# An Introduction to Factorial Designs Using the Example of Hiring Decisions

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NEGOTIATE
Overcoming early job-insecurity in Europe

# Background

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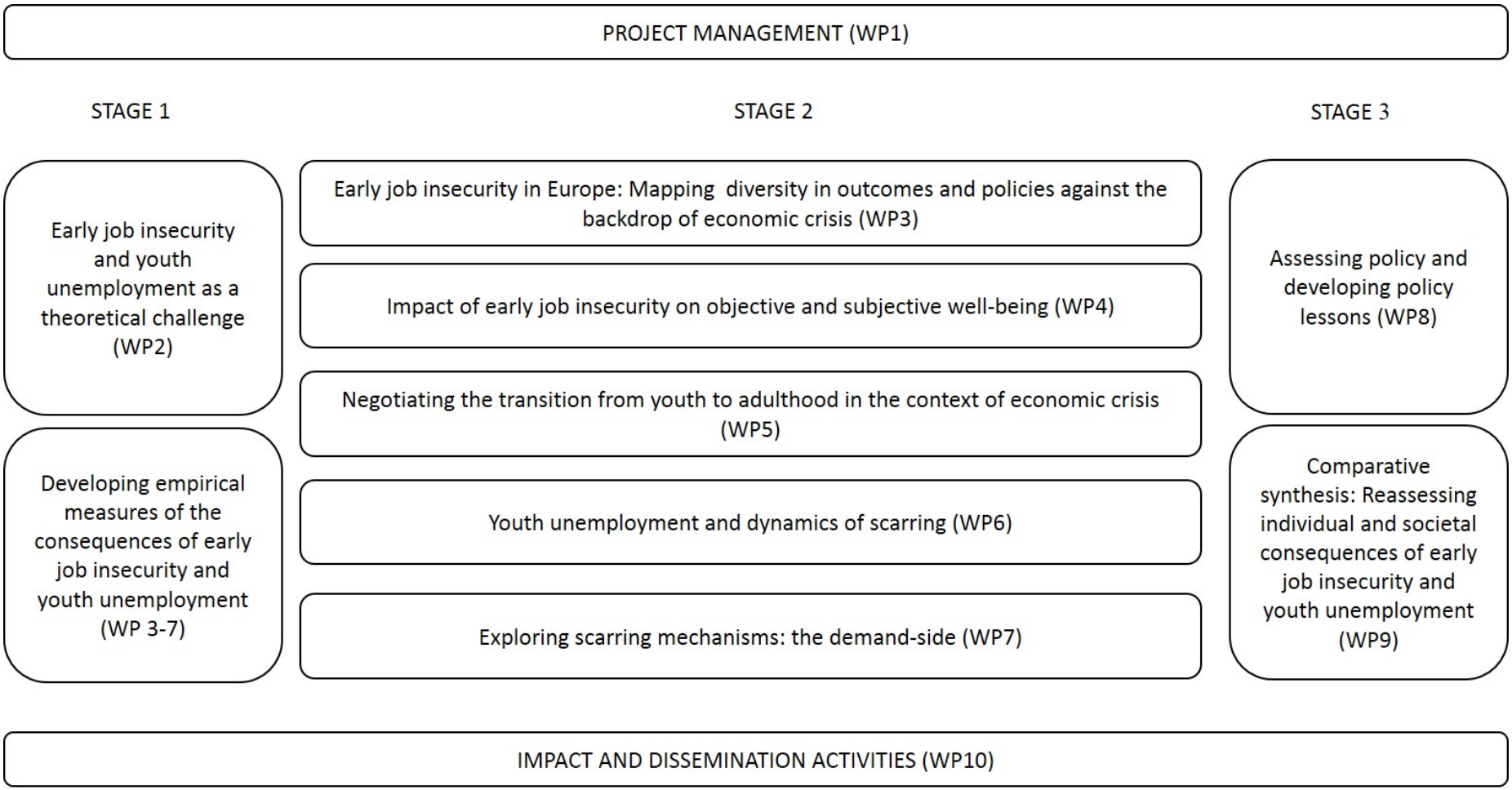
- Changing transitions to adulthood
- Young people remain in education for longer periods of time
- Delayed and fragmented entry into employment
- Part-time or temporary jobs, if any
- The Great Recession exacerbates situation in Europe
- Early unemployment spells may affect employment chances and future wages *e.g., Bonoli, 2014*
- Unemployment associated with scarring *e.g., Arulampalam, 2001*
- Duration and timing of unemployment spells affect hiring chances *e.g., Eriksson & Rooth, 2014*
- Skills underutilization matters too *Pedulla, 2016; Shi et al., 2018*
- Different consequences per country depending on, e.g., employment protection regulation

# Project


PROJECT MANAGEMENT (WP1)
STAGE 1
STAGE 2
STAGE 3
Early job insecurity and youth unemployment as a theoretical challenge (WP2)
Developing empirical measures of the consequences of early job insecurity and youth unemployment (WP 3-7)
Early job insecurity in Europe: Mapping diversity in outcomes and policies against the backdrop of economic crisis (WP3)
Impact of early job insecurity on objective and subjective well-being (WP4)
Negotiating the transition from youth to adulthood in the context of economic crisis (WP5)
Youth unemployment and dynamics of scarring (WP6)
Exploring scarring mechanisms: the demand-side (WP7)
Assessing policy and developing policy lessons (WP8)
Comparative synthesis: Reassessing individual and societal consequences of early job insecurity and youth unemployment (WP9)
IMPACT AND DISSEMINATION ACTIVITIES (WP10)

# Demand-Side Mechanisms

- Hiring process: situation of imperfect information
- Reliance on signals such as previous jobs, education, etc. *Spence, 1973*
- Unemployment spells associated with lack of skills, lack of motivation, undesirable personality traits, etc. *e.g., Atkinson et al., 1996; Luijx & Wolbers, 2009*
- Skill depreciation: lack of on-the-job training, depreciation of human capital *Mooi-Reci & Ganzeboom, 2015*
- Queuing theory: job-competition model, sorting according to estimated training costs, unemployment $\searrow$ trainability *Thurow, 1975; Di Stasio, 2014*
- Rational herding: unemployment indicates other recruiters previously chose not to employ *Oberholzer-Gee, 2008*

# Unemployment vs. Skills Underutilization

- Unemployment scarring: focus on productivity
- Other mechanisms might include:
  - Turnover intentions $\nearrow$ scarring
  - Reliability, punctuality, social skills $\nearrow$ conflicts, times absent $\nearrow$ scarring
- Skills underutilization: mainly skill depreciation
  - Lack of motivation, no identification with job $\nearrow$ lack of commitment
  - Could be positive in some occupations (e.g., new experiences)

# Transaction Costs

- Recruiters try to maximize benefits and minimize loss for company
- Significant loss when selected candidate turns out to be bad fit, new appointment necessary
- *Risk of loss* hard to estimate, mainly function of match between candidate, position, and company, "having the right pedigree"
- Gender, education, experience might work as matching signals (above productivity)
- *Extent of loss* easier to estimate $\approx$ transaction costs incurred
- Three components *Russo, Hassink & Gorter, 2005; Blatter, Mühlemann & Schenker, 2009*:
  1. Search costs and direct recruiting costs
  2. Training costs
  3. Spillover costs (e.g., impact on productivity of co-workers)
- H: Transaction costs positively associated with scarring effects

# Methodological Considerations

- Observational studies, e.g., recruiter surveys, prone to social desirability bias
- Factorial survey experiments (FSE) may alleviate some of these problems *e.g., Auspurg & Hinz, 2015*
- Multidimensional experimental design, participants judge stimuli, descriptions of hypothetical situations (vignettes)
- Within vignettes systematic variation of levels of characteristics (dimensions)
- Multidimensionality of the evaluation task reduces social desirability bias, forced to make trade-offs between several dimensions *Auspurg et al., 2014*
- Internal validity $\rightarrow$ observed variation in the outcome variable(s) due to experimental stimuli
- External validity $\rightarrow$ generalizability of findings

# Surveys vs. Experimental Methods

- Surveys: ex post facto (causal) inferences of random samples $\rightarrow$ low internal validity, but high external validity
- Experiments: assign participants randomly to experimental conditions $\rightarrow$ high internal validity, but low external validity (esp. for some lab experiments)
- Factorial survey methods: combination of both, should on average increase internal and external validity and allow for CID

# The Present Study

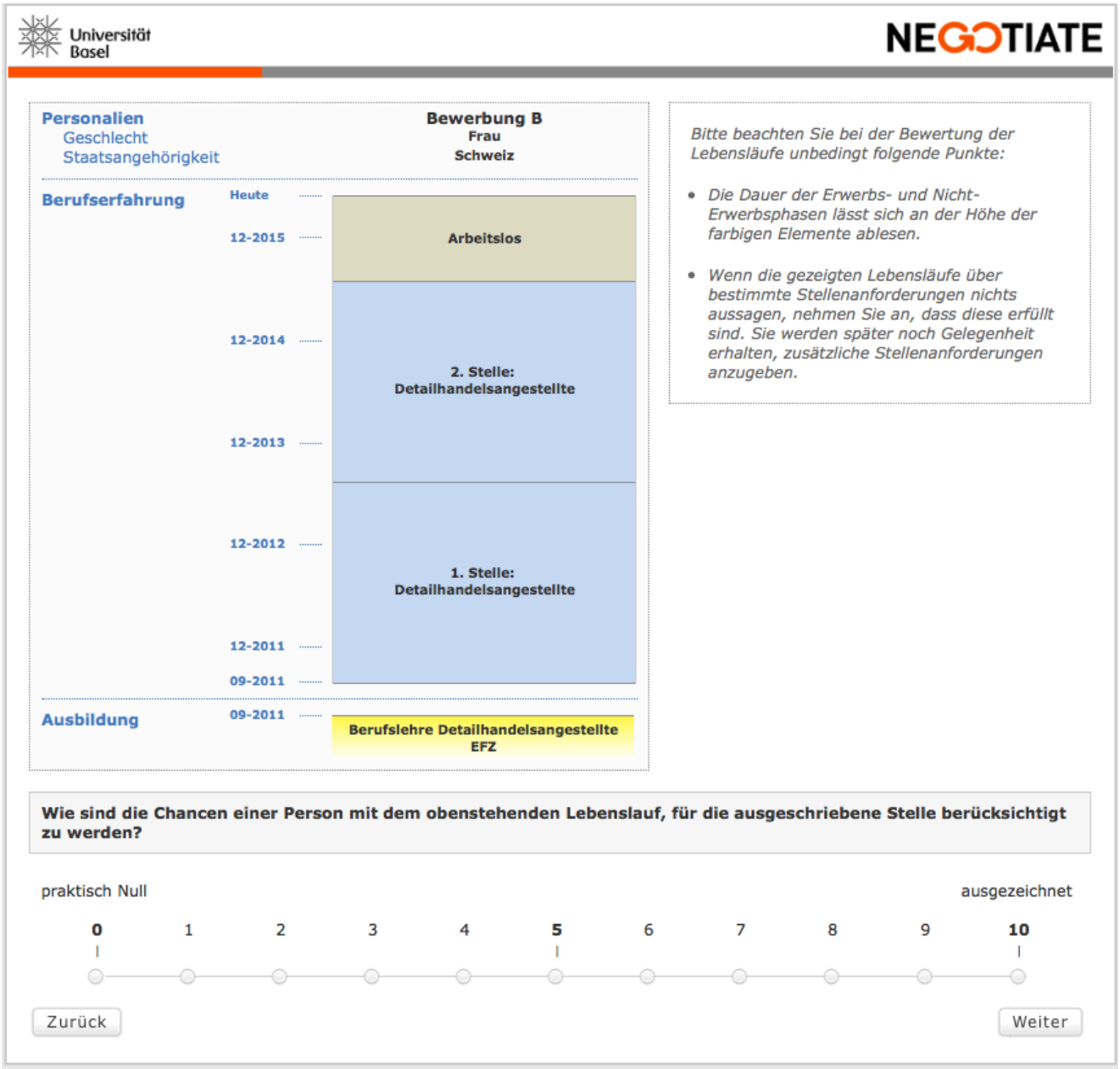
# Instrument and Data (1)

- Survey with vignette experiment and choice task, four countries
- Comparative multiple case study, not a quantitative comparative country analysis
- Hypothetical applicants, but real vacancies and real recruiters
- To assess between-job heterogeneity, jobs with a low, middle, and high skill profile, gender-mixed, gender-typed, various turnover rates
- Mechanics, finance (banking and insurance), catering, nursing, and information technology (ICT)
- Examples: Machinery mechanics, finance dealers and brokers, waiters, nursing associate professionals, health care assistants, and software developers

# Instrument and Data (2)

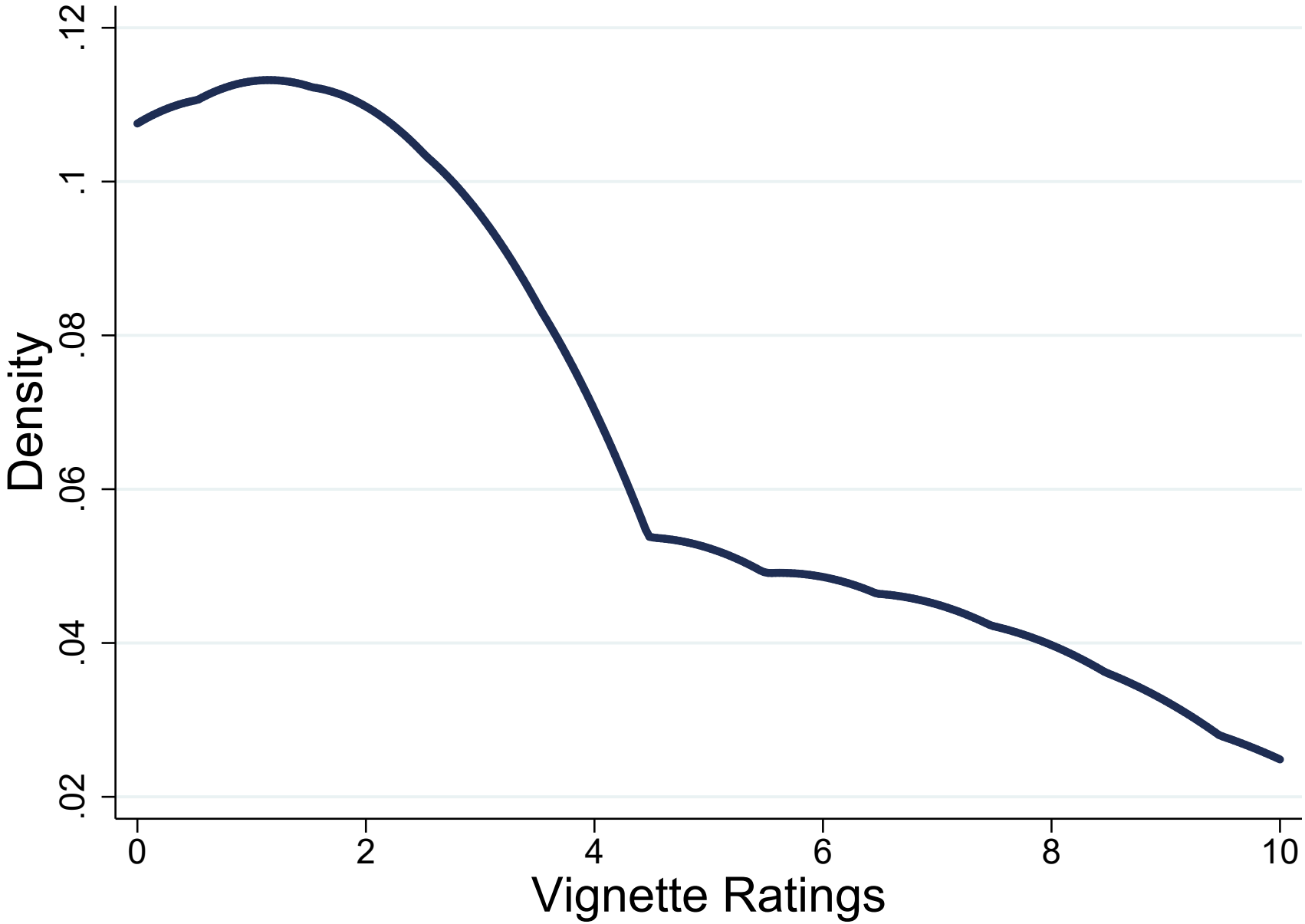
- $2^2 9^1 7^1$ design
- Fielded fraction optimized for maximal D-efficiency and minimal confounding, taking pre-test response rates into account
- Nested design due to different expected response rates
- Pre-tests in Oct 2015 (CH), Feb 2016 (all); field May–Jun 2016
- About 2,000 completed surveys

# Example Vignette

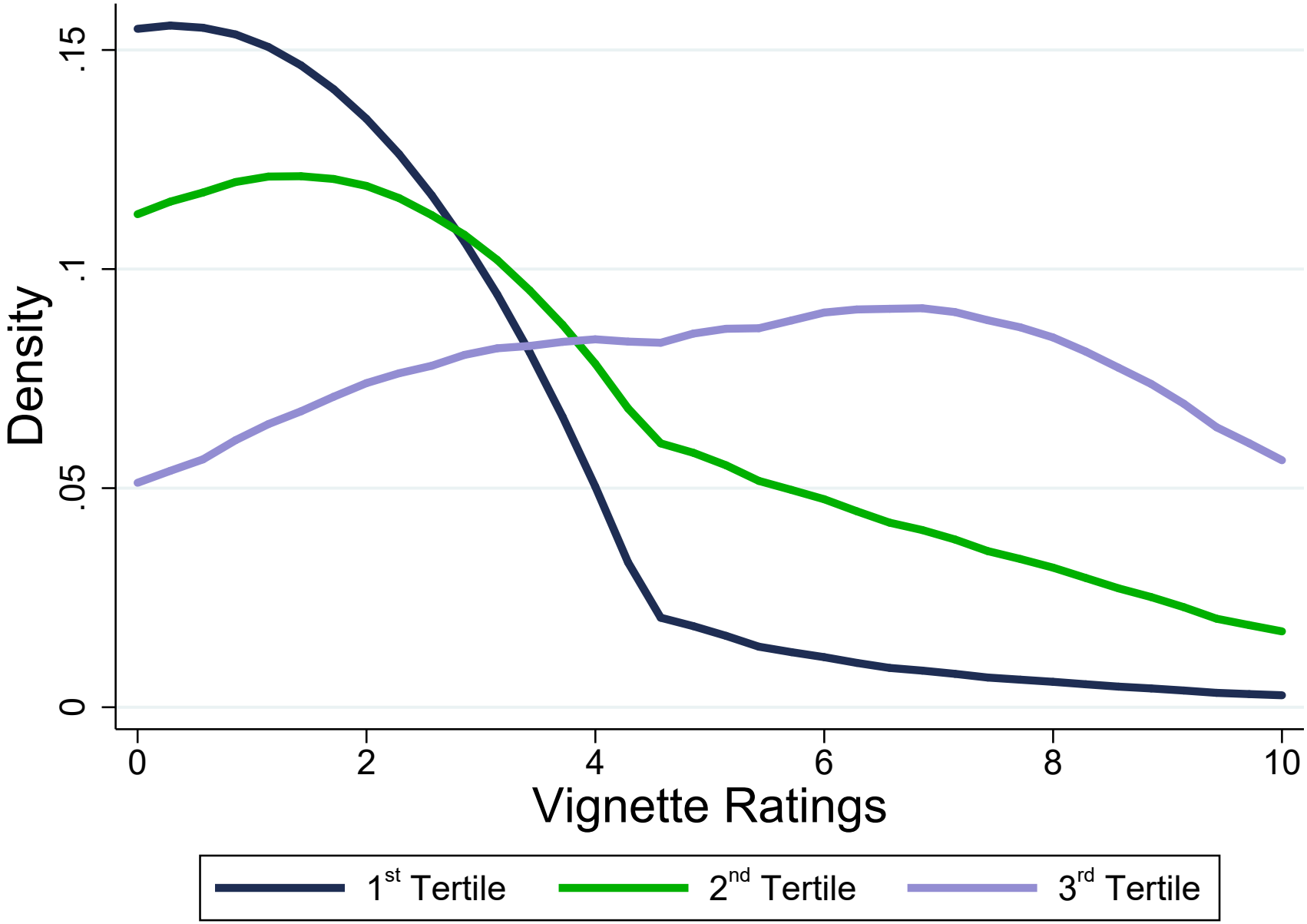


# Descriptive Findings and Analytical Strategy

# Distribution of Ratings (1)



# Distribution of Ratings (2)



# Measures

- Unemployment (yes/no)
- Skills underutilization (work in call center vs. various types of matched employment)
- Transaction costs ($\alpha = .46$)
  1. Search costs and direct recruiting costs
  2. Training costs: monetary costs, staff costs, settling-in period
  3. Spillover costs (e.g., impact on productivity of co-workers): hierarchic position of job
- Alternative operationalization strategy: transaction costs $\propto$ wage

# Analytical Strategy

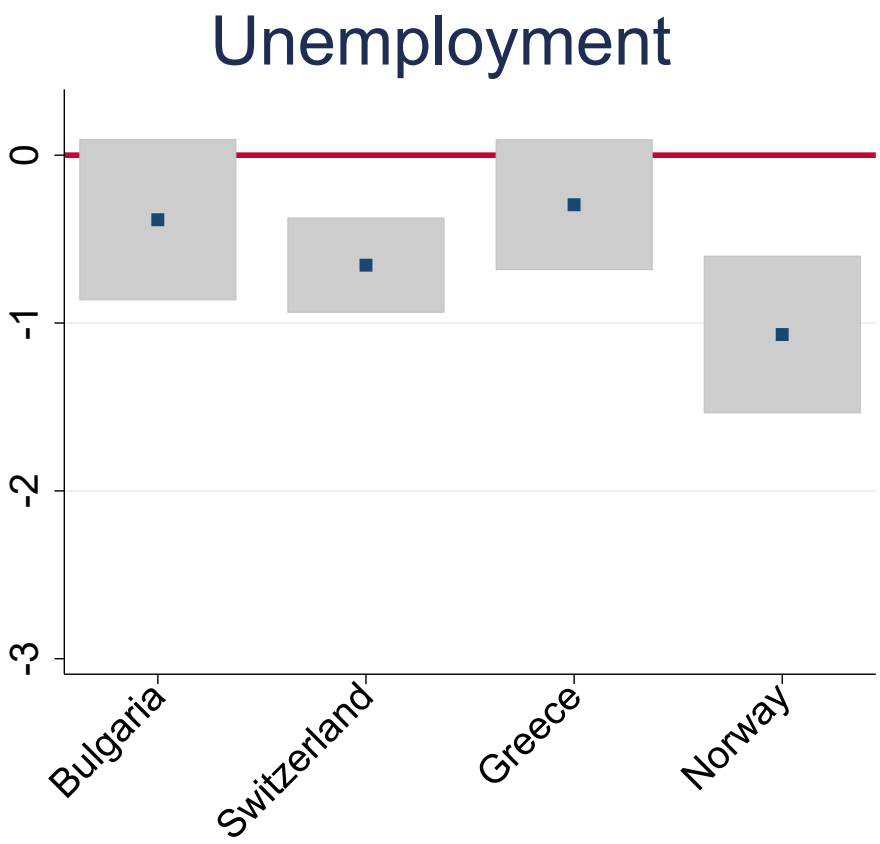
- (Logged) Ratings: multilevel linear regression with RI

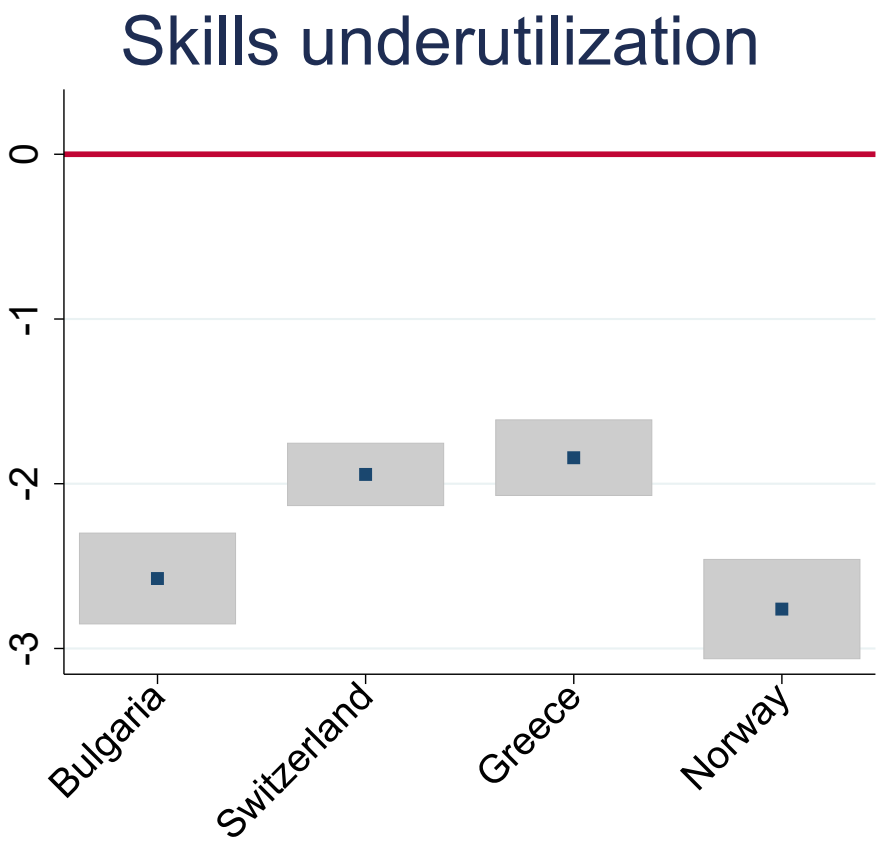
$$\ln(Y_{ij}) = \beta_0 + \beta' X_{ij} + \gamma' Z_j + u_j + \epsilon_{ij}$$

- Remember: randomized assignment of vignettes to random sample of recruiters
- Hence $corr(X_k, u_j) = 0$ should hold for vignette variables (and $corr(Z_m, u_j) = 0$ for respondent variables)
- RE models will deliver consistent estimates
- All models with cluster-robust SE
- Interest in effect of unemployment and skills underutilization and their interaction with transaction costs
- Control for match of vignette with vacancy (+ entropy balancing)

# Results (1)

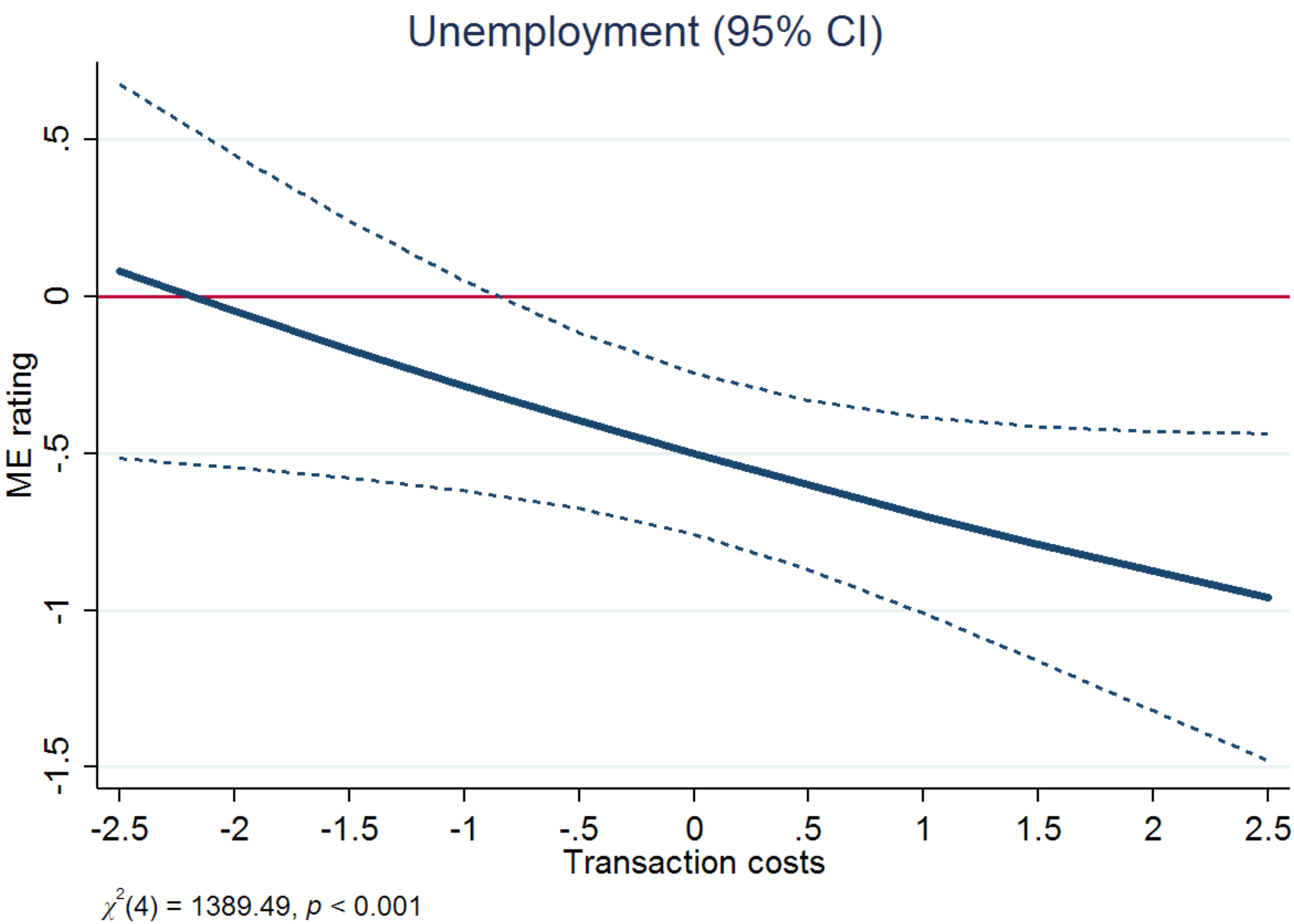
# Unemployment vs. Skills Underutilization



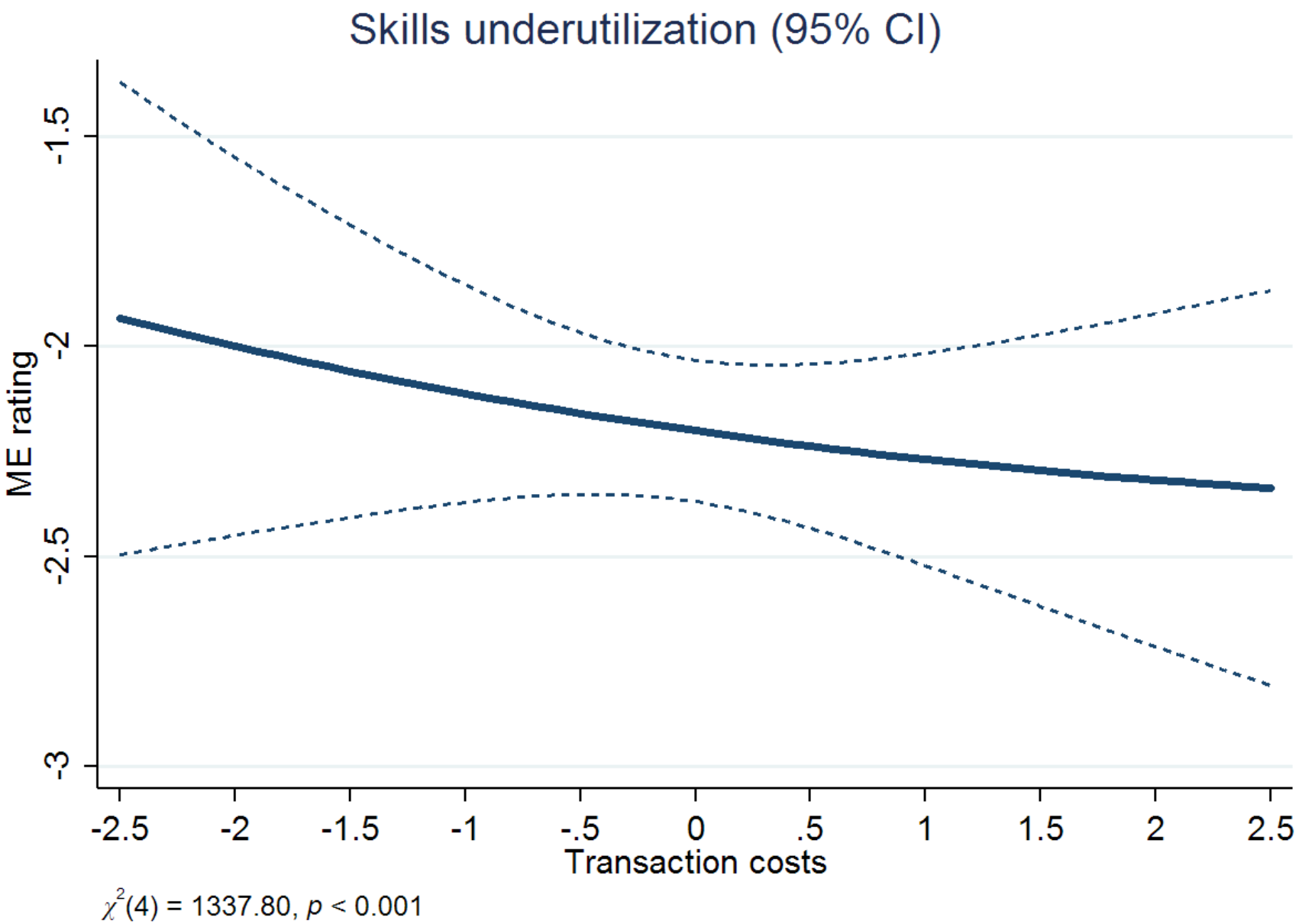



# Results (2)

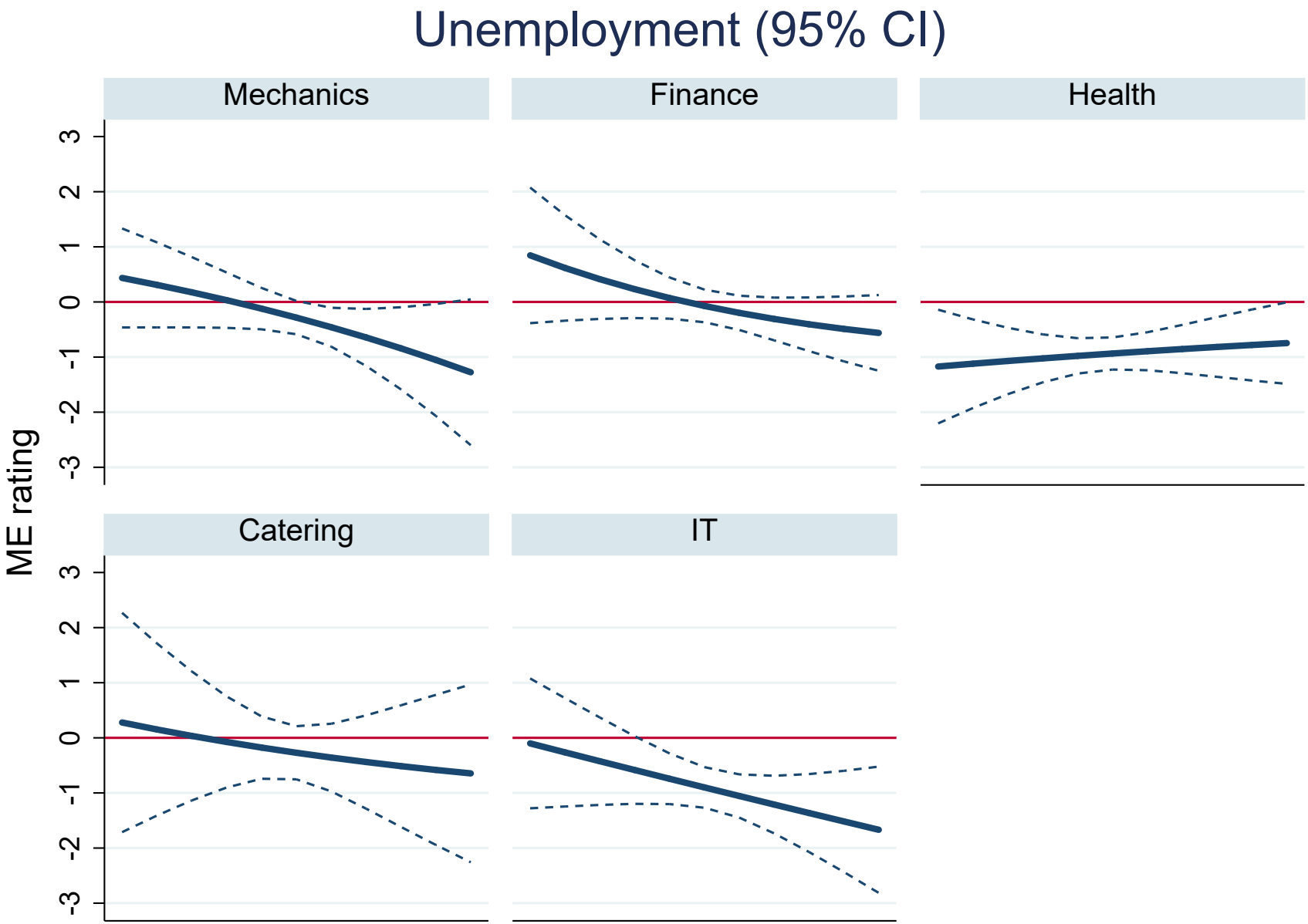
# Unemployment



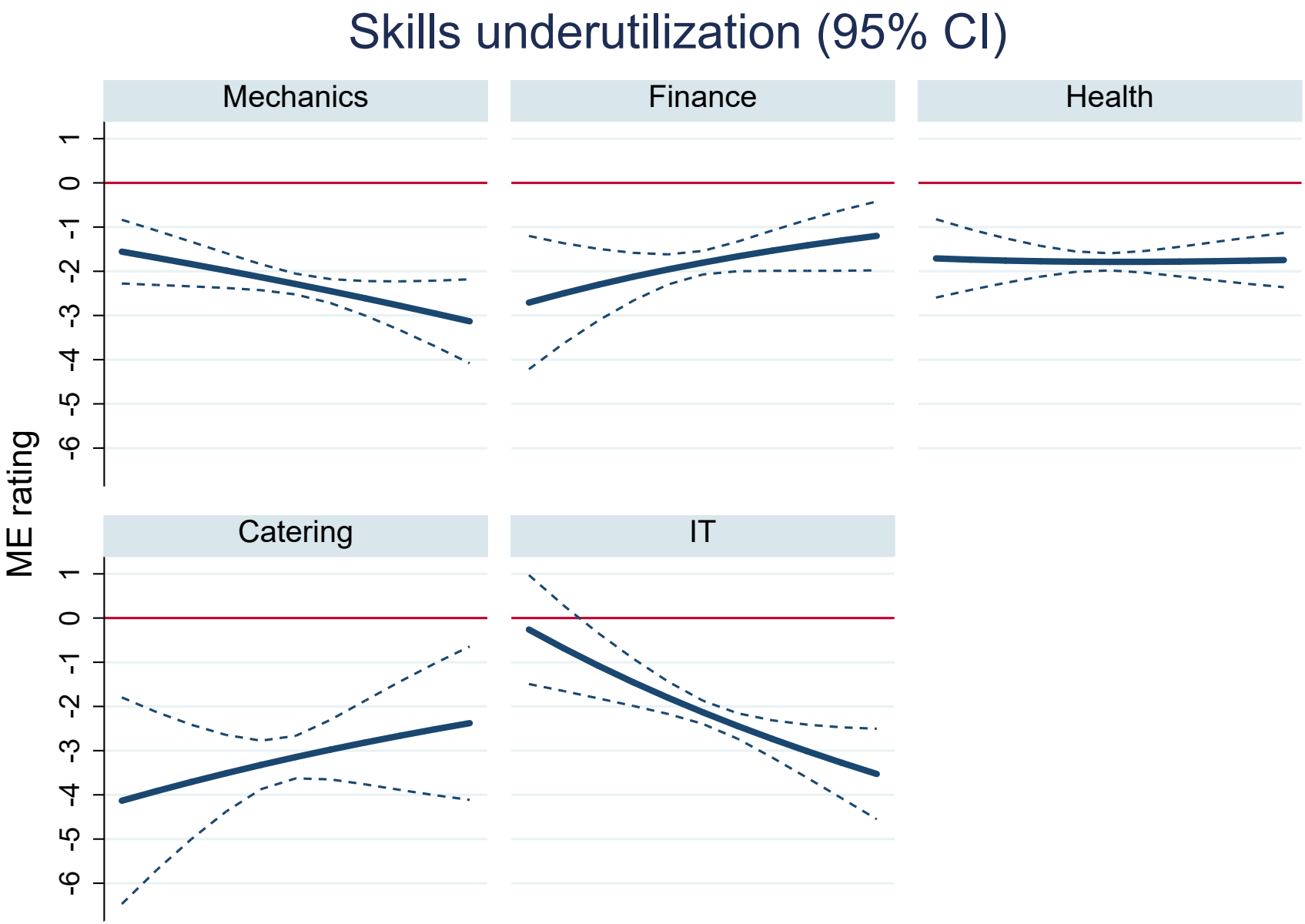
# Skills Underutilization



# Unemployment across Occupational Fields



# Skills Underutilization across Occupational Fields



# Conclusion

# Conclusion and Outlook

- Overall, transaction costs moderate scarring effects
- Early job insecurities detrimental to securing good jobs
- Assessing between-job and within-job heterogeneity
- More robust specification of country differences

# Some Pros and Cons of FSE

- Cons
  - Standardization $\rightarrow$ omission of potentially relevant signals
  - External validity restricted w.r.t. different occupations
  - Including respondent characteristics $\neq$ experimental logic
- Pros
  - Getting closer to CID
  - Minimize social desirability bias
  - Possible to test an array of factors at once, without confounding

*All with respect to specific application of FSE as presented!*

# Appendix

# Country Differences

Table 1: Country overview

| | Bulgaria | Greece | Norway | Switzerland |
|---|---|---|---|---|
| *Youth unemployment* | Moderate | High | Low | Low |
| Assumed scarring | + | – – | ++ | ++ |
| *Employment protection* | Weak | Tight | Tight | Weak |
| Assumed scarring | – – | + | + | – – |
| *Share in unskilled jobs* | High | Moderate | Moderate | Low |
| Assumed scarring | – – | – | – | ++ |