Wittgenstein Centre
FOR DEMOGRAPHY AND GLOBAL HUMAN CAPITAL
IIASA ÖAW universität wien

How unemployment and perceived employment uncertainty affect fertility in stable and crisis times? Evidence from 16 German states in years ~~2004~~-2021 2016-2021

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Motivation (1)

Unemployment–fertility nexus

- Context-dependent (e.g. labour market conditions, institutions, gender norms; Alderotti et al. 2021; Cazzola et al. 2016; Goldstein et al. 2013)
  - Men's unemployment: typically negative
  - Women's unemployment: more contextual

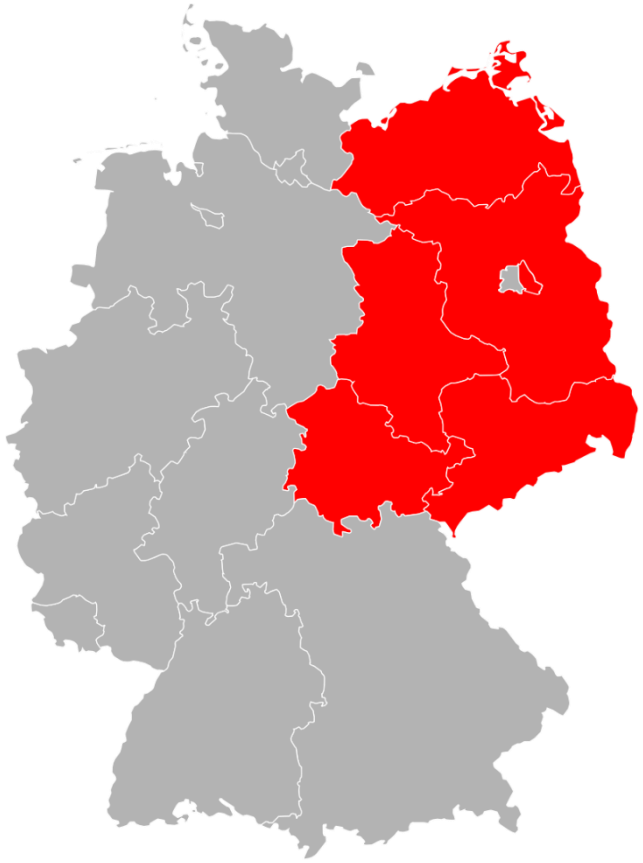
  〉 Most likely tempo-effects rather than quantum (Pailhé & Solaz 2012) but evidence mostly for period fertility
- Unemployment often a proxy for employment uncertainty

Beyond unemployment: Employment uncertainty–fertility nexus

- Empl. uncert. can contribute to decline in fertility independently of changes in unemployment (Comolli and Vignoli 2021)
- Most evidence micro-level & cross-sectional, often *ad hoc* questions (Kreyenfeld 2010; Pailhé & Solaz 2012; Vignoli et al., 2012, 2019)
- ? Alternative? : data on Google queries related to job uncertainty, known as good short-term predictors of unemployment rate (D'Amuri and Marcucci 2017; Comolli and Vignoli 2021)

Both nexuses in spotlight now in the pandemic

Motivation (2)



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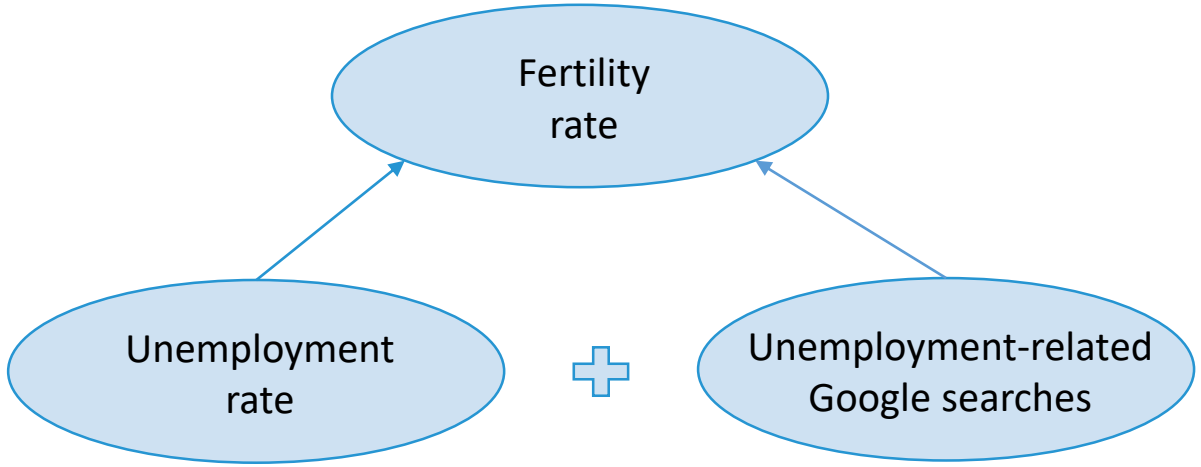
- Germany: 10 ”old” (Western) and 6 ”new” (Eastern) federal states
- Unemployment–fertility nexus dependent on contextual factors
  - Large E-W differences in, e.g.:
    - Gender norms (especially mothers’ professional career)
    - Exposure to profound socio-economic and political changes
  - Fertility increases during the world economic recession (Matysiak et al. 2020)
    - Larger in E than in W
  - *Pandemic* fertility in 2021:
    - Increases in most states in W but not E (Statistisches Bundesamt Deutschland 2021)

Objectives

How fertility,
registered unemployment &
unemployment-related Google searches
are associated with each other
in stable (pre-pandemic) & crisis (pandemic) times?



1. Registered unemployment vs.
   unemployment-related Google searches:
   a. How closely are they related?
   b. Do they affect fertility in a similar way? / What is their (separate and join) effect on fertility?
   c. Are there any differences in their effects on fertility before and during the pendemic?

2. How is this link modified by contextual factors: How it differs between Eastern and Western German states?

Data

Level of analysis: monthly data Jan 2016-Aug 2021 for 16 German federal states (N = 1088)

DESTATIS German statistical office

- Births per 1,000 women 15-49 (GFR)
- Unemployment rate among women and men

Google Trends ~30 topics & keywords

unemployment, job loss, layoff, unemployment benefits (incl. Hartz IV), short-time work (Kurzarbeit), work, help, no money, unemployment office (Arbeitsamt)

- Relative measure: number of searches relative to the maximum (100) search volume throughout the analysed period, counted separately for each query

Winner chosen in machine learning proces
In fact, negligible differences in many cases.

Rescaled & slightly recoded:
range 0.5-10, 0 coded as NA

Methods

OLS models, log scale (interpretation of the effects as elasticity)

$$fert_{st+11} = \alpha_s + \theta_m + t * eastwest * pandemic + \sum_i \beta_i X_{ist} * eastwest * pandemic + \varepsilon_{st}$$

Outcome: fertility rate

General Fertility Rate (GFR) in state s & at time t, led by 11 months

Lead of 11 months

Machine learning-based choice
Leads tested: 8-15
(anything between 10 &15 OK-ish)

Fixed effects & time trend

α_s : state fixed effects
θ_m: month fixed effects (seasonality)
t : time (month-years)
interacted with
EastWest dummy &
pandemic dummy

Explanatory & control variables

X_{ist} explanatory/control variable i
in state s & at time t
interacted with
EastWest & pandemic dummies

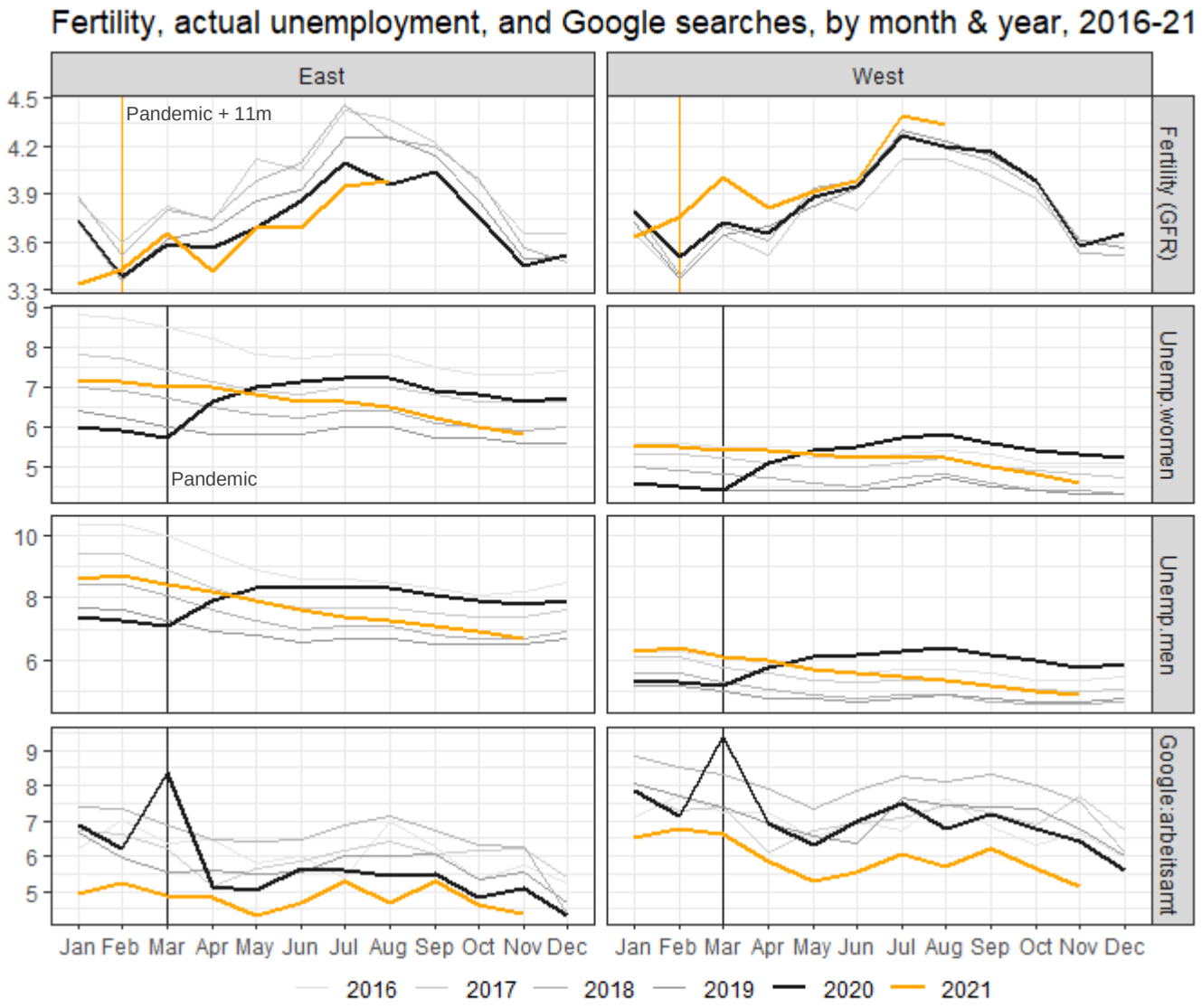
Explanatory variables:

M1: women's unemployment rate
M2: men's unemployment rate
M3: Google searches related to Arbeitsamt (unemployment office)
M4: Google + unemp. women (M1+M3)
M5: Google + unemp. men (M2 + M3)

Control variables:

Google usage (searches for common words)

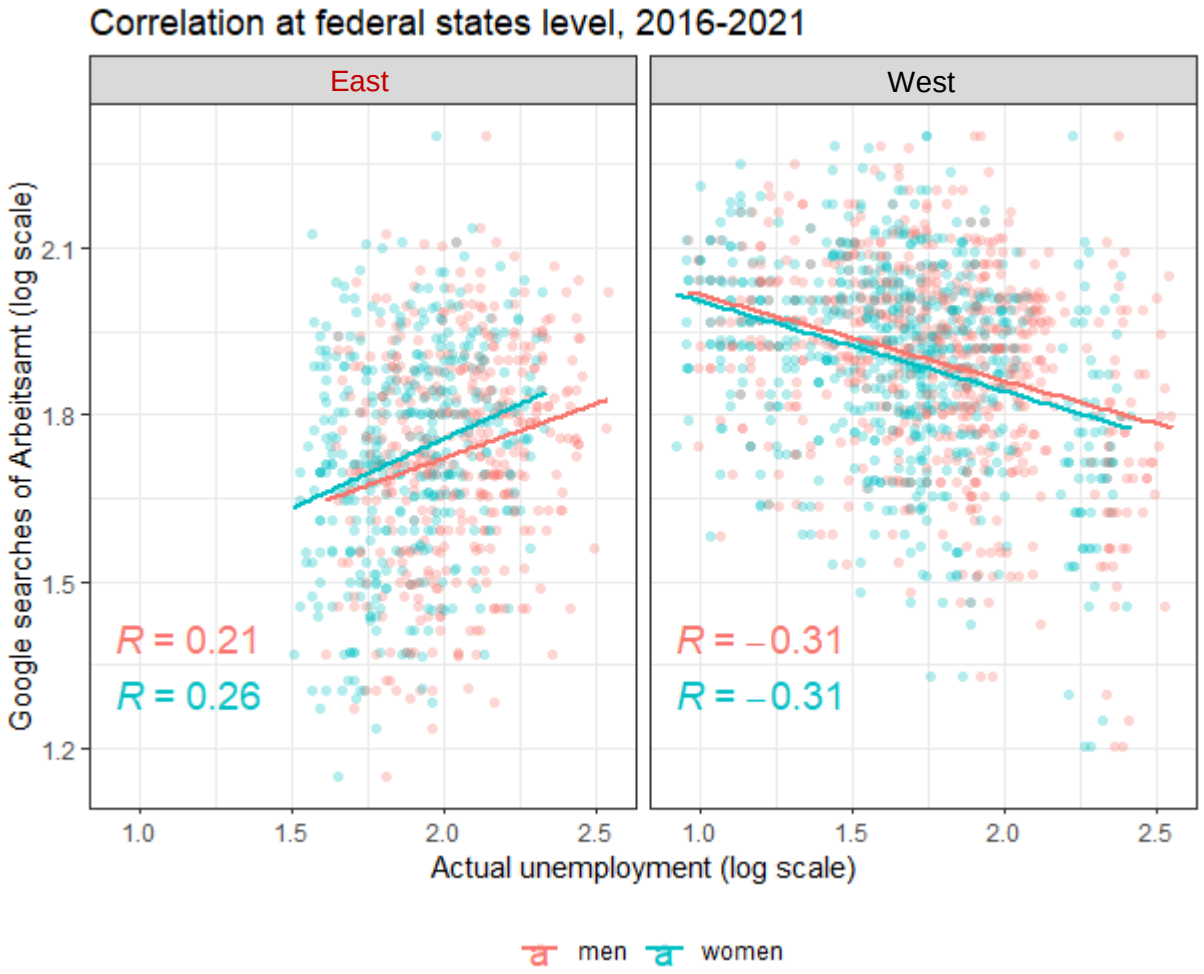
Fertility, unemployment and Google: trends 2016-21

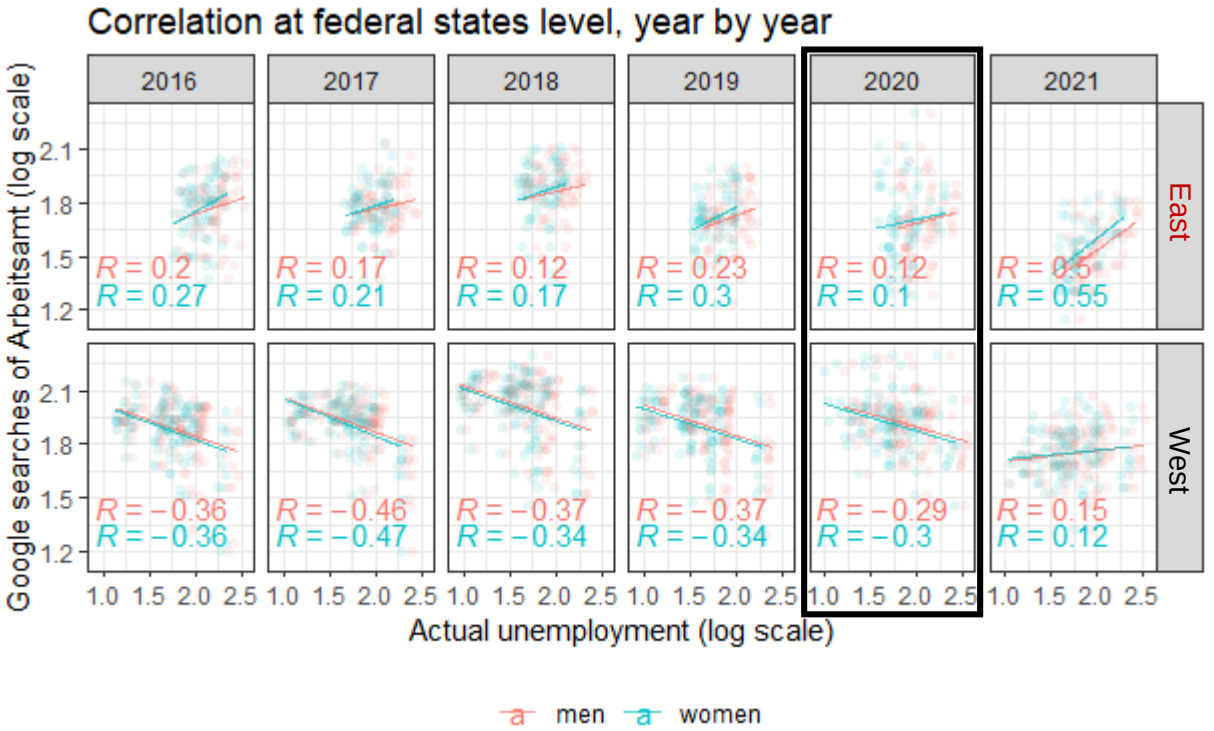


- Fertility
  - East: decreasing over time;
    lower in 2021 than in 2020
  - West: increasing/not declining over tme;
    higher in 2021 than in 2020
- Unemployment
  - E & W: Decreasing before the pandemic
  - Pandemic:
    Going up Mar-Aug 2020, then going down
    Rises steeper in E than W, esp. among women
  - Persistently higher in E
- Unemployment-related Google searches:
  - Decreasing over time since 2019
  - Lower in E

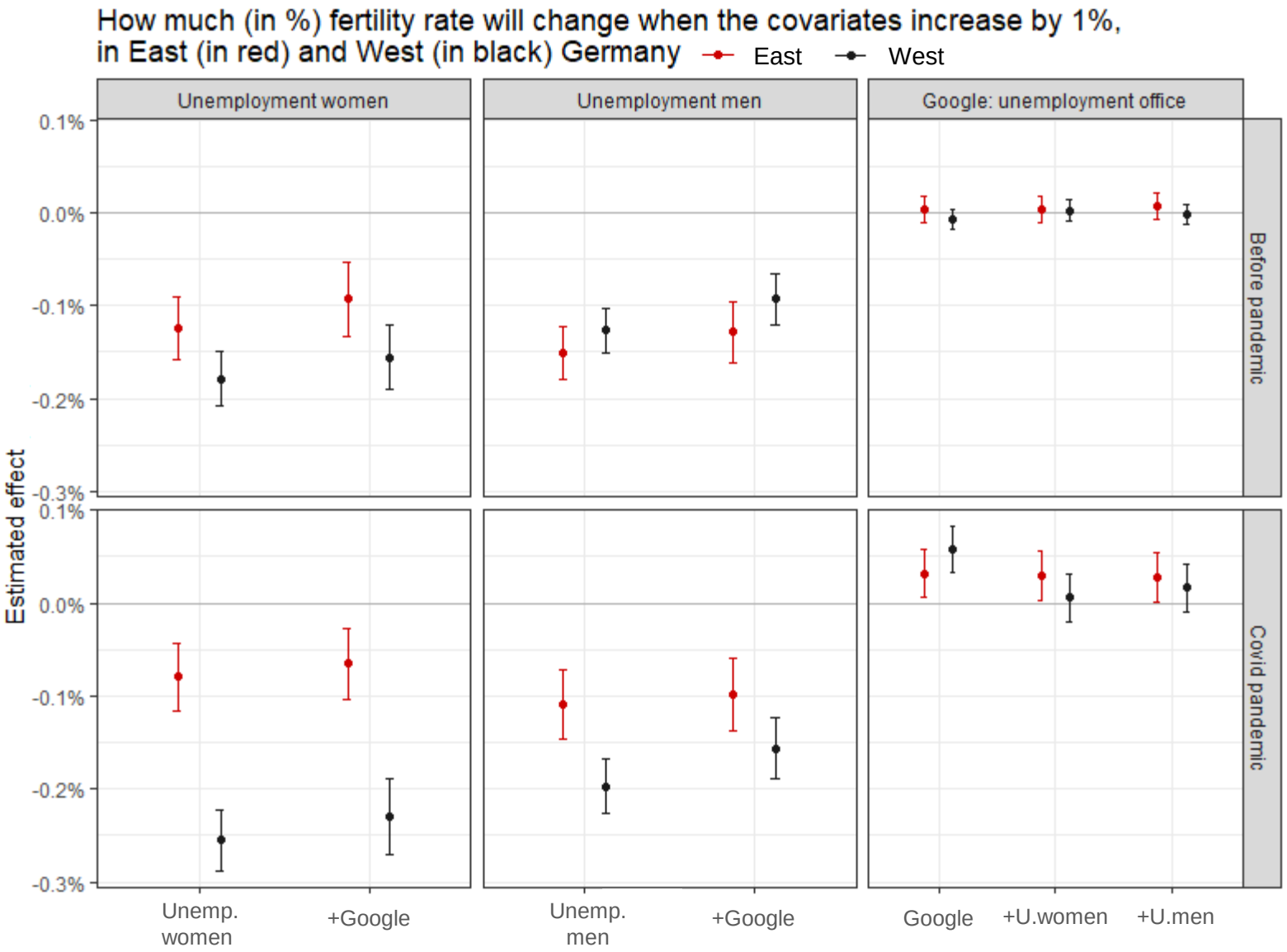
Unemployment: actual vs. Google searches

Relatively low correlation, different direction in E and W





Effects of actual unemployment and Google searches on fertility



- Overall, rather modest effects, esp. in E
  - All models: controlling for state fixed effect, time and seasonality
- Effect of unemployment
  - West: Negative, stronger in the pandemic, stronger for women than men
  - East: Negative, for women weaker than in W, stable over time
  - No substantial differences in models with and without Google searches
- Effect of unemp.office Google searches:
  - Before the pandemic: not siginificant
  - During pandemic:
    - East: positive, weak
    - West: positive, but when controlling for actual unemployment not significant

Tentative conclusions >> *next steps*

- Clearly, unemployment-related Google searches capture something else than (only) actual unemployment
  - The correlation is weak to moderate and not necessarily positive
  - Opposite effects on fertility

  » *Try to include more unemployment-related Google searches simultaneously*

- Effects of unemployment on fertility
  - Rather modest but of a similar size as in past macro-level studies (Goldstein et al. 2013)
  - Not sensitive to the inclusion of Google searches

  » *Try to get unemployment data for women and men at reproductive age / by age groups*
  » *Try to get additional economic measures at month-state level*

- A bit surprising:
  - The pandemic has strenghtened the negative effect of unemployment only in the West
  - The effect of women's unemployment is stronger in the West than in the East, esp. during the pandemic

  » *Fertility by birth order and/or age & social characteristics (edu, migration background) would be terrific….*

Thank you

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