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Article

Regulating low wages: cross-national policy variation and outcomes

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Abstract

This article provides a comparative analysis of three central policies to regulate low wages: statutory minimum wages, state support for collective bargaining and topping up low wages with public transfers (in-work benefits). We map the variation of these policies across 33 OECD countries and analyze the incidence of low-wage employment they are associated with. We find three approaches to regulating low wages. In the first, 'wage scale protection', states put most emphasis on supporting collective bargaining. In the second, 'bare minimum', there is not much else than the statutory minimum wage. In the third, 'state pay', the statutory minimum wage is supplemented by sizeable public financial support for low earners. When analyzing policy outcomes, 'wage scale protection' is associated with least low-wage employment. For 'bare minimum', much depends on the level of the statutory minimum wage. Although 'state pay' props up workers' disposable income, many workers receive low gross pay.

Key words: state, low-wage employment, labor market institutions, collective bargaining, welfare state, labor law

JEL classifications: H53 Government Expenditures and Welfare Programs, J38 Wages—Public Policy, J58 Collective Bargaining—Public Policy

1. Introduction

Approximately 15% of full-time workers across OECD countries are paid less than two-thirds of median earnings (OECD, 2021). Even if some countries have had a high incidence of low-wage employment for a long time and others are resisting the trend, there are several structural pressures pushing down wages (Gautié and Schmitt, 2010; Grimshaw, 2011), such as the decline in collective bargaining (Hassel, 2015; Baccaro and Howell, 2017), the rise of the service sector (Wren, 2013), globalization (Autor *et al.*, 2016) and technological change (Autor, 2015).

In this article, we analyze which policies states use to tackle low-wage employment and the outcomes different policy approaches are associated with. Initially, we observed that states are increasingly intervening directly to regulate low wages and that minimum wages are becoming more politicized. In the USA, there have been protests to raise the minimum wage ('Fight for $15'), and the US president Joe Biden vowed in 2021 to more than double the federal minimum wage from $7.25 to $15. The European Union (EU) adopted a directive in October 2022 asking Member States to ensure adequate minimum wages and to support collective bargaining. Germany introduced a minimum wage in 2015. The UK significantly increased its minimum wage in recent years and so did Spain.

But states have more tools for dealing with low pay than statutory minimum wages. Governments can support collective bargaining, as aimed for in the EU directive. And they can top up low earnings with public transfers, known as in-work benefits (IWBs)—for several years now a popular policy among experts (Kenworthy, 2008; Immervoll and Pearson, 2009; Abbas, 2020). In this article, we map how states combine these three policies to regulate low wages, and we examine the outcomes of the different policies in reducing low-wage employment.

We build on Bonoli's (2003) conceptual framework of three ways of providing economic security to wage earners and apply it specifically to low-wage employment. Consequently, our article draws on comparative welfare state literature as well as comparative research on industrial relations. Both literatures address parts of our topic from their respective angles. Comparative welfare state research often analyzes social policies for low earners (e.g. Marchal and Marx, 2018), while industrial relations research focuses on collective bargaining and its relation to the state (e.g. Traxler, 1999; Meardi, 2014; Dingeldey *et al.*, 2021). There are studies that analyze in detail one or two of the three policies of interest in this article, but there are no studies, to our knowledge, that systematically consider all three policies in relation to each other. By examining three policies, 33 countries as well as change over time, our article is much more ambitious in empirical scope than any related study that we are aware of. We also make an empirical contribution by having developed a measure for the tax-benefit generosity for low earners and having coded IWB schemes across 33 countries from 2001 to 2018.

We conduct a confirmatory factor analysis (CFA) to summarize several policy indicators for each policy into one measure and to map cross-national policy variation. The first contribution of our article consists thus of providing a map, i.e. an overview of the terrain. We identify three main approaches to regulating low pay. The first we call 'wage scale protection'. Here, the state puts most emphasis on supporting collective bargaining. This ensures not only the setting of a wage floor but also regulating the wage distribution above the minimum, thus preventing workers from slipping down to the bottom. We call the second approach 'bare minimum' because it relies primarily on the statutory minimum wage without major support for collective bargaining and without substantial IWBs. This approach sets a wage floor but does little else to protect workers against either sliding down to the minimum wage or against low disposable income. The third approach, 'state pay', is characterized by extensive IWBs that combine with a well-established statutory minimum wage and little support for collective bargaining. This implies that the state indirectly subsidizes employers of low-earning workers by propping up the disposable income of these workers through the tax-benefit system.

In the second part of our analysis, we examine the levels of low-wage employment that low-wage policies and their combinations are associated with. We show that statutory minimum wages are associated with higher incidences of low-wage employment than support of collective bargaining. But we also find that once a state has a statutory minimum wage, higher minimum wage levels lead to less low-wage employment. Moreover, we find that states with strong IWBs have more low-paid workers and that the combination of statutory minimum wage and IWBs is associated with an even higher share of low-paid workers. In summary, the 'wage scale protection' model is most successful in limiting low pay, the 'state pay' model performs worst and the 'bare minimum' model lies in the middle.

In the next section, we present our conceptual framework. The following section discusses our methodological choices. We then present the results from the two parts of our analysis: mapping policy variation and analysis of policy outcomes. This is followed by a discussion of the implications of our findings and directions for future research.

2. The policy options

In his seminal 2003 article 'Social policy through labor markets', Giuliano Bonoli identified three distinct ways of providing economic security to wage earners: labor law, collective bargaining and tax-financed income transfers. First, governments can use legislation to ensure economic security for workers, in particular employment protection legislation and statutory minimum wages, but also mandatory extensions of collective bargaining. Second, workers' economic security can be regulated in similar ways but through collective bargaining between employers and trade unions instead of state legislation. These first two options can be called social policy through regulation.[1] They regulate labor markets and thus shape economic security outcomes before the state redistributes resources through taxes and benefits. In policy discourses, this has sometimes been called 'predistribution' (e.g. Diamond and Chwalisz, 2015). The main difference between the first two options is whether the state imposes regulation by law or whether collective interest organizations self-regulate the labor market. This difference has implications regarding politics and scope of regulation, which we will discuss below for regulation of low pay.

The third option in Bonoli's (2003) framework are tax-financed income transfers, which can be regarded as 'classic' redistribution by the welfare state after market allocation of resources. Here, Bonoli focuses consciously on tax-financed transfers rather than contribution-funded social insurance because the latter is closely tied to employment status and hence to market allocation rather than its *ex post* correction. By comprising labor law, collective bargaining and social spending, Bonoli's framework provides a natural basis for integrating the fields of comparative industrial relations and comparative welfare state research.

We apply Bonoli's (2003) framework specifically to low-wage employment. His three types of instruments—labor law, collective bargaining and social spending—correspond to three specific instruments to address low pay: statutory minimum wages, wage regulation through collective agreements and IWBs. We can deductively derive why these three policies are central for low-wage employment by considering: What can be done to help workers on low wages? (a) Their wages can be raised. (b) Their disposable income can be supplemented

1 See also the literature on the regulatory dimension of welfare states (e.g. Levi-Faur, 2014).

from other sources of income. When we are interested in government actions, this translates into three possible policy instruments. Option a can be achieved through direct state regulation (statutory minimum wages) or through collective bargaining, which the state can facilitate in various ways (see below).[2] Option b can be attained through IWBs.

Of course, there are in principle other strategies of dealing with low-wage employment. The state may try to prevent the conditions that give rise to low wages through investments in higher productivity, especially education and training, or through strict regulation of non-standard employment, which can put downward pressure on wages. In addition, unemployment benefits can function as a reservation wage, preventing the unemployed from accepting low-paid jobs. However, for each of these policies the effect on low-wage earners is indirect, while the policies have other primary objectives and vast effects outside low-wage employment. Certainly, also state regulation of collective bargaining has wide effects beyond low pay. Still, setting wages and, particularly, defining the low end of the wage scale are at the very heart of collective bargaining. So, state support for collective bargaining is clearly an important and directly relevant policy for low-wage employment.

That setting wage floors is at the heart of collective bargaining has technical and empirical reasons. Technically, collective wage agreements normally define the lowest possible wage for each job category. Therefore, they also set the lowest possible wage in their area of application overall (Dingeldey *et al.*, 2021; Bhuller *et al.*, 2022). One may ask, however, to what extent collective bargaining actually benefits those at the low end of the wage distribution. Insider–outsider theory implies that it does not (Lindbeck and Snower, 2001). Yet, empirically, it has been shown that unionization raises the wages of low-wage workers more than the wages of other workers (Schmitt, 2008), that centralized wage bargaining, high bargaining coverage and unionization reduce wage inequality (Pedersen, 2023), and that minimum wages set by collective agreement tend to be higher than statutory minimum wages.[3]

Let us take a closer look at the three main policies to address low pay: statutory minimum wages, supportive regulation of collective bargaining and IWBs. Statutory minimum wages (SMW) prohibit wages below a certain level (Schulten *et al.* 2006). The level of SMW is its most important feature. But other institutional characteristics matter as well. One is how the level of the minimum wage is updated over time. It can be entirely at the government's discretion, there can be fixed rules of indexation or the social partners can be involved to varying degrees. Moreover, SMWs can vary by groups of workers covered. Normally, SMW applies to all workers, but some states differentiate between age groups (e.g. younger workers), occupations (e.g. tipped workers) or sectors. The types of remuneration covered can also vary (e.g. regarding bonuses or internships allowances). Finally, enforcement is important as states vary in resources and institutional structures to monitor compliance with SMW.

Supportive regulation of collective bargaining (RCB) seeks to back unions and employer associations in collectively setting a wage floor, which includes aiming for a wide coverage of such agreements (Traxler, 1999; Meardi, 2014). Although employer associations often

2 In slight contrast to Bonoli (2003), we do not focus on collective bargaining as such, but on government actions to support it.

3 The last point is shown in a forthcoming book chapter by Picot entitled 'Minimum wages: by collective bargaining and by law', to be published in Clegg, D., and Durazzi, N. (eds.) Research handbook of labour market policy in rich democracies. Cheltenham: Edward Elgar.

develop an interest in collective bargaining institutions, state support for unions is vital to facilitate, in particular, the setting of effective wage floors through collective bargaining. A fundamental aspect of such state support is to guarantee the right of association, right of collective bargaining and right to strike. Further, state support for worker representation at the workplace, such as works councils, can promote collective bargaining, although it is also possible that local negotiations undermine sectoral agreements. More generally, the state can bolster collective bargaining by facilitating collaboration between worker and employer representatives and enhancing the status and visibility of collective industrial organizations, as in corporatism, when the state shares public responsibilities with the collective organizations of workers and employers, thus strengthening their status in the public sphere (Crouch, 1993; Traxler, 1999, p. 56).

The state can also find ways to incentivize workers and employers to become members in their collective interest organizations. For example, in Ghent systems of unemployment insurance the state delegates administration of unemployment benefits to unions. This gives workers a strong incentive to join unions, especially when the state subsidizes the union-run unemployment schemes (Rothstein, 1992; Rasmussen and Pontusson, 2018). Another way in which the state can support collective bargaining is to make public procurement conditional on contractors paying wage rates in line with collective agreements (Schulten *et al.*, 2012). In contrast, mandatory extensions of collective contracts, i.e. when governments extend collective agreements to an entire sector beyond the firms that were originally part of the agreement, are more ambiguous. Some authors consider them as promoting collective bargaining (Hayter and Visser, 2018). However, extending the results of collective bargaining by the power of the law is not the same as supporting collective bargaining itself. It does not contribute to the degree of organization of the industrial parties, and it can undermine the autonomy of collective bargaining. As state interventions in wage setting, mandatory extensions rather resemble SMW (Bonoli, 2003). Given the ambiguous status of mandatory extensions we do not cover them systematically in the empirical part of this article, but we return to them in the final section. The EU directive on adequate minimum wages, which intends to strengthen also collective bargaining, and the US legislative proposal Protecting the Right to Organize (PRO Act) are examples of governments' deliberate use of RCB to address low-wage employment.

IWBs supplement the income of low-wage earners. It is not easy to define IWBs because there is a host of benefits and tax rules that can lift the disposable income of individuals or households with low earnings (Abbas, 2020). We identify two types of explicit IWBs. (a) In-work cash transfers are a direct and regular transfer from the state to people with low earnings from work. (b) Refundable tax credits are similar but tied to the tax system. They may be paid out regularly over the course of the year, but their overall amount depends on the income tax declaration. Beyond these two explicit IWBs, there is a range of other benefits or tax reductions that low earners can benefit from, such as nonrefundable tax credits, reductions in social contributions, family benefits, or housing benefits. Also some unemployment benefits (Clasen, 2020) and disability benefits can be paid to workers with low earnings and thus effectively function as IWB.

The three low-wage policies have distinct distributive implications. SMW and RCB establish a wage floor. They therefore force employers to pay higher wages and make it easier for workers at the bottom of the wage scale to live off their work income. In contrast, IWBs imply that taxpayers indirectly subsidize employers who pay low wages. IWBs incentivize

low wages as employers know that low wages will be topped up by the state thus making them economically viable for workers (e.g. Azmat, 2019). There is even evidence that the wages of non-recipients of IWBs get pulled down as IWBs increase the supply of low-paid workers (e.g. Leigh, 2010). So, in terms of policy design, SMW and RCB prevent low wages while IWBs facilitate them. Besides, IWBs are mostly applied at the household level (taking the economic situation of the household rather than the individual into account), whereas SMW and RCB regard wages and, hence, individuals regardless of their family situation.

But there are also important differences between SMW and RCB. First, SMW sets only a wage floor. In contrast, collective bargaining normally defines not only the lowest possible wage but the wage grades for all jobs, i.e. the entire wage scale. This is important because it prevents employers from cutting the pay of workers who earn more than the minimum wage, and therefore keeps workers from slipping down to minimum wage level. In a wider perspective, collective bargaining is not only about preventing low pay but about the distribution of firms' profits between workers and the owners of capital. Another, important difference between SMW and RCB is political control. As SMW is based on legislation it depends on parliament and political parties, notwithstanding some variations in level-setting institutions. If left parties lose an election it may lead to a lower SMW (Rueda, 2008). IWB is similarly exposed to political fluctuations. In contrast, RCB strengthens worker organizations and their influence on setting the wage floor. Hence, workers have more control through their own interest organizations. On the other hand, this can lead to inequities. Collective agreements normally vary between sectors or firms, and their coverage is often more limited than the coverage of SMW.

Most developed democracies have SMW (25 of the 33 countries we cover in this article). All have at least some positive RCB (such as right to strike) and most countries can be expected to have at least some form of tax rules or benefits that support workers on low wages. So, the three measures of interest in this article are likely to mix. However, they are not equally likely to be strongly articulated concurrently. As mentioned, SMW and RCB share the effect of setting a wage floor. This makes it unlikely that they are well institutionalized at the same time. Where collective bargaining works well, there is no need for SMW, and in such contexts trade unions tend to politically object to SMW (Meyer, 2016; Furåker and Larsson, 2022, ch. 3). Hence, we can expect RCB and SMW to be inversely related. Aghion *et al.* (2011) have pointed to such a negative correlation, based on a game-theoretical model and descriptive statistics. Between SMW and IWB, on the other hand, there can be synergy effects (Lee and Saez, 2012). As IWB tends to incentivize low pay, SMW can draw a floor under such a downward trend. This not only supports the pay of IWB-recipients but may also limit public expenditure on IWB (although the latter effect is weakened where IWB is based on household income). This does not imply that SMW and IWB have to go hand in hand, but for countries with strong IWB it can be helpful if the policy is accompanied by SMW.

As RCB also helps to establish wage floors, it might be expected to be complementary to IWB as well. Yet, for two reasons we rather expect that strong RCB is not accompanied by IWB. First, effective collective bargaining lifts not only the lowest wages but more generally low-to-medium wages (Pedersen, 2023). Hence, in countries with effective collective bargaining generous IWB policies should not be necessary. Second, in such countries trade unions tend to be strong and prefer wages over benefit income, hence politically limiting

IWB. In sum, we expect to find countries that combine well-developed IWB and SMW, but not countries with strong combinations of SMW and RCB or RCB and IWB.

3. How to compare three policies across 33 countries

The aim of this study is to cover all advanced capitalist democracies. We take all OECD Member States as a starting point, but we have excluded Turkey, Mexico and Chile because they have lower GDP per capita, and their distinct institutional contexts would have introduced too much heterogeneity. Colombia was not a member when we collected the data. Some of the indicators in our data set reach as far back as 1960. However, data for our IWB indicators were only available from 2001. Overall, our data set reaches from 1960 to 2017 and covers 33 countries, but not all countries have complete data in the earlier years.

For each of the three policies we intend to measure, we initially collected all relevant and available indicators based on the theoretical considerations in the previous section.[4] We use the so-called Kaitz index to measure SMW levels: nominal minimum wage levels as a share of the median wage. Further, we draw on Visser (2019) for an ordinal variable of the level-setting institutions where states with most government control over the SMW level score highest. Unfortunately, there is no comparative data on SMW enforcement.

IWBs are notoriously hard to measure and there is currently no good comparative data (Abbas, 2020). To resolve this, we developed two new indicators drawing on resources from the OECD *Benefits and Wages* portal (OECD, 2020): a broad measure of tax-benefit generosity for households with low earnings and a narrower, binary indicator of explicit IWB schemes. For tax-benefit generosity for low earners we used the OECD tax-benefit calculator (OECD, 2020) and took the difference between net and gross income as a proportion of gross income. The indicator therefore shows how much the state adds to gross income (if transfers net of taxes are positive) or subtracts (if net is negative). We calculated this for two model households: (a) a single adult earning full-time 40% of the average wage (this wage level corresponds approximately to the average minimum wage level across countries) and (b) two adults with children, both earning 40% of the average wage but one working 60% part-time and the other 40% so that the overall gross earnings are equivalent to those of the single household. Thus, differences in net income between the two household types are mere effects of household composition.

Our in-work tax-benefit generosity measure is a broad measure comprising all tax rules and benefits, and not only IWBs narrowly defined. The family household, in particular, is affected also by family policies. There are two reasons for choosing this broad measure. First, due to the complexity of IWBs there is currently no comparable generosity data specifically for IWBs. Second, it is in fact desirable to account for tax rules and transfers that are not dedicated IWBs. Those rules and transfers still affect the economic situation of low earners even if they are not targeted at this group. Where exactly to draw a boundary between these policies and dedicated IWBs can easily become arbitrary. Nevertheless, it matters, in addition, to account for specific IWBs because they explicitly benefit just low earners and thus send a political signal. For this reason, we have, in a considerable data collection effort, hand-coded the existence of dedicated IWBs based on the country reports from OECD (2020) (for the coding scheme, see Supplementary Appendix C). We created a dummy

4 See Table A1 in Appendix A for more detailed information on variables and data sources.

variable that is coded one for every country-year with an in-work cash transfer or a refundable tax credit. This indicator compensates for the breadth of the generosity indicator by identifying the countries with explicit IWBs.

For supportive RCB we collected five indicators. The right to bargain collectively and the right to strike are measured by ordinal variables in Visser (2019) indicating whether these rights are fully guaranteed or subject to minor or major restrictions.[5] For state support for works councils we take another ordinal variable from Visser (2019), which we have simplified into a dummy variable as not all distinctions in the variable make a difference for our purposes. The original variable treats as equivalent whether works councils are mandatory by law or by national agreement. Although our focus is on state regulation, this is acceptable for our purposes because governments either participate in national agreements or at least decide to accept their results. In order to measure corporatism, we use the ordinal measure of wage coordination from Visser (2019) as a proxy. There is a vast discussion of how to measure corporatism (e.g. Kenworthy, 2003; Jahn, 2014). Although our interest here is mostly in the institutional integration of peak interest organizations, the available measures of tripartite arrangements lack validity because they do not capture the effectiveness and relevance of such arrangements. In line with Kenworthy's (2003) survey of the field, we have therefore chosen wage coordination as a proxy.[6] A drawback of this measure is that it directly measures the structure of wage bargaining and not a state policy. However, high-wage coordination is normally accompanied by the consent or even active support of the state. Moreover, wage coordination requires the kind of organizational structure of industrial organizations that is necessary for corporatism.

Our final indicator of RCB is a dummy variable for Ghent unemployment insurance. We take this from Rasmussen and Pontusson (2018) and have complemented it where necessary with our own coding based on *Social Security Programs Throughout the World* (Social Security Administration, 2018). Unfortunately, there is no adequate comparative data for pay clauses in public procurement (Schulten *et al.*, 2012), which would have been another suitable RCB indicator.

We use CFA to combine the indicators of each of the three policy fields into one measure that is comparable between countries. CFA is a type of structural equation modeling that assesses the relationship between observed variables and hypothesized latent variables (or factors), in our case the three policies. This method helps to summarize indicators and give an overview of the policy field. It is a theory-driven method where the number of latent variables and which observed variables they are based on, are pre-specified and then empirically tested. It is generally considered a large-sample technique, with 30 as the minimum sample size (Kline, 2016). Our sample of 33 countries is therefore just within the acceptable range.

Our CFA is robust for cross-sectional analysis based on the most recent and most complete data. However, when we tried to conduct it for earlier years with more missing observations the model often did not converge because the ordinal and dummy variables in our data set exacerbate the challenges of a small sample, such as perfect separation. Therefore, we adopt a different approach for our descriptive analysis over time. We use the CFA with

5 We collected also right of association from the same data set, but it did not add any variation.

6 Following Jahn (2014), we have adjusted the variable to exclude those elements of wage coordination that are unilaterally imposed by the state rather than through corporatism.

the most recent data to derive weights, which we then use to calculate policy indexes over time.

To analyze the effects of our three policies on the incidence of low-wage employment, we run a time-series cross-sectional regression. The dependent variable is measured as the share of full-time workers earning less than two-thirds of the median earnings of all full-time workers (OECD, 2021). As independent variables we use SMW level, corporatism (proxied by wage coordination) and the tax-benefit generosity for low-earning single households. While CFA is ideal to summarize and map the variation of our policies, the factors, by their nature of synthesizing several indicators, are not necessarily ideal for more specific analysis of the politics or effects of certain policies, such as in this case. However, the CFA results helped us to select the most important indicators: those that are significant in the CFA and load strongest on a factor.

As control variables we use three economic variables: the unemployment rate as a fundamental variable for the status of the labor market, the share of employment in the service sector because low-skilled services are particularly prone to low pay (Wren, 2013), and trade openness (total exports and imports as share of GDP) to control for globalization. Finally, we control for collective bargaining coverage. In a strict theoretical perspective, this variable could be conceived as an outcome of RCB policies, which could be a reason for not including it. However, it would be naïve to think that any RCB variable can account for all variation in bargaining coverage, while at the same time it is clearly an important variable affecting low-wage employment. As a robustness check, we also run the analysis without bargaining coverage.

The model further includes a time trend and we lag the policy variables to address the possibility of reverse causality. We run our main model once with fixed effects and once with random effects. Yet, we give preference to the fixed effects specification, in line with the Hausman test and because this is the more conservative approach. We provide more details on our methods as part of the presentation of results and in the Supplementary Appendix.

4. Mapping low-wage regulation

4.1. Dimensions and cross-national variation

We conducted the CFA for 33 countries in 2017.[7] We averaged the last 3 years of the continuous variables (minimum wage level and in-work tax-benefit generosity for single and family households respectively) to smooth out short-term fluctuations. In all our CFA models we assume that the factors are correlated since policy-makers take into account other pertinent policies when they reform policies. We use maximum likelihood estimation with robust standard errors (RML) and with Satorra-Bentler standard errors (ML with Satorra-Bentler) because our data includes dummy and ordinal variables in addition to continuous variables. RML uses an asymptotic covariance matrix, which generates less biased standard errors and performs well with a smaller sample size as well as some degree of non-normality (Cheng-Hsien, 2016; Kline, 2016, pp. 323–330). ML with Satorra-Bentler ensures inference is asymptotically robust to violation of normality (Kolenikov, 2009).

We first ran the CFA with all indicators (see model 1 in Supplementary Appendix Figure A1 and Table A2). The CFA results show how much each indicator contributes to a

7 The countries are listed below Figure 1.

common factor. The first model had a poor fit (see the fit statistics in Supplementary Appendix Table A4). In addition, we noted already in model 1 that the SMW factor was closely and negatively correlated with the RCB factor ($r = -0.871$). To improve the model, we first removed the observed variables that contributed least to any of the three latent variables. Hence, we dropped right to collective bargaining, right to strike and state support for work councils from the indicators that are hypothesized to contribute to RCB (see model 2 in Supplementary Appendix Figure A1 and Table A3). This new model had a good fit, but again SMW and RCB are highly and negatively correlated ($r = -0.873$).

The second model therefore yields a first important result, in line with Aghion *et al.* (2011): SMW and RCB are inversely correlated. Governments either set a wage floor through direct intervention or they support the collective bargaining system. Figure 1 plots all countries with their factor scores for SMW and RCB respectively, based on model 2. Two clusters of countries emerge. The cluster in the top left is made up of countries that score high on SMW but low on RCB. The bottom right cluster are countries with strong RCB but weak SMW. Most remarkable is that, with the slight exception of Estonia, there is

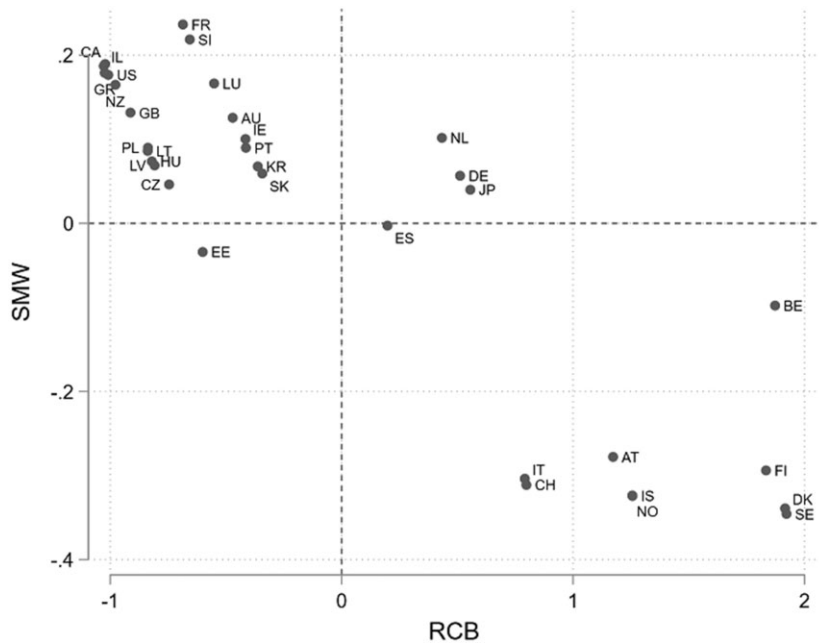

Figure 1. Scatterplot of factor scores for statutory minimum wage policies and supportive regulation of collective bargaining.

Note: The factor scores are from model 2 as in Supplementary Appendix Table A3 (see also Supplementary Appendix Figure A1). The value of 0 corresponds to the mean value of the factor. Country acronyms: Australia (AU), Austria (AT), Belgium (BE), Canada (CA), Czech Republic (CZ), Denmark (DK), Estonia (EE), Finland (FI), France (FR), Germany (DE), Greece (GR), Hungary (HU), Iceland (IS), Ireland (IE), Israel (IL), Italy (IT), Japan (JP), Latvia (LV), Lithuania (LT), Luxemburg (LU), Netherlands (NL), New Zealand (NZ), Norway (NO), Poland (PL), Portugal (PT), Slovak Republic (SK), Slovenia (SI), South Korea (KR), Spain (ES), Sweden (SE), Switzerland (CH), United Kingdom (UK), and United States (US).

no country that scores low on both SMW and RCB. This implies that there is always a national policy for a wage floor, either to support social partners in setting it or to set it by law, although in theory it would be entirely possible for a government to do none of the two.

As the factors SMW and RCB are closely correlated, we merged them into one factor in model 3 (see Supplementary Appendix Figure A1). This merged factor can be interpreted as stateness of the wage floor. High values mean the state sets the wage floor directly through SMW while low values mean the state provides indirectly for a wage floor through RCB. In a first attempt, this model did not converge because of the correlation between SMW level and SMW institutions. Consequently, we correlated the error terms of these two variables,

Table 1. Confirmatory factor analysis of low-wage policies.

	With robust standard errors ($N = 33$)		With Satorra-Bentler standard errors ($N = 33$)	
	Stateness of wage floor	IWB	Stateness of wage floor	IWB
SMW level	0.738***		0.738***	
	(0.159)		(0.167)	
SMW institutions	0.724***		0.724***	
	(0.104)		(0.094)	
Coordination	−0.834***		−0.834***	
	(0.104)		(0.117)	
Ghent	−0.630***		−0.630***	
	(0.143)		(0.134)	
Tax-benefit generosity, low-earning single		0.534***		0.534***
		(0.029)		(0.138)
Tax-benefit generosity, low-earning family		0.521		0.521***
		(0.327)		(0.202)
IWB policy		0.541		0.541**
		(0.360)		(0.213)
Goodness of fit				
Chi-square			0.5652	
RMSEA			0.000	
CFI			1.000	
TLI			1.035	
SRMR	0.071		0.071	
CD	0.907		0.907	

***$P<0.01$; **$P<0.05$; *$P<0.1$.

This is model 3 in Supplementary Appendix Figure A1. Standardized estimates with standard errors in parentheses. IWB: in-work benefit policies. See Supplementary Appendix Table A5 for covariance matrix, and Supplementary Appendix Table A6, model 3 for estimates of error variance and factor/error covariance. Only residual fit statistics are available with robust standard errors. For the model with Satorra-Bentler adjusted fit statistics are reported. All results were computed in Stata 16.

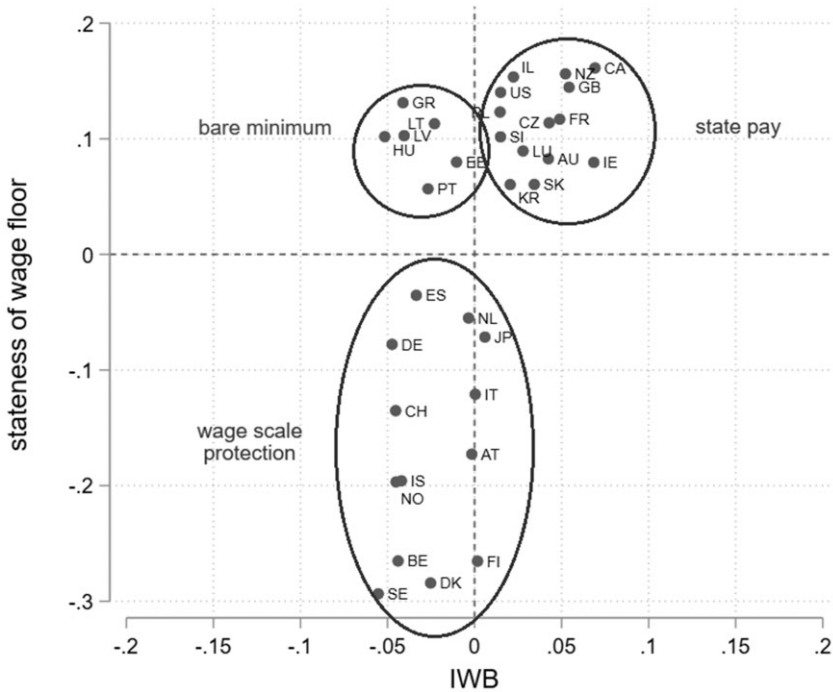

Figure 2. Cross-national variation in low-wage policies, 2017.

Note: Based on results from Table 1. The value of 0 corresponds to the mean value of the factor. IWB: in-work benefit policies. The three ellipses indicate groups of countries with substantively and statistically distinct policy approaches, as explained in the text. Country acronyms, see note under Figure 1.

which allowed the model to converge. This also makes theoretical sense because the two variables are related, especially due to the distinction between countries with and without SMW. The results are presented in Table 1 with standardized factor loadings. The table shows the extent to which observed variables load onto a common factor as hypothesized. While all observed variables have reasonably high factor loadings, they are particularly high for the stateness factor. As expected, the SMW variables contribute positively to stateness of wage floor and the RCB variables detract from it. Tax-benefit generosity for a low-earning family household and the IWB policy variable are marginally nonsignificant by a conventional threshold of $p = 0.1$ in the RML estimation, but they are clearly significant in the estimation with Satorra-Bentler standard errors. The model has a good or even very good fit by all fit statistics.

Two results stand out when plotting the factor scores (see Figure 2). First, as we draw on the standardized solution, the CFA generates different factors on the same scale. Therefore, Figure 2 shows that there is more cross-sectional variation in terms of stateness of the wage floor than in terms of IWBs. Second, we find an inverted-L pattern, where cases with high IWB are exclusively among those at the SMW end (the upper half) of the stateness of wage floor. Conversely, countries at the RCB end (the lower half) all have low IWB. Another set of countries, in the upper-left corner of the inverted L, scores high on stateness of wage floor

but low on IWB. Together with the previous result from Figure 1, this confirms our expectations on how the three policies mix. SMW and RCB are alternatives and not strongly articulated at the same time. RCB and IWB do not commonly go together either. Only SMW and IWB are often well developed in the same country.

Looking at Figure 2, it is intuitive to distinguish countries into three quadrants: bottom-left, top-left and top-right. To investigate whether such a distinction is statistically justified, we ran a hierarchical cluster analysis on the factor scores (see Supplementary Appendix Figure A2). This confirms clearly that there is a primary distinction between the lower and the upper half in Figure 2: that is, between states that mostly support a wage floor set by social partners and states that set the wage floor mostly by law. It further shows that among the cases with high stateness the next level of distinction is between those with above average IWB and those below. Therefore, the cluster analysis confirms the distinction into the three quadrants. In addition, it suggests that three subgroups can be distinguished within the bottom-left quadrant according to differing degrees of stateness.

Based on CFA and cluster analysis, we therefore identify three approaches to regulating low pay. First, the approach by countries in the bottom-left of Figure 2 can be called 'wage scale protection'. These states support the setting of a wage floor through collective bargaining and have low IWB policies. However, collective bargaining not only sets a wage floor but protects all workers across the wage scale. The Nordic countries are the clearest examples of this policy approach, but also Belgium, even though Belgium has an SMW in addition to strong RCB. Most continental European countries are also in this cluster, but with somewhat weaker RCB, due to the lack of Ghent unemployment insurance and lower wage coordination. Finally, this group includes Italy, Spain and Japan. Second, we call the approach by states in the top-left of Figure 2 'bare minimum' because these states have well-established SMW but little else: no robust RCB and no substantial IWB. This group consists of several countries from Central and Easter Europe (CEE) (Hungary and the Baltic states) as well as Portugal and Greece. The third policy approach, shared by cases in the top-right quadrant, can be called 'state pay'. These countries have SMW, but very little RCB to protect workers from sliding down into minimum wage levels. Rather, they use the tax-benefit system to subsidize workers on low earnings. Here we find all the English-speaking states, Israel (in line with the liberal traits of its politico-economic regime), the remaining CEE countries (Czech Republic, Slovak Republic, Slovenia and Poland), and South Korea. France and Luxembourg are also in the top-right group, distinct from the other Continental European countries.

To illustrate the three policy approaches, we can take a look at Sweden (as an example of wage scale protection), Hungary (bare minimum) and Canada (state pay). Sweden and Hungary are similar by not having strongly developed IWB policies. Neither of the two has a dedicated IWB. Sweden augments the gross income of a low-earning family household by 31% and Hungary by 37% (against an OECD average of 52%). In contrast, Canada has an explicit IWB and doubles the gross income of the low-earning family household (107%). On the other hand, Hungary and Canada resemble each other in the stateness of their wage-floor policies. Both have statutory minimum wages with levels not too far from the OECD average (Hungary 52% of median wage, Canada 45%, OECD 50%) and a fair degree of government control, but neither of the two has wage coordination (our proxy for corporatism) or a Ghent system of unemployment insurance. In contrast, Sweden has no statutory minimum wage, but a high degree of corporatism and Ghent unemployment insurance.

While we identify three substantively and statistically distinct policy approaches to regulating low pay, in a sense 'three worlds of low-pay regulation', we caution against interpreting them as stable regime types. As the next section shows, there was considerable movement along both dimensions in Figure 2. So, countries do not stay fixed in one of the clusters. Also theoretically, we know that structural pressures force governments to adjust their wage-related policies and since the 1980s have induced them to liberalize their support of collective bargaining (Baccaro and Howell, 2017).

4.2. Trends over time

As mentioned in the methods section, the nature of our data set does not allow us to conduct the CFA for earlier years. We use instead the factor loadings from the CFA to derive weights for a policy index for each of the two dimensions the CFA identified (stateness of wage floor and IWB). These two indexes can be easily applied back in time. The index construction is explained in detail in Supplementary Appendix B.

Figure 3 shows an overwhelming tendency of the stateness of the wage floor to increase. In 15 of the 19 countries for which we have continuous data since 1960, the wage floor has become more directly controlled by the state. This is to a large extent driven by the fact that more and more states introduced SMW in this period, 8 out of the 19 states in the figure: Canada (1965), Netherlands (1969), Belgium (1975), New Zealand (1985), Israel (1987), UK (1999), Ireland (2000) and Germany (2015). Sweden and Denmark, with the lowest stateness in 1960–1962,[8] have managed to remain at that level, while in the countries with highest stateness in 1960–1962 (France, USA, New Zealand and Luxembourg) it did not increase much further. Otherwise, we find increases in stateness across the spectrum of 1960–1962 levels.

For IWB we only have data since 2001. Figure 4 shows that the trend is less clear than for the stateness of wage floor. Nine out of the 28 countries for which we have continuous data have reduced their IWB policies since 2001 and about 14 have increased them, the remaining have kept them unchanged. If we calculate the average IWB index across countries, it has increased overall even if moderately (from −0.0029 in 2001–2003 to 0.110 in 2015–2017). Increases and reductions of this index are spread quite evenly across the range of 2001 values. Most of the CEE countries that have a 'state pay' model in Figure 2 have moved in this direction since 2001. This shows that the original post-transition model in CEE was one of 'bare minimum', but about half of the CEE countries in our sample have started to supplement SMW with IWB. Overall, there is a moderate trend to make more use of IWBs, but less marked than the trend towards SMW.

5. Policy outcomes: low-wage employment

To examine policy outcomes, we start simply with the average incidences of low-wage employment for each of the three policy approaches identified above. Table 2 shows that the incidence is highest in the 'state pay' model, next highest in the 'bare minimum' model and lowest in the 'wage scale protection' model. The same order emerges when we consider wage inequality between the 10th and the 50th decile. However, here the difference between the 'bare minimum' and the 'state pay' approach is negligible.

8 We averaged 3 years at each end of the 1960–2017 period to even out noise in the data.

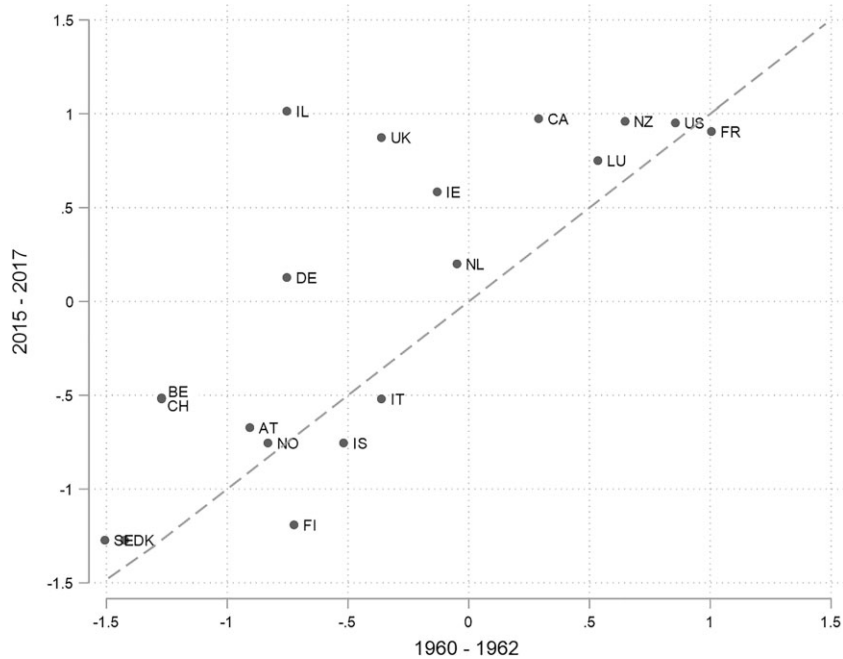

Figure 3. Stateness of wage floor index over time, 1960–2017.

Note: For index calculation see Supplementary Appendix B. We averaged values over three years for each axis.

To take this a step further, we test the association of low pay incidence with low-pay policies, while controlling for potential confounders and using our pooled time-series data set. Here, we return to observed policy indicators rather than the CFA factors, in order to focus the analysis on specific policy traits. Yet, we use the CFA to identify the indicator most central to each of the three policy fields. According to Table 1, the minimum wage level and coordination have the strongest factor loadings for SMW and RCB respectively (remember that we can easily distinguish SMW and RCB in the stateness of the wage floor factor according to positive and negative loadings, see Table 1). On the IWB factor, our dummy variable for IWB policy has a slightly higher loading than tax-benefit generosity for a low-earning single household. Yet, only the latter is significant in both CFA specifications in Table 1. In addition, we regard tax-benefit generosity for single households as the more encompassing and informative measure.

To assess the consequences of combining strong SMW and IWB, we interact SMW level and tax-benefit generosity for a low-earning single household. From the CFA results, we know that this is the main policy combination to evaluate, represented in the 'state pay' approach. In contrast, the 'wage scale protection' and the 'bare minimum' approaches make primary use of just one policy (RCB and SMW, respectively).

For SMW level we include a squared term in addition to the main variable. The reason is that SMW level comprises two kinds of variation (see the histogram at the bottom of Figure 5): first, the difference between having an SMW and not having one (when the level is

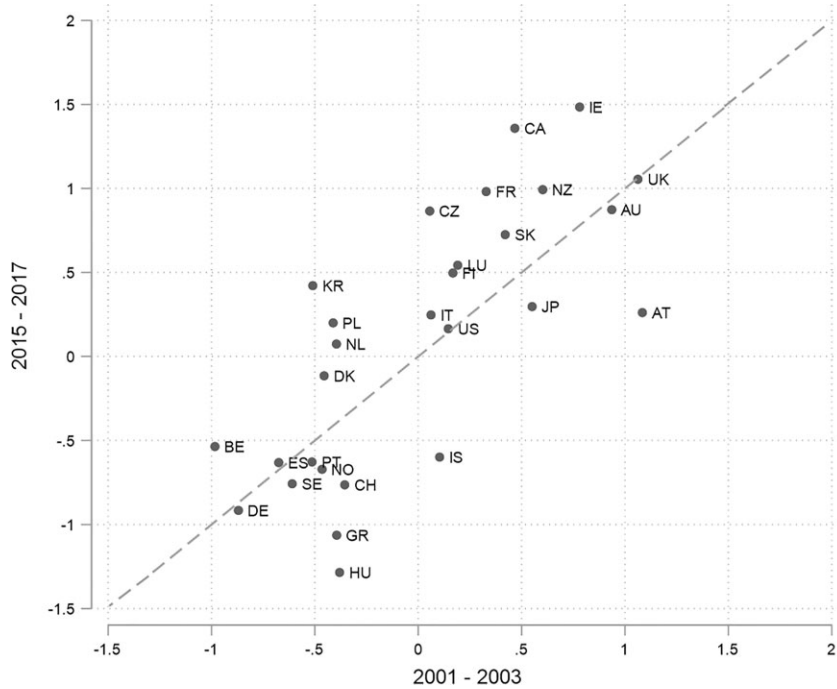

Figure 4. In-work benefit index over time, 2001–2017.

Note: For index calculation see Supplementary Appendix B. We averaged values over three years for each axis.

Table 2. Policy outcomes by policy approach to regulation of low pay, 2017.

Policy approach	Countries	Low pay incidence	10th–50th wage inequality
Wage scale protection	BE, DK, SE,[a] FI, NO,[a] IS, AT, IT, CH, DE, NL, JP, ES	9.57 (SD 4.209)	1.520 (SD 0.133)
Bare minimum	HU, EE,[b] LT, LV, GR, PT	15.97 (SD 7.20)	1.745 (SD 0.254)
State pay	AU, NZ, CA, US, IE, UK, IL, CZ, SK, PL, SI, KR, FR, LU	17.66 (SD 4.946)	1.754 (SD 0.176)

[a]Data missing for Sweden and Norway.
[b]Data missing for Estonia.
The policy approaches are explained in Section 4.1. For some countries we used data from 2016 or 2018 because 2017 data were not available.
Source: OECD (2021).

zero), second, the actual variation in levels among the countries with SMW. The normal SMW level variable captures primarily the difference between not having and having an SMW, whereas the squared term captures primarily the variation in levels between countries with SMW. We standardize all variables to compare effect sizes, but also to diminish the risk of multicollinearity that can arise with interactions.

Table 3. Regression analysis of low-pay incidence.

	Model 1		Model 2		Model 3	
	Std. Coef.	SE	Std. Coef.	SE	Std. Coef.	SE
SMW level $_{t-1}$	2.818**	(1.204)	3.164***	(1.092)	3.504***	(1.046)
SMW level$^2_{t-1}$	−2.867**	(1.221)	−3.061**	(1.182)	−3.336**	(1.123)
Coordination $_{t-1}$	−0.148	(0.107)	−0.142	(0.105)	−0.196	(0.102)
TB generosity, sh $_{t-1}$	0.466**	(0.227)	0.479***	(0.166)	0.481**	(0.185)
SMW level × TB gen. $_{t-1}$			0.422***	(0.101)	0.426***	(0.108)
Collective bargaining coverage	−2.025***	(0.684)	−2.279***	(0.697)	−2.591***	(0.520)
Unemployment rate	−0.716***	(0.224)	−0.219***	(0.230)	−0.604**	(0.199)
Share of service employment	0.354	(0.888)	0.345	(0.819)	−0.320	(0.652)
Trade openness	−1.206	(0.772)	−1.123	(0.634)	−0.770	(0.530)
Time	−0.169	(0.283)	−0.045	(0.057)	−0.111	(0.251)
Constant	15.012***	(0.221)	15.272***	(0.499)	15.138***	(0.819)
F-test	0.011		0.003		0.000	
Fixed effect	Yes		Yes		No	
R^2 within	0.222		0.265		0.255	
R^2 between	0.340		0.354		0.507	
R^2 overall	0.361		0.369		0.474	
Obs	277		277		277	
N	28		28		28	

***$P<0.01$
**$P<0.05$
*$P<0.10$.
Fixed-effect models estimated with country cluster robust standard errors and random effect model with robust standard errors. TB: tax-benefit; sh: low-earning single household.

Table 3 reports the results of our regression analysis with three models. Model 1 does not include the interaction effect between SMW and IWB. Model 2 adds the interaction effect. And model 3 is the same as model 2 but with random instead of fixed country effects. Given that the results are very similar across all three models, we focus on model 2 as the main model, unless otherwise mentioned.

Strikingly the regression analysis shows that SMW level both as a simple and as a squared variable has a significant and strong influence on the incidence of low-wage employment. Having an SMW compared to not having one (captured by the simple SMW level variable), is associated with more low-wage employment. However, among the countries that have SMW, higher levels lead to less low-wage employment (captured by squared SMW level) (see Figure 5). Countries often introduce SMW when their collective bargaining declines (Meyer, 2016). Hence, our results indicate that countries with SMW have more low-wage employment because their collective bargaining is weaker beyond what is controlled for by bargaining coverage and workers can more easily slide down the wage scale. Yet, once a country is in the 'SMW camp' a higher SMW nevertheless contributes to reducing low-wage employment.

The coefficient for wage coordination, our RCB variable in this analysis, has a negative sign, as expected, but is not significant. But collective bargaining coverage is also negative, highly significant and has the second largest effect after SMW level. This shows that

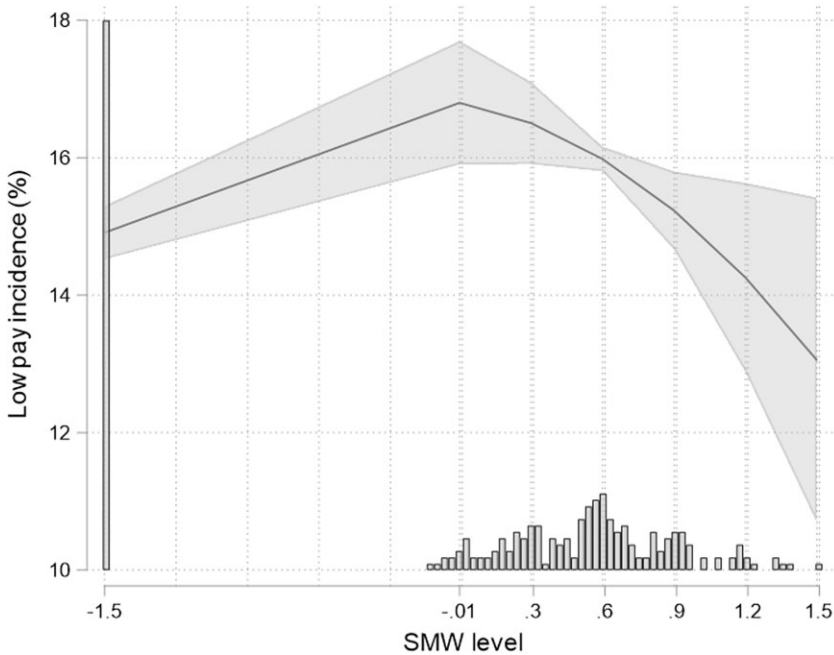

Figure 5. Predicted levels of low-pay incidence by SMW level.
Note: Predicted levels are calculated from model 2 in Table 3, with 95% confidence interval. The histogram at the bottom of the figure shows the distribution of SMW level. The figure is based on standardized variables. The value −1.5 corresponds to 0 in the nonstandardized variable.

inclusiveness in collective bargaining is more important for reining in low-wage employment than coordination, in line with Vlandas (2018). In a robustness check, we have dropped bargaining coverage from the regression. This hardly changes our results (see Supplementary Appendix Table A8). However, in models 2 and 3 our RCB variable, coordination, becomes significant. This suggests that indeed RCB reduces low-wage employment by propping up collective bargaining coverage. More generally, it is clear from Table 3 that collective bargaining is vital for reducing low-wage employment and that for this reason state support for collective bargaining (RCB) is an important policy for tackling low-wage employment.

Further, the results show that IWBs lead to more low-wage employment. According to model 1, tax-benefit generosity for a low-earning single household has a positive and significant effect on low-pay incidence, in line with our theoretical expectations about IWB facilitating low pay. When we add the interaction term with SMW level (models 2 and 3) the effects of both constituent terms remain, and the interaction term itself is also positive and significant. For better interpretation, we plot the interaction in Figure 6.

The figure shows that tax-benefit generosity for low-earning singles does not have a significant effect on low-pay incidence for low values of SMW level, which are those observations where there is no SMW. By contrast, for observations with an SMW, tax-benefit generosity for low earners significantly increases low-wage employment. This explains that the 'state pay' approach to low pay is the one with highest low-wage employment. It seems

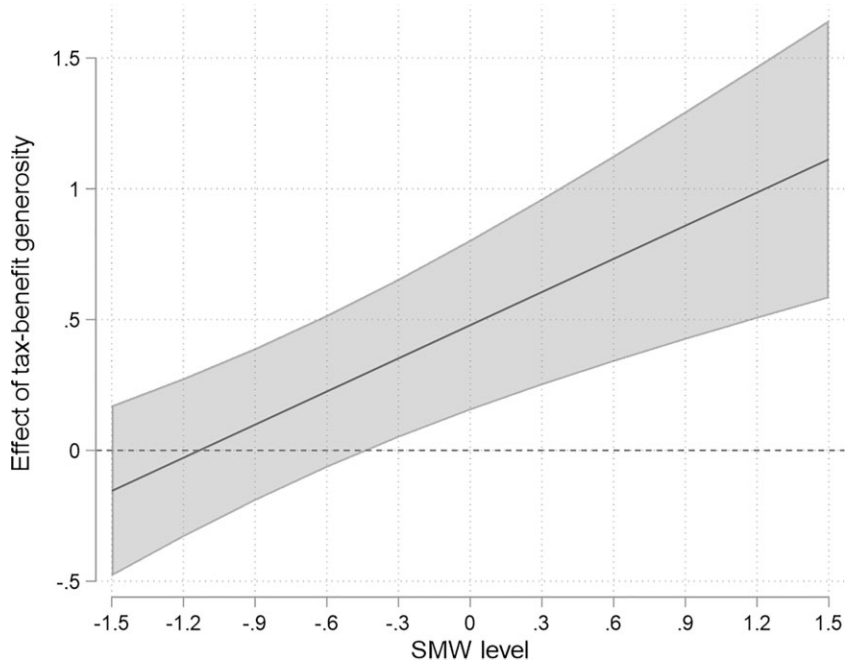

Figure 6. Marginal effects of tax-benefit generosity on low-pay incidence over different levels of SMW. Note: The marginal effects are calculated from model 2 in Table 3, with 95% confidence interval. The figure is based on standardized variables. The value −1.5 corresponds to 0 in the nonstandardized variable.

that IWBs push low-skilled workers down onto the minimum wage, while the minimum wage in almost all countries is still below the threshold for low-wage employment (two-thirds of the median wage).[9] This downward impact of IWB on wages is facilitated by the fact that SMW, as opposed to collective bargaining, does not protect workers above minimum wage level from sliding down the wage scale.

As we use standardized variables, model 1 reveals that SMW level is the variable with the strongest effect on low-wage employment (positive for the simple variable, negative for the squared term). The second most important determinant is collective bargaining coverage. All other variables are less impactful. In the appendix (see Supplementary Appendix Table A9), we show that our main results are the same when we use wage inequality, measured as the ratio between the 50th and 10th decile of the wage distribution, as dependent variable. The results of the regression analysis confirm therefore the descriptive impression from Table 2. The best way for states to prevent low-wage employment is to support collective bargaining, the 'wage scale protection' approach. On the other hand, the combination of SMW and IWB ('state pay') leads to highest low-wage employment. States that primarily use SMW ('bare minimum') lie in the middle, and much depends on the level of SMW.

9 Only one country-year is above two-thirds of the median wage: France in 2005 with 67%.

6. Conclusion and discussion

This article has provided a map of cross-national variation in low-wage policies as well as an assessment of the outcomes they are associated with. By covering 33 OECD countries and three policies, our article is far more comprehensive than any other study on low-wage regulation that we are aware of. We started by building on Bonoli's (2003) conceptual framework on three ways of providing economic security to wage earners: labor law, collective bargaining and tax-financed income transfers. In line with this framework, we identified three policies that address low-wage employment: SMW, RCB and IWB.

Analyzing the variation of these policies, we found that two, SMW and RCB, are so closely inversely related that they can be expressed as one latent variable: stateness of the wage floor. With this as the first and IWB as the second dimension, we produced a two-dimensional policy map in our Figure 2. All advanced capitalist democracies either support collective bargaining or implement an SMW, but none completely neglects setting a wage floor. IWBs are used on a large scale only in countries with strong SMW and weaker support for collective bargaining. These patterns are in line with the theoretical expectations we formulated based on the inherent characteristics of these policies and their political implications. The policy variation can be summarized in three substantively and statistically distinct policy approaches: 'wage scale protection' (primary emphasis on RCB), 'bare minimum' (primary emphasis on SMW) and 'state pay' (combining strong SMW and IWB). In addition, we found, a clear trend over time of states making more use of SMW and less use of RCB as well as a less marked trend towards more substantial IWB.

In an additional step, we analysed how our policies of interest perform in reducing low-wage employment. The results show that collective bargaining, and hence state support for it and the 'wage scale protection' approach, is the best way of reducing low-wage employment. The 'bare minimum' approach is associated with more low-wage employment because it builds mostly on SMW instead of well-functioning and inclusive collective bargaining that protects workers from sliding down the wage scale. However, once countries have SMW, a higher minimum wage nevertheless leads to less low-wage employment. Finally, the 'state pay' approach leads to the highest incidence of low pay as IWB policies incentivize employers to pay just the minimum wage, while there are insufficient collective bargaining structures to keep workers from slipping down the wage scale.

The research objective of this article was to give a thorough overview of how low-wage policies vary across advanced democracies, combined with an analysis of outcomes. Our article thus opens a research agenda for explaining this variation.[10] In our view, such explanations should take into account the historical roots of corporatism, political incentives and state capacities. Traditions of corporatism (Crouch, 1993), even if to some extent eroded, still shape the politics and institutional possibilities for wage policies, especially the degree of RCB. Political incentives, especially electoral incentives, can explain why political parties started promoting SMW or IWB as alternatives to RCB, and when. As corporatism declines, political parties become more important actors in wage regulation. They respond to the preferences of their core constituencies or the preferences of new voters they wish to gain (Häusermann *et al.*, 2013). SMWs have an obvious electoral appeal when precarious labor

10 The literature on the politics of these policies is limited, but insightful contributions are Rueda (2008), Meyer (2016), Mabbett (2016), Marx and Starke (2017) and Vlandas (2013).

spreads (Marx and Starke, 2017). They have the benefit of helping those with low earnings while generating little cost for the public budget. Finally, state capacities matter in determining the range of possible policies. IWBs are demanding to administer because they require sound assessment of applicants' economic situation and are undermined by undeclared employment.

As we have shown, the existence of SMW is associated with more low-wage employment (although higher levels help when a country already has SMW), while collective bargaining coverage unequivocally reduces low-wage employment. This makes it somewhat troubling to observe that the policy trend over the last decades moves from RCB to SMW. To be sure, for governments it is easier to introduce SMW than to fix industrial relations: the latter rely on the strength of industrial organizations, which can only be facilitated but not generated by law. Still, from a normative point of view, our article suggests that policy-makers should pay more attention to supporting collective bargaining.

Our results support the thrust of the EU directive on adequate minimum wages. One major aspect of the directive is that countries below 80% bargaining coverage have to produce national action plans to increase bargaining coverage. Our article shows that improving bargaining coverage is the best way to reduce low-wage employment. This element of the directive will generate demand for more research on supportive regulation of collective bargaining—a policy that has too often been outside the radar of comparative researchers. The other main element of the EU directive is that countries with SMW should make sure its level is adjusted at regular intervals with respect to concrete benchmarks. While our article does not suggest that SMW is the best way to fight low pay, it is important to acknowledge that not all countries can build or re-build a well-functioning collective bargaining system from one day to the other. We have shown that such countries normally have SMW instead, and that in this case raising its level contributes to reducing low-wage employment.

We have not systematically covered mandatory extensions of collective bargaining in this article. In the section on policy options (section 2), we explained why they have a theoretically ambiguous status between RCB and SMW. A more thorough comparative analysis of mandatory extensions is another important task for future research. In a forthcoming chapter, Picot presents a typology of minimum wage regimes based on the existence of SMW, collective bargaining coverage and the scale of mandatory extensions.[11] Comparing countries' locations on our stateness of the wage floor dimension to their minimum wage regime in that chapter shows a substantial degree of overlap, thus suggesting that our results are in line with related research comprising mandatory extensions.

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11 See footnote 3.

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Supplementary material

Supplementary material is available at *Socio-Economic Review Journal* online.

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