# The Effect of Minimum Wages on Teenagers' Education Decisions

# Florian Wozny (IZA Bonn)

#### **SUMMARY**

- Effect of a minimum wage introduction on early school leaving in England and Wales
- Idea: opportunity costs of schooling increases stronger in low income regions
- Difference-in-difference-in-differences strategy that exploits early school leaving between different income regions
- Longitude data is partly substituted by cross-sectional data
- Result: increases in early school leaving were higher in low income regions

#### (2) LEGAL FRAMEWORK

- Minimum wage started on 1. April 1999 for everybody who had reached legal age (3.6£ aged 21 and above; 3.0£ aged 21-18)
- Compulsory schooling ended at the age of 16 years
- School year ended in July

### (3) CONCEPTUAL FRAMEWORK

- Crucial assumption: monopsonistic labor market
- Marginal lifetime return on schooling:  $b/r = \frac{\partial F(S,A,D)}{\partial S}/r$ ,
- marginal costs of one additional school year: c = y(S, A, D); S: schooling, A: ability, D: relative demand for labor
- Minimum wage induces early school leaving if:

$$\underline{Y}^*S'(\underline{Y},A,D) > \int_{S'}^{S^*} f\left(\frac{\partial F(S,A,D)}{\partial S}/r\right) dx - \int_{S'}^{S^*} f\left(y(S,A,D)\right) dx$$



# (4) DATA

- Ninth Youth Cohort Study, panel of youths aged 16 onwards, living in England and Wales
  - Includes: residence at NUTS-3 level, monthly activity status, age, sex, ethnicity, 22,498 individuals, after resampling process: 1,489 individuals

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- **Regional Accounts Data** 
  - regional disposable household income per head, degree of urbanization
- UK Labor Force Survey

1.after

1.treat

1.after#c.median

1.treat#c.median

1.after#1.treat

level 3

employment

not white

women

baseline

Observations

Number of individuals

geo

1.after#1.treat#c.median

- employment rate, highest educational attainment at NUTS-3 level





ratio
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0.795

(0.114)

1.203\*\*\*

(0.121)

0.811

(0.169)

0.816\*

(0.0875)

0.933

(0.181)

0.966

(0.145)

1.559\*\*\*

(0.237)

1.266\*\*\*

(0.09762)

0.905\*\*\*

(0.1354)

1.150\*\*\*

(0.4201)

0.989\*\*

(0.222)

1.058

(0.113)

9.714\*\*\*

(2.449)

22,561

1,489

Source: Office for National Statistics

6	) IDENTIFICATION
•	Diff-in-Diff comparing changes in the probability of being en- rolled for 17 and 18 year olds before and after minimum wage
•	Issue: differences between 17 and 18 year olds (graduation, legal obstacles, social norms)
•	Diff-in-Diff-in-Diff measures differences in the differences be- tween entitled and unentitled individuals in the probability of

Controlling for regional employment, urbanization, education

 $logit(enroll) = \ln\left(\frac{p(enroll=1)}{1-p(enroll=1)}\right)$ 

enrollment between income regions

 $= \beta_0 + \beta_1 treat + \beta_2 after + \beta_3 median + \beta_4 treat \times after$  $+ \beta_5 treat \times median + \beta_6 after \times median + \beta_7 after \times treat$  $\times$  median +  $\beta_8$ level3 +  $\beta_9$ employment +  $\beta_{10}$ geo +  $\beta_{11}$ women  $+ \beta_{12}$ not white  $+ \varepsilon$ 

## 9 REGIONAL INCOME DIFFERENCES **IN GERMANY IN 2012**







Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# 8 FURTHER RESEARCH: **APPLICABLE FOR GERMANY?**

- Minimum wage starts at the age of 18 years
- Compulsory schooling depends on federal state, normally until the age of 18 years
- Thus, no control group which is free in enrollment decision but unaffected by minimum wage
- Enrollment of 18 year olds in 2013/2014 and 2014/2015 may be affected by unobservable variables
- However, high regional income differences •

Source: Statistische Ämter des Bundes und der Länder

15,782 - 18,171 € 18,172 - 19,898 € 19,899 - 21-048 € 21,049 - 22,256 € 22,257 - 39,524€

#### (III) TWO POSSIBLE APPROACHES

- Diff-in-Diff using regional income as continuous treatment variable for individuals who are at least 18 years old after the minimum wage introduction
- works if high income regions are unaffected by the minimum wage, in need of monopsonistic competition
- Diff-in-Diff-in-Diff with two cohorts of 18 year olds, 2013/2014 (untreated) and 2014/2015 (treated) and regional income as continuous variable
  - Even works if high income regions are affected, regional income has to be independent of time varying unobservable, in need of monopsonistic competition.