

THE USE OF QUANTITATIVE  
METHODS IN LABOUR LAW  
RESEARCH: AN ASSESSMENT  
AND REFORMULATION

Simon Deakin

WP 495  
March 2018

**THE USE OF QUANTITATIVE METHODS IN LABOUR LAW  
RESEARCH: AN ASSESSMENT AND REFORMULATION**

Centre for Business Research, University of Cambridge  
Working Paper No. 495

Simon Deakin  
Centre for Business Research, University of Cambridge  
[s.deakin@cbr.cam.ac.uk](mailto:s.deakin@cbr.cam.ac.uk)

March 2018

## **Abstract**

This paper considers the potential and limits of quantitative approaches to labour law research. It explores the methods used to construct and validate indicators of labour regulation ('leximetrics') and those used in the econometric analysis of the effects of labour law rules on employment, productivity and inequality. It is argued that while there is a risk of the misuse and misappropriation of legal indicators, they can provide new evidence on the nature and effects of labour law rules, and thereby contribute to labour law theory as well as to the resolution of some practical issues of regulatory policy.

**Keywords:** Labour law, empirical legal studies, econometrics

**JEL Codes:**

## **Acknowledgements**

I am grateful for feedback from Ruth Dukes and other participants at the workshop on Labour Law and Labour Markets: New Methodologies, held in Glasgow on 25 November 2016. The research described in the paper was supported by the DFID-ESRC Joint Fund on Poverty Alleviation (Award ES/J019402/1, 'Labour Law and Poverty Alleviation in Low- and Middle-income Countries'). A version of the paper is forthcoming in *Social and Legal Studies*.

Further information about the Centre for Business Research can be found at:  
[www.cbr.cam.ac.uk](http://www.cbr.cam.ac.uk)

## 1. Introduction

Labour law research has long been more open to interdisciplinary influence than other sub-fields of legal scholarship, and has made greater use of contextual data drawn from social science research. This does not, however, mean that labour lawyers see empirical analysis as central to their field. Empirical research by labour lawyers was and is rare, and work using quantitative methods is more unusual still. This can be partly ascribed to the training received by legal researchers (including labour lawyers) which, at all levels including the critical stage of doctoral formation, continues to be focused on interpretive skills (Genn et al., 2006). These skills equip labour lawyers well to integrate into their work the findings and insights of certain fields of philosophical and conceptual inquiry, but they do not provide them with the means to engage with those modes of research which are concerned with classifying and mapping the social world.

Through legal origin theory, economists critical of the labour law status quo found a way to reach policy makers which legal researchers using interpretive techniques had no ready means of countering. For the proponents of the legal origin hypothesis, ‘the crucial requirement of reform is the availability of objective data on legal and regulatory rules, preferably in a comparative form so that the consequences of particular rules can be evaluated’ (La Porta et al., 2008: 325). Collating such data made it possible for the World Bank, via its *Doing Business* reports, to initiate ‘regulatory reforms in dozens of countries’ (La Porta et al., 2008: 325) in the decade following the appearance of the first papers to deploy the new methodology. In 2004 a paper written by the research team responsible for the legal origin hypotheses, using a ‘comprehensive’ approach to the collection of data on labour laws around the world, found that ‘heavier regulation of labor has adverse consequences for labor force participation and unemployment, especially of the young’ (Botero et al., 2004: 1379). In 2008 the World Bank, noting that ‘governments struggle to find the right balance between labor market flexibility and job stability’ claimed that ‘many countries err on the side of excessive rigidity’ with the result that ‘in these and other countries laws created to protect workers often hurt them – especially women, youth and unskilled workers’ (World Bank, 2008: 19). The basis for this claim was empirical: ‘the collection of data on the flexibility of labor regulations had spurred significant new research’. Thus ‘in the Indian state of Maharashtra... a study finds that rigid labor laws have resulted in 15% fewer jobs being created in the retail sector’; ‘a study of 90 developing countries finds that exporting businesses grew faster where labor regulations were flexible’; while ‘in an open economy, flexible labor regulation can increase annual growth by up to 1.5%’ (World Bank, 2008: 20).

In the event, labour laws have changed less than the advocates of deregulatory reform might have anticipated, with labour market regulations in 2008 already displaying a ‘mixed’ picture compared to clearer trends liberalising the rules on business entry and strengthening investor rights (La Porta et al., 2008: 325). The extreme swings in labour market regulation and deregulation experienced by some regions (such as virtually the whole of South America since the 1970s, see section 3.3 below) might lead us to think that labour laws are on the whole highly volatile, but this does not seem to be the case. In a global context these trends are unusual, with stability of labour regulation the more normal case, and there is no worldwide trend towards the removal of worker protections, even in the aftermath of the global financial crisis of 2007-8 (Gahan et al., 2012; Adams et al., 2017b).

But if labour law systems are proving resistant, on the whole, to deregulatory pressures, the economic critique of their impact on development and growth remains, seemingly, ever present. In its 2017 *Doing Business* report the World Bank chose to highlight research over a decade old (Besley and Burgess, 2004) purporting to show that in India ‘states with rigid employment regulation had lower output, employment and productivity in formal manufacturing than they would have had if their regulations were more flexible’ (World Bank, 2016: 92). The World Bank cited five further studies applying or modifying the methodology of the Besley-Burgess paper to arrive at the same result. It did not cite any of the studies which had criticised the methodology of Besley and Burgess or which had arrived at different results using alternative methods (Bhattarcharjea, 2005, 2006; De Souza, 2008; Deakin and Sarkar, 2011). At this time, a deregulatory reform of labour laws was under consideration by the Indian government (Deakin and Haldar, 2016), which may have been why the World Bank chose to highlight this particular national case study.

There is no easy path to countering the economic case against labour law. A critique of the standard economic view is called for, however, if only because of the enormous influence which it has come to exercise over policy making. The translation of research findings into a policy agenda serves nobody’s interests if those findings are taken out of context or without reference to wider trends in a given disciplinary field. What then is the basis for the repeated claim that labour laws are detrimental not just to economic growth, but to the well being of the people they are meant to protect? This paper will try to answer that question by engaging in an inquiry which is concerned with the methods used in the quantitative social science research widely relied on by the World Bank, other international organisations, and national governments to support deregulatory reforms.

As Sally Engle Merry has argued, ‘as the world becomes ever more measured and tracked through indicators, it becomes increasingly important to sort out the technical and political dimensions of the new technology’ (Engle Merry, 2011: S92). The present paper is a contribution to the debate over the technical or methodological aspects of indicators. Thus the approach taken here will be to scrutinise the theoretical assumptions, data collection techniques and econometric models which underlie the policy claim. These are the focus, respectively, of sections 2, 3 and 4 of this paper. Section 5 provides a synthesis and conclusion. Throughout the paper, reference is made to features of the Centre for Business Research Labour Regulation Index (‘CBR-LRI’), which was developed as an alternative to the OECD and World Bank indices (see Adams et al., 2017a).

## **2. Theory and method in empirical labour law research**

In the empirical social sciences, data are collected by various means, ranging from surveys and indices at the more quantitative end of the methodological spectrum, through to interview-based fieldwork, participant and non-participant research and ‘grounded research’ at the other, more qualitative end (Poteete et al., 2010). A foundational assumption of all such attempts at empirical research is that the data thereby gathered are capable of representing features of the social world which exist independently of the process of inquiry which is being used to study them: in other words, they would exist if they were not being studied, and they continue to exist, in the same form, when they are. These data seem very different from the ‘data’ which legal researchers deal with when, for example, they are interpreting legal texts. In what sense can we talk about the objective existence of a supposed referent, the legal system, which depends upon legal reasoning itself for its mode of operation? Is it not the case that legal reasoning is a means of *constituting* legal relations and processes, rather than observing them (Samuel, 2003: 295)?

There are a number of possible responses to this dilemma, some of which are not very promising for the possibility of empirical legal research, while others are potentially more useful. It will not be possible here to come close to resolving debates between ‘positivists’ and ‘constructionists’ which have divided social scientists for decades. A more modest and achievable aim is to identify the particular conception of social and legal reality which is presupposed by attempts to map, through empirical social science research, the societal impacts of legal rules.

An unpromising conception of social reality, for this purpose, is one which argues that all aspects of reality are constructed, and, relatedly, that interpretive or hermeneutic techniques suffice for analysing them. From this point of view, it is not only legal rules and principles that are constructs, but also features of social life beyond the legal text. As Geoffrey Samuel puts it, describing what he calls ‘textualist’ or ‘post-modern’ approaches, there is ‘no such thing as objective knowledge or objective reality in social science (and indeed in the natural sciences); there are only texts and thus all knowledge in interpretative. All knowledge is hermeneutics’ (Samuel, 2011: 189).

Categories used in statistical social science analysis, such as ‘Gross Domestic Product’ or ‘economic value added, are not naturally occurring phenomena. They are constructs which are partly the result of conscious design, and partly the outcome of the evolution of shared understandings within an epistemic community of researchers and research users. Nor are they simple descriptions of the social world. GDP was a concept developed to facilitate national economic planning in the period, after 1945, when there was a broad consensus on the active role which government could play in stimulating economic growth (Coyle, 2014). Economic value added is a metric which came to prominence in the 1980s for the purpose of benchmarking shareholder value at a time when developed market economies were becoming increasingly financialised (Stern and Shiely, 2001). Both of these concepts are examples of categories which have outgrown their origins in a particular political or commercial setting, to become, by convention, more widely accepted as indicators of social phenomena. In that sense they do not fundamentally differ from legal concepts such as ‘employment’ which can have multiple uses as reference points for the classification and regulation of social relations, and have changed their meaning over time in ways which obscure their origins.

In the case of both legal research and social science research, language is used through the medium of an organised discourse to ascribe meaning to social phenomena which are complex and in a state of flux. It does not follow, however, that the way language is used in legal discourse is identical to the way it is used in the social sciences, or that in some sense legal and social-scientific constructions are functional equivalents. Lawyers use concepts for normative ends such as assigning rights and attributing powers to legal persons and entities. In order to perform this task, legal categories cannot be entirely dissociated from the empirical reality of social relations, but nor do they need to have a one-to-one correspondence with them. A juridical concept is useful, above all, if it helps to achieve consistent and coherent interpretations of legal texts, not because it is a precise fit for social reality.

In the social sciences, concepts and categories are judged in various different ways: to help formulate a theoretical claim, to assist in the collection of data, or to clarify a statistical result. The value of a social scientific category or concept lies not so much in its contribution to hermeneutic coherence (although many aspects of empirical social science are interpretive), as in its use to create new knowledge of the social world by means which are transparent and replicable, and hence capable of external validation.

Do the concepts used by social scientists have any inherent advantage over those used by lawyers when it comes to representing features of social reality? Lawyers (among others) may feel that social scientists' claims to be engaging in value-free research are at least overstated, or, in the final analysis, simply unsustainable. But legal researchers also need to acknowledge the limitations of their own methods, and of the materials they are dealing with. By the standards of the social sciences, lawyers use data which are biased and unrepresentative, and causal models which are circular to the point of being tautological. This is not necessarily a problem for legal hermeneutics, given the self-referential nature of much legal reasoning (Luhmann, 2004), but it is a problem when lawyers leave the interpretive realm of legal doctrinal analysis, and engage in arguments over the social and economic effects of laws. The data lawyers have available to them from such sources as appellate case law and legislative histories do not provide an adequate empirical base to make claims about the social and economic consequences of legal rules.

Thus the case for lawyers taking seriously the methods of the empirical social sciences is that these techniques are better suited than legal methods are to answering certain questions. This does not mean that the methods of social sciences consistently meet the claims made for them. Lawyers, given their own interpretive training, may be well placed to examine the values which are implicitly reproduced, claims for objectivity notwithstanding, when certain social science models are used or methodologies deployed.

However, this 'deconstructive' critique requires legal researchers, at the very least, to become familiar with the techniques of other disciplines, and so to engage with them on their own terms. Social scientists tend to respond to lawyers' claims concerning the subjectivity of the knowledge that they have created by arguing that the aim of social science is to advance understanding by examining empirically testable claims, not to arrive at authoritative truths. To argue that social science research is flawed simply because its results are provisional and contingent is to apply a false standard. Research which misapplies a given method, or uses a good method to address the wrong question, can be attacked on *those* grounds, but the social sciences should be judged by reference to their own methods, not those of legal scholarship.

A deconstructive approach has other shortcomings as a mode of critique. If we were to conclude that organised knowledge concerning society is not possible because of the subjective nature of the data used by social scientists, and that we should be content to rely on legal descriptions of the social world in preference to those derived from the social sciences, we would end up in a very strange place, one where legal knowledge of the kind generated by doctrinal analysis occupies a privileged position at the expense of other modes of discourse. This is no more productive than the conclusion that legal knowledge is of no value because it is ‘unscientific’.

In the context of a consideration of methods, some ontological questions can be put, if only temporarily, to one side: it may not greatly matter whether law and the economy are understood as alternative epistemic frames, separate ‘realities’, or discrete expressions of a single social reality. What is important from a methodological perspective is to avoid ascribing ontological priority to one over the other.

Empirical legal research is therefore an exercise in linking together a number of different methods, each one with the potential to create knowledge in its respective sphere of operation. While various hermeneutic methods, ranging from systematic doctrinal interpretation to deconstruction and immanent critique, are available for addressing questions relating to the conceptual structure of legal language, these techniques do not enable us to answer questions relating to the impact of labour law rules on economic variables such as productivity and employment (Frazer, 2009). To address those questions it will be necessary to employ methods used within the empirical social sciences. A first issue to consider is how to operationalise law as a variable for the purposes of empirical research, and it is to this that we now turn.

### **3. Labour law as an empirical variable: statistical representation and construct validity**

The technique which has come to be known as ‘leximetric’ data coding involves, in essence, the translation of legal texts into a numerical form which can be used in statistical analysis (Lele and Siems, 2007). It is generally understood that this is a process of construction involving a series of steps, at each of which decisions have to be taken on the relevant elements of the research design. Most of these decisions will involve issues of judgment. This is recognised in the growing literature on the question of ‘construct validity’ (Strauss and Smith, 2009) and documents produced by governmental bodies and international agencies with the aim of summarising the state of the art in this field. In 2008 the OECD and European Commission jointly produced a *Handbook on Constructing Composite Indicators* which is the most thorough

and comprehensive of these accounts. At an early point in the analysis it presents, the *Handbook* states:

Composite indicators are much like mathematical or computational models. As such, their construction owes more to the craftsmanship of the modeller than to universally accepted scientific rules for encoding. With regard to models, the justification for a composite indicator lies in its fitness for the intended purpose and in peer acceptance. (OECD, 2008: 14)

The *Handbook* defends the production of data of this kind on the grounds that composite indicators ‘which compare country performance are increasingly recognised as a useful tool in policy analysis and public communication’ but it also acknowledges that they can ‘send misleading policy messages if they are poorly constructed or misinterpreted’ (OECD, 2008: 13). If methodological issues are not ‘addressed transparently’ prior to the process of construction, it will be hard to avoid ‘data manipulation and misrepresentation’ (OECD, 2008: 7). In the case of legal data coding, the first and most fundamental issue in need of clarification is the question of what exactly is being coded.

### **3.1 ‘Capturing reality’: what is being measured?**

The premise of index construction is that a ‘summary statistic’ can in some sense ‘capture reality’ (Sharpe, 2004, cited in OECD, 2008: 14). To use the terms most often employed by statisticians, the coded data constitute a ‘construct’ which relates to a ‘concept’. The concept captures a feature of social reality, a social ‘referent’, which the construct represents in statistical form. What, then, is the ‘reality’ which is being represented in legal indices?

Most of the datasets which aim to measure aspects of labour law for statistical purposes claim to be quantifying legal rules or regulations. The first paper of this kind to appear, by the OECD economists David Grubb and William Wells), describes its focus as ‘statistical measures of employment regulation’ (Grubb and Wells, 1993: 8). Regulation is defined as a constraint on employer conduct derived from a legal source: ‘regulation exists when an individual employer cannot, even by agreement with his or her own employees, use particular working arrangements or forms of employment contract, without risking legal sanctions or the invalidity of the relevant provisions in the contract’ (Grubb and Wells, 1993: 9). The sources for the codings reported in this first OECD study were statutes and sector-level agreements with legal or some similar regulatory effect. Later versions of the OECD index have retained this approach. The version of the index published in 2013 purports to measure ‘employment protection legislation’ and a related document setting out the sources of the codings refers almost entirely to statutory rules, with standards derived from

collective agreements receiving a few references for some countries and none at all for most. The influential study of labour laws around the world carried out by the legal origin theorists Botero et al. similarly refers to ‘labour regulation’ as its focus (Botero et al., 2005: 1346, and cites as the primary sources for the variables recorded in its dataset ‘the laws of the countries concerned’ (Botero et al., 2004: 1348).

The identification of ‘regulation’ as the underlying ‘concept’ to which data relate is, however, more ambiguous than these formulations allow. There are two meanings to regulation which need to be distinguished here: one is regulation as the intended effect of a norm or rule, and the other is regulation as the actual impact on a social actor, here the employer. The OECD index seems to slip from one to the other, without acknowledging that they may be different. Thus a 2009 paper describing the OECD’s coding methods in some detail states that the ‘OECD employment protection indicators are compiled from 21 items *quantifying the costs and procedures* involved in dismissing individuals or groups of workers or hiring workers on fixed-term or temporary work agency contracts’ (Venn, 2009: 6) (emphasis added). Here, the existence of a rule is being equated with a particular economic effect, namely a cost to the employer. The index constructed by Botero et al. appears to be based on the same premise:

Our index of employment laws... reflects the incremental *cost* to the employer of deviating from a hypothetical rigid contract, in which the conditions of a job are specified and a worker cannot be fired. This index is thus an *economic measure* of protection of (employed) workers, and not just a reflection of legal formalism. (Botero et al., 2004: 1353) (emphasis added).

By contrast, the ILO’s EPLex indicators are based on an attempt to ‘quantify legal information in the area of employment protection’ (ILO, 2015: 3), while the Cambridge University Labour Regulation Index (‘CBR-LRI’) states its goal as ‘the quantitative analysis of legal rules’ (Adams et al., 2017b: 2). The data contained in the Cambridge index aim to measure ‘the intended or presumed normative effect of the legal rule’ (Adams et al., 2017b: 5), not the costs to employers of compliance with such a rule.

A premise of the Cambridge index is that a study of legal texts is not capable, in itself, of indicating whether a particular rule implies costs or benefits for any given employer or for employers in general. This is for various reasons (Deakin and Sarkar, 2008). It could be that a regulation setting a labour standard on, for example, maximum working hours, constrains some employers’ freedom of action to offer working conditions below the statutory norm, but it could also be the case that it empowers other employers to offer improved terms and

conditions of employment by protecting them from undercutting. Also, since most labour law rules are minimum standards which employers can improve on but may not derogate from, it is misleading to take the view that labour regulation imposes an equivalent constraint on all firms; most employers will have agreed contractual standards above the minima set by law. Thus charting and quantifying the information contained in legal texts cannot, in itself, tell us whether the law imposes a ‘cost’ on firms.

Thus the ILO and Cambridge indices are formally neutral on whether the effects of labour laws are good or bad, leaving this issue to be resolved through econometric analysis on whether laws, as quantified in the relevant index, have this effect. By contrast, the OECD index and the Botero et al. index, while intended to be put to use in econometric analysis, have built into them the assumption that labour laws are costly for employers. They thereby run the risk of assuming the truth of the claim which the econometric stage of the analysis is meant to be addressing.

A further ambiguity of the term ‘regulation’ should be noted. Particularly in parts of the continental European legal tradition, it has been conventional to distinguish between the legal rule as an instruction or command created by an organ of the state and directed to social actors, on the one hand, and the legal rule understood as an internal legal communication, that is, an element of the legal order of the normative system. This is the basis for Hans Kelsen’s theory of the legal norm:

The norm-creating act is a fact which exists in time and space and can be perceived by our senses. This fact can be described as an *is*-statement. But this fact is different from its meaning – that is, the norm – which is the object of jurisprudence, and which cannot be described in an *is*-statement, but only in an *ought*-statement’ (Kelsen, 1960: 271).

This view can be contrasted, for example, with Alf Ross’s insistence that ‘the doctrinal study of law must be recognised as an empirical social science’ (Ross, 1958: 40; for discussion see Van Hoecke, 2011: 10, describing Kelsen’s theory of the norm as ‘completely untenable’). Even if we were not to go all the way with Ross in equating doctrinal legal analysis with empirical inquiry, for reasons discussed, for example, by Samuel (2011) and Van Hoecke (2011), Kelsen’s account of the demarcation between legal analysis and the social sciences need not be read as invalidating the coding methods used in leximetric analysis; just the opposite.

Coding is carried out on the basis that the meanings of legal texts can, firstly, be objectively ascertained using normal modes of doctrinal legal analysis, and

then, secondly, translated into a quantitative form appropriate for statistical analysis. The first step does not involve going beyond the view that what Marc Van Hoecke (2011: 18) calls an ‘intersubjective consensus among legal scholars’ can be sufficiently identified in order for the core meaning of a text to be established.

The second step, coding legal rules into a statistical form, does involve going beyond the normal bounds of legal doctrinal inquiry, and, as we shall see shortly (see the next subsection), involves the use of social science methods of index construction which do not normally form part of a legal training. Here, the legal researcher engaged in leximetric coding is engaging in statistical analysis of a certain kind, while at the same time using primary legal sources to which their legal knowledge and training gives them access.

In leximetric coding, the ‘concept’ or social referent which the statistical variable is attempting to capture is not the internal meaning of the legal rule, what Kelsen referred to as an ‘ought-statement’. It is the instruction or command, Kelsen’s ‘is-statement’, which issues from the state organ or other authoritative source and which is directed to social actors. As Kelsen recognised, the analysis of an is-statement lies within the domain of social science rather than doctrinal legal analysis (‘jurisprudence’). Thus it is not inappropriate in principle to use statistical coding techniques to analyse such statements.

It is important, finally, to draw a further distinction, namely between the regulatory purpose of the law, on the one hand, and its impact on actors. Leximetric coding, based as it is on legal texts, can capture the message which the law is sending, but it does not tell us anything about its impact on the actors to whom or which the message is addressed. It may well be that laws are ineffective in practice, because they are under-enforced, or because they lack legitimacy and are regarded, in practice, as a dead letter.

There are various ways of addressing this problem, but one which causes more problems than it solves is for the coder to ‘deflate’ the value given to a particular variable in a way which is understood to represent a lack of enforcement or legitimacy on the ground. The weakness of this approach is that a single measure is then capturing two different dimensions of regulation: the substantive content of the legal rule, on the one hand, and the absence of enforcement or legitimacy on the other. The World Bank’s Employing Workers Index, which is reported in its annual *Doing Business* reports (World Bank, various years), runs this risk by combining data, drawn from surveys, on the perceived effects of laws, with a content-based analysis of legal texts, as does the OECD index, which is based on information ‘collected from questionnaires

completed by officials in OECD member and some accession countries and from labour legislation and secondary sources for other countries' (Venn, 2009: 7). The ILO's EPLex index and the Cambridge index, on the other hand, code only for legal information, but use data drawn from other sources, such as indicators of labour and human rights violations in particular countries (Freedom House, 2016), to control for the absence of legal effectiveness in practice (Adams et al., 2017c). What this means in practice is that the value attributed to a given rule in the legal index may be deflated (for example) if data drawn from the other index suggest that human rights violations are common in the country in question. The advantage of this approach is that it is clear what each index is measuring: the legal index measures the content of the legal rule, while the human rights index captures the extent to which the rule is being observed, or not, in practice.

### **3.2 Normalisation, weighting and aggregation**

'Normalisation' is the process of rendering variables in a numerical form which makes them mutually comparable, while 'weighting' and 'aggregation' are concerned with the ways in which variables are combined to produce an overall indicator of the strength or weakness of the law in a given case. In practice, they are interrelated, in the sense that the approach taken to the identification of variables and their normalisation using a standard scale will impact on the way they are then weighted and aggregated, and vice versa.

The Cambridge index is built up from 40 individual indicators grouped into five sub-indices representing particular aspects of labour regulation: these are the laws governing the choice of different employment relationships (employment versus self-employment, part-time work, fixed-term employment and temporary agency work); working time regulations; dismissal laws; laws on collective employee representation; and laws governing industrial action. The choice of the indicators reflected the goal of developing a labour law index which was comprehensive in its coverage, in the sense of including both individual and collective aspects of labour law rules, and their grouping into sub-indices was intended to capture the interlocking nature of the rules governing a particular issue (Deakin, Lele and Siems, 2007; Adams et al., 2017a, 2017b). The Cambridge index covers the same areas of labour law as the index developed by the legal origin team in the early 2000s (Botero et al., 2004), but the individual indicators are defined differently, in an attempt to capture a greater degree of legal detail. The other feature of the Cambridge index which distinguishes it from that of Botero et al. (2004) is that it codes for an extended period of time (1970-2013), whereas the Botero et al. index provides a snapshot of labour laws around the world as they stood in the early 2000s.

Since an index, by its nature, has to be selective, the choice of indicators can always be contested; probably the best that can be achieved is transparency in the criteria used to make the choice, and consistency in their definition (OECD, 2008: 22). The ILO's EPLex index tries to get round the problem of subjectivity in the identification of indicators by using ILO Conventions to identify the most important variables (ILO, 2015). A possible drawback with this approach is that the resulting index is essentially measuring the extent of a country's compliance with ILO standards, which may not fully capture all relevant aspects of national labour law systems.

Unless a binary coding scheme is used, that is, one which simply identifies the presence or otherwise of a law on a given topic, normalisation will involve the construction of an arithmetic scale which expresses the degree of labour protection entailed by a given rule, together with a coding protocol or algorithm which sets out the basis on which values should be assigned to rules of different types. Some labour law rules can quite straightforwardly be expressed in numerical terms, as in the case, for example, of norms setting limits to working time or minimum notice periods. Then it is possible for the coding to express absolute or cardinal values. More normally, the coding protocol will indicate ordinal values, that is, a ranking which is internally consistent between laws of different degrees of protection, but which does not express absolute quantities. Table 1 below sets out examples of both types, drawn from the coding protocol for the Cambridge index.

<b>Indicator</b>	<b>Coding algorithm</b>
5. Fixed-term workers have the right to equal treatment with permanent workers	<p data-bbox="864 277 1993 352">Equals 1 if the legal system recognises a right to equal treatment for fixed-term workers (as, for example, in the case of EC Directive 99/70/EC).</p> <p data-bbox="864 405 1993 528">Equals 0.5 if the legal system recognises a more limited right to equal treatment for fixed-term workers (via, e.g., more general right of workers not be treated arbitrarily in employment)</p> <p data-bbox="864 580 1993 616">Equals 0 if neither of the above.</p> <p data-bbox="864 668 1993 743">Scope for further gradation between 0 and 1 to reflect changes in the strength of the law.</p>
6. Maximum duration of fixed-term contracts	<p data-bbox="864 756 1993 959">Measures the maximum cumulative duration of fixed-term contracts permitted by law before the employment is deemed to be permanent. The score is normalised from 0 to 1, with higher values indicating a lower permitted duration. The score equals 1 if the maximum limit is less than 1 year and 0 if it is 10 years or more or if there is no legal limit.</p>

Table 1. Examples of ordinal and cardinal scales in a leximetric coding protocol. Source: CBR-LRI (Adams et al., 2017a).

The aggregation of individual indicators into a composite measure is unavoidable if an overall picture of the law in a given country or region is to be presented, but that picture can end up being an oversimplified or possibly even a distorted one. This is because there is no simple solution to the problem of how to weight the individual indicators. If they are simply aggregated or averaged, the effect is to impute an equal weighting to each individual variable. This may not be justified; within the scheme of a particular index, certain variables may express rules of greater or lesser importance for the operation of the system of labour law regulation as a whole. For example, the way in which a given national system defines the boundary between employment and self-employment (or between 'subordinate' and 'autonomous' work) may well be of foundational importance by comparison to the details of rules on the permitted duration of fixed-term contracts or the requirements for equal treatment of agency workers with those in the regular employment of the user enterprise. To complicate matters further, the relative importance of individual indicators may differ from one country to another, or across different time periods. Yet there may be no systematic basis for deciding how to weight different variables, either in general or on a cross-national or inter-temporal basis. In that case, the default position of equal weighting may be the best, but still highly imperfect, option.

Other solutions may be available. One is to obtain survey evidence from users of the law on the weight they attach to particular rules. This is resource-intensive and may not provide accurate data for historical values, so making it of limited use for time-series data. Statistical techniques may also help. Principal component analysis (PCA) and factor analysis can be used to identify groups of variables which cluster together in the sense of being highly correlated with one another. The resulting component may be used in preference to the overall composite indicator to give a clearer outcome in an econometric regression analysis (OECD, 2008: 26). However, PCA can sometimes throw up correlations between variables which have no obvious connection with each other (this would be the case, for example, if the variables for rules on unofficial strikes turned out to be highly correlated with those governing the maximum permitted duration of fixed-term contracts). Unless the component derived from PCA makes sense at a theoretical level, using it in place of more theoretically coherent grouping of variables would not be an improvement. In the case of the Cambridge index, because the grouping of variables into sub-indices on issues such as working time or employee representation represents a prior design decision, the need for PCA is somewhat reduced.

### 3.3 Presentation and transparency of data

As the OECD Handbook puts it,

The way composite indicators are presented is not a trivial issue. Composite indicators must be able to communicate a story to decision-makers and other end-users quickly and accurately. Tables, albeit providing the complete information, can sometimes obscure sensitive issues immediately visible with a graphical representation. (OECD, 2008: 40).

Thus one of the major benefits of leximetric data coding is that permits graphical representations of data which are otherwise complex and hard to access. Line graphs can be especially effective as a means of presenting time-series data. In Figures 1 and 2, the decline in labour protection experienced by many South American countries during the 1970s, when many of them had authoritarian and military governments, is clearly represented, as is the revival of labour law protections which many of them experienced from the 1990s onwards.

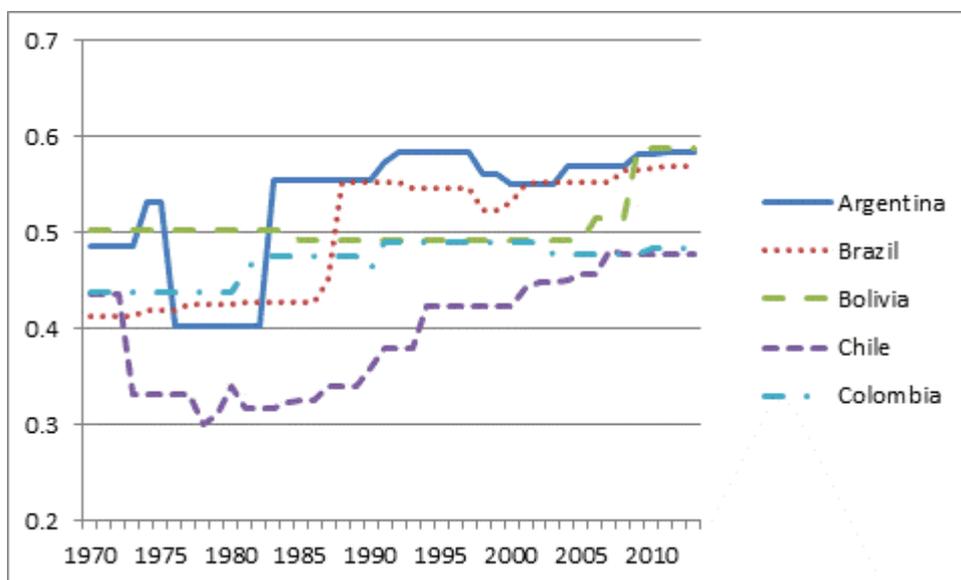


Figure 1. Trends in labour law in selected South American countries.

Source: CBR-LRI dataset. The data reported are the averages of the 5 sub-indices in the LRI. For further details see Adams et al., 2017a.

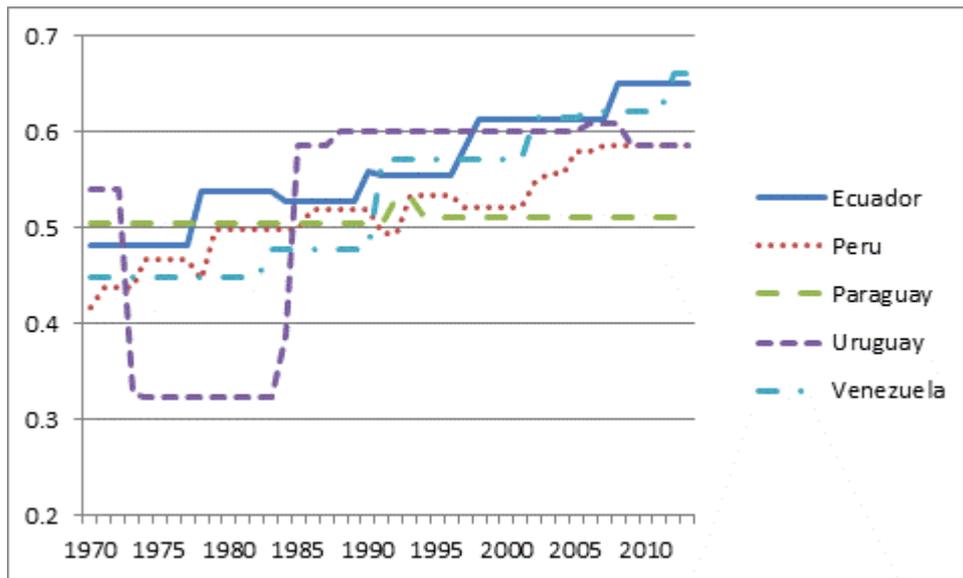


Figure 2. Trends in labour law in selected South American countries.

Source: see Figure 1.

Related to the issue of presentation is the question of transparency. Given the inherent limitations of composite indicators and the difficulty of some of the methodological choices which have to be made in the course of their construction, transparency in reporting the process of data collation and analysis, and ensuring availability of the underlying data, may be researchers' best defence from criticism:

The quality and accuracy of composite indicators should evolve in parallel with improvements in data collection and indicator development. The current trend towards constructing composite indicators of country performance in a range of policy areas may provide further impetus to improving data collection, identifying new data sources and enhancing the international comparability of statistics. On the other hand we do not marry the idea that using what is available is necessarily enough. Poor data will produce poor results in a 'garbage-in, garbage-out' logic. From a pragmatic point of view, however, compromises need to be done when constructing a composite. What we deem essential is the transparency of these compromises. (OECD, 2008: 23)

This implies a strategy of not only rendering explicit the theoretical assumptions and methodological choices underlying the choice and definition of indicators, but of making data available to researchers in a form which they can use and if necessary adapt. While research funded by the UK research councils must, as a condition of the grant, be archived on the conclusion of the project and hence made more widely available, this is not always condition of grant funding, or of journal publication. This is problematic, as it means that the data generated by composite indices cannot be checked by reference to primary sources, which, in turn, may serve to undermine the credibility of this type of research. In the case of the Cambridge index, the primary legal sources for all codings have been archived and so can be consulted and checked by third parties (Adams et al., 2017a). This is also the case with the OECD's Employment Protection Indicators, but only for codings after 2008 (OECD, 2016).

#### **4. The use of composite legal indices in econometric analysis**

The final step in the use of leximetric data to test claims concerning the economic impact of labour regulation is to carry out a regression analysis to test for correlations and causal relations between legal and economic variables. This kind of analysis raises an entirely different set of methodological issues, along with the high risk of false results and misinterpretations.

A statistical correlation between two values essentially means that they co-vary in a linear way and that they lie on the same side of the mean, their relationship is positive, or on opposite sides, if their relationship is negative. In the context we are considering, a finding of a correlation between an aspect of labour regulation (for example, dismissal protection, as measured by a composite index), and an economic variable (for example, unemployment or productivity) would indicate that a potential causal relation exists between them. However, a simple statistical association in a bivariate regression using cross-sectional data from a single point of time cannot be used to infer either causation or correlation. To establish that labour regulation is, or is not, causing unemployment to fall, or to rise, or is connected with it by some means or other, we would need much more information: ideally we would have time series data, that is, data on trends in law and the economy over time, and we would have data on additional variables which would make it possible to control for the background environment and more generally to rule out other causal explanations. We would also need comparable data on a sufficient number of countries to make the finding one with the potential to be generalised.

The analysis of multi-country panel data is one of the most complex areas of contemporary econometric research and the difficulties of this kind of work are compounded when a time dimension is added. The risk of spurious regressions in time series data has been understood since the inception of modern statistics but solutions to this problem have proved elusive and there is, to this day, a lack of consensus on the best methods.

It was already in the mid-1920s ‘fairly familiar knowledge’, wrote the statistician George Udny Yule, ‘that we sometimes obtain between quantities varying with time (time-variables) quite high correlations to which we cannot attach any physical significance whatever, although under the ordinary test the correlation would be held to be certainly significant’ in the sense of not being explained by fluctuations in sampling. Yule gave the example of a nearly perfect positive correlation between the fall in the number of Church of England marriages between 1866 and 1911, and the decline in the standardised mortality rate for the same period. Of this he wrote:

it is possible, given a little ingenuity and goodwill, to rationalise very nearly anything. And I can imagine some enthusiast arguing that the fall in the proportion of Church of England marriages is simply due to the Spread of Scientific Thinking since 1866, and the fall in mortality is also clearly to be ascribed to the Progress of Science: hence both variables are largely or mainly influenced by a common factor and consequently ought to be highly correlated. But most people would I think agree with me that the correlation is simply sheer nonsense; that is has no meaning whatever; that it is absurd to suppose that the two variables in question are in any sort of way, however indirect, causally related to one another. (Yule, 1926: 2).

The type of correlation Yule was describing in this passage might be described as *coincidental*: in other words, a mathematical relationship between two variables might arise purely by chance. This possibility is a reminder of the need for all statistical analyses to be grounded in theory: unless there is a good theoretical reason to suppose that two phenomena might be causally related, the presence of a mathematical association between them cannot be regarded as proof that they are related to each other at the level of social or other material reality.

Yule’s 1926 paper, however, pointed to a more fundamental problem with time series, namely the tendency for two essentially unrelated phenomena to become associated with one another in a regression analysis simply because of the way they were statistically expressed. This problem, referred to as serial correlation or autocorrelation, refers to a tendency of variables to appear to be converging when they are expressed as continuous time series. The element of convergence

is a mathematical property which arises independently of any relation between the social phenomena which the data represent. This type of false correlation might be described as *representational* as it is a product of the way in which a given social phenomenon is mathematically represented.

Beginning in the 1960s, statisticians, led by the econometrician Clive Granger, found solutions to the problem of autocorrelation which also helped to clarify the distinction between causation and correlation in time series analysis. Granger's concept of co-integration helped to show how variables with the property of non-stationarity, meaning that they were liable permanently to deviate from a pre-existing path or trend in response to an external shock, could be shown to be associated with each other notwithstanding the risk of autocorrelation leading to a spurious correlation (Engel and Granger, 1987). The related concept of 'Granger causality' describes a mathematical technique for identifying the direction of causation in cointegrated time series: if the addition of lagged or past values of one of the two variables to the regression strengthens the correlation between them, but the same type of association is not observed when past values of the second variable are added, a causal influence flowing from the first (causal or independent) variable to the second (outcome or dependent) one can be inferred (Granger, 1969).

In the context we are considering, namely the relationship between legal and economic change in labour markets, these issues are relevant because time series of leximetric data are often non-stationary (Deakin and Sarkar, 2008). This means that standard econometric techniques run the risk of producing spurious results. A category of time series regressions known as vector autoregression and vector error correction models can be used to address the problem of false results and to distinguish between long-run and short-run effects of legal change. These models are particularly interesting for the debate over the economic effects of labour laws as they show that while the initial 'shock' of increased labour protection can have negative impacts on employment and productivity, over time these trends can be reversed and positive effects identified (Deakin et al., 2014). This is consistent with the suggestion that labour laws can operate as a 'beneficial constraint' (Streeck, 1997), requiring firms to adjust to stricter standards by investing in training and making organisational improvements of the kind needed to cover the cost of legally mandated improvements to terms and conditions of employment. A further finding from dynamic panel data analysis with relevance for the debate over the effects of labour regulation is that a higher degree of legal protection for workers tends to increase the labour share of national income (Deakin et al., 2014).

If the use of ‘dynamic’ panel data modelling and time-series econometric techniques is capable of throwing new light on the potentially beneficial effects of labour standards on employment and productivity, the limitations of this kind of statistical analysis need to be borne in mind. Even these complex multivariate models, which make it possible to take into account to control for the influence of various background factors and to model dynamic inter-temporal effects, risk giving a false account of precision in the results they present. Given the uncertainty inherent in the process of quantifying legal variables, econometric analysis of this kind should be seen as indicating the overall direction and duration of a particular relationship (positive or negative, short-run or long-run), rather than allowing for finely calibrated measurements of the effects of laws on economic outcomes. There is also a danger of taking findings out of context: results drawn from large cross-national panels may indicate general trends which are not borne out when particular countries or regions, or certain time periods, are studied more closely. There is finally the risk inherent in all econometric research of over-interpreting correlations: models which test for two-way correlations, even in the context of a multivariate regression, can give the appearance of social relationships which are fixed and determinate, when in fact they are open-ended and contingent. For these reasons, econometric analysis of the operation of labour law systems should ideally be conducted as part of a wider, multi-methods study, making use of interview-based field work and other qualitative methods capable of retrieving rich information on causes and effects (Poteete et al., 2010).

## **5. Conclusions**

Viewed purely from a methodological perspective, the often repeated claim that pro-worker labour laws harm economic development and growth, and thereby hurt the interests of those they are meant to protect, rests on remarkably weak foundations. The empirical studies underlying this position, which are now mostly a decade or more old, used statistical techniques which were not particularly advanced for that time, and have been superseded since.

Empirical social science analysis should not be understood as establishing authoritative truths; rather, it progresses by making incremental gains in knowledge, and by falsifying hypothetical claims so that new paradigms can emerge. The empirical findings of the legal origin school, which are often cited by policy makers critical of labour protection, can be seen to be a significant addition to understanding, without necessarily being accurate. The legal origin literature stimulated a response from researchers which has called into question some of the original results to come from that body of work.

This is how social science should work. As new ‘leximetric’ techniques for coding labour law are developed, and as they are put to use in more complex, and hence more realistic, regression analyses, we are likely to get a more nuanced view of the economic effects of labour laws. This will not be one which straightforwardly refutes the standard economic critique, since empirical research in the social sciences rarely produces such clear-cut results. It should, however, engender a debate about the strengths and weaknesses of different quantitative approaches to the study of legal systems. Labour lawyers, trained in interpretive techniques, might be more open about the limits of what can be achieved through hermeneutic methods; economists and other social scientists could be clearer on the role of contingency and judgment in their own work.

## References

- Adams, Z., Bishop, L. and Deakin, S. (2017a) CBR Labour Regulation Index (Dataset of 117 Countries), in J. Armour, S. Deakin and M. Siems (eds.) *CBR Leximetric Datasets (Updated)* <https://doi.org/10.17863/CAM.9130> (Cambridge: University of Cambridge Data Repository).
- Adams, Z., Bastani, P., Bishop, L. and Deakin, S. (2017b) The CBR-LRI dataset: methods, properties and potential of leximetric coding of labour laws *International Journal of International and Comparative Labour Law*, 33: 55-91.
- Besley, T. and Burgess, R. (2004) Can labour regulation hinder economic performance? Evidence from India *Quarterly Journal of Economics*, 119: 91–134.
- Bhattacharjea, A. (2006) Labour market performance and industrial performance in India *Indian Journal of Labour Economics*, 49: 211-32.
- Bhattacharjea, A. (2009) The effects of employment protection legislation on Indian manufacturing *Economic and Political Weekly*, 44: 55-62.
- Botero, J., Djankov, S., La Porta, R., Lopez-de-Silanes, F. and Shleifer, A. (2004) ‘The regulation of labor’ *Quarterly Journal of Economics*, 119: 1340-82.
- Coyle, D. (2014) *GDP: A Brief but Affectionate History* (Princeton, NJ: Princeton UP).
- Deakin, S., and Haldar, A. (2015) How should India reform its labour laws? *Economic and Political Weekly*, 50: 448-455.
- Deakin, S., Lele, P., Siems, M. (2007) The evolution of labour law: calibrating and comparing regulatory regimes *International Labour Review*, 146: 133-162.

- Deakin, S. and Sarkar, P. (2008) Assessing the long-run economic impact of labour law systems: a theoretical reappraisal and analysis of new time series data *Industrial Relations Journal*, 39: 453-487.
- Deakin, S. and Sarkar, P. (2011) Indian labour law and its impact on unemployment, 1973-2006: a leximetric study *Indian Journal of Labour Economics*, 53: 607-629.
- Deakin, S., Malmberg, J. and Sarkar, P. (2014) How do labour laws affect unemployment and the labour share of national income? The experience of six OECD countries, 1970–2010 *International Labour Review*, 153: 1-24.
- D'Souza, E. (2010) The employment effects of labour legislation in India: a critical survey *Industrial Relations Journal*, 41: 122-135.
- Engle, R., and Granger, C. (1987) Co-integration and error correction: representation, estimation, and testing *Econometrica*, 55: 251-276.
- Engle Merry, S. (2011) Measuring the world: indicators, human rights and global governance *Current Anthropology*, 52: S83-S95.
- Freedom House, *Freedom in the World 2016*, available at <https://freedomhouse.org/report-types/freedom-world>, accessed 17 June 2017.
- Frazer, A. (2009) Industrial relations and the sociological study of labour law *Labour and Industry*, 19: 73-96.
- Gahan, P., Mitchell, R., Cooney, S., Steward, A. and Cooper, B. (2012) Economic globalization and convergence in labor market regulation: an empirical assessment *American Journal of Comparative Law*, 40: 703.
- Genn, H., Partington, M. and Wheeler, S. (2006) *Law in the Real World: Improving Our Understanding of How Law Works* (London: Nuffield Foundation).

- Granger, C. (1969) Investigating causal relations by econometric models and cross-spectral methods *Econometrica*, 37: 424-438.
- Grubb, D. and Wells, W. (1993) Employment regulation and patterns of work in EC countries *OECD Economic Studies*, 21: 7-58.
- ILO (2015) Employment protection legislation summary indicators in the area of terminating regular contracts (individual dismissals) (Geneva: International Labour Organization, 2015), available at [http://www.ilo.org/wcmsp5/groups/public/---ed\\_protect/---protrav/---travail/documents/publication/wcms\\_357390.pdf](http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---travail/documents/publication/wcms_357390.pdf), accessed 17 June 2017.
- Luhmann, N. (2004) *Law as a Social System* trans. K. Ziegert, ed. F. Kastner, R. Nobles, D. Schiff and R. Ziegert (Oxford: OUP).
- Kelsen, H. (1960) What is the pure theory of law? *Tulane Law Review*, 34: 269-76.
- Lele, P., and Siems, M. (2007) Shareholder protection: a leximetric approach *Journal of Corporate Law Studies*, 7: 17.
- OECD (2008) *Handbook on Constructing Composite Indicators. Methodology and User Guide* (Paris: OECD).
- OECD (2013) *Employment Outlook* (Paris: Organization for Economic Cooperation and Development).
- OECD (2016) Detailed description of employment protection legislation, 2012-13, OECD countries, available at <http://www.oecd.org/els/emp/All.pdf>, accessed 17 June 2017.
- Poteete, A., Janssen, M. and Ostrom, E. (2010) *Working Together: The Commons, Collective Action and Multiple Methods in Practice* (Princeton, NJ: Princeton University Press).

Ross, A. (1958) *On Law and Justice* (London: Stevens).

Samuel, G. (2003) *Epistemology and Method in Law* (Aldershot: Ashgate).

Samuel, G. (2011) Does one need an understanding of methodology in law before one can understand methodology in comparative law?, in M. Van Hoecke (ed.) *Methodologies of Legal Research: What Kind of Method for What Kind of Discipline?* (Oxford: Hart).

Stern, J., and Shiely, J. (2001) *The EVA Challenge* (New York: Wiley).

Strauss, M., and Smith, G. (2009) Construct validity: advances in theory and methodology *Annual Review of Clinical Psychology*, 5: 1-25.

Streeck, W. (1997) Beneficial constraints: on the economic limits of rational voluntarism, in J. Hollingsworth and R. Boyer (eds.) *Contemporary Capitalism: The Embeddedness of Institutions* (Cambridge: CUP).

Van Hoecke, M. (2011) Legal doctrine: which kinds of method(s) for what kind of discipline?, in M. Van Hoecke (ed.) *Methodologies of Legal Research: What Kind of Method for What Kind of Discipline?* (Oxford: Hart).

Venn, D. (2009) Legislation, collective bargaining and enforcement: updating the OECD employment protection indicators, OECD Working Paper, available at a <http://www.oecd.org/employment/emp/43116624.pdf> accessed 29 December 2017.

World Bank (2008) *Doing Business in 2008* (Washington, DC: International Bank for Reconstruction and Development).

World Bank (2016) *Doing Business 2017: Equal Opportunities for All* (Washington, DC: International Bank for Reconstruction and Development).

Yule, G.U. (1926) Why do we sometimes get nonsense-correlations between time series? A study in sampling and the nature of time-series *Journal of the Royal Statistical Society*, 89: 1-63.