Labour institutions and inequality[1]

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Main findings

- There has been a considerable decline in unionization over the past two decades. Union density declined in almost all the 51 countries considered in this analysis. The decline was dramatic in Central and Eastern European countries, where levels had initially been very high. On the other hand, changes in collective bargaining structure were less spectacular, according to the data that were collected. In most countries, the basic level of collective bargaining did not change. There was, however, a modest trend towards more decentralization and/or less coordination of collective bargaining.

- While, as shown in chapter 1, income inequality increased in almost all the countries under consideration, there is no evidence to support the claim that this increase was caused by changes in labour institutions. In particular, the decline in trade union density does not explain the rise in income inequality, except in the Central and Eastern European countries, where it seems to have been a significant factor. Elsewere, there is no statistical association between changes in union density, and other labour institutions, and changes in inequality within countries, when other determinants are taken into account.

- The analysis carried out for the purposes of this chapter suggests that recent changes in inequality seem better predicted by economic factors than by changes in labour institutions. Thus, technology-induced shifts in the demand for skilled labour, as illustrated by the incidence of investment in information and communication technology (ICT) tend to increase inequality, as does higher foreign direct investment (FDI). Tariff liberalization also seems associated with greater income inequality, but the impact of this variable seems less robust. By contrast, a larger supply of human capital – as expressed in average years of education – lowers income inequality.

- Despite the above, labour institutions continue to play a redistributive role in the majority of the countries under consideration, with the notable exception of Latin America, where labour institutions generally fail to address inequality concerns. In advanced countries, in particular, high trade union density, a more coordinated collective bargaining structure, and wider coverage of collective bargaining agreements tend to be associated with a larger welfare state. Large welfare states, in turn, are associated with lower inequality. For instance, the analysis suggests that if the country with the highest level of inequality in the sample (the United States) had raised its welfare state levels to those of the average country during the period under consideration, it would have reduced its predicted level of inequality by 48 per cent in 1978-1989 and by 70 per cent in 1990-2002.[2] What diminished, from the 1990s on, was the capacity of labour institutions to reduce inequality directly by compressing market earnings. In particular, centralized collective bargaining seems to have become much less redistributive than it once was.

Introduction

The promise held out by globalization is to increase standards of living for all by virtue of greater specialization and higher productivity, cheaper goods and services, better access to credit and capital, and quicker diffusion of technological innovation. At the same time, there is growing concern in international policy circles, and among the general public, that in its current form globalization is not working (Wade 2004; Goldberg and Pavcnik 2007 p. 39). Increasingly, there is a suspicion that its benefits accrue only to a small portion of the population (the very rich), while others gain little, except greater anxiety and a growing sense of precariousness (Luebker 2004). It is also feared that the adverse distributional consequences of globalization may lead to a political backlash against it, and even to its undoing (Berger 2000; Scheve and Slaughter 2004; OECD 2007; Scheve and Slaughter 2007; Rodrik 1997). Chapter 2 of this World of Work Report sheds further light on this issue by considering the impact of financial globalization on income inequality.

Concerns about the sustainability of the current globalization regime are not to be taken lightly: the first wave of globalization, before the First World War, resulted in some respects, in even closer economic integration across countries than today, for example as far as migration flows were concerned (O'Rourke 2001; Berger 2003). Yet, in the years before the Second World War, this wave of globalization gave way not only to economic protectionism but, more importantly, to fascist regimes in some countries. One of the reasons for the failure of the first globalization was the inability of governments to solve the "Polanyi problem": how to manage the social disruption associated with unfettered economic competition and a global free-market economy (Polanyi 1957; Munck 2004).

It has been argued repeatedly, – among others by the ILO (2004), – that, in order to be sustainable and bring positive outcomes for all, globalization needs a new regulatory framework, which requires the introduction of an appropriate governance structure at the international level. However, as there is no consensus on how exactly to proceed, few positive steps have so far been taken to this end and, in all likelihood, few will be taken in the foreseeable future. As a consequence, the international governance regime will probably remain under-institutionalized and the task of protecting societies from the potentially undesirable consequences of globalization will still fall largely, if not exclusively, on national-level institutions, however weakened these may be at the moment. This chapter focuses on some of these institutions, in particular on those that have to do with workers' rights, trade unionism and collective bargaining.

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2. This simulation exercise is based on the regression coefficients in tables 3.C5 and 3.C6, column 1.

The research question driving the chapter is whether the institutions with which the ILO is traditionally associated, especially trade unionism and collective bargaining, can be said to contribute to the reduction of inequality in the current globalization era and, if so, to what extent. It is known from previous research on advanced countries that trade unionism and collective bargaining have redistributive effects. This chapter seeks to ascertain whether such inequality-reducing effects were still present at a more recent period (the 1990s and early 2000s) than those considered in previous studies and looks also at the record of developing countries.

There is reason to suspect that the same institutions that once improved earnings and income distribution may have recently become much less adept at doing so. Indeed, given that one of the effects of globalization is to increase competition among firms and workers, for example by increasing product and labour demand elasticities (Rodrik 1997; Scheve and Slaughter 2004; OECD 2007 pp. 130-7), so that firms cannot afford to deviate from market outcomes without running a serious risk of going out of business, and workers – particularly low-skilled workers – cannot, without jeopardizing their jobs, push for wages higher than those prevailing in a competitive equilibrium, the impact of unions and collective bargaining on distributional outcomes is likely to be reduced.[3]

Among the developments that may have contributed to this state of affairs is the emergence in several countries, predominantly but not exclusively European, of a particular kind of centralized collective bargaining, known as a social pact, which, although apparently similar to past arrangements as far as its institutional form is concerned, has rather different outcomes and, in particular, is more focused on national competitiveness than on redistribution (Rhodes 1996; Fajertag and Pochet 1997; idem 2000; Streeck 2000; Rhodes 2001; Berger and Compston 2002; Hassel 2003; Baccaro and Lim 2007). Other suggestive evidence comes from a recent shift in union wage policies: in several advanced countries, trade union confederations no longer explicitly seek the compression of wage differentials, as they did in the past, but have moved to more distributionally neutral wage policies (Edin and Holmlund 1995; Baccaro and Locke 1998; Schulten 2002). Even in a country like Sweden, often considered a beacon of egalitarian capitalism, its very high trade union density and – despite a recent shift from the national to the industry level (Pontusson and Swenson 1996; Swenson and Pontusson 2000) – relatively centralized collective bargaining structure have not prevented inequality from growing in the past few years (Smeeding 2002; Gustavsson 2007, pp. 85-7; Atkinson 2008; Bjorklund and Freeman 2008).

Any attempt to answer the question whether labour institutions still reduce inequality in the current era presents considerable empirical challenges. Country estimates of inequality are often based on different income concepts, population coverage, age coverage, thus making both cross-sectional and longitudinal comparisons problematic (Atkinson and Brandolini 2001). Also, and perhaps more importantly, unlike advanced countries, for which full-time series data on union density and collective bargaining structures are available,[4] data on labour rights and industrial relations institutions for non-advanced countries are sparse, to say the least. For this chapter, the available evidence was collected from various sources and an effort was made to fill in as many gaps in the data as possible. Based on the availability of trade union, inequality and other data, the analysis focuses on 51 countries – advanced, Asian, Central and Eastern European and Latin American – between 1989 and 2005.

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3. To use the words of Richard Freeman: "When firms do not have 'rents' to share with workers, institutions cannot affect redistribution" (Freeman 2007a, p. 15).
4. This is thanks to the data collection efforts of Jelle Visser over the years.

A. Review of earlier studies

There was a general consensus in the previous literature that trade unionism and associated institutions reduced inequality. In a recent literature review, Richard Freeman, one of the key scholars in this domain, argued not only that unions and collective bargaining improved income distribution but also that this was the only robust effect of labour institutions on outcomes: "For all of the difficulties in pinning down the impact of institutions on aggregate economic performance across countries, analyses have found that institutions have a major impact on one important outcome: the distribution of income" (Freeman 2007a, pp. 19-20).

Yet what now seems almost received wisdom was controversial only a few years ago. In his influential *Capitalism and Freedom*, Milton Friedman (1962, p. 124), for example, articulated a powerful argument as to why unions, far from acting as a "sword of justice," according to Flanders' famous expression (Flanders 1970; Metcalf, Hansen and Charlwood 2001), were to be regarded as "vested interests", as far as their distributional consequences were concerned:

> "If unions raise wage rates in a particular occupation or industry, they necessarily make the amount of employment available in that occupation or industry less than it otherwise would be – just as any higher price cuts down the amount purchased. The effect is an increased number of persons seeking other jobs, which forces down wages in other occupations. Since unions have generally been strongest among groups that would have been high-paid anyway, their effect has been to make high-paid workers higher paid at the expense of lower-paid workers."

According to Friedman's argument, unions create inequality between two identical workers by pushing up wages in the union sector and thus, because there is a larger supply of workers who cannot find jobs in the unionized sector, depressing wages in the non-union sector. If the workers' skill levels are not identical, but, as Friedman believes, union members are more highly skilled, then unions contribute still further to increasing inequality by pushing up the skill premium.

In a classic study on the effect of unionism in the United States, using microdata, Freeman and Medoff (1984, chapter 5) reversed this argument. They showed that the effect of unions was theoretically ambiguous (see also Gottschalk and Smeeding 1997, p. 647), in that although unions did, as argued by Friedman, push up the wages of their members relative to non-members, this "monopoly" (or "between") effect was in fact counteracted by three other factors that reduced inequality. First the dispersion of earnings within establishments was lower in union than non-union establishments; second, the dispersion across establishments was also lower, owing to the coordinated wage policies pursued by unions in collective bargaining; and, third, the skill premium (as between blue-collar and white-collar workers) was lower in unionized establishments. Because the union wage premium benefited blue-collar workers more than others, the "monopoly" effect operated in the opposite direction from the one hypothesized by Friedman: it reduced rather than increased inequality. As to mechanisms, the authors pointed to two in particular. In the first place, unions are democratic organizations, whose policy decisions may be expected to reflect the preferences of the median union member. If such a member is less skilled, and therefore less well paid, than the average worker, the union will pursue redistributive wage policies that reduce the skill premium. Secondly, union wage policies attach wages to occupations rather than to individual workers on the basis of supervisors' assessments. Since the distribution of supervisors' assessments of workers is probably wider than the distribution of occupations, union establishments have lower within-group dispersion than non-union establishments.

Twenty years after Freeman and Medoff (1984), these empirical findings still appeared very solid, having been corroborated by numerous subsequent studies (see Freeman 2007b

for a review). For example, Card, Lemieux and Riddell (2007) conducted a similar analysis to Freeman and Medoff (1984) based on microdata for three countries – the United States, Canada and the United Kingdom – which were all characterized by a sharp divide between union and non-union sectors. They found that the dispersion of wages was lower for union than for non-union workers, even within narrowly defined skill categories, thus confirming one of Freeman and Medoff's key results, and that unions also contributed to reducing the skill premium but only for male workers. The net effect was to decrease income inequality for men but not for women. For the female workers, the inequality-increasing "monopoly" (or "between") effect prevailed over the inequality-decreasing "within" effect. This divergence was due to the different distribution of union membership according to skill between the two sexes: whereas male union members were concentrated in the middle of the skill distribution, so that the "monopoly" effect boosted their wages in relation to those of more highly skilled workers, female union members were positioned closer to the top. This was because a higher proportion of female union members was in the public sector (Card, Lemieux and Riddell 2007, p. 134). Interestingly, this analysis also revealed that the wage premium enjoyed by unionized workers over their non-organized counterparts had declined between the early 1980s and early 2000s and, consequently, that the ability of unions to compress the distribution of wages had also been declining over time (ibid. pp. 137 and 149-150). Overall, the analysis suggests that the impact of unionism on inequality is empirically dependent on whether the equalizing within-group effect prevails over the disequalizing between-group effect, which in turn depends on whom the unions represent: if they predominantly represent the most skilled workers, the net effect could be (as in Friedman's passage above and as in the case of women in the United States, Canada and the United Kingdom) to increase the dispersion of wages. Also, according to this analysis, the union impact on wages seems to be declining over time. In other words, unions seem less and less capable of affecting either the level or the distribution of wages relative to a competitive scenario. This theme will be considered further in the analysis below.

The work of Blau and Kahn (1996) has an important place in the comparative literature on institutions and inequality, because theirs seems to be the only study in which the comparison relies on microdata relating to workers rather than on aggregate cross-section time-series data at the country level. The data these authors used came from various sources, but principally from the International Social Survey Programme (ISSP). The authors examined ten advanced countries in the mid- to late-1980s, with particular reference to differences between the United States and the other countries. They found that the most important determinants of the greater dispersion in the bottom half of the wage distribution in the United States relative to other countries were not demand and supply conditions but institutional differences in wage-setting. Focusing on the wage gap between two workers in the 50th and in the tenth percentile of the wage distribution, respectively, they found that while the difference in dispersion between the United States and the rest was not so great for the unionized sectors (union workers in the United States had almost the same degree of wage compression as in other countries), the dispersion of wages for non-union workers was much greater in the United States than in other countries. The authors interpreted this difference as due to institutional differences in the structure of collective bargaining which allowed unions to influence the wage structure of non-union workers to a much greater extent than in the United States, through various mechanisms like extension clauses, industry floors, or (given the greater power of unions outside of the United States) spontaneous adoption of union rates by non-union companies. In other words more centralized wage setting institutions in other countries brought about more wage compression than in the United States not so much among union members, but among workers that were not affiliated to trade unions. Consistent with these results, the authors also found that the union/non-union gap was greater in the United States than in other countries.

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Partly as a result of the difficulty of collecting and standardizing microdata sets for a large number of countries, most comparative research on the determinants of inequality takes a given country in a given year as the unit of analysis. This approach exploits the variation in union density rates and degrees of collective bargaining centralization across countries and/or within time to identify the effects of industrial relations institutions. The results almost always suggest that institutions make a difference to inequality; but opinions are divided as to exactly which institutions play the most important role. The main problem with the country/year approach – which is also the approach adopted in this chapter – is that, while it makes it possible to estimate net effects, it does not allow for analysis of the different and possibly contradictory channels by which unionization and collective bargaining have an impact on inequality.

Wallerstein (1999) examined the effect of wage-setting institutions on earnings inequality in 16 OECD countries between (roughly) 1980 and 1992. This study used a rich data set of industrial relations institutional characteristics (measuring, for example, the locus of bargaining, the degree of government involvement in wage bargaining, the degree of union confederation involvement in wage bargaining, the internal concentration of union confederations and the concentration across union confederations). This data set was developed by the author and two of his colleagues, and, updated afterwards, was to become an essential reference for quantitative comparative studies on industrial relations systems (Golden, Lange and Wallerstein 2006). Wallerstein pooled observations across countries at three points in time and estimated a model that had a measure of wage dispersion as the dependent variable,[5] several institutional predictors as independent variables (including the level of wage-setting and the union density rate), and controlled for additional political and institutional determinants that could affect the distribution of earnings. Owing to the small sample size, limited number of economic controls like trade exposure and measures of human capital supply were also included. Wallerstein found that the degree of collective bargaining centralization was by far the most important predictor of cross-country within-time differences in wage inequality, so much so that "it [was] difficult to find other variables that matter[ed] once the institutional variation in wage-setting [was] controlled for" (Wallerstein 1999, p. 650).

A similar study was performed by Rueda and Pontusson (2000), who examined the determinants of earnings inequality in the period between 1973 and 1995 in 16 OECD countries by using a dynamic model with country fixed effects and an instrumental variable approach (the Anderson-Hsiao estimator) to address the problem of the endogeneity of the lagged dependent variable. The model tested the effects of union density and collective bargaining centralization. This model went further than the Wallerstein (1999) specification in attempting to control for economic conditions, since it included the share of government employment and the partisan composition of governments among the institutional predictors. The choice of a fixed-effects estimator implied an exclusive focus on within-country changes in earnings inequality, controlling for time-unchanging differences in the average level of inequality across countries. The theoretical set-up also assumed that the effects of both economic and institutional effects varied systematically across different "varieties of capitalism" (Hall and Soskice 2001) and were potentially very different in "liberal" market economies (United States and other Anglo-Saxon countries) and in "coordinated" market economies (Germany and the Nordic countries). The econometric results suggested that trade union density was the only predictor whose within-country variation was unconditionally negatively correlated with earnings dispersion, regardless of the political economy of the country in question, while the effects of all other variables varied across regimes. Bargaining centralization, for example, contributed to a reduction in inequality far more

5. This measure of wage inequality was drawn from the OECD Earnings Database.

in coordinated economies than in liberal ones.[6] Rueda and Pontusson (2000) ultimately agreed with Wallerstein (1999) that institutions reduced inequality, but they gave greater emphasis to trade union density than to collective bargaining structure.[7]

In a recent article, Koeniger, Leonardi and Nunziata (2007) improved on previous analyses by considering the impact of a wider array of labour market institutions: not just collective bargaining structure and trade union density rates, but also employment protection, replacement rates of unemployment insurance, duration of unemployment insurance and size of the tax wedge. For data on labour market institutions, they relied on a database assembled by Nickell and Nunziata and used previously to analyse the impact of labour market institutions on unemployment in OECD countries (Nickell et al. 2001). The data on earnings inequality came from the OECD database on earnings. Greater richness in institutional detail came at the expense of a smaller number of advanced countries included in the analysis: a total of 11. The time frame was 1973-1998. The analysis sought to build on the previous Wallerstein (1999) analysis. As in Rueda and Pontusson (2000), the focus was on within-country changes. The basic theoretical premise was that labour market institutions reduced wage inequality by improving the bargaining position of unskilled workers more than that of skilled workers, thus bringing about wage compression. The models also controlled for trade- and technology-induced demand shocks and for skill supply. The theoretical predictions were largely confirmed by econometric results, which showed that all institutional variables were negatively associated with wage dispersion, except collective bargaining coordination, which, depending on specification, often had a positive effect. The authors concluded that changes in institutions explained the trajectory of wage inequality within countries at least as well as economic variables did. Some of the econometric results were counterintuitive, however. For example, the proxy for labour demand shifts favouring the more highly skilled appeared to reduce, not increase, wage inequality, while a greater supply of skilled labour seemed associated with an increase rather than a reduction in inequality. As acknowledged by the authors, these unexpected coefficients possibly signalled specification problems.

Within this literature, the work of Bradley et al. (2003), while similar in style and methodological approach to others, stands out because, unlike the studies reviewed above, which focus on earnings inequality alone, it investigates the determinants of inequality both in market income and in post-tax and transfer income. The dependent variables (market income and disposable income) are measured using aggregate microdata from the Luxembourg Income Study (LIS),[8] a collection of country-based microdata sets harmonized to increase their comparability both across countries and over time.[9] In the study by Bradley et al. (2003), the sample covered 14 advanced countries. Most data points used in the analysis were placed at approximately 5-year intervals between the early 1980s and the mid-1990s. Although the specifications included a number of controls for economic conditions, the institutional variables considered were the union density rate and collective bargaining centralization. Moreover, since the main focus was on effects of the political parties, the cumulative shares of social democratic and Christian democratic parties in government were included among the predictors.

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6. These results concerning the heterogeneity of institutional effects across models of capitalism do not seem very robust. For example, Wallerstein, too, (1999, p. 670) tested for different effects in coordinated as against liberal market economies (albeit with a smaller sample size) but could find no essential differences.

7. However, in a related article relying on very similar data and specifications, Pontusson, Rueda and Way (2003) found that both union density and bargaining centralization were important. These slightly different findings may be due to the different estimator used in the second analysis: a least squares dummy variable estimator (which is inconsistent with a dynamic model with a small time dimension).

8. Market income includes wages and salaries, self-employment earnings, property income and private pension income. Disposable income is market income after cash transfers and taxes. The unit of analysis is the household, not the individual, and the analysis is restricted to households where the head is of working age, i.e. between 25 and 59.

9. For information, see: http://www.lisproject.org/.

Like Rueda and Pontusson (2000), the authors found that trade union density was a more important determinant of inequality in market earnings than collective bargaining centralization and that, while redistribution through taxes and transfer was substantial in all countries, including those, like the Anglo-Saxon countries, characterized by a smaller welfare state (Esping-Andersen 1990), it was greatest in countries where governments were dominated by social democratic parties. Interestingly, the study found that trade union density and collective bargaining coverage did not just determine market incomes but were also statistically associated with the extent of redistribution through taxes and transfer. Indeed, the authors argued that, owing to collinearity among institutional and political indicators, a model in which redistribution was a function of the partisan composition of governments was statistically indistinguishable from models in which the main institutions considered were trade union density or collective bargaining centralization. However, a comparison of historical situations – in Australia, for example, a strong labour movement failed to reduce inequality because of the lack of social-democratic political dominance – led the authors to concentrate on political factors. On the basis of this study, one may hypothesize that trade unions have an effect not just on market earnings but also, indirectly, on post-tax and transfer redistribution. Strong trade unions may proxy for other political variables, such as social democracy and associated policies, that reduce inequality by other means than the compression of market earnings.

All the cross-country longitudinal studies on the relationship between industrial relations institutions and inequality reviewed so far are based on a limited number of advanced countries. There is at least one exception to this, however: a study by Calderón, Chong and Valdés (2004) on the impact of labour market regulation on income inequality in 121 countries between 1970 and 2000. This study draws on various indices of labour regulations, both de jure (by counting the cumulative number of ILO core Conventions ratified by the country concerned for the year in question) and de facto. Most of the institutional information is drawn from an unpublished database assembled by Rama and Artecona (2002) for the World Bank.[10] Another source of information is the cross-sectional data set of Botero et al. (2003) on the legislative protection of employment, industrial relations and social security. Owing to a concern that, given the long time period, labour institutions may respond endogenously to income inequality, the authors use a dynamic generalized method of moments (GMM) estimator and control for country and time effects. Despite the much larger sample size and the inclusion in the analytical framework of a number of developing countries, the econometric results are in line with other studies. In particular, trade union density is found to diminish income inequality. The number of core ILO Conventions ratified does not seem to have an impact on inequality.

The research reviewed so far (see table 3.1 for a summary) suggests that industrial relations institutions are important determinants of cross-country differences in inequality. Several studies find that high trade union density rate is associated with lower inequality. A centralized collective bargaining structure also seems associated with greater equality, but not all the studies bear this out. Trade unions and collective bargaining exert a net effect, resulting from various forces that may operate at cross-purposes. Indeed, as shown by micro-studies, the question of whether trade unions reduce or increase inequality depends strongly on whom the unions represent, and particularly on whether union members are on average more skilled than other workers. Also, trade unions not only affect market earnings directly, by compressing the wage distribution, but also indirectly affect final incomes by being associated with other institutional and political variables, such as social-democratic regimes and associated economic policies, whose effect is either to compress

10. Many thanks to Martin Rama of the World Bank for making this database available. The information on trade union density contained therein was not used in this chapter for two reasons: 1) the data in the database are aggregated in five-year averages; 2) they are expressed as a percentage of the total labour force rather than of wage and salary earners.

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Table 3.1. Cross-country time-series studies of the relationship between industrial relations institutions and inequality

Authors	Dependent variable	Country coverage	Time coverage	Estimator used	Impact of institutions
Wallerstein (1999)	Earnings inequality	16 advanced countries	1980-1992	Feasible generalized least squares (FGLS) error correction model, with and without country effects	Significant negative coefficient for level of wage setting
Rueda and Pontusson (2000)	Earnings inequality	16 advanced countries	1973-1995	Anderson-Hsiao estimator, dynamic model with country effects	Significant negative coefficient for union density
Bradley et al. (2003)	Market income inequality; post-tax and transfer reduction in inequality	14 advanced countries	Early 1980s-mid-1990s (for most countries)	Pooled ordinary least squares (OLS) with cluster-robust standard errors, no country effects	Significant negative coefficient for union density
Calderón, Chong and Valdés (2004)	Income inequality	121 countries	1970-2000	System GMM (dynamic model with country and time effects)	Significant negative coefficient for union density; insignificant coefficient for ratifications of ILO core Conventions
Koeniger, Leonardi and Nunziata (2006)	Earnings inequality	11 advanced countries	1973-1998	Panel-weighted least squares, with country and time effects	Significant negative coefficient for union density

further the distribution of market earnings or to redistribute disposable incomes through progressive taxes and transfers.

The analysis that follows examines whether these conclusions remain valid for a more recent period (from the late 1980s to the early 2000s) than those considered in previous studies. It includes not just advanced countries but also Latin American, Central and Eastern European, and a number of Asian countries, and considers various dimensions of economic globalization that may have an impact on within-country inequality.

Expected effects of globalization variables

While the focus of the analysis in this chapter is the impact of labour institutions on inequality, it is nonetheless helpful to review briefly the expected effects of globalization measures (for recent reviews, see Brady, Beckfield and Zhao 2007; Goldberg and Pavcnik 2007). According to the Stolper-Samuelson theorem, the consequences of trade openness should differ systematically across countries, depending on their relative endowment of skilled and unskilled labour.[11] Countries that are relatively rich in skilled labour should thus specialize in skilled-intensive productions. This should increase the effective demand for skilled labour and depress the demand for unskilled workers in skilled-endowed countries, and vice versa for countries rich in unskilled labour. To the extent that unskilled labour is the abundant factor in developing countries, and skilled labour the abundant factor in advanced countries, Stolper-Samuelson predicts that trade openness will reduce inequality in developing countries by compressing skill differentials and increase inequality in advanced countries by widening skill differentials. This pattern is, however, not

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11. The paragraphs that follow draw on Goldberg and Pavcnik (2007).

exactly in line with the available evidence. Indeed, inequality has been growing in various developing countries commensurately with their increased exposure to trade (Goldberg and Pavcnik 2007, p. 55).

One argument about the effects of globalization that is compatible with the current trend of growing inequality in both advanced and developing countries is the one advanced by Feenstra and Hanson (2001), to the effect that one of the main features of globalization is the current international restructuring of production processes in global supply chains (Gereffi, Humphrey and Sturgeon 2005; Barrientos 2007). According to this model, firms in advanced countries outsource particular phases of the production process to developing countries, those phases being less skill-intensive from the point of view of developed countries but relatively skill-intensive in the receiving countries. Thus the effect of global production-sharing is to shift labour demand away from unskilled workers and towards skilled workers in both developed and developing countries.

One of the most visible aspects of economic globalization is the increase in foreign direct investment (FDI). In theory, the impact of FDI on inequality should be similar to the Stolper-Samuelson prediction for trade: if FDI is attracted to a country because of the relative abundance of a particular factor of production, then it should, by increasing demand for unskilled labour (the abundant factor), in developing countries lead to more equitable distribution in those countries (Cornia 2004; Vivarelli 2004) but the opposite in developed countries. However, there are also various ways in which FDI may worsen distribution. As pointed out by Feenstra and Hanson (2001), FDI may increase the demand for skilled labour in both advanced and developing countries, even if the transferred technology is neutral. Another factor is what Cornia (2004, p. 197) calls "systemic effect": in order to attract a greater share of FDI, a country may relax a series of policy and regulatory constraints (relating to working conditions or taxation, for example) that are associated with a more compressed income distribution. A third factor may be linked to the complementarity between capital and skilled labour (Acemoglu 2002). This also pertains to another dimension of globalization: capital liberalization. To the extent that capital and skilled labour are complementary, and capital liberalization facilitates access to capital, there should be an increase in the relative demand for skilled workers.

Another channel by which globalization may affect inequality is by facilitating the transmission of skill-biased technological change from advanced to developing countries (Lee and Vivarelli 2006, p. 7). Such change increases both the relative price and the relative quantity of skilled labour (Berman and Machin 2004). If greater international competition forces companies to restructure and upgrade to defend themselves against competitors (in which case technological change would be an endogenous response to globalization), or if the technology transferred with FDI is itself skill-biased, trade and financial liberalization may push out the relative demand for skilled labour and increase inequality.

In brief, there are multiple channels by which different features of economic globalization may lead to greater within-country inequality. Some of these channels may operate at cross-purposes: for example, trade openness may reduce inequality in a developing country by Stolper-Samuelson effects, while capital openness increases it. Moreover, net effects may vary from one country to another (Goldberg and Pavcnik 2007). A recent analysis of the impact of globalization on inequality by the International Monetary Fund (IMF 2007) finds that, while trade liberalization has contributed to reducing within-country inequality, financial globalization – and particularly a growing share of FDI liabilities as a percentage of gross domestic product (GDP) – has increased it.

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B. Cross-country patterns of labour institutions and income inequality

This chapter considers the role of three labour institutions 1) trade union density, namely the percentage of workers affiliated to trade unions in a given country in a given year; 2) collective bargaining structure, particularly the degree to which collective bargaining is centralized or coordinated and whether if takes place at levels above the enterprise (for example at the industry or national level), or is coordinated through other mechanisms, including powerful and internally cohesive employer and worker organizations; and 3) labour law, and in particular the extent to which national regulations comply with international labour standards. Data for each of these dimensions were collected from various sources. In total, a comprehensive data set covering 51 countries has been gathered for the purposes of this report (see Appendix A for the sources and definitions of these indicators).

Trade union density has tended to decline over the past two decades…

Table 3.2 summarizes the change in union density since 1990 or so. Between 1989 and 2005, union density declined in the 51 countries or territories for which data could be collected, with the exception of seven – Brazil, China, Hong Kong (prior to reunification with China), India, Paraguay, Singapore, and Spain – in which union density increased, and three – Belgium, Finland and Pakistan – in which it was stable. The decline was dramatic in Central and Eastern European countries: more than 50 per cent in the Czech Republic, Estonia, Hungary, Latvia and Lithuania, where there was almost universal union affiliation in the Communist years.

…but collective bargaining structures have remained broadly stable in a majority of countries

Besides union density, the way employers and workers bargain over wages and working conditions is also crucial for understanding the functioning of labour markets. Collective bargaining can be more or less centralized and coordinated. In some countries, such as the Nordic countries and Uruguay, employer and trade union federations agree on national guidelines, which serve as a benchmark for lower-level negotiations. By contrast, bargaining is more decentralized in other countries, such as the Republic of Korea, the United Kingdom and the United States.

Table 3.3 shows estimates of the extent of coordination of collective bargaining in the 51 countries under consideration. These estimates, graded in value from 1 (in cases where bargaining is mainly confined to individual enterprises) to 5 (where bargaining is centralized and coordinated by national federations, are provided as averages for the period between 1989 and 2005, so that collective bargaining structures may be compared across countries. It will be seen that there are significant cross-country differences. Coordination is greatest in Ireland, closely followed by Norway. Among the largest economies, Germany, Italy and Japan appear to have relatively coordinated bargaining structures. By contrast, bargaining is strongly decentralized in China, the United Kingdom and the United States. Brazil, France and India lie somewhere in between these groups, with bargaining taking place between the plant and the sectoral level.

The third column of the table shows changes in the structure of collective bargaining between 1989 and 2005. For 31 countries, there is no apparent change. For 8 (Belgium, Finland, Hungary, Ireland, Italy, Portugal, Slovenia and Spain), collective bargaining seems to have become more coordinated or centralized. These are the countries that saw the emergence in the 1990s of social pacts. For 12 countries (Argentina, Australia, Czech Republic,

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Table 3.2. Change in union density rates, 2005-1989

Country	Union density change	Last/initial year
Singapore	0.08	2005/1989
Paraguay	0.06	2004/1994
China	0.04	2005/1989
Hong Kong	0.04	1999/1989
Spain	0.04	2005/1989
India	0.03	2002/1991
Brazil	0.01	2005/1991
Finland	0.00	2005/1989
Belgium	0.00	2005/1989
Pakistan	0.00	2005/1989
Chile	-0.01	2005/1989
Jamaica	-0.01	2005/1991
Turkey	-0.01	1999/1989
Taiwan (China)	-0.02	2005/1989
Netherlands	-0.02	2005/1989
France	-0.02	2005/1989
Norway	-0.03	2005/1989
Philippines	-0.03	1998/1989
Canada	-0.03	2005/1989
Denmark	-0.04	2005/1989
United States	-0.04	2005/1989
Argentina	-0.04	2005/1989
Dominican Republic	-0.04	2005/1990
El Salvador	-0.04	2005/1990
Switzerland	-0.05	2005/1989
Italy	-0.05	2005/1989
Mexico	-0.05	2002/1989
Sweden	-0.07	2005/1989
Japan	-0.07	2005/1989
Costa Rica	-0.08	2003/1993
Republic of Korea	-0.08	2003/1989
Uruguay	-0.08	2005/1990
Germany	-0.11	2005/1989
United Kingdom	-0.12	2005/1989
Honduras	-0.13	2001/1990
Greece	-0.14	2005/1989
Austria	-0.15	2005/1989
Australia	-0.17	2005/1989
Venezuela	-0.19	2005/1989
Portugal	-0.20	2005/1989
Ireland	-0.22	2005/1989
Peru	-0.31	2005/1989
New Zealand	-0.32	2005/1989
Slovenia	-0.32	2005/1989
Poland	-0.42	2005/1990
Slovakia	-0.53	2005/1990
Hungary	-0.54	2005/1989
Latvia	-0.61	2005/1991
Czech Republic	-0.62	2005/1990
Lithuania	-0.82	2005/1989
Estonia	-0.83	2005/1989

Source: see Appendix A.

Table 3.3. Average collective bargaining structure and change, on a scale of 1 to 5, 1989-2005

Country	Collective Bargaining Structure	Change
Slovenia	3.47	3
Italy	3.65	2
Belgium	4.35	1
Finland	3.71	1
Hungary	1.76	1
Ireland	4.71	1
Portugal	2.88	1
Spain	3.24	1
Austria	4.00	0
Brazil	2.00	0*
Canada	1.00	0
Chile	1.00	0
China	1.00	0
Costa Rica	1.00	0
Denmark	3.29	0
Dominican Republic	1.00	0
El Salvador	1.00	0
France	2.00	0
Germany	4.00	0
Greece	3.94	0
Honduras	1.00	0
Hong Kong (China)	1.00	0
India	2.00	0
Jamaica	1.00	0
Republic of Korea	1.00	0
Mexico	2.12	0
Netherlands	4.00	0
New Zealand	1.00	0
Norway	4.65	0
Pakistan	1.00	0
Paraguay	1.00	0
Philippines	1.00	0
Poland	2.00	0
Singapore	2.00	0
Taiwan China	2.00	0
Turkey	1.00	0
United Kingdom	1.00	0
United States	1.00	0
Venezuela	2.00	0
Argentina	2.35	-1
Peru	1.59	-1
Slovakia	4.24	-1
Sweden	3.29	-1
Switzerland	3.41	-1
Uruguay	3.29	-1
Australia	2.82	-2
Japan	3.59	-2
Czech Republic	2.59	-3
Estonia	2.38	-3*
Latvia	2.71	-3
Lithuania	2.35	-3

* 2005/1990.   Source: See Appendix A.

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Estonia, Japan, Latvia, Lithuania, Peru, Slovakia, Sweden, Switzerland and Uruguay), the index signals a trend towards more decentralized or uncoordinated bargaining.

In parallel with the trend rise in income inequality documented in Chapter 1, unionization has followed a downward trend, while collective bargaining structures have remained broadly stable – or, in some countries, become somewhat more decentralized or less coordinated. The next step is to establish whether, side by side with this temporal coincidence between declining unionism and growing inequality, there is also a causal relationship between the two. We begin with a simple examination of bivariate correlation and follow with a more detailed analysis.

Highly unionized countries and countries where collective bargaining is more coordinated tend to have low income-inequality…

Figure 3.1 shows a clear negative correlation between unionization and inequality: the countries in which income inequality is on average lower in the period 1989-2005 tend to be those in which a greater proportion of workers is affiliated to trade unions.

The structure of collective bargaining is also associated with income inequality: as Figure 3.2 shows, the more collective bargaining takes place at levels above the enterprise, the less unequal the distribution of income. Conversely, the countries in which collective bargaining is on average more highly centralized or coordinated are those in which inequality tends to be lower.

However, it is not the case that the change in bargaining structure within countries is negatively related to inequality or that the more collective bargaining becomes decentralized or uncoordinated, the more inequality grows within a country, or vice versa. This is somewhat at odds with conventional wisdom. Indeed, historically, centralized collective

Figure 3.1. Bivariate correlation between average Gini coefficient and average union density, 1989-2005
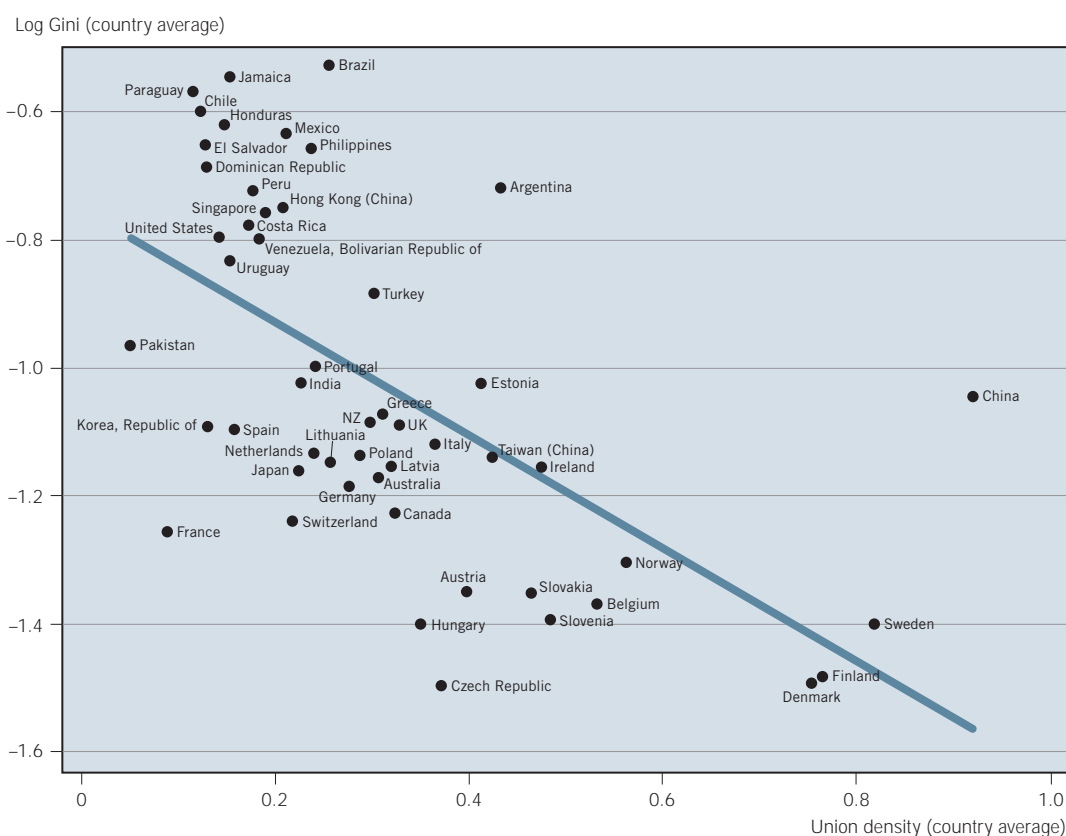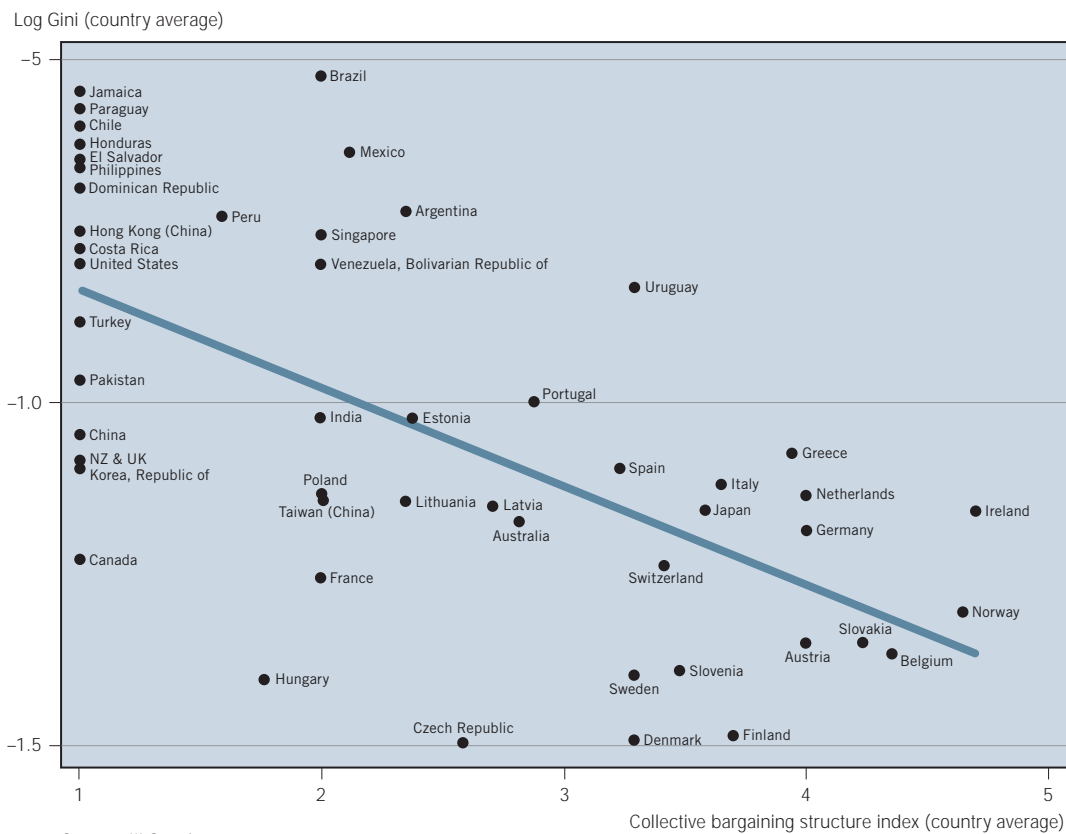

Source: IILS estimates.

Figure 3.2. Bivariate correlation between average Gini coefficient and average collective bargaining structure index, 1989-2005

Log Gini (country average)

Source: IILS estimates.

bargaining has contributed to the reduction of inequality by reducing wage dispersion across sectors and skill levels, as suggested by the literature reviewed above. The countries in which the indicator of collective bargaining structure has changed the most are the advanced countries.

… and greater compliance with the Freedom of Association and Protection of the Right to Organize, 1948 Convention (No. 87) and the Right to Organize and Collective Bargaining Convention, 1949 (No. 98) tends to be associated with lower inequality

There seems to be a marginally negative relationship between the average number of core Conventions ratified by a given country and income inequality in that country. On the other hand, when one looks at the relation between changes in the ratification of core Conventions and changes in inequality within countries over time, the slope of the curve is positive.[12] This relationship is, however, not only statistically very weak but also, in all likelihood, spurious. It is probably due to the fact that both indicators – namely, ratifications and inequality – tend to grow over time for unrelated reasons. At any rate, the bivariate associations suggest that the ratification of core Conventions is not significantly linked to income inequality.

More important seems the degree of compliance with the specific norms contained in Conventions No. 87 and No. 98. Figures 3.3 and 3.4 plot average compliance with the two Conventions (the "severity score") against average inequality and reveal a positive

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12. Similar conclusions (both cross-sectionally and longitudinally) are reached if one focuses on ratification of Conventions No. 87 and No. 98 alone.

Figure 3.3. Bivariate correlation between average Gini coefficient and average severity score for Convention No. 87, 1990-2000
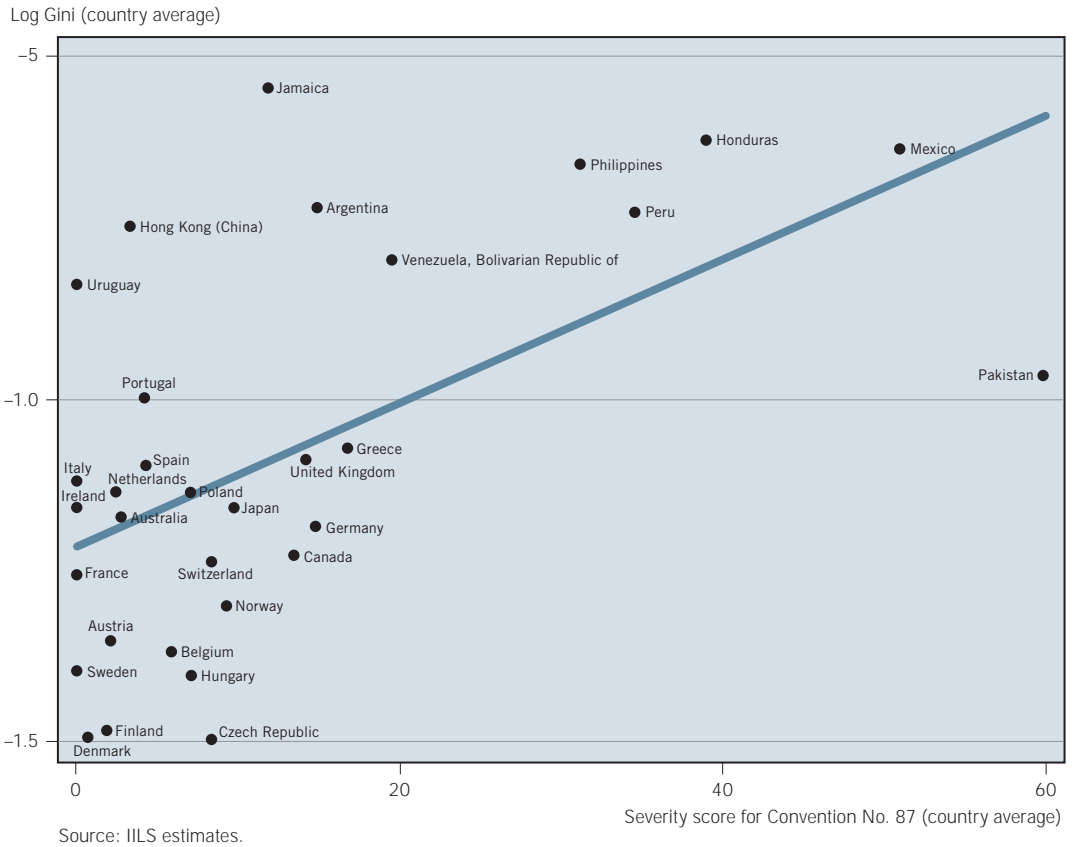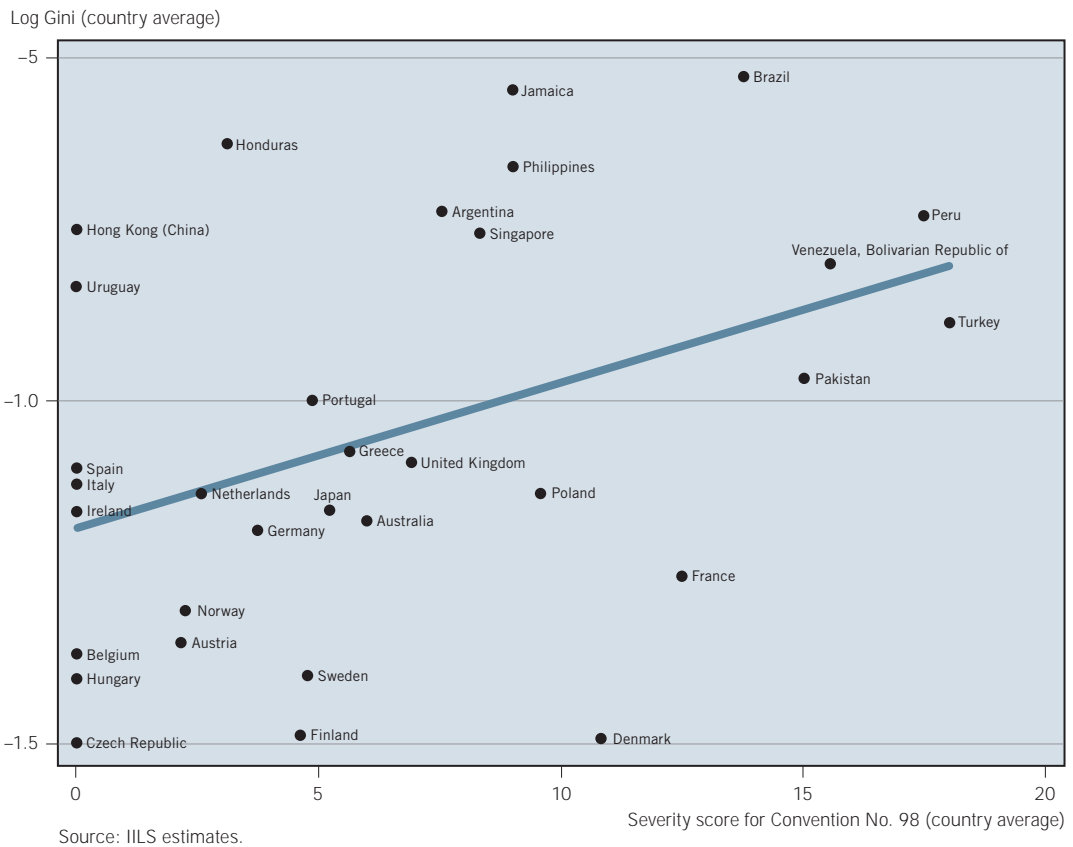
Log Gini (country average)

Source: IILS estimates.

Figure 3.4. Bivariate correlation between average Gini coefficient and average severity score for Convention No. 98, 1990-2000

Log Gini (country average)

Source: IILS estimates.

3. Labour institutions and inequality

relationship for both: the more serious, on average, the violation of fundamental norms relating to freedom of association and collective bargaining, the greater the average level of inequality in the country in question.[13] The positive association seems stronger for Convention No. 87 than for Convention No. 98.

If one were to plot changes in severity scores against changes in inequality within countries, however, a much smaller positive relationship would emerge (though it would be larger for Convention No. 98 than for Convention No. 87). Hence, again, cross-sectional differences in institutions seem more closely associated with income inequality than do changes over time.

The simple bivariate correlations discussed above suggest that labour institutions are important determinants of inequality, not so much over time (with the possible exception of the union density rate) as across countries. Cross-country differences in institutions are likely to reflect a constellation of factors that historically have led, either directly or indirectly, to a more compressed distribution of incomes. Labour institutions tend to come together as parts of a system.[14] The countries in which union density rates are higher are also the ones in which the welfare state is more developed, taxation levels higher and more progressive, collective bargaining more centralized and labour law both closer to international labour standards and better implemented. What is more surprising is that changes in these institutions seem less clearly associated with the increase in inequality. That conclusion is also valid when other potential determinants of income inequality are taken into account on the basis of econometric analysis.

Detailed analysis confirms that changes in labour institutions are not strongly related to changes in income inequality, which are due rather to technical change and globalization…

Appendix B presents the findings of what is probably the first comparative assessment of the impact of domestic and external factors of inequality. It shows that changes through time in income inequality are robustly associated with an increase in the stock of FDI as a percentage of GDP and somewhat less robustly with trade liberalization (in the form of tariff reductions). Other facets of globalization such as capital openness do not seem significant predictors of income inequality. Technology-induced shifts in the demand for skilled labour, as captured by the share of information and communication technology (ICT) investment in the capital stock, also tend to increase inequality. By contrast, changes in labour institutions within countries do not seem responsible for growing inequality over time, with the exception of trade union decline in the Central and Eastern European countries, which seems to have contributed to the growth in inequality in that region.

…while labour institutions are more systematically related to differences in income inequality across countries…

Rather different results concerning the impact of industrial relations institutions are reached if one focuses on differences across countries as opposed to differences within a given country. Differences in average levels of income inequality across countries seem to depend entirely on institutional differences, while the economic predictors are hardly ever statistically different from zero.

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13. These unpublished data on severity of violations were elaborated by the OECD Secretariat. Many thanks to Douglas Lippoldt of the OECD Secretariat for providing them. For more information on the construction of the index, see OECD (2000: 85-7).

14. Statistically, this phenomenon manifests itself as positive correlation among the labour institutions indicators.

On average, the countries in which trade union density is higher are those in which the income distribution is less unequal on average. Consistently with results from the within country analysis, there seem to be regional differences in the impact of unionization. Greater union density in Latin American countries is not associated with lower inequality: although the coefficient is positive, it is insignificant. This may be due to the historical corporatist nexus linking trade unions to the state in some Latin American countries (Zapata 1998; Murillo 2001). Also, if trade unions represent predominantly skilled (for example, public sector) workers, then the "monopoly" effect (the enhancement of skill differentials) may effectively dominate the "within" effect (more compressed distribution), thus leading to a more unequal income distribution. On the other hand, union density is associated with lower inequality in advanced, Central and Eastern European and Asian countries.

The effects of collective bargaining structure also seem regionally specific: in Latin America, more centralized collective bargaining is associated with greater inequality, whereas the opposite is true in advanced, Central and Eastern European and Asian countries. Overall, collective bargaining coefficients seem less robustly significant than union density rates. It is telling that the more politically illiberal the government, the greater the inequality is on average. This is not surprising and may be due to the fact that illiberal governments may be less disposed than democratic ones to correct inequality through redistributive policies (Meltzer and Richard 1981; Sen 1999). Other institutional measures having to do with labour law (the core Conventions, severity of violations of international norms for Conventions No. 87 or No. 98) do not seem to have a significant cross-sectional association with inequality.

Overall, econometric analysis suggests the following: despite a rather impressive bivariate association, it cannot be said that the pronounced fall in trade union density in the last two decades, or the more modest trend towards collective bargaining decentralization, has caused income inequality to rise. There seems to be no robust statistical association between changes in inequality within countries and changes in the labour institutions considered here, when other possible determinants of inequality are taken into account.

The increase in inequality in the past 15 years seems due mostly to economic forces, particularly a technologically induced shift in the demand for skilled labour and the increase in FDI as a percentage of GDP. Tariff liberalization may also have contributed, although less markedly than other predictors.

When it comes to explaining differences in average levels of inequality across countries, however, it remains the case that labour institutions play a substantial role. On average, the countries in which trade unions are stronger have lower levels of inequality than others. It is also the case that a more centralized or coordinated structure of collective bargaining and more extensive political rights are associated with more income equality. These results do not seem very surprising: labour institutions are generally parts of social systems, and high trade union density and centralized collective bargaining structures are likely to be associated with other features (such as social democratic governments in some countries, or redistributive social policies), which in turn are likely to be conducive to a more egalitarian distribution of incomes. Interestingly enough, the estimation results suggest that labour institutions may function differently in different regions of the world. In Latin American countries, for example, high trade union density and a more centralized collective bargaining structure may not be conducive to greater equality.

**…and the inequality-reducing effect of labour institutions seems
to have weakened in advanced countries over the pas few years**

Appendix C contains the findings of an analysis of inequality trends in 16 advanced countries for which longer time-series data on institutions and other variables are available: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy,

Figure 3.5. Relationship between labour power and welfare state size
        in the periods 1978-1989 and 1990-2002

Welfare state size   Welfare state size

Source: IILS estimates.
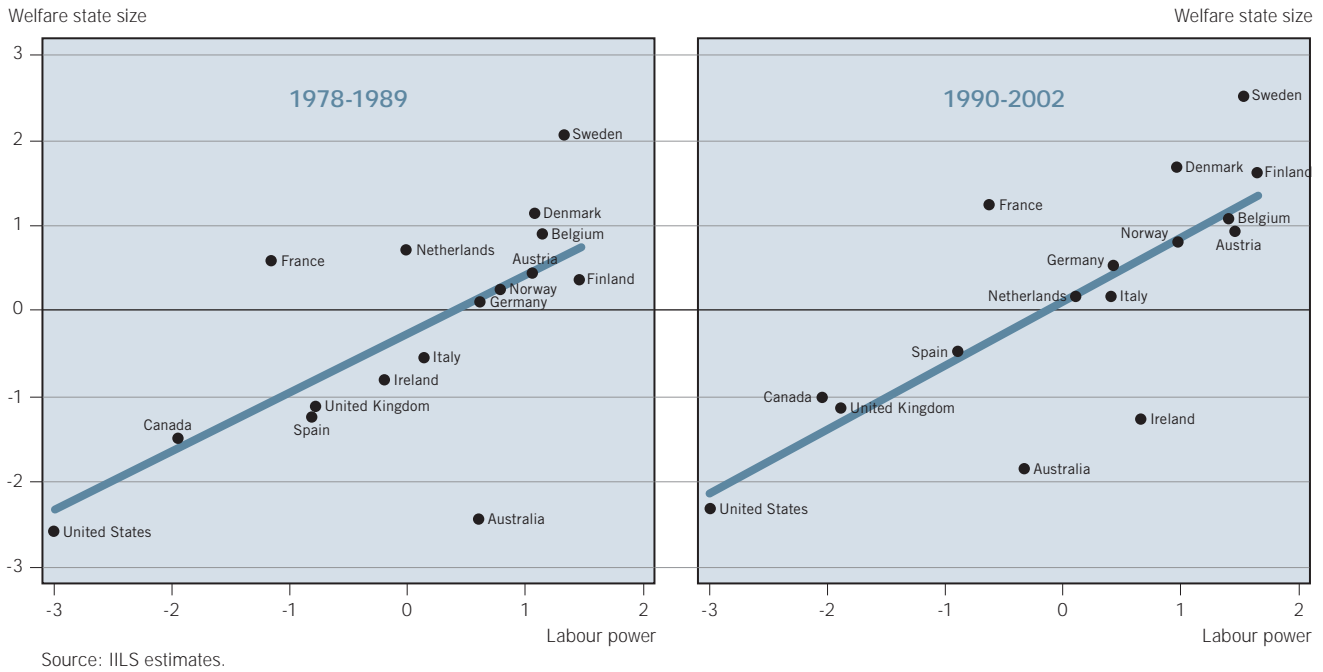
the Netherlands, Norway, Spain, Sweden, the United Kingdom, and the United States. This analysis also takes account of total public social expenditure as a percentage of GDP, thus showing the effect that labour institutions exert on income inequality, directly, by compressing the distribution of market earnings. The indirect effect of labour institutions, by being associated with a more generous welfare state, is controlled for.

Figure 3.5 displays the bivariate correlation between a summary indicator of labour power and a summary indicator of welfare state size before and after 1990.[15] The relationship is positive in both periods. The countries with lower degrees of labour power, and above all the United States, tend to be characterized by a smaller welfare state, whereas the opposite is true of countries with high labour power (the Scandinavian and Central European countries). The relative position of some countries changes over time. Australia, for example, was clearly an outsider in the former period, in that it had a smaller welfare state than the strength of its labour movement would suggest, but less so in the second, whereas the United Kingdom shifted closer to the United States in the second period. The shapes of the two curves, however, remain remarkably similar across both periods.[16]

Figure 3.6 examines the relationship between the composite indicator of welfare state size and a composite indicator of inequality during the two periods. This relationship is negative, as might be expected: the greater the size of the welfare state, the lower the inequality. The two opposite poles are, once again, the United States – a country with a residual welfare state and high levels of inequality – and Sweden, where extensive social

15. Labour power is a linear combination of collective bargaining coordination, trade union density rate and collective bargaining coverage. The weights are the factor loadings of the first principal component of these three variables. Welfare state size is composed of the total tax wedge as a percentage of GDP, including social security and indirect taxes, and total public social expenditure as a percentage of GDP. Further details are contained in Appendix C.

16. With a collective bargaining system characterized by compulsory arbitration, generally considered a functional substitute for centralized bargaining (Lansbury and Wailes 2004), Australia scored almost as high as Central and Northern European countries on the labour power index before 1990, but the welfare state size was similar to that of other Anglo-Saxon countries.

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Figure 3.6. Relationship between welfare state size and inequality
in the periods 1978-1989 and 1990-2002
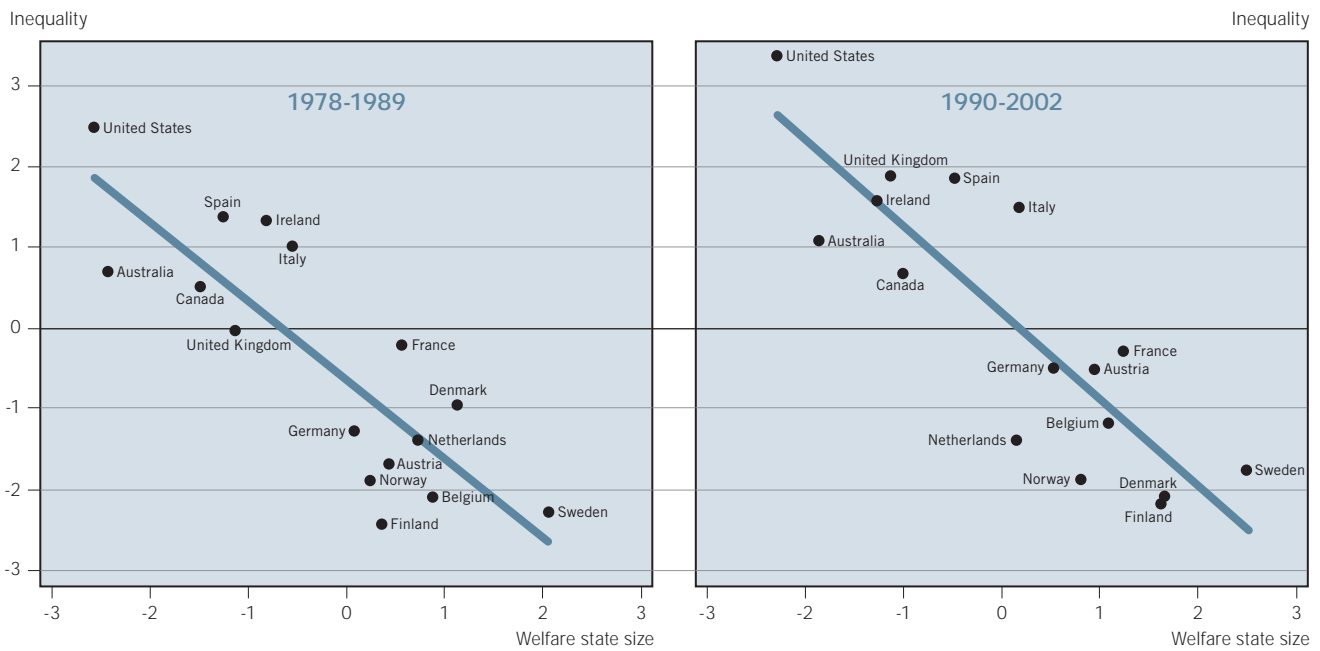
Source: IILS estimates.

protections is accompanied by a much more egalitarian distribution of incomes. The slope of the two curves remains similar over time. However, the second graph seems to have shifted rightwards compared to the first: both the size of the welfare state and inequality grew on average during the period 1990-2002. The increase in the size of the welfare state is due to the well-known phenomena of population ageing and the coming to maturity of various social programmes (see Pierson 2001). Also, the graphs in figure 3.5 confirm that, over time, the United Kingdom shifted its relative position in the direction of the United States.

Figures 3.7 and 3.8 display the partial correlation of the inequality indicator and the labour power indicator, controlling for welfare state size, over the two periods. The graphs plot the residual of a regression of inequality on welfare state size against the residuals of a regression of labour power on welfare state size. The linear fit becomes much less steep in the period between 1990 and 2002 than in the previous period between 1978 and 1989.

These graphs suggest that, from the early 1990s on, the institutions associated with labour power – high trade union density, high collective bargaining coverage, and a coordinated bargaining structure (particularly coordinated bargaining) – largely forfeited their capacity to reduce inequality directly by compressing market earnings, and retained only an indirect effect on inequality thanks to the welfare state size factor. This is consistent with micro-evidence suggesting that the ability of unions to compress the distribution of wages has been declining over time (Card, Lemieux and Riddell 2007, pp. 137 and 149-150). It is also consistent with case study evidence on recent developments in some of the countries included in this analysis. Some time ago, unions participating in national collective bargaining engaged in explicit attempts to compress skill differentials through various means, including requests for lump-sum wage increases, which tend to favour low-paid workers; tapered percentage wage increases, with the highest increases for low-paid workers; and skewed indexation mechanisms (like the Italian *scala mobile*), which assured those on low earnings a greater degree of protection from inflation and which, particularly in times of double digit inflation, helped to compress earnings (Edin and Holmlund 1995; Erickson and Ichino 1995; Baccaro and Locke 1998; Schulten 2002).

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Figure 3.7. Partial correlation between inequality and labour power, controlling for welfare state size, 1978-1989

Inequality residuals
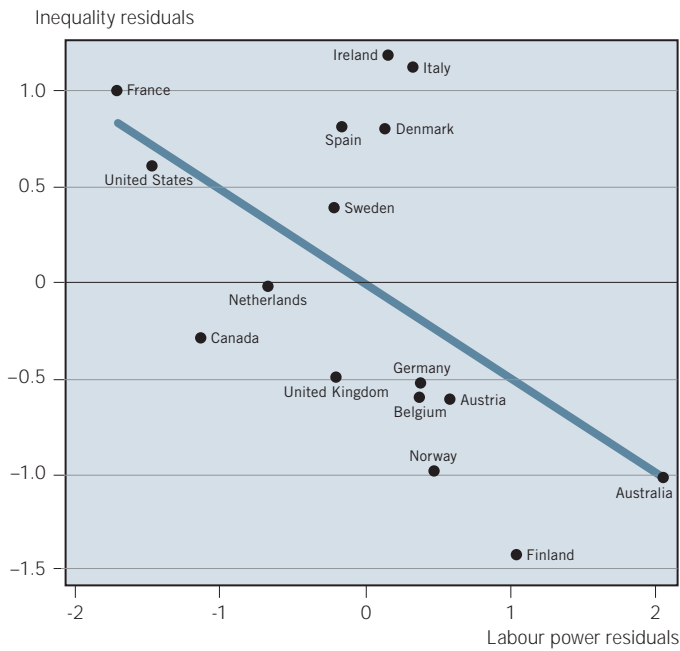
Source: IILS estimates.

Figure 3.8. Partial correlation between inequality and labour power controlling for welfare state size, 1990-2002

Inequality residuals
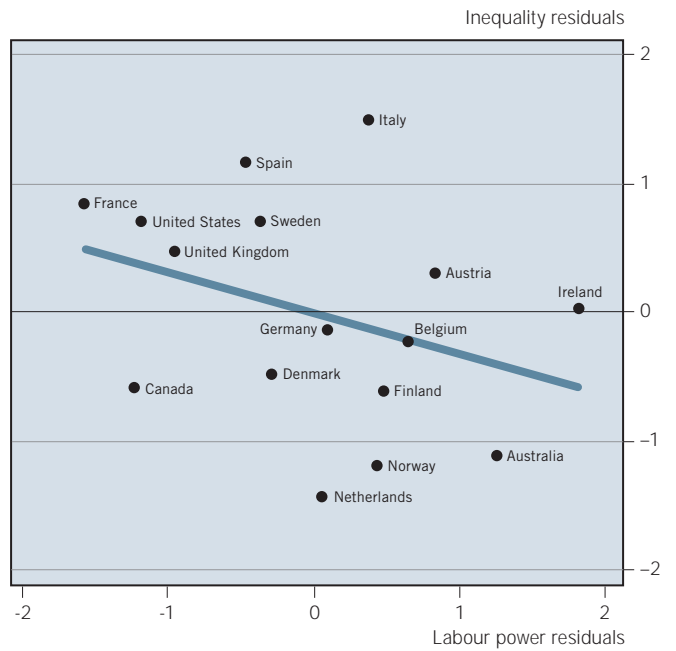
Source: IILS estimates.

Over time, these strategies and institutional arrangements were largely discarded. In Sweden and other Scandinavian countries, the egalitarian wage policies pursued by the unions from the late 1960s on created considerable problems for employers, who found it difficult to recruit and motivate highly skilled labour (Pontusson and Swenson 1996; Swenson and Pontusson 2000). They also generated problems for unions. For example, in the early 1980s the Swedish blue-collar union Metall found itself losing many members to the white-collar union where workers who did similar jobs were paid more, and had eventually to drop the policy of wage compression as well as the whole model of national bargaining associated with it, which was replaced by sectoral bargaining (Thelen 1993, p. 39).

Centralized bargaining used to be one of the key institutions in "social corporatist" countries (Korpi 1978; Pekkarinen, Pohjola and Rowthorn 1992; Rowthorn 1992; Pontusson 2005), with unions negotiating at the national level and exchanging wage moderation for both a more equitable distribution of earnings and more extensive social protection networks (Pizzorno 1978; Mares 2006). It suffered a temporary decline in the 1980s, but, in the 1990s, it surprisingly resurfaced in a number of countries, primarily but not exclusively European (Fajertag and Pochet 1997; idem 2000; Berger and Compston 2002; Hassel 2003; Baccaro and Lim 2007). However, the social outcomes of these new forms of centralized bargaining, also known as social pacts, were quite different; they were markedly less redistributive than in the past and much more concerned with increasing country competitiveness (Rhodes 1996; Streeck 2000; Rhodes 2001). In Ireland, for example, the collective bargaining system has been strongly recentralized in the past two decades, yet there is little evidence that this has contributed to reducing wage differentials (Barrett, Gerald and Nolan 2000; Baccaro and Simoni 2007). In Italy, the *scala mobile* was abolished in 1992 and the unions negotiated with employers and the government a new architecture of nationally coordinated sectoral bargaining, which did not, however, prevent wage and income inequality from rising (Erickson and Ichino 1995; Brandolini, Cipollone and Sestito 2001; Baccaro 2002).

In short, faced with new market constraints – more elastic labour demand, particularly for the low-skilled, and high skill premiums as a result of skill-biased technological change – union behaviour seems, over time, to have started to conform more closely with market outcomes and in so doing to have lost much of its redistributive impetus. Large welfare states, on the other hand, continued to play an important redistributive role well into the 1990s. Indeed, an even greater proportion of the cross-country variation in inequality was due to differences in welfare state size during this period than it was earlier. This may seem surprising, given the current debate on the crisis of the welfare state; but it is in line with the findings of other scholars as well (Bradley et al. 2003; Kenworthy and Pontusson 2005; Pontusson 2005, chap. 7).

C. Policy considerations

The Chapter shows that countries that have stronger tripartite institutions are better placed to ensure that the gains from globalization are distributed in a balanced manner. However, the income distribution effects of tripartite institutions have become weaker. This reflects mainly the inequality-increasing impacts of rapid technological change and globalization – and the fact that such underlying trends are difficult to arrest directly through tripartite institutions.

The policy issue is how tripartite institutions can continue to shape income distribution, consistent with economic realities. This is an area where country specificities are important, so there is no one-size-fits-all model of industrial relations. Yet, policies can promote the involvement of employers and workers in various ways.

First, governments may engage with social partners –and revitalise social dialogue where needed – to discuss reforms of labour markets and, particularly, social protection. Experience shows that this may be a helpful way to ensure that the interests of all parties are well understood. The involvement of social partners in the reform process may also facilitate implementation of any agreed measures. And experience shows that strong tripartite institutions tend to be associated with social protection designed in a way which protects workers, and yet is consistent with high employment (see evidence in this Chapter, as well as Chapter 6).

Second, in the case of skill development policies, evidence suggests that the involvement of social partners is crucial for an efficient design of the measures. This may help enhance workers' skills, and thus achieve better income distribution outcomes.

Appendix A
Measures of labour institutions

Information on the three labour institutions considered here – trade union density, i.e. the percentage of wage and salaried workers affiliated to trade unions, collective bargaining structure more or less centralized or coordinated, and labour law – is drawn largely from the database assembled by Jelle Visser for advanced and Central and Eastern European countries.[17] This was then supplemented by data from various sources for Latin American and Asian countries.[18] Table 3.A1 reports the sources of union density data.[19]

Table 3.A1. Sources of trade union density data

	Frequence	%
OECD.Stat	26	3.22
Jelle Visser	438	54.21
Institute estimates	344	42.57
Total	808	100.00

For the index of collective bargaining structure, Visser's database – which was complemented by our own research for other countries[20] – provides an index of collective bargaining coordination, which in turn updates a previous index elaborated by Kenworthy (2003). This 1-to-5 index is coded as follows:

1 = Fragmented wage bargaining, confined largely to individual firms or plants.

2 = Mixed industry- and firm-level bargaining, with little or no pattern-setting and relatively weak elements of government coordination, such as setting of basic pay rate or wage indexation.

3 = Industry-level bargaining with somewhat irregular and uncertain pattern-setting and only moderate union concentration.

4 = Centralized bargaining by peak confederation(s) OR government imposition of a wage schedule/freeze, without a peace obligation OR informal centralization of industry- and firm-level bargaining by peak associations OR extensive, regularized pattern-setting coupled with a high degree of union concentration.

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17. Many thanks to Jelle Visser for making this database available.
18. Initially, data on union density were collected for 139 countries from various sources, but the analysis ended up focusing on only 51 countries, those in which there was a meaningful time variation and for which information on other variables was available. For Asian countries, an important source was Kuruvilla et al. (2002). Many thanks to Pascal Annycke and Melissa Luongo for the excellent work they did in assembling some of the data and, in the case of Melissa Luongo, for her research on a number of countries. The data from the Visser database are adjusted density rates: the number of union affiliates who are not wage and salary workers is subtracted from the numerator, and the number of wage and salary workers who do not have the right to organize (such as public sector workers in some countries) is subtracted by the denominator. For the other countries, such adjustments were not possible. However, the denominator was kept constant as far as possible.
19. The union density variable was linearly interpolated. This increased the number of data points from 719 to 808.
20. Again, many thanks to Melissa Luongo for providing the information needed for the coding through various secondary sources.

5 = Centralized bargaining by peak confederation(s) OR government imposition of a wage schedule/freeze, with a peace obligation OR informal centralization of industry-level bargaining by a powerful, monopolistic union confederation.

For the non-advanced countries, however, there was often not enough information on the degree of coordination brought about by institutional features other than the structure of wage-setting. For these countries, therefore, the index is really an index of collective bargaining centralization, and the coding is simplified as follows (Golden, Lange and Wallerstein 2006):

1 = Plant-level wage-bargaining

2 = Mixed industry- and firm-level wage bargaining

3 = Industry-level wage bargaining

4 = Centralized wage-bargaining without sanctions

5 = Centralized wage-bargaining with sanctions.

It should also be added that most of the variation in this index is cross-sectional. This is not surprising, since the institutional structure of collective bargaining tends to be resilient over time; but it may also be due to measurement error. Moreover, most of the within-country, longitudinal variation in the index is provided by the advanced countries. For the Asian countries, the index is entirely time-invariant.

The third dimension of labour institutions considered in this analysis is compliance with international labour standards. Three indicators were used: 1) the number of core ILO Conventions ratified by a given country in a given year;[21] 2) the number of ratifications of Convention No. 87 and Convention No. 98; and 3) unpublished violation severity scores elaborated and kindly made available to us by the OECD Secretariat.[22] The severity scores are based on the biannual reports on Convention No. 87 and Convention No. 98, the two core Conventions on freedom of association and collective bargaining, respectively, by the ILO Committee of Experts on the Application of Conventions and Recommendations (CEACR). For the countries that have ratified either Convention, CEACR writes a report every two years, which measures the distance between the norms contained in the Convention and the de jure (and, to a lesser extent, also de facto) situation in each country. The OECD Secretariat coded the CEACR reports for a number of countries between 1990 and 1999 and elaborated a violation severity index for each Convention[23] These indices (which are not available for all countries in the sample) tell us not just whether one of the Conventions has been ratified but also the extent of a country's compliance with it.[24] Figures 3.A1 and 3.A2 plot the average severity scores over time. For Convention No. 87 the graph reveals first an increase in the severity of violations in the early 1990s and then a decrease. For Convention No. 98 there seems to be a constant increase over time.

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21. The ILO core Conventions are eight in number and pertain to: the Forced Labour Convention, 1930 (No. 29) and the Abolition of Forced Labour Convention, 1957 (No. 105); Conventions No. 87 and No. 98; the Equal Remuneration Convention, 1951 (No. 100) and the Discrimination (Employment and Occupation) Convention 1958 (No. 111); and the Minimum Age Convention, 1973 (No. 138) and the Worst Forms of Child Labour Convention, 1999, (No. 182).
22. Many thanks to Douglas Lippoldt of the OECD Secretariat for providing these data.
23. The index weights the perceived severity of the labour violation (based on the OECD Secretariat's assessment) against the severity of the CEACR evaluation of the situation. For more information on the construction of the index, see OECD (2000, pp. 85-87). The data have been linearly interpolated.
24. The number of countries for which the Convention No. 87 severity score is available is 30 in 1990 and 32 in 2000. For the Convention No. 98 severity score, these numbers are 29 and 32, respectively. It needs to be taken into account that several countries in the sample have not ratified either or both Conventions. For these countries, the severity scores are obviously not available.

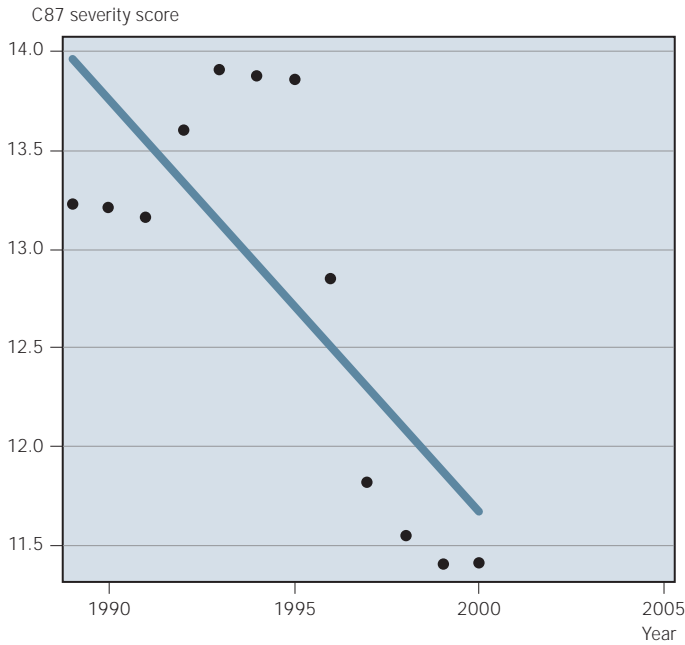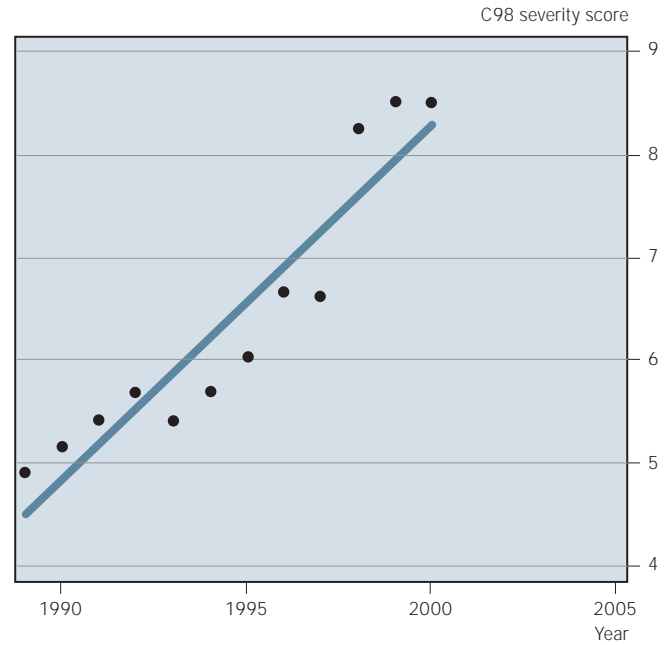**Figure 3.A1.** Average severity score over time, Convention No. 87

C87 severity score

Figure 3.A2. Average severity score over time, Convention No. 98

C98 severity score

Appendix B
Do labour institutions reduce inequality?
An econometric analysis

The purpose of this appendix is to examine how closely unionization and inequality are related, when various dimensions of globalization and other demand and supply factors are taken into account. The dependent variable is the measure of inequality (Gini coefficient) described in Chapter 1.[25] The list of predictors includes the labour institutions described in Appendix A (trade union density, collective bargaining structure and measures of compliance with international labour standards), as well as various measures of economic globalization. For all information relating to globalization and other economic controls (human capital and technology-induced demand for skilled labour), the analysis relies on a database used by the IMF for a recent report on globalization and inequality (IMF 2007)[26] and made available by the IMF Secretariat.

The data distinguish between trade and financial globalization. For trade globalization, there are two indicators, one de facto and the other de jure: 1) trade openness, that is, the sum of imports and exports (excluding oil-related transactions) as a percentage of GDP; and 2) de jure tariff openness, which is equal to 100 minus the tariff rate.[27] There are also two indicators, one de facto and one de jure, for financial globalization: 1) the ratio of inward

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25. The Gini coefficient estimates were linearly interpolated. This increased the number of data points from 409 to 622.

26. Many thanks to Patrick Hettinger and Subir Lall of the IMF Secretariat for providing these data.

27. The tariff rate is an average of the effective tariff rate (tariff revenue/import value) and of the average unweighted tariff rate; see IMF (2007, p. 57).

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FDI stock as a percentage of GDP (Lane and Milesi-Ferretti 2006);[28] and 2) Menzie D. Chinn and Hiro Ito's measurement of capital openness, which, based on the coding of information from the IMF Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) (Chinn and Ito forthcoming),[29] captures the extent of capital controls.

In addition, the econometric analysis reported below also controls for the degree of development of the credit market,[30] for human capital supply[31] and for the technological intensity of the capital stock.[32] A more developed credit market may reduce income inequality by facilitating access to credit by the less wealthy. Similarly, a greater relative supply of skilled labour is likely to reduce inequality by reducing skill premiums. Finally, the higher the (technology-induced) demand for skills, the higher the inequality, all other things being equal.

Among the institutional predictors, in addition to the ones whose effects are discussed in chapter 3 – trade union density and collective bargaining coverage, both of which the previous literature considered to be negatively related to inequality – two other indicators relating to labour law indicators are considered: core Convention ratification and compliance with the rights of association and collective bargaining. While there is no clear guidance in the literature concerning their effects, they should theoretically operate in the same way as other institutions: to the extent that they strengthen the bargaining position of less skilled workers or proxy for a government's favourable attitude towards redistribution, they should be associated with a more equal distribution. The analysis also controls for political regime, and specifically for political rights violations, by using the Freedom House indicator.[33] This is done for two reasons. First, it is more than likely that the effects of trade unionism and collective bargaining are contingent on the prevailing political regime: trade unions in non-democratic countries (where membership may be compulsory, or effectively so) may not redistribute as much as in democratic countries if at all. Also, to the extent that, in democratic regimes, political parties are pushed by the logic of electoral competition to compensate for increasing market inequality (where the income of the median voter falls below average income) with redistributive taxes and transfers (Meltzer and Richard 1981), it may be assumed that countries with fewer violations of political rights would have lower income inequality than others.[34] Table 3.B1 summarizes the list of predictors included in the econometric analysis and theoretical expectations about their effects. The analysis begins by examining changes within countries over time.[35]

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28. The Lane and Milesi-Ferretti data set on gross foreign asset and liability positions for 145 countries is available online at: http://www.tcd.ie/iiis/pages/people/planedata.php/.

29. The Chinn-Ito de jure measure of capital openness is available online at: http://www.web.pdx.edu/~ito/kaopen_2006.xls/.

30. The measure of financial sector development is private credit provided by deposit money banks and that provided by other financial institutions as a percentage of GDP. See Beck, Demirguc-Kunt and Levine (2007). The measure is available online at: http://siteresources.worldbank.org/INTRES/Resources/469232-1107449512766/FinStructure_60_06_final.xls/.

31. The measure of human capital is Barro and Lee's average number of schooling years in the population aged 15+ (Barro and Lee 2000). These data, which are available at five-year intervals until 2000, have been interpolated and extrapolated to cover the 2001-2005 period. The Barro and Lee database is available online at: http://www.cid.harvard.edu/ciddata/barrolee/appendix_data_tables.xls/.

32. The proxy used is the ratio of the stock of ICT capital to total capital. For more information on this variable, see IMF 2007, p. 58).

33. The Freedom House scores are available at: http://www.freedomhouse.org/uploads/FIWAllScores.xls. The political rights index is graded 1 to 7, with the higher scores indicating more serious violations of political rights.

34. Owing to lack of data, it was not possible to consider the impact of other institutional predictors, such as the minimum wage, which is likely to pull up the lower tail of the distribution, or labour market institutions like employment protection and generous unemployment insurance, which are likely to improve the position of less skilled workers. However, in so far as such institutions are closely correlated with unionization and collective bargaining, the latter proxy for the missing institutions as well. Data on 18 advanced countries between 1960 and 1998 suggest that this may indeed be the case: the correlation between union density rates and/or collective bargaining coordination scores, on the one hand, and measures of employment protection, unemployment benefit replacement and unemployment benefit duration, on the other, is always positive and significantly different from zero (Baccaro and Rei 2007).

35. The software used for all analyses is Stata 10 SE.

Table 3.B1. List of predictors and expected impact on inequality

Variable	Description	Expected
Globalization measures		
FDI	Ratio of inward FDI stock to GDP	Ambiguous
Tariff openness	100 minus tariff rate	Ambiguous
Capital account openness	Index capturing extent of de jure capital controls	Ambiguous
Trade openness	Sum of imports and exports (excluding oil-related transactions) as a percentage of GDP;	Ambiguous
Other factors		
Average education	Average number of schooling years in the population aged 15+	Negative
ICT share	Stock of ICT capital as a percentage of total capita	Positive
Financial sector development	Private credit by deposit money banks and other financial institutions as a percentage of GDP	Negative
Institutional factors		
Trade union density	Union membership as a percentage total wage and salary earners	Negative
Collective bargaining structure	Growing incidence of coordination/centralization	Negative
Core Convention ratification	Number of ILO core Conventions ratified	Negative
Convention No. 87 severity index	Index capturing compliance with provisions in Convention No. 87	Negative
Convention No. 98 severity index	Index capturing compliance with provisions in Convention No. 98	Negative
Reversed democracy index	Freedom House political liberty index	Negative

(a) Within-country regression analysis

The model estimated is as follows:[36]

$$\ln(gini_{i,t}) = a + X_{i,t}\beta + Z_{i,t}\gamma + \delta_i + \tau_t + \varepsilon$$

where $\ln(gini)$ is the natural logarithm of the Gini coefficient in country i at time t; X is a vector of labour institutions variables, including the trade union density rate, the index of collective bargaining centralization/coordination, the number of core Convention ratifications, particularly of Conventions No. 87 and No. 98, and the OECD indices of the severity of violations of those Conventions; and Z is a vector of economic and social controls, which includes the measures of trade discussed above (trade openness, tariff liberalization) and financial globalization (FDI stock as a percentage of GDP, capital account

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36. The econometric model assumes that there is no reversed causation (and hence endogeneity) from income inequality to the right-hand side predictors. This assumption seems warranted, as far as institutional variables are concerned: institutions are highly path-dependent and, to the extent that they change, the motivation is often more political than economic. It also seems unlikely that inequality causes globalization, especially the more de jure dimensions of it, such as tariff and capital account liberalization. One possible source of endogeneity may be found in human capital supply: the individual's decision to invest in human capital may be related to skill premiums. For this reason, the measure used is average years of education, rather than the percentage of population with higher education (which is more likely to depend on skill differentials). There could be endogeneity on the right-hand side of the model, since some of the predictors may be causally related to one another. The analysis below tests explicitly for the possible endogeneity of union density to globalization. Endogeneity on the right-hand side of the statistical model is likely to manifest itself as multicollinearity, which makes it more difficult to reject hypotheses about zero coefficients.

openness), as well as the average number of years of education, credit by banks and other financial institutions as a percentage of GDP.[37] The insertion of the country dummies δ_i ensures that the focus is exclusively on the time variation within countries. The time dummies (τ_t), which relate to shocks affecting all countries simultaneously, seek to capture any cross-sectional dependence in the errors and to account for the cyclical behaviour (around a growing trend) of all the globalization variables. Since the series are trended, it seems implausible that a shock (captured by the error term) should be absorbed in only one year. For this reason, the econometric model allows for first-order serial correlation in the errors:

$$\varepsilon_{i,t} = \rho\varepsilon_{i,t-1} + \nu_{i,t}$$

where $\nu_{i,t}$ is assumed to be independent and identically distributed (i.i.d.) and $|\rho|<1$.[38]

The econometric analysis reported below covers 42 countries for which there are data on all variables. There are 13 in Latin America and the Caribbean: Argentina, Brazil, Chile, Costa Rica, Dominican Republic, El Salvador, Honduras, Jamaica, Mexico, Paraguay, Peru, Uruguay and Venezuela; 21 advanced countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Turkey, United Kingdom and United States; 2 Central and Eastern European countries: Hungary and Poland; and 6 Asian countries: China, India, Republic of Korea, Pakistan, Philippines and Singapore[39] The time frame is 1989-2003, since in no instances is the capital openness indicator available for 2004-2005. All variables, except tariff liberalization, capital openness, union density and collective bargaining structure, are transformed to natural logarithms in order to make them more normally distributed.[40]

Columns 1 to 4 in table 3.B2 present the results of estimations in which the within-country variation in the Gini coefficient is solely a function of economic variables (globalization measures and controls). Column 1 includes FDI, the index of tariff liberalization, the index of capital account openness, the average number of years of education and a measure of the development of the financial sector. Column 2 replaces the tariff-based

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37. Separate specifications not reported here also control for the share of ICT investment in total capital stock, which acts as proxy for relative labour demand. This measure is available for a subset of countries and turns out to have substantial positive relation to inequality. See Baccaro (2008) for these additional results.
38. The time series are too short for meaningful tests of stationarity and cointegration. However, while the series are certainly long-memoried (De Boef 2001), a unit-root problem is unlikely. Inspection of the coefficient of the lagged dependent variable in a specification including labour institutions, globalization variables and other economic controls (the right-hand variables are the same as in column 1 of table B2 below, except that the lagged dependent variable is also included) but excluding the country dummies indicates that not even with this estimator, which is known to bias the coefficient of the lagged dependent variables upwards, does the 95 per cent confidence interval of the lagged dependent variable cover one (Bond 2002).
39. Data on the capital account openness index are unavailable for Taiwan (China) and several Central and Eastern European countries Czech Republic, Estonia, Latvia, Lithuania, Slovakia and Slovenia). For Estonia, Latvia, Lithuania and Taiwan (China), data on average number of years of education are also unavailable. There are no data on the variable credit by bank and other financial institutions as a percentage of GDP for Taiwan (China) and the reversed democracy index is not available for Hong Kong (China).
40. The Stata command used for estimation is *xtregar, fe*. This routine estimates time-series cross-section regressions when the error term is first-order autoregressive (AR(1)). It is based on Baltagi and Wu (1999) and is appropriate for unbalanced panels and for observations that are unequally spaced over time. The option *onestep* – used to estimate the autoregressive parameter ρ – implements the method proposed by Baltagi and Wu (1999). After ρ is estimated, the data are transformed in two stages: first to remove the Ar(1) component and then to remove the fixed effects ("within" transformation). In this second transformation, the first observation of each panel is dropped (see Stata Corporation 2007, pp. 421-427). Note that the AR(1) component estimated to be around 0.6 in all specifications, which is a sizeable figure. This implies that ignoring serial correlation of the errors, especially in the presence of heavily trended independent variables, is likely to underestimate severely the standard errors of the coefficients and overestimate the R^2, which would give over-generous significance levels (see Gujarati 2003, pp. 449-460). Indeed, estimates of fixed-effects models identical to the ones reported in table 3.5 that disregard (first-order) serial correlation in the error term show up many more economic variables significantly different from zero and the R^2 is more than 20 per cent higher.

Dependent variable	1	2	3	4	5	6	7	8	9	10
FDI	0.0243[b] (0.0101)	0.0209[b] (0.0104)	0.0215[b] (0.0105)	0.0275[a] (0.0105)	0.0237[b] (0.0104)	0.0260[b] (0.0107)	0.0263[b] (0.0106)	0.0263[b] (0.0107)	0.0264[b] (0.0106)	0.0266[b] (0.0106)
Tariff liberalization	0.00133 (0.00102)	— —	— —	0.00130 (0.00102)	0.00147 (0.00106)	0.00150 (0.00107)	0.00183[c] (0.00108)	0.00190[c] (0.00112)	0.00184[c] (0.00109)	0.00196[c] (0.00109)
Capital account openness	-0.00342 (0.00338)	-0.00341 (0.00337)	-0.00347 (0.00338)	-0.00326 (0.00339)	-0.00331 (0.00348)	-0.00337 (0.00351)	-0.00408 (0.00351)	-0.00413 (0.00354)	-0.00429 (0.00352)	-0.00376 (0.00354)
Education years (average)	-0.256 (0.186)	-0.238 (0.188)	-0.239 (0.189)	-0.207 (0.190)	-0.212 (0.192)	-0.201 (0.193)	-0.194 (0.187)	-0.197 (0.187)	-0.203 (0.187)	-0.200 (0.185)
Credit to private sector	-0.0118 (0.0111)	-0.0108 (0.0111)	-0.0107 (0.0111)	-0.0123 (0.0111)	-0.00956 (0.0114)	-0.0102 (0.0115)	-0.0106 (0.0114)	-0.0109 (0.0114)	-0.0115 (0.0114)	-0.0106 (0.0113)
Trade openness	— —	0.00831 (0.0195)	0.0121 (0.0209)	— —	— —	— —	— —	— —	— —	— —
Trade openness in advanced countries	— —	— —	-0.0208 (0.0409)	— —	— —	— —	— —	— —	— —	— —
GDP	— —	— —	— —	-0.0412 (0.0432)	— —	— —	— —	— —	— —	— —
GDP squared	— —	— —	— —	0.00532 (0.00421)	— —	— —	— —	— —	— —	— —
Union density (UD)	— —	— —	— —	— —	-0.0159 (0.0628)	-0.0203 (0.0633)	0.0526 (0.0749)	0.0515 (0.0764)	0.0529 (0.0751)	0.0513 (0.0752)
Reversed Democracy index	— —	— —	— —	— —	— —	0.000228 (0.00473)	0.00154 (0.00479)	0.00163 (0.00484)	0.00168 (0.00480)	0.00129 (0.00481)
UD in advanced	— —	— —	— —	— —	— —	— —	0.0123 (0.190)	0.0212 (0.190)	0.00715 (0.190)	0.0325 (0.190)
UD in Central and East European countries	— —	— —	— —	— —	— —	— —	-0.356[b] (0.152)	-0.357[b] (0.150)	-0.353[b] (0.151)	-0.346[b] (0.151)
UD in Asia	— —	— —	— —	— —	— —	— —	-0.231 (0.359)	-0.222 (0.362)	-0.218 (0.360)	-0.220 (0.361)
Collective bargaining structure	— —	— —	— —	— —	— —	— —	— —	-0.00114 (0.00521)	— —	— —
No. of ratifications of core Conventions	— —	— —	— —	— —	— —	— —	— —	— —	0.00295 (0.00425)	— —
No. of ratifications of Conventions No. 87 and No. 98	— —	— —	— —	— —	— —	— —	— —	— —	— —	-0.0130 (0.0138)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	435	441	441	435	422	417	417	416	417	417
Number of countries	43	44	44	43	43	42	42	42	42	42
Coefficient of determination (R^2) (within)	0.158	0.147	0.147	0.165	0.156	0.157	0.188	0.193	0.191	0.194
Estimated ρ	0.633	0.643	0.643	0.628	0.621	0.621	0.592	0.583	0.589	0.585

Figures in brackets represent standard errors.   [a] $p < 0.01$.   [b] $p < 0.05$ [c] $p < 0.1$

measure of trade liberalization with trade openness. Column 3 tests whether trade openness has different impacts in advanced and developing countries, as suggested by the Stolper-Samuelson theorem (see Perry and Olarreaga 2007), by introducing an interaction between the trade openness variable and a dummy that captures whether a country is advanced or developing. Column 4 estimates a Kuznets (1955)-type model by checking whether the trajectory of within-country inequality is affected by levels of income. To this end, GDP and its square are entered.

Of all economic controls, the only one that seems robustly associated with inequality is FDI levels as a percentage of GDP: the greater the growth in FDI, the greater the increase in inequality within a country. There may be at least two reasons for this. First, FDI may increase demand for skills in the receiving country at the same time as it decreases the relative demand for semi-skilled workers in the sending country (Feenstra and Hanson 2001), the assumption being that FDI replaces low-skill activities in the sending country, with activities that are relatively skill-intensive in the receiving country, for example in such sectors as textiles and apparel (IMF 2007, p. 45). Second, the need to attract FDI may induce a country to reduce taxes and adopt less redistributive social policies (Cornia 2004). Of the other economic variables, tariff liberalization seems positively associated with income inequality, while capital account liberalization, average years of education and credit to the private sector are negatively signed. However, one cannot reject the hypothesis of zero coefficients for these variables, with the exception of the tariff liberalization index which is often significant at the 10 per cent level.

Columns 4 to 10 examine the impact of labour institutions, taking other economic determinants into account. Column 5 includes union density and column 6 the reversed democracy score (the higher the score, the more undemocratic the country concerned in year in question). Column 7 examines possible variations in the impact of unionization and to this end introduces specific terms for advanced countries, Central and Eastern European countries, and Asian countries, the reference category being unionization in Latin American countries. It is conceivable that, in an economy characterized by a large informal sector, a high degree of organization among formal-sector workers may increase income inequality, especially if trade unions represent predominantly skilled workers (Heckman and Pagés 2000). Column 8 includes collective bargaining structure, the assumption being that a more centralized/coordinated collective bargaining structure tends to reduce inequality.[41] Column 9 checks whether an increase in the number of ratifications of core Conventions has a significant impact on income inequality. Column 10 focuses exclusively on the two core Conventions on freedom of association and collective bargaining (FACB).[42]

The pattern of results in table 3.B2 remains valid even when a number of robustness checks (not shown here), including the use of alternative estimators, are performed (Baccaro 2008). In particular, the introduction of an important additional control – the share of ICT investment in the capital stock – does not seem fundamentally to change conclusions concerning other predictors. Although available only for a subset of countries and for no Central or Eastern European country, which precludes any estimation of the effect of union density in the region[43], this proxy, which captures technology-induced demand for skilled labour, turns out to be a significant predictor of inequality: the higher the share

41. The collective bargaining structure index is entirely time-invariant for Asian countries; any time variation that does appear is due to variation within the advanced countries. An analysis of regional heterogeneity similar to that conducted for trade union density would therefore make little sense in this case.
42. The regression coefficient on the FACB variable depends only on Hong Kong (China), the Netherlands and New Zealand, which were the only countries for which the 0-2 index of ratifications of Conventions No. 87 and No. 98 changed in the period under consideration. The overall number of core Conventions ratified, however, had greater time variation.
43. Data on IT investments as a percentage of capital stock are unavailable for the following countries and territories: Czech Republic, Dominican Republic, Estonia, Greece, Hong Kong (China), Hungary, Jamaica, Latvia, Lithuania, New Zealand, Poland, Portugal, Slovakia, Slovenia, Switzerland and Taiwan (China).

of ICT, the higher the inequality. With this alternative specification, the coefficients of FDI and tariff liberalization become insignificant. Also, the number of years of education emerges as a significant negative predictor of inequality.

Table 3.B3 examines possible endogeneity on the right-hand side of the Gini equation. Specifically, it considers whether the reason why union density has no significant effect on income inequality, even when globalization forces are taken into account, is that union density is itself affected by globalization. The results of two fixed-effects models with AR(1) errors, where the dependent variable is unionization and within-country changes in unionization are regressed on globalization variables, suggest that the increase in FDI stock as a percentage of GDP within countries is associated with a decline in union density in those countries. There is case-study evidence on Ireland (a country in which FDI plays a key role) suggesting that as FDI was attracted to the country in large quantities in the 1990s, multinational corporations (particularly those from the United States) increasingly went back on their previous practice and refused to recognize trade unions. This was possible because the public agency responsible for attracting FDI waived the union recognition requirement for location grants (Roche and Geary 1997; Gunnigle and McGuire 2001). These examples suggest possible channels through which an increase in FDI may thus lead to lower unionization. Other facets of globalization (tariff liberalization, capital openness, trade openness) do not seem to have a significant impact on unionization. When the models in table 3.B2 are re-estimated by dropping the FDI factor and thus allowing union density a potentially greater impact on inequality, not mediated by FDI, the results do not change much (Baccaro 2008). Both trade union density and other institutional variables remain insignificant predictors of inequality, again with the exception of trade union density in Central and Eastern European countries.

Overall, the results of the within-country analysis suggest that, generally speaking, changes in union density are not significantly associated with changes in income inequality in the period under investigation. If one distinguishes by region, however, one finds that in the Central and Eastern European countries, the precipitous decline in unionization after the collapse of the Berlin Wall seems to have significantly contributed to an increase in inequality.[44] Interestingly enough, while they are not significantly different from zero, the coefficients for unionization in Latin American and advanced countries are positive rather than negative. The political freedom index is positive (indicating that the more political rights are violated, the greater the inequality) but statistically insignificant. Nor does the centralization or coordination of collective bargaining reduce inequality: the coefficient is negative but statistically insignificant.[45] Finally, the ratification of core Conventions, including Conventions No. 87 and No. 98, is not significantly associated with inequality.[46]

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44. Since the capital openness and education variables are not available for a number of Central and Eastern European countries – only Hungary and Poland have data on the former – and these variables seem insignificant according to the previous analysis, they are removed from the econometric model, using an alternative specification not shown here (see Baccaro 2008, table 9), in order to demonstrate the impact of union density for a greater number of countries in the region. With this alternative specification, the coefficient of unionization can refer to a much larger sample of countries: Czech Republic, Estonia, Latvia, Lithuania, Slovakis and Slovenia, in addition to Hungary and Poland. It remains negative, approximately of the same magnitude as before and highly significant.

45. As argued above, the coefficient of the collective bargaining structure largely depends on developments in advanced countries, which are the only regional groups with substantial within-country variation.

46. Additional models have been estimated to assess the impact on inequality of variations in the severity of violations of Conventions No. 87 and No. 98, with controls for other determinants. None of these additional institutional variables seems to have a significant impact on inequality. These additional results are available upon request.

Table 3.B3. Impact of globalization on union density rates: fixed-effects models with AR(1) errors, intercept and time dummies not reported

Dependent variable	1	2
FDI	-0.000930[a]	-0.000966[a]
	(0.000358)	(0.000359)
Tariff liberalization	0.000348	0.000385
	(0.000570)	(0.000572)
Capital account openness	0.00111	0.00108
	(0.00240)	(0.00240)
Trade openness		0.00680
		(0.0135)
Time dummies	Yes	Yes
Observations	564	564
No. of countries	43	43
R^2 (within)	0.0919	0.0950
Estimated ρ	0.714	0.708

Figures in brackets represent standard errors. [a] $p < 0.01$. [b] $p < 0.05$ [c] $p < 0.1$

(b) Between-country regression analysis

Having examined how the change in labour institutions within countries has affected the change in inequality in the past few years, the goal of this subsection is to examine whether countries that are more institutionally dense – that is, having a higher unionization rate, a more centralized collective bargaining system and greater respect for political rights and core labour rights— tend to be associated with lower average levels of inequality, taking into account various features of globalization.

Table 3.B4 estimates essentially the same specifications as table 3.B2, but focuses on the cross-sectional variation in the data. Columns 1 and 2 contain only economic controls. Columns 3 to 8 check for the impact of institutional predictors, thus enabling the effects of trade unionism (columns 5 and 6), of collective bargaining structure (column 7) and of the two together (column 8) to be regionally-differentiated.

The results of the between-country estimators are rather different from those of the within-country estimators. Differences in average levels of income inequality across countries seem to be due entirely to institutional differences. The economic predictors are hardly ever statistically different from zero. The two exceptions are the measure of human capital, which (as expected) is negatively associated with inequality in the model including only economic controls (table 3.12, column 1), although its coefficient declines dramatically in absolute value, and becomes statistically insignificant, once the institutional predictors are inserted; and the extent of FDI, which is positive but rarely significantly different from zero.

As stated in the body of the chapter, labour institutions make a significant difference to average levels of inequality across countries; yet they do not seem to significantly affect recent changes in inequality. There are several possible reasons for this. One reason could be measurement error: since the institutional variables are not measured very precisely – probably less precisely than the economic variables – their impact may be

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Table 3.B4. Determinants of Gini coefficients: between effects (constant not reported)

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FDI	0.0639[c]	0.0467	0.0648[b]	0.0397	0.0326	0.0231	0.0270	0.0253
	(0.0377)	(0.0458)	(0.0312)	(0.0295)	(0.0226)	(0.0231)	(0.0253)	(0.0240)
Tariff liberalization	0.00647	0.00735	0.00466	0.00446	0.00207	0.00257	0.00434	0.00214
	(0.00769)	(0.00819)	(0.00641)	(0.00560)	(0.00442)	(0.00434)	(0.00491)	(0.00468)
Capital account openness	-0.0470	-0.0725	-0.0469	-0.00747	-0.0192	-0.0103	-0.0237	-0.00575
	(0.0419)	(0.0501)	(0.0347)	(0.0320)	(0.0266)	(0.0266)	(0.0284)	(0.0279)
Education years (average)	-0.0566[a]	-0.0297	-0.0308	-0.00429	0.00288	-0.00240	-0.00342	-0.00667
	(0.0207)	(0.0275)	(0.0183)	(0.0176)	(0.0141)	(0.0142)	(0.0157)	(0.0149)
Credit to private sector	-0.0862	-0.120	-0.0691	-0.0748	-0.00655	-0.0000386	-0.0109	0.0160
	(0.0666)	(0.0751)	(0.0559)	(0.0487)	(0.0554)	(0.0545)	(0.0518)	(0.0574)
ICT share capital (%)		-0.00865						
		(0.0129)						
Union density (UD)			-0.660[a]	-0.822[a]	0.348	0.462	-0.598[a]	0.421
			(0.161)	(0.149)	(0.322)	(0.323)	(0.143)	(0.489)
Reversed democracy index				0.0909[a]	0.0638[b]	0.0542[c]	0.0542[b]	0.0535[c]
				(0.0262)	(0.0268)	(0.0270)	(0.0261)	(0.0281)
UD • in advanced countries					-1.137[a]	-1.152[a]		-1.067[b]
					(0.283)	(0.277)		(0.490)
• in Central and Eastern European countries					-1.707[a]	-1.716[a]		-3.835[b]
					(0.345)	(0.338)		(1.824)
• in Asia					-0.964[b]	-1.016[a]		-0.980[c]
					(0.372)	(0.366)		(0.535)
Collective bargaining structure						-0.0317	0.0715[c]	-0.0164
						(0.0213)	(0.0392)	(0.0545)
• advanced countries							-0.114[a]	-0.0200
							(0.0358)	(0.0558)
• in Central and Eastern European countries							-0.226[a]	0.395
							(0.0613)	(0.326)
• Asia							-0.103	-0.00743
							(0.0625)	(0.0760)
Year[d]	-0.0216	-0.0172	-0.000853	0.0257	0.0226	0.0220	0.0184	0.0229
	(0.0266)	(0.0338)	(0.0230)	(0.0217)	(0.0164)	(0.0161)	(0.0180)	(0.0170)
No. of countries	43	35	43	42	42	42	42	42
R^2	0.449	0.487	0.627	0.730	0.860	0.870	0.845	0.879

Figures in brackets represent standard errors.   [a] $p < 0.01$.   [b] $p < 0.05$ [c] $p < 0.1$ [d] Since the sample is unbalanced, and the countries are observed at different points in time, the variable "Year" checks whether the period in which the countries are observed affects the assessment of their average inequality.

diminished. Secondly, changes in institutions take a long time to affect income distribution, so, given the short time frame of the analysis here, their effects perceptible. Thirdly, labour institutions may have begun to function differently: whereas in the past: stronger trade unions and a more centralized structure of bargaining led to a more compressed income distribution through various means, more recently they no longer do so, or do so to a much lesser extent. The results of a more detailed analysis of inequality trends reported in Appendix C seem to support this third hypothesis.

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Appendix C

Is the inequality-reduction effect of industrial relations institutions withering away in advanced countries?

This appendix addresses the question of whether the impact of labour institutions has been changing over time by taking a closer look at 16 advanced countries for which longer time-series data on institutions and other variables are available (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Spain, Sweden, United Kingdom and United States). The analysis begins by re-estimating essentially the same within-country model as in table B2, over the same time frame, but controlling for the proportion of ICT investment in total capital – a measure which is available for all the above countries (columns 1 and 3 in table 13). The reversed democracy index is not included, as it is entirely time-invariant for the 16 countries in question.[47] Another predictor for which time-series data are available – total public social expenditure as a percentage of GDP – is added (column 3). Thus the focus is on the effects that labour institutions exert directly on income inequality. Those that these institutions exert indirectly, by being associated with a more generous welfare state are now controlled for.[48]

There are some interesting changes in the globalization variables when the focus is on advanced countries: FDI comes out as a significant predictor only when technology-induced demand for skilled labour is not explicitly taken into account (column 2), which suggests that the FDI term is likely to act as proxy for this omitted variable and that FDI in developed countries probably leads to greater demand for skilled labour (Feenstra and Hanson 2001). Moreover, an increase in de jure capital openness seems to lead to greater income inequality in these countries, whereas a greater supply of skills is associated with lower inequality. The higher the share of ICT investment (signalling greater relative demand for skilled labour), the more inequality increases. Total public social expenditure emerges as a highly significant predictor: the more social expenditure declines in a country, the more inequality (measured by the Gini coefficient of equivalized net household disposable income) increases.[49]

In line with previous results changes in unionization and collective bargaining coordination are both negatively signed but not significantly different from zero. This runs counter to previous research findings – all relating to an earlier period – reported in this chapter, which suggested that industrial relations institutions had an equalizing effect on earnings and hence on income distribution. To check whether the effects have indeed changed compared to the past, the remainder of this appendix considers a longer time frame – 1978-2002 – for the 16 advanced countries in question.

The analysis that follows is freely inspired by a theoretical paradigm known as power resource theory (PRT), which was elaborated to explain the historical trajectory of the Scandinavian countries, advanced capitalist societies characterized by a highly egalitarian distribution of incomes (Korpi and Shalev 1979; Stephens 1979; Korpi 1983; Esping-Andersen and Korpi 1984; Esping-Andersen 1990). According to PRT, there are

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47. All 16 countries score 1 (minimum level of political rights violation) throughout the period under consideration.
48. The data, which cover the period up to 2003, come from the OECD Social Expenditure Database.
49. One legitimate concern about the social expenditure variable has to do with possible reversed causation (from inequality to social expenditure) and hence endogeneity. However, if high inequality leads governments to increase social expenditure, then the correlation between the two should be positive rather than negative, as it appears in column 3 of table 3.C1. The coefficient of social expenditure can thus be considered a lower bound.

Table 3.C1. Determinants of the Gini coefficient in 16 advanced countries (fixed effects with AR(1) errors, time dummies and constant not reported)

Dependent variable	1	2	3
FDI	0.0157	0.0293[c]	-0.00214
	(0.0151)	(0.0152)	(0.0147)
Tariff liberalization	0.00271	0.00498	0.00397
	(0.00402)	(0.00413)	(0.00385)
Capital openness	0.0192[c]	0.0132	0.0229[b]
	(0.0105)	(0.0109)	(0.00963)
Education years	-0.707	-1.124[b]	-0.838[b]
	(0.460)	(0.475)	(0.404)
Credit to private sector	-0.0154	-0.0197	-0.00426
	(0.0138)	(0.0143)	(0.0132)
ICT share	0.197[a]		0.0922[c]
	(0.0554)		(0.0540)
Union density	-0.283	-0.226	-0.230
	(0.179)	(0.186)	(0.169)
Collective bargaining coordination	-0.00312	-0.000705	-0.000978
	(0.00541)	(0.00555)	(0.00525)
Public social expenditures			-0.0113[a]
			(0.00261)
Time dummies	Yes	Yes	Yes
Observations	175	175	174
No. of countries	16	16	16
Adjusted R^2	0.168	0.0894	0.292
Estimated ρ	0.595	0.611	0.532

Figures in brackets represent standard errors.   [a] $p < 0.01$.   [b] $p < 0.05$ [c] $p < 0.1$

substantial variations in the organization of capitalist societies that ultimately lead to different levels of equality or inequality in the distribution of incomes (Korpi 2006). The crucial factor determining these differences is the power of organized labour. The argument is that at crucial moments in history – the period between the First and Second World Wars and then in the early post-war years – in some countries, although not in others, the labour movement and its political allies were able, through mobilization and industrial action, to force capital into a compromise, whereby, in exchange for accepting capitalist organization of the economy, labour obtained not only a recognition of its prerogatives as the labour market intermediary, by means of protective regulations on trade unionism and collective bargaining, but also protection against various social risks and an increasing range of social rights.

Over time, this historical compromise crystallized into a specific type of organized capitalism, quite unlike the model prevailing in the United States and subsequently in other Anglo-Saxon countries: a highly institutionalized labour market structure, in which a large percentage of the workforce belonged to trade unions, wages and working conditions were determined through collective bargaining at the national level and there was an extensive welfare state whose provisions were a matter of citizenship rights, not of the individual's ability to pay. There was consequently a relatively equitable distribution of incomes.

In brief, according to PRT, labour power is responsible both for the establishment of a large welfare state and for a highly institutionalized structure of the industrial relations system. It thus affects inequality through both channels. On the one hand, it contributes to the direct compression of market earnings (the industrial relations channel), because trade unionism is historically associated with egalitarian wage policies ("equal pay for equal work") and centralized wage bargaining further contributes to wage compression by reducing inter-establishment and inter-sector dispersion. On the other hand, it also reduces inequality indirectly by contributing to the establishment and gradual development of a large, redistributive welfare state, which corrects market-generated inequality through redistributive taxes and transfers. The PRT argument incorporates an element of path-dependency (Thelen 1999; Pierson 2004): the events that shaped organized capitalism took place far back in history. However, since institutions are resilient and tend to change only slowly over time, those formative events still shape cross-national differences in industrial relations and welfare systems.

In this appendix, the applicability of the theoretical framework summarized above is tested through the simple empirical strategy of comparing cross-sectional regressions at two points in time: the decades 1978-1989 and 1990-2002.[50] The year 1990 was selected as a cut-off point simply because it divides the sample more or less in two. Moreover, the 1990s were when the economic processes associated with globalization started to become most visible and when the whole globalization debate began.

One obvious shortcoming of such an empirical approach is that the sample size is very small. As hypothesized by PRT, institutions are likely to form part of a system. In effect, this means that their individual features will be highly correlated and that it is difficult to separate out their respective contributions to inequality patterns. The analysis here relies on principal component analysis (PCA) to summarize the information underlying multiple indicators. PCA assumes that the data are visible manifestations of underlying hidden constructs, to which they are related, and expresses these hidden constructs as linear combinations of standardized observed variables.

To operationalize labour power, three related indicators were used: 1) the bargaining coordination index described in Appendix A ("BargCoord"); 2) the collective bargaining coverage rate ("BargCov"), namely the percentage of workers covered by collective bargaining agreements (see Ochel 2001); and 3) the trade union density rate ("TUDens"). These indicators are all positively correlated and the pairwise correlation coefficient is always higher than 0.5 as well as highly significant.

The results of the PCA given in table 3.C2 suggest that the three indicators belong together: only one component has higher eigenvalue than 1 and captures about 63 per cent of the total variance. The composite indicator of labour power uses the factor loadings of the first component as weights. These are all positively signed, with bargaining coordination carrying a little more weight than collective bargaining coverage or trade union density in determining a given country's score. Labour power is thus high in countries with more coordinated bargaining, higher collective bargaining coverage and greater trade union density.

Encouraging results are also obtained from the PCA of the other two constructs. For welfare state size (table 3.C3), two indicators are used: 1) the total tax wedge as a percentage of GDP, including social security and indirect taxes, which, as a proxy for state intervention, indicates how far a state can extract resources from its citizens for its

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50. A time series cross-sectional model (TSCS) with annual data was not estimated for a number of reasons: 1) all indicators of inequality, which are drawn from the LIS database – and some institutional indicators, too, such as collective bargaining coverage – are annual interpolations from five-year data; 2) while a TSCS approach generally requires fixed effects to control for time-invariant omitted variables, the labour institutions under consideration do not vary much over time but rather across countries; and 3) the series are long-memoried and seem highly serially correlated. Given the short duration of the series, no reliable tests of stationarity and cointegration are available.

**Table 3.C2. Principal component analysis of labour power:
one component retained, 366 observations**

Component	Eigenvalue	Difference	Proportion of variance	Cumulative
1	1.90205	1.21004	0.6340	0.6340
2	0.692015	0.286083	0.2307	0.8647
3	0.405932	—	0.1353	1.0000

Variable	Component 1
BargCoord	0.6235
BargCov	0.5897
TUDens	0.5133

Formula: Labour power = 0.6235std(BargCoord) + 0.5897std(BargCov) + 0.5133std(TUDens)

**Table 3.C3. Principal component analysis of welfare state size:
one component retained, 352 observations**

	Component	Eigenvalue	Difference	Proportion of variance	Cumulative
	1	1.8608	1.7216	0.9304	0.9304
	2	0.139199	—	0.0696	1

Eigenvector	Variable	Component 1
	Tax wedge	0.7071
	SocExp	0.7071

Formula: Welfare state size = 0.7071std(TaxWedge) + 0.7071std(SocExp)

Table 3.C4. Principal component analysis of inequality

	Component	Eigenvalue	Difference	Proportion of variance	Cumulative
	1	2.77657	2.56678	0.9255	0.9255
	2	0.209797	0.196167	0.0699	0.9955
	3	0.01363	—	0.0045	1

Eigenvector	Variable	Compenent 1
	D9/D1	0.5964
	D9/D5	0.5605
	PovRatio	0.5746

Formula: Inequality = 0.5664std(D9/D1) + 0.5605std(D9/D5) + 0.5746std(PovRatio)

activities;[51] and 2) total public social expenditure ("SocExp") as a percentage of GDP, which is a direct reflection of social transfers. In this case, the first principal component captures almost the totality of variance (93 per cent). The two variables are weighted equally in the composite indicator, the conclusion being that the greater the percentage of total taxes and of public social expenditure, the greater the welfare state size.

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51. Many thanks to Andrea Bassanini of the OECD Secretariat for providing this variable.

Table 3.C5. Determinants of inequality in 16 advanced countries (1978-1989), between regressions (constants not reported)

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Welfare state	-0.650[a]	-0.659[a]	-0.844[a]	-0.845[a]	-0.716[a]	-0.642[a]	-0.887[a]	-0.643[a]	-0.707[a]	-0.576[a]	-0.646[a]	-0.647[a]
	0.0993	0.101	0.144	0.160	0.153	0.122	0.265	0.111	0.150	0.139	0.108	(0.136)
Labour power	-0.492[a]	-0.522[b]				-0.488[a]	-0.384[c]	-0.620[a]	-0.516[a]	-0.595[a]	-0.472[a]	-0.617[a]
	0.131	0.198				0.127	0.201	0.130	0.133	0.165	0.116	(0.139)
Left power		0.00418										
		0.0203										
Collective bargaining coverage			-0.0180									
			0.0109									
Union density				-1.571								
				1.109								
Collective bargaining coordination					-0.446[b]							
					0.180							
FDI						0.0605						
						0.336						
Tariff liberalization							0.136					
							0.104					
Capital openness								-0.428[b]				-0.415[c]
								0.141				(0.227)
Education years									-0.209[c]			-0.0152
									0.102			(0.146)
Credit to private sector										-0.442		
										0.459		
ICT Share											0.252	
											0.497	
Adjusted R^2	0.748	0.729	0.685	0.682	0.732	0.728	0.760	0.846	0.781	0.741	0.730	0.832

Figures in brackets represent standard errors.   [a] $p < 0.01$.   [b] $p < 0.05$ [c] $p < 0.1$

The third PCA captures the level of inequalities in a given country. For this purpose, it uses three highly correlated indicators from the LIS database: 1) the D9/D1[52] ratio of net disposable income, 2) the D9/D5[53] ratio of net disposable income; which captures inequality in the upper part of the distribution, where, according to some analyses (Atkinson 2007; Atkinson 2008) inequality has grown the most; and 3) the poverty ratio ("PovRatio"), which applies to people with less than 50 per cent of the median net disposable income. Once again, the first principal component captures most of the information in the data (93 per cent). All three factor loadings are positive, with approximately the same weight. A more unequal country is one in which the D9/D1, D9/D5 and poverty ratios are higher.

Table 3.C5 contains estimates of the impact that labour power and welfare state size had on inequality, separately and jointly, in the period 1978-1989. Additional specification (column 2) take account of the power of left-oriented parties (measured through the proportion of seats that they held in the lower chamber of parliament), which, it has been argued, affected redistributive stance of governments (Stephens 1979; Bradley et al.

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52. D9/D1 is the ratio of the upper limit of earnings of workers in the ninth decile of the earnings distribution to the upper limit of earnings of workers in the first decile.
53. D9/D5 is the ratio of the upper limit of earnings of workers in the ninth decile of the earnings distribution to median earnings.

Table 3.C6. Determinants of inequality in 16 advanced countries (1990-2002), between regressions (constant not reported)

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Welfare state	-0.816[a]	-0.800[a]	-0.873[a]	-0.899[a]	-0.948[a]	-0.851[a]	-0.886[a]	-0.753[a]	-0.857[a]	-0.799[a]	-0.823[a]
	0.196	0.210	0.180	0.162	0.157	0.240	0.170	0.181	0.200	0.231	0.208
Labour power	-0.314	-0.306				-0.303	-0.365[b]	-0.411[b]	-0.348[b]	-0.393	-0.340
	0.187	0.187				0.214	0.135	0.168	0.143	0.248	0.201
Left power		-0.00365									
		0.0144									
Collective bargaining coverage			-0.00287								
			0.0135								
Union density				-1.678							
				1.026							
Collective bargaining coordination					-0.219						
					0.158						
FDI						-0.228					
						0.387					
Tariff liberalization							0.244				
							0.182				
Capital openness								-0.765			
								0.607			
Education years									-0.317[b]		
									0.117		
Credit to Private Sector										-0.595	
										0.966	
ICT share											-0.341
											0.849
Adjusted R^2	0.739	0.718	0.744	0.739	0.731	0.726	0.741	0.751	0.821	0.730	0.720

Figures in brackets represent standard errors. [a] $p < 0.01$. [b] $p < 0.05$ [c] $p < 0.1$

2003), as well as of other economic determinants (columns 6 and following), which are entered individually, in view of the small sample size. The main goal of the analysis is to see whether the coefficients of the two main predictors change over time and, if so, in which direction.

The compact model with only two predictors in table 3.C5, column 1 – welfare state size and labour power – performs remarkably well in explaining cross-country differences in inequality in the 1978-1989 period, accounting for almost 75 per cent of the variance in the dependent variable. All the regression coefficients are beta coefficients and therefore directly comparable. The most important determinant is the size of the welfare state: one-standard deviation increase in the size of the welfare state reduces inequality by 0.65 standard deviations. Another predictor that has a consistent impact is the labour power indicator, one-standard deviation increase in which is associated with lower inequality of about 0.5 standard deviations. The electoral strength of the parliamentary left is insignificant in comparison with welfare state size and labour power (column 2). The models in columns 3 to 5 estimate separately the impact of different elements in the labour power indicator. The coefficient of the collective bargaining coordination term is significantly different from zero (column 5), while the others are not. The models in columns 6 to 11 relate to the same economic and globalization factors as examined above (FDI stock, tariff liberalization, capital openness, years of education, credit to the private sector and share of ICT investment in capital stock): they are considered individually in view of the small

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size of the sample. Both capital openness and years of education have a negative value and are of significant size. Yet, when they are entered in the specification simultaneously in column 12, the years of education factor becomes insignificant in comparison with welfare state size and labour power; indeed the coefficient of the latter even increases in absolute value. These regression results suggest that institutional features of both the welfare state and of the labour market are the most important predictors of cross-country differences during inequality levels in the 1978-1989 period.[54]

In table 3.C6 the same models are re-estimated for the period 1990-2002 to see if coefficients change. The most important difference is that labour power is much less robustly associated with inequality than in the previous period.[55] The coefficient of labour power is still negative, but its magnitude is smaller in absolute value and often not significantly different from zero. Conversely, the welfare state size variable now plays a greater role in explaining cross-country differences. A closer look at the individual components of labour power reveals that the biggest change pertains to the collective bargaining coordination index, whose coefficient is practically halved and no longer significant (column 5). Thus it looks as though, from the 1990s on, coordinated bargaining no longer significantly reduced inequality. In controlling economic determinants one by one, as before, one notices that capital openness is no longer significantly associated with lower inequality (column 8). The effect in the previous period was probably due to small, open societies like the Scandinavian countries, which simultaneously had high capital openness and an egalitarian income structure. As more countries opened up their capital markets, the effect disappeared in the later period. The human capital control (years of education) remains significantly negative (column 9). Even taking that into account, however, the impact of labour power is lower than in the previous period.[56]

These results suggest that, from the early 1990s on, the institutions associated with labour power – high trade union density, high collective bargaining coverage and, in particular, a coordinated bargaining structure – largely forfeited their capacity to reduce inequality directly by compressing market earnings and only retained an indirect influence on inequality by virtue of the size of the welfare state.

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54. These results hold good if the dependent variable is the Gini coefficient of net disposable income. The main differences using these alternative specifications are that the union density rate coefficient is significantly different from zero and that the capital openness and years of education variables are both insignificant in column 12. The results also apply if the equation in column 1 is re-estimated after one country is extracted at a time. These additional analyses are available upon request.

55. It is worth mentioning that a previous analysis found that the impact of bargaining centralization on reducing wage dispersion was "virtually identical" in 1973 and 1985 (Rowthorn 1992, p. 111).

56. Again, these results remain valid when the Gini coefficient is used as the dependent variable. The main peculiarity is that union density does have a significant negative association with the use of the Gini coefficient, with a magnitude only slightly smaller than in the previous period. As suggested above, it is bargaining coordination rather than union density that seems to have lost its inequality-reducing effects. The results also hold good overall if the equation in column 1 is re-estimated after the extraction of one country at a time. Interestingly, the labour power term is significant if Canada, Ireland and Italy are taken out of the sample. This suggests that in the above-mentioned countries labour power is less conducive to redistribution than elsewhere. Ireland and Italy experienced a marked increase in collective bargaining coordination in the 1990s, with the establishment of "social pacts," but in both countries inequality not only did not decline but may even have increased. These additional analyses are available upon request.

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