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## Working Paper Minimum Wage and Collective Bargaining Reforms: A Narrative Database for Advance Economies

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## Minimum Wage and Collective Bargaining Reforms: A Narrative Database for Advanced Economies

## Abstract

This paper presents and describes a new database of major minimum wage and collective bargaining reforms covering 26 advanced economies over the period 1970-2020. The main advantage of this dataset is the precise identification of the nature and date of major reforms, which is valuable in many empirical applications. Based on the dataset, major changes in minimum wages have been more frequent than in collective bargaining in the last decades, and the majority of these were implemented during the 1980s and 1990s. In our empirical application, we find that minimum wage reforms have a medium-run positive impact on labor productivity and they lead to a fall in the unemployment rate. Collective bargaining reforms do not seem to affect either productivity or capital formation but they have a clear medium-term effect on the labor market. Moreover, collective bargaining reforms are more sensitivity to the prevailing business cycle conditions at the time of the reform (vis-à-vis minimum wage reforms).

JEL-Codes: C220, E240, J310, J520.

Keywords: labour market policies, minimum wage, collective bargaining, labour productivity, growth, local projection.

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### **1. INTRODUCTION**

A new cross-country time-series database of major historical reforms in minimum wage and collective bargaining could be of great use to researchers and practitioners alike. Hence, this should be particularly the case in those areas where measuring the policy stance is most challenging and existing information on major wage reforms is currently scarce, incomplete or even inexistent. For advanced economies, while prime candidates such as product market regulation, employment protection legislation or unemployment benefits have been covered for Advanced Economies by Duval et al. (2018). However, minimum wage and collective bargaining remain to be addressed.

For the relevance and contextualization of the topic at hand, we can recall notably the early discussion about the so-called Okun Law linking unemployment and economic growth (Okun, 1962). On the other hand, Levine (1991) mentions that policies affecting, for instance, minimum wage, can increase efficiency in economies. Akerlof (1982) discussed the idea that workers become more motivated and more productive in response to higher wages (efficiency wage). Dickens et al. (1999), mention that, for the UK, in the period, 1975-1992, minimum wages significantly compress the distribution of earnings although they do not find negative effects on employment.

In addition, existing literature also has addressed such issues as inclusivity in the labour market (El-Ganainy at al., 2021), the design of labour market institutions that matter for workers, notably minimum wages and collective bargaining (Duval and Loungani, 2019). National minimum wage hikes induce productivity growth, as reported by Rizov et al. (2016) for the UK, while Sabia (2015) finds for the US that an increase in minimum wage is associated with a decline in GDP generated by lower-skilled industries when compared with higher-skilled industries. In the case of Germany, Caliendo et al. (2019) refer that two years after the minimum wage introduction (in 2015), hourly wages increased for low-wage earners while they also report small negative employment effects. Finally, Hoffmann et al. (2021), discuss the relevance of Italian labour market reforms, of the 1990s and 2000s, for earnings.

Therefore, this paper presents a new database on major reforms in the areas of minimum wage and collective bargaining for 26 countries over the period 1970-2020.<sup>1</sup> The dataset is built in two steps. First, for each of the 26 advanced economies and each of the aforementioned policy areas,

<sup>&</sup>lt;sup>1</sup> For the former transition economies in the dataset, namely the Czech Republic and the Slovak Republic, data are available over 1990-2020.

we record all legislative actions mentioned in all past *OECD Economic Surveys* – the regular country surveys published by the OECD – published over the period 1970-2020. Second, among all those actions, we identify major measures (liberalizing and tightening reforms) as those that meet at least one of three alternative criteria: (i) a narrative criterion based on OECD staff's judgement on the significance of the reform at the time of adoption; (ii) whether the reform is mentioned again in subsequent *Economic Surveys*, as opposed to only once when the measured is adopted; (iii) the magnitude of the change in the corresponding OECD minimum wage indicator.

The main advantage of this dataset is to identify, document, and provide the implementation date of, major reforms in the areas of minimum wage and collective bargaining. As flagged above, this is highly valuable in many empirical applications. For example, in an application to the cross-country time-series estimation of the macroeconomic effects of major minimum wage reforms, we illustrate the gains from using our database rather than others typically used in this strand of the literature on reforms (such as the simple annual change in the level of the minimum wage variable available e.g. from the OECD database).

At the same time, it should be acknowledged that the criteria we apply to identify major reforms, as transparent as they are, are not the only possible option – there is no single, objective way to distinguish between major and minor reforms. Furthermore, we do not distinguish among different major reforms – all of them are treated equally, even though some have likely been more important than others in practice have. This dataset should be regarded as work in progress, for researchers to build on and improve upon. Furthermore, the approach taken here could, in principle, be extended to other relevant areas not covered here.

Based on the dataset, major reforms in the areas covered in this paper appear to have been more frequent in minimum wages than in collective bargaining in the last decades, and the majority of them were implemented during the 1980s and 1990s.

Minimum wage reforms have a statistically significant positive impact on labor productivity over the medium term and they lead to a medium-run fall in the unemployment rate. In addition, collective bargaining reforms do not seem to influence either productivity or capital formation but they have a clear medium-term effect on the labor market. Moreover, collective bargaining reforms are more sensitivity to the business cycle positioning of the economy at the time of the reform than are minimum wage reforms. The remainder of the paper is organized as follows. Section 2 presents the methodology. Section 3 discusses some stylized facts on reform patterns. Section 4 provides an empirical application. Section 5 is the conclusion.

#### 2. METHODOLOGY

### 2.1 Database construction

The database currently covers 4 main areas within minimum wage (MW) and collective bargaining (CB). For the first, two categories are considered, namely broad and targeted minimum wage reforms. For the second, also two categories are considered, namely moves to collective bargaining and extensions of the collective bargaining agreement.

In a first step, we identify all legislative and regulatory actions related to minimum wage and collective bargaining mentioned in any *OECD Economic Survey* for any of the 26 countries over the entire sample.<sup>2</sup> Several hundred such actions are identified overall. In a second step, for any of these actions to qualify as a major liberalizing (+1) or tightening (-1) reform one of the following three alternative criteria has to be met:

- (1) The *OECD Economic Survey* uses strong normative language to define the action at the time is taken, suggestive of an important measure (for example, "major reform"). In this respect, the methodology is related to the "narrative approach" used by Romer and Romer (1989, 2004, 2010, and 2017), Devries et al. (2011) and Duval et al. (2018) to identify monetary and fiscal shocks, periods of high financial distress and product and labor market reforms, respectively.
- (2) The policy action is mentioned repeatedly across different editions of the *OECD Economic Survey* for the country considered, and/or in the retrospective summaries of key past reforms that are featured in some editions, which is also indicative of a major action;
- (3) For the minimum wage reform area only, when available, the existing OECD minimum wage continuous variable displays a very large change (in the 5<sup>th</sup> percentile of the distribution

<sup>&</sup>lt;sup>2</sup> The 26 countries covered are Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom and United States. For the Czech Republic and the Slovak Republic, policy actions are recorded starting from 1990. For Korea, while data are collected starting from 1970, the information is drawn from OECD Surveys published starting from 1994. Hence, the quality of the information collected for the years prior to 1994 is generally poorer for Korea than it is for the other countries.

(top and bottom) of the cumulative change in the indicator over three years—to accommodate possibly gradual phasing-in of otherwise major reforms). The OECD minimum wage indicator is available publicly in *OECD.stat* at current prices in national currency. When only this third condition is met, an extensive search through other available domestic and national sources, including through the internet, is performed to identify the policy action underpinning the change in the minimum wage. For collective bargaining, no continuous counterpart or proxy is available so the reform coding is solely based on criteria (1) and (2).

As noted above, the approach considers both liberalizing and tightening reforms. Therefore, for each country, the reform variable in each area (MW or CB) takes value 0 in non-reform years, 1 in liberalizing reform years, and -1 in tightening reform years. In the absence of fully comprehensive information on reform announcement dates, the database focuses on implementation dates. Given its annual frequency, as a rule, major reforms that are implemented during the first half of a given year *t* are assigned to year *t*, while those implemented during the second half of year *t* are assigned to year t+1. Judgement calls are made when a major reform results from two or more measures taken at different points during a given year or are spread across two years. This is the case when a major reform results from the combination of two distinct policy actions taken at different, but close dates.

### 2.2 Strengths and weaknesses

Table 1 provides an illustrative example on how the three criteria mentioned above guide the identification of major reforms and "counter-reforms" in the area of MW and CB. In some cases, the available OECD indicator does not capture the full scope of the measure (1984 Denmark minimum wage change). In other cases, the qualitative information drawn from the *Country Surveys* coincides, and is fully consistent with, the observed change in the value of the corresponding OECD indicator (1984 Greek collective bargaining change).

Reform (+) or Counter- reform (-)	Implementation Year	Area	Country	Content	Normative Language featured in OECD Country Survey	Mention in later Surveys	Large Change in OECD Indicator
-	1975	Minimum Wages	Australia	The decision provides an immediate increase of 3.6 per cent in all wages under Federal award and an increase of \$ 4 per week in the minimum wage, effective from the first period on or after May 15.		1976, 1980	No
+	1984	Minimum Wages	Denmark	Agreement on additional budget improvements, amounting to Kr. 1 1/2 billion in 1984 and some Kr. 5 billion in 1985.	() Major steps to improve the wage formation process were taken already in 1979/80 by first excluding energy prices from the index regulating wage increases and then partially suppressing automatic wage adjustments. After a two year pause, efforts to break the wage-price spiral were intensified by the present Government which in 1982 decided to suspend the automatic indexation scheme until 1985.()	1986	No
÷	1993	Collective Bargaining	Australia	Industrial Relations Reform Bill 1993	(pg. 89, 1994): The Federal Government has introduced the Industrial Relations Reform Bill 1993 in order to provide an effective framework for the further spread of enterprise bargaining throughout the Australian economy. A major part of the Reform Bill is the introduction of more effective arrangements for direct bargaining, including the establishment of a new stream of enterprise flexibility agreements to be made directly between employers and employees. These agreements will be of particular relevance to non-unionised and lightly unionised enterprises. ()	1994, 1995, 1997, 1998	No
+	1984	Collective Bargaining	Greece	The 1984 national collective agreement.	The 1984 national collective agreement is signed, providing for full indexation of minimum salaries and wages.	No	Yes

## Table 1. Country Examples of Reforms Identified According to Different Criteria

More broadly, compared to indirect methods that would infer major reforms in the area of minimum wage only from changes in OECD variable, our approach: identifies the exact timing of major legislative and regulatory actions; identifies the precise reforms that underpin what otherwise looks like a gradual increase or decrease in OECD minimum wage variable without any obvious break; documents the nature and timing of the legislative and regulatory actions that underpin observed large changes in the OECD minimum wage variable – in cases where the latter are the main, or even the only source of identification of a major reform. It also captures reforms in areas for which OECD indicators do not exist, such as collective bargaining.

These important strengths of the database come with limitations, some conceptual, others practical. On a conceptual level, as transparent as they are, the criteria we apply to identify major reforms are only one amongst several possible options—there is no single, objective way to distinguish between major and minor reforms. Furthermore, we do not distinguish among different major reforms—all of them are treated equally, even though some have likely been more important than others in practice have. Yet two large reforms in a given area (for example, broad and targeted minimum wage reforms) can involve widely different specific actions in practice. Finally, by design, the reform database provides no information regarding the *stance* of minimum wage or collective bargaining regulations.

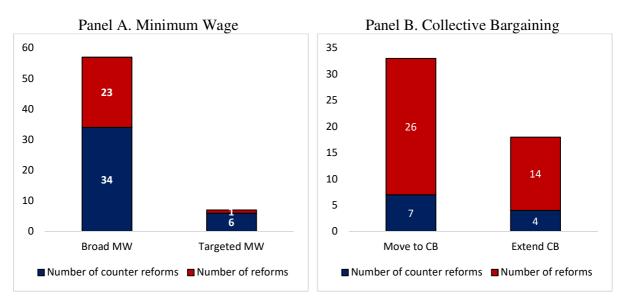
The dataset is preliminary and should be regarded as such. In cases where extensive web search had to be performed to identify the nature of the reforms —primarily in the case of the minimum wage area when changes were not mentioned in any OECD *Economic Survey* and instead were inferred only from a large change in the corresponding OECD minimum wage variable—the quality and accuracy of the information gathered sometimes varied, and in a handful of cases no relevant information could be found altogether at this stage. The focus and quality of the information featured in OECD *Economic Surveys* has also varied across areas, countries and, perhaps most importantly, over the years—typically becoming more detailed over time. This implies that the quality of the current database is likely to be stronger for the recent decades (1990s, 2000s and 2010s) than for older ones (1970s and 1980s).

### 3. A FEW STYLIZED FACTS ON REFORM PATTERNS

All major reforms in the database are documented and cover each of the minimum wage and collective bargaining areas highlighted above. Figures 1–3 present stylized facts on reforms—

that is, decreases in regulation/liberalizing measures—and counter-reforms—that is, increases in regulation/tightening measures.

Major reforms appear to have been more frequent in collective bargaining than in the area of minimum wages in the last decades. Figures 1A and 1B, which provide the total number of reforms and counter-reforms identified in the sample, illustrate this heterogeneity of reforms (and counter-reforms) across the two areas. In the area of minimum wage, major reforms have been most frequently applied in a broader sense. In addition, tightening reforms have been less frequent in collective bargaining than in the minimum wage area over the last five decades; there have been only 11 tightening-reform cases in collective bargaining—that is, less than 10 percent of the total number of major actions, while in minimum wage over 1/3 of the total number of major actions were tightening reforms.



**Figure 1. Number of Major Reforms and Counter-reforms** (26 advanced economies, 1970-2020)

Over time, no clear pattern emerges across any of the two areas covered (Figure 2, Panels A and B).

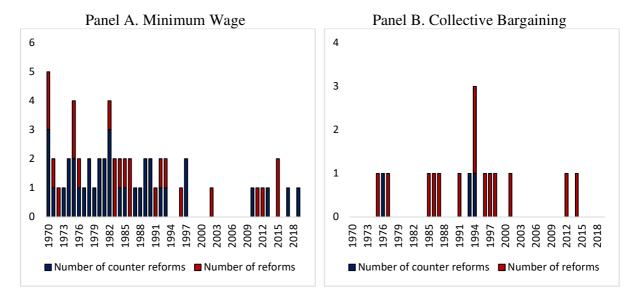


Figure 2. Distribution of Major Reforms and Counter-Reforms across Time (26 advanced economies)

In geographical terms, in the area of minimum wage, southern European countries (e.g. Portugal, Greece, and Spain) took many counter-reforms that are more significant; this is also true outside Europe in the cases of Australia and New Zealand. Concerning collective bargaining, several countries—including southern European—reformed the system (Figure 3, Panels A and B).

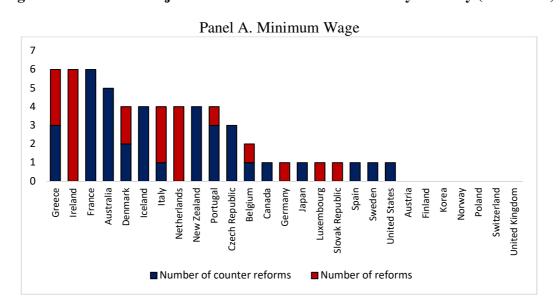
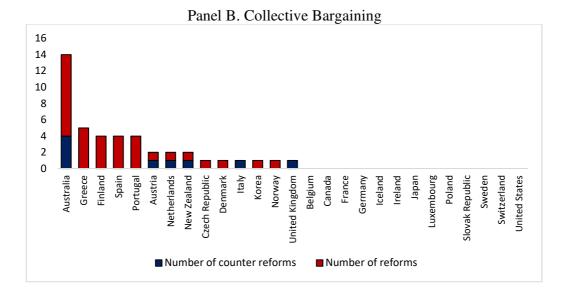


Figure 3. Number of Major Reforms and Counter-reforms by Country (1970-2020)



Finally, while minimum wage reforms have been more frequently implemented during periods of positive economic growth (with differences in sub-categories), the opposite is true for collective bargaining (Table 2). At the same time, recessions being rare events, the frequency of collective bargaining reforms carried out in bad times was actually substantially higher than the frequency of bad times in the sample.

Table 2. Percentage of Reforms by Area in Good and Bad Times

	Good times	Bad times
Minimum Wage	57	43
Broad	59	41
Targeted	0	100
Collective Bargaining	27	73
Move to facilitate firm level bargaining	21	79
Extensions to collective wage agreements	32	68

Source: authors' calculations

Note: good and bad times defined simply as positive and negative real output gaps in a given year, respectively.

### 4. AN EMPIRICAL APPLICATION

As previously discussed, one important advantage of this dataset is the precise identification of major MW and CB reforms and their implementation date. This is particularly valuable in many empirical applications, including assessing the dynamic (short- and medium-term) effects of reforms.

To illustrate the usefulness of the dataset for such empirical analysis, we compare the productivity, investment, employment and unemployment effects of the minimum wage reforms identified in the database with those obtained using: (i) gradual changes in the OECD minimum wage variable; (ii) large jumps in the OECD minimum wage variable, which aim to capture indirectly major reforms.<sup>3</sup>

To empirically evaluate the dynamic effects of these reforms on the four macroeconomic outcomes identified above<sup>4</sup>, we rely on the local projection method of Jordà (2005) to estimate impulse response functions. This approach has been advocated by Auerbach and Gorodnichenko (2013) and Romer and Romer (2019) as a flexible alternative, better suited to estimating a dynamic response—such as, in our context, interactions between reforms and macroeconomic conditions. The baseline specification is:

$$y_{t+k,i} - y_{t-1,i} = \alpha_i + \tau_t + \beta_k R_{i,t} + \boldsymbol{\theta}' \boldsymbol{X}_{i,t} + \varepsilon_{i,t}$$
(1)

in which y is the dependent macroeconomic variable of interest;  $\beta_k$  denotes the (cumulative) response of the variable of interest k years after the reform shock;  $\alpha_i$  and  $\tau_t$  are country and time fixed effects respectively, included to take account for cross-country heterogeneity and global shocks;  $R_{i,t}$  denotes the reform shock;<sup>5</sup> and  $X_{i,t}$  is a vector of control variables including two lags of reform shocks, two lags of real GDP growth and two lags of the relevant dependent variable.

<sup>&</sup>lt;sup>3</sup> To keep comparability with our database, we classify large jumps as those associated with a change in the OECD indicator in the top 5<sup>th</sup> percentile of the sample distribution of annual changes in the indicator.

<sup>&</sup>lt;sup>4</sup> Productivity is obtained as real GDP divided by employment; investment is proxied by real gross fixed capital formation; employment rate refers to the total number of employed people over the entire population; unemployment rate refers to the total number of unemployment over the labor force. These are retrieved from the World Bank World Development Indicators.

<sup>&</sup>lt;sup>5</sup> All pandereform mic shocks featured in our analysis are country-wide shocks.

Equation (1) is estimated using OLS.<sup>6</sup> Impulse response functions (IRFs) are then obtained by plotting the estimated  $\beta_k$  for k = 0, 1, ...6 with 90 (68) percent confidence bands computed using the standard deviations associated with the estimated coefficients  $\beta_k$ —based on robust standard errors clustered at the country level.

We also explore whether initial economic conditions at the time of the reform shock influence its effect on macroeconomic outcomes. We implement this by allowing the response to vary as follows:

$$y_{i,t+k} - y_{i,t-1} = \alpha_i + \tau_i + \beta_k^L F(z_{i,t}) R_{i,t} + \beta_k^H (1 - F(z_{i,t})) R_{i,t} + \theta' X_{i,t} + \varepsilon_{i,t}$$
(2)  
with  $F(z_{it}) = \frac{\exp(-\gamma z_{it})}{1 + \exp(-\gamma z_{it})}, \quad \gamma > 0$ 

in which  $z_{it}$  is an indicator of economic activity (proxied by real GDP growth) normalized to have zero mean and unit variance.<sup>7</sup> The coefficients  $\beta_L^k$  and  $\beta_H^k$  capture the trade impact of reform shocks at each horizon k in cases of recessions ( $F(z_{it}) \approx 1$  when z goes to minus infinity) and expansions  $(1 - F(z_{it}) \approx 1$  when z goes to plus infinity), respectively. We choose  $\gamma = 1.5$ .<sup>8</sup>

As discussed in Auerbach and Gorodnichenko (2012, 2013), the local projection approach to estimating non-linear effects is equivalent to the smooth transition autoregressive (STAR) model developed by Granger and Teräsvirta (1993). The advantage of this approach is twofold. First, compared with a model in which each dependent variable would be interacted with a measure of the business cycle position, it permits a direct test of whether the effect of reforms varies across different regimes such as recessions and expansions. Second, compared with estimating structural vector autoregressions for each regime, it allows the effect of reform shocks to change smoothly between recessions and expansions by considering a continuum of states to compute the impulse response functions, thus making the response more stable and precise.

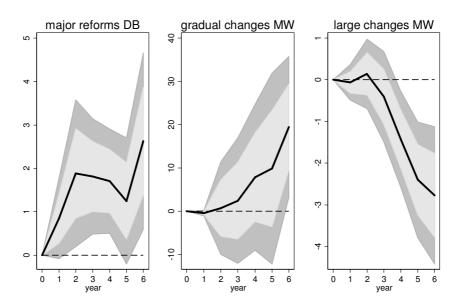
<sup>&</sup>lt;sup>6</sup> Another advantage of the local projection method compared to vector autoregression (autoregressive distributed lag) specifications is that the computation of confidence bands does not require Monte Carlo simulations or asymptotic approximations. One limitation, however, is that confidence bands at longer horizons tend to be wider than those estimated in vector autoregression specifications.

<sup>&</sup>lt;sup>7</sup> The weights assigned to each regime vary between 0 and 1 according to the weighting function F(.), so that  $F(z_{it})$  can be interpreted as the probability of being in a given economic space state, recession or boom.

<sup>&</sup>lt;sup>8</sup> Our results hardly change when using alternative values of the parameter  $\gamma$ , between 1 and 4.

The analysis shows that the minimum wage reforms identified in the dataset have a statistically significant (at the 10 percent level) positive impact on labor productivity (Figure 4, Panel A). The cumulative effect reaches close to 3 percent after 6 years. This result is in line with the one reported by Rizov et al. (2016). In contrast, the estimated short-to-medium-term effect is not statistically significant when using alternatively the gradual change in the OECD's minimum wage variable and it is, in fact, negative and statistically significant when considering a dummy variable that takes value one for a large change in the same variable (Figure 4, Panels B and C).

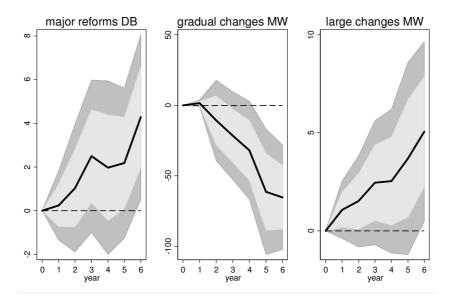
Figure 4. The Average Effect of Major Minimum Wage Reforms on real labor productivity (percent)



Note: x-axis in years; t=0 is the year of the reform shock; t=1 is the first year of impact. Solid black lines denote the response to a reform shock, dark grey area denotes 90 percent confidence bands while light gray area denotes 68 percent confidence bands, based on standard errors clustered at country level.

Moreover, the minimum wage reforms identified in our dataset, result in a positive and statistically significant impact on real gross fixed capital formation (GFCF) while gradual changes have the opposite (that is, a negative) impact (Figure 5, panel A and B). A large change in the indicator at hands also yields a positive effect on GFCF.

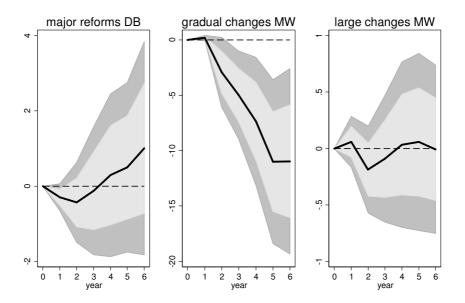
## Figure 5. The Average Effect of Major Minimum Wage Reforms on real gross fixed capital formation (percent)



Note: x-axis in years; t=0 is the year of the reform shock; t=1 is the first year of impact. Solid black lines denote the response to a reform shock, dark grey area denotes 90 percent confidence bands while light gray area denotes 68 percent confidence bands, based on standard errors clustered at country level.

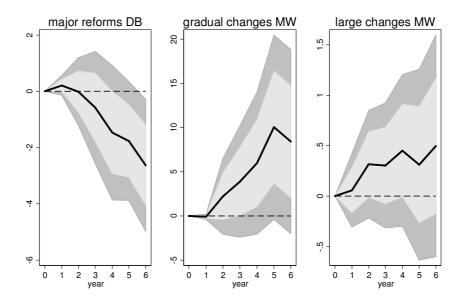
Turning now to the effects on labor market variables, Figure 6 shows the effects of minimum wage reforms on the employment rate while Figure 7 plots the responses of the unemployment rate. We find that the set of reforms identified using our narrative methodology do not seem to statistically affect the employment rate, whereas they lead to a medium-run fall in the unemployment rate (reaching close to -3pp after 6 years). On the other hand, gradual changes have a negative impact on the employment rate (Caliendo et al., 2019, found a similar result for the case of Germany after the introduction of the minimum wage in 2015) and no statistically significant effect on the unemployment rate.

## Figure 6. The Average Effect of Major Minimum Wage Reforms on employment rate (percentage points)



Note: x-axis in years; t=0 is the year of the reform shock; t=1 is the first year of impact. Solid black lines denote the response to a reform shock, dark grey area denotes 90 percent confidence bands while light gray area denotes 68 percent confidence bands, based on standard errors clustered at country level.

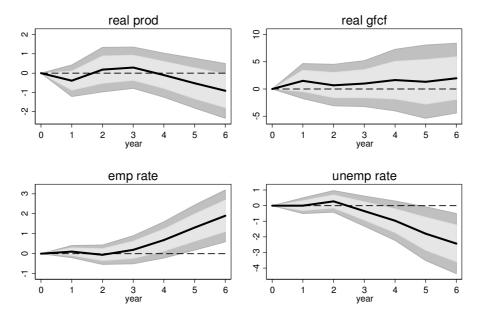
## Figure 7. The Average Effect of Major Minimum Wage Reforms on unemployment rate (percentage points)



Note: x-axis in years; t=0 is the year of the reform shock; t=1 is the first year of impact. Solid black lines denote the response to a reform shock, dark grey area denotes 90 percent confidence bands while light gray area denotes 68 percent confidence bands, based on standard errors clustered at country level.

To complement the previous analysis for which we are able to contrast against a continuous indicator, in the case of collective bargaining one has to limit to a new empirical analysis with no possible comparator. Figure 8 plots the responses of the same set of macroeconomic outcomes inspected before following a major collective bargaining reform narratively identified. While this class of reforms does not seem to impact neither productivity nor capital formation (in a statistically significant manner), it has a clear medium-term effect on the labor market. Specifically, they lead to an increase in the employment rate up to 2pp after 6 years and a fall in the unemployment rate of more than 2pp also after 6 years.

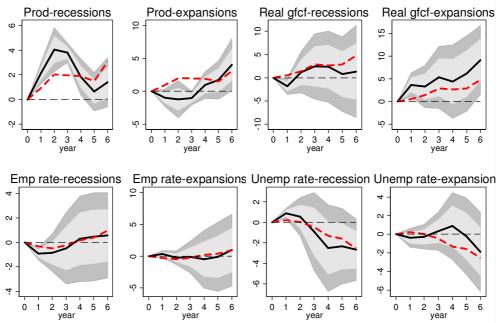
## Figure 8. The Average Effect of Major Collective Bargaining Reforms on macroeconomic outcomes (percent for real variables and pp for rates)



Note: x-axis in years; t=0 is the year of the reform shock; t=1 is the first year of impact. Solid black lines denote the response to a reform shock, dark grey area denotes 90 percent confidence bands while light gray area denotes 68 percent confidence bands, based on standard errors clustered at country level.

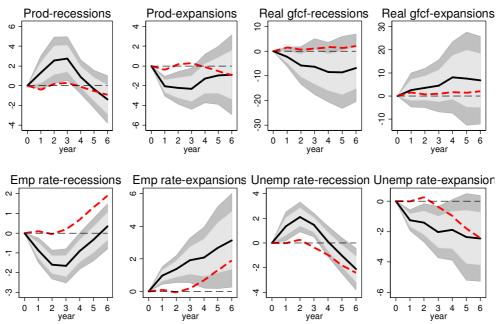
Our final exercise consists in estimating equation (2). Results are plotted in Figures 9 and 10 for minimum wage and collective bargaining reforms, respectively. Major minimum wage reforms have a particularly strong positive effect on productivity during bad times, while the effect is not statistically different from zero in the short-run during boom periods until after 6 or 7 years, when the effect becomes positive but not statistically different from the baseline. In contrast, the prevailing business cycle conditions at the time of these reforms seem to matter for labor market outcomes in the very short run: following reforms, the employment rate drops but then from year 2 it recovers and the statistically significant effect fades away. Mutatis mutandis for the unemployment rate. Turning to the collective bargaining, again the position of the economy in the cycle seems to matter for the responses. We obtain a positive (negative) productivity effect in recessions (expansions). Furthermore, the effect on employment rate (unemployment rate) is strongly negative (positive) and significant during bad times and strongly positive (negative) during good times. Overall, it seems collective bargaining reforms are more sensitivity to the business cycle positioning than are minimum wage reforms.

Figure 9. The Average Effect of Major Minimum Wage Reforms on macroeconomic outcomes: the role of the business cycle (percent for real variables and pp for rates)



Note: x-axis in years; t=0 is the year of the reform shock; t=1 is the first year of impact. Solid black lines denote the response to a reform shock, dark grey area denotes 90 percent confidence bands while light gray area denotes 68 percent confidence bands, based on standard errors clustered at country level. The red line denotes the unconditional baseline result from estimating equation (1).

## Figure 10. The Average Effect of Major Collective Bargaining Reforms on macroeconomic outcomes: the role of the business cycle (%)



Note: x-axis in years; t=0 is the year of the reform shock; t=1 is the first year of impact. Solid black lines denote the response to a reform shock, dark grey area denotes 90 percent confidence bands while light gray area denotes 68 percent confidence bands, based on standard errors clustered at country level. The red line denotes the unconditional baseline result from estimating equation (1).

### 5. CONCLUSION

We contributed to the literature by presenting and describing a new database of major minimum wage and collective bargaining reforms covering 26 advanced economies over the period 1970-2020. The main advantage of our dataset is the precise identification of the nature and date of major reforms, which is valuable in many empirical applications. The dataset does not attempt to measure and compare policy settings across countries, and as such is no substitute for other publicly available continuous indicators produced, for example, by the OECD for minimum wages. Based on the dataset, major changes in minimum wages have been more frequent than in collective bargaining in the last decades, and the majority of these were implemented during the 1980s and 1990s.

In our empirical application, we find that the minimum wage reforms identified in the dataset have a statistically significant (at 10 percent) positive impact on labor productivity over the medium term. These reforms do not seem to statistically affect the employment rate, whereas they lead to a medium-run fall in the unemployment rate. In addition, collective bargaining

reforms do not seem to influence either productivity or capital formation but they have a clear medium-term effect on the labor market.

Furthermore, our results suggest that collective bargaining reforms are more sensitivity to the business cycle positioning of the economy at the time of the reform than are minimum wage reforms.

Finally, the dataset does not attempt to measure and compare policy settings across countries, and as such is no substitute for other publicly available continuous indicators produced, for example, by the OECD for minimum wages. It should also be seen as work in progress, for researchers to build on and improve upon.

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