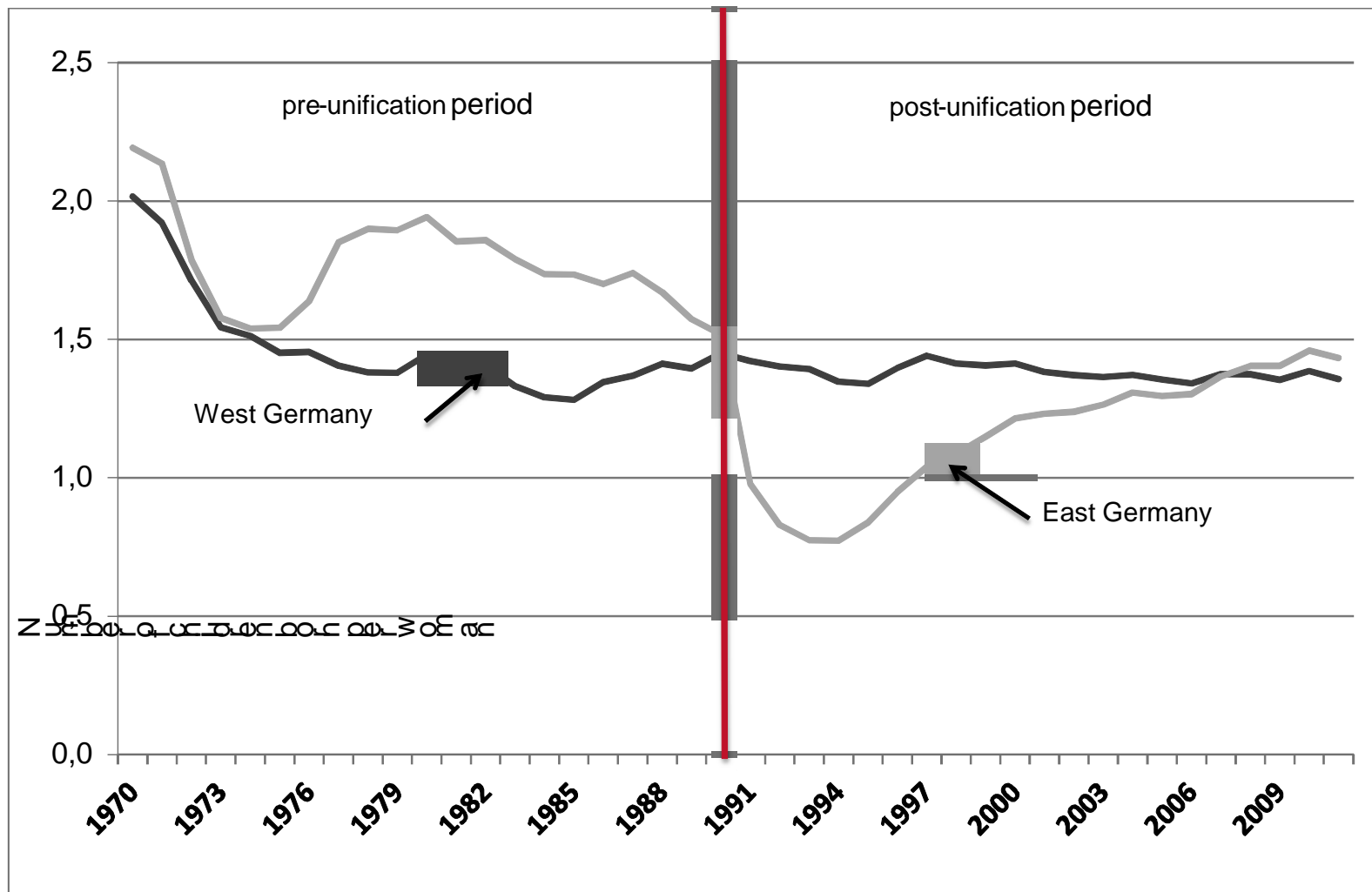


Explaining the East German Fertility Crisis: Permanent wage changes and the timing of birth

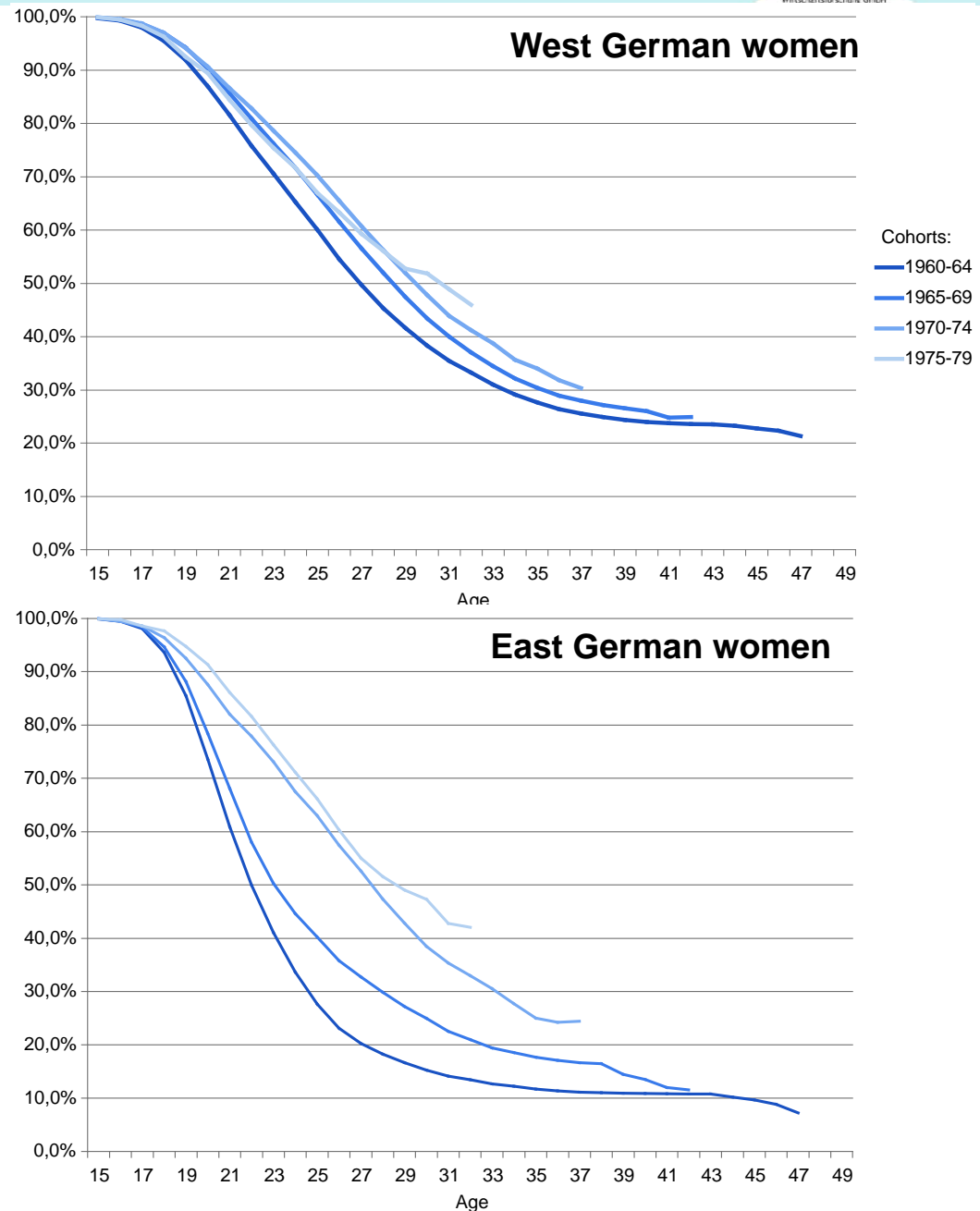
Melanie Arntz, Martha Bailey and Christina Gathmann
University of Heidelberg/University of Michigan/ZEW
SEEK Conference, Mannheim 26/04/2013

East German Fertility Decline after Unification



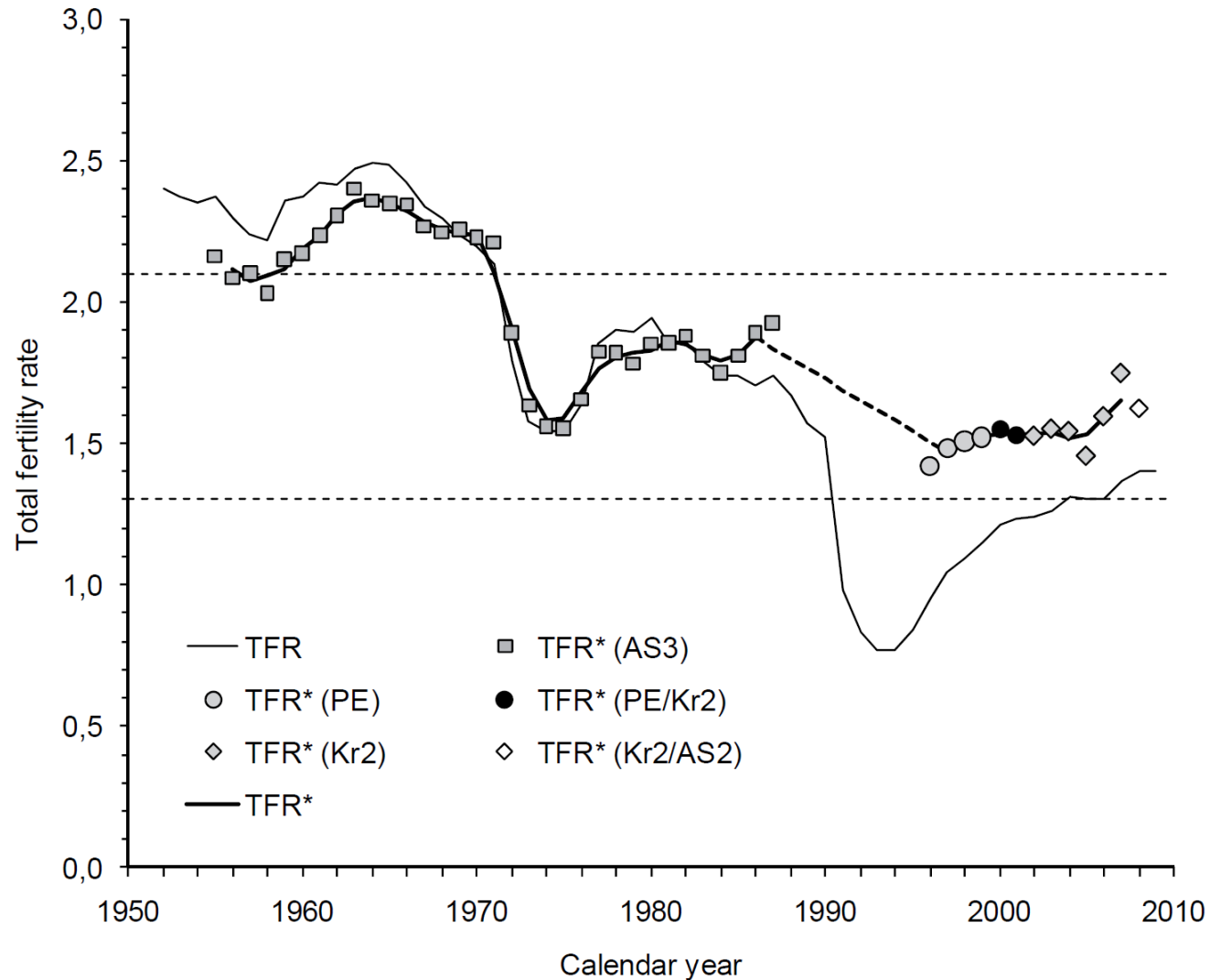
Source: Administrative birth records of the Federal Statistical Office

Share of childless women by age, cohort and origin



Source: Own calculations based on the VSKT 2007

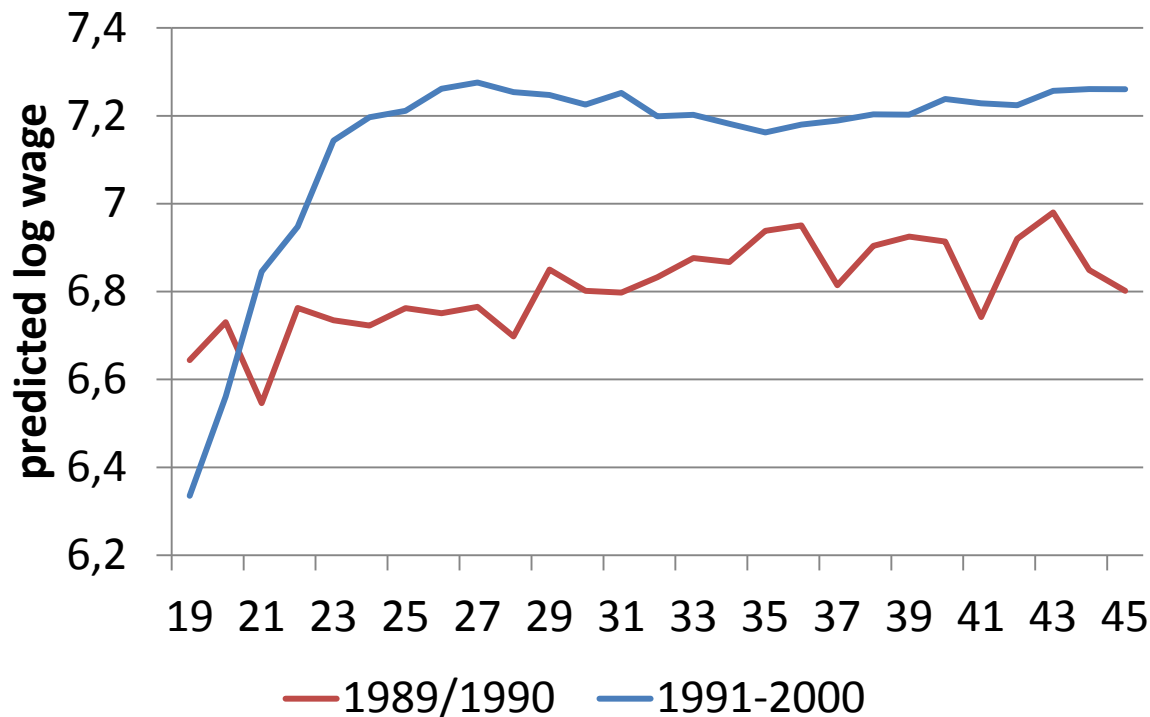
Tempo-adjusted TFR for Eastern Germany (Luy and Pötzsch 2010: 621)



Our explanation:

Steepening of age-earnings profiles after unification

Predicted monthly log wages for women of East German origin by age (SOEP):



Prior to 1990:

1. Flat age-earnings profiles
2. Cost of career break = wages during break

After 1990:

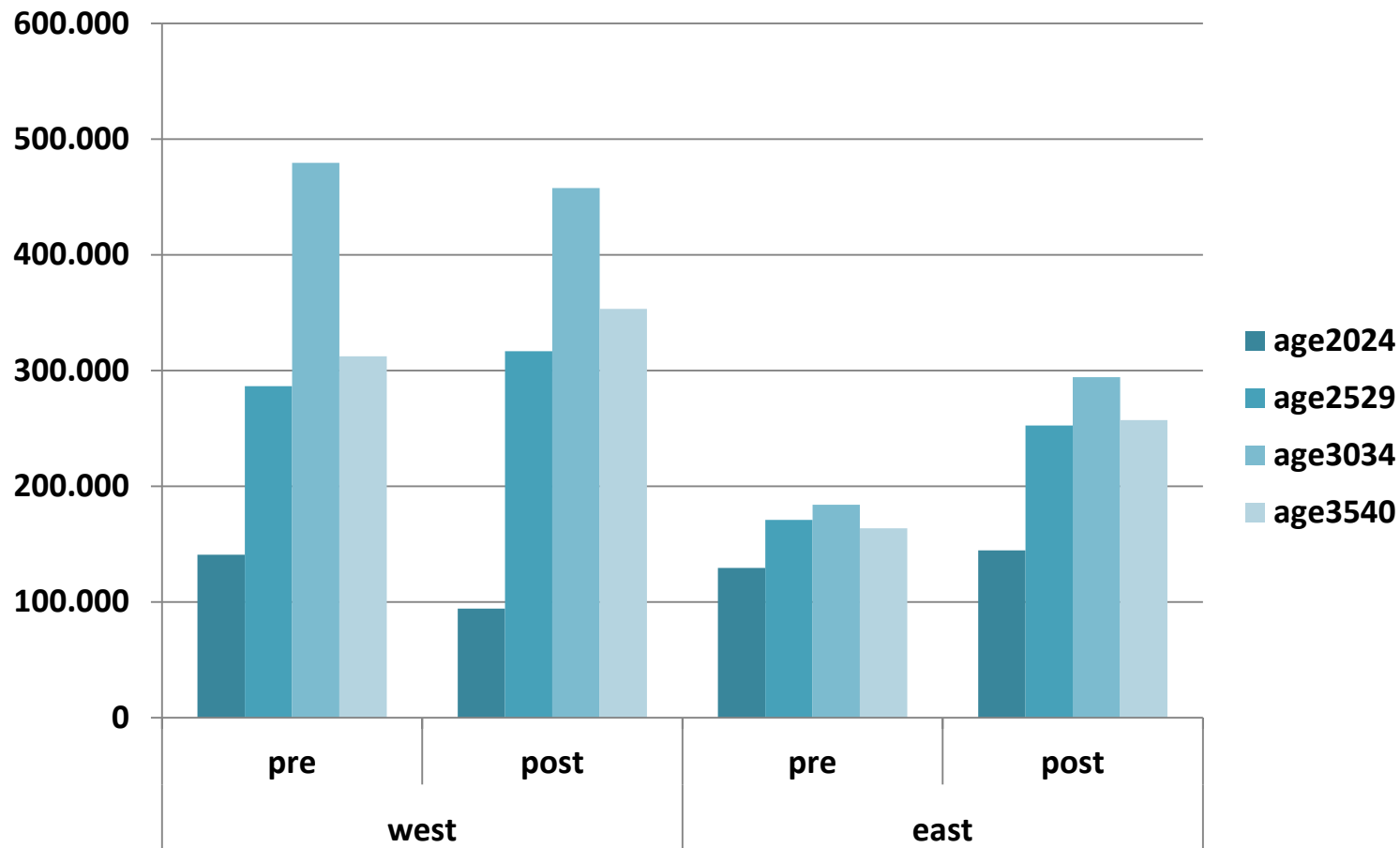
1. Higher wages and lifetime earnings ($\uparrow\downarrow?$)
2. Higher returns to (early) experience

(Cost of career break = wages during break + loss in lifetime earnings)

=> postpone births

Lifetime earnings depending on timing of first birth

Total career wage for next 15 years when having first child during the age of 20-24, 25-29, 30-34 and 35-40 (SOEP):



Alternative Explanations:

- **Increase in Unemployment Risk**
 - for Women = Lower Opportunity Cost of Time
→ **Fertility** ↑ (Substitution effect)
 - for Men = Decline in Income → **Fertility** ↓ (Income effect)
- **Rise in Household Income** → **Fertility** ↑ (Income effect)
- **Public Transfers for Families** ↑↓?
similar effect than change in household income
- **Change in Stability of Marriages/Partnerships** ?

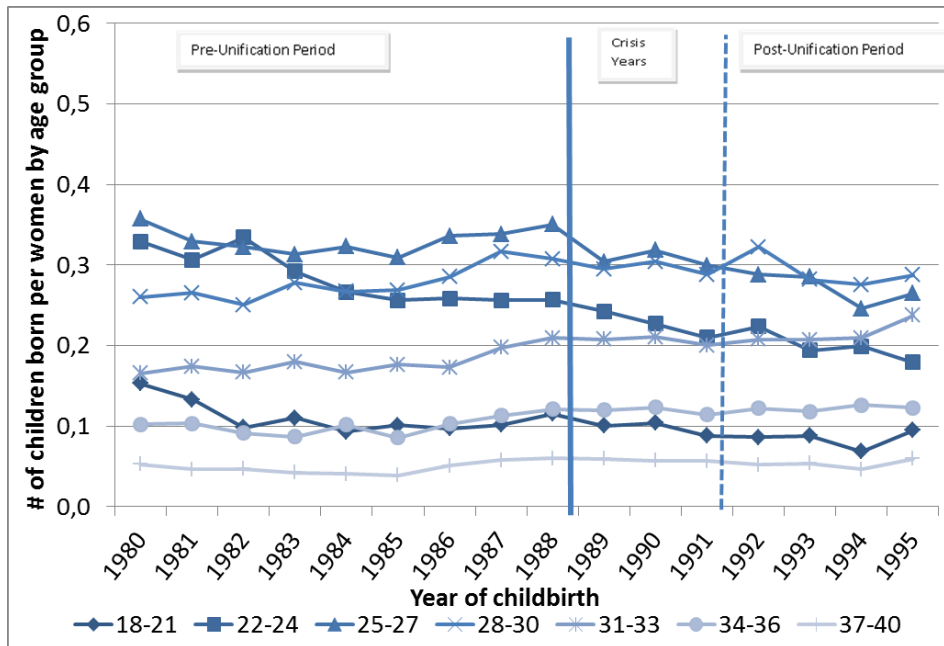
Contribution

1. Identify role of permanent changes in wages for changing fertility patterns after unification by ...
 - ... using unique administrative life-cycle data for West and East German birth cohorts from 1940 to 1992
 - ... using plausibly exogenous shifts in permanent wages in the post- relative to the pre-unification period
2. Shed light on how the timing of births and the total demand for children responds to permanent (rather than transitory changes) in wages and employment risk

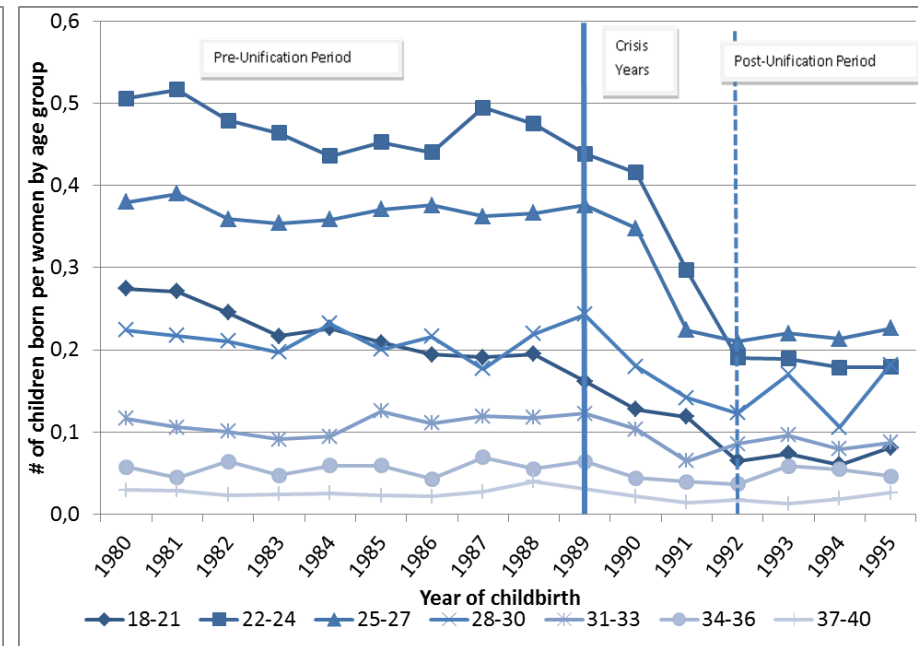
Life-cycle data – VSKT 2007

- labor market and fertility history of a 1% sample of birth cohorts 1940-92 with at least one pension record in 2007
- only microdata recording all births by women of East and West German origin
- restrict data to cohorts 1940 to 1977 (authorized accounts)
- exploit 68,032 births of 104,387 women during 1980 to 2000 in order to calculate age-specific fertility rates for 2,576 cells with more than 30 women:
 - 21 age groups (20 to 41 years of age)
 - 3 educational degrees (no voc./voc. training/tertiary education)
 - 2 origins (east/west)
 - 21 years of childbirth (1980 to 2000)

Fertility rates by age groups and origin, VSKT2007 1980-1995



West German origin



East German origin

→ Treatment effect which is stronger the younger a cohort at unification

Econometric approach

$$AFR_{j l k t} = \alpha + \theta_j + \gamma_l + \beta_1 east + \beta_2 post + \beta_3 treat + \gamma X_{j l k t} + \varepsilon_{j k l t}$$

AFR: age-specific fertility rate for J=21 age groups, L = 3 education groups, K = 2 origins (east, west) and T = 21 years

east: dummy for east German origin

post: dummy for post-unification period

treat: treatment intensity

X: cell-specific wage and employment conditions

what_career: total predicted wage for next 15 years (in 1,000 Euros)

what_child_now: total predicted wage when having child now

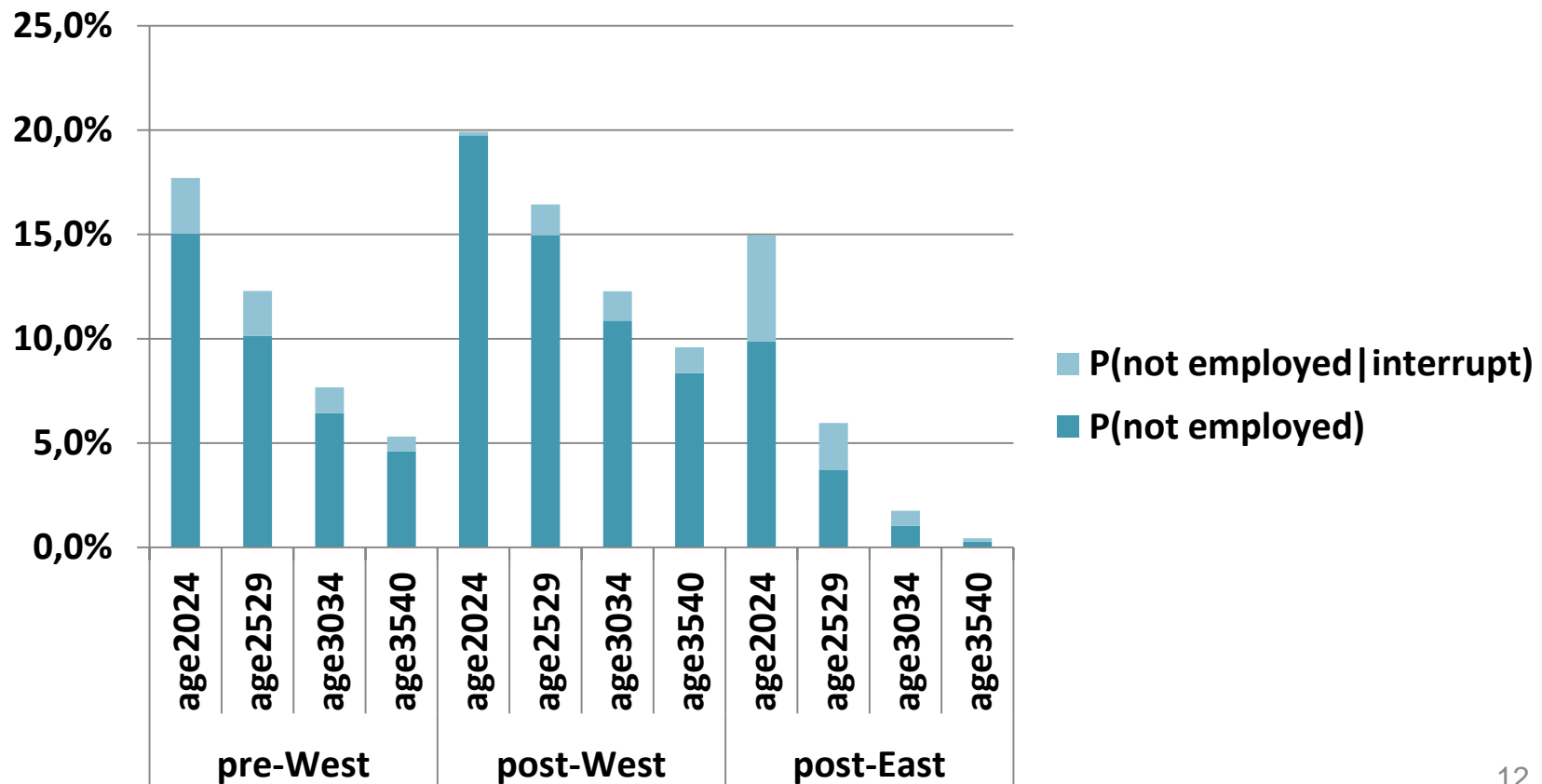
what_child_next: total predicted wage when postponing birth by 5 yrs

unemp: average (non-)employment risk for next 15 yrs

unemp_interrupt: average (non-)employment risk for next 15 yrs
when losing 3yrs of work experience now

Unemployment risks with/without interrupting

- Unemployment probability as a function of age, tenure and age x tenure by education, pre/post, east/west
- Predict average employment rate for the next 15 years with and without interruptions (loss in experience of 3 yrs)

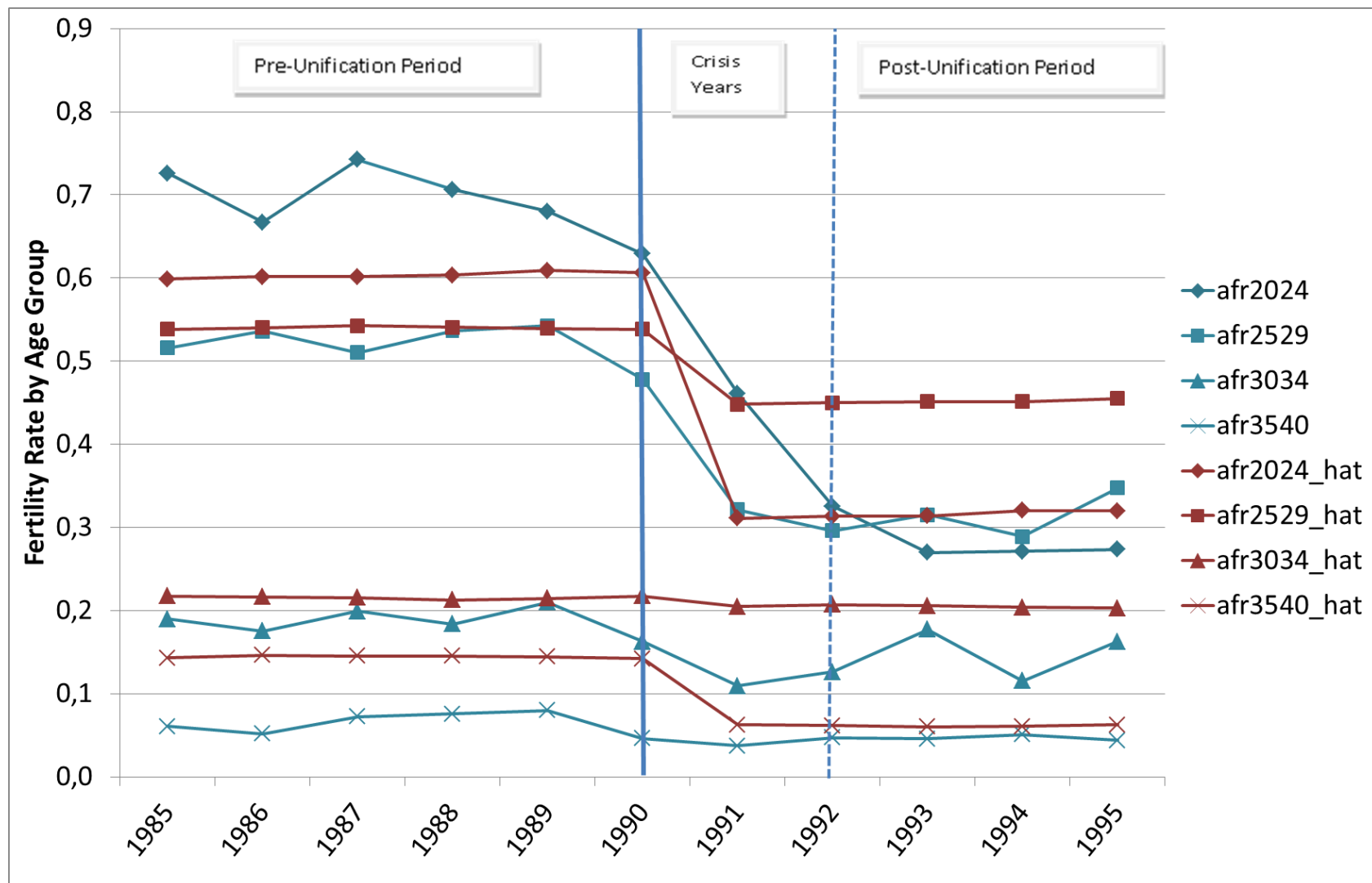


Estimation results

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 4 – east only |
|---------------------|------------|------------|------------|------------|---------------------|
| Voc. training | -0.0073*** | -0.0036 | -0.0032 | -0.0053* | -0.0037 |
| Tertiary Education | -0.0174*** | -0.0166** | -0.0254*** | -0.0319*** | -0.0119 |
| East | 0.0070 | 0.0038 | 0.0137** | 0.0313*** | n/a |
| Post | -0.0061 | -0.0034 | -0.0045 | -0.0033 | 0.0227** |
| East_post_int | -0.0357*** | | | -0.0342*** | -0.0472** |
| What_career | | -0.0002*** | -0.0002*** | -0.0001*** | -0.0004*** |
| What_child_now | | 0.0002*** | 0.0003*** | 0.0003*** | 0.0006*** |
| What_child_next | | -0.0001*** | -0.0001** | -0.0001** | -0.0003 |
| Unemp | | | 0.0069*** | 0.0038*** | 0.0027* |
| Unemp_interrupt | | | -0.0075*** | -0.0047*** | -0.0041* |
| N | 2576 | 2576 | 2576 | 2576 | 1278 |
| Adj. R ² | 0.4883 | 0.5685 | 0.6032 | 0.6116 | 0.6708 |

Note: Standard errors clustered by 38 cohort/origin cells

Observed and predicted fertility rates by age group



Conclusion

- Fertility decline after reunification mainly results from adaption to West German pattern of age at first birth
- Exploit unification as exogenously shifting permanent wages
- Postponement of birth driven by
 - Steepening of wage profiles
 - Increasing wage penalty from child interruptions early in career
 - Increasing unemployment risk for women
 - Increasing unemployment risk after interruptions
- Good predictive power for fertility decline
- Opportunity structure of West German labour market sets strong incentives for postponing birth

Outlook

- take account of relevant other factors
 - Uncertainty (transitory changes)
 - Institutional changes (child benefits, housing benefits etc.)
 - Unemployment risks of men
 - Changes of household incomes
- check robustness of wage and employment estimates
 - correct for selection into employment?
 - fit more flexible models (if possible)

Back-Up

| Variable | base1 | base2 | base3 |
|---------------|------------|------------|------------|
| _Iage_21 | 0.0089 | 0.0089 | 0.0091 |
| _Iage_22 | 0.0225*** | 0.0227*** | 0.0229*** |
| _Iage_23 | 0.0202*** | 0.0201*** | 0.0203*** |
| _Iage_24 | 0.0291*** | 0.0290*** | 0.0290*** |
| _Iage_25 | 0.0324*** | 0.0323*** | 0.0319*** |
| _Iage_26 | 0.0284*** | 0.0284*** | 0.0276*** |
| _Iage_27 | 0.0246*** | 0.0245*** | 0.0233*** |
| _Iage_28 | 0.0218*** | 0.0216*** | 0.0199*** |
| _Iage_29 | 0.0108 | 0.0107 | 0.0086 |
| _Iage_30 | 0.0059 | 0.0058 | 0.0034 |
| _Iage_31 | -0.0028 | -0.0028 | -0.0056 |
| _Iage_32 | -0.0124 | -0.0124* | -0.0155* |
| _Iage_33 | -0.0204** | -0.0203** | -0.0238*** |
| _Iage_34 | -0.0271*** | -0.0271*** | -0.0309*** |
| _Iage_35 | -0.0339*** | -0.0339*** | -0.0380*** |
| _Iage_36 | -0.0396*** | -0.0396*** | -0.0440*** |
| _Iage_37 | -0.0468*** | -0.0469*** | -0.0516*** |
| _Iage_38 | -0.0503*** | -0.0504*** | -0.0555*** |
| _Iage_39 | -0.0536*** | -0.0536*** | -0.0591*** |
| _Iage_40 | -0.0576*** | -0.0576*** | -0.0634*** |
| _Ieduc_2 | -0.0074*** | -0.0073*** | -0.0073*** |
| _Ieduc_3 | -0.0175*** | -0.0174*** | -0.0174*** |
| east | -0.0024 | 0.0089 | 0.0070 |
| post | -0.0163*** | -0.0042 | -0.0061 |
| east_post | | -0.0246*** | |
| east_post_int | | | -0.0357*** |
| _cons | 0.0825*** | 0.0768*** | 0.0802*** |
| N | 2576 | 2576 | 2576 |
| r2_a | 0.4682 | 0.4852 | 0.4883 |

legend: * p<.05; ** p<.01; *** p<.001

Base 2 specification:

$$AFR_{j l k t} = \alpha + \theta_j + \gamma_l + \beta_1 east + \beta_2 post + \beta_3 east_post + \varepsilon_{j k l t}$$

with

AFR: Age-specific fertility rate

J= 21 (age groups),

L = 3 (education groups),

K = 2 (east, west),

T = 21 (years)

Base 3 specification:

$$AFR_{j l k t} = \alpha + \theta_j + \gamma_l + \beta_1 east + \beta_2 post + \beta_3 east_post_int + \varepsilon_{j k l t}$$

Estimating career wages (SOEP)

- Mincer wage equations with experience, education, experience x education for women aged 20 to 45 years, estimated separately by pre/post-unification period, Eastern and Western Germany
- Predict total career wage for next 15 years

