

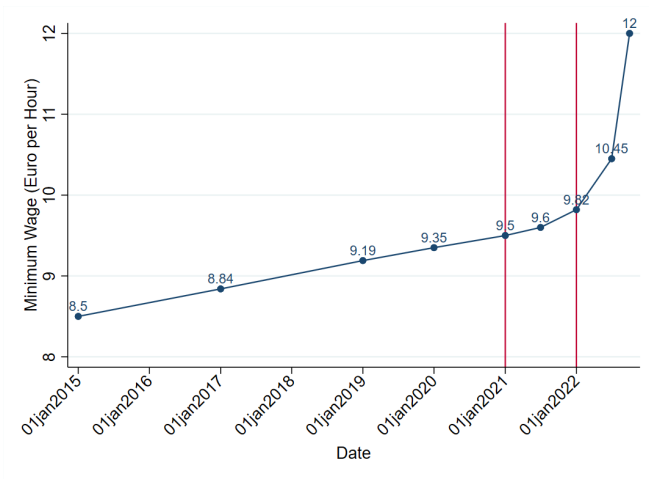
# Revealing Dynamics: The Impact of Minimum Wage on Inequality Within Germany's Regions

Mariya Afonina

Department of Business Administration and Economics, Bielefeld University  
Leibniz ScienceCampus SOEP RegioHub: RegioEcon

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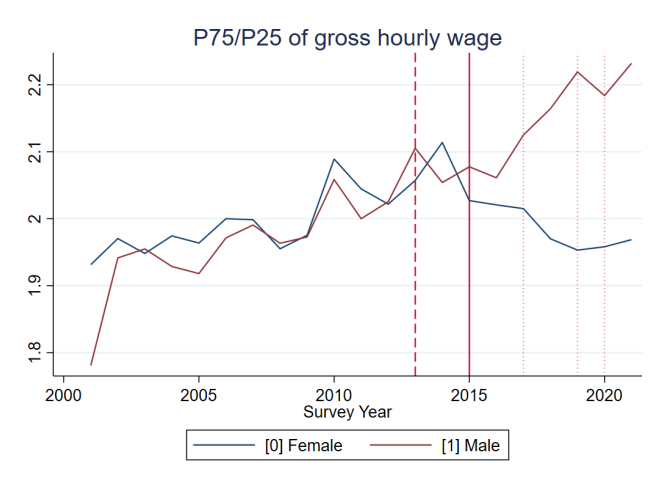
# Minimum wage in Germany



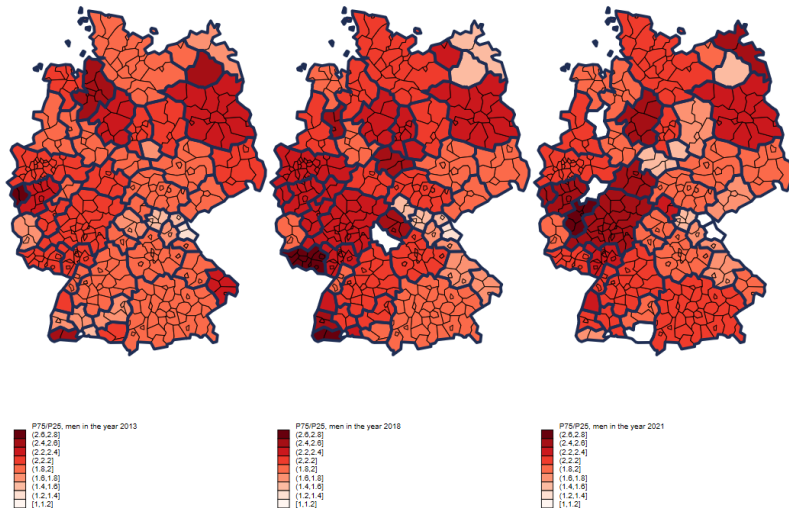
**Figure:** Development of the minimum hourly wage;

*Source: based on data from Destatis*

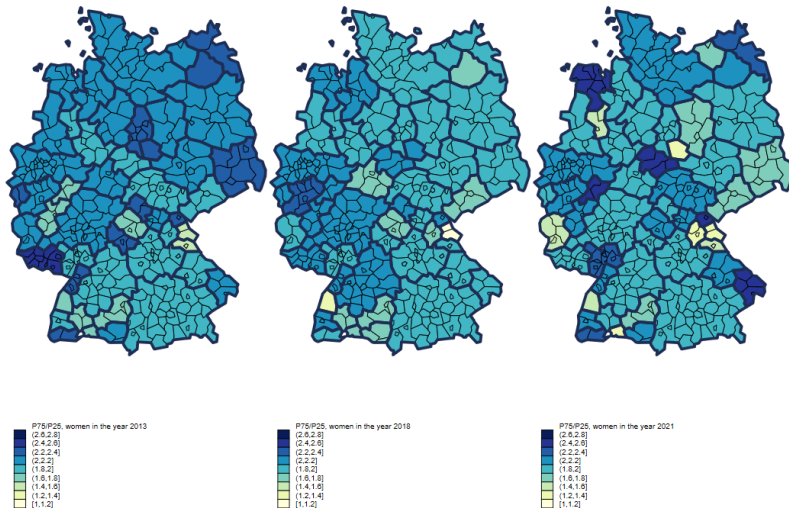
# Wage inequality within sex



# Wage inequality: men in 2013, 2018, and 2021



# Wage inequality: women in 2013, 2018, and 2021



# Literature Review

**A large body** of controversial **literature** on minimum wage effects...

A great focus on **(un-)employment effects**, see, e.g., Holtemöller and Pohle (2020), Friedrich (2019), Schmitz (2017), Caliendo, Wittbrodt, and Schröder (2019), and Bruttel, Baumann, and Dütsch (2018)

**Wage distribution:** Bossler and Schank (2023), Rattenhuber (2014), and Dustmann et al. (2022)

**Spillovers** to the other parts of the wage distribution: Gopalan et al. (2020), Rattenhuber (2014), Fortin, Lemieux, and Lloyd (2021), and Gregory and Zierahn (2022)

# Literature Review (cont'd)

..but **scarce** evidence on **regional differences**, **gender wage gap**, and **inequality** aspects

**Gender wage gap** studies: women's wages rose directly after the reform, while men's with a some delay (Burauel et al. 2017; Bachmann et al. 2022); different effects in the different parts of distribution (Caliendo and Wittbrodt 2022)

**Regional effects:** Ahlfeldt, Roth, and Seidel (2018) find spatial inequality convergence; Bonin et al. (2020) studied effects on regional (un-)employment

**Inequality:** Backhaus and Müller (2023) found no effects on inequality reduction in HH income; Bossler and Schank (2023) found a significant reduction in wage inequality in terms of monthly wages

# Data

## Datasets

- German Socio-Economic Panel (SOEP), v.38 - up to the year 2021
- Indicators and maps of spatial and urban development (INKAR) - currently up to the year 2020

## Treatment assignment

Regional level (LLMAs) vs individual change of wages

# Defining Local Labour Market Areas

## Functional vs Administrative LLMAAs

Following Kropp and Schwengler (2016) (IAB):

- Maximizing commuting within regions
- Minimizing commuting between regions
- Stability of the NUTS3 attributions
- Results in **50 functional LLMAAs**, homogeneous in terms of population

# Minimum wage “bite”

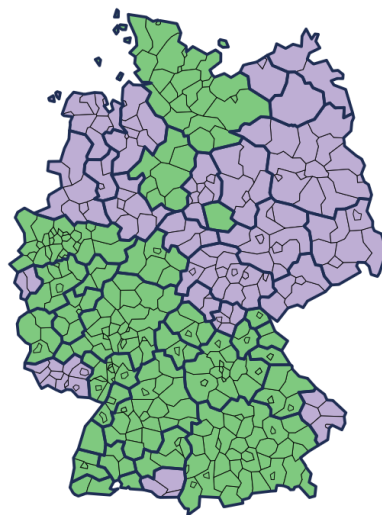
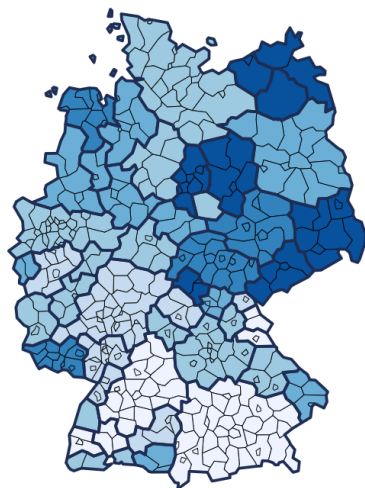
**Current definition** (per Caliendo et al. 2023):

$$Bite_{rtg} = \frac{a_{rtg} - \bar{a}_{tg}}{\hat{\sigma}(a_{tg})}$$

where  $a_{rtg}$  is a share of respondents with gross hourly income below 8.5 Euro in a region  $r$  at time  $t$  over subgroup  $g$

⇒ A region is considered treated, if the normalized bite is greater than 0.

# Treatment definition: minimum wage “bite”



# Methods

## Difference-in-Difference approach

- ① on the LLMA's level - DiD-R
- ② on the individual level - DiD-I

SOEP allows to define both + different types of hours: contracted and actual

# Regression Equations: DiD-R I

## Total effect:

$$\ln(Y_{rgt}) = \beta_1(\text{Bite}_{rg}^{2013} \times \mathbb{1}\{t = 2015 - 2021\}) + \mu X_{rgt} + \\ + \sum_{y=2012, y \neq 2014}^{2021} \theta_y \times \mathbb{1}\{t = y\} + c_r + u_{rt},$$

$Y_{rt}$  - inequality measure for region  $r$  at time  $t$

$\beta_1$  - treatment coefficient

$X_{rt}$  - a set of time-varying control variables for demographic and labour market conditions in a region, such as average # of children below 16 years of age in a HH, average # of working adults in a HH, average years of education in a region, share of men, share of migrants, share of the full-time employees, share of small and large firms in a region; share of industries by NACE.

$\mathbb{1}$  is an indicator variable for a year

$c_r$  is regional fixed effects and  $u_{rt}$  is an error term

# Regression Equations: DiD-R II

Short-mid-long(er) term effect:

$$\begin{aligned} \ln(Y_{rgt}) = & \beta^{2015} (\text{Bite}_{rg}^{2013} \times \mathbb{1}\{t = 2015\}) + \\ & + \beta^{2016-2018} (\text{Bite}_{rg}^{2013} \times \mathbb{1}\{t = 2016 - 2018\}) + \\ & + \beta^{2019-2021} (\text{Bite}_{rg}^{2013} \times \mathbb{1}\{t = 2019 - 2021\}) + \\ & + \mu X_{rgt} + \sum_{y=2012, y \neq 2014}^{2021} \theta_y \times \mathbb{1}\{t = y\} + c_r + u_{rt} \end{aligned}$$

Dynamic setup:

$$\begin{aligned} \ln(Y_{rgt}) = & \sum_{y=2015}^{2021} \beta^y (\text{Bite}_{rg}^{2013} \times \mathbb{1}\{t = y\}) + \\ & + \mu X_{rgt} + \sum_{y=2012, y \neq 2014}^{2021} \theta_y \times \mathbb{1}\{t = y\} + c_r + u_{rt} \end{aligned}$$

# Results: Overall

**Table:** *Aggregated effects of the minimum wage introduction on within-region inequality on LLMA level*

	P75/P25	P90/P10	P25/P10	Std. dev
Bite2013 # Post-treatment years	-0.029 (0.023)	-0.117*** (0.036)	-0.070** (0.029)	0.016 (0.023)
Observations	449	449	449	449
Parallel trends p-value	0.414	0.995	0.323	0.006
Granger causality p-value	0.416	0.981	0.319	0.006

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ ; Control variables are included as aggregated information on the LLMA level: general hh composition, labour market conditions, average respondents' characteristics

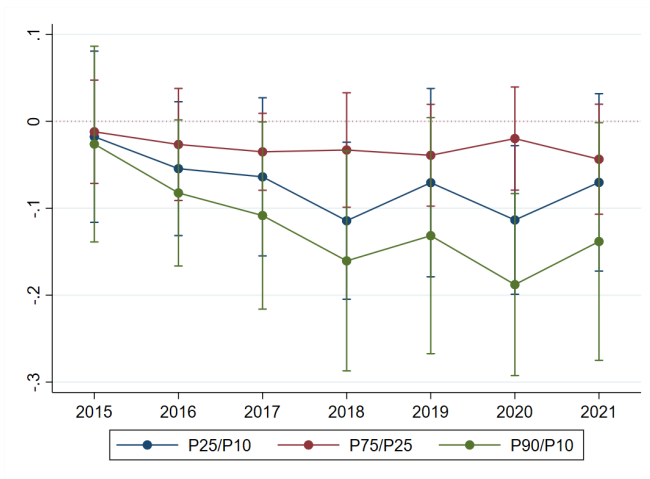
# Results: disaggregated by sex

**Table:** Effects of the minimum wage introduction on within-region inequality on LLM level

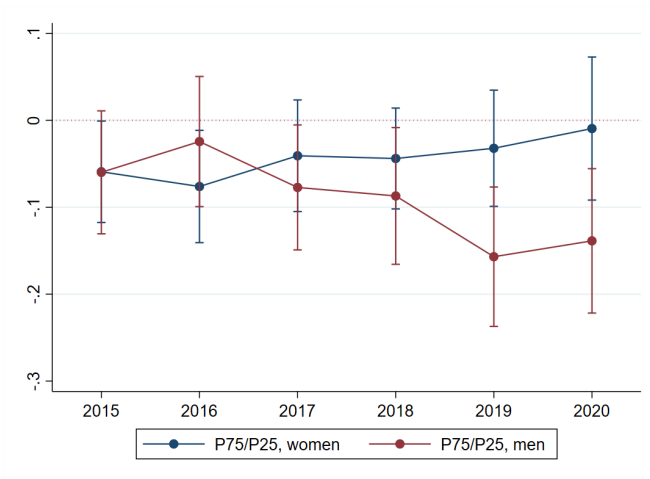
	P75/P25	P90/P10	P25/P10	Std. dev
<b>Panel A: LLMA effects, women</b>				
Bite2013 (women) # Post-treatment years	-0.045* (0.023)	-0.059 (0.038)	-0.044 (0.032)	0.090*** (0.031)
Observations	400	400	400	400
Parallel trends p-value	0.048	0.393	0.441	0.025
Granger causality p-value	0.047	0.395	0.441	0.025
<b>Panel B: LLMA effects, men</b>				
Bite2013 (men) # Post-treatment years	-0.089*** (0.028)	-0.156** (0.072)	-0.018 (0.052)	-0.039 (0.029)
Observations	400	399	399	400
Parallel trends p-value	0.445	0.684	0.163	0.685
Granger causality p-value	0.419	0.709	0.166	0.708

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ ; Control variables are included as aggregated information on the LLMA level: general hh composition, labour market conditions, average respondents' characteristics. All variables are aggregated at the subgroup level

# Time perspective: overall



# Time perspective: sex



# Conclusion


With the help of the **DiD** on the **functional LLMA level** it has been established that


- **Overall, the policy has reduced inequality** between top and bottom deciles of the within-region wage distribution by 11%
- However, at **the bottom** of the wage distribution the effects are less pronounced
- Most of the effects are **driven** by the change of inequality for **men**, which aligns with the regional pattern of the inequity evolution


# Thank you for attention!


Your questions are welcome!


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