The role of earnings expectations versus non-pecuniary factors in university attendance

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Sciences Po

Motivation

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  - Increased earnings
  - Better health

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- **Often taxpayers are paying for these benefits**
  - £17 billion upfront costs of higher education in the UK in 2017 (Dearden et al., 2017)
  - OECD countries' public spending on HE $\approx$ 1% of GDP (OECD, 2020)

Motivation

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- Lots of evidence of benefits of a university degree
- Often taxpayers are paying for these benefits
- **Persistent gap in HE attainment by socio-economic status**
  - and hence in who enjoys these state-sponsored benefits
  - England: children of parents' earning in top 20% **twice as likely to attend university** as children of parents in the bottom 20%
  - "SES-gap" in attainment up to 30pp across OECD countries (OECD, 2018)
  - is HE actually hindering social mobility?

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Understanding the factors that influence educational attainment is key, not only for educational outcomes but also for wider issues such as inequality and who benefits from public spending

Research questions + contributions

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- What's driving the SES-gap in educational attainment?
- How have these factors changed over a period of expansion in HE attainment (1980s to today)?

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  - US: Heckman et al. (2006) estimate earnings and "psychic costs"
  - France: D'Haultfoeuille and Maurel (2013) similar exercise
  - both rely on family background heterogeneity to estimate non-pecuniary factors
- This paper:
  - I exploit data on expectations about non-pecuniary aspects
    $\rightarrow$ more relevant heterogeneity
    $\rightarrow$ can **decompose** non-pecuniary factors [in progress]
  $\Rightarrow$ and find a large role for non-pecuniary factors
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  - 10% response rate, students still at university
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- Panel data for cohort born in 1989/90
- Model + data $\rightarrow$ estimate distributions of factors
- Re-estimate model on cohort born in 1970

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- **Model the decision to go to university**
  - Extended-Roy model of educational choice at age 16 / 17
  - Explicitly include earnings expectations and other factors
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Road map

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- **Panel data for cohort born in 1989/90**
  - Schooling, background, and non-pec. expectations from before decision
  - Choices: did they *complete* university? (96% completion rate)
  - Earnings and occupation after entry to labour market (age 25)
- Model + data $\rightarrow$ estimate distributions of factors
- Re-estimate model on cohort born in 1970

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- **Re-estimate model on cohort born in 1970**
  - Compare across cohorts
  - $\rightarrow$ understand drivers of expansion of HE in England

Introduction

Extended Roy-model including psychic costs

Large-cohort panel data

Identification and estimation

Results

Conclusion

Factors in the decision to attend university

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- life after university:
  - $+$ better job / career
  - $\pm$ graduate “identity”
  - $-$ debt

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Different factors enter utility function *additively*

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- ϵ_S is a random utility term
- terms differ for each individual conditional on choice S

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- probability of attending university conditional on Y_s^{ea} and θ_{Si} is

$$\Pr(S = 1 | Y_s^{ea}, \theta_{Si}) = \Pr(\alpha(Y_{1i}^{ea} - Y_{0i}^{ea}) + (\theta_{1i} - \theta_{0i})'\gamma > \epsilon_{0i} - \epsilon_{1i})$$

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Next Steps (main data source)

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British Cohort Study (comparison over time)

- Similar study also run by CLS
- Cohort born in one week in April 1970
- Waves every 4 years since birth

Next Steps (1990)

Sample design

- Sampling “unit” school: 647 of 892 selected took part
- Repr. sample oversampled minorities and “deprived” schools
- 15,770 interviews in sweep 1, from sample of 21,000 (74%)
- Sweeps annually between 14 and 20, then again at 25

Key feature: subjective, open-ended questions about advantages and disadvantages of attending university

- subjective: captures which aspects **each** student considers
- open-ended: students can mention anything, not leading q’s
- questions specifically about attending university
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Subsample: all students who were asked subjective questions about university (those with > 5 GCSEs)

	Full sample	Subsample
N	6,628	4,640
Female	0.55	0.57
Degree*	0.58	0.68
*Russell group**†	0.26	0.28
Employed*	0.83	0.87
Wage (GBP)*‡	393	424

Notes: * At age 25. † Among degree holders. ‡ Median wage.

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What do you think the advantages, if any, might be for SOMEONE of going to university to study for a degree?

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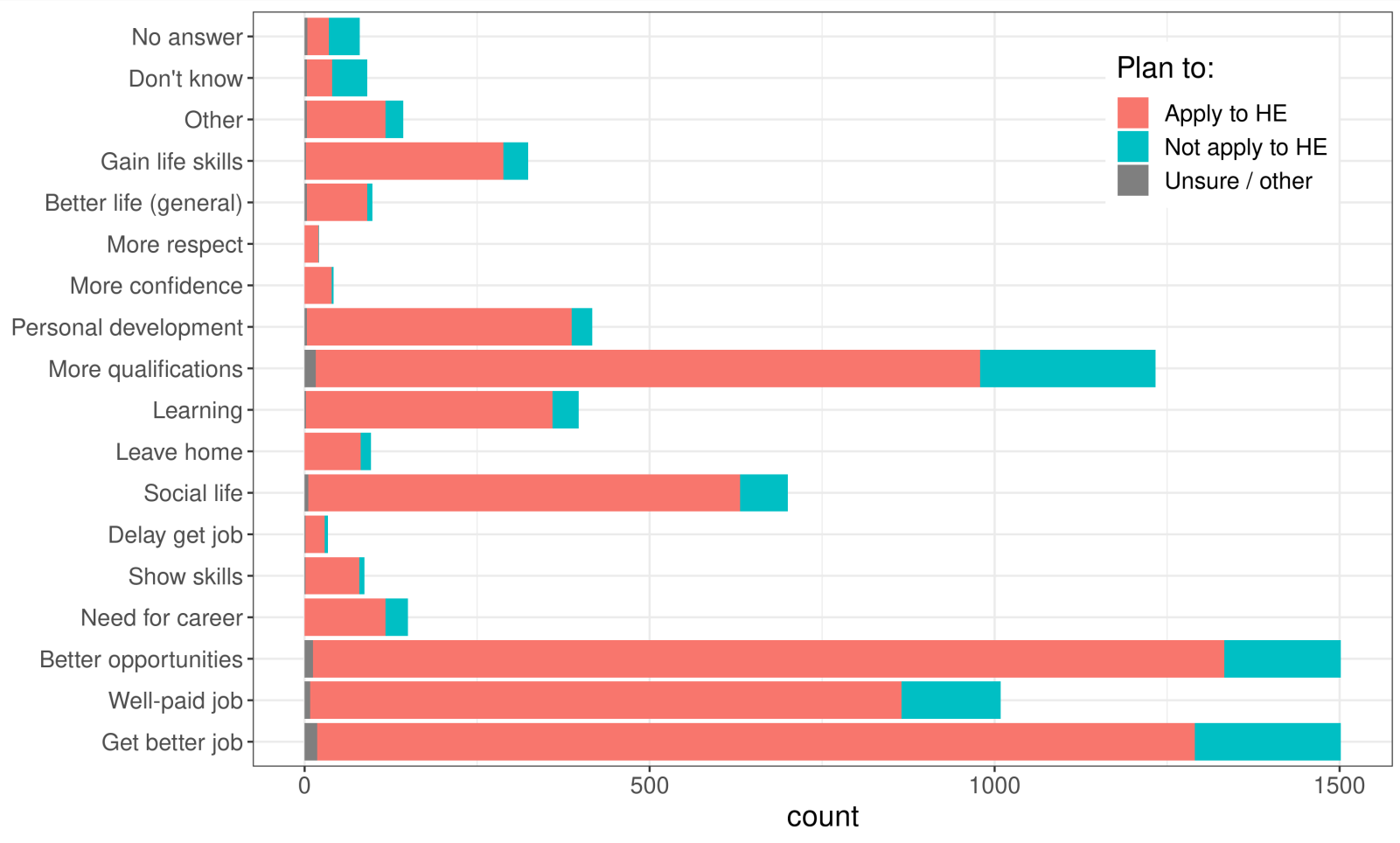

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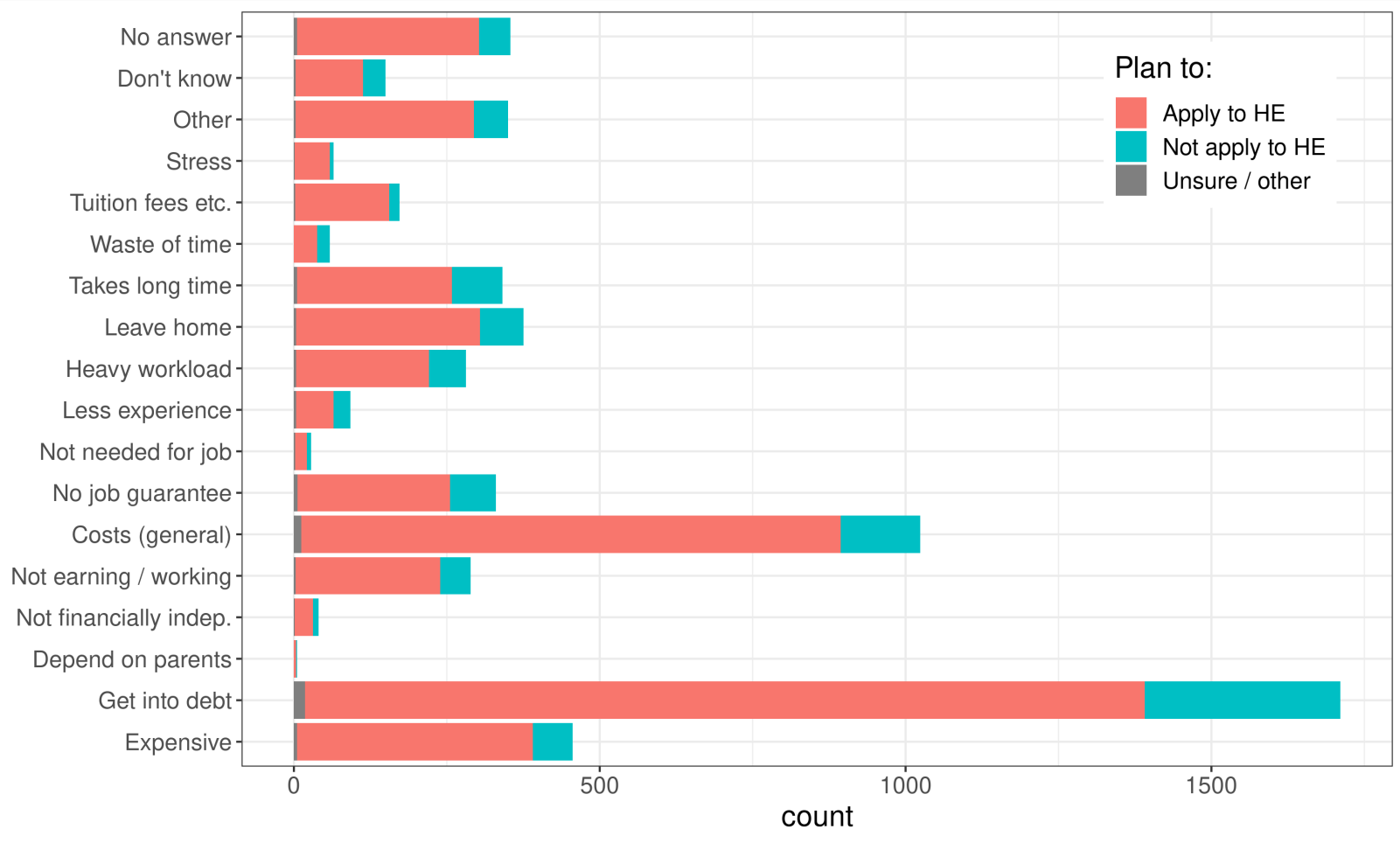

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  - value 1 if mentioned by student; 0 otherwise
  - also include family background and other characteristics

α and γ

- Recall the conditional probability of attending university

$$\Pr(S = 1 | Y_s^{ea}, \theta_{Si}) = \Pr(\alpha(Y_{1i}^{ea} - Y_{0i}^{ea}) + (\theta_{1i} - \theta_{0i})'\gamma > \epsilon_{0i} - \epsilon_{1i})$$

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- assume errors follow an extreme-value distribution

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- standard in discrete-choice models

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Parameter estimates $(\widehat{\alpha}, \widehat{\beta_k}, \widehat{\gamma})$

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  - parents': occupations, ethnicity group, education, income
  - no. A-levels taking; gender; whether think high pay is important
- recall: θ contains responses to open-ended questions (plus components of X)

Comparing earnings with other factors

- Compare relative importance of earnings versus other factors

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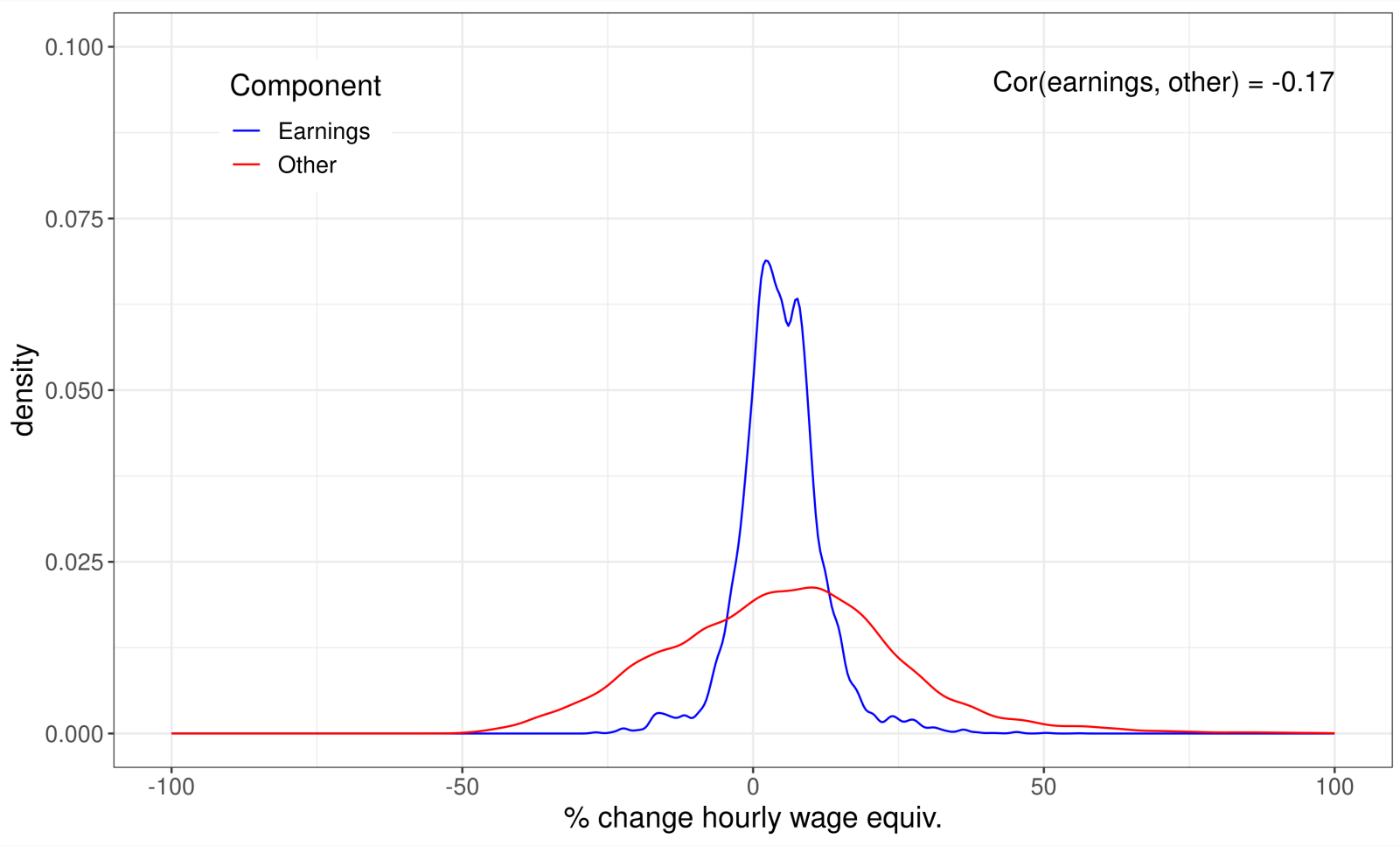
  - Transform these factors so they are equivalent to $\%\Delta$ in earnings
  - Plot the transformed distributions

Full sample (1990): earnings vs other factors

- Both distributions similarly located, with positive means (4.8% vs 4.9%)



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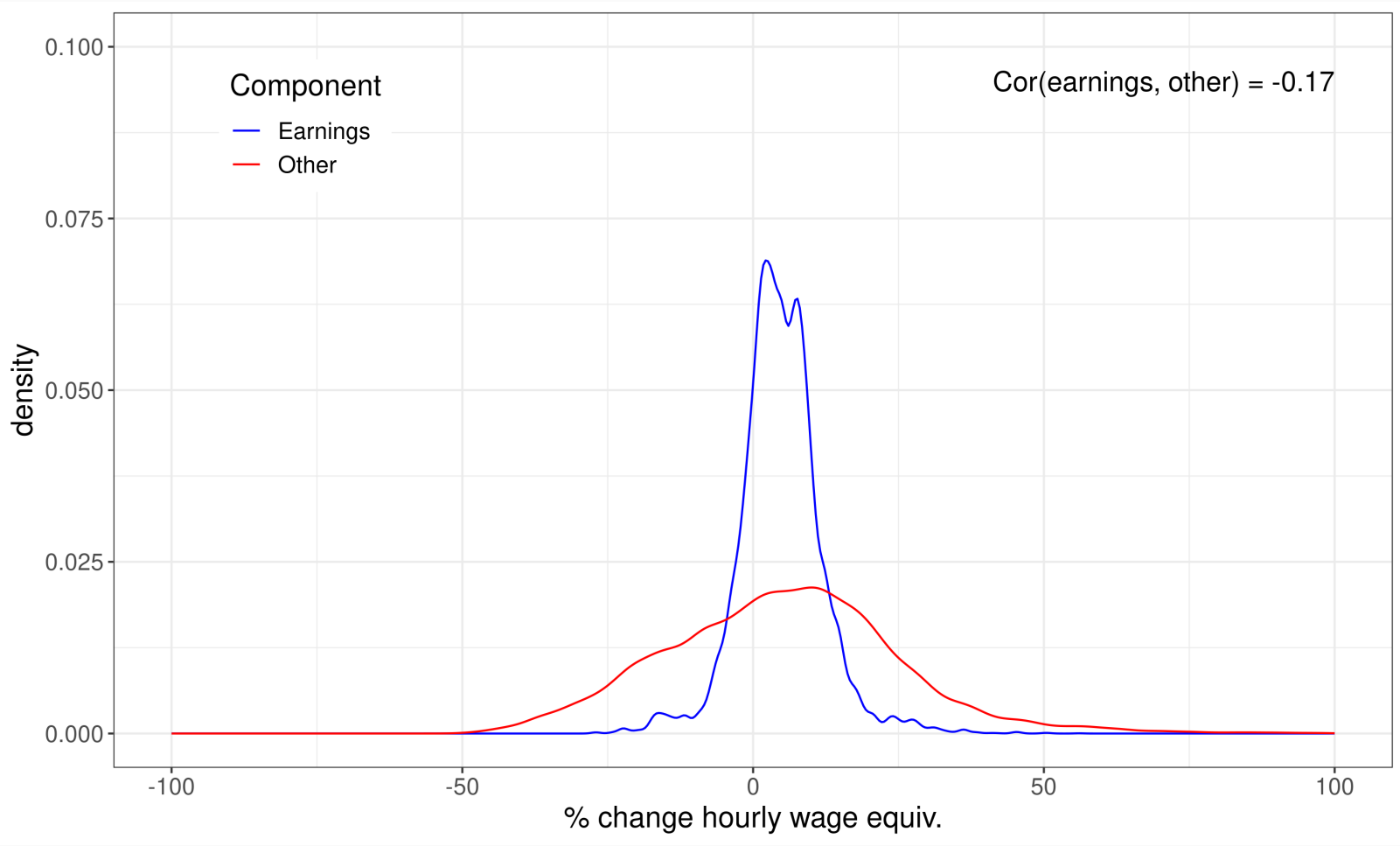

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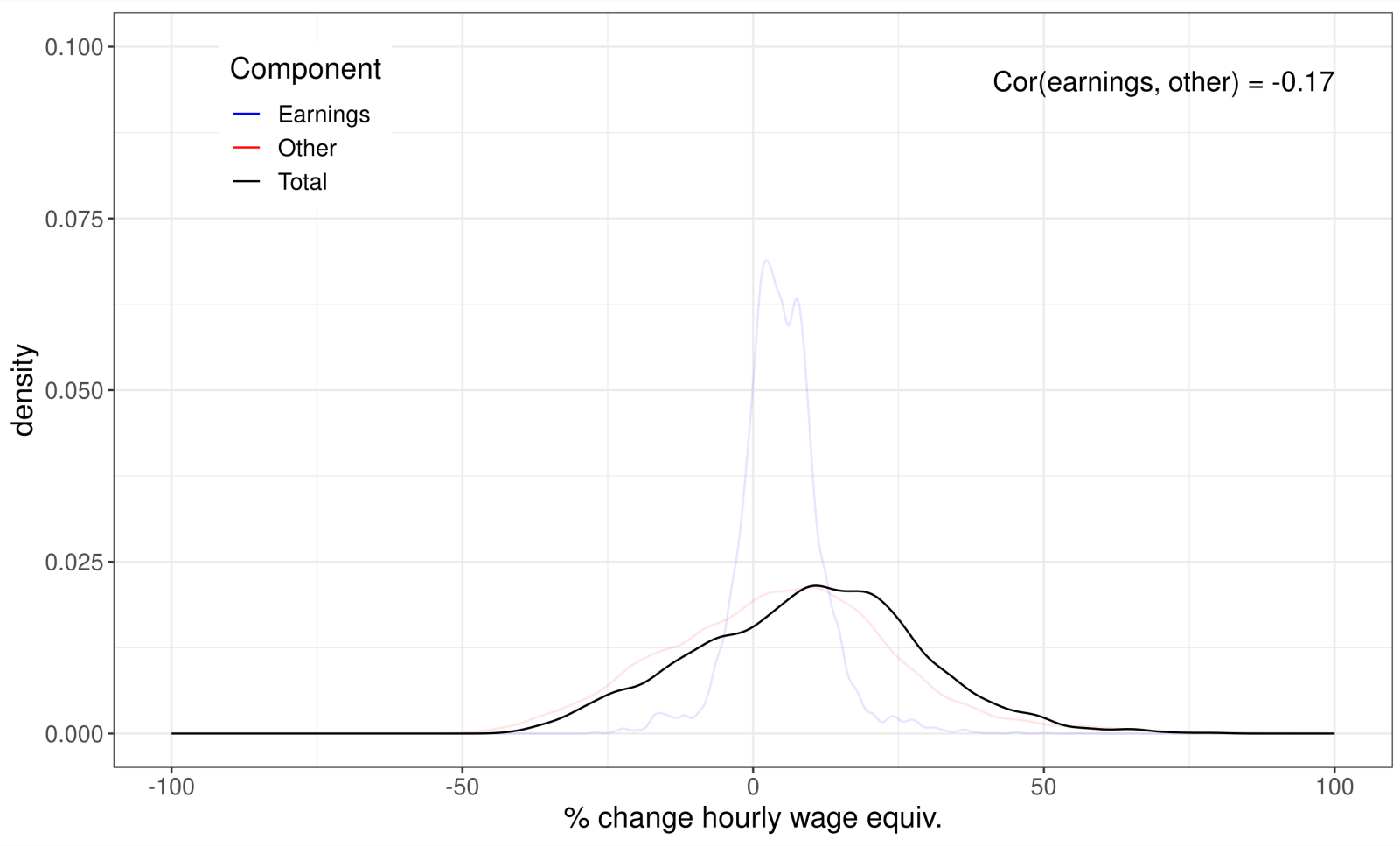
  $\Rightarrow$ Main determinant of decision is other factors: SD(total) = 19.2%



Counterfactual exercise

Variation in factors: suppose everyone has...

- ...non-pecuniary factors equal to first quartile

  $\rightarrow$ only 24.0% have high-enough earnings expectations to choose to attend university
- ...non-pecuniary factors equal to third quartile

  $\rightarrow$ now 99.5% attend university
- earnings expectations equal to first quartile

  $\rightarrow$ 61.9% have high-enough non-pec. factors to attend university
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  $\rightarrow$ still only 74.8% would attend university

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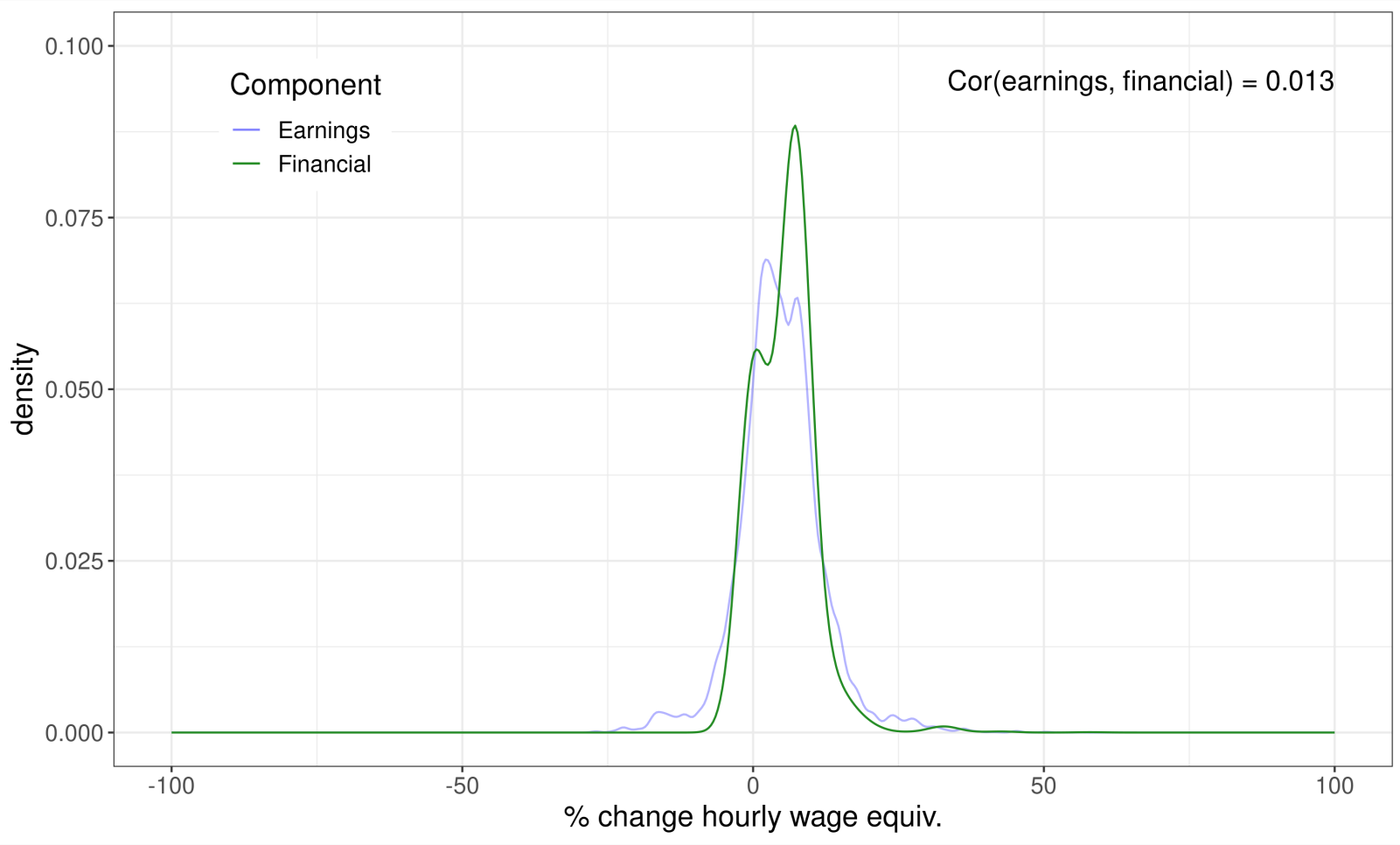
Full sample (1990): splitting θ into financial and other

- Financial factors distribution very similar to earnings expectations
- Mean financial positive (5.4%), mean other now negative (−2.1%)
- SD financial smaller (4.9%) than other (17.8%)

financial factors



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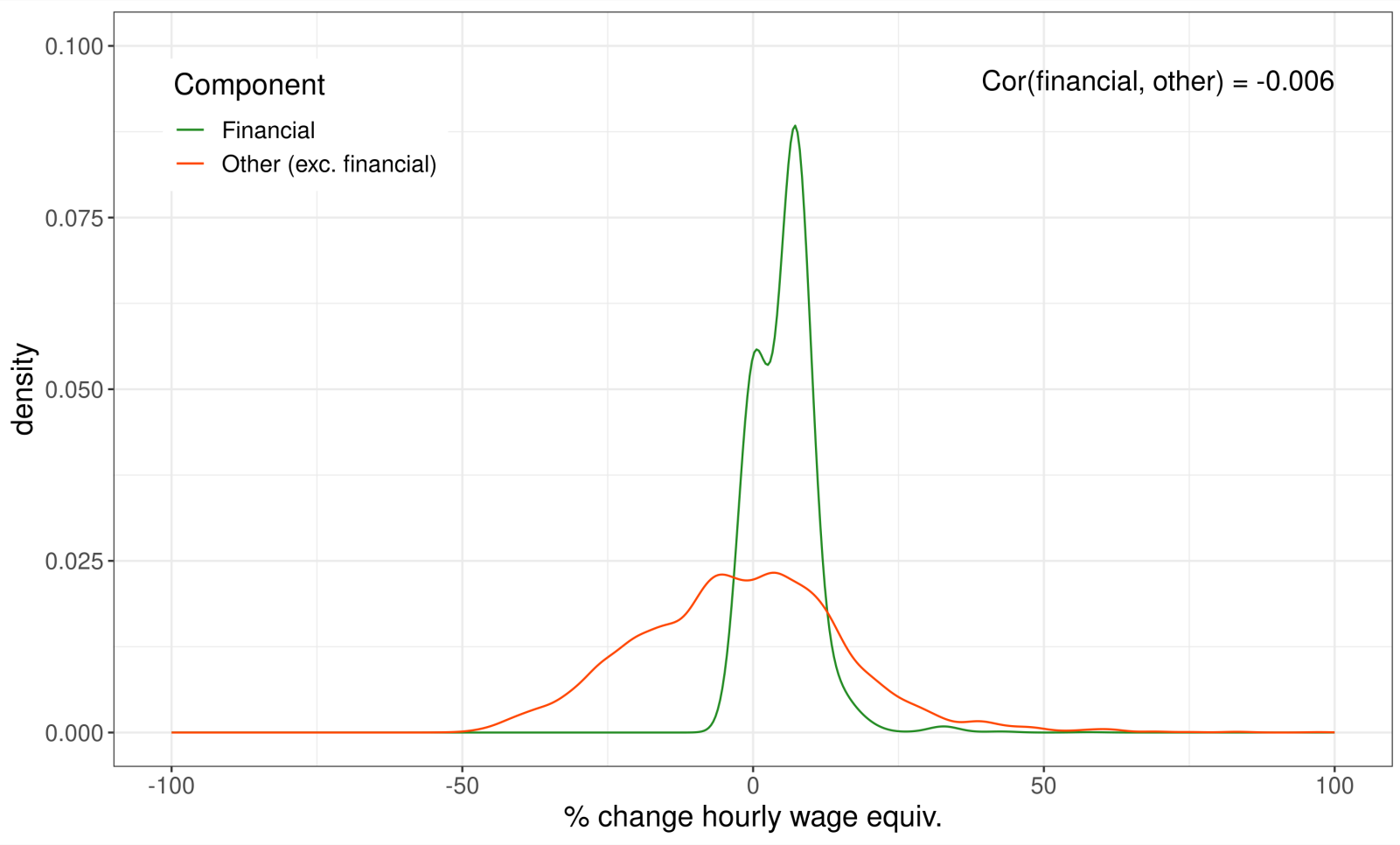

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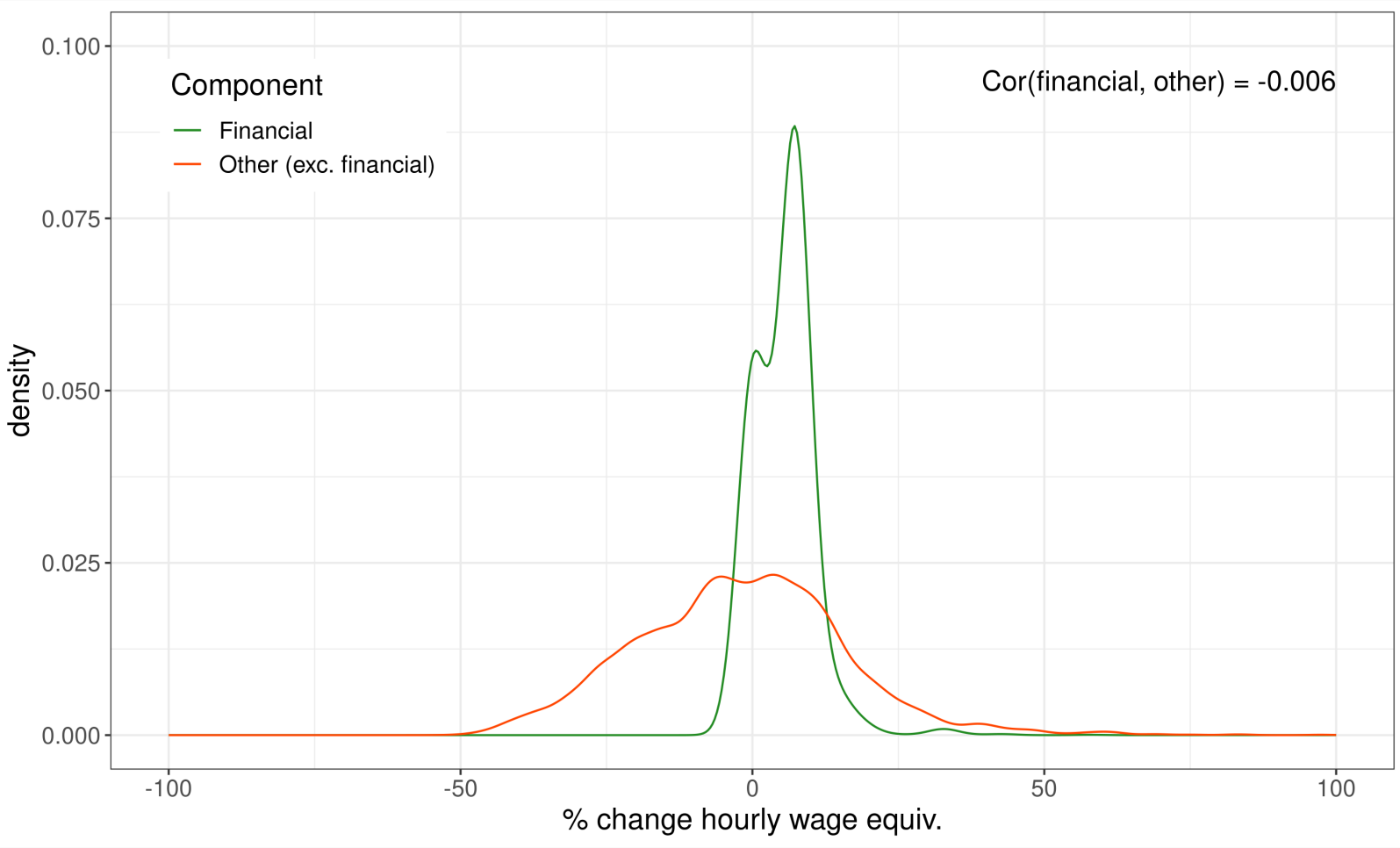


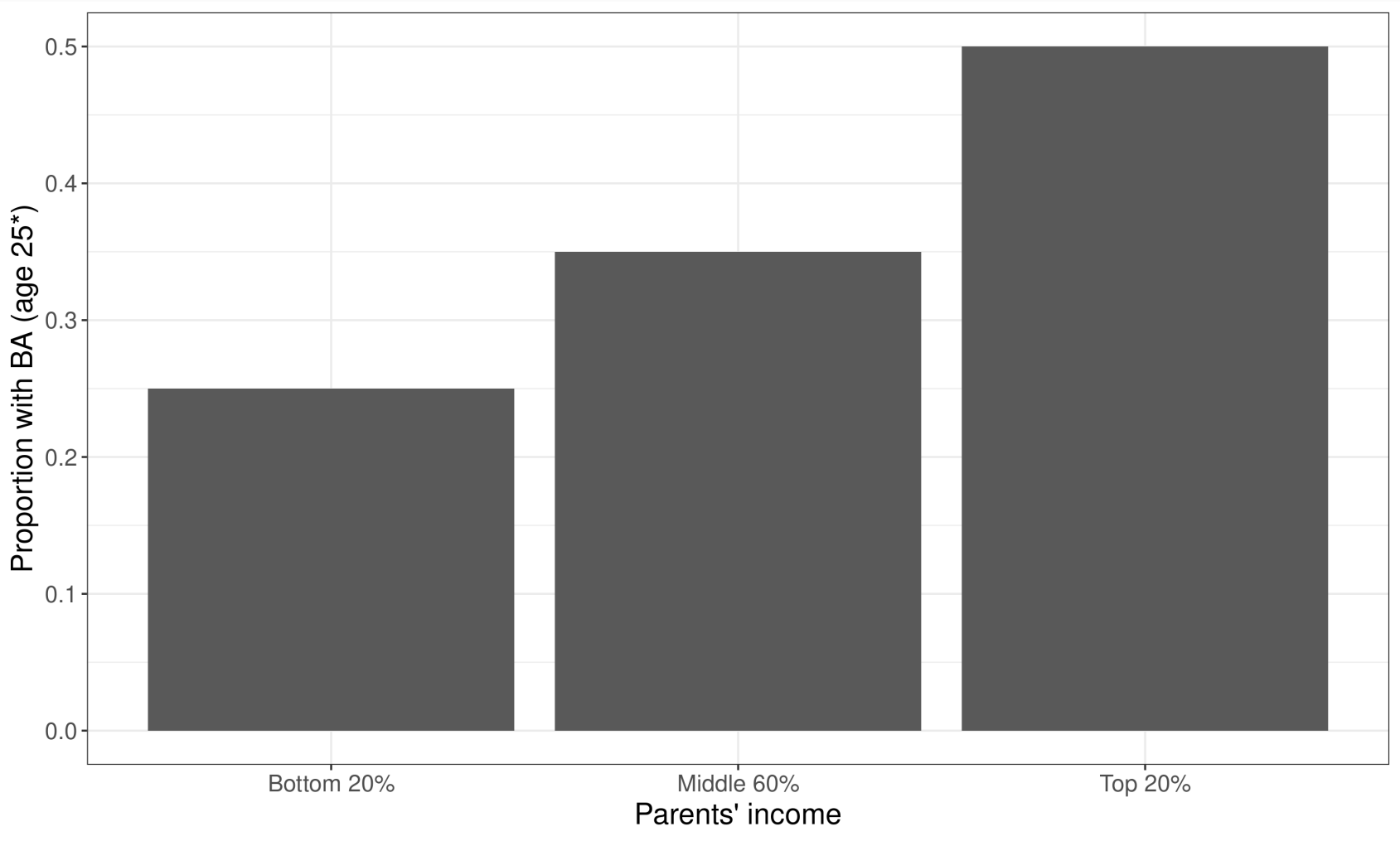
Factors by SES group

- Use same parameter estimates as before
- Split sample by parental earnings at 16 into 3 groups:
  $\rightarrow$ bottom 20%, middle 60%, top 20%
- plot distribution of factors within each group

Why?

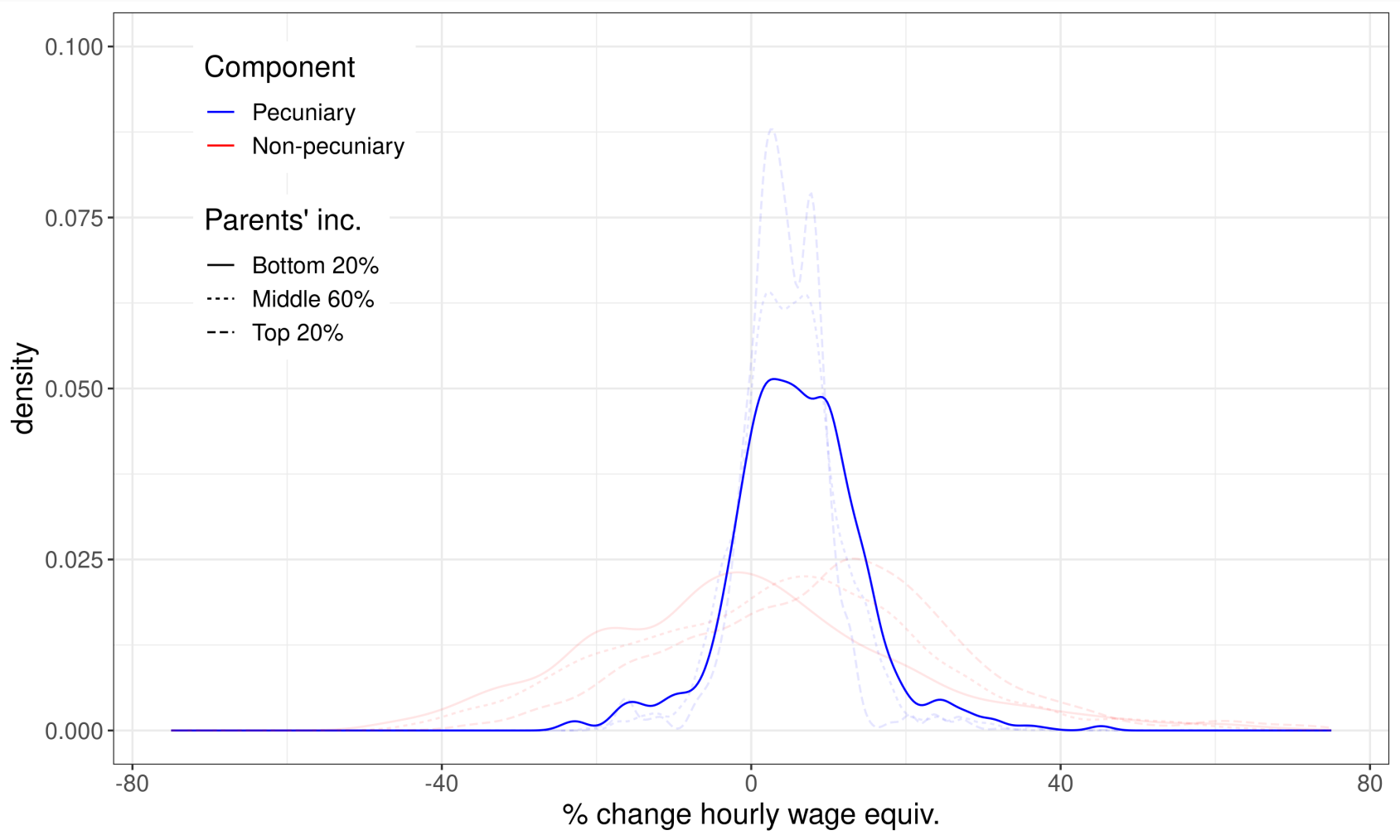
Huge SES-gap in attainment

Children of top 20% by income **twice as likely to hold BA at 25** than children of bottom 20%



By SES (1990, SES = parents' income at 16)

Parental income	Mean	Variance	Skewness
Bottom 20%	0.147	0.018	0.335
Middle 60%	0.143	0.013	0.271
Top 20%	0.099	0.008	0.650



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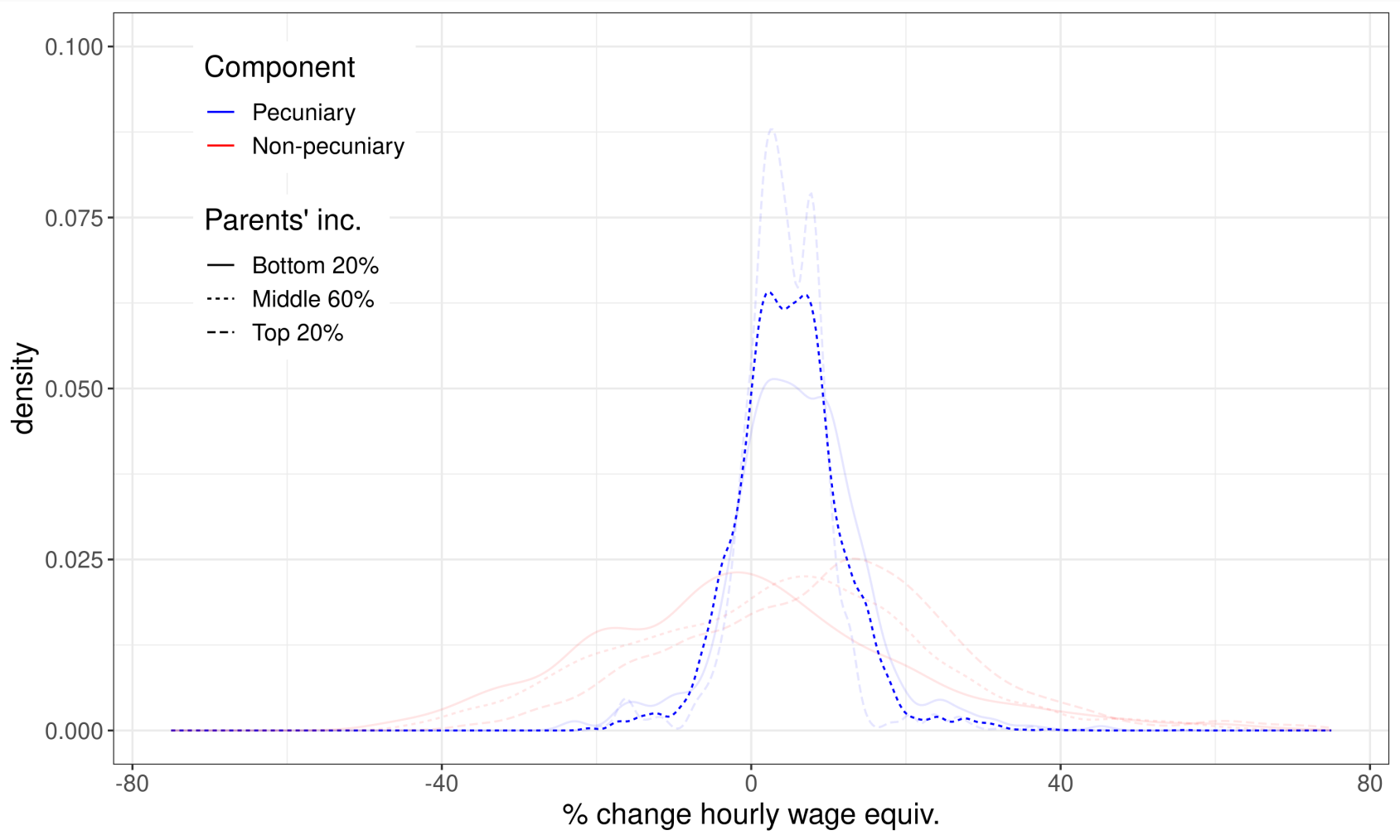

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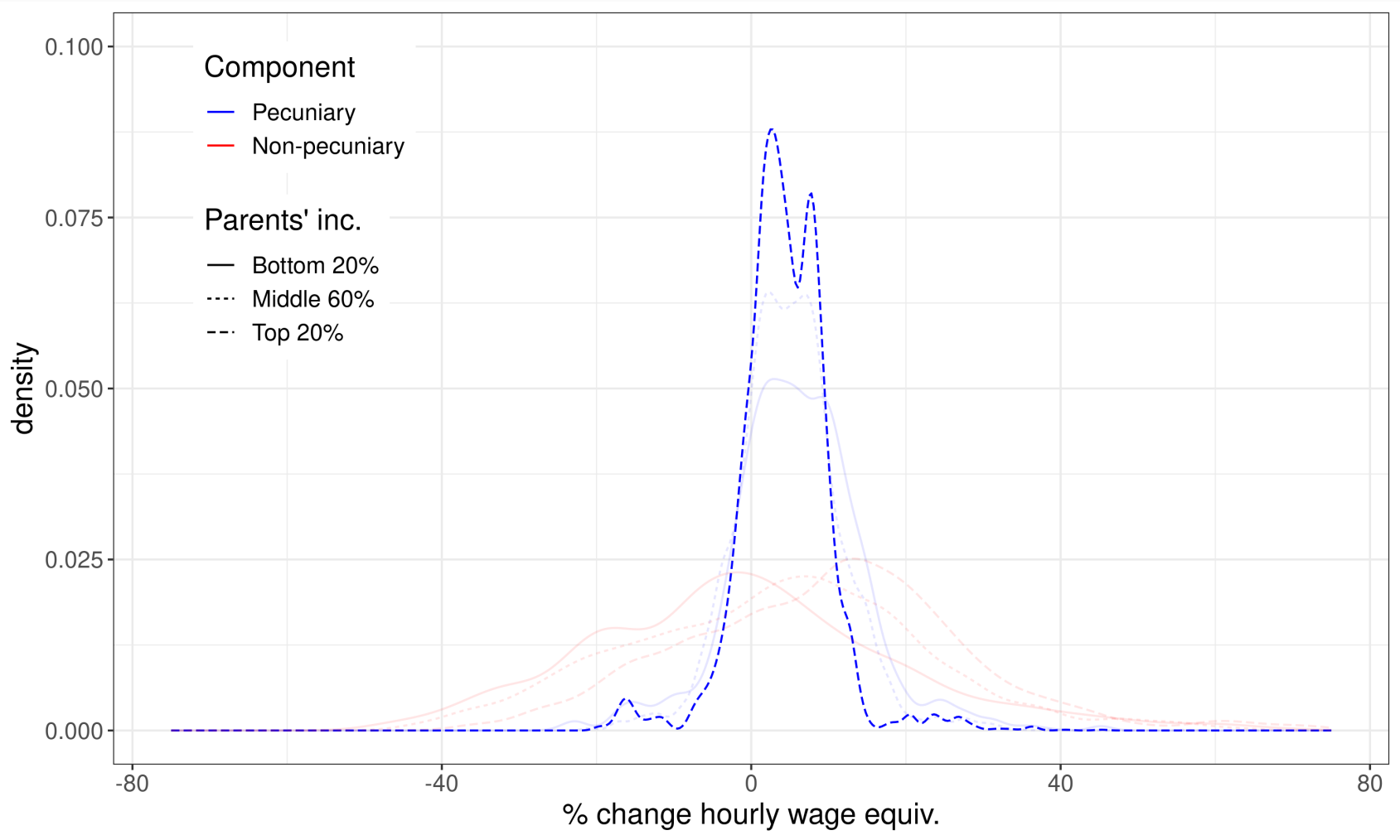

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Bottom 20%	−0.185	0.066	0.520
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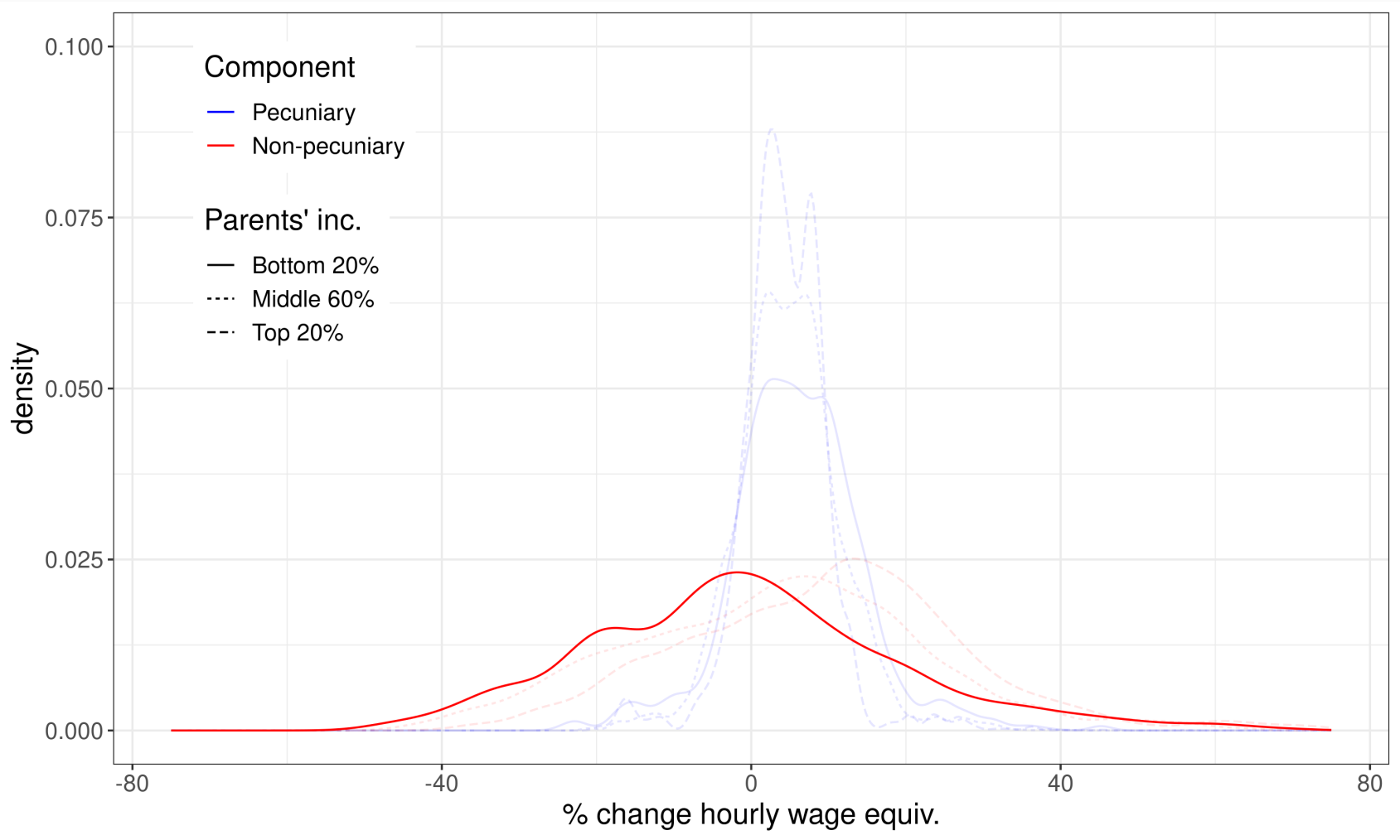

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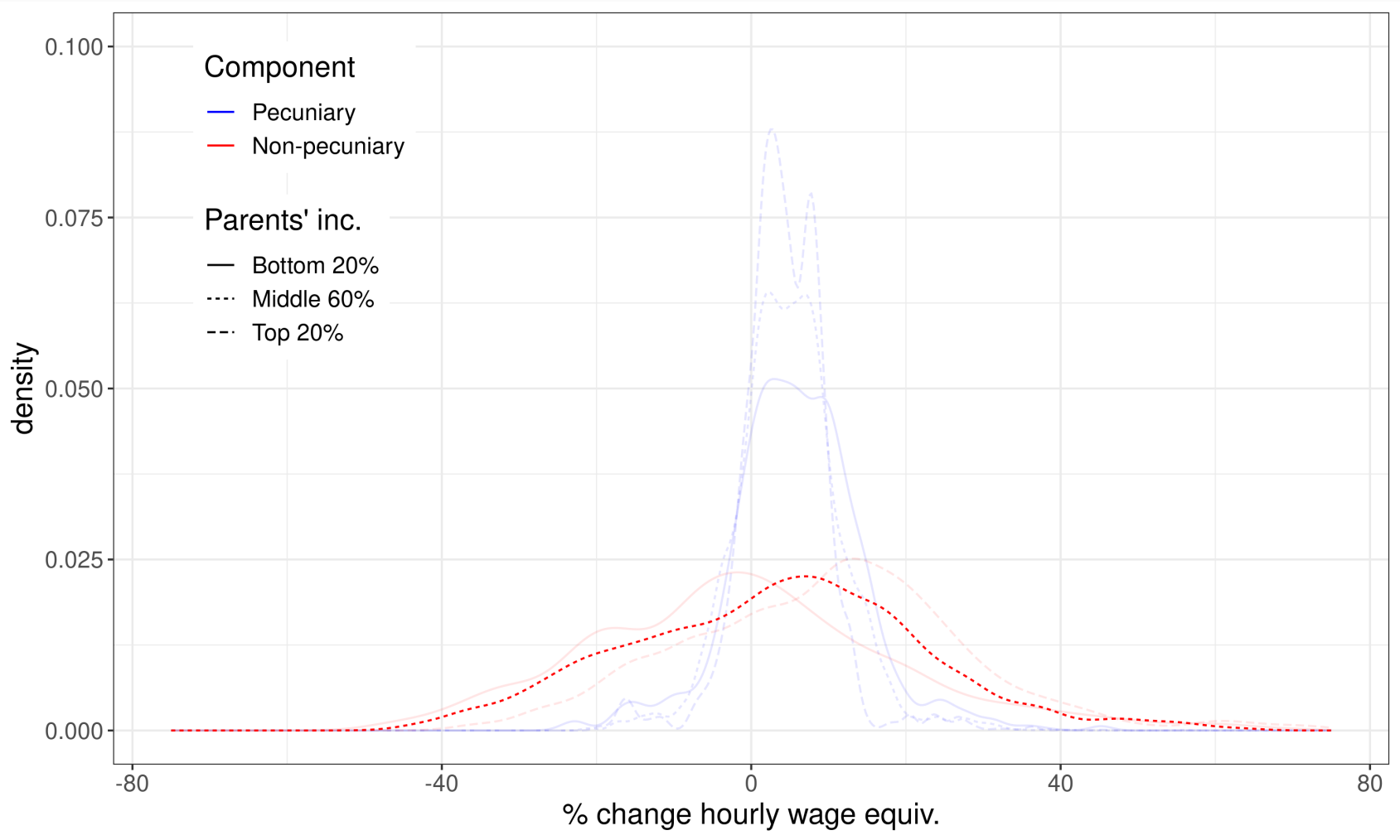

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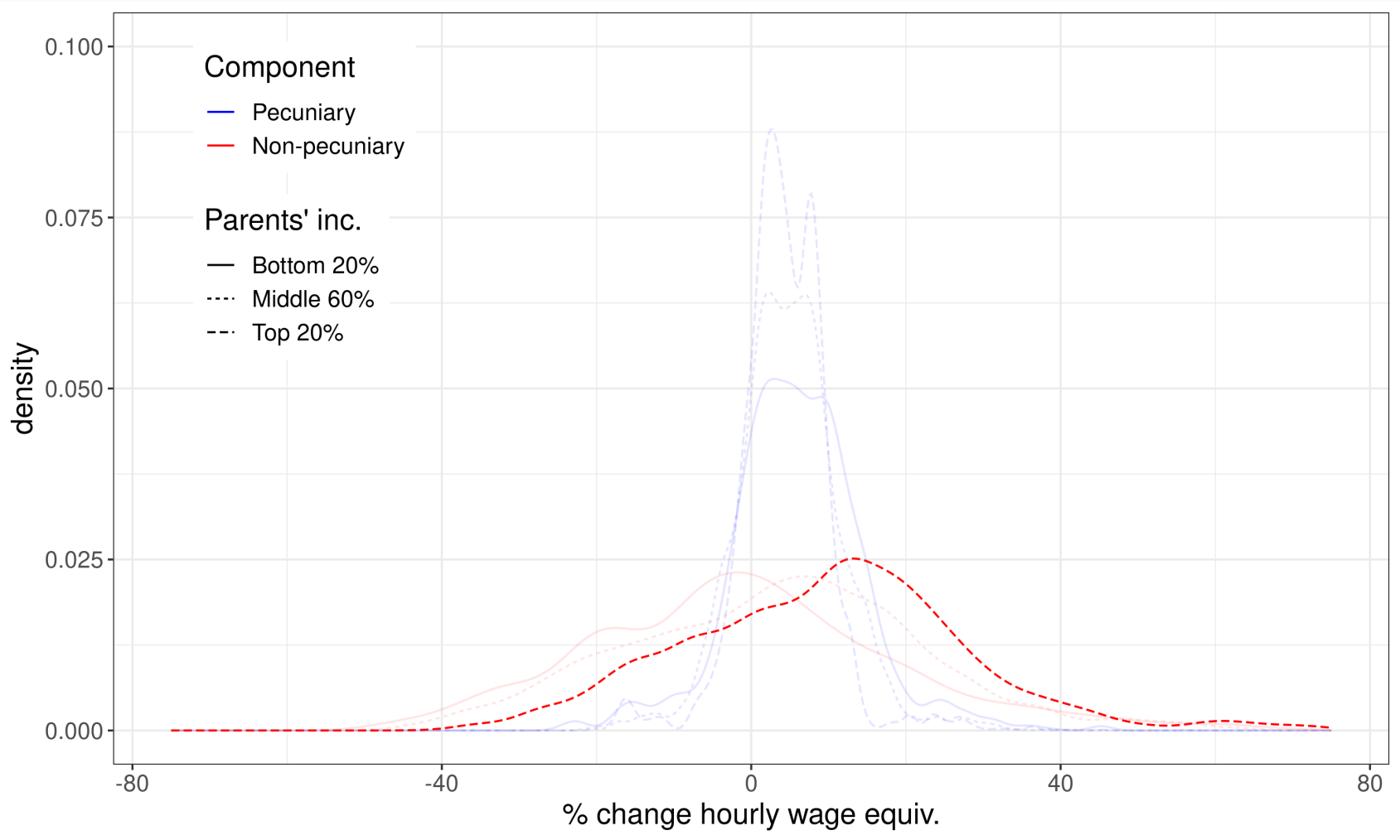
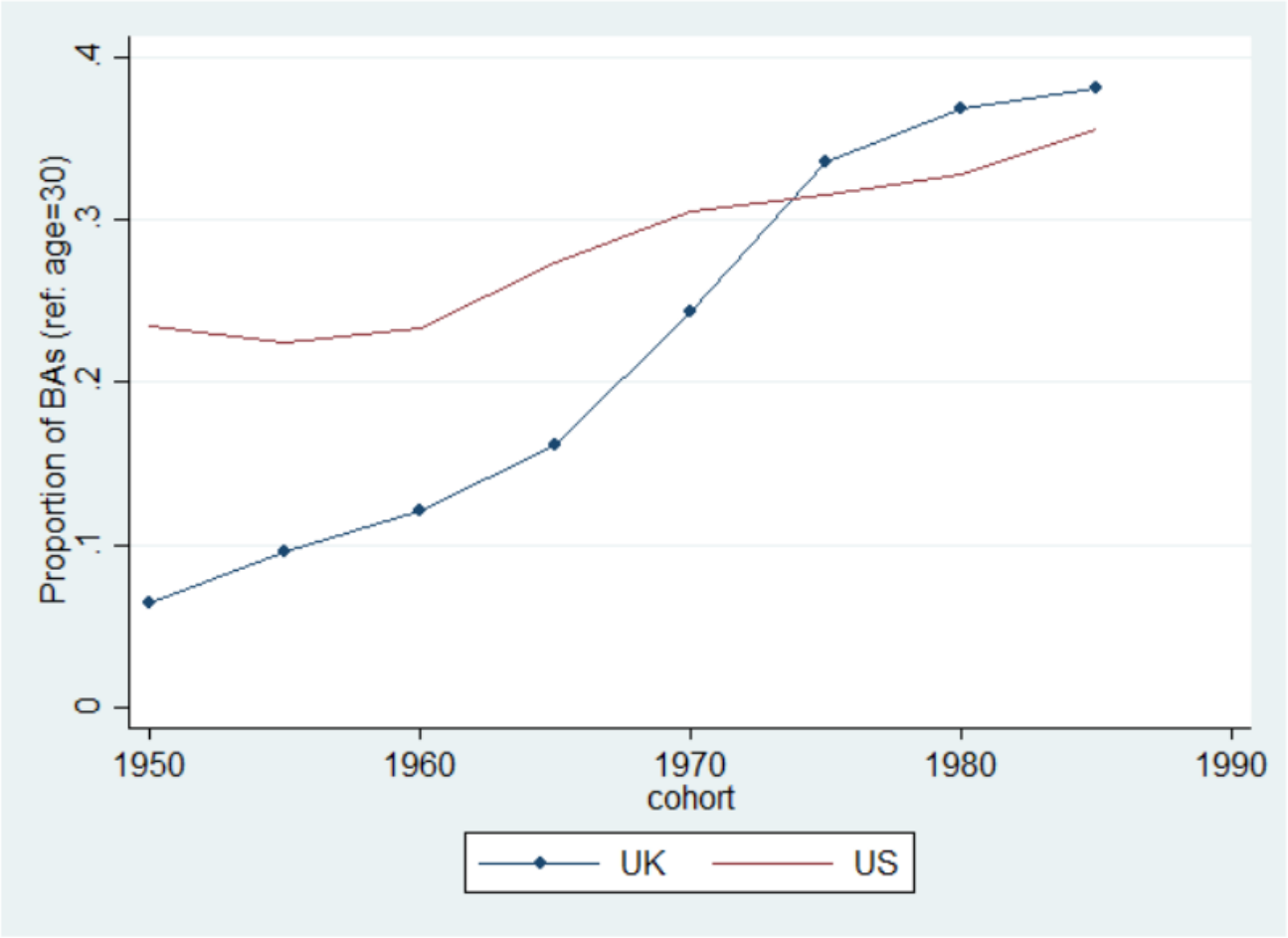


Huge expansion in HE attainment

Figure 2: Proportion of People with a BA or Higher Education by Cohort, UK and US



Note: sample restricted to age 22-59 and excludes full-time students. Each education-cohort cell has at least 100 observations.

Source: Blundell et al. (2018).

Huge expansion in HE attainment

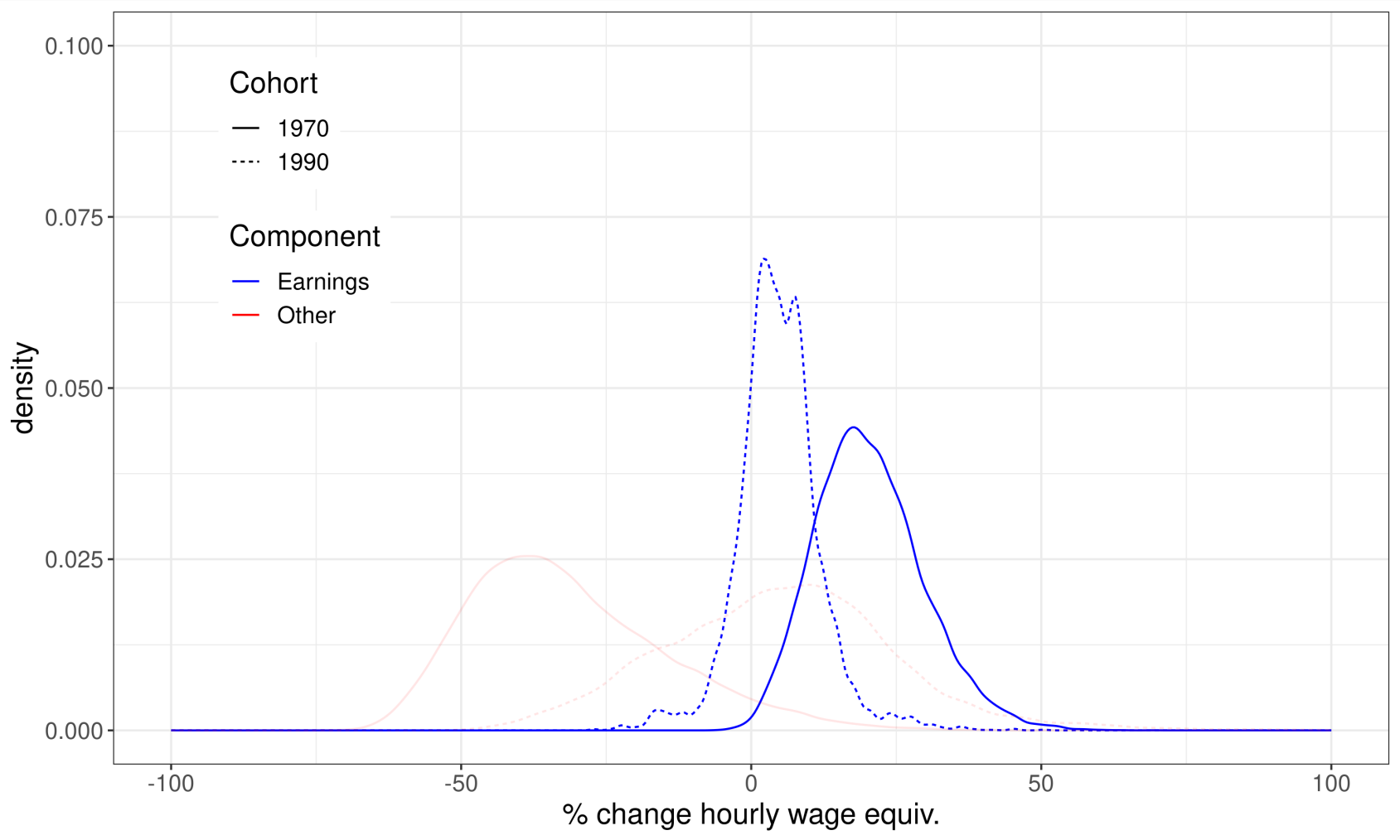
- Re-estimate model on data from similar cohort study born in 1970

  $\Rightarrow$ Compare factors in 1970 to 1990

Changes between 1970 and 1990 cohorts

- earnings exp. fell: 20% $\rightarrow$ 4.8% (mean); 9.3% $\rightarrow$ 7.1% (sd)
- non-pec. benefits increased: $-31\% \rightarrow 4.9\%$ (mean); $17\% \rightarrow 20\%$ (sd)

$\Rightarrow$ non-pec. factors driving the large increase in attendance



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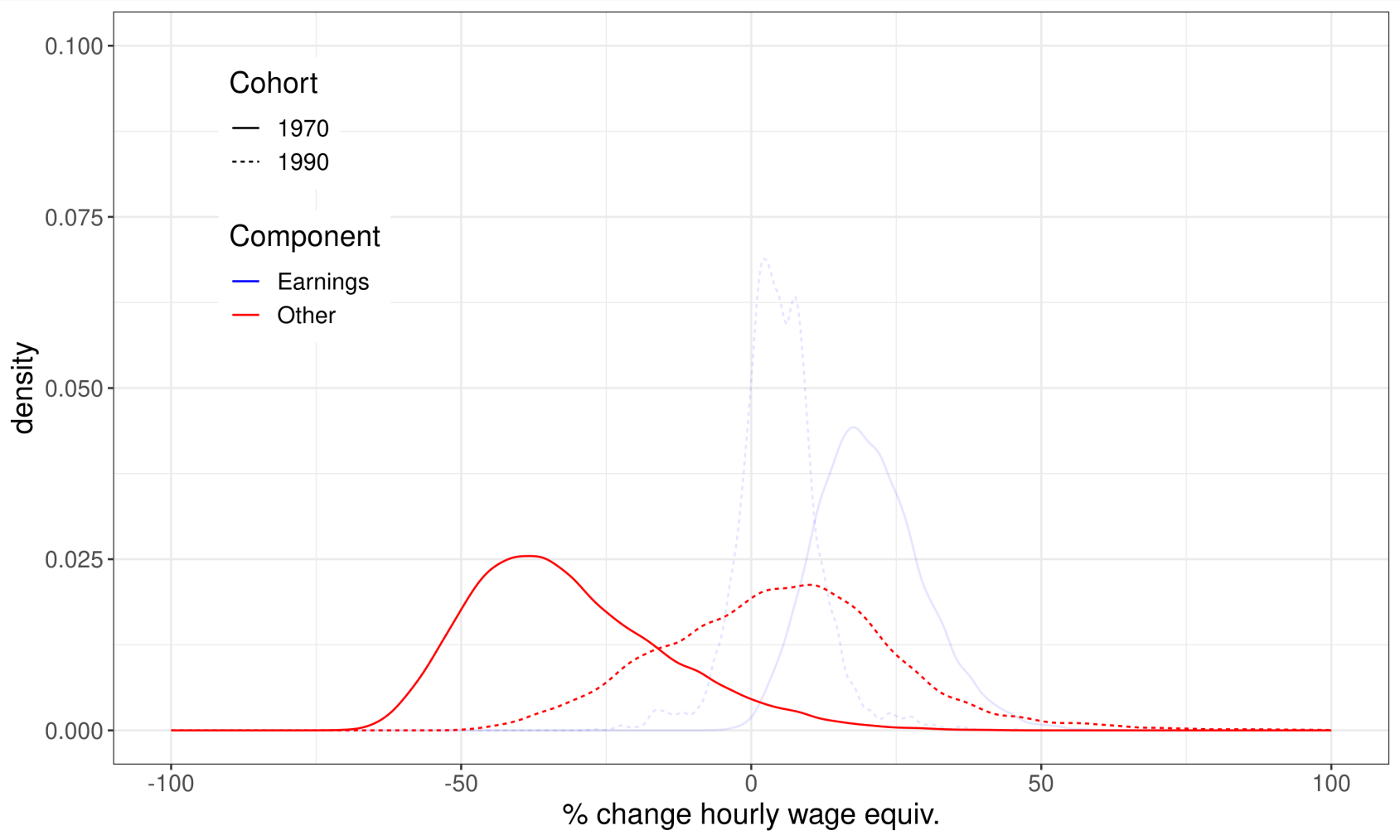

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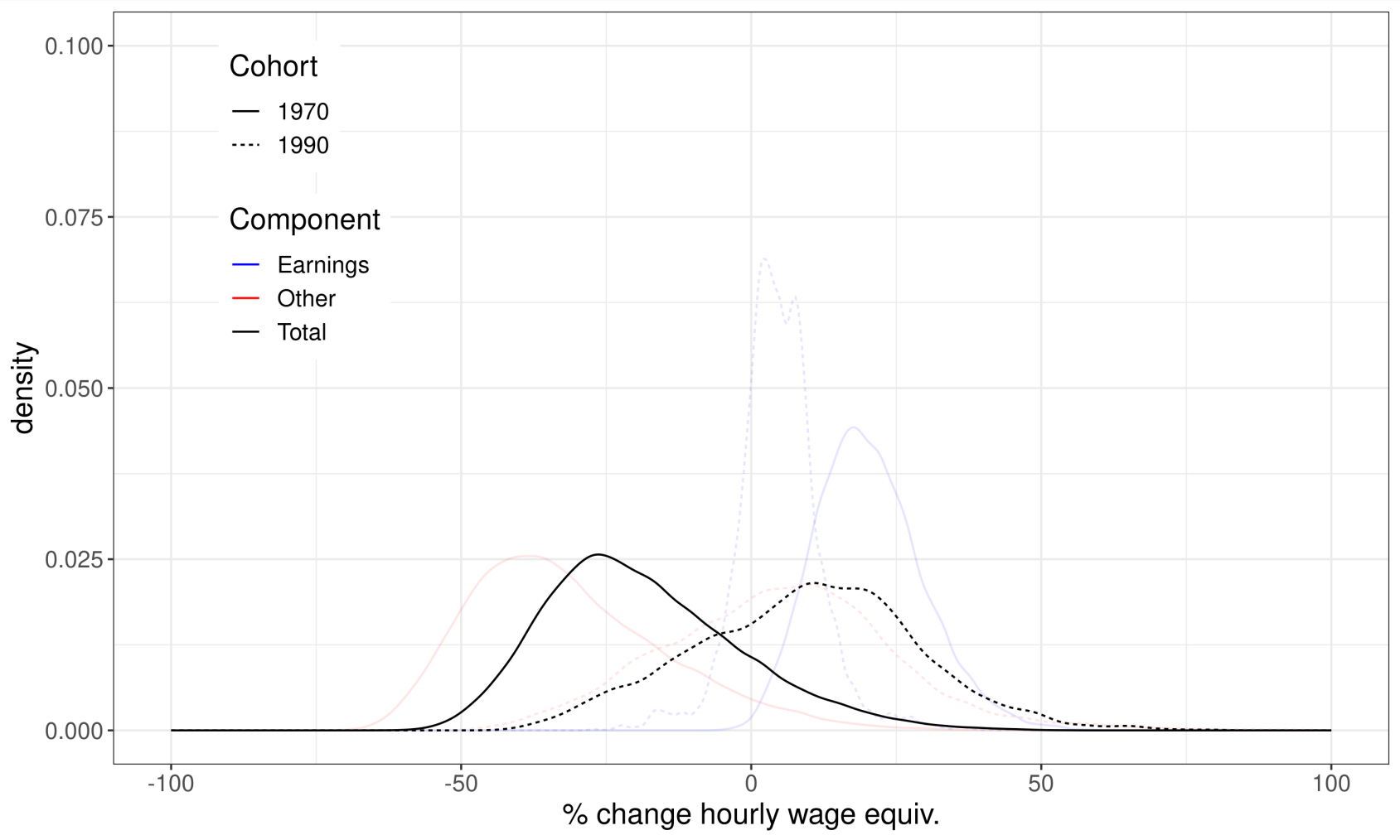

What’s next?

Conclusion

- Earnings exp. less important than other factors in HE decision
- Earnings exp. similar across SES, other factors driving gap
- Other factors drove large increase in HE attainment since 1970s

Still lots to do:

1. **Continue to decompose other factors into meaningful components**
   - Form natural "groups" of factors: Career; financial (now and future); Social life / environment; Education; Personal development; Time
   - But ind. parameters $\rightarrow$ smaller groups difficult to interpret
2. **Improve the model of earnings expectations**
   - Model lifetime earnings, rather than relying on single point
   - Allow for **unobserved heterogeneity** in earnings [see e.g. Heckman et al. (2006)]

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Thank you

Thank you :)

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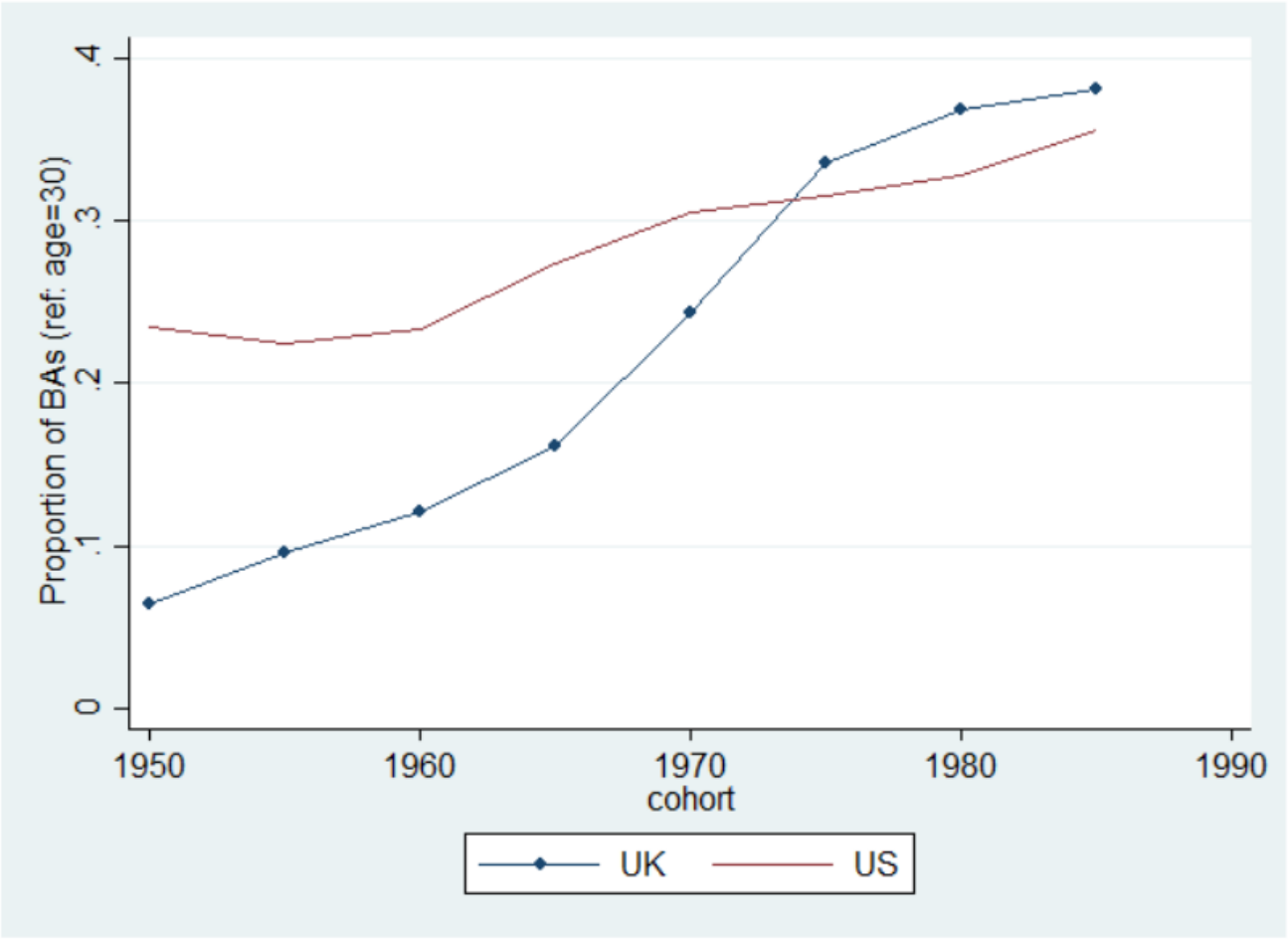
UK HE Expansion

Figure 2: Proportion of People with a BA or Higher Education by Cohort, UK and US



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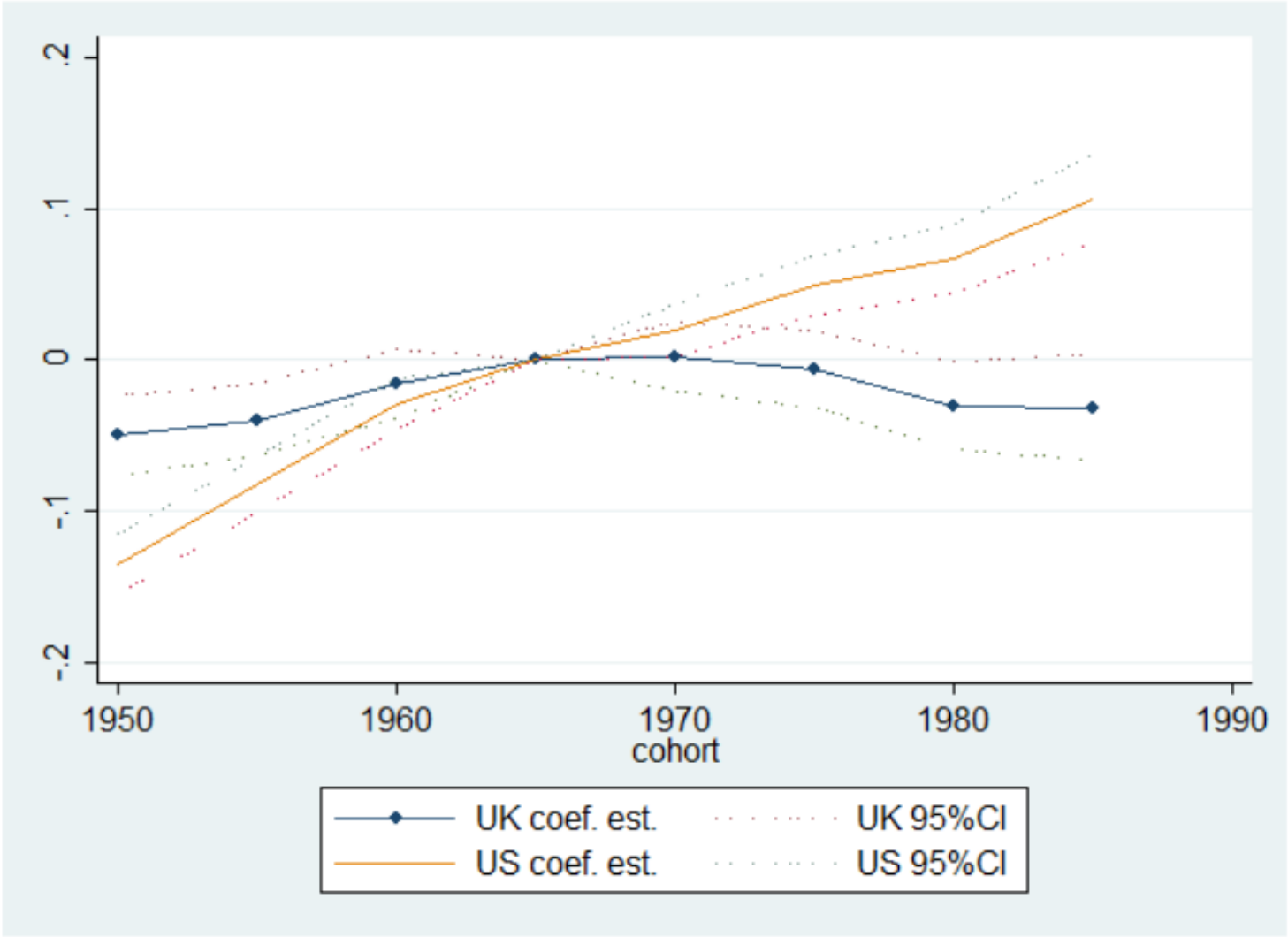
Source: Blundell et al. (2018).

back

Graduate-wage premium

Figure 3: Ratio of BA median wage to that of high-school graduates, cohort effects



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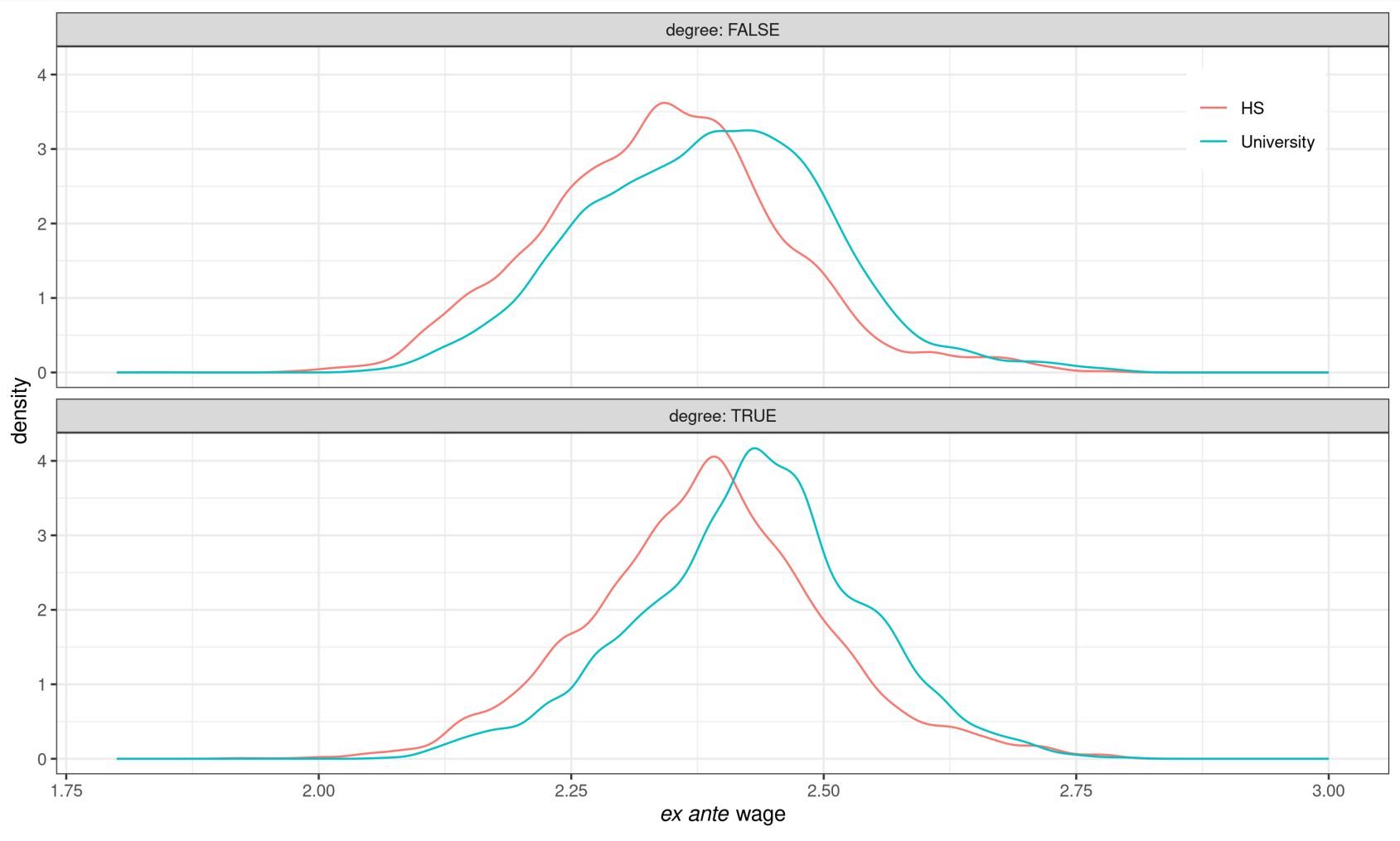
Wage distributions (Next Steps)

Ex ante (expected) wages, Y_s^{ea}



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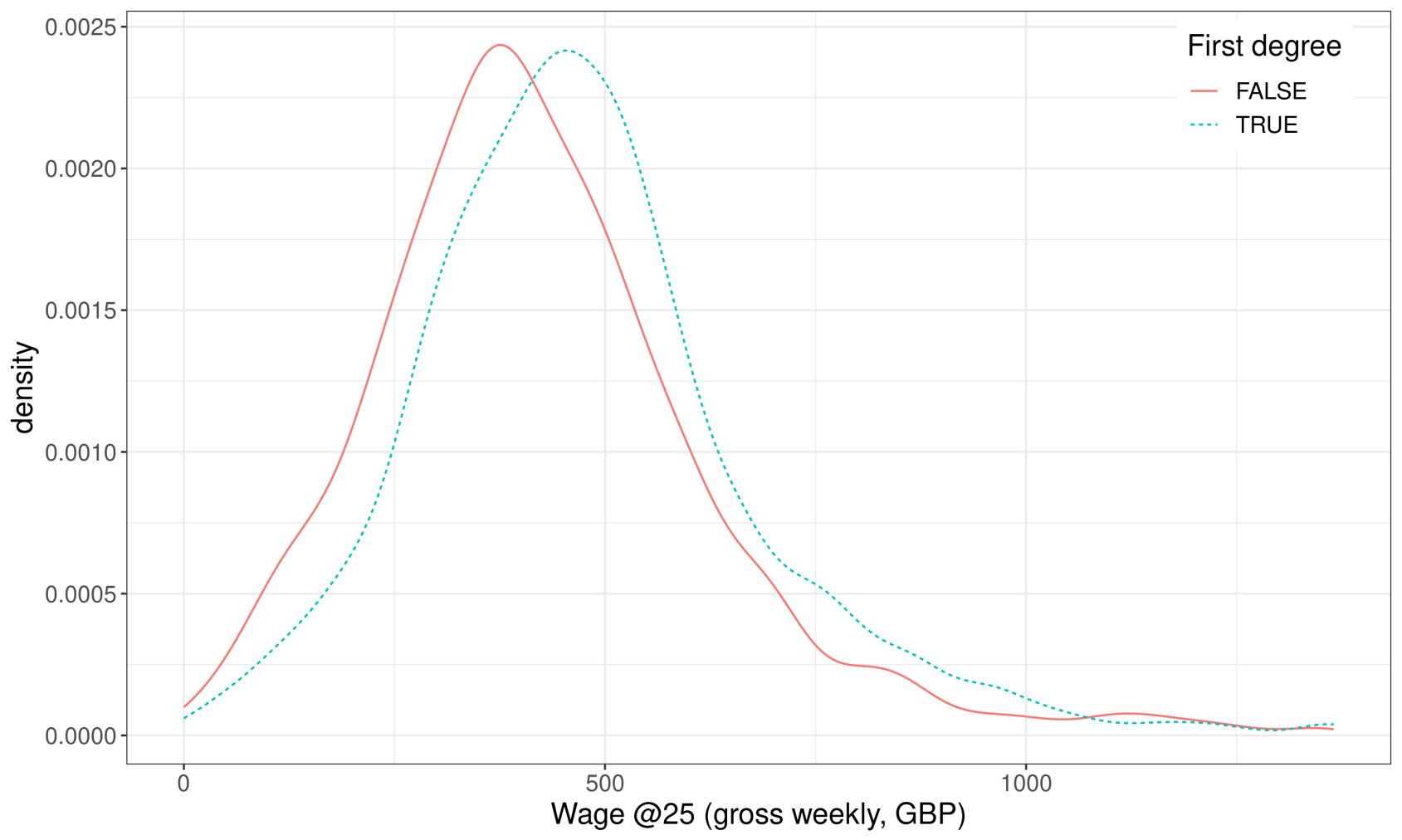
Wage distributions (Next Steps)

Ex post (realised) wages, Y_s



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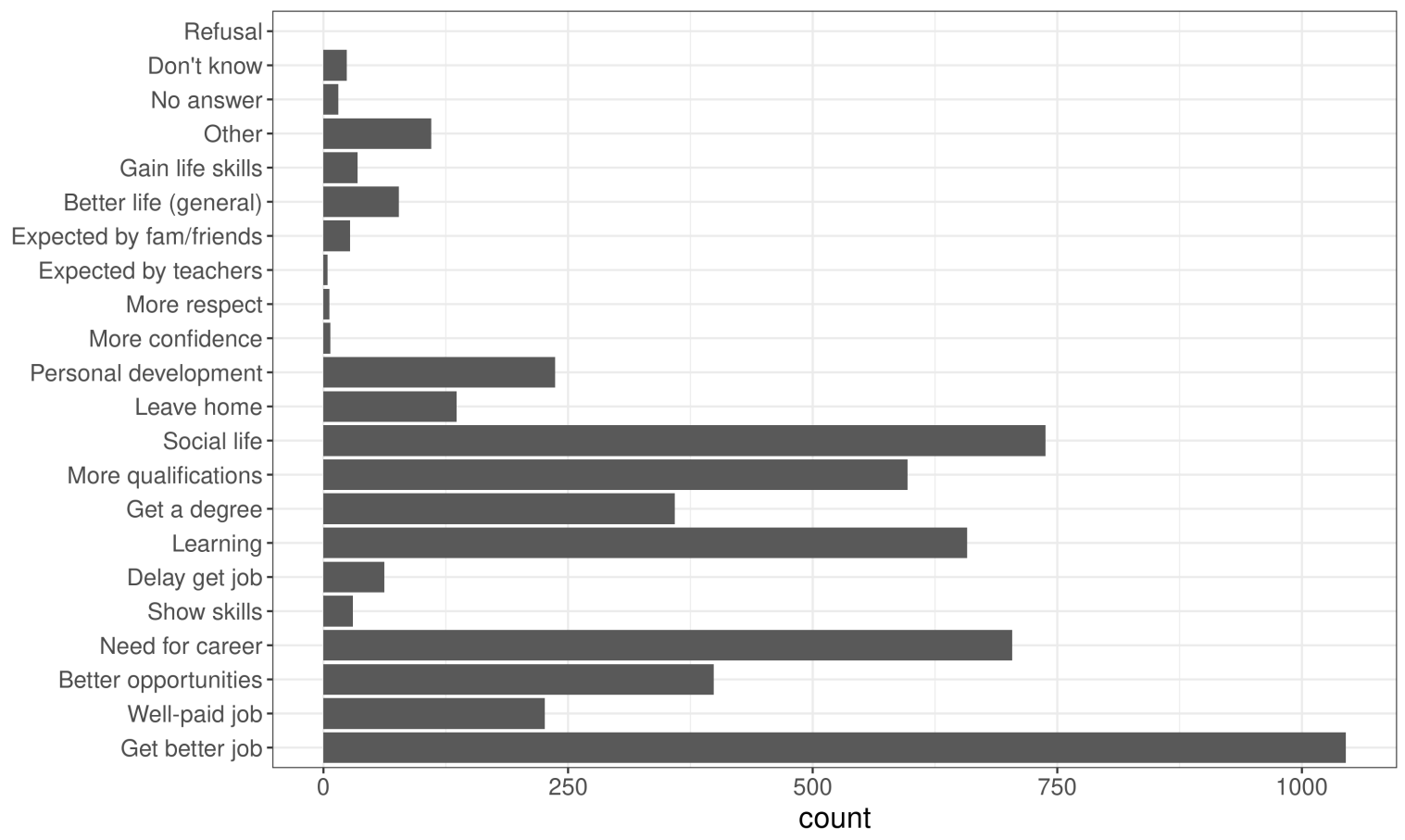
Main reasons for applying to university

Now thinking about yourself. You said you plan to apply for a place at university. What are YOUR main reasons for wanting to go to university?



Notes: Students with >5 GCSEs @A*–C and **who plan to apply**.
Open-ended. $N = 4,640$.

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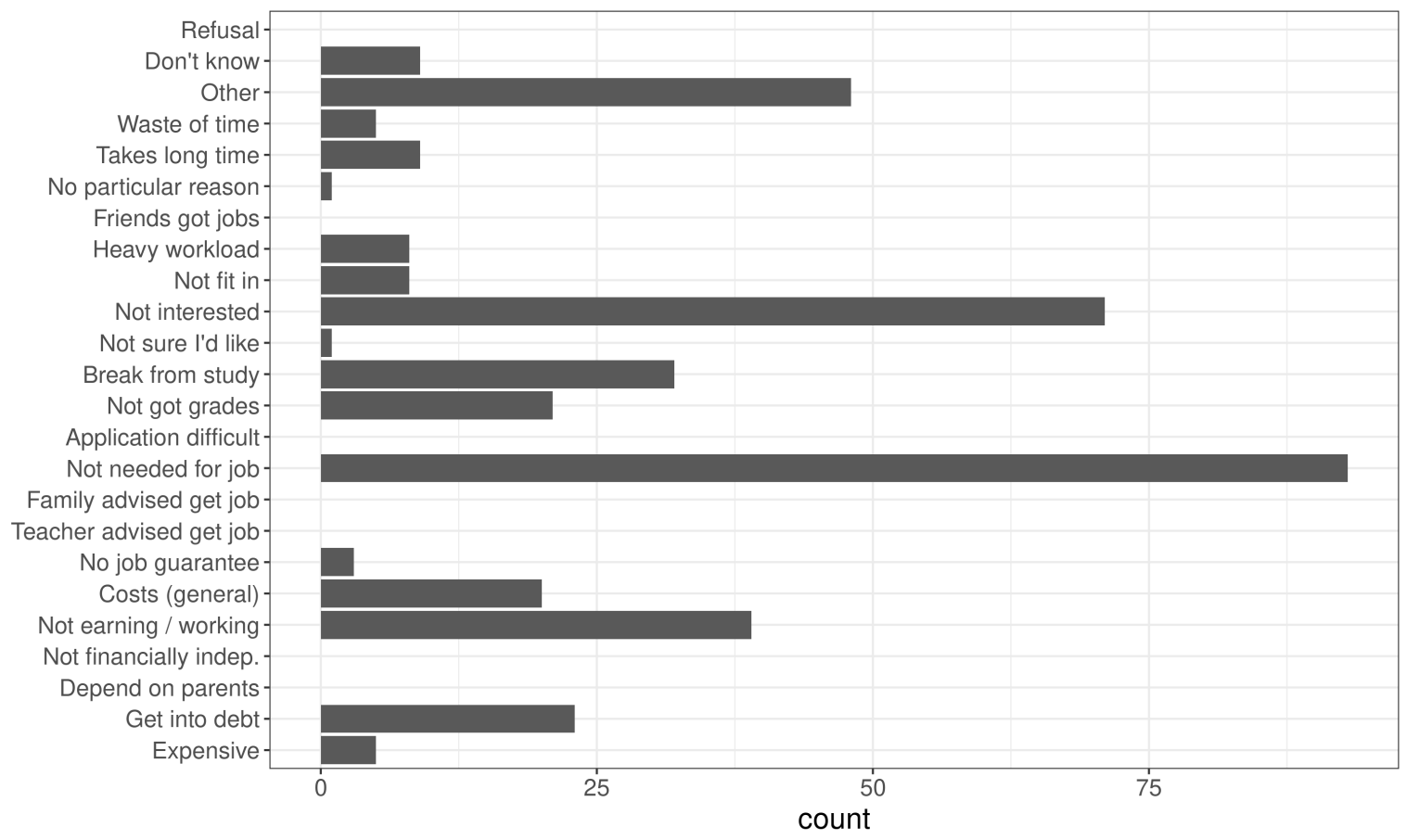
Main reasons for not applying

You have said that you are not planning to apply to university/not likely to ever apply to university. What are the MAIN reasons why you decided not to apply for a place at a university?



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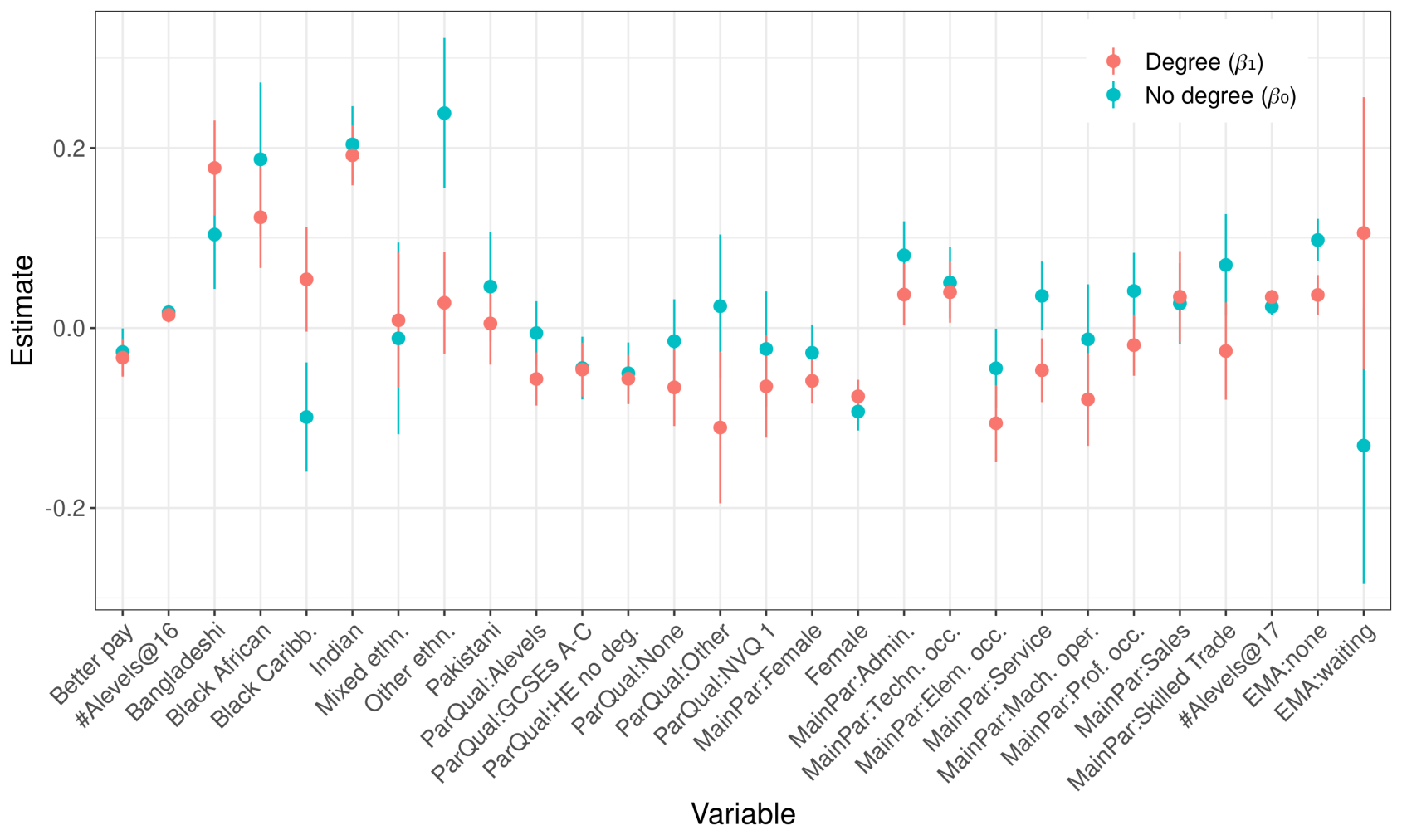
Open-ended. $N = 4,640$.

back

Wage equation parameters, β_s



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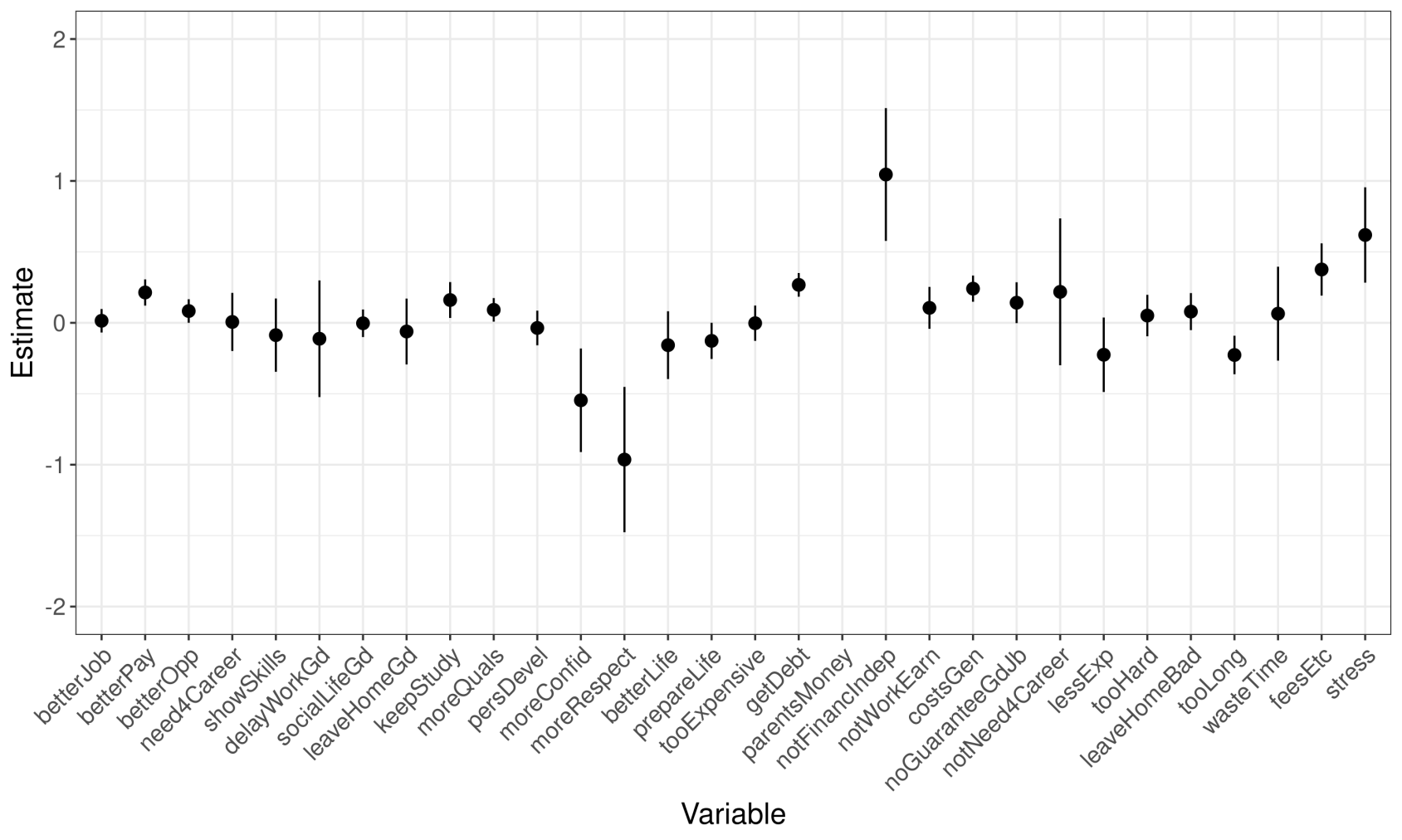
Choice equation parameters, γ

Responses to open-ended questions



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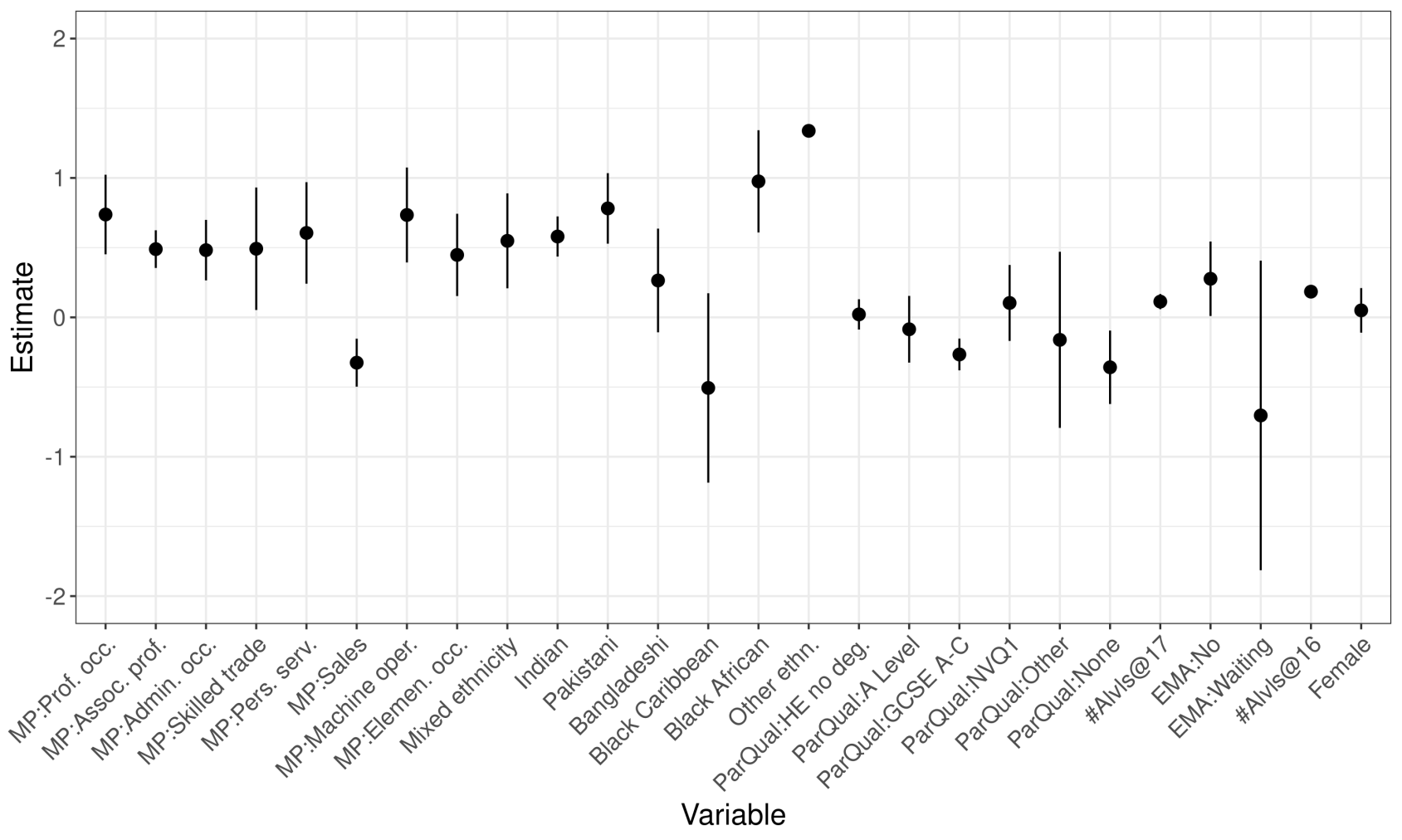
Choice equation parameters, γ

Background characteristics, X



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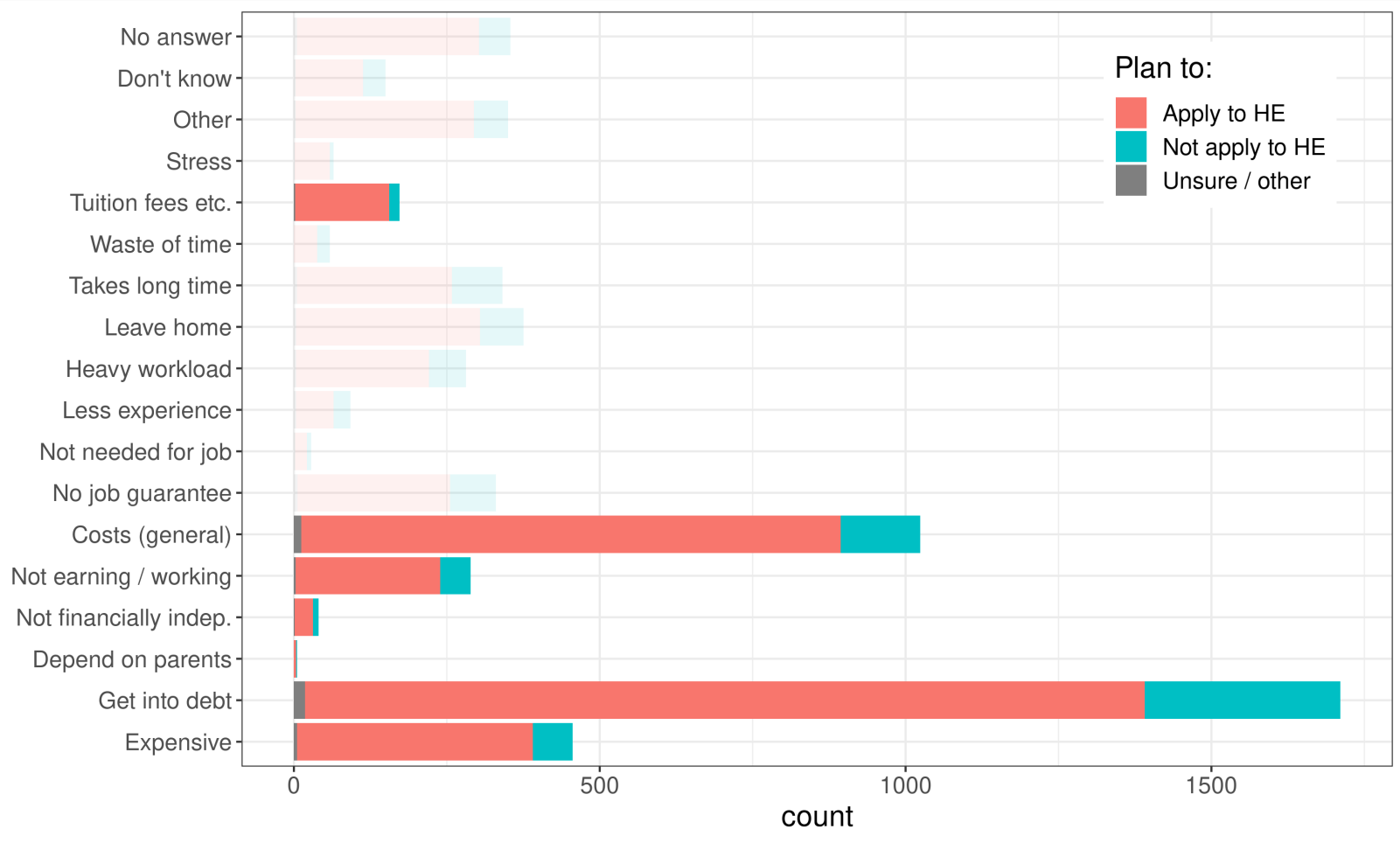
Financial factors

Responses to open-ended questions classified as financial factors for decomposition of “psychic costs” (all *disadvantages*)



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