ON-LINE APPENDIX 2: ADDITIONAL ROBUSTNESS CHECKS

1. Impact of young workers and apprentices

Many countries and sectors differentiate applicable minima according to the employment status and age of individuals. Due to the practical difficulty of identifying reduced rates for apprentices and young workers in all country- and sectoral-level minima included in our database, we have not been able to collect all prevailing sub-rates so that our results might be biased if the incidence of differentiated rates is high or extremely heterogeneous across minimum wage systems; Kaitz indices might be overestimated if reduced rates apply for a substantial part of the labour force.

In order to examine the scope of this issue, we have rerun all regressions after excluding apprentices and workers younger than 18 years from the SILC. While this procedure does not directly measure the impact of reduced rates on indicators such as the Kaitz index, it has the merit of assessing whether our conclusions regarding the rest of the labour force are robust. The regression outputs of this test correspond to model 14f in Table A.2 and models 2d and 4d in Table A.4. In light of the stability of all marginal effects we conclude that the existence of sub-minima for young workers and apprentices does not affect our baseline results. The results for the model with the proportion of workers below prevailing minimum are also very similar with this sensitivity test.

2. Alternative data on collective bargaining coverage

Our data on sectoral collective bargaining coverage stems from the European Company Survey (see Section 3.2). An alternative and widely used reference for information on collective bargaining coverage is Jelle Visser's Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS), a standard benchmark in the literature on labour market institutions that in turn compiles information from various international surveys and country-specific sources (Visser, 2011). The major drawback of the ICTWSS for the question addressed in this paper is that the database only contains the national collective coverage; in contrast to the ECS, it does not allow to account for sector-level heterogeneity in coverage. This means that sectoral-level regressions with the ICTWSS collective bargaining information rely on the assumptions that the proportion workers covered only at the sectoral level does not differ systematically across sectors and countries.

Despite this limitation and due to the ICTWSS's status as standard reference, we have used ICTWSS data corresponding to all country-year observations in our sample in order to test the robustness of our results. A comparison of the collective bargaining coverage in the ICTWSS and the ECS shows that the two are strongly correlated: the highly significant correlation coefficient between the two coverage variables equals 0.60 and means that the ECS variable is on average lower than the ICTWSS. This is not surprising given that the latter contains also bargaining coverage at the company level whereas we defined our ECS variable as including only higher levels of bargaining.

Table A.5 compares the regression results for our preferred specification with the sectoral Kaitz index as dependent variable. In the specification without interaction variable (models 2 and 2e), the marginal effect for the existence of a national statutory minimum wages is smaller when based on the ICTWSS data compared to the baseline model, whereas the size of the marginal effect for collective bargaining coverage is higher and statistically significant. By contrast, in the specifications with interaction variables (models 4 and 4e), the marginal effect for the national minimum wage is larger and significantly negative with the

ICTWSS whereas the interaction and the collective bargaining variable are not significantly different from zero in model 4e.

Table A.2 shows the robustness tests for the specifications with the share of workers below the minimum wage as dependent variable; model 14d corresponds to the regression based on the ICTWSS data for (national) collective bargaining coverage. While the sign and significance of all marginal effects is similar to the baseline specification (model 14), the size of the collective bargaining and the national minimum wage variables are somewhat higher (in absolute value) compared to the specification with sectoral ECS data.

To conclude, the regressions based on the ICTWSS data confirm a negative relationship between the existence of a national statutory minimum wage and the Kaitz index and provide additional evidence for the hypothesis that a higher level of collective bargaining coverage is associated with higher Kaitz indices. By contrast, the ICTWSS data fails to capture the interaction between collective bargaining coverage and the national wage floor. The relationships in our baseline specification with the share of workers with subminimum wages are also confirmed by the alternative regression with ICTWSS data. One should, however, bear in mind that the ICTWSS data does not capture inter-sectoral variation, especially the interaction between the national wage floor and sectoral minimum wage coverage are therefore likely to be misrepresented.

Table A.1: Robustness tests with sector-level Kaitz index as dependent variable, Fractional logit results (marginal effects)

	Model 2	Model 2b	Model 2c	Model 4	Model 4b	Model 4c
	Baseline model	**Sample excluding sectors with Kaitz > 0.9**	**Sample excluding Belgium**	**Baseline model**	**Sample excluding sectors with Kaitz > 0.9**	**Sample excluding Belgium**
	Without interaction term			***With interaction term***		
National minimum wage (NMW)	-0.11***	-0.10***	-0.12***	0.01	0.02	0.01
	(0.01)	(0.01)	(0.01)	(0.03)	(0.03)	(0.03)
Collective bargaining cov. (CBC)	0.03	0.03	0.02	0.18***	0.19***	0.18***
	(0.03)	(0.02)	(0.03)	(0.04)	(0.04)	(0.04)
Interaction NMW*CBC				-0.23***	-0.23***	-0.24***
				(0.05)	(0.05)	(0.05)
Control variables:						
Sex ratio	Yes	Yes	Yes	Yes	Yes	Yes
Part-time ratio	Yes	Yes	Yes	Yes	Yes	Yes
Share of public employment	Yes	Yes	Yes	Yes	Yes	Yes
Age composition	Yes	Yes	Yes	Yes	Yes	Yes
Educational composition	Yes	Yes	Yes	Yes	Yes	Yes
Occupational composition	Yes	Yes	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	520	511	507	520	511	507
Log pseudo-likelihood	-228.7	-225.6	-223.1	-228.3	-225.2	-222.6
Chi-squared statistic (joint significance)	937.1	959.2	891.6	1,013.7	1,002.9	1,021.5
p-value (associated to Chi-squared statistic)	0.00	0.00	0.00	0.00	0.00	0.00

Sources: SILC waves 2008-2010; European Company Survey 2009 for collective bargaining coverage at sector level; WSI Mindestlohndatenbank for statutory minimum wages; authors' calculations. All regressions include NACE 1-digit sectors from 17 European countries. Heteroscedasticity and autocorrelation consistent standard errors are reported between parentheses. Significance levels: * p<0.1, ** p<0.05, ***p<0.01

Table A.2: Robustness tests with sector-level share of workers earning less than 75% of prevailing minimum wages as dependent variable (except in Model 14e where the threshold is set at 85%), Fractional logit results (marginal effects)

	Model 14	Model 14b	Model 14c	Model 14d	Model 14e	Model 14f
	Baseline model	**Sample excluding sector with Kaitz > 0.9**	**Sample excluding Belgium**	**Collective bargaining coverage from ICTWSS**	**Threshold below MW = 85 %**	**Excluding workers aged below 18 years and apprentices**
National minimum wage (NMW)	-0.03***	-0.01	-0.03***	-0.09***	-0.03**	-0.01
	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)
Collective bargaining cov. (CBC)	-0.02**	-0.01*	-0.02**	-0.05***	-0.02**	-0.02***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Interaction NMW*CBC	0.03***	0.02**	0.03***	0.06***	0.02**	0.02***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Kaitz index (KI)	0.13***	0.14***	0.12***	0.12***	0.19***	0.14***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Interaction NMW*KI	0.00	-0.02*	0.00	0.00	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Control variables:						
Sex ratio	Yes	Yes	Yes	Yes	Yes	Yes
Part-time ratio	Yes	Yes	Yes	Yes	Yes	Yes
Share of public employment	Yes	Yes	Yes	Yes	Yes	Yes
Age composition	Yes	Yes	Yes	Yes	Yes	Yes
Educational composition	Yes	Yes	Yes	Yes	Yes	Yes
Occupational composition	Yes	Yes	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	533	511	520	533	533	533
Log pseudo-likelihood	-65.9	-57.2	-63.9	-65.7	-82.0	-61.0
Chi-squared statistic (joint significance)	2,552.4	1,747.8	2,512.2	3,159.3	4,155.2	3,500.6
p-value (associated to Chi-squared statistic)	0.00	0.00	0.00	0.00	0.00	0.00

Sources: SILC waves 2008-2010; European Company Survey 2009 and ICTWSS version 3.0 for collective bargaining coverage at sector level; WSI Mindestlohndatenbank for statutory minimum wages; authors' calculations. All regressions include NACE 1-digit sectors from 17 European countries. Heteroscedasticity and autocorrelation consistent standard errors are reported between parentheses. Significance levels: * p<0.1, ** p<0.05, ***p<0.01.

Table A.3: Robustness tests with sector-level employment spike as dependent variable, Fractional logit results (marginal effects)

	Model 7	Model 7b	Model 9	Model 9b
Dependent variable = share of workers receiving wages in the interval of:	**+/- 5 percent around the minimum wage ≡ Baseline model**	**+/- 1 percent around the minimum wage**	**+/- 5 percent around the minimum wage ≡ Baseline model**	**+/- 1 percent around the minimum wage**
National minimum wage (NMW)	0.01***	0.01***	-0.02	0.00
	(0.00)	(0.00)	(0.01)	(0.00)
Collective bargaining cov. (CBC)	-0.00	0.00	0.01	0.00
	(0.01)	(0.00)	(0.01)	(0.00)
Interaction NMW*CBC			-0.03***	-0.00
			(0.01)	(0.01)
Kaitz index (KI)	0.11***	0.03***	0.08***	0.02***
	(0.01)	(0.00)	(0.01)	(0.00)
Interaction NMW*KI			0.06***	0.01***
			(0.01)	(0.00)
Control variables:				
Sex ratio	Yes	Yes	Yes	Yes
Part-time ratio	Yes	Yes	Yes	Yes
Share of public employment	Yes	Yes	Yes	Yes
Age composition	Yes	Yes	Yes	Yes
Educational composition	Yes	Yes	Yes	Yes
Occupational composition	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Observations	533	533	533	533
Log pseudo-likelihood	-64.3	-22.4	-64.1	-22.3
Chi-squared statistic (joint significance)	959.4	358.6	1,256.0	395.2
p-value (associated to Chi-squared statistic)	0.00	0.00	0.00	0.00

Sources: SILC waves 2008-2010; European Company Survey 2009 and ICTWSS version 3.0 for collective bargaining coverage at sector level; WSI Mindestlohndatenbank for statutory minimum wages; authors' calculations. All regressions include NACE 1-digit sectors from 17 European countries. Heteroscedasticity and autocorrelation consistent standard errors are reported between parentheses. Significance levels: * p<0.1, ** p<0.05, ***p<0.01.

Table A.4: Robustness tests with sector-level Kaitz index as dependent variable, Fractional logit results (marginal effects)

	Model 2	Model 2d	Model 4	Model 4d
	Full sample	**Excluding workers aged below 18 years and apprentices**	**Full sample**	**Excluding workers aged below 18 years and apprentices**
	Without interaction term		***With interaction term***	
National minimum wage (NMW)	-0.11***	-0.10***	0.01	0.03
	(0.01)	(0.01)	(0.03)	(0.03)
Collective bargaining cov. (CBC)	0.03	0.04	0.18***	0.21***
	(0.03)	(0.03)	(0.04)	(0.04)
Interaction NMW*CBC			-0.23***	-0.26***
			(0.05)	(0.05)
Control variables:				
Sex ratio	Yes	Yes	Yes	Yes
Part-time ratio	Yes	Yes	Yes	Yes
Share of public employment	Yes	Yes	Yes	Yes
Age composition	Yes	Yes	Yes	Yes
Educational composition	Yes	Yes	Yes	Yes
Occupational composition	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Observations	520	520	520	520
Log pseudo-likelihood	-228.7	-229.3	-228.3	-228.7
Chi-squared statistic (joint significance)	937.1	858.8	1013.7	935.0
p-value (associated to Chi-squared statistic)	0.00	0.00	0.00	0.00

Sources: SILC waves 2008-2010; European Company Survey 2009 and ICTWSS version 3.0 for collective bargaining coverage at sector level; WSI Mindestlohndatenbank for statutory minimum wages; authors' calculations. All regressions include NACE 1-digit sectors from 17 European countries. Heteroscedasticity and autocorrelation consistent standard errors are reported between parentheses. Significance levels: * p<0.1, ** p<0.05, ***p<0.01.

Table A.5: Robustness tests with sector-level Kaitz index as dependent variable, Fractional logit results (marginal effects)

	Model 2	Model 2e	Model 4	Model 4e
	Collective bargaining coverage from ECS	**Collective bargaining coverage from ICTWSS**	**Collective bargaining coverage from ECS**	**Collective bargaining coverage from ICTWSS**
	Without interaction term		***With interaction term***	
National minimum wage (NMW)	-0.11***	-0.06***	0.01	-0.20***
	(0.01)	(0.02)	(0.03)	(0.06)
Collective bargaining cov. (CBC)	0.03	0.18***	0.18***	0.03
	(0.03)	(0.03)	(0.04)	(0.08)
Interaction NMW*CBC			-0.23***	0.10
			(0.05)	(0.09)
Control variables:				
Sex ratio	Yes	Yes	Yes	Yes
Part-time ratio	Yes	Yes	Yes	Yes
Share of public employment	Yes	Yes	Yes	Yes
Age composition	Yes	Yes	Yes	Yes
Educational composition	Yes	Yes	Yes	Yes
Occupational composition	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Observations	520	520	520	520
Log pseudo-likelihood	-228.7	-227.9	-228.3	-227.8
Chi-squared statistic (joint significance)	937.1	1,115.6	1013.7	1,161.1
p-value (associated to Chi-squared statistic)	0.00	0.00	0.00	0.00

Sources: SILC waves 2008-2010; European Company Survey 2009 and ICTWSS version 3.0 for collective bargaining coverage at sector level; WSI Mindestlohndatenbank for statutory minimum wages; authors' calculations. All regressions include NACE 1-digit sectors from 17 European countries. Heteroscedasticity and autocorrelation consistent standard errors are reported between parentheses. Significance levels: * p<0.1, ** p<0.05, ***p<0.01.