

THE MINIMUM WAGE IN THE GERMAN ROOFING SECTOR – AN EVALUATION WITH THE SYNTHETIC CONTROL METHOD

Rahel Felder

RWI and RUB

Introduction

Contextual Setting

- Negotiation of minimum wages at the sectoral level
- Sectors with and w/o legally binding minimum wages

Previous Research

- DiD studies on effects of sectoral minimum wages in Germany have contradictory results

This study

- Application of Synthetic Control Method (SCM) to evaluate employment effects of the minimum wage introduction in 1997 to the roofing sector

Research Questions

- Are employment effects of the minimum wage in the roofing sector negative?
- Is SCM best practice in estimating effects of sectoral minimum wages in Germany?

Data

Sample of Integrated Labour Market Biographies (SIAB)

- Administrative linked employer and employee data set
- Based on a representative 2 % sample of all employees in Germany

Synthetic Control Method

General Features

- Treatment effects on the aggregate level
- Choice of control group rests on data-driven procedure

A Synthetic Control Group is ...

- a linear combination of potential comparison groups that mirrors most closely the pre-treatment outcomes of the treated group.
- determined in the pre-treatment period by:

$$\min_{W(V)} \sum_{m=1}^k v_m (X_{1m} - X_{0m} W)^2$$

$$\text{s.t. } w_j \geq 0 \text{ and } \sum_{j=2}^{J+1} w_j = 1$$

- used as counterfactual to establish the treatment effect by:

$$\tau_{1t} = Y_{1t} - \sum_{j=2}^{J+1} w_j Y_{jt} \quad \forall t > \text{treatment period}$$

X_{1m} : predictors of treated unit

X_{0m} : (1×J) vector with predictors of untreated units

W : (J×1) vector of weights for each untreated unit

Significance Testing by Placebo Tests:

- Reassignment of treatment to untreated sectors
- If actual treatment outweighs the placebo treatments, the effect is judged to be significant

Empirical Specification

- Treatment: Introduction of the minimum wage in the German roofing sector in 1997
- Predictor set:
 - ▶ 5 lags of the employment stock (1993-1997)
 - ▶ 3 sectoral labour market characteristics averaged over pre-treatment time (share of male, of medium skilled and of prime aged workers)
 - ▶ 1 measure for sectoral firm structure (share of small sized firms)
- Donor pool (j>1):
 - ▶ Subsectors of the construction sector
 - ▶ Additionally upstream sectors

Results

Predictor Set by Donor Pool for East Germany

Variables	Real	Synthetic I	Synthetic II
Percent male	91.84	85.78	86.61
Percent medium skilled	58.03	60.34	59.91
Percent prime aged	69.69	67.83	73.53
Percent of small sized firms	69.89	44.84	47.42
Employment 1993	31 150	36 394	34 082
Employment 1994	36 050	40 592	38 156
Employment 1995	40 250	40 343	39 752
Employment 1996	42 300	38 631	38 526
Employment 1997	41 400	34 696	39 701
RMSPE		4 616.09	2 465.98

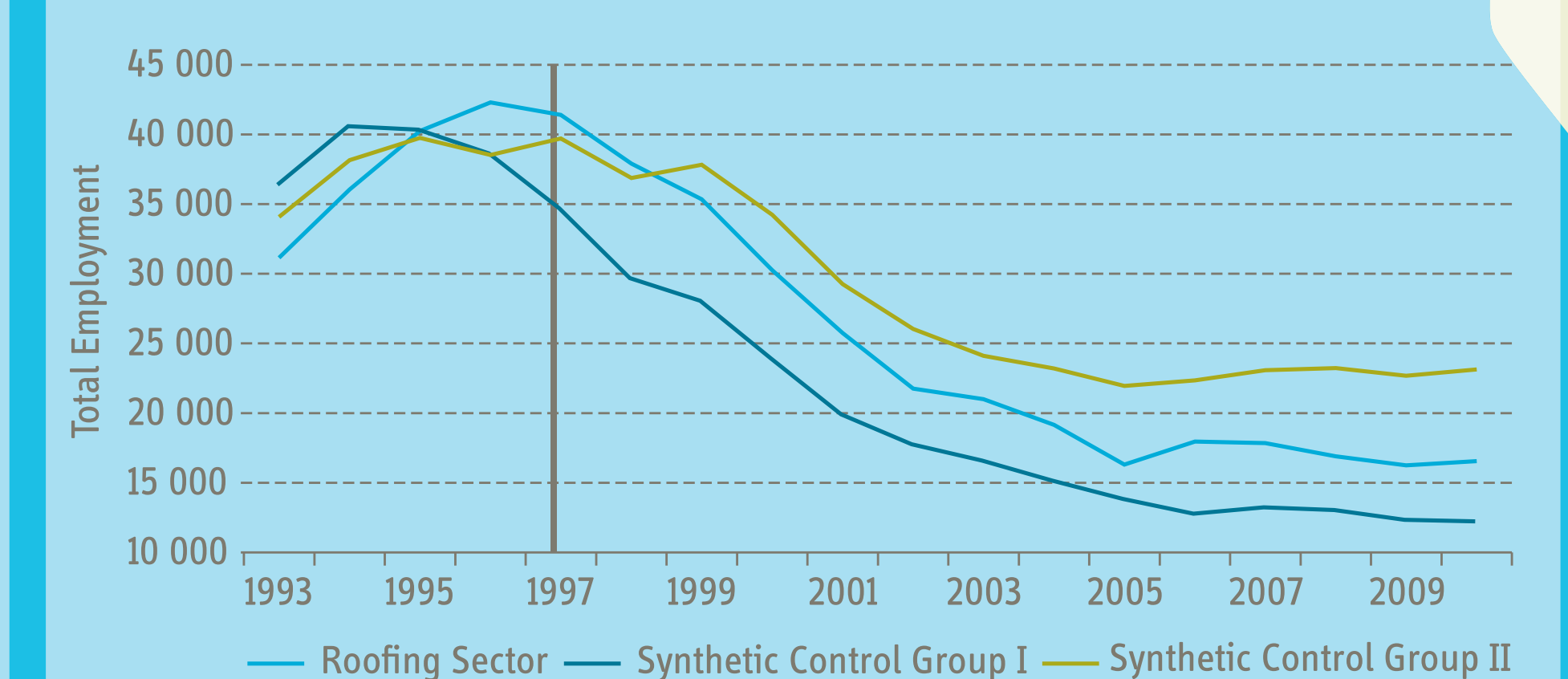
Predictor Set by Donor Pool for West Germany

Variables	Real	Synthetic I	Synthetic II
Percent male	91.13	82.11	83.65
Percent medium skilled	49.69	51.47	37.75
Percent prime aged	73.36	68.20	76.27
Percent of small sized firms	55.63	42.98	42.26
Employment 1993	62 300	61 856	62 508
Employment 1994	62 850	62 275	62 728
Employment 1995	63 800	62 966	63 589
Employment 1996	59 850	61 819	60 429
Employment 1997	60 300	60 312	60 098
RMSPE		1 009.61	304.81

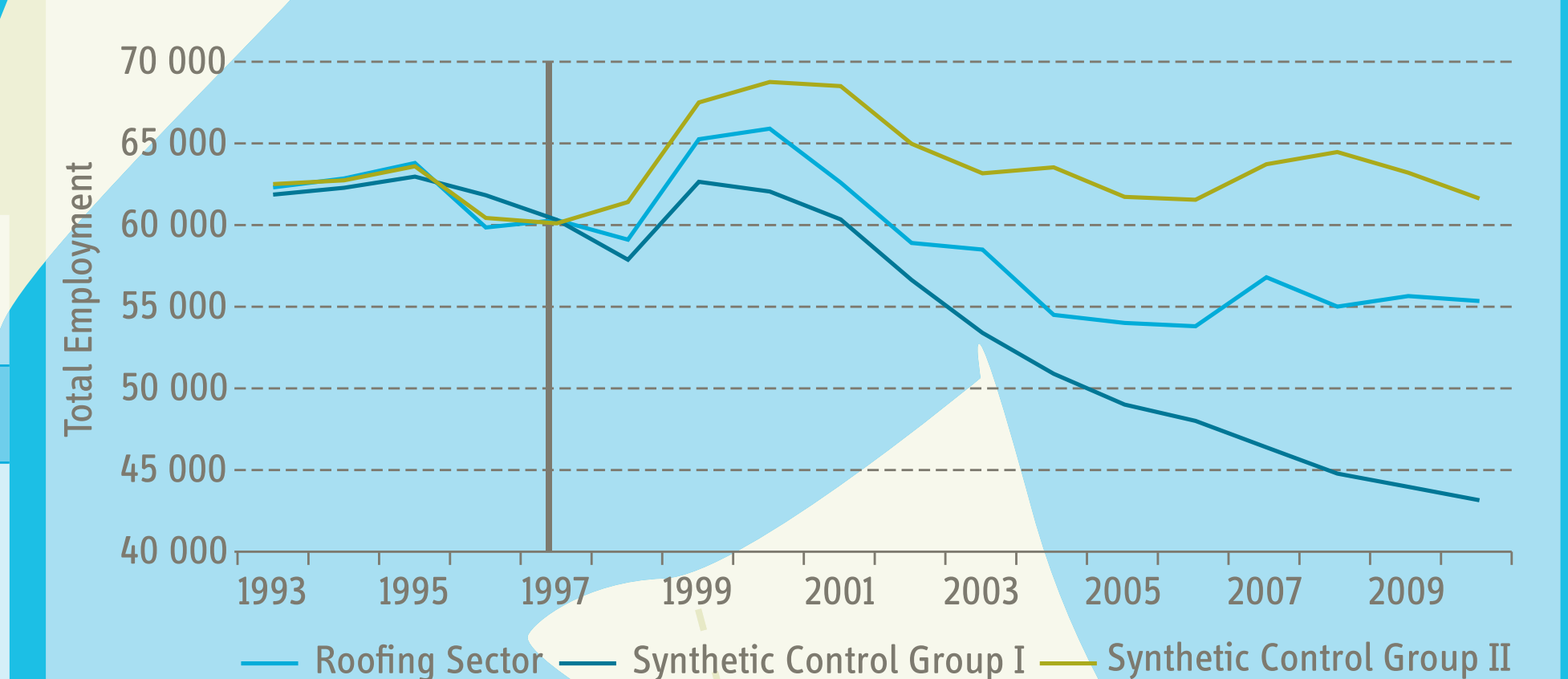
Donor Weights by Donor Pool

Region	East Germany		West Germany	
	I	II	I	II
Plumbing	0.62	0.31	0.56	0
Glazing	0	0	0.44	0
Stove maker	0.38	0	0	0
Manufacture of builders' carpentry, joinery		0.69		0.19
Manufacture of plastics		0		0.40
Locksmithery, welding, grinding		0		0.34
Sawmilling, planing of wood		0		0
Manufacture of sheet metal products		0		0
Manufacture of ceramics, tiles, and tiled stoves		0		0
Manufacture of steel tube furniture		0		0
Manufacture of metal small-wares		0		0.06
Manufacture of stoneware, pottery		0		0
Manufacture of plywood, particle board		0		0
Custom steel forming		0		0
Manufacture of heating, cooking equipments		0		0
Manufacture of general hardware		0		0
Manufacture of woodturned products and basketry		0		0

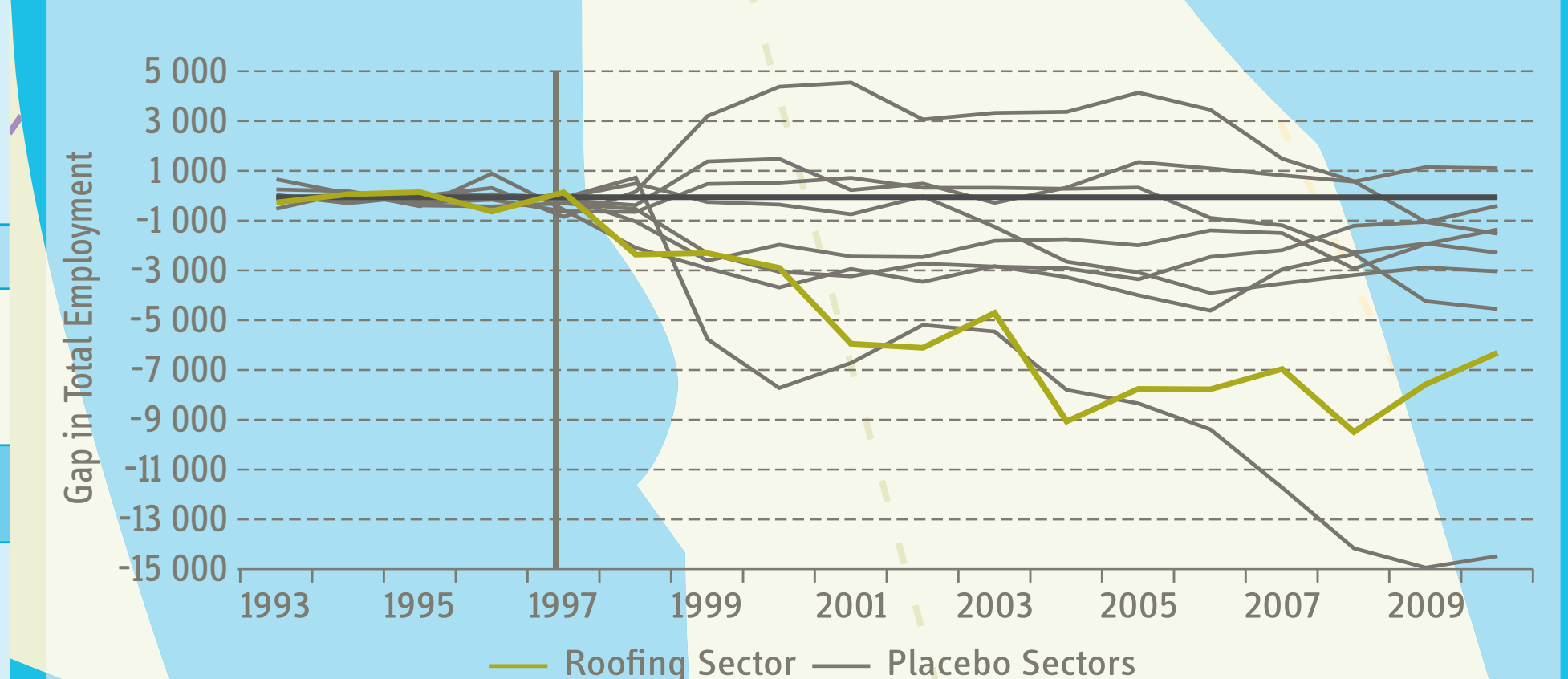
Effects on Employment: East Germany



Effects on Employment: West Germany



Placebo Test: West Germany



Conclusions

- West German roofing sector: SCM analysis suggests negative employment effects of the minimum wage.
- East German roofing sector: SCM fails to produce an acceptable and convincing counterfactual.
- SCM estimates are robust to the choice of predictors, but very sensitive to the choice of the donor pool.
- General trade-off: prediction fit versus interpolation bias.
- Results amplify weaknesses of SCM; method should be applied using specification tests.
- SCM only produces reliable estimates under certain circumstances; might not always be applicable at the sectoral level.

References

- Abadie, A., Diamond, A. and Hainmueller, J. (2010), 'Synthetic control methods for comparative case studies: Estimating the effect of California's tobacco control program', *Journal of the American Statistical Association* 105(490), 493–505.
- Abadie, A. and Gardeazabal, J. (2003), 'The economic costs of conflict: A case study of the Basque country', *American Economic Review* 93(1), 113–132.
- Aretz, B., Arntz, M. and Gregory, T. (2013), 'The minimum wage affects them all: Evidence on employment spillovers in the roofing sector', *German Economic Review* 14(3), 282–315.

Contact:

Rahel Felder, Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI), rahel.felder@rwi-essen.de

Acknowledgements:

I thank the ZEW for the support during the period in which this study was initialized.