴ If this study were limited to industrialised nations, the size of the service sector could also be included at this point. However, because there is a greater variance through the agricultural sector when we think about the sectoral composition of the economy with the inclusion of developing countries, which also became apparent via the empirical analysis, this factor was included.
- ⁵ With this view, the influence of democracy is considered to be structural. Although democracies offer a framework that has sanctioning potential, the institutional factors that now follow are to be understood more as rules in the sense of the neo-institutionalist debate. Thus, the structural dimension is rather aimed at those factors that provide information on how the parts of a system are arranged.
- ⁶ Bearing in mind that legal rights or obligations do not necessarily mean that they are respected and implemented, we nevertheless find differences between countries, which give some indications of how industrial relations are structured in a country. Not least, ILO treaties ratified show whether and to what extent trade unions were able to enforce their demands and anchor them legally.

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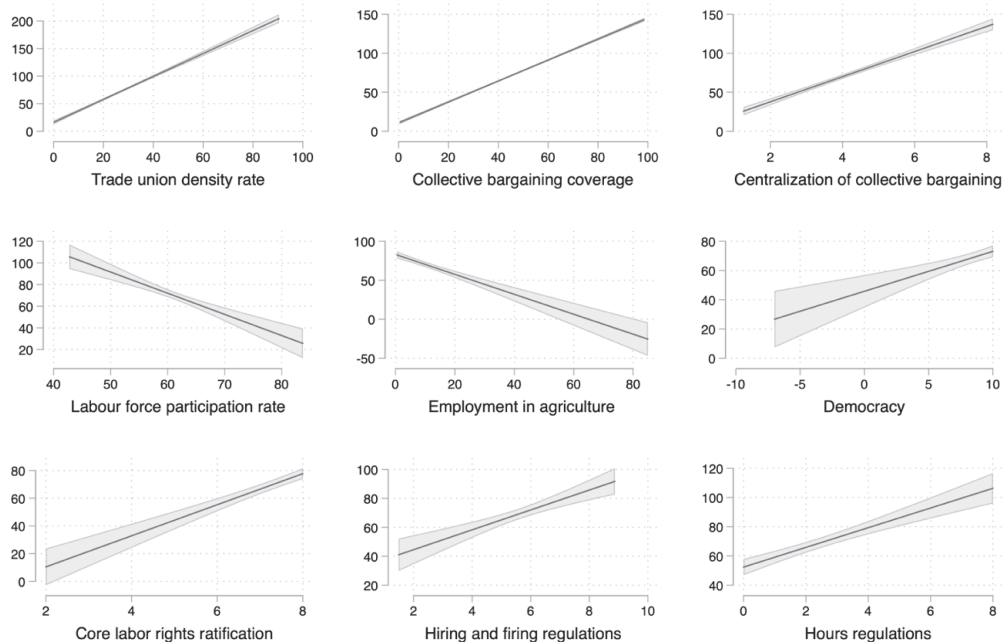
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APPENDIX A.



Note: Correlations with the specified indicators and the proxy for trade union strength (collective bargaining coverage plus union density), indicated with confidence intervals.

FIGURE A.1 Determinants of trade union strength

TABLE A.1 Eigenvectors of the principal component analysis

Variable	Component 1	Component 2	Component 3	Unexplained
Density	-0.1536	0.6913	0.0338	0.1796
Coverage	0.1540	0.5227	0.1124	0.1757
Central	0.3066	0.4252	-0.1351	0.2814
Partici	0.3189	-0.0795	0.3531	0.4866
Agri	-0.1591	0.1479	0.6653	0.2221
Demo	0.1165	-0.1133	0.5678	0.4044
CLS	0.4548	0.1036	-0.1834	0.4916
Hirefire	0.5858	-0.0898	-0.0713	0.3394
Hours	0.4099	-0.0906	0.1990	0.5254
Variation explained	0.2495	0.2171	0.1883	

Note: Eigenvectors with values above 0.35 are bold. These load most strongly on the respective components. Adding up the explained variation, the cumulative variation is 0.6549.

TABLE A.2 Variables, short forms, descriptions and sources

Dimension	Short form	Description	Source
Associational	Asso		
Union density	Density	Share of trade union members in all employees.	ILO (2018)
Collective bargaining coverage	Coverage	Share of employees to whom a collective agreement applies.	ILO (2018)
Collective bargaining centralisation	Central	Degree to which collective bargaining takes places at central not company level. The original scale has been reversed and now ranges from 1 to 7 with 7 being a high degree of centralisation.	Gwartney et al. (2018)
Structural	Struc		
Size of the labour force	Partici	Proportion of a country's working-age population that engages actively in the labour market.	ILO (2018)
Share of employees in agriculture	Agri	Share of people working in agriculture in total employment.	The World Bank (2019)
Democracy level	Demo	Measures the level of democracy or autocracy from -10 (maximum autocratic; hereditary monarchy) to +10 (maximum democratic, consolidated democracy).	Marshall and Gurr (2018)
Institutional	Insti		
Ratification of ILO core labour standards	CLS	Number of ratified fundamental ILO conventions, the so-called core labour standards.	ILO (2019)
Hiring and firing regulations	Hirefire	Degree to which hiring and firing of workers is subject to regulations or flexibly determined by employers. The original scale has been reversed and now ranges between 1 and 7 with 7 implying high regulations.	Gwartney et al. (2018)
Hours regulations	Hours	Degree to which working time restrictions apply. The original scale has been reversed and now ranges from 1 to 10 with 10 being a high degree of regulation.	Gwartney et al. (2018)

TABLE A.3 CLF and globalisation, 17 countries, fixed effects (replication of Dreher & Gaston, 2007)

	(1)	(2)	(3)	(4)	(5)
Variables					
Index of globalisation	0.042 (0.03)				
Economic integration		0.051*** (0.01)	0.047*** (0.01)		
Political integration		-0.027 (0.03)		0.008 (0.03)	
Social integration		-0.033* (0.02)			-0.036* (0.02)

TABLE A.3 (Continued)

	(1)	(2)	(3)	(4)	(5)
Population density	0.020** (0.01)	0.017** (0.01)	0.019** (0.01)	0.019** (0.01)	0.018** (0.01)
Left wing governments, dummy	0.288*** (0.05)	0.281*** (0.05)	0.284*** (0.05)	0.289*** (0.05)	0.286*** (0.05)
Unemployment rate	-0.029*** (0.01)	-0.024** (0.01)	-0.026*** (0.01)	-0.029*** (0.01)	-0.027*** (0.01)
Inflation	0.015 (0.02)	0.017 (0.02)	0.009 (0.02)	0.022 (0.02)	0.031 (0.02)
Industrial employ. to total labour	0.033 (0.03)	0.013 (0.03)	0.025 (0.03)	0.029 (0.03)	0.016 (0.03)
Trend	-0.039*** (0.01)	-0.014 (0.01)	-0.035*** (0.01)	-0.029** (0.01)	-0.009 (0.01)
Constant	81.908*** (25.26)	36.888 (28.11)	73.014*** (21.22)	64.392*** (22.36)	28.661 (28.43)
Observations	208	208	208	208	208
Number of countries	17	17	17	17	17
Adjusted R^2	0.343	0.383	0.376	0.336	0.348
Country fixed effects	✓	✓	✓	✓	✓
Random effects	×	×	×	×	×

Note: The above and following regression tables are replications of Dreher and Gaston's empirical analysis in their paper 'Has Globalisation Really had no Effect on Unions?'. Here, they statistically examine whether globalisation, as measured by the KOF index, correlates with union density in 17 OECD countries from 1980 to 1999. I replaced union density, as the dependent variable, with the CLF and performed the same calculations as Dreher and Gaston. The only difference is the time period, and in contrast to Dreher and Gaston, I did not use changes in the dependent variable, because the authors only use 5-year averages (due to the availability of the KOF at that time), that is, levels, and the change calculation would eliminate a not insignificant part of observations in my calculations (because for some countries, CLF data are only available every 2 years). The results show that the replacement by my indicator produces very similar results. That is, almost the same variables, including the control variables, are significant, and the correlations go in the same direction as in the original paper.

TABLE A.4 CLF and globalisation, 17 countries, random effects (replication of Dreher & Gaston, 2007)

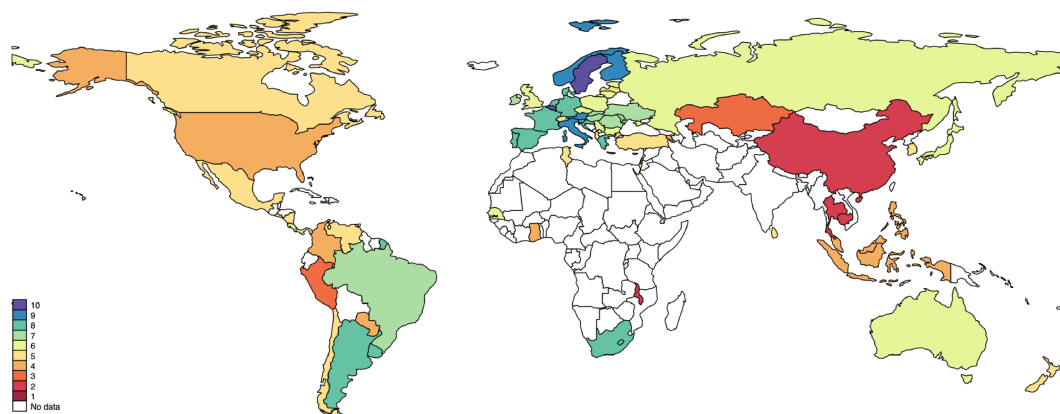
	(1)	(2)	(3)	(4)	(5)
Variables					
Index of globalisation	0.045 (0.03)				
Economic integration		0.055*** (0.01)	0.049*** (0.01)		
Political integration		-0.032 (0.03)		-0.003 (0.03)	
Social integration		-0.038** (0.02)			-0.036* (0.02)

(Continues)

TABLE A.4 (Continued)

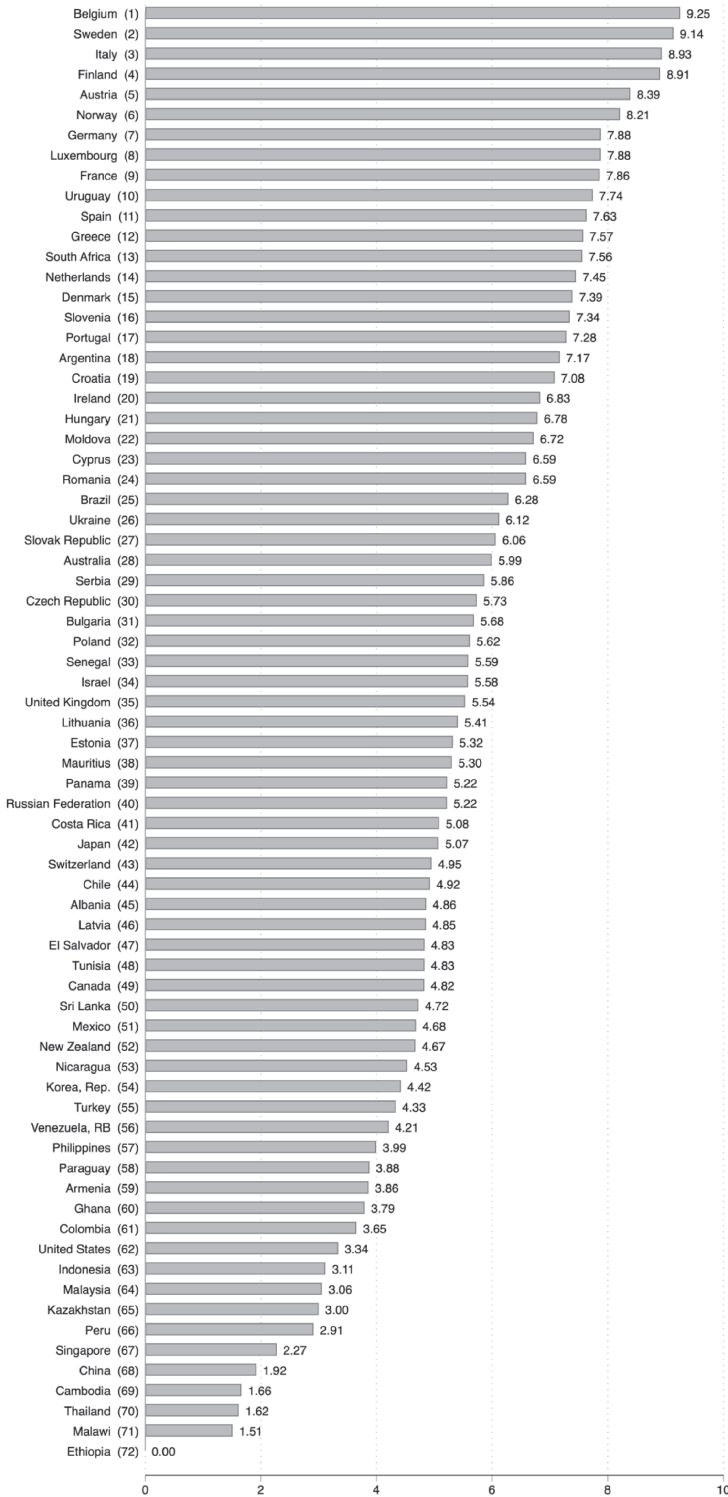
	(1)	(2)	(3)	(4)	(5)
Population density	−0.004* (0.00)	−0.004 (0.00)	−0.004* (0.00)	−0.004* (0.00)	−0.005* (0.00)
Left wing governments, dummy	0.230*** (0.05)	0.235*** (0.05)	0.231*** (0.05)	0.232*** (0.05)	0.231*** (0.05)
Unemployment rate	0.004* (0.00)	0.003 (0.00)	0.004 (0.00)	0.004 (0.00)	0.005* (0.00)
Inflation	0.024 (0.02)	0.025 (0.02)	0.017 (0.02)	0.033 (0.02)	0.041* (0.02)
Industrial employ. to total labour	0.047* (0.03)	0.022 (0.03)	0.039 (0.03)	0.041 (0.03)	0.027 (0.03)
Ghent, dummy	0.970 (0.63)	0.751 (0.72)	0.739 (0.62)	1.101 (0.68)	1.116* (0.65)
Anglo, dummy	−1.998*** (0.63)	−2.216*** (0.71)	−2.058*** (0.61)	−2.083*** (0.68)	−2.115*** (0.65)
Trend	−0.035*** (0.01)	−0.007 (0.01)	−0.029*** (0.01)	−0.024** (0.01)	−0.006 (0.01)
Constant	73.303*** (23.95)	23.380 (27.15)	61.325*** (20.53)	54.721** (21.69)	21.156 (27.88)
Observations	208	208	208	208	208
Number of countries	17	17	17	17	17
R ² (overall)	0.74	0.74	0.75	0.71	0.69
Country fixed effects	×	×	×	×	×
Random effects	✓	✓	✓	✓	✓

Note: See the notes to Table A.3.



Note: The map shows the distribution and coverage of the index. The values are based on the averages of the years 2000 to 2016.

FIGURE A.2 Collective labour force in the world (average over all years) [Colour figure can be viewed at wileyonlinelibrary.com]



Note: The ranking summarizes the average value over all years of the CLF for all countries in the sample and lists them in descending order.

FIGURE A.3 CLF index ratings on average over all years