Interviewers’ influence on bias in reported income

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Motivation

- Interaction between respondent and interviewer influences response behavior
- Answers to sensitive questions often affected by social desirability bias
- Income questions have very high sensitivity, with non-response rates ranging from 20-27% (Krumpal 2013)
- Growing literature on item non-response with income questions

⇔ So far little known about accuracy of reported income
⇔ Linked survey and administrative data enable us to validate responses
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Research questions

1) What is the extent of income misreporting?

2) How do respondent characteristics influence the report behavior?

3) How do interviewer characteristics influence the report behavior?
Hypotheses

- Hypotheses on influence of respondent characteristics:
  - **H1**: Female respondents report more accurately
  - **H2**: More highly educated respondents report more accurately

- Hypotheses on influence of interviewer characteristics:
  - **H3**: More experienced interviewers produce more accurate reports
  - **H4**: Similarity between interviewer and respondent reduces misreporting
Data overview

Data of the National Educational Panel Study (NEPS) → Linked data → Register data of the IAB (IEB)
Data of the National Educational Panel Study (NEPS)

- NEPS Starting Cohort 6 (adults), waves 2 through 5, birth cohorts 1944-1986 (doi:10.5157/NEPS:SC6:5.1.0)
- N: 17,140
- CATI/CAPI with focus on educational history, also covering (un)employment, social background etc.
- Information on net and gross income for current job episodes
- Some paradata on interviewers and interview situation
Administrative data of the IAB

- Daily longitudinal data on:
  - employment (since 1975)
  - registered unemployment (since 1975)
  - participation in labor market programs (since 2000)
  - registered job search activities (since 2000)

- Covering over 85% of the German labor force

- Mandatory social security notifications by employers on their dependent employees
  ⇒ highly reliable information on gross income

- Consistent person identifier
  ⇒ once a survey respondent is identified in the administrative data, complete employment history is available
Record linkage of survey and administrative data using name, address, birth date, and sex of respondents

Combination of deterministic and probabilistic linkage methods

Informed consent to linkage from about 90% of respondents

Linkage success rate: 91%
Comparison of frequency distributions

- Administrative income evenly distributed, only heap at the cut-off point of social security contribution ceiling
- Heaping across whole distribution of reported income
Sample restrictions

- Only episodes of dependent, full-time employment
- Only employment episodes that are ongoing at or have ended shortly before the time of the interview
- No spells with implausible or censored income

Table: Comparison of register and reported income

<table>
<thead>
<tr>
<th></th>
<th>(N= 12,486)</th>
<th>median</th>
<th>s.d.</th>
<th>min</th>
<th>max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Register income</td>
<td>3,228</td>
<td>1,191</td>
<td>1,217</td>
<td>5,598</td>
<td></td>
</tr>
<tr>
<td>Reported income</td>
<td>3,000</td>
<td>1,784</td>
<td>980</td>
<td>20,000</td>
<td></td>
</tr>
</tbody>
</table>
Bivariate results: respondents

- Respondents with higher education degree show highest deviation in both directions
- Below that level of education very similar deviations

![Boxplot showing deviation by education level](image)

- **Schooling & no training**
- **Lower secondary & VET**
- **Intermediate & VET**
- **Upper secondary & VET**
- **Higher education degree**

**Education**

- **total**

**Deviation**

-2,000 -1,000 0 1,000 2,000

*excludes outside values*
Bivariate results: interviewers

- Interviewers’ experience only weakly affects report accuracy
- Least experienced interviewers produce highest deviation

<table>
<thead>
<tr>
<th>Experience</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 6 years</td>
<td></td>
</tr>
<tr>
<td>4–5 years</td>
<td></td>
</tr>
<tr>
<td>2–3 years</td>
<td></td>
</tr>
<tr>
<td>&lt; 2 years</td>
<td></td>
</tr>
</tbody>
</table>

Note: Excludes outside values.
Bivariate results: interaction of characteristics

- Interviewers’ sex does not produce differences in report accuracy
- Male respondents vary more in report accuracy
Results of multivariate regression I

- Tables show results from logistic regression.

- Dependent variables: indicator whether absolute difference is...
  - Model 1: larger than one standard deviation of administrative income (share: 8%)
  - Model 2: more than 20% larger than administrative income (share: 21%)
# Results of multivariate regression II

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coef</td>
<td>z</td>
<td>coef</td>
<td>z</td>
</tr>
<tr>
<td>Female</td>
<td>−0.291*</td>
<td>−1.97</td>
<td>−0.079</td>
<td>−0.93</td>
</tr>
<tr>
<td>Lower second., voc. training (ref.:no train.)</td>
<td>−0.647*</td>
<td>−2.34</td>
<td>−0.444**</td>
<td>−3.11</td>
</tr>
<tr>
<td>Intermediate, voc. training</td>
<td>−0.279</td>
<td>−1.03</td>
<td>−0.365**</td>
<td>−2.62</td>
</tr>
<tr>
<td>Upper secondary, voc. training</td>
<td>−0.001</td>
<td>0.00</td>
<td>−0.316*</td>
<td>−2.04</td>
</tr>
<tr>
<td>Higher education degree</td>
<td>−0.018</td>
<td>−0.07</td>
<td>−0.473**</td>
<td>−3.25</td>
</tr>
<tr>
<td>Inc.: &lt;2000 EUR (ref.:3000 - &lt;4000 EUR)</td>
<td>−0.896***</td>
<td>−3.88</td>
<td>−0.200</td>
<td>−1.53</td>
</tr>
<tr>
<td>Inc.: 2000 - &lt;3000 EUR</td>
<td>−1.364***</td>
<td>−5.9</td>
<td>−0.331***</td>
<td>−3.70</td>
</tr>
<tr>
<td>Inc.: 4000 - &lt;5000 EUR</td>
<td>0.576***</td>
<td>4.38</td>
<td>0.183*</td>
<td>2.05</td>
</tr>
<tr>
<td>Inc.: 5000 EUR and above</td>
<td>1.647***</td>
<td>11.74</td>
<td>0.687***</td>
<td>6.79</td>
</tr>
<tr>
<td>Big 5: Extraversion</td>
<td>−0.011</td>
<td>−0.22</td>
<td>0.024</td>
<td>0.73</td>
</tr>
<tr>
<td>Big 5: Agreeableness</td>
<td>−0.345***</td>
<td>−4.23</td>
<td>−0.118*</td>
<td>−2.07</td>
</tr>
<tr>
<td>Big 5: Conscientiousness</td>
<td>0.345***</td>
<td>4.66</td>
<td>0.190***</td>
<td>4.08</td>
</tr>
<tr>
<td>Big 5: Neuroticism</td>
<td>−0.105</td>
<td>−1.46</td>
<td>−0.065</td>
<td>−1.42</td>
</tr>
<tr>
<td>Big 5: Openness to experience</td>
<td>0.002</td>
<td>0.04</td>
<td>−0.019</td>
<td>−0.59</td>
</tr>
</tbody>
</table>
### Results of multivariate regression III

<table>
<thead>
<tr>
<th>Interviewer</th>
<th>Model 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coef</td>
<td>z</td>
<td>coef</td>
<td>z</td>
<td></td>
</tr>
<tr>
<td>I: aged 30-49 (ref.:below 30)</td>
<td>0.138</td>
<td>0.85</td>
<td>0.018</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>I: aged 50-65</td>
<td>0.132</td>
<td>0.77</td>
<td>0.095</td>
<td>0.77</td>
<td></td>
</tr>
<tr>
<td>I: aged older than 65</td>
<td>0.215</td>
<td>0.92</td>
<td>−0.002</td>
<td>−0.01</td>
<td></td>
</tr>
<tr>
<td>I: intermediate (ref.:lower secondary)</td>
<td>0.066</td>
<td>0.45</td>
<td>0.004</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>I: upper secondary</td>
<td>−0.109</td>
<td>−0.95</td>
<td>−0.094</td>
<td>−1.02</td>
<td></td>
</tr>
<tr>
<td>I: exp. 2-3 years (ref.:&lt;2 years)</td>
<td>0.000</td>
<td>0.00</td>
<td>0.050</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>I: exp. 4-5 years</td>
<td>0.055</td>
<td>0.41</td>
<td>0.050</td>
<td>0.51</td>
<td></td>
</tr>
<tr>
<td>I: exp. 6 or more years</td>
<td>−0.09</td>
<td>−0.62</td>
<td>−0.033</td>
<td>−0.33</td>
<td></td>
</tr>
<tr>
<td>I: running no. of interviews per wave</td>
<td>0.002</td>
<td>1.91</td>
<td>0.001</td>
<td>1.24</td>
<td></td>
</tr>
<tr>
<td>R: Male # I: female (ref.:R: male#I: male)</td>
<td>0.024</td>
<td>0.23</td>
<td>−0.018</td>
<td>−0.23</td>
<td></td>
</tr>
<tr>
<td>R: Female # I: female</td>
<td>−0.322</td>
<td>−1.62</td>
<td>−0.101</td>
<td>−0.91</td>
<td></td>
</tr>
</tbody>
</table>
## Results of multivariate regression IV

<table>
<thead>
<tr>
<th>Interview situation</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coef</td>
<td>z</td>
</tr>
<tr>
<td>CATI (ref.:CAPI)</td>
<td>−0.291</td>
<td>−1.56</td>
</tr>
<tr>
<td>2010/2011 (3rd wave)</td>
<td>0.295</td>
<td>1.36</td>
</tr>
<tr>
<td>2011/2012 (4th wave)</td>
<td>0.157</td>
<td>1.06</td>
</tr>
<tr>
<td>2012/2013 (5th wave)</td>
<td>0.303</td>
<td>1.53</td>
</tr>
<tr>
<td>Constant</td>
<td>−2.935***</td>
<td>−4.89</td>
</tr>
</tbody>
</table>

| Observations                | 8060  | 8060  |
| pseudo R²                   | 0.17  | 0.028 |
| BIC                         | 4078.305 | 8065.351 |

Source: NEPS-SC6-ADIAB; omitted respondent characteristics: age classes, country of birth, paid overtime; ***/***/** indicates significance at the 0.1/1/5% level; robust standard errors based on 542 interviewers as clusters; z-statistics in parentheses.
Summary

- Average deviation of reported income from administrative income: underestimation of about 200 EUR (< 10% of median administrative income)
- Descriptive evidence shows only small variation of deviation across subgroups
- Higher female report accuracy corroborates H1
- Least qualified show highest likelihood of deviation, supporting H2
- Results on H1 and H2 strongly depend on measurement of deviation / specification of dependent variable
- Multivariate results hint at negligible influence of interviewer characteristics
  ⇒ no support for H3 or H4
Future work

Further steps:

- Consider direction of misreporting in a multinomial model
- Include other interaction terms between characteristics of respondents and interviewers to measure similarity
- Run separate analyses by mode
- Experiment with specification of dependent variable
- Quantile regression that considers income quantiles
- Face facts and change title of paper
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Thank you for your attention!

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Overview of IAB data

**BA/IAB data**
- Employment History
  - Benefit Recipient History
  - Participation-in-Measures History File
  - Unemployment Benefit II Recipient History
  - Jobseeker History

**Integrated Employment Biographies**

**FDZ data**
- Establishment History Panel (BHP)
- Sample of Integrated Labour Market Biographies (SIAB)
- Linked data
- Establishment surveys
- Individual and household surveys

**Surveys**

**Process-generated data**