

How do labour laws affect unemployment and the labour share of national income? The experience of six OECD countries, 1970–2010

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Abstract. *Using longitudinal data on labour law in France, Germany, Japan, Sweden, the United Kingdom and the United States over the period 1970–2010, the authors estimate the impact of labour regulation on unemployment and the labour share of national income. Their dynamic panel data analysis distinguishes between the short-run and long-run effects of regulatory change. They find that worker-protective labour laws in general have no consistent relationship to unemployment but are positively correlated with labour's share of national income. Laws specifically relating to working time and employee representation are found to have beneficial effects on both efficiency and distribution thus proxied.*

In this article we present new empirical evidence on the impact of labour laws on the labour share of national income and unemployment in developed market economies. The issue is one which has preoccupied economists and other social scientists for some time, without any clear consensus emerging. In the 1990s the OECD's *Jobs Study* (see OECD, 1994) made the argument for liberalizing labour laws as part of a strategy for enhancing labour market flexibility and thereby boosting job creation. During the 2000s similar arguments were made by the World Bank through its *Doing Business* initiatives (World Bank, various years). Economic theory incorporating equilibrium-based modelling broadly supports these positions, but empirical evidence has been much more equivocal (Skedinger, 2010). A growing number of studies suggest that the supposed negative effects of labour laws may be either very small or simply non-existent (Blanchflower, 2001; Baker et al., 2005), and that

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such laws could, in fact, have beneficial effects on productivity and innovation (Acharya, Baghai and Subramanian, 2012a and 2012b). In the light of this evidence, some scholars have called for a reappraisal of the assumptions underlying equilibrium-based models of the labour market (Freeman, 2005).

Our contribution to this debate is an empirical one and makes two methodological innovations. Firstly, we make use of a recently constructed data set, the Labour Regulation Index of the Centre for Business Research (CBR), which provides the most detailed and systematic analysis of trends in labour law over time in major industrialized economies. It differs from the most commonly used alternatives (the OECD's Employment Protection Index and the World Bank's Employing Workers Index) in providing a continuous time series based on consistent coding of primary legal sources covering the full range of laws governing individual and collective work relations. Secondly, we analyse the impact of labour law on the economy using econometric techniques which distinguish between short-run and long-run effects of legal change and take into account dynamic interactions between legal and economic variables. These techniques mark an advance on the more static cross-sectional and time invariant analyses which have mostly been used until now to analyse the economic effects of labour laws.

Our study examines the economic effects of labour laws between 1970 and 2010 in six OECD countries, namely, France, Germany, Japan, Sweden, the United Kingdom and the United States. These countries span the main legal families (common law and civil law) and the principal "varieties" of market economy ("liberal market" and "coordinated market" systems). We carry out a dynamic panel data analysis which shows that labour laws across the board had no clear long-term or short-term effect on unemployment over this time span and for these developed market economies. When we break our analysis down to look more closely at particular kinds of labour law regulation, we find strong evidence that laws providing for working time reductions have the effect of reducing unemployment, and weaker evidence of the same effect on the part of laws protecting worker representation. Then we look at the impact of labour laws on labour's share in national income. We find that worker-protective labour laws are associated with a higher labour share and therefore, in broad terms, with improved income distribution – an outcome driven by laws on working time and employee representation.

The remainder of the article is organized into five sections. The first briefly overviews the current state of the debate over the equity–efficiency trade-off in labour law. The second introduces our data. The third section presents the results of our econometric analysis, and the fourth provides an assessment. The fifth section concludes.

Equity and efficiency in labour law: Is a trade-off inevitable?

In the labour law literature, legal protection of workers is typically justified on the grounds that it reduces or mitigates the effects of the inequality of bargaining power which is inherent in the employment relationship. The central aim

of labour law has traditionally been thought of as a means “to ensure a just share of the fruits of progress to all”, as the ILO’s Philadelphia Declaration put it in 1944 (see Supiot, 2012). The economic critique of labour laws, by contrast, is summed up in the World Bank’s argument that “laws created to protect workers often hurt them” (World Bank, 2007, p. 19). This is ultimately based on the assumption that the labour market is in a unique equilibrium prior to the law’s “intervention”, which must therefore be understood as upsetting the competitive process and distorting market outcomes. The economic literature on minimum wage laws provides a “textbook” illustration of this effect: assuming that the market is in a prior state of equilibrium, a mandatory wage floor artificially raises workers’ reservation wage, leading to depressed demand on the part of employers, and hence to reduced employment. Any fairness effects achieved through wage protection for some workers are thereby offset by unemployment for others (Neumark and Wascher, 2008).

However, not all economic arguments go against labour market regulation. Where the employer is a monopsonist or there are asymmetries of information between employers and workers, minimum wage legislation can be expected to have positive effects: under these conditions, it is well understood that a minimum wage floor can raise both wages and employment (Card and Krueger, 1995; Manning, 2003).

Relatedly, the sum total of the norms governing employment – legal, contractual and customary – can be thought of as providing a framework for repeated exchange in a setting characterized by radical uncertainty, in such a way as to improve contractual efficiency. *Ex ante*, the worker sells to the employer his or her labour power or capacity to work in return for an agreed wage. *Ex post*, residual income and control rights are vested in the employer. What juridical language refers to as the worker’s “subordination” can be described in economic terminology as contractual incompleteness (Deakin and Wilkinson, 1999). Because the precise terms of the bargain between employer and worker cannot be specified in advance, their formal agreement is supplemented by other norms, many of which have a fairness dimension in the sense of specifying distributions which the parties regard as legitimate. Behavioural studies show that fairness norms help build trust between the parties to the employment contract, thereby reconciling equity and efficiency (Bartling, Fehr and Schmidt, 2012).

That it may be in the enlightened self-interest of employers to offer job security and worker voice in order to improve contractual outcomes is not surprising; this observation is recognized in some well-established economic concepts such as those associated with efficiency wage theory, for example (Bulow and Summers, 1986). It is less obvious that labour law should mandate particular forms of worker protection. It could be argued that if employers adopted these norms anyway, the law should not impose them; and if they did not, the law would be interfering with autonomous contractual choices. However, this view neglects the presence, in practice, of constraints on the spontaneous emergence of worker-protective rules. Adverse selection effects may deter employers

from offering job security to prospective employees (Levine, 1991), while the threat of free-riding by other employers may lead to under-provision of training by firms (Acemoglu and Pischke, 1999). Labour laws setting standards for termination of employment and requiring employers to provide training are essentially means of overcoming collective action problems associated with the inability of employers to coordinate on efficient rules. Laws of this kind have often had the support of employer groups and have been legislated by political parties with a broadly pro-employer leaning (Barry, Michelotti and Nyland, 2006).

A further efficiency-related objection to labour law is that mandatory legal rules may not be well suited to some contexts. However, not all labour laws are straightforward impositions in this sense. The clarity and precision of minimum wage laws setting specified basic rates of pay are the exception, not the rule. Many labour laws set open-ended standards which give expression to fairness norms. Laws governing “unfair dismissal” or prescribing a right to “equal treatment” between different groups of workers have this characteristic. Labour laws also tend to set standards which are as much procedural as substantive in nature. For example, laws governing forms of worker representation in the enterprise or at workplace level establish a framework for industrial relations, and rarely specify particular distributive outcomes.

In general, then, labour law rules can be understood in Coasean terms as transaction cost-reducing devices which expand the scope for contractual co-operation and thereby increase gains from trade (Deakin and Wilkinson, 1999). The possibility of an alignment between efficiency and fairness in the operation of labour law rules should not be taken to imply that worker protection is always and everywhere efficient. Labour law rules are often an incomplete match for specific market imperfections, such as monopsony or adverse selection (Kaufman, 2009). For some, this implies that legal abstention is to be preferred to active regulatory intervention (Bertola, 2009). While this perspective has some validity, it must also be borne in mind that labour law rules do not operate in a vacuum. Even if there were no worker-protective rules, the employment relationship would be subject to legal regulation through rules of contract and property law which structure the basic exchange, providing the employer with the legal authority to coordinate production and with residual property rights over the enterprise and the fruits of its activities (Deakin and Wilkinson, 2005). The idea that labour law should not “intervene” in the employment relationship to protect the rights of workers needs to take into account the “interventions” of private law in favour of the employer.

An empirically grounded model of labour law also needs to move away from the notion that worker-protective legal rules operate on a pre-existing, uniquely efficient equilibrium. At a micro-level, the employment relationship is shaped by path-dependent norms which, when expressed at the macro-level of the market as a whole, influence distributive outcomes as well as the efficiency of resource allocations. When labour laws are modified by judicial decision or statutory action, the effect is akin to one of selection among a range

of possible equilibria, each of them representing a particular conjunction of equity and efficiency outcomes. Some of these equilibria may involve equity gains being made at the expense of efficiency (trade-offs), while others may give rise to resource allocations which are both more efficient and more fair than feasible alternatives (complements).

The empirical literature gives a sense of the conjunctions (trade-offs and complements) between equity and efficiency which may arise from the operation of labour laws. For example, legislation mandating working time reductions is generally associated with productivity improvements, as labour productivity tends to diminish with longer working hours, but the resulting efficiency gains do not always translate into superior job creation; they may instead lead to higher unemployment as firms maintain existing levels of production with reduced labour inputs (White, 1981; Golden, 2011). Employment protection laws, in particular those which regulate dismissal (unfair or unjust dismissal laws), may raise hiring and termination costs simultaneously, the two effects balancing out in terms of their impact on unemployment levels (Bertola, 2009). Unfair dismissal laws may give firms incentives to train in order to minimize the costs associated with statutory constraints on their ability to dismiss workers in a downturn (Koeniger, 2005), but can also lead to the displacement of excluded workers into a secondary labour market segment of more casual employment (Saint-Paul, 1997). Some of these potentially negative effects of unfair dismissal and working time laws can be mitigated in systems with legally mandated vocational training systems (Acemoglu and Pischke, 1999).

Unfair dismissal protection can also be made more flexible by the operation of laws governing the way in which alternative employment contracts are constituted and regulated. Thus labour law rules may allow employers scope to use self-employment, part-time work, fixed-term employment and temporary agency work in ways which avoid costs associated with the “standard employment relationship” of permanent and full-time work. However, these laws, in so far as they create divisions within the workforce between “atypical” and “standard” employment forms, may create new rigidities: in particular, atypical employment forms are associated with reduced training and lower levels of investment in human capital, so it is not clear that, overall, their encouragement via the legal system results in a net economic benefit (Deakin, 2013).

Codetermination or employee involvement laws, which may mandate various types of employee representation at workplace and company level, operate in a similar way to employment protection laws in providing firms and employers with incentives to make complementary investments in firm-specific skills (FitzRoy and Kraft, 2005; Jirjahn, Mohrenweiser and Backes-Gellner, 2011). Laws of this kind appear to work best in an environment of stable corporate ownership, the intuition here being that employers’ commitments to job security have more credibility in a context where shareholders cannot easily exit the firm and remove assets from it through a merger or takeover (Aoki and Jackson, 2008; Gatti, 2009).

Even in systems with relatively liquid capital markets, empirical studies suggest that worker-protective dismissal laws have the effect of increasing innovation, as measured by patents, citations to patents, numbers of high-tech start-ups and numbers employed in such firms (Acharya, Baghai and Subramanian, 2012a and 2012b). The basic insight here is that legal constraints on the employer's power to dismiss at will reduce the exposure of workers to employer hold-up and makes them more likely to invest their skills and time in developing innovative products and processes, rents from which will no longer be captured entirely by the firm and its shareholders. Employment protection laws may thereby encourage efficient rent-sharing between workers and shareholders.

There is less ambiguity about the distributional effects of labour laws and related labour market institutions, including mechanisms for collective worker representation and wage determination. The evidence that collective bargaining reduces earnings inequality is "overwhelming" at least for developed countries (Freeman, 2005). Dispersion of pay is lower in countries with strong sector-level collective bargaining and wage indexation laws, while within systems with decentralized wage determination, pay dispersion is reduced in workplaces with a union presence (Freeman and Schettkat, 2001; Manacorda, 2004).

The conclusion to be drawn from this developing literature is that labour laws can have a number of effects on efficiency, both positive and negative, depending on context. Their implications for distribution are more often positive, although also context-dependent. These perspectives point to the need for empirical evidence to establish the nature and magnitude of the effects of labour laws.

Empirical evidence from the CBR Labour Regulation Index

Although the literature examining the economic impact of labour laws is large, very little of it uses time series data, even though this is the kind of evidence "which most empiricists would regard as providing a stronger and more valid test of any claim" than time-invariant data of the kind commonly used in cross-sectional regressions (Freeman, 2005, p. 14). Part of the reason is the lack, until recently, of reliable time series on legal and related institutional changes. The data set most heavily relied on in empirical studies of labour legislation, the OECD's Employment Protection Index (EPI), has only a limited longitudinal dimension. Data have been collected at various points since the EPI's inception in the 1990s (see Grubb and Wells, 1993) but there are gaps in the time series. In any event, the EPI only covers employment protection laws, mostly relating to unfair dismissal legislation. Laws on working time and industrial action are not included in the EPI, and those governing codetermination, employee involvement and collective worker representation are only covered in so far as they relate to collective dismissals and related aspects of employment

terminations. The right to strike is not covered at all in the EPI. The index prepared by Botero et al. (2004) does cover these areas of labour law (as well as some aspects of social security laws), but it is not longitudinal. Building on Botero et al. (2004), the World Bank's various *Doing Business Report* indices relating to labour law provide limited longitudinal data, but going back only to the early 2000s.

The Labour Regulation Index (LRI) is one of a number of databases developed at the Centre for Business Research in Cambridge since the mid-2000s which provide longitudinal data on changes in labour and company law. The LRI is based on a "fine-grained" approach to the coding of primary legal sources which makes it possible not just to indicate the presence or absence of a worker-protective law in a given country, but to estimate magnitudes concerning the degree of protection conferred on workers by a given legal rule. These are represented using graduated scores between 0 (indicating little or no protection of workers) and 1 (indicating high protection of workers). Coding algorithms or protocols are used in an attempt to ensure consistency in the scoring of legal rules, and primary sources are reported in full alongside the scores for particular variables.¹

The LRI contains 40 indicators in all, spread across five sub-indices, covering, respectively, the regulation of alternative employment contracts (self-employment, part-time work, fixed-term employment and temporary agency work), working time (daily and weekly working time limits and rules governing overtime and nightwork), dismissal (procedural and substantive rules on termination of employment), employee representation (rules on collective bargaining, the closed shop and codetermination) and industrial action (the extent of legal support for the right to strike, including rules on secondary and political strikes).²

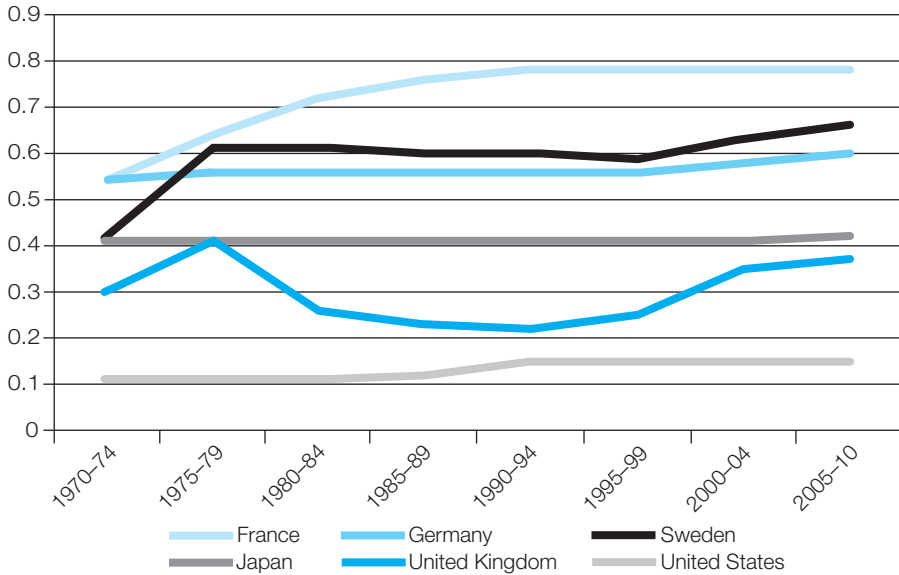
In this article, we report findings from data coding exercises covering France, Germany, Sweden, Japan, the United Kingdom and the United States from the early 1970s to more or less the present day. France, Germany, the United Kingdom and the United States are among the five countries initially coded up to 2006 (see Deakin, Lele and Siems, 2007). Japan and Sweden have been added to the data set, and their coding covers the period 1970–2010.

Figures 1–6 present data on labour laws in these six countries over the four decades from 1970. Scores are represented as five-year averages in order

¹ For further details, see Deakin, Lele and Siems (2007). For more general discussion of the "leximetric" methods used to create these data sets, see Deakin and Sarkar (2008); and Siems and Deakin (2010); and for helpful discussion of coding such "synthetic" indices more generally, see OECD (2013, ch. 2). The LRI data set is publicly available at: <http://www.cbr.cam.ac.uk/research/projects/project2-20output.htm> [accessed 29 January 2014].

² As such, the index does not cover all aspects of employment law. There may indeed be a case for extending the LRI to cover other areas of labour law, such as discrimination law, in future. The analysis presented here thus represents work in progress (see Deakin, Lele and Siems, 2007). For some other areas of regulation, however, such as minimum wage laws, there is less of a need for a "synthetic" index such as the LRI, as the effects of legal regulation can be studied using widely available country-level earnings data. For a recent example, see Grimshaw (2013).

Figure 1. Labour laws (all) in six OECD countries, 1970–2010



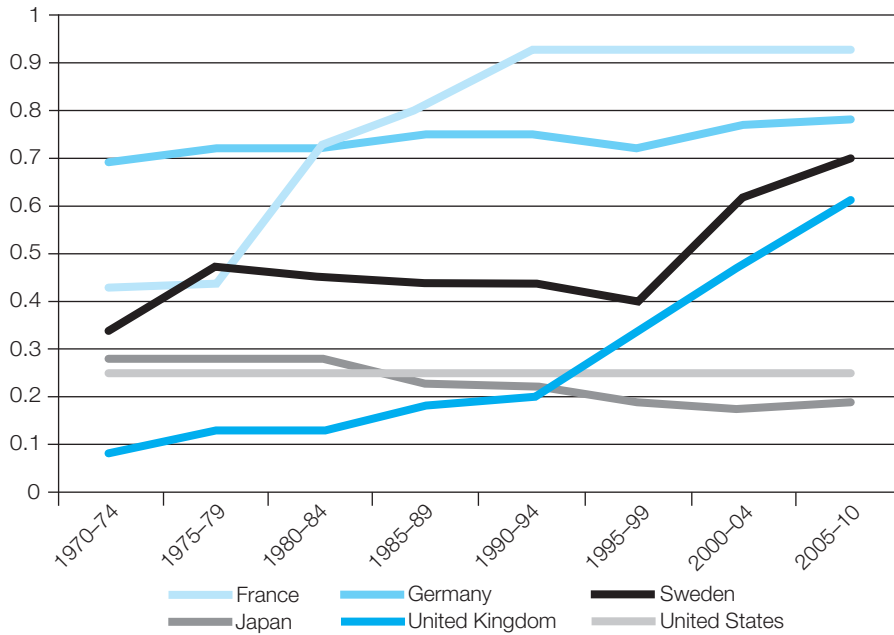
Source: CBR Labour Regulation Index (LRI), available at: <http://www.cbr.cam.ac.uk/research/projects/project-2-20output.htm> [accessed 18 February 2014]. Data are expressed as five-year averages.

to illustrate general trends over time. Figure 1 represents the trend in labour laws as a whole (that is, covering each of the five sub-indices). The time trend is represented in terms of five-year moving averages. As figure 1 makes clear, the individual country experiences vary greatly. Labour law is much more worker-protective in France and Sweden than in the United States, for example. There is also considerable variation over time, particularly in the United Kingdom and Sweden. In the United States and Japan, by contrast, labour law has changed very little over the period covered by the data set.

Figures 2–6 break down the aggregate scores by sub-index, with the data again presented in five-year averages. These show that the composition of the different labour law systems differs across countries.³ France has particularly strong working time protections and, in the area of collective labour law, places greater emphasis on the right to strike than on employee representation. Both Germany and Japan, by contrast, emphasize worker protection in the area of employee representation over the protection of the right to strike. Germany's high scores on the employee representation sub-index are a reflection of its support for multi-employer collective bargaining and codetermination at the enterprise and workplace levels. In Japan, strong constitutional protections for both collective bargaining and the right to strike are reflected in a high level

³ The data set, available online (see note 1 above), has full details of the relevant laws and explanations of the coding.

Figure 2. Alternative employment contracts in six OECD countries, 1970–2010

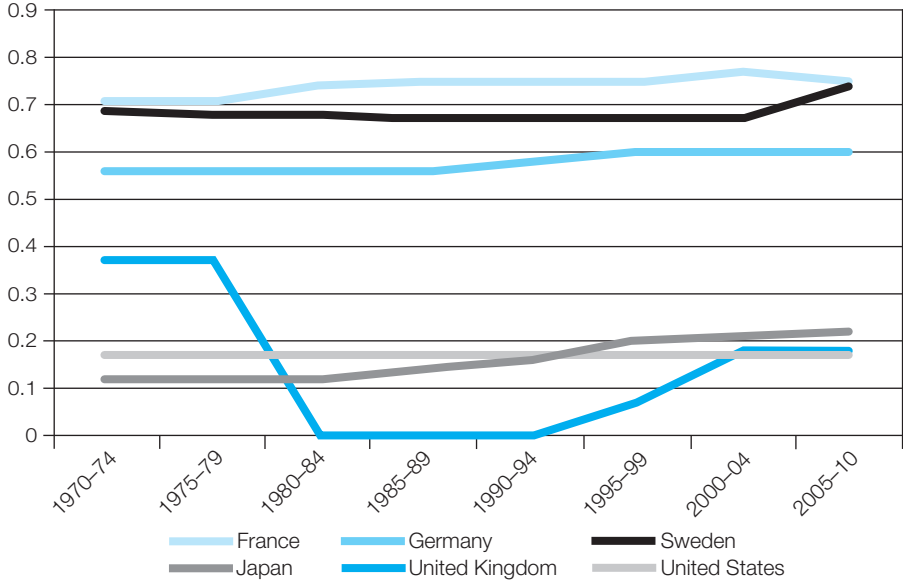


Source: CBR Labour Regulation Index (LRI), available at: <http://www.cbr.cam.ac.uk/research/projects/project-2-20output.htm> [accessed 18 February 2014]. Data are expressed as five-year averages.

of legal support for collective bargaining and worker representation at company level and in the workplace.

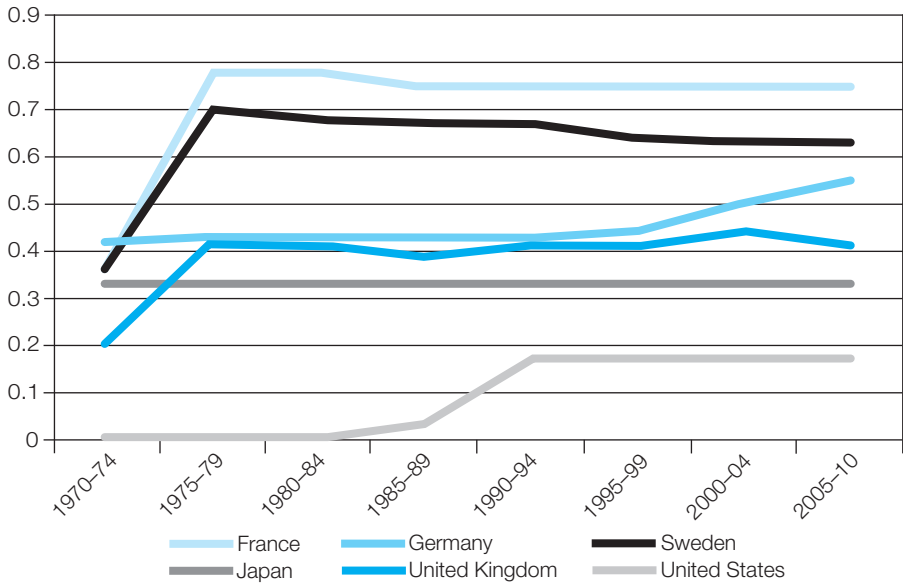
These three countries also have different approaches to the regulation of alternative employment contracts. Japan has a lower score on protection of agency workers and fixed-term employees than the other countries, reflecting the absence of a right to equal treatment for these groups and the flexibility employers enjoy in respect of the dismissal of fixed-term employees. At the opposite extreme, French labour law adopted the principle of equal treatment for alternative employment forms in the early 1980s, prior to the adoption of EU-wide standards on this issue; and it continues to have more protective rules on this issue than comparable developed countries. In Germany, the “Hartz reforms” of the mid-2000s, which were intended to introduce greater flexibility into the hiring of workers in alternative employment forms, had their greatest impact in areas of social security law and tax law, rather than in labour law. The labour changes made by the so-called Hartz IV relate to the rules governing temporary agency work. Although these reforms allowed employers more leeway in employing temporary agency workers, they were offset by the introduction of a legal requirement of equal treatment of agency workers and permanent workers in the same establishment in respect of the wages and conditions of employment.

Figure 3. Working time laws in six OECD countries, 1970–2010



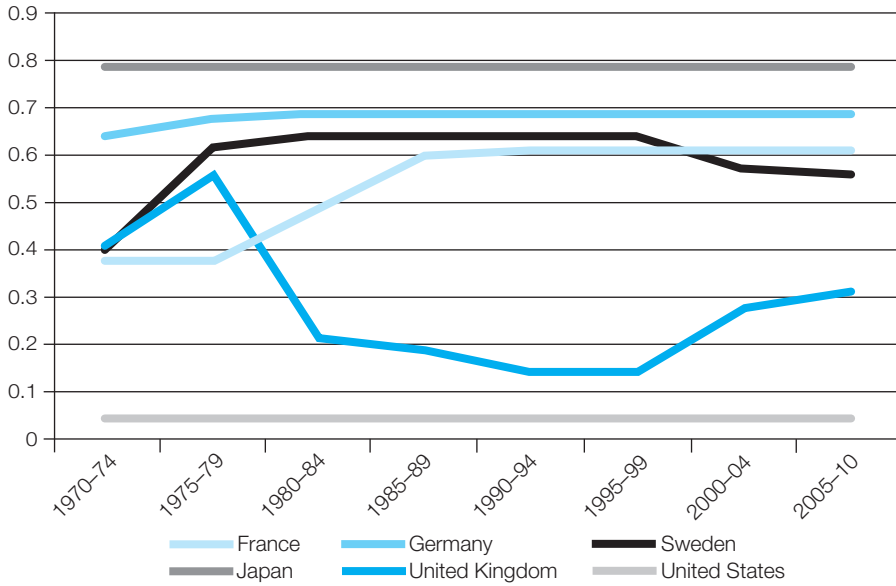
Source: CBR Labour Regulation Index (LRI), available at: <http://www.cbr.cam.ac.uk/research/projects/project-2-20output.htm> [accessed 18 February 2014]. Data are expressed as five-year averages.

Figure 4. Dismissal laws in six OECD countries, 1970–2010



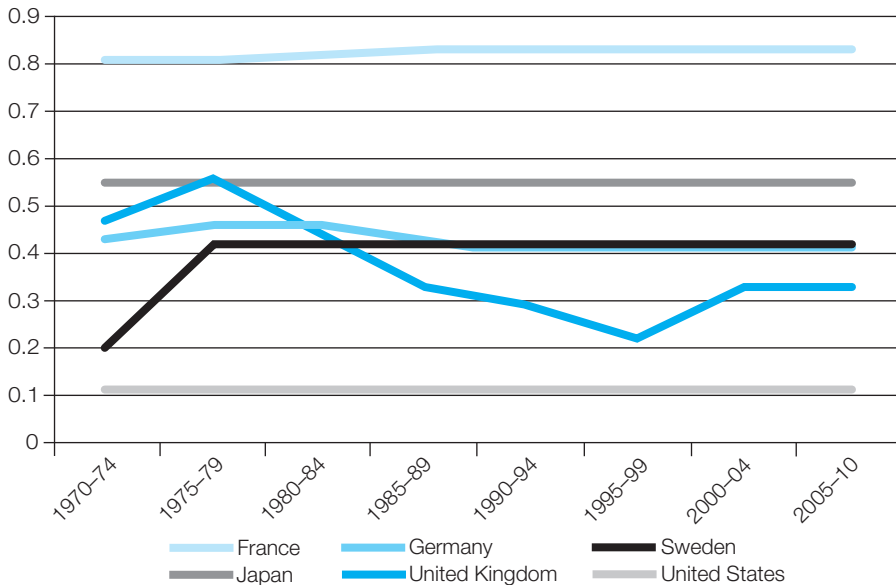
Source: CBR Labour Regulation Index (LRI), available at: <http://www.cbr.cam.ac.uk/research/projects/project-2-20output.htm> [accessed 18 February 2014]. Data are expressed as five-year averages.

Figure 5. Employee representation laws in six OECD countries, 1970–2010



Source: CBR Labour Regulation Index (LRI), available at: <http://www.cbr.cam.ac.uk/research/projects/project-2-20output.htm> [accessed 18 February 2014]. Data are expressed as five-year averages.

Figure 6. Industrial action laws in six OECD countries, 1970–2010



Source: CBR Labour Regulation Index (LRI), available at: <http://www.cbr.cam.ac.uk/research/projects/project-2-20output.htm> [accessed 18 February 2014]. Data are expressed as five-year averages.

In Sweden and the United Kingdom, labour law systems have seen greater change over the period of the study. Swedish labour law was extensively reformed during the 1970s with the aim of strengthening the position of employees in the workplace. Although this legislation has remained politically controversial, its basic content has remained intact. Employers' access to alternative forms of employment was significantly liberalized through successive changes in the 1990s, but since Sweden's accession to the EU in 1995, a series of amendments of labour legislation has been adopted in order to implement EU Directives on the issue of discrimination against workers in part-time, fixed-term and agency work.

In the United Kingdom, as in Sweden, the 1970s were a period of increasing regulation, in particular in the area of employment protection legislation. This body of law largely survived the reforms of the 1980s, but in other respects, particularly in relation to working time, worker representation and the right to strike, the 1980s were a period of rapid and far-reaching deregulation under Conservative-led governments. From the mid-1990s, at first under the growing influence of EU law and then following the election of a Labour government in 1997, the tide of regulation turned again, although there was no return to the extensive right to strike of the 1970s. Increases in worker protection mostly occurred in the area of alternative employment contracts as the United Kingdom, like Sweden, implemented EU Directives on the right to equal treatment of part-time and fixed-term contract workers, and in the area of working time, where the United Kingdom implemented most aspects of the EU Working Time Directive while availing itself of an opt-out for the 48-hour limit on weekly working time.

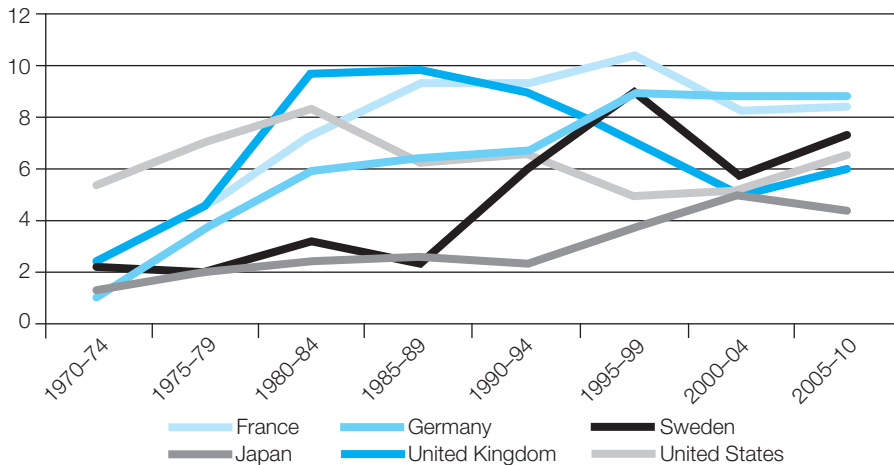
The United States is an outlier among developed countries in respect of labour law. There is no constitutional protection for worker representation or the right to strike, and its collective labour laws offer virtually no scope for employee involvement along the lines of codetermination. Individual employment law remains dominated by the principle of employment at will, according to which the employer can terminate the employment relationship without the need to show good cause or compliance with due process, although the passage of federal legislation governing notice periods and severance pay in the event of economic dismissals in the late 1980s was a small but significant change. The United States has working time protections dating back to federal legislation of the 1930s which are minimal by comparison to those in force in the other countries.

The impact of labour laws on unemployment and the labour share of national income

In this section we present the results of an econometric analysis of the effects of labour law on the unemployment rate and the share of wages in domestic output (the "labour share").

Figure 7 reports data on the unemployment rates in the six countries of our study, expressed as five-yearly averages. From the early 1970s to the early 2000s, unemployment rose steadily in France, Germany and Sweden. The

Figure 7. Unemployment in six OECD countries, 1970–2010



Source: OECD iLibrary, available at: <http://www.oecd-ilibrary.org/statistics> [accessed 20 February 2014]. Data are expressed as five-year averages.

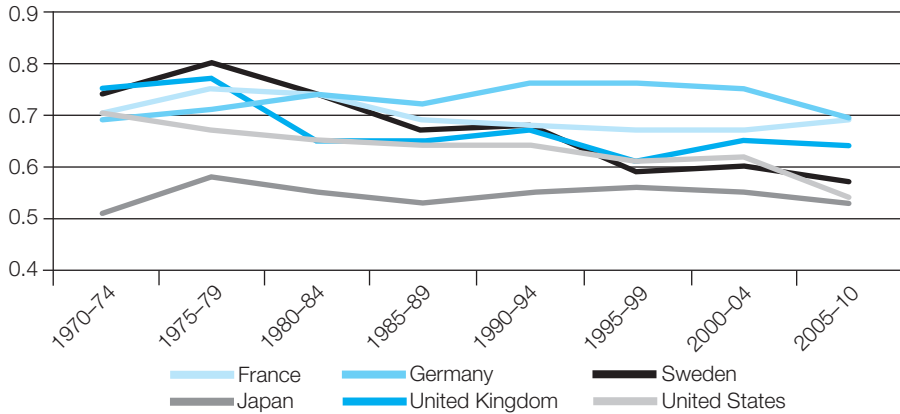
United States and the United Kingdom, by contrast, show a declining trend from the mid-1980s up to the period 2005–10, the latter part of which was marked by the onset of the subprime loan crisis and credit crunch in these two countries.

Figure 8 presents data on the labour share, i.e. the share of wages in domestic output (GDP).⁴ Changes in the labour share over time are a good indicator of distribution as they indicate the extent to which wages keep pace (or not) with increases in national wealth, although it should be noted that this measure does not capture pay inequalities between different groups in the labour force.⁵ From the early 1970s onwards, the labour share fell steadily from over 70 per cent to below 60 per cent in France, Sweden, the United Kingdom and the United States. In Germany it was largely stable until 2000, after which it began a slow decline. Japan had the lowest labour share to begin with but it also experienced the least fluctuation (around 55 per cent).

⁴ More precisely, our labour share data are based on the notion of “labour income share” as defined by the OECD (see <http://www.oecd-ilibrary.org/statistics> [accessed 20 February 2014]). The annual labour income share is calculated as total labour costs divided by nominal output. “Total labour costs” here refers to compensation of employees adjusted for the extent of self-employment in a given country, and thus essentially gives a measure of the total income accruing to labour. See http://stats.oecd.org/Index.aspx?DatasetCode=ALFS_SUMTAB# [accessed 20 February 2014].

⁵ A more comprehensive measure, which captures inequalities between groups within the labour force, is the Gini coefficient in its various forms. However, Gini coefficient data are not available for all the countries in our study in a sufficiently continuous time series to make it possible to carry out the dynamic panel data analysis that we present here. See, for example, the World Bank Gini index data set (available at: <http://data.worldbank.org/indicator/SI.POV.GINI>) and the WIDER data set (available at: http://www.wider.unu.edu/research/Database/en_GB/database) [both accessed 29 January 2014]. There may be scope in future to use these data sets in conjunction with the LRI to study country-level trends in inequality.

Figure 8. Labour share in six OECD countries, 1970–2010



Source: OECD iLibrary, available at: <http://www.oecd-ilibrary.org/statistics> [accessed 20 February 2014]. Data are expressed as five-year averages.

Our econometric method involves regressing the LRI scores against measures of unemployment and the labour share for the six countries, whose time series data are pooled to form a panel. We control for the level of economic activity in the countries by including in the regression equation the log of GDP, expressed in purchasing power parity dollar values.

The time dimension of our data makes it possible to estimate both short-run and long-run impacts of labour laws. In principle, new labour laws could induce short-run changes to both employment and distribution, the effects of which are then absorbed as firms and workers adjust their behaviour to the new legal environment. Such effects would be akin to a temporary “shock”. For example, laws tightening working time protection could lead to short-term unemployment as firms react to the new legal regime by shedding labour, but this effect might be reversed over the medium to long term, as firms adjust to more stringent regulation by increasing their investment in firm-specific human capital and through organizational and technological upgrading. If this were to be the case, one would expect to observe no long-term effects in the regression analysis. Alternatively, legal changes could bring about more fundamental changes in the economy’s equilibrium path, inducing a lasting rise or fall in unemployment or the labour share as the case might be. Thus stricter working time laws could permanently alter a country’s equilibrium path by inducing firms to move from a low-protection, low-skill equilibrium to one based on complementary investments in firm-specific human capital and firm-level technological capabilities. Any such shift would appear in the regression analysis as a long-term impact. In the case of both short-term and long-term impacts, it is necessary to control for other factors, particularly short-term fluctuations in the business cycle and in the long-term growth rate of the economy, both of which can be captured by national-level GDP data.

We use the dynamic panel data methodology recommended by Pesaran, Shin and Smith (1999) for panels with a sizable dimension (here, four decades of data). They show that some of the most widely used procedures for estimation of panel data models, such as fixed effects, instrumental variables and generalized method of moments (GMM) analyses, “can produce inconsistent, and potentially very misleading estimates of the average values of the parameters in dynamic panel data models unless the slope coefficients are in fact identical” (ibid., p. 622). Their recommended procedure involves using a vector error correction methodology which can take into account likely country-level differences.

We start by postulating a long-run relationship involving the dependent or outcome variable X (the unemployment rate or labour share), the control variable Y (GDP in natural log) and the independent or causal variable Z (labour regulation as measured by the LRI), as follows:

$$X_{it} = \psi_i Y_{it} + \pi_i Z_{it} + \eta_{it} \quad (1)$$

where i ($=1,2,3,4,5,6$) stands for countries, t ($=1,2,\dots$) stands for time periods (years), ψ_i and π_i are the long-run parameters, and η_{it} is the error term.

We are interested to know whether there exist long-term and short-term effects of Z (labour protection) along with Y (GDP measuring economic activity) on X (unemployment rate or labour share) and whether there exists a stable adjustment path from the short-term relationship (if any) to the long-run relationship.

Following Pesaran, Shin and Smith (1999), our panel data analysis is based on the following error correction representation:

$$X_{it} = \theta_i(\eta_{it-1}) + \sum_{j=1}^{p-1} \lambda_{ij} \Delta X_{i,t-j} + \sum_{k=0}^{q-1} \psi_{ik} \Delta Y_{i,t-k} + \sum_{l=0}^{r-1} \pi_{il} \Delta Z_{i,t-l} + \mu_i + \phi_{it} \quad (2)$$

where Δ is the difference operator; θ_i is the country-specific error-correcting speed of adjustment term; λ_{ij} , ψ_{ik} and π_{il} are the coefficients of the lagged variables; μ_i is the country-specific effect; and ϕ_{it} is the disturbances term. The existence of a meaningful long-run relationship with a stable adjustment dynamic requires $\theta_i < 0$.

Within this general structure, we can have three alternative models. At one extreme, we have a dynamic fixed effect (DFE) estimators model, in which intercepts are allowed to vary across the countries but all other parameters and error variances are constrained to be the same. At the other extreme, we can estimate separate equations for each country and calculate the mean of the estimates to get a glimpse of the overall picture. This is a mean group (MG) estimator model, which can give consistent estimates of the averages of parameters in a dynamic panel data analysis (Pesaran and Smith, 1995). The intermediate alternative is a pooled mean group (PMG) estimator, as suggested by Pesaran, Shin and Smith (1999). This allows intercepts, short-run coefficients and error variances to differ freely across the countries, but the long-run coefficients are constrained to be the same; this means that $\psi_i = \psi$ and $\pi_i = \pi$ for all i in equation (1), while θ_i , λ_{ij} , etc. of equation (2) may differ from country to country.

Using the STATA-based software developed by Blackburne and Frank (2007), we estimate each of the above three models (MG, PMG and DFE). We use the Lag Exclusion Wald Test for each variable separately to determine the lag structure of the regression (that is, the assumed delay in the impact of the independent or causal variable). We use the Hausman test to select the appropriate model, comparing two at a time (PMG vs MG, MG vs DFE, and so on). This tests for the null hypothesis, namely, that the difference in the estimated coefficients is not systematic. If the null hypothesis is accepted, implying no systematic difference between the two estimates, the choice of the appropriate model is based on the efficiency property of the estimated coefficients. If the null hypothesis is rejected, implying systematic difference between the two estimates, the choice of the appropriate model is based on the consistency property of the estimated coefficients.

Considering first the impact of labour laws in general (LABALL) on unemployment, we observe neither a long-term nor a short-term relationship between the overall LRI scores and levels of unemployment. This is the case for each of the three models (see Appendix table 1a). When we break the LRI down into its sub-indices, the finding of no relationship between legal regulation and unemployment holds for three of them, namely, alternative employment contracts (ALTCON), dismissal protection (DISMISS), and the law governing industrial action (INDACT). These results are shown in Appendix tables 1b, 1d and 1f.

We do, however, observe effects for the other two sub-indices. The working time indicator (WORKTIME) is negatively correlated with the unemployment over the long run for two of the three models (DFE and PMG). None of the three models shows a short-term effect. The adjustment process from short-run to long-run effects is stable in each case. The Hausman tests select the DFE model as the most appropriate, lending further support to this result (Appendix table 1c).

In the case of the employee representation indicator (EMPREP), we observe a negative relationship with unemployment over both the long run and the short run in the PMG model. The DFE model chosen by the Hausman test does not indicate a statistically significant relationship although the sign is negative as in the PMG model (Appendix table 1e).

We therefore have evidence to suggest that worker-protective labour laws in general are not related to unemployment levels after controlling for the overall level of economic activity as measured by GDP. But when we take a closer look at the effects of particular laws, protective laws in the areas of working time and (less clearly) employee representation are found to be associated with reduced unemployment, after controlling for GDP.

Turning now to the relationship between labour law and the labour share, we observe a positive relationship between the overall score for labour law and the share of labour in national income according to the PMG model, which is the one selected by the Hausman test in this regression (see Appendix table 2a). We also find a positive correlation between labour law and the labour share

over the short run in regard to the alternative employment contracts, working time and employee representation sub-indices, and over the long run in regard to the working time and employee representation sub-indices (Appendix tables 2b–2f). The models reporting the long-run effects (i.e. the DFE model for working time and the PMG model for employee representation) are identified as the most appropriate by the Hausman test. Again, these results are arrived at after controlling for country-level GDP.

The results from our analysis on the labour share imply that while the proportion of national income going to wages as opposed to profits was falling in the countries in our sample for most of the period from 1970 to 2010, it would have fallen more quickly had it not been for the effects of worker-protective labour laws. Because we have presented a panel data analysis, we avoid the problem of extrapolating from the experience of just one country. Conversely, we cannot use our analysis to make a definitive statement about the laws of any single country case, considered in isolation. Thus, as will be clear from comparing figures 1 and 8, the United States' consistently low score for labour regulation does not translate into its having the lowest labour share of the six countries in the sample. The statistical methods we have employed enable us to say something slightly different, namely, that across our sample of six developed economies, using a variety of models which take into account cross-country differences, we find a positive relationship between worker-protective labour laws and more egalitarian distributional outcomes, as proxied by labour's share of national income.

Assessment

Our panel data analysis suggests that there is no consistent relationship, either negative or positive, between labour laws *in general* and unemployment in developed countries. Yet some *specific* types of labour regulation may have the effect of reducing unemployment. In the case of working time regulation, this effect could be the combined result of work-sharing arrangements and improved labour productivity. In the case of worker representation laws, the impact could be derived from the positive effects of such laws on employee motivation and morale.

There is some evidence, then, that labour laws are compatible with improved efficiency at the level of the firm and enhanced macroeconomic performance. This is consistent with some aspects of the literature on labour regulation (outlined above). Our other finding is that labour laws in general, and working time laws and employee representation laws in particular, have positive, that is, egalitarian distributional effects. In this respect our findings tally with the consensus observed above across other empirical studies.

The absence of clear findings on two of our sub-indices – namely, those relating to employment protection and strike law – suggests that further research is needed to disentangle their possible effects. As others have pointed out (e.g. Bertola, 2009), employment protection laws could have mutually

offsetting effects on unemployment, limiting hiring but also making dismissals more costly. The absence of short-run and long-run effects in our results for this sub-index may be due to these multiple influences. In relation to strike law, our results suggesting the absence of either positive or negative economic effects are perhaps not surprising when the aims of this type of regulation, which is more concerned with issues of freedom of association and human rights than with inducing particular economic outcomes, are borne in mind. Another possible explanation is that the influence of strike law on the economy is mediated by the wider industrial relations framework at country level, a variable which is not well captured in our analysis. This is a matter for future research.

There are limitations to the approach we have taken which need to be borne in mind when assessing our findings. The labour regulation data that we have presented are based on a process which codes for the formal law, that is, “law in the books”. There may well be a gap between the formal content of a legal rule and its application in practice. However, in the case of the developed countries in our sample, we would not expect this gap to be very substantial. They all have well-functioning legal systems and transmission mechanisms allowing for the translation of legal norms into practice at the level of the firm, through legal advice and human resource management functions inside firms. Thus, in this case, we think that the measures of the formal law that we have used are a good proxy for what we want to study, the regulatory impact of the law on the behaviour of labour market actors.

A further limitation is that we have focused here on macro-level impacts (changes to the laws of countries) and outcomes (national-level data on unemployment and distribution). National laws may be mediated or supplemented in practice by regulations operating at the firm or industry level, whose effects can be studied using firm-level data. These avenues can be followed up in future research. Additional analysis is also needed to identify more precisely the channels through which laws impact on efficiency at the level of the firm. As suggested above, laws can alter the environment for contracting between labour and capital in various ways: they can affect firms’ hiring decisions, their labour input decisions more generally, and their approach to human resource management. They can also affect worker morale and effort. These issues should be explored in future through the use of firm-level data in econometric analysis, and in firm-level case studies, each of which may fill out our macro-level analysis.

Conclusion

When it comes to evaluating the economic effects of labour law, economists and lawyers confront similar problems. Both disciplines assume that labour laws have an impact on the behaviour of employers and employees. While economists apply theoretical models based on assumptions about agents’ preferences and choices, legal scholars rarely express the assumptions made about how legal rules affect behaviour in the labour market. The assumptions applied are usually based on intuitive or common-sense assessments, often supported

by anecdotal observations of how the rules are applied in different situations or concrete disputes. On the other hand, labour law scholarship can supply a more nuanced description of the content of law and its interaction with other institutions than is often found in economic research. Common to both fields of research, however, is the difficulty of producing empirical evidence to support or refute hypotheses concerning the economic effects of labour laws.

In this article we have sought to bridge the gap between economic and legal analyses, by providing data on labour law systems in a form which captures some of the complexity of this type of regulation and its variance over time, while also permitting quantitative empirical testing of claims concerning its effects. Our empirical analysis of six OECD countries suggests that labour laws in general do not lead to higher unemployment, and that some types of regulations – namely, those relating to working time and employee representation – may have the effect of reducing it. We also find that labour laws in general, and laws relating to working time and employee representation in particular, are correlated with more egalitarian distributional effects, as measured by labour's share of national income. Our study suggests that hypotheses on the economic effects of labour must incorporate the possibility of an alignment between efficiency and fairness in the operation of labour law rules.

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Appendix table 1

Table 1a. Short-run and long-run effects of labour laws (all): dependent variable unemployment

	PMG model	MG model	DFE model
Independent variable			
<i>Long-run relationship</i>			
GDP	-3.124***	-1.293*	-3.654***
LABALL	-0.537	24.694	1.508
<i>Short-term relationship</i>			
Adjustment Coefficient θ	-0.159***	-0.273***	-0.122***
ΔUNEMP_{t-1}	0.46***	0.455***	0.51***
ΔUNEMP_{t-2}	-0.115***	-0.009	-0.161***
ΔGDP_t	-17.894***	-19.296***	-15.28***
ΔLABALL_t	-4.76	9.391	-2.673
μ	-5.905***	0.329	4.77***
Chosen model		MG	

Note: The variables are: GDP = gross domestic product; LABALL = labour laws (all); UNEMP = unemployment. For the sources of data, see the notes to figures 1, 7 and 8 above. The models are: PMG = pooled mean group regression; MG = mean group regression; DFE = dynamic fixed effect regression.

*** significant at the 1 per cent level; ** significant at the 5 per cent level; * significant at the 10 per cent level.

Table 1b. Short-run and long-run effects of labour laws (alternative employment contracts): dependent variable unemployment

	PMG model	MG model	DFE model
Independent variable			
<i>Long-run relationship</i>			
GDP	-3.304***	2.063***	3.869***
ALTCON	0.421	9.9089	2.303
<i>Short-term relationship</i>			
Adjustment Coefficient θ	0.156***	-0.217***	-0.121***
ΔUNEMP_{t-1}	0.453***	0.442***	0.514***
ΔUNEMP_{t-2}	-0.121***	-0.043	-0.154**
ΔGDP_t	-17.841***	-18.918***	-15.594***
ΔALTCON_t	-0.382	-0.617	-0.207
μ	5.939***	3.399	4.893***
Chosen model		MG	

Note: The variables are: GDP = gross domestic product; ALTCON = laws on alternative employment contracts; UNEMP = unemployment. For the sources of data, see the notes to figures 1, 7 and 8 above. The models are: PMG = pooled mean group regression; MG = mean group regression; DFE = dynamic fixed effect regression.

*** significant at the 1 per cent level; ** significant at the 5 per cent level; * significant at the 10 per cent level.

Table 1c. Short-run and long-run effects of labour laws (working time): dependent variable unemployment

	PMG model	MG model	DFE model
Independent variable			
<i>Long-run relationship</i>			
GDP	-2.609***	-1.212	-2.997***
WORKTIME	-15.742***	-16.231	-8.979***
<i>Short-term relationship</i>			
Adjustment Coefficient θ	-0.197***	-0.275***	-0.132***
Δ UNEMP _{t-1}	0.449***	0.433***	0.518***
Δ UNEMP _{t-2}	-0.095**	-0.18	-0.145**
Δ GDP _t	-16.766**	-17.288***	-15.649***
Δ WORKTIME _t	3.319	-0.337	-1.525
μ	7.212***	5.38	5.069***
Chosen model	PMG		

Note: The variables are: GDP = gross domestic product; WORKTIME = laws on working time; UNEMP = unemployment. For the sources of data, see the notes to figures 1, 7 and 8 above. The models are: PMG = pooled mean group regression; MG = mean group regression; DFE = dynamic fixed effect regression.
*** significant at the 1 per cent level; ** significant at the 5 per cent level; * significant at the 10 per cent level.

Table 1d. Short-run and long-run effects of labour laws (dismissal): dependent variable unemployment

	PMG model	MG model	DFE model
Independent variable			
<i>Long-run relationship</i>			
GDP	-3.377***	-1.887	-3.966***
DISMISS	1.696	9.075	3.348
<i>Short-term relationship</i>			
Adjustment Coefficient θ	-0.159***	-0.258***	-0.119***
Δ UNEMP _{t-1}	0.445***	0.445***	0.508***
Δ UNEMP _{t-2}	-0.117***	-0.27	-0.16***
Δ GDP _t	-18.154***	-19.212***	-15.556***
Δ DISMISS _t	-0.166	-0.834	-0.733
μ	6.607***	3.142	4.853***
Chosen model	DFE		

Note: The variables are: GDP = gross domestic product; DISMISS = laws on dismissal; UNEMP = unemployment. For the sources of data, see the notes to figures 1, 7 and 8 above. The models are: PMG = pooled mean group regression; MG = mean group regression; DFE = dynamic fixed effect regression.
*** significant at the 1 per cent level; ** significant at the 5 per cent level; * significant at the 10 per cent level.

Table 1e. Short-run and long-run effects of labour laws (employee representation): dependent variable unemployment

	PMG model	MG model	DFE model
Independent variable			
<i>Long-run relationship</i>			
GDP	-3.149***	-1.485	-3.577
EMPREP	-9.517*	-6.766	-3.087
<i>Short-term relationship</i>			
Adjustment Coefficient θ	-0.166***	-0.229***	-0.123***
Δ UNEMP _{t-1}	0.459***	0.457***	0.516***
Δ UNEMP _{t-2}	-0.101***	-0.034	-0.152**
Δ GDP _t	-17.649***	-18.527***	-15.538***
Δ EMPREP _t	-3.943	-2.151	-1.208
μ	6.606***	4.355***	5.024***
Chosen model			DFE

Note: The variables are: GDP = gross domestic product; EMPREP = laws on employee representation; UNEMP = unemployment. For the sources of data, see the notes to figures 1, 7 and 8 above. The models are: PMG = pooled mean group regression; MG = mean group regression; DFE = dynamic fixed effect regression.
 *** significant at the 1 per cent level; ** significant at the 5 per cent level; * significant at the 10 per cent level.

Table 1f. Short-run and long-run effects of labour laws (industrial action): dependent variable unemployment

	PMG model	MG model	DFE model
Independent variable			
<i>Long-run relationship</i>			
GDP	-0.2559***	1.31	-2.679**
INDACT	15.695	-4.236	8.121
<i>Short-term relationship</i>			
Adjustment Coefficient θ	-0.139***	0.218***	-0.108***
Δ UNEMP _{t-1}	0.494***	0.486***	0.574***
Δ UNEMP _{t-2}	-0.117***	-0.54	-0.177***
Δ GDP _t	-19.485***	-19.205***	-16.635***
Δ GDP _{t-1}	5.398	2.161	5.575***
Δ INDACT _t	-4.93	-3.897	-1.796
μ	3.595***	3.228	3.019***
Chosen model			DFE

Note: The variables are: GDP = gross domestic product; INDACT = laws on industrial action; UNEMP = unemployment. For the sources of data, see the notes to figures 1, 7 and 8 above. The models are: PMG = pooled mean group regression; MG = mean group regression; DFE = dynamic fixed effect regression.
 *** significant at the 1 per cent level; ** significant at the 5 per cent level; * significant at the 10 per cent level.

Appendix table 2

Table 2a. Short-run and long-run effects of labour laws (all): dependent variable labour share

	PMG model	MG model	DFE model
Independent variable			
<i>Long-run relationship</i>			
GDP	0.0686***	-0.47	-0.92***
LABALL	0.267**	-0.448	0.146
<i>Short-term relationship</i>			
Adjustment Coefficient θ	0.282***	0.409***	-0.175***
Δ LABSHARE _{t-1}	0.319***	0.307***	0.257***
Δ GDP _t	-0.13***	-0.212***	-0.201***
Δ LABALL _t	0.121	0.153	0.128***
μ	-0.303***	-0.503***	0.226***
Chosen Model	PMG		

Notes: The variables are: GDP = gross domestic product; LABALL = labour laws (all); LABSHARE = labour's share of national income. For the sources of data, see the notes to figures 1, 7 and 8 above. The models are: PMG = pooled mean group regression; MG = mean group regression; DFE = dynamic fixed effect regression.

*** significant at the 1 per cent level; ** significant at the 5 per cent level; * significant at the 10 per cent level.

Table 2b. Short-run and long-run effects of labour laws (alternative employment contracts): dependent variable labour share

	PMG model	MG model	DFE model
Independent variable			
<i>Long-run relationship</i>			
GDP	0.56***	-0.067**	-0.084***
ALTCON	-0.59	-0.64	-0.63
<i>Short-term relationship</i>			
Adjustment Coefficient θ	-0.267***	-0.353***	-0.173***
Δ LABSHARE _{t-1}	0.307***	-0.303***	0.262***
Δ GDP _t	-0.124***	-0.222***	-0.192***
Δ ALTCON _t	0.784**	0.059***	0.063***
μ	0.296***	0.434***	0.231***
Chosen model			DFE

Notes: The variables are: GDP = gross domestic product; ALTCON = laws on alternative employment contracts; LABSHARE = labour's share of national income. For the sources of data, see the notes to figures 1, 7 and 8 above. The models are: PMG = pooled mean group regression; MG = mean group regression; DFE = dynamic fixed effect regression.

*** significant at the 1 per cent level; ** significant at the 5 per cent level; * significant at the 10 per cent level.

Table 2c. Short-run and long-run effects of labour laws (working time): dependent variable labour shar

	PMG model	MG model	DFE model
Independent variable			
<i>Long-run relationship</i>			
GDP	-0.06***	-0.055***	-0.089***
WORKTIME	0.216***	-0.238	0.215
<i>Short-term relationship</i>			
Adjustment Coefficient θ	-0.304***	-0.369***	-0.188***
Δ LABSHARE _{t-1}	0.319***	-0.369***	-0.188***
Δ GDP _t	-0.16***	-0.218***	-0.196***
Δ WORKTIME _t	0.087	0.181	0.74***
μ	0.321***	0.442***	0.234***
Chosen Model			DFE

Notes: The variables are: GDP = gross domestic product; WORKTIME = laws on working time; LABSHARE = labour's share of national income. For the sources of data, see the notes to figures 1, 7 and 8 above. The models are: PMG = pooled mean group regression; MG = mean group regression; DFE = dynamic fixed effect regression. *** significant at the 1 per cent level; ** significant at the 5 per cent level; * significant at the 10 per cent level.

Table 2d. Short-run and long-run effects of labour laws (dismissal): dependent variable labour share

	PMG model	MG model	DFE model
Independent variable			
<i>Long-run relationship</i>			
GDP	-0.47***	-0.039***	-0.099***
DISMISS	0.006	0.08	0.168
<i>Short-term relationship</i>			
Adjustment Coefficient θ	-0.463**	-0.619***	-0.189***
Δ LABSHARE _{t-1}	0.413***	0.461***	0.313***
Δ LABSHARE _{t-2}	0.087	0.172	-0.105
Δ LABSHARE _{t-3}	0.105	0.188***	-0.035
Δ GDP _t	-0.101*	-0.137***	-0.195***
Δ DISMISS _t	0.007	0.031	-0.001
μ	0.473**	0.527***	-0.252
Chosen model			DFE

Notes: The variables are: GDP = gross domestic product; DISMISS = laws on dismissal; LABSHARE = labour's share of national income. For the sources of data, see the notes to figures 1, 7 and 8 above. The models are: PMG = pooled mean group regression; MG = mean group regression; DFE = dynamic fixed effect regression.

*** significant at the 1 per cent level; ** significant at the 5 per cent level; * significant at the 10 per cent level.

Table 2e. Short-run and long-run effects of labour laws (employee representation): dependent variable labour share

	PMG model	MG model	DFE model
Independent variable			
<i>Long-run relationship</i>			
GDP	-0.052***	-0.043**	-0.041**
EMPREP	0.185***	0.164	0.103
<i>Short-term relationship</i>			
Adjustment Coefficient θ	-0.293***	-0.371***	-0.155***
Δ LABSHARE _{t-1}	0.349***	0.356***	0.296***
Δ GDP _t	-0.234***	0.277***	-0.306***
Δ GDP _{t-1}	0.257***	0.224***	0.366***
Δ EMPREP _t	-0.038	-0.044	0.051
μ	0.278	0.342***	0.133***
Chosen model	PMG		

Notes: The variables are: GDP = gross domestic product; EMPREP = laws on employee representation; LABSHARE = labour's share of national income. For the sources of data, see the notes to figures 1, 7 and 8 above. The models are: PMG = pooled mean group regression; MG = mean group regression; DFE = dynamic fixed effect regression.

*** significant at the 1 per cent level; ** significant at the 5 per cent level; * significant at the 10 per cent level.

Table 2f. Short-run and long-run effects of labour laws (industrial action): dependent variable labour share

	PMG model	MG model	DFE model
Independent variable			
<i>Long-run relationship</i>			
GDP	-0.05***	-0.046***	-0.043**
INDACT	0.03	0.164	-0.042
<i>Short-term relationship</i>			
Adjustment Coefficient θ	-0.269***	-0.337***	-0.141***
Δ LABSHARE _{t-1}	0.331***	0.324***	0.291***
Δ GDP _t	-0.208***	-0.259***	-0.302***
Δ GDP _{t-1}	0.282***	0.24***	0.364***
Δ INDACT _t	0.051	-0.071	-0.006
μ	0.262	0.417***	0.133
Chosen model	PMG		

Notes: The variables are: GDP = gross domestic product; INDACT = laws on industrial action; LABSHARE = labour's share of national income. For the sources of data, see the notes to figures 1, 7 and 8 above. The models are: PMG = pooled mean group regression; MG = mean group regression; DFE = dynamic fixed effect regression.

*** significant at the 1 per cent level; ** significant at the 5 per cent level; * significant at the 10 per cent level.