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The Combined Employment Effects of Minimum Wages and Labor Market Regulation – A Meta-analysis

Bernhard Boockmann

Institut für Angewandte Wirtschaftsforschung e.V.
Ob dem Himmelreich 1 | 72074 Tübingen | Germany
Tel.: +49 7071 98960 | Fax: +49 7071 989699

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The combined employment effects of minimum wages and labor market regulation – a meta-analysis

Bernhard Boockmann*

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Abstract: This paper provides a meta-analysis of 55 empirical studies estimating the employment effects of minimum wages in 15 industrial countries. It strongly confirms the notion that the effects of minimum wages are heterogeneous between countries. As possible sources of heterogeneity, it considers the benefit replacement ratio, employment protection and the collective bargaining system. While the results are in line with theoretical expectations, the degree to which they are robust differs across these institutions.

JEL-Codes: J38, J20, C12

Key Words: Minimum wage, regulation, employment, meta-analysis

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* Institute for Applied Economic Research (Institut für Angewandte Wirtschaftsforschung, IAW), Tübingen; University of Mannheim; IZA Bonn. Ob dem Himmelreich 1, D-72074 Tübingen, Germany, Tel.: +49 7071 9896-20, Fax: +49 7071 9896-99, E-mail: bernhard.boockmann@iaw.edu.

1. Introduction

Following the influential study by Card and Krueger (1995a), a wealth of empirical studies on the employment effects of minimum wages has been produced for a large number of countries. The available evidence for the US has been summarized in meta-analyses by Card and Krueger (1995b) and, more recently, by Doucouliagos and Stanley (2009). Meta-analysis is a useful statistical tool for reviewing empirical results increasingly adopted in the economics profession. This study provides a meta-analysis for the effect of minimum wages on employment in major industrial countries since 1995.

A central theme of the paper is that the effects of particular regulations such as mandates for minimum wages are likely to depend on a country's wider institutional setting, as well as on norms, macroeconomic conditions and other circumstances. However, it is difficult to estimate empirically how important these interdependencies are. In modern empirical analysis, regulation effects are mostly estimated on the basis of micro-level data and using techniques such as natural experiments. This approach, however, takes the institutional and social framework as given and does not allow for comparisons between different settings. By contrast, studies based on country-level panel data offer the potential for cross-country comparisons but often suffer from low statistical power. In this trade-off, the use of meta-analysis may provide a bridge between the use of sophisticated methods of statistical evaluation and the objective to compare systematically between countries.

The interdependence between different policy interventions is a question of high political importance and the object of much academic research. Following the important contributions by Coe and Snower (1997) and Orszag and Snower (1998), studies such as Amable and Gatti (2006), Bassanini and Duval (2006, 2009), Eichhorst and Konle-Seidl (2005) and Elmeskov et al. (1998) give support to the notion that policy recommendations and reform proposals for labor markets need to differ according to a country's institutional framework. Empirically, interdependence between particular labor market regulations such as employment protection, replacement rates, collective

bargaining structures and tax rates has been analyzed studies such as Belot and van Ours (2004) and Belot et al. (2007). These studies find significant evidence for the interaction of different policies. Concerning minimum wages, interaction effects with other regulations on youth unemployment have been empirically investigated by Neumark and Wascher (2004a) for a sample of 17 OECD countries. Using pooled cross-section time-series data, these authors find that the employment effects of minimum wages vary considerably across countries. Institutions such as employment protection, union coverage and active labor market policies are shown to explain part of these differences.

In this paper, we focus on the level of benefit payments, employment protection and the collective bargaining system as possible sources of policy complementarities. First, benefits received by the long-term unemployed often set effective minimum wages. If market wages fall below this level, workers rationally prefer to remain out of work. Thus, minimum wages have employment effects only above a certain threshold. Conversely, reducing benefits may only increase employment if minimum wages are low (Orszag and Snower 1998).

Second, costs of employment protection may be shifted to workers in the form of lower wages unless shifting is prevented by minimum wages (Lazear 1990, Cahuc and Zylberberg 1999). Thus, at least in the long run, adverse employment effects of employment protection and minimum wages may reinforce each other. In the short run, however, employment protection may also reduce employment losses that would otherwise result from an increase of the minimum wage (Neumark and Wascher 2004a).

Third, collective bargaining also sets minimum wages that may be a substitute for legal minimum wages. If collective bargaining results in uniform nationwide standards that are generally applied, the additional effect of a statutory minimum wage is likely to be limited (Cahuc et al. 2001). The inverse relation between the use of statutory minimum wages and union bargaining has been given a theoretical underpinning by Aghion et al. (2008).

In addition to these institutions, minimum wages may interact with several other country characteristics, including tax policies (Bassanini and Duval 2006), active labor market, training and housing policies. Product market regulation could be a close substitute to minimum wage regulation if minimum wages are used to increase competing firms' costs of production (see, however, Amable and Gatti 2004 for a model with different conclusions). In addition, Alesina et al. (2010) stress interactions between labor market regulation and the role of the family. In this paper, however, we are explicitly concerned only with labour market regulation and welfare state characteristics. The high significance of country fixed effects found in our empirical results, however, makes it appear quite likely that other interaction effects are present.

2. Meta-Analysis and Minimum Wage Research

Meta-analysis is a quantitative method to summarize the content of a sample of empirical studies.[1] In a meta-regression approach, the dependent variable is a statistic such as an elasticity or a regression parameter obtained from each study in the sample. A study may contribute more than one estimate to the analysis. The dependent variable is statistically explained by characteristics of the study such as its empirical data base, the methods used, place and time of publication and others. If successful, meta-analysis may reconcile the diversity of findings often obtained by researchers working on the same empirical question. It may also hint at inadequacies in the literature such as publication bias.

While meta-analysis originated in the sciences, it is frequently used in empirical economics. There are numerous examples for applications to empirical labor economics, such as Greenberg et al. (2005), Kluve (2006) and Card et al. (2009) for the empirical effects of welfare and active labor market programs, Jarrell and Stanley (1990) for the union influence on wages, Pereira and Martins

1 More detailed information on the methods of meta-analysis and their use in economics is provided in Stanley (2001) and Stanley and Jarrell (2005).

(2004) for the returns to education, Longhi et al. (2005) for immigration and earnings and Weichselbaumer und Winter-Ebmer (2005, 2007) for the presence of gender discrimination in wage-setting.

The employment effects of minimum wages have been meta-analyzed by Card und Krueger (1995b) and Doucouliagos and Stanley (2009). Card and Krueger used meta-analysis to examine publication bias in a sample of 14 time-series studies for the US. They start with the observation that in a meta-analysis using an unbiased sample of coefficients (where differences result from the usual sampling error and not from systematic selection), the relation between sample size and reported t-values should be inverse. Contrary to this expectation, they find that the reported employment effects of the minimum wage very often have a t-statistic of slightly above two, regardless of sample size. This suggests the presence of publication bias, such that published studies are systematically selected on the basis of the t-values of the estimated parameters.[2] The more recent study by Doucouliagos and Stanley (2009), based on a sample of 64 studies for the US using different methodologies, similarly finds strong evidence for publication bias and little or no evidence of a negative association between minimum wages and employment.

More often than examining publication bias, however, meta-analysis is used to synthesize the literature and derive conclusions with respect to the questions the original studies sought to answer. Thus, several independent variables typically used in meta-analyses contain information about the specific kind of intervention and the population groups to which the intervention is targeted. Variables relating to study design (e.g., data sources and sampling, econometric methods used) are often used as control variables. Finally, if the studies refer to different countries, one may also include measures defining the institutional context and other country characteristics. This is the feature most important for our study.

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2 See, however, Neumark and Wascher (1998) for an alternative explanation.

An example for country characteristics identified by meta-analysis is Winter-Ebmer and Weichselbaumer (2007). The country-level policy variables used in their study relate, first, to the ratification of international conventions against discrimination and, second, to economic freedom (as measured by the Freedom House index) as a measure of competition. They find that, consistent with expectations, both international rules and competition reduce the wage differential estimated by the econometric studies in the sample.

3. Data

Data collection is a first and crucial step in meta-analysis. Since statistical analysis requires a sufficient data base, only topics frequently investigated in empirical research can be analyzed. Given the large number of studies published after Card and Krueger (1995a), the minimum wage is a suitable topic for a meta-analysis. Since 1995 marks a turning point in research on minimum wages and in order to obtain a relatively homogenous set of studies, only studies published after 1995 are included in the sample. Many of these studies are not concerned with the effect of the minimum wage on employment but study other outcomes potentially influenced by minimum wages, such as labor earnings, the wage distribution, or product prices. By contrast, only estimates relating to employment are included in this study.

The data set consists of all econometric studies published in journals or as discussion papers found in an extensive literature search. Standard economic databases (ECONLIT, ECONIS and RePEc) were systematically searched using "minimum wage" and several flections as a keyword. In addition, internet searches using Google were made to detect new studies not yet published in journals or included in standard databases. The lists of references in the database were checked for further studies to ensure that our database is as complete as possible.

A minimum requirement for inclusion of a study in our data is that the employment effect is estimated econometrically by an estimator more sophisticated than simply a bivariate correlation.

Most of the studies in the sample use either regression techniques or quasi-experimental difference-in-differences (DiD) methods. Since the objective is to identify the effects of variables measured at country level, studies estimating effects for several countries (e.g., in a pooled cross-section time-series study for a panel of countries) were excluded. Apart from these requirements, all available studies were used, leaving us with a data set of 55 studies relating to 15 industrial countries.[3] Both studies based on micro and aggregate data are included. The list of papers is contained in the Appendix.

Given that most studies contain more than a single estimate for the employment effects, a choice has to be made of how many to include. Two extreme ways to deal with this problem are the 'best-set' and the 'all-set' of estimates (Doucouliagos and Stanley 2009). In the first case, only the estimate preferred by the study author(s) is included in the data. The disadvantage is that an objective standard for the preferred estimate does not exist. In the second case, all estimates are included. The problem here is that a lot of redundant information is included if authors engage in extensive robustness analysis or present results for slightly different data versions.

The best choice is, therefore, to determine what constitutes a separate entry in the data base on a case-by-case basis. To standardise the decision, a codebook was developed giving instructions how to distinguish substantial variations between estimates from redundant information. The rules of the codebook are contained in Table 1. While the application of the rules did not uniquely determine coding decisions, they provided guidelines that were sufficiently transparent and manageable. Checks revealed that the decisions made on the basis of the codebook were consistent. The data was coded partly by the present author and partly by a research assistant. As a result, the 55 studies yielded 304 separate estimates, with a minimum of one estimate and a maximum of 21.

3 There are also a number of studies for developing countries and emerging economies. To keep the country sample homogenous, they were not included in this study.

Since the likelihood of obtaining similar estimates is higher within studies than between studies, standard errors with clusters for studies are used in estimation.

Table 1 about here

Not surprisingly, the distribution of estimates over countries is very uneven. Roughly one half of the studies relate to the US. Other countries with many studies are the UK, Canada and France (see Figure 1).

Figure 1 about here

4. Empirical Model

A metric used in existing meta-studies is the elasticity of employment with respect to the minimum wage. Using this metric, however, would result in the loss of a large number of studies and countries, since elasticities are often not reported or cannot be derived from the results. This concerns, in particular, micro-level studies where the (change of) individual employment status is the dependent variable. Moreover, employment is defined differently across studies (employment numbers, full-time equivalents, hours etc.), and some of the studies use unemployment instead of employment as the concept of measurement. The measure of the minimum wages also varies across studies. Most studies use the absolute amount of the minimum wage per hour worked. Several macro-level studies, however, use the Kaitz index, i.e. the relation between minimum wage and average wage, or relate the minimum wage to other reference measures. In some cases, the proportion of workers directly affected by the minimum wage is taken as a measure of regulation intensity.

Since a common metric for the size of the effect is lacking, we follow the example of other studies such as Card et al. (2009) and define the dependent variable on the basis of statistical

significance and the direction of the influence. This results in an ordinal measure with four categories (statistically significant and positive, positive but insignificant, negative but insignificant, and significantly negative) where the cut-off level for significance is five percent. Alternative measures with fewer or more categories are used for robustness checks. To account for different concepts of measurement, the definition of employment and minimum wage is included as a control variable in the estimations.

Table 2 contains the frequencies of the four categories of the dependent variable used in the analysis. Roughly one third of the estimates are significantly negative, insignificant and negative or positive (either significantly or insignificantly). About 8 per cent of the estimation results represent a significantly positive effect. Of course, no conclusions as to the 'true' effect of minimum wages can be derived from these frequencies.

Table 2 about here

To take account of the ordinal nature of the dependent variable, the ordered probit model is used for estimation. The independent variables are listed (with means and standard deviations) in Table 3. A first group concerns the population group for which the study has been made. The employment consequences of minimum wages are often believed to be particularly strong for young workers. This is reflected in the fact that a quarter of the estimation results refer to individuals below age 19. About one third of the data points represent separate estimation results for men and women while in two thirds of the estimates no distinction according to gender is made. In addition, a small number of studies restrict attention to low-skilled workers or to workers from low-paying industries.

Table 3 about here

Studies using the difference-in-differences (DiD) methodology often restrict attention to one or several narrowly defined industries, such as the fast food sector in Card and Krueger (1995a). The employment consequences of a minimum wage may differ in a specific sector and the whole economy. As Neumark and Wascher (2007) remark, if the minimum wage affects both the sector under study and a competing sector, and the competing sector produces with higher labor intensity, the price response will be larger in the competing sector, increasing demand in the sector considered in the study. A positive employment effect of the minimum wage in a small industry may, thus, be fully consistent with the competitive model of the labor market. Therefore, we include a dummy indicating whether the study relates to workers in a small industry (such as fast food stores, supermarkets, hairdressing, or residential care homes).

Concerning the level of aggregation of the data, we distinguish between studies based on individual-level and aggregate data, where the former either relate to individuals or firms and establishments. If regional averages are derived from individual-level data and analysis is performed at the regional level, the study is coded as using aggregate data. Among the studies based on aggregate data, we distinguish time-series and panel studies. For the period after 1995, the vast majority of aggregate data studies use panel data.

As mentioned before, the sample studies differ in the measurement concept of the outcome variable. Originally, we defined a set of dummies for the different outcomes. Since most of them never turned out significant, we retain only one variable indicating if the outcome measure is the unemployment rate rather than a measure for employment. We group the estimators into three categories: OLS (including time-series estimators), IV and DiD. More than half of the estimates in the sample originate from applications of the DiD technique, attesting to the huge influence of the Card-Krueger approach in the minimum wage literature.

A last study characteristic is whether the results were published in a peer-reviewed journal or appeared as a discussion paper or policy report. If journal referees are biased in their judgement

in favor of statistically significant results and/or in favor of the economic 'common sense', authors will have difficulties in placing insignificant or positive findings in reviewed journals.[4] An extensive analysis of the subtle methods used to detect publication bias is included in Doucouliagos and Stanley (2009).

An important group of independent variable relate to labor market regulation in the country for which the study has been done. A first characteristic is the tightness of existing minimum wage regulation. An increase in the minimum wage from a level already quite advanced may have a different effect than introducing a minimum wage in a country in which it has not previously existed. Apart from a measure for minimum wage regulation, we also use indicators for the level of benefits received by the long-term unemployed, the level of employment protection and the collective bargaining system. These indicators are used to detect possible policy complementarities between different fields of labor regulation, their choice being motivated by the literature cited in introductory section.

All the variables used are constant for countries and years and relate to the late 1990s, which corresponds to the average of the observation period of the studies included in the analysis. For the minimum wage level, we use Neumark and Wascher (2004b, Table 1) as the data source. For employment protection, we use the OECD summary indicator of employment protection for the late 1990s, as published in the 2004 OECD Employment Outlook (OECD 2005). This broad measure captures employment protection of regular employment relationships as well as regulations for fixed-term and temporary agency work. The benefit replacement rates are taken from the 2007 edition of "Benefits and Wages", a regular OECD publication. The specific measure used relates to the average for four different household types and over the first 60 months of unemployment and is

4 We checked whether the effect of this variable changes if we include the publication date as an additional regressor, to take account of not-yet-published as opposed to never-published papers. There were little changes in the coefficient of this variable from this robustness check.

measured in the year 2001. It does not distinguish between different branches of the social security system, such as unemployment insurance or social assistance. The collective bargaining system can be distinguished according to several characteristics, such as centralization, coordination and bargaining coverage (Kenworthy 1999). Most relevant in our context is the potential of unions and employer associations to act as standard-setters. Hence, we choose the degree of bargaining coordination as the variable to include. It is taken from the OECD Employment Outlook 2003 (OECD 2004, Table 3.5) and relates to 1995-2000.

5. Results

The estimation results (ordered probit coefficients and t-values) are displayed for different specifications in Table 4. Table 5 provides additional robustness analysis. The dependent variable is coded such that a negative coefficient implies a higher likelihood of a negative estimated effect on employment. A general-to-specific-approach was used to search for the most appropriate specification. The first column (ALLVARS) contains all available independent variables except those for used to check for policy complementarities, which are added later. Only variables at least coming close to statistical significance (using a p-level of 0.15 as the threshold) are retained in the next specification (INSIG-OUT). This specification is used as the baseline for the next two estimations. In the third specification (DUMMIES), country fixed effects are added. Finally, the last specification (PREFERRED) adds the institutional variables to the baseline specification.

Tables 4 about here

Concerning the variables for different population groups, no significant results are found except that studies for low-skilled workers tend to find more negative minimum age effects on employment. The dummy variable for studies related to "small" industries compared to the

economy has the expected positive sign, but is not significant. Both micro data and panel data generate more negative (and more significant) employment results than time-series data. Thus, in contrast to the meta-analysis by Card and Krueger (1995b), in our sample more statistical power seems to produce more significant results. The period of observation positively influences the dependent variable, which suggests that the effect of minimum wages has become less negative over time. Since this variable is highly collinear with publication date, an alternative explanation is that studies finding negative employment effect have become scarcer over time. Unfortunately, the data do not allow discriminating between these explanations.

Unemployment as an outcome measure is less negatively affected[5] by the minimum wage as compared to employment. The estimation technique (OLS, IV or DiD) does not statistically significantly affect the estimation outcomes. Finally, there is no indication of publication bias in the sense that negative and significant results are published with higher likelihood than insignificant or positive employment effects. Rather, the coefficient is positive, but it is only marginally significant in the baseline specification and loses its significance if further variables are added.

According to joint significance tests, country fixed effects are highly significant in statistically explaining the outcomes of minimum wage studies (DUMMIES). Taking the USA as the baseline, the coefficients of the individual dummies have positive signs for most European countries except France and Portugal. The high significance of the country dummies is not self-evident. For instance, in the meta-analysis of active labor market policies by Card et al. (2009), country dummies were found to be insignificant. Thus, the notion that minimum wage effects are heterogeneous across countries is supported by our analysis.

In the final specification (PREFERRED), the dummies are replaced by the institutional variables on employment protection, net replacement rates and bargaining coordination. The results

5 The coding ensures that a positive effect on unemployment is coded in the same way as a negative effect on employment.

suggest that the three dummies used do not fully explain the heterogeneity found in the DUMMIES specification. However, the absolute increase in the log likelihood value is about sixty per cent of the increase achieved by the inclusion of the country dummies. All three variables are statistically significant. Higher benefit replacement rates and union-employer bargaining coordination decrease the negative effects of the minimum wage, while stricter employment protection reinforces the negative employment effects.[6] The other variables are only little affected by the inclusion of country fixed effects or institutional variables.

Before we turn to interpreting these results, we present some robustness analysis. This is important because several countries contribute only few data points to the sample. Hence, the results may not be stable. We have checked the robustness in several ways (see Table 5 for results).

Exclusion of Institutional Variables

The institutional variable taken together may describe the countries' regulation system but it is unclear whether they have a separate impact on the estimated minimum wage effects. Including these variables one-by-one reveals that only the benefit replacement ratio remains significant (specifications BRR, EPL and COORD). However, even here the effect is only significant at the ten per cent level, and it is reduced by two thirds in magnitude as compared to specification PREFERRED. This suggests that the interaction between institutions is more complex than can be

6 We can also compare the effects quantitatively by looking at the marginal effects. Focussing on the likelihood of a significantly negative employment effect, the marginal effects of a change in the institutional variables by one standard deviation are -0.17 for the benefit replacement ratio, 0.16 for the employment protection indicator and -0.05 for bargaining coordination. Thus, the effects of benefits and employment protection are quantitatively much more pronounced than the effect of coordination. Overall, marginal effects for the probability of a significantly negative outcomes do not differ from coefficient estimates in direction and statistical significance (results are available on request from the author).

captured by bivariate interaction effects. As a consequence, one should be very careful with statements about the precise nature of the institutional interactions.

Table 5 about here

Weighted Estimation

To avoid giving studies with many different estimates disproportionate influence on the results, estimates may be weighted by the inverse of the number of estimates included, such that the impact of each study on the outcome is the same. Column WEIGHTED contains the results. Weighting does not affect the conclusions substantially.

Different Definitions of the Dependent Variable

The coding of the dependent variable in four categories is arbitrary. One could argue for a coarser measure in which all insignificant outcomes are joined into one category. Alternatively, a finer measure distinguishing between insignificant and marginally significant estimates may also appear sensible. In the specifications headed 3-CAT and 6-CAT, these two alternatives are tried. Again, the results are robust to these specification changes.

Moulton Bias

The main independent variables of interest are fixed for countries. This could introduce bias in the standard errors because the iid assumption is violated (Moulton 1986). To check for this possibility, meta-analysis is performed at the country level, using country averages of the dependent and independent variables. Given that the original dependent variable is ordinal, this imposes further structure on the data. Moreover, with only 15 observations the sample becomes very small. The results (headed MOULTON) are similar to the results with estimates as data points. Employment

protection increases the negative impact of minimum wages on employment, union centralization reduces it. The benefit replacement ratio, however, becomes insignificant. The other variables, as far as collinearity problems do not require their exclusion, give similar results as found previously.

6. Interpretation and Conclusions

A first conclusion from the results of the meta-analysis is that the notion that the employment effects of minimum wages are heterogeneous between countries (Neumark and Wascher 2004a 2004b; König and Möller 2008) receives strong support from the data. Even after controlling for study characteristics, country-specific institutions or, alternatively, country dummies remain strongly significant. This is not self-evident; for instance, in the meta-analysis by Card et al. (2009) on active labor market policy, country dummies are jointly insignificant. As a conclusion, differences in country characteristics such as the institutional framework should be considered before any conclusions from other countries' experiences with minimum wages are drawn.

The three institutional variables included to capture interactions with other regulations influence the estimated employment effects of the minimum wage in plausible ways. The benefit replacement ratio weakens any negative employment effects. This is consistent with strategic substitutability between these instruments: if one is in place, it limits the harmful effect of the other. Stricter employment protection enhances the negative employment effect of minimum wages. This result is in contrast to the finding by Neumark and Wascher (2004a). The discrepancy can perhaps be reconciled if the result of Neumark and Wascher is interpreted as a short-run effect. In the short run, employment losses due to minimum wages may be reduced by strict employment protection. This short-run effect will, however, disappear over time, while the additional costs to employers from having both minimum wages and employment protection will persist. Unfortunately, our data does not allow separating the estimations that represent short-run or long-

run effects. Finally, bargaining coordination seems to reduce the employment effects of minimum wages. However, the effect is not particularly pronounced quantitatively.

While the estimated effects appear plausible, their robustness is not beyond doubt. Although minimum wage research has expanded massively over the last 15 years, the number of studies currently available does not allow for more detailed analysis. Moreover, the complementarity of minimum wage effects with other country characteristics, such as the tax structure or family values, remains an open question. Thus, while the results of this study strongly warn against the unconsidered application of other countries' experiences with minimum wages in the political discourse, more research is needed on the interaction between minimum wages and other institutions.

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Table 1: Codebook for Inclusion of Estimation Results as Separate Entries

Number	Definition
1	Include results for different groups of workers (sex, age, qualification etc.) separately.
2	Otherwise, include only the specification with the most comprehensive data base (e.g., do not include sub-periods, use the specification with the largest set of controls unless rule 5 applies, etc.).
3	If possible, choose the representation that is most comparable across studies (e.g., report elasticities rather than measures depending on the scale of the variables).
4	Do not include small variants of estimations as separate entries. Small variations are specifications that differ in the set of covariates or the specific functional form (e.g. linear versus logarithmic). If no other decision rule applies, include the smallest and the largest estimate among a set of similar results.
5	If specifications differ substantially (e.g., use of different estimation procedures, different data bases), include results as separate entries.
6	Do not include results of generalizations not supported by the data (e.g., insignificant lags, insignificant groups of dummies).
7	Exclude specifications explicitly marked as inferior to preferred specifications by the author(s).

Table 2: Dependent Variable, Estimation Sample

	Number	Percent
sigificantly negative (5% level)	96	31.58
insigificantly negative	107	35.2
insigificantly positive	78	25.66
sigificantly positive (5% level)	23	7.57

Table 3: Independent Variables, Estimation Sample

	Mean	Std. Dev.
Age less than 19	0.25	0.44
Age 19-25	0.06	0.23
Gender: Men only	0.18	0.39
Gender: Women only	0.18	0.39
Low-skilled workers	0.02	0.14
Low-wage sectors	0.07	0.25
Small industry	0.08	0.28
Data: Micro	0.56	0.50
Data: Macro panel	0.34	0.47
Observation period	1992.23	7.06
Outcome: unemployment	0.02	0.14
Estimator: DiD	0.58	0.49
Estimator: IV	0.03	0.16
Peer reviewed journal	0.64	0.48
Minimum wage level	4.64	0.95
Basic assistance level	2.95	1.11
Employment protection	1.08	1.05
Bargaining coordination	1.97	1.10

Table 4: Ordered Probit Estimation Results from Meta-Analysis

Specification	ALLVARS		INSIG-OUT		DUMMIES		PREFERRED	
	coeff.	t-stat.	coeff.	t-stat.	coeff.	t-stat.	coeff.	t-stat.
Age less than 19	-0.04	-0.16						
Age 19-25	-0.22	-0.77						
Gender: Men only	0.06	0.23						
Gender: Women only	0.11	0.56						
Low-skilled workers	* -0.60	-2.26	* -0.64	-3.47	* -0.64	-2.82	* -0.56	-3.01
Low-wage sectors	-0.05	-0.20						
Small industry	0.60	1.45	0.56	1.44	0.58	1.08	0.70	1.49
Data: Micro	* -0.73	-2.10	* -0.59	-2.34	* -0.66	-2.22	* -0.81	-2.88
Data: Macro panel	* -1.29	-4.51	* -1.19	-4.78	* -0.92	-3.14	* -1.16	-5.18
Observation period	* 0.05	2.60	* 0.05	2.84	0.03	1.79	* 0.03	2.22
Outcome: unemployment	* 1.23	2.89	* 1.43	4.69	* 1.24	2.93	* 1.25	3.35
Estimator: DiD	0.00	0.01						
Estimator: IV	-0.22	-0.28						
Peer reviewed journal	0.34	1.72	0.30	1.44	0.26	1.32	0.27	1.48
Minimum wage level	0.12	1.28						
Benefit replacement ratio							* 0.55	2.95
Employment protection							* -0.53	-3.35
Bargaining coordination							* 0.16	2.37
Country dummies	NO		NO		YES		NO	
Studies	55		55		55		55	
Countries	15		15		15		15	
Observations	304		304		304		304	
Log-Likelihood	-354.27		-356.79		-339.23		-346.50	
Joint significance, χ^2 value					* 2509.23		* 15.88	

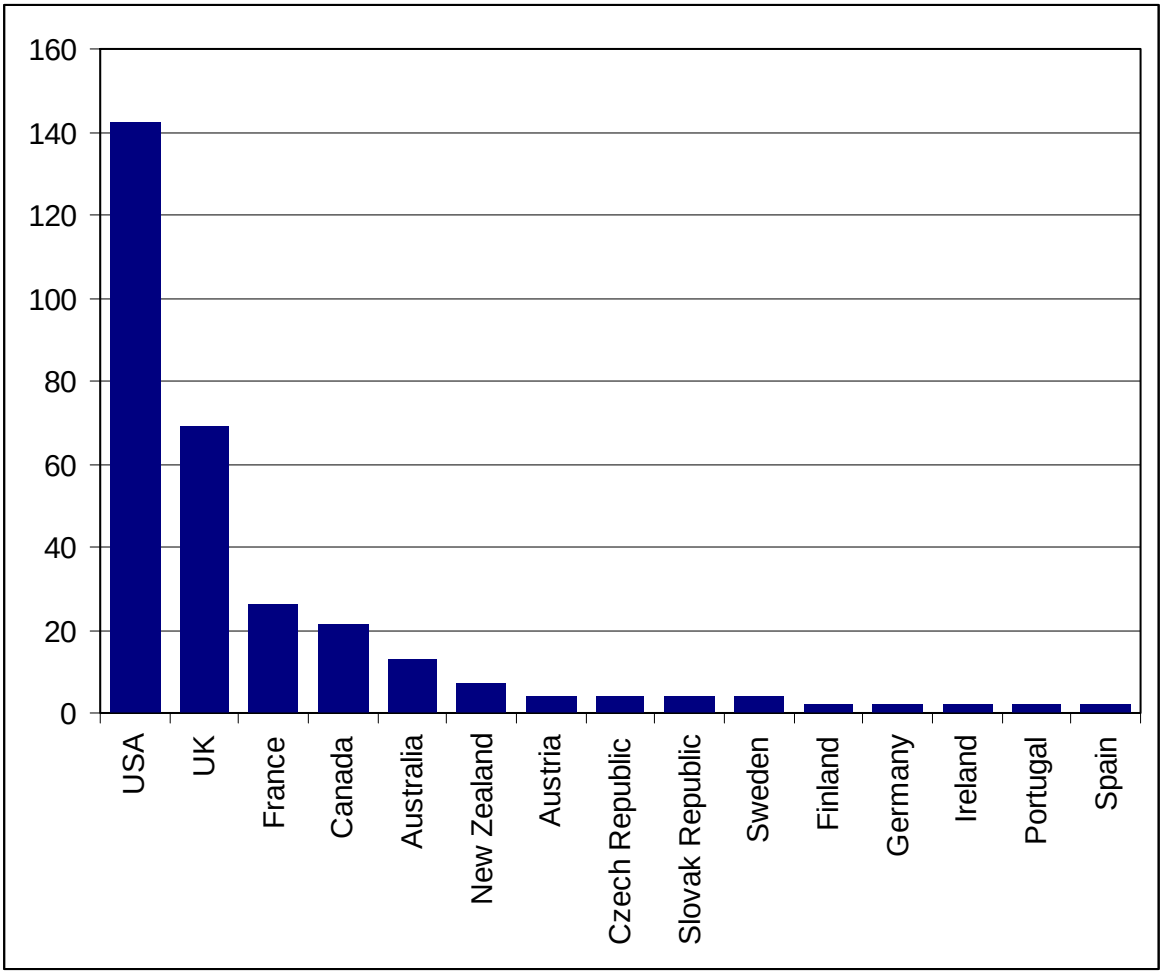
* denotes entries with a least five percent significance. Standard errors are in parentheses. The excluded groups for the dummy variable groups are: Age – all age groups, Gender – men and women; Data – macro cross-section; Estimator: OLS.

Table 5: Further Results from Meta-Analysis (Robustness Analysis)

Specification	BRR		EPL		COORD		WEIGHTED		6-CAT		3-CAT		MOULTON	
	coeff.	t-stat.	coeff.	t-stat.	coeff.	t-stat.	t-stat.	t-stat.	t-stat.	t-stat.	t-stat.	t-stat.	coeff.	t-stat.
Low-skilled workers	* -0.51	-2.63	* -0.60	-3.06	* -0.61	-3.22	* -0.72	-3.22	* -0.65	-3.68	* -0.39	-2.07		
Small industry	0.68	1.65	0.58	1.50	0.56	1.49	0.69	1.43	0.78	1.62	0.88	1.91	* 2.72	4.45
Data: Micro	* -0.77	-2.87	* -0.61	-2.35	* -0.58	-2.50	* -0.82	-2.61	* -0.84	-2.93	* -0.80	-2.36	* -3.38	-4.22
Data: Macro panel	* -1.19	-5.35	* -1.18	-4.98	* -1.15	-5.09	* -0.96	-3.39	* -1.16	-4.80	* -1.33	-5.11	* -4.29	-5.69
Observation period	* 0.04	2.77	* 0.05	2.82	* 0.05	2.92	* 0.03	2.00	* 0.03	2.22	0.03	1.55	* 0.17	3.07
Outcome: unemployment	* 1.25	3.25	* 1.39	4.19	* 1.40	4.29	* 1.36	4.18	* 1.22	3.31	* 1.16	4.77	5.25	0.93
Peer reviewed journal	0.25	1.23	0.29	1.35	0.29	1.36	0.14	0.78	0.26	1.46	0.22	1.08		
Benefit replacement ratio	0.19	1.79					* 0.61	2.41	* 0.55	2.92	* 0.42	2.23	-0.14	-0.49
Employment protection			0.05	0.52			* -0.62	-2.73	* -0.52	-3.27	* -0.44	-2.89	* -0.42	-2.23
Bargaining coordination					0.08	1.23	* 0.17	2.30	* 0.14	2.17	* 0.15	2.49	* 0.19	2.35
Country dummies	NO		NO		NO		NO		NO		NO			
Studies	55		55		55		55		55		55		55	
Countries	15		15		15		15		15		15		15	
Observations	304		304		304		304		304		304		15	
Log-Likelihood	-352.76		-356.46		-355.80		-350.71		-408.65		-228.47			
Adjusted R^2													0.81	

* denotes entries with a least five percent significance. Standard errors are in parentheses. The excluded groups for the dummy variable groups are: Age – all age groups, Gender – men and women; Data – macro cross-section; Estimator: OLS.

Figure 1: Number of Data Points by Country, Estimation Sample



Appendix: Studies Included in the Sample

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