Is the Motherhood Wage Penalty strongest for highly skilled Women?

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• This study: use FE model with Individual Slopes (FEIS) to test and correct for these biases
• Large degree of heterogeneity for women’s wage trajectories
  • not just different wage levels, but different slopes
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• Heterogeneity of wage trajectories might be related to motherhood
  • Women sorted into occupations with low wage growth (Polachek 1981), more likely with strong preference for motherhood
  • Women with strong career motivation stay childless and have stronger wage growth (Hakim 2002)
  • If women with low wage growth select themselves into motherhood, standard FE will overestimate the average motherhood penalty
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  • highly skilled have shorter employment breaks after child birth (endowment)
  • highly skilled loose more with equal length of break (differential returns)
• **Strong arguments (and evidence) for skill-based wage profiles**
  • steeper with (observed) higher formal education (ED)

• Skill-based heterogeneity of wage trajectories might be related to motherhood

• Need to control for interaction of skills and age

• But skills partly unobserved (B)

• FE returns biased estimates of motherhood penalties by (observed) level of skills

• Skill-based heterogeneity of wage trajectories might NOT be related to motherhood

• Even then, need to control for interaction of skills and age

• But unobserved skills (B) likely correlated with observed skills (A, ED)

• FE returns biased estimates because B#age correlated with ED#age and A#age

• FE with Individual Slopes (FEIS) (Wooldridge 2010) returns unbiased estimates of motherhood penalties
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Estimation and tests using Stata or R

**Stata**

Installation  
ssc install xtfeis

Estimation  
xtfeis y x, slope(t) cluster(id)

ART  
xtart [FEIS] [, fe re]

BSHT  
xtbsht FEIS FE, seed(123) reps(100)

**R**

Installation  
install.packages("feisr")

Estimation  
feis(y ~ x | t, data=df, id="id", robust=TRUE)

ART  
feistest(FEIS, robust=TRUE, type="all")

BSHT  
bsfeistest(FEIS, seed=123, rep=100, type="all")

• Rüttenauer & Ludwig (2019)
• National Longitudinal Survey of Youth (NLSY79), waves 1979-2012
  • Sample restricted to women, childless and never-married at first observation, currently working, at least 4 valid person-years
  • $N = 3,150$, $NT = 39,706$
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• Main Indep vars:
  • Number of biological children, dummy currently married
  • Cognitive Skills: AFQT test score (Armed Forces Qualification Test), dummy for low / high IQ
  • Educational attainment: years of formal schooling, dummy for low / high attainment at labor market entry (before 1st child birth)
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• Control vars: Dummy educational enrollment, Survey year (grouped)
Results: Wage profiles by women’s level of skills

Non-mothers

Log hourly wage (predicted)

Age

16-20 21-25 26-30 31-35 36-40 41-45 46-55

low ED - low AFQT
low ED - high AFQT
high ED - low AFQT
high ED - high AFQT
Results: Wage profiles by women’s level of skills

Mothers

Age
16-20 21-25 26-30 31-35 36-40 41-45 46-55

Log hourly wage (predicted)

low ED - low AFQT
low ED - high AFQT
high ED - low AFQT
high ED - high AFQT
Results: Effect of Motherhood and Marriage across Models

- Marriage: standard FE models biased, Motherhood: FE unbiased
- Artificial Regression Test: no need for FE or FEIS models to estimate effect of motherhood
Results: Effects of Motherhood by Skill level

- **FE models**: motherhood penalty does vary by skill, results heavily depend on specification
- **FEIS model**: motherhood does not vary by skill

![Graph showing motherhood wage penalty per child (%) for different skill levels and FE model specifications.](image)
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