Technology, labour market change and fertility

Anna Matysiak

Faculty of Economic Sciences
University of Warsaw

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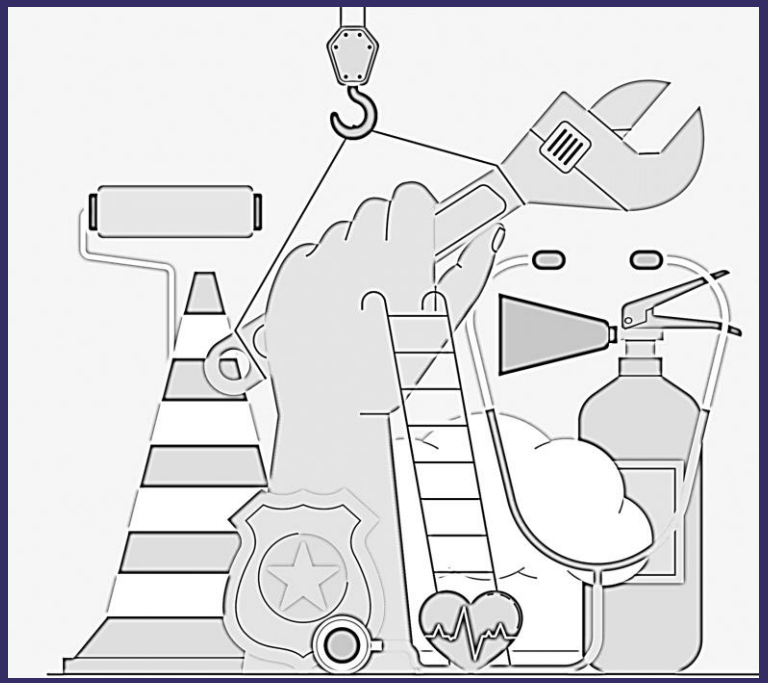
LABOUR MARKET



income

independence

empowerment

dignity

meaning in life

self-accomplishement

personal growth

innovation & development

economic growth

redistribution

social contacts

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Technology and the labour market

AUTOMATION

WORK AUTONOMY

how? how much?

who? where? when?

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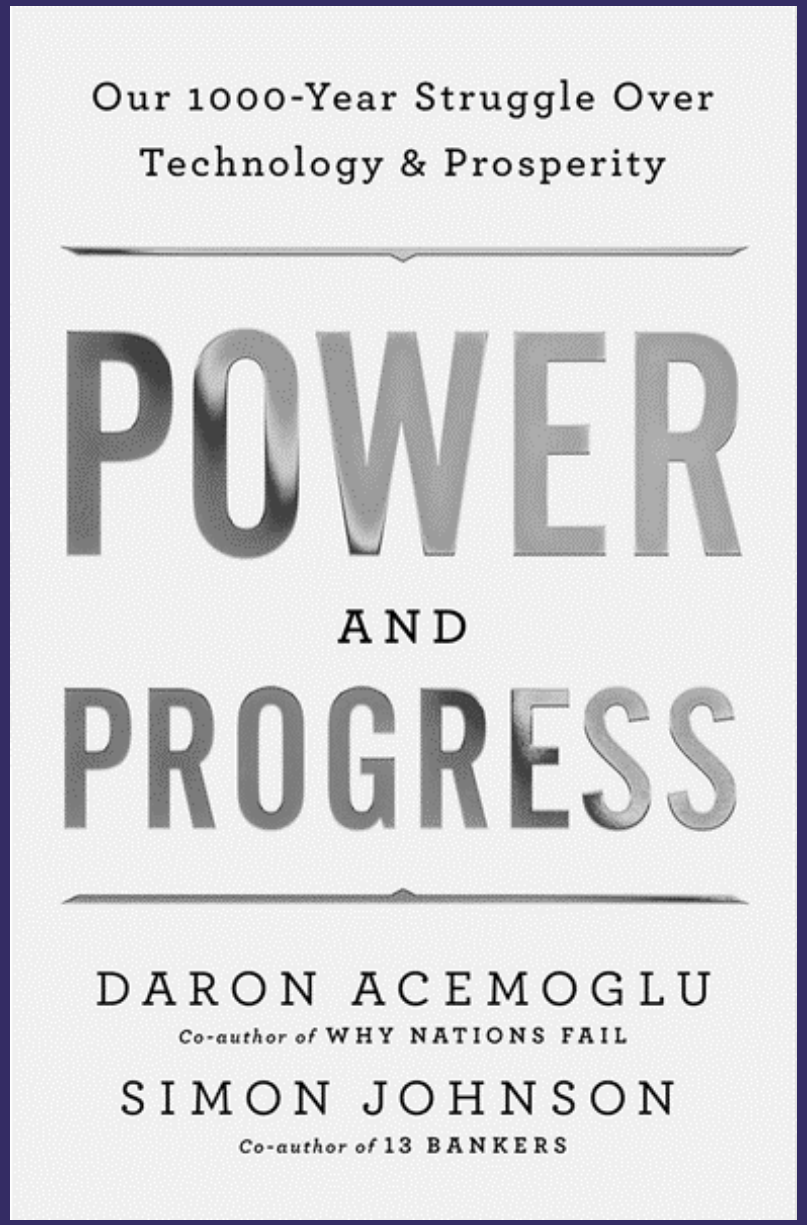

- Technological innovations facilitate development but may lead to substantial social inequalities

- Labour augmenting or displacing
  - Marginal productivity of workers
  - Institutions

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Labour augmenting effects

Labour augmenting effects

complementing human labour

↓

marginal productivity of workers ↑

↓

output ↑

↓

labour demand & wages ↑

Electric assembly line

- Reduction in production time and costs
- Production tripled
- Larger demand for lower skilled workers
- Working hours declined from 9 to 8 hours
- Wages doubled
- Better working condings (safety and health)
- Expansion of trade unions

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Labour augmenting effects but...

Labour augmenting effects

complementing human labour

↓

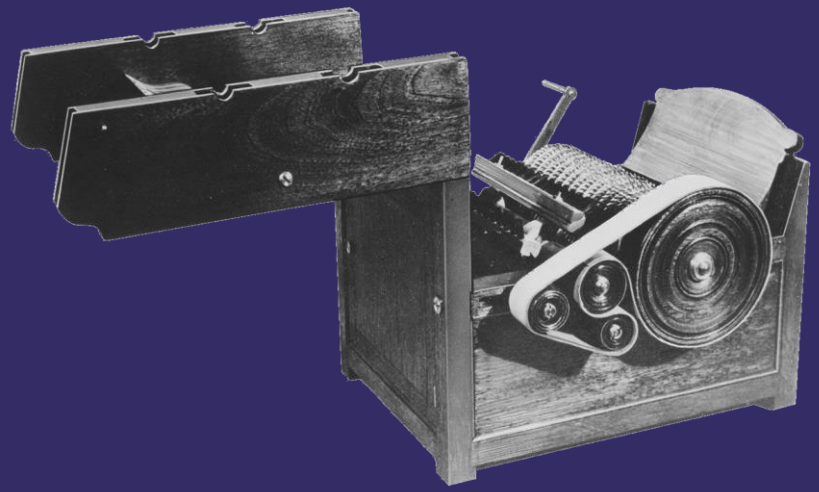
marginal productivity of workers ↑

↓

output ↑

↓

labour demand & wages ↑



Cotton gin

- Cotton productionin the US expanded from 750,000 bales in 1830 to 2.85 million bales in 1850
- Reduction in time: from 2-3 pounds to around fifty pounds of cotton per day
- Workforce (slave labour): 700,000 in 1790 to around 3.2 million in 1850
- Profits went exclusively to land owners and slavery strenghtened

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Labour displacing effects?

Labour displacing

effects

Certain job and work tasks get replaced by machines

↓

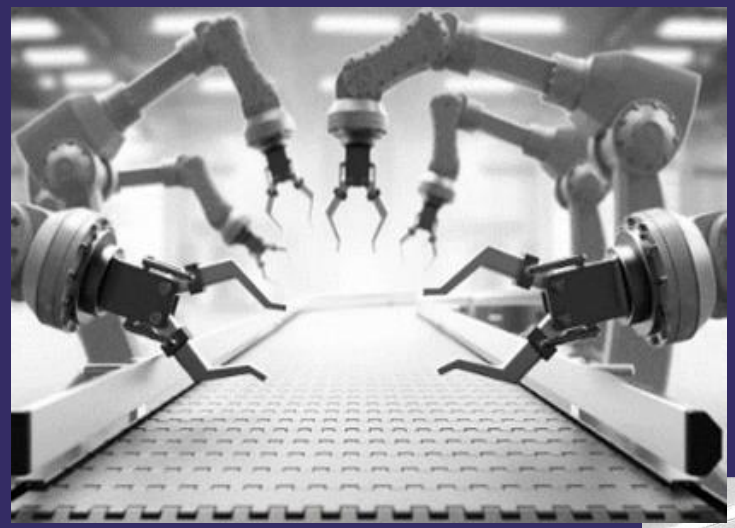
production costs ↓

average productivity ↑

marginal productivity of workers ↓

↓

Output? Labour demand? Wages?



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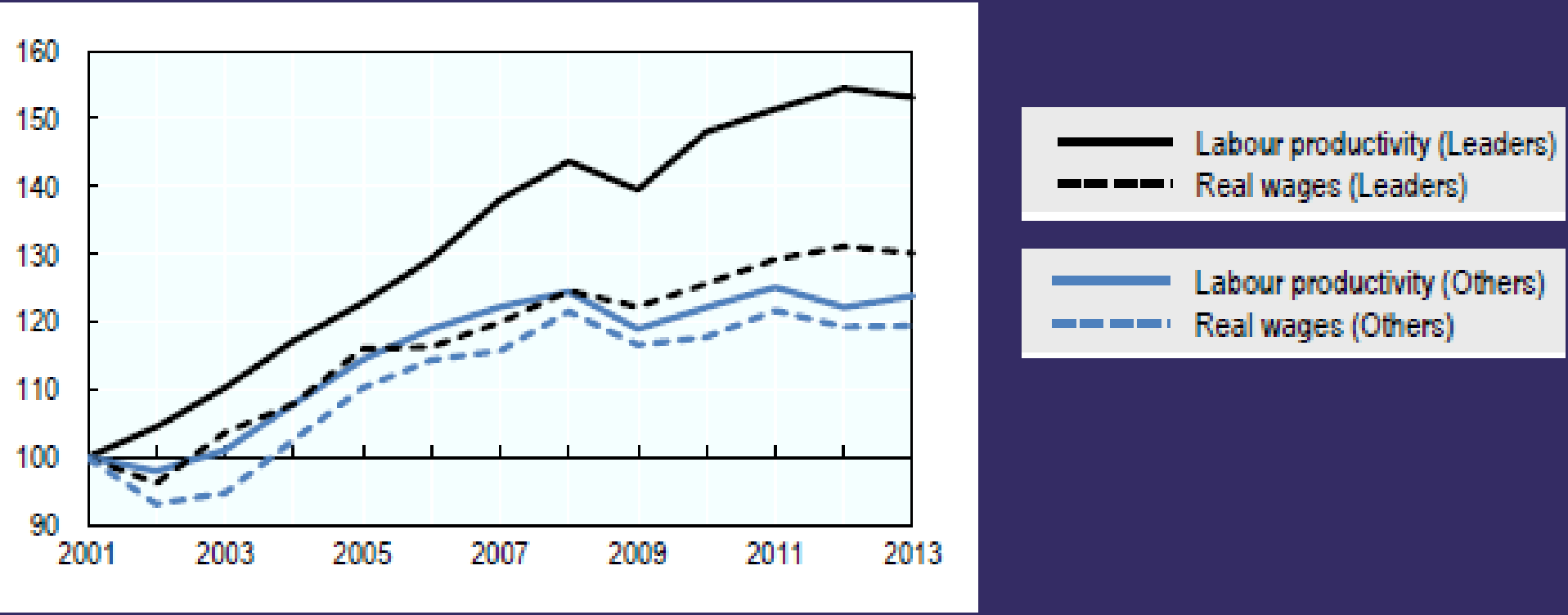
Wages have decoupled from productivity in technologically advanced firms...



Countries: Belgium, Denmark, Germany, Ireland, Japan, Korea, Sweden, UK, US

Source: OECD Employment Outlook 2018

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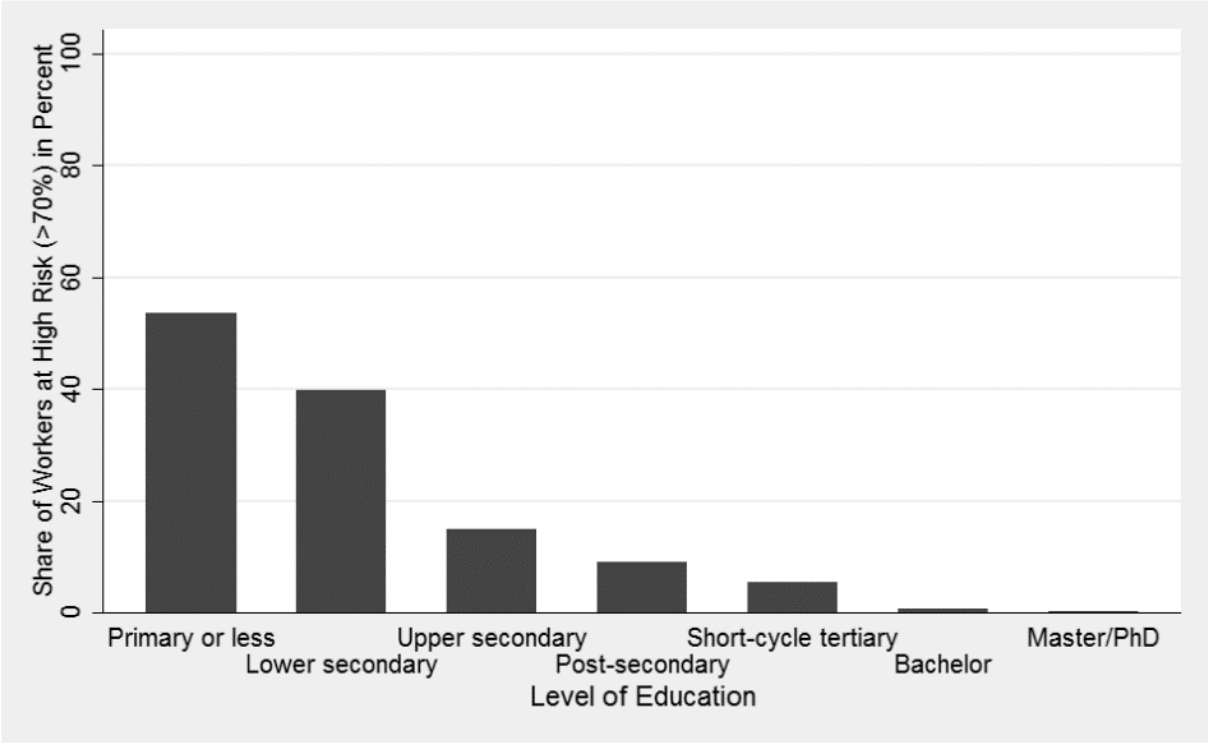
Risks of automation

- 9-14% of jobs at high risk of full automation (more than 70% of tasks automatable)
- 25-32% jobs at medium risk (50-70% of tasks automatable)

Source: Arntz et al. (2017), Nedelkoska and Quinitini (2018)

Figure 6. **Share of Workers with High Automatibility by Education**



Source: Authors' calculation based on the Survey of Adult Skills (PIAAC) (2012)

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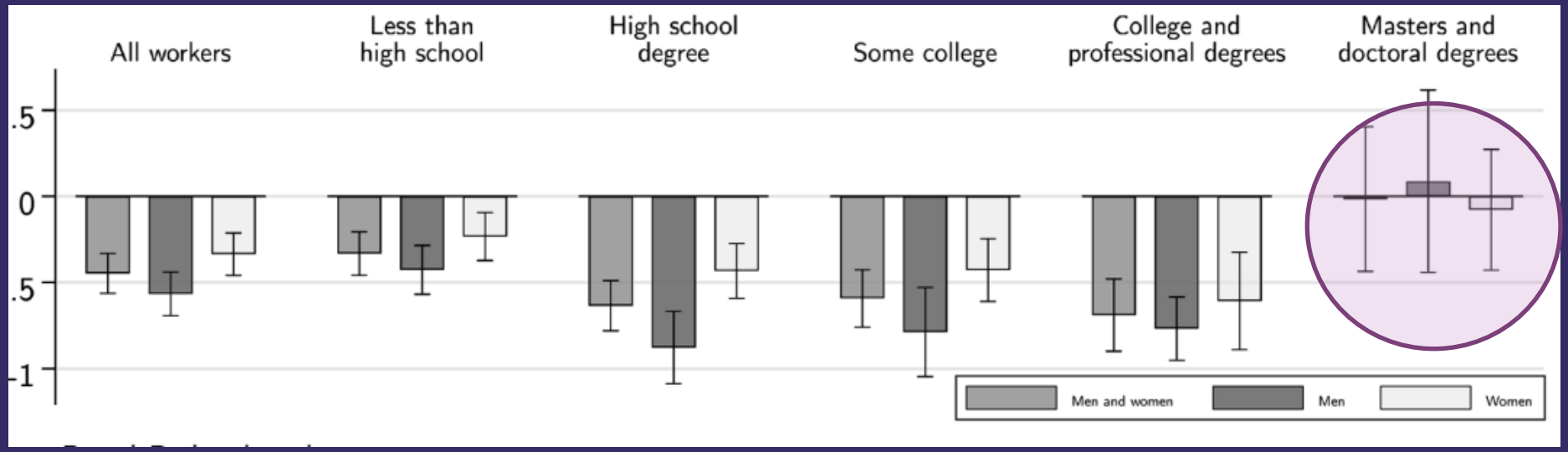
Industrial robots and employment

- **US:** 1 robot / 1000 workers reduces the employment rate by 0.2 pp. and wages by about 0.42% (Acemoglu and Restrepo 2020)



Source: Acemoglu and Restrepo 2020

- **Europe:** null overall effect, but negative effects on employment of low and middle educated workers (Graetz and Michaels 2018)

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LM consequences of automation

- changing demand for labour
- growing disparities between high and low-to-middle skilled

  - employability - job quality - earnings

- turnover in the labour market
- uncertainty (Dekker et al. 2017, Schwabe and Castellacci 2020)
- negative effects on mental health (Abeliansky et al. 2019)
- even higher mortality (Gihleb et al. 2021, O'Brien et al. 2022)
- ongoing change (not cyclical)

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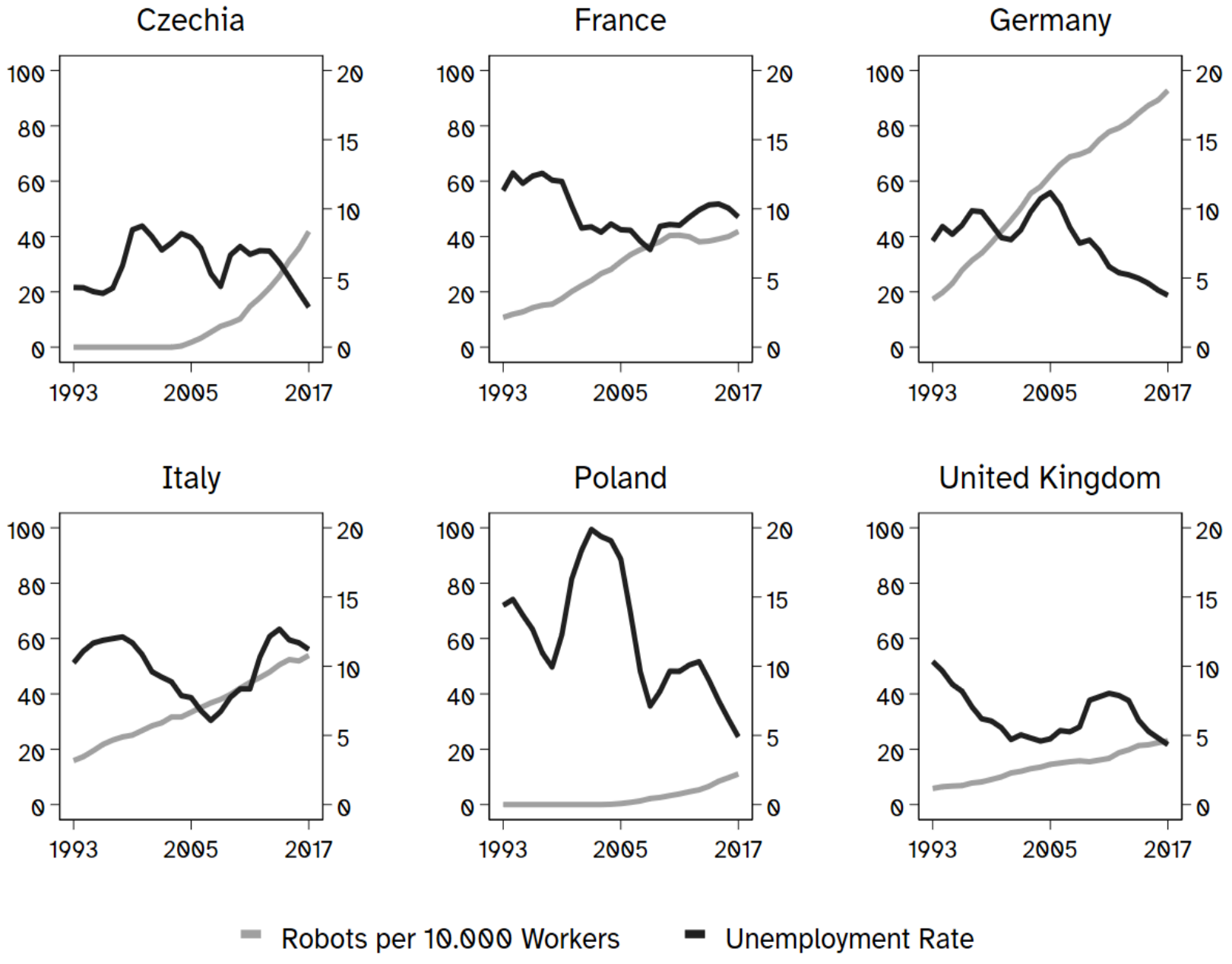

Source: Matysiak, Bellani, Bogusz 2023

Fertility effects of automation

AUTOMATION

?

Stability of employment

Wages

Uncertainty

Dignity

Structural change (not cyclical!)

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MICRO-LEVEL STUDY 1

?

Co-authors: L. Andersson, W. Hardy

Countries: Sweden

Period: 1993-2017

Data:

- Swedish register data
- IFR robot stocks (industry-specific) at 3 digit since 1993

Measure:

- Exposure to robots

Method:

- Discrete-time EHA

$$Exposure\ to\ robots_{r,t} = \frac{robots^{c}_{i,t}}{empl_{i,t_0}}$$

replacement of initial employment (at *t0*) in the industry *i* by robots

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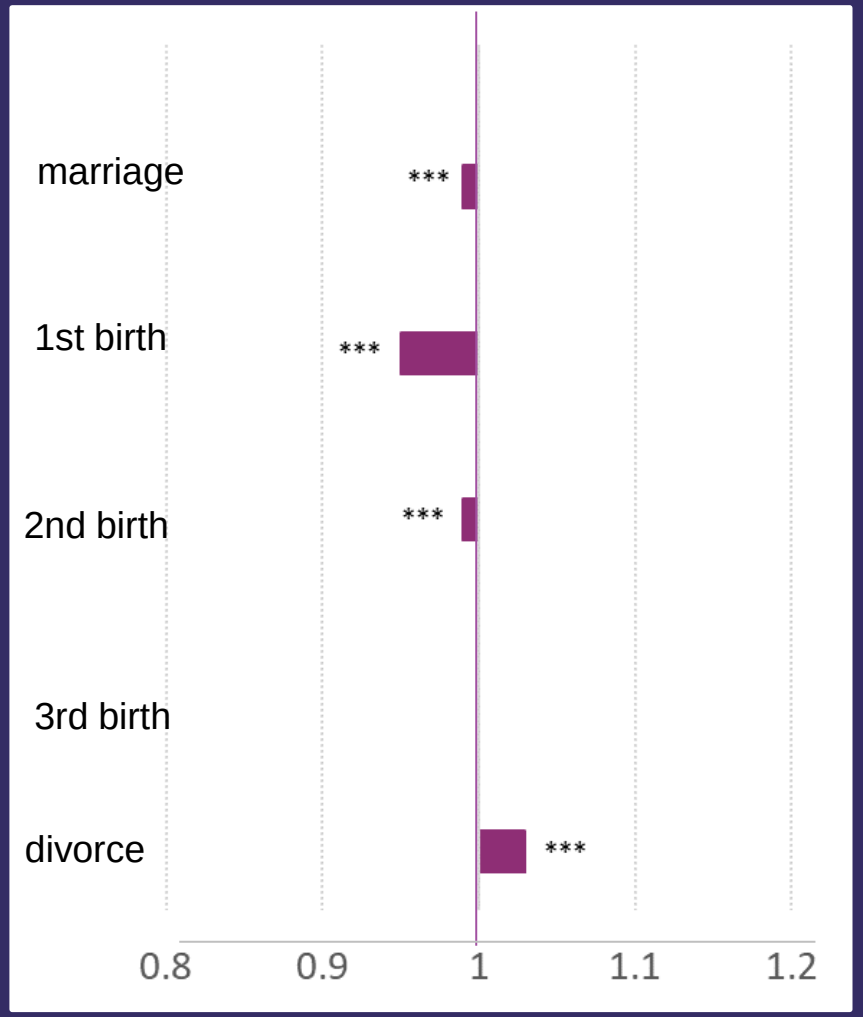
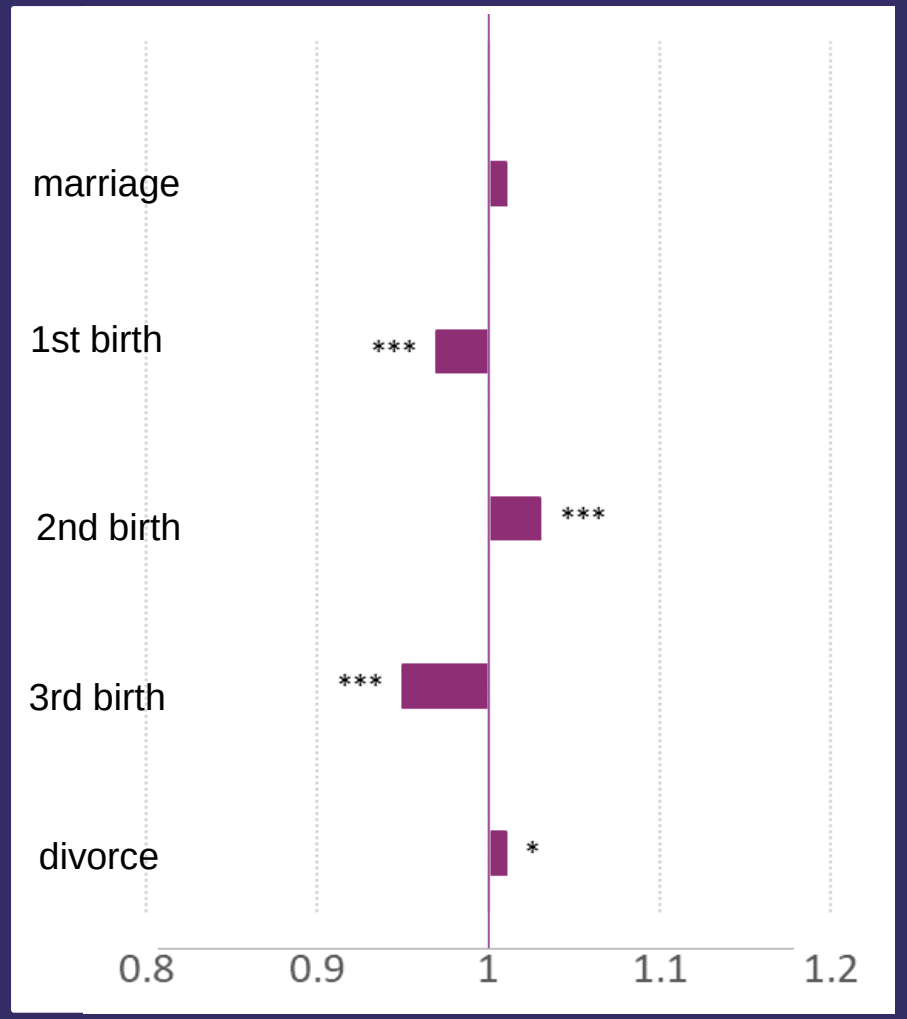
Fertility effects of automation, Sweden

MEN



WOMEN

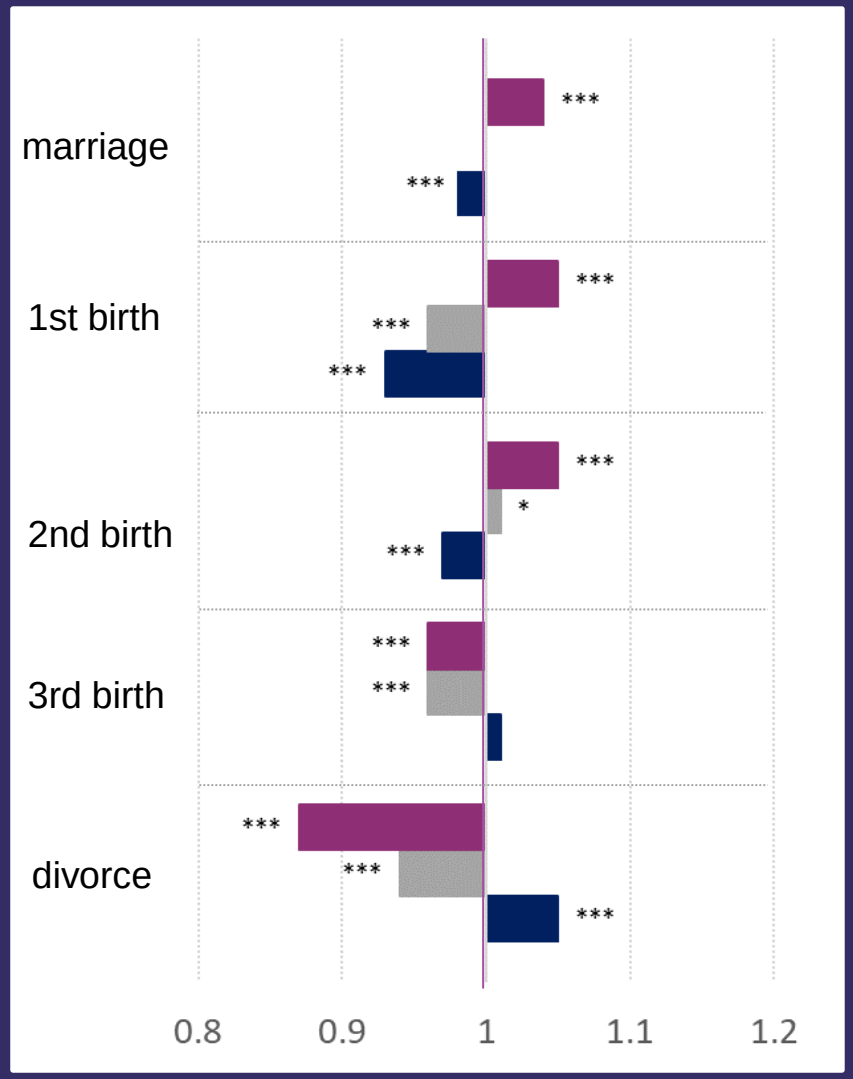


Note: Association between a change in 1 st dev in robot adoption in an industry and risk of event

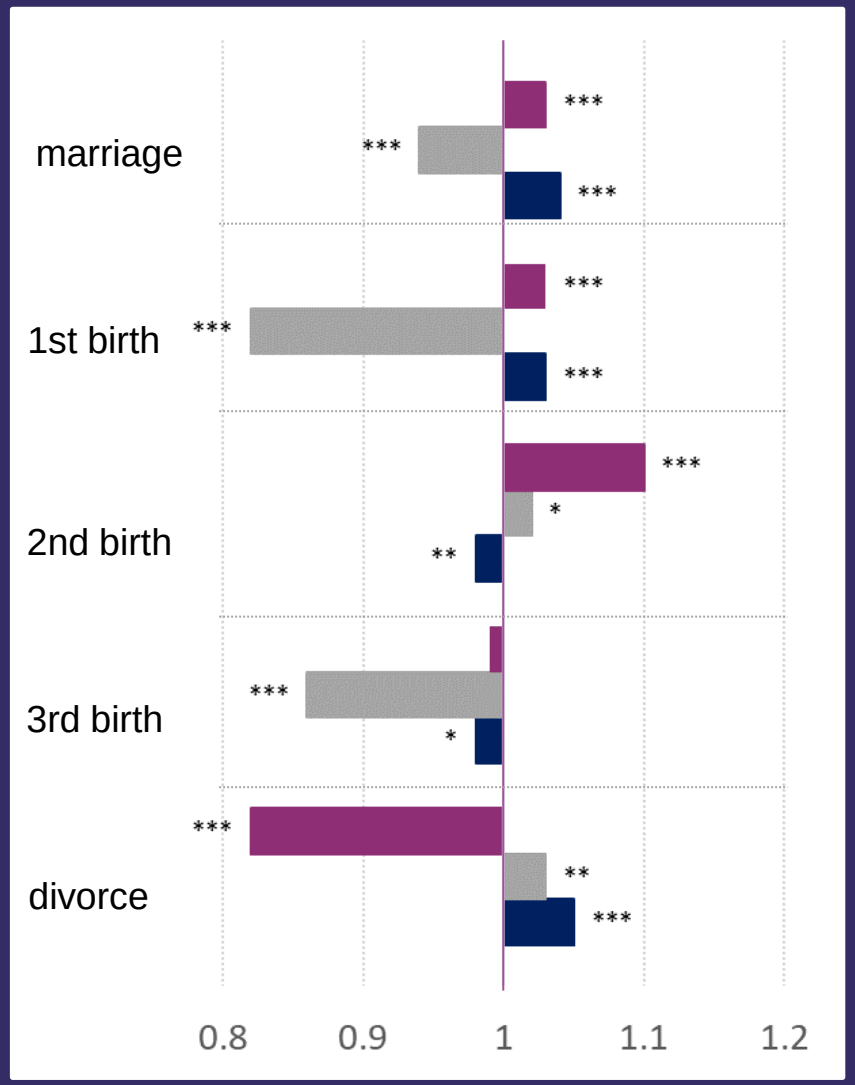
Source: Andersson, Hardy, Matysiak, forthcoming

Fertility effects of automation, Sweden

MEN



WOMEN



ISCED 6-8
ISCED 4-5
ISCED 1-3

Note: Association between a change in 1 st dev in robot adoption in an industry and risk of event

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how? how much?

who? where? when?

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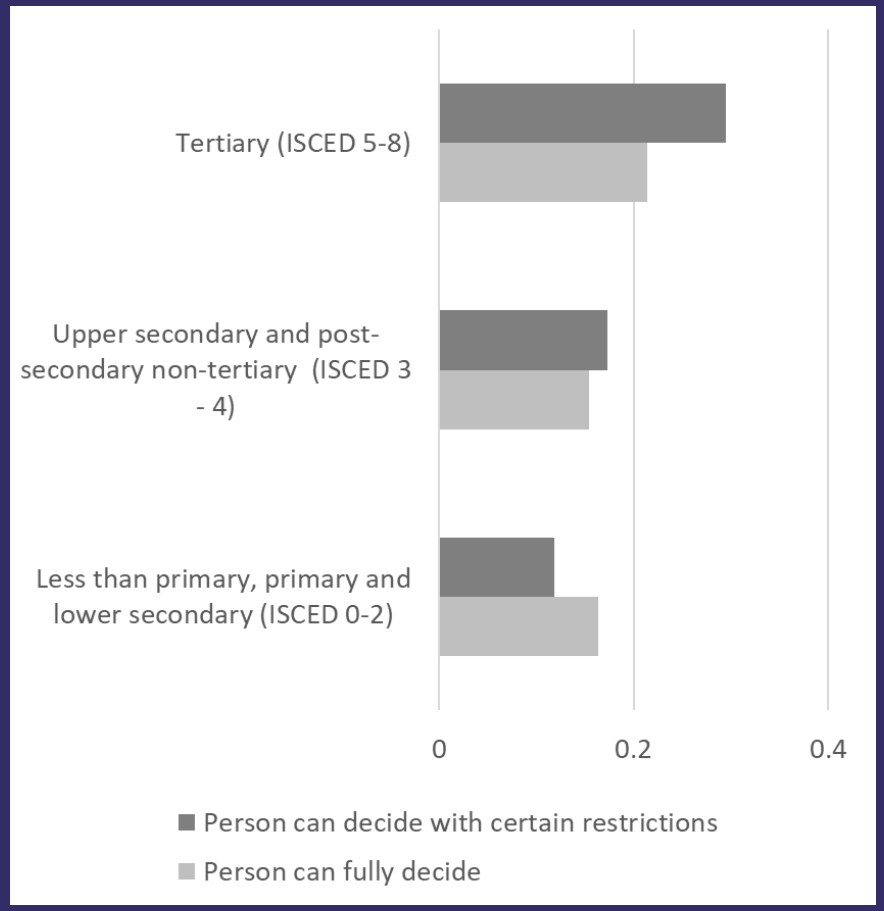
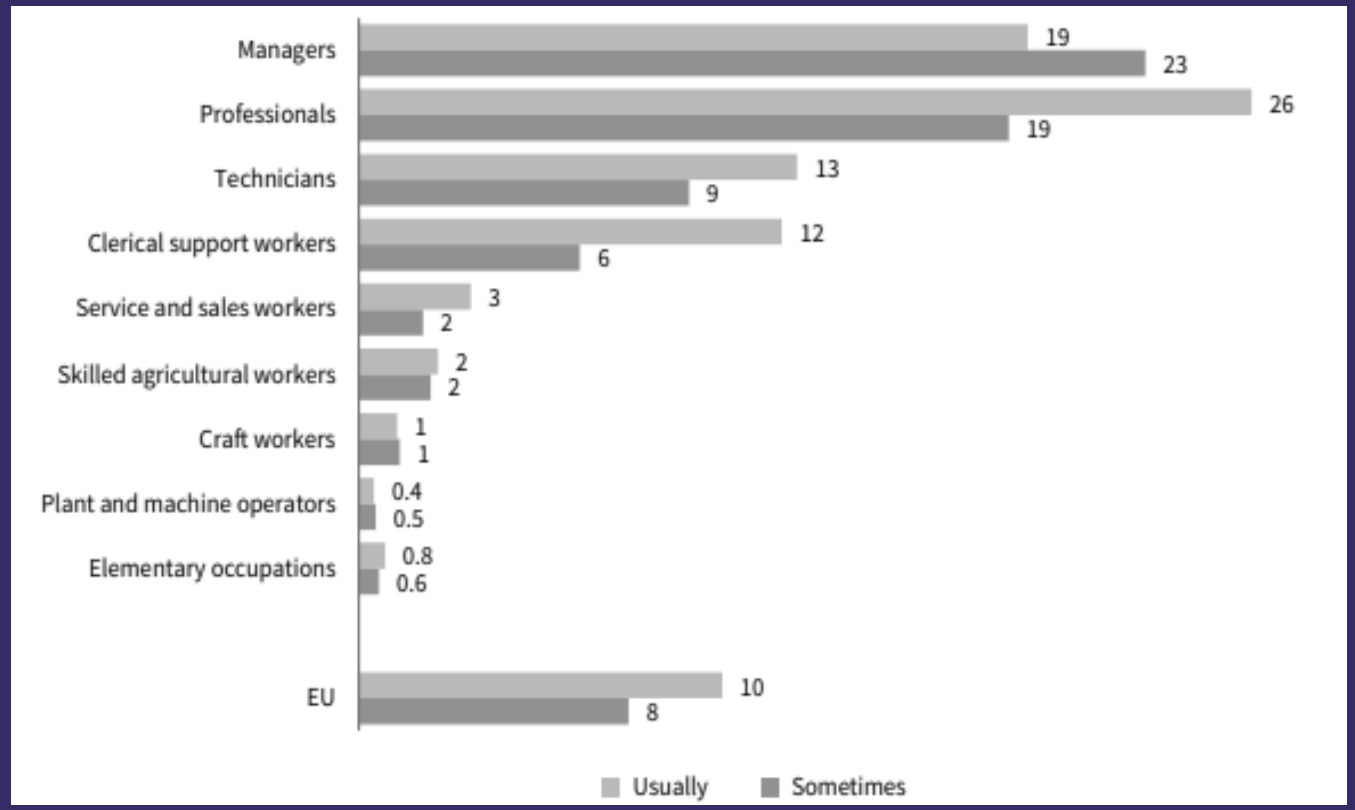
Flexible working time, 2019



Source: Eurostat, LFS ad hoc module 2019

Incidence of telework during the pandemic, 2020



Source: Eurofound (2022). Living and working in Europe

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Work autonomy

WHEN?

WHERE?

PROS:

- Possibility to adjust paid work to family demands
- Time savings
- Cost savings (on cloths, lunches)
- Larger presence in children’s life

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Work autonomy

WHEN?

WHERE?

CONS:

- Spillover from family to work
- Fragmented working time & multitasking
- Expectations re housework / childcare
- Higher work intensity, 24/7 work
- Stress
- Flexibility stigma & negative career consequences

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?

MICRO-LEVEL STUDY 2

Co-authors: B. Osiewalska

Countries: UK

Data:

- UKHLS 2009-2019

Sample

- partnered women aged 18-44

2,125

2,143

Method:

- Discrete-time EHA

Controls:

- Woman's age, ethinicity, health and woman's family orientation, partnership status, men's and woman's education, men's income, calendar time, childcare use (for parents)

Measures:

Control over the start / end of working day

Regular / irregular work from home

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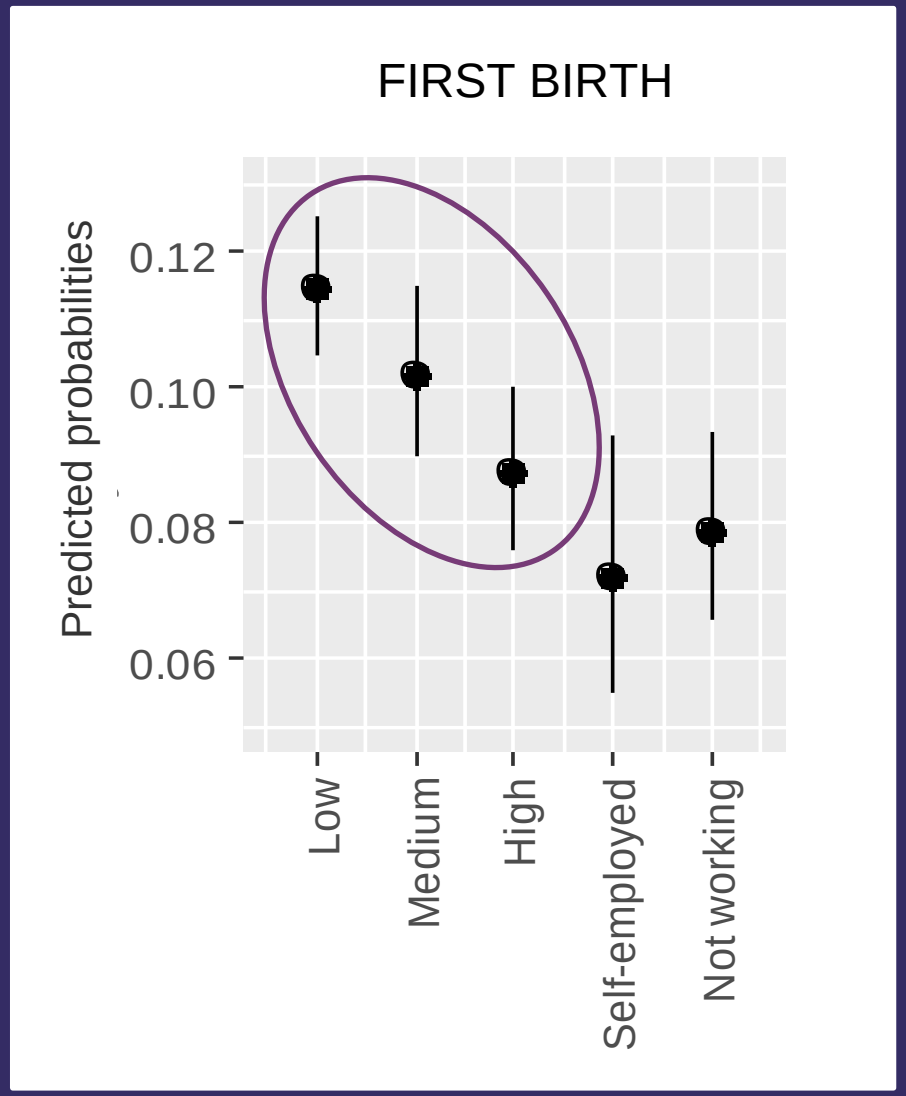
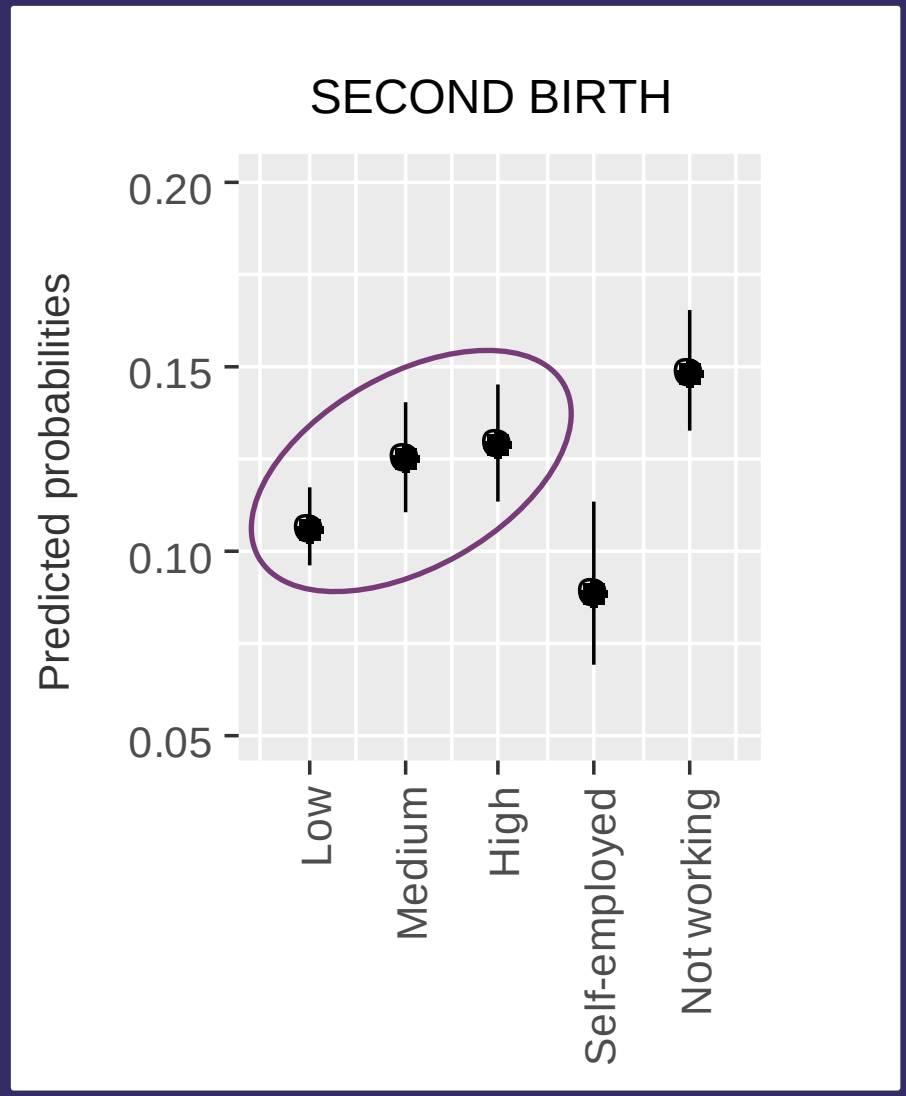
WHEN?





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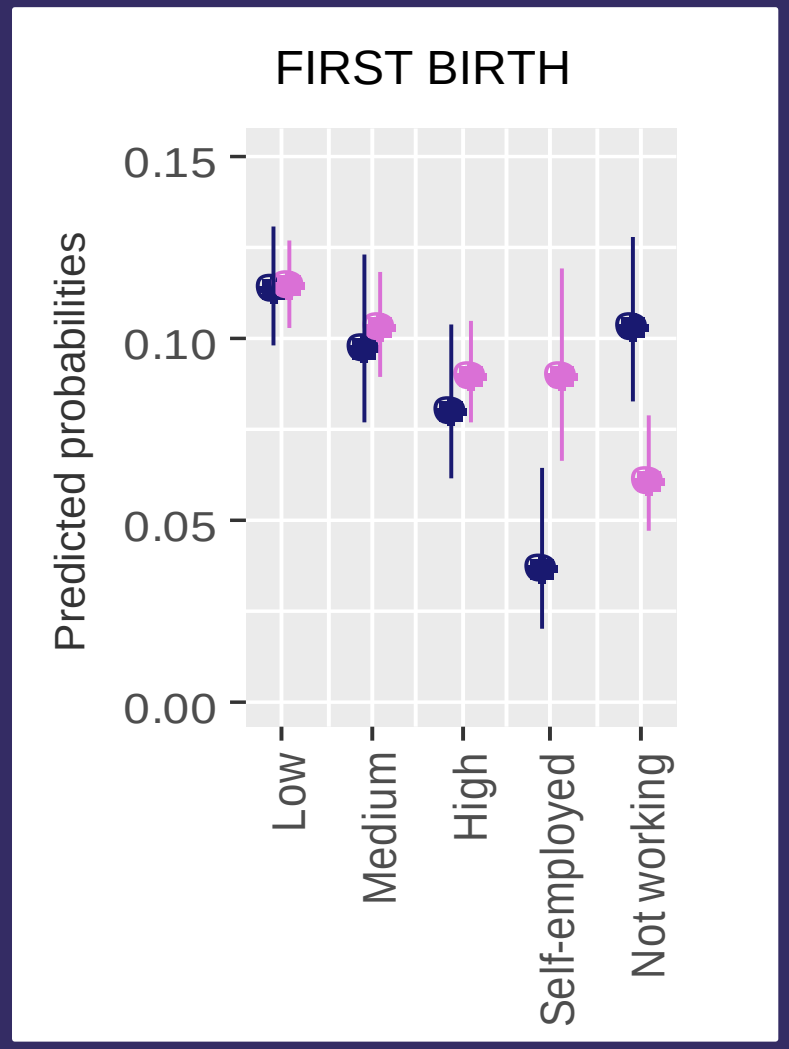
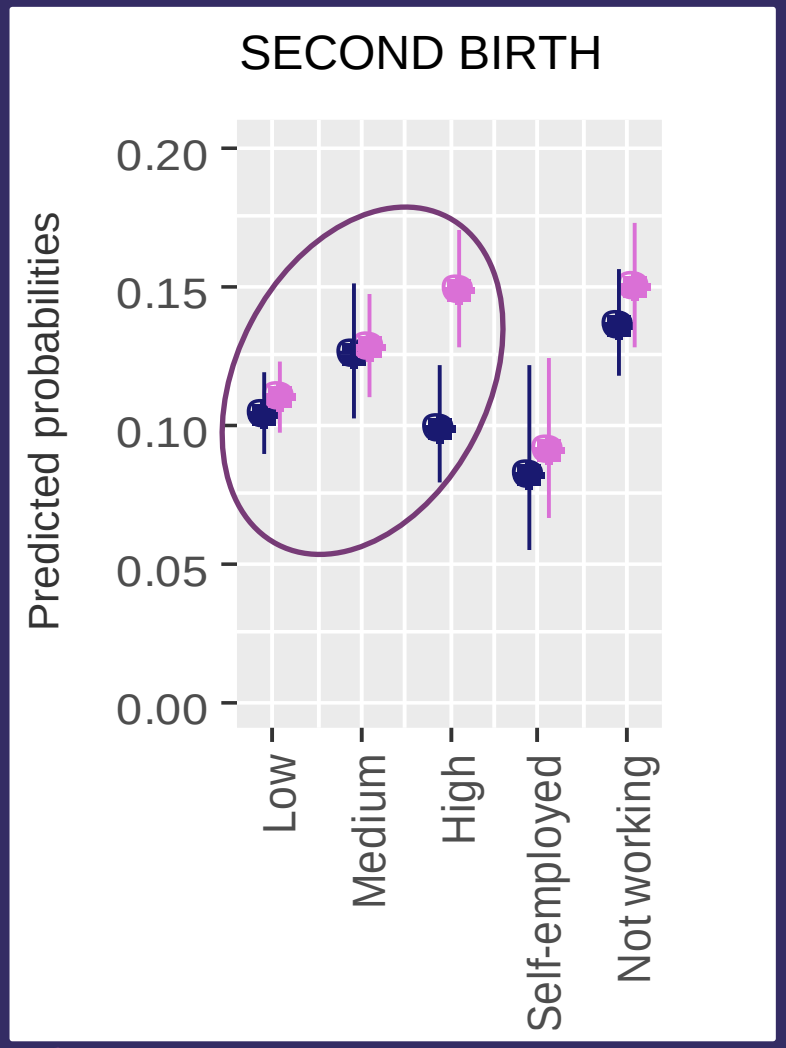
Source: Osiewalska and Matysiak, ongoing

WHEN?





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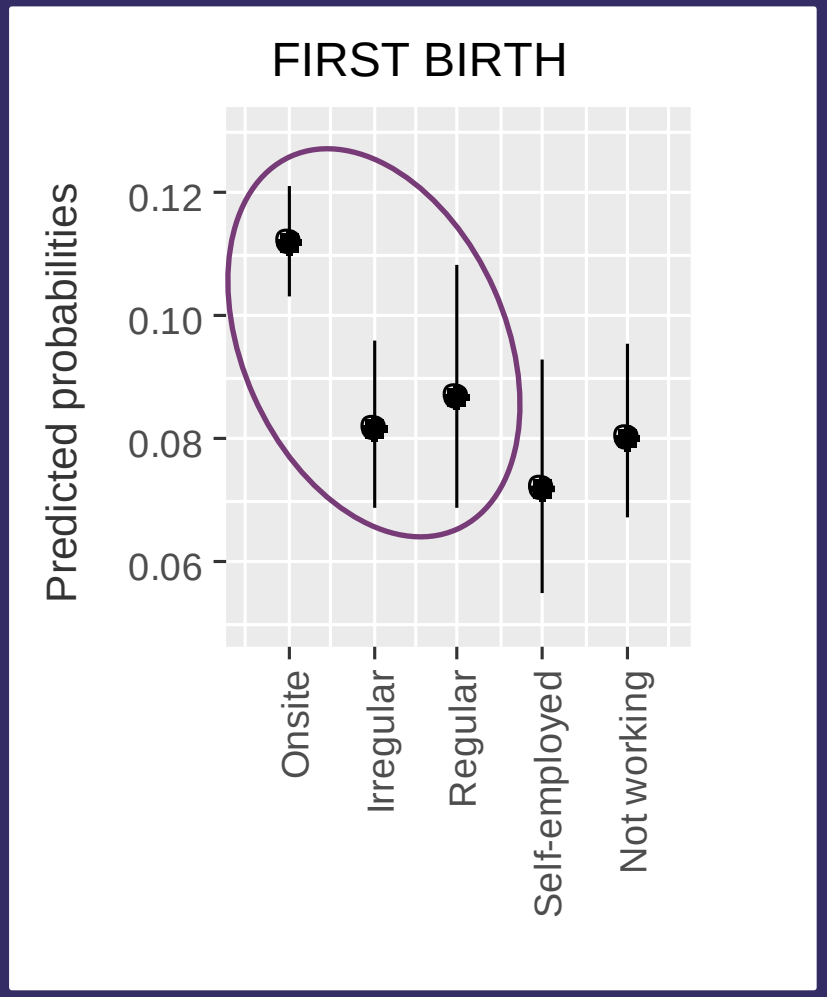

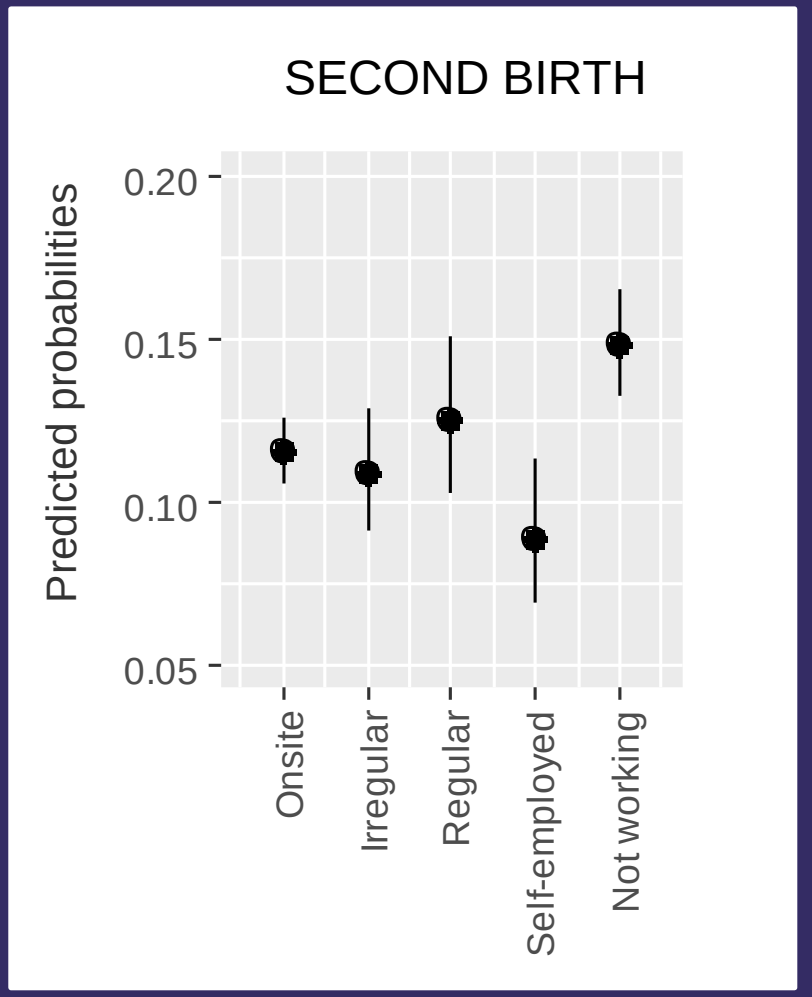

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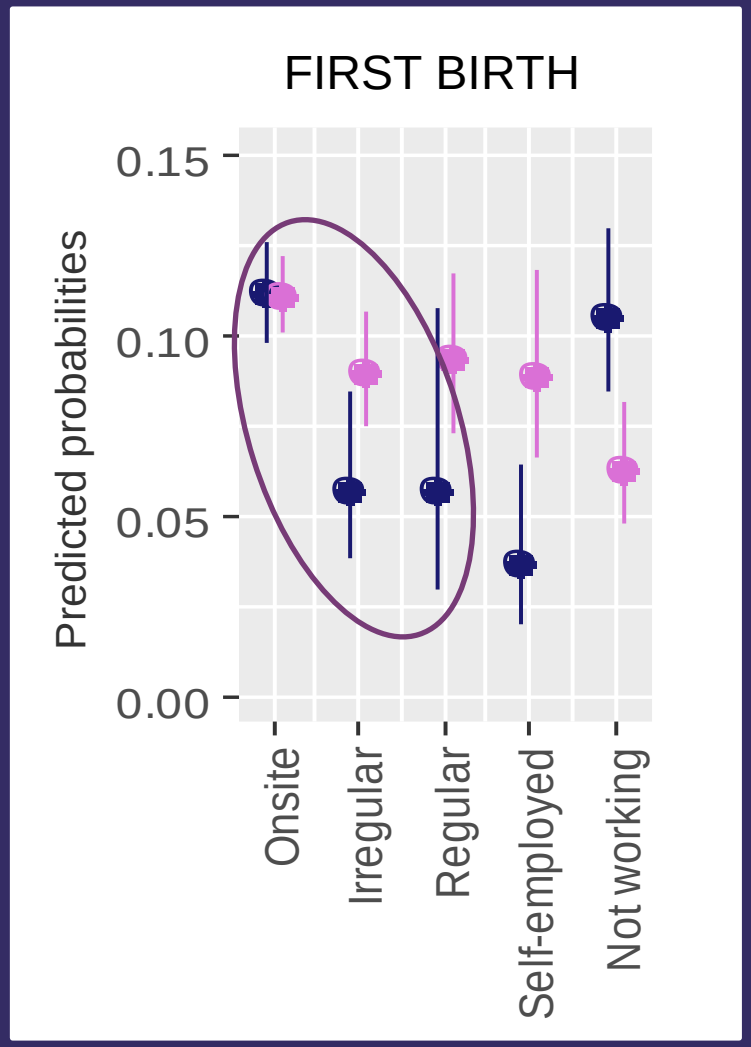
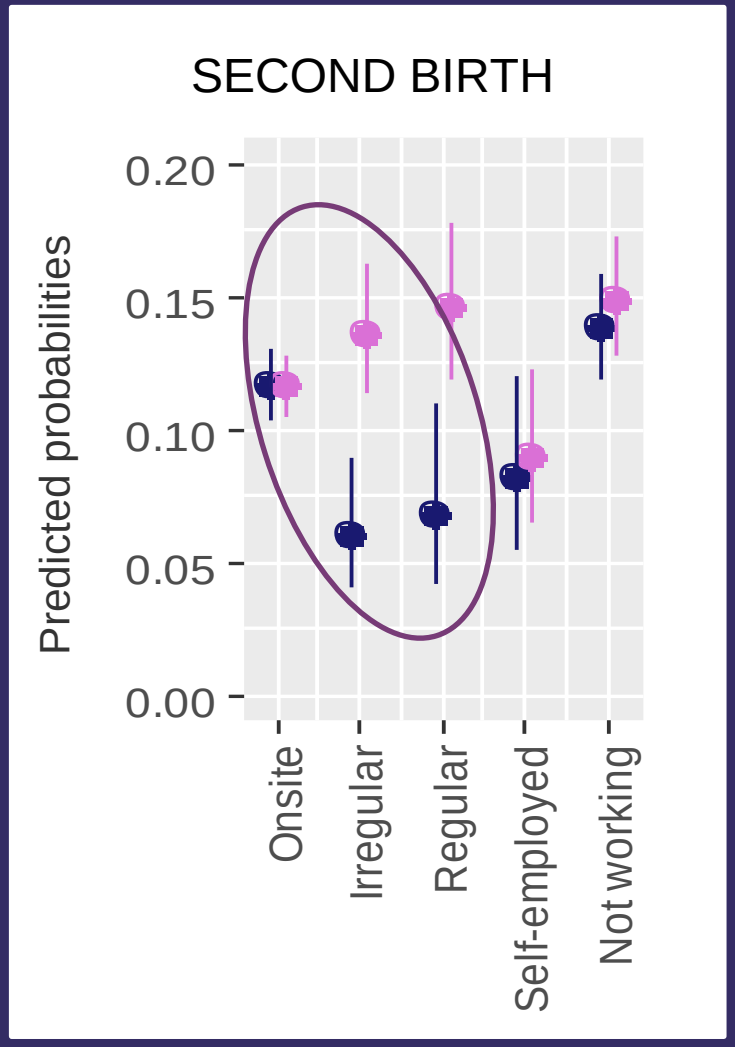
Source: Osiewalska and Matysiak, ongoing

WHERE?





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Source: Osiewalska and Matysiak, ongoing

- Less skilled workers increasingly struggle in the labour markets (they are more exposed to negative consequences of automation and have worse access to job resources like work autonomy
- These struggles constrain their family formation
- Redistributive function of the LM starts to fail….

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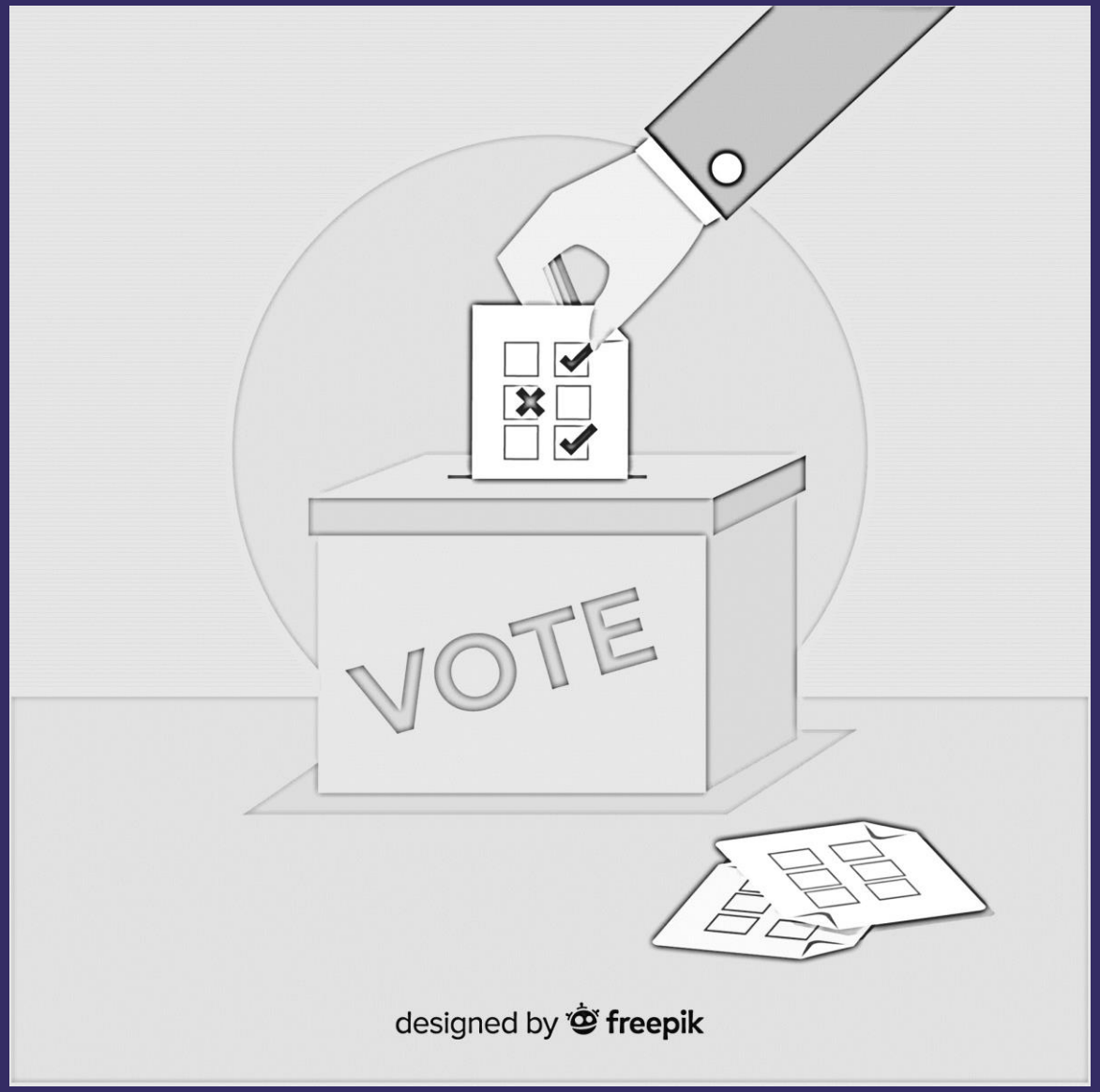

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JOURNAL OF REGIONAL SCIENCE

ORIGINAL ARTICLE

Globalization, robotization, and electoral outcomes: Evidence from spatial regressions for Italy

Mauro Caselli, Andrea Fracasso, Silvio Traverso

First published: 08 June 2020 | https://doi.org/10.1111/jors.12503 | Citations: 12

- Effects of flows of migrants, foreign competition in international trade, and diffusion of robots on local electoral outcomes in 2001, 2008 and 2013
  - All increase in far-right votes in 2001 and 2008
  - Only robotization continues to have such an impact in 2013 (immigration increased votes for Far Star Movement at the expense of far right)

Political machinery: did robots swing the 2016 US presidential election?

Carl Benedikt Frey, Thor Berger, Chinchih Chen

Oxford Review of Economic Policy, Volume 34, Issue 3, Autumn 2018, Pages 418–442, https://doi.org/10.1093/oxrep/gry007

Published: 02 July 2018

positive and significant effect of workers' exposure to robot adoption on the change in the regional share of votes in favour of the Republican candidate (2016 vs 2012 elections; Trump vs Romney)

Comparative Political Studies

Impact Factor: **5.0** / 5-Year Impact Factor: **5.7**

Available access | Research article | First published online March 3, 2021

Voting for Populism in Europe: Globalization, Technological Change, and the Extreme Right

Helen V. Milner View all authors and affiliations

Western Europe 1990-2018

Import competition, automation and financial crisis positively related to suport for populist parties

Conclusions

- Economic activity matters for family formation
- LM has undergone huge changes which go beyond having a job or not, full-time / part-time employment or permanent/temporary contracts
  - Flexibility in where / how / when
  - Employer / employee-oriented flexibility
  - Work intensity
  - Changes in the demand for skills and job content
  - Necessity to reskill / upskill / adapt
  - Quality of employment
- Social surveys lack data to measure these concepts, in particular in longitudinal form

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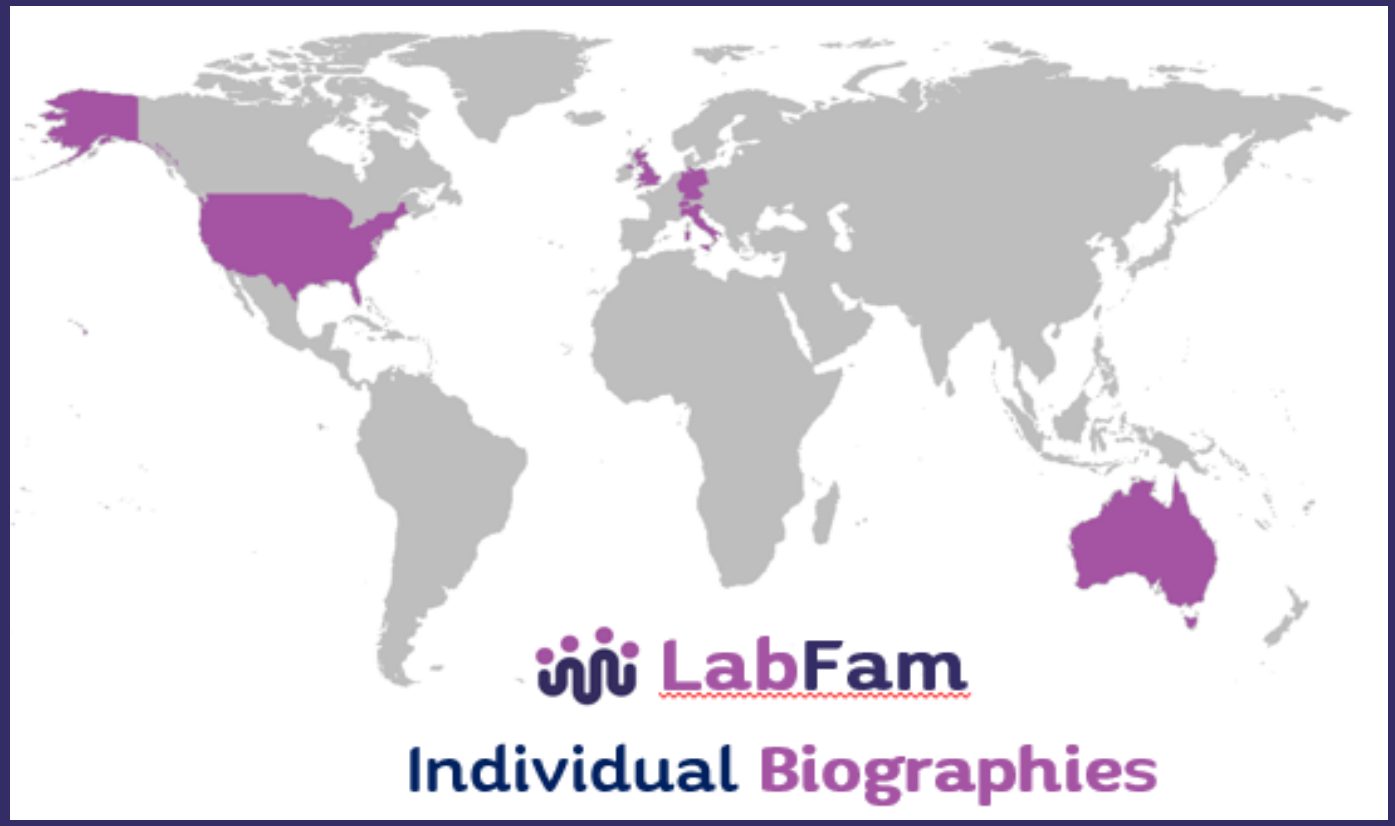
Outlook



Open-source comparable event / spell datasets containing the following individual histories:

- Partnership
- Fertility
- Employment

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THANK YOU!

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