An Introduction to Factorial Designs Using the Example of Hiring Decisions

Robin Samuel

Université du Luxembourg

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NEGOTIATE
Overcoming early job-insecurity in Europe
Background
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

STAGE 1

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)

STAGE 2

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)

STAGE 3

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 \( \downarrow \) 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 ↗ scarring
  - Reliability, punctuality, social skills ↗ conflicts, times absent ↗ scarring
- Skills underutilization: mainly skill depreciation
  - Lack of motivation, no identification with job ↗ lack of commitment
  - Could be positive in some occupations (e.g., new experiences)
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 ≈ 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 → observed variation in the outcome variable(s) due to experimental stimuli
- External validity → generalizability of findings
Surveys vs. Experimental Methods

- Surveys: ex post facto (causal) inferences of random samples → low internal validity, but high external validity
- Experiments: assign participants randomly to experimental conditions → 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
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
2^{9^{17}} 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

Bitte beachten Sie bei der Bewertung der Lebensläufe unbedingt folgende Punkte:

- Die Dauer der Erwerbs- und Nicht-Erwerbsphasen lässt sich an der Höhe der farbigen Elemente ablesen.

- Wenn die gezeigten Lebensläufe über bestimmte Stellenanforderungen nichts aussagen, nehmen Sie an, dass diese erfüllt sind. Sie werden später noch Gelegenheit erhalten, zusätzliche Stellenanforderungen anzugeben.

Wie sind die Chancen einer Person mit dem obenstehenden Lebenslauf, für die ausgeschriebene Stelle berücksichtigt zu werden?

praktisch Null ausgezeichnet

0 1 2 3 4 5 6 7 8 9 10

Zurück Weiter
Descriptive Findings and Analytical Strategy
Distribution of Ratings (2)

The graph shows the distribution of ratings for vignettes categorized into three tertiles. The x-axis represents the vignette ratings ranging from 0 to 10, while the y-axis represents the density. Three curves are plotted: 1st Tertile (blue), 2nd Tertile (green), and 3rd Tertile (purple).

- **1st Tertile** (blue) starts high and drops sharply, indicating a concentration of ratings at the lower end of the scale.
- **2nd Tertile** (green) shows a moderate distribution with a peak around a rating of 4.
- **3rd Tertile** (purple) has a more even distribution, peaking around a rating of 6.

The graph illustrates how different tertiles of vignette ratings are distributed across the scale.
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)
Results (2)
Unemployment

Unemployment (95% CI)

\[ \chi^2(4) = 1389.49, \ p < 0.001 \]
Skills Underutilization

Skills underutilization (95% CI)

\[ \chi^2(4) = 1337.80, \ p < 0.001 \]
Unemployment across Occupational Fields

Unemployment (95% CI)

- Mechanics
- Finance
- Health
- Catering
- IT

ME rating vs. ME rating

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Skills Underutilization across Occupational Fields

Skills underutilization (95% CI)

- Mechanics
- Finance
- Health
- Catering
- IT

ME rating

-6 -5 -4 -3 -2 -1 0 1

-6 -5 -4 -3 -2 -1 0 1

-6 -5 -4 -3 -2 -1 0 1

-6 -5 -4 -3 -2 -1 0 1

-6 -5 -4 -3 -2 -1 0 1

-6 -5 -4 -3 -2 -1 0 1

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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 → omission of potentially relevant signals
- External validity restricted w.r.t. different occupations
- Including respondent characteristics ≠ 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**

<table>
<thead>
<tr>
<th></th>
<th>Bulgaria</th>
<th>Greece</th>
<th>Norway</th>
<th>Switzerland</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Youth unemployment</strong></td>
<td>Moderate</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Assumed scarring</td>
<td>+</td>
<td>– –</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td><strong>Employment protection</strong></td>
<td>Weak</td>
<td>Tight</td>
<td>Tight</td>
<td>Weak</td>
</tr>
<tr>
<td>Assumed scarring</td>
<td>– –</td>
<td>+</td>
<td>+</td>
<td>– –</td>
</tr>
<tr>
<td><strong>Share in unskilled jobs</strong></td>
<td>High</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>Assumed scarring</td>
<td>– –</td>
<td>–</td>
<td>–</td>
<td>++</td>
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