Department of Economics
Working Paper Series

2019/005

The Effect of Unemployment on Noncognitive Skills

Kristin J. Kleinjans

October 2019
The Effect of Unemployment on Noncognitive Skills

Kristin J. Kleinjans
Department of Economics
Mihaylo College of Business and Economics
California State University, Fullerton
Fullerton, CA 92834-6848

Abstract

Unemployment results in lower levels of cognitive skills and has long-term effects on health and economic well-being. In this paper, I show that unemployment also has negative effects on noncognitive skills, at least in the short term. Using a sample of Germans born between 1945 and 1995, I account for potential endogeneity by using state-level unemployment rates as instruments and controlling for past levels of noncognitive skills. The effects of not working are strong, reducing conscientiousness by 0.15 of a standard deviation for women and by 0.25 for men.

Keywords: Noncognitive skills; conscientiousness; unemployment; recessions; Germany

JEL codes: D91, J6, J24

---

1 E-mail: kkleinjans@fullerton.edu, Phone: 657-278-8693.
1 Introduction

Does unemployment affect noncognitive skills? Noncognitive skills are an important contributor to economic outcomes (e.g., Heckman et al. 2006), and if they are indeed affected by unemployment this could explain the persistence of the negative effects of unemployment on wages (see, e.g., Mincer and Ofek 1982; Jacobson et al. 1993). In this paper, I assess whether the noncognitive skill of conscientiousness is affected by unemployment by exploiting state differences in unemployment rates in Germany.

Unemployment reduces well-being in the long-term, especially of those for whom unemployment is new or uncommon (Clark et al. 2001; Clark and Lepinteur 2019). Well-being is affected by health and health behaviors, which are negatively affected by unemployment (Currie et al. 2015; Lenhart 2017). Health behaviors, such as smoking, are closely related to conscientiousness (Roberts et al. 2011), one of the Big 5 personality traits identified by psychologists. Facets of conscientiousness include responsibility, self-control, and perseverance (Eisenberg et al. 2014). Not surprisingly, conscientiousness is, among other things, predictive of earnings as well as unemployment (Heckman et al. 2006; Roberts et al. 2011).

While this suggests a causal link between conscientiousness and unemployment, health, and health behaviors, there is quite possibly also a feedback effect of unemployment on conscientiousness, for example through changes in self-control and motivation. Hence, changes in conscientiousness may be one of the mechanisms by which unemployment affects individual outcomes. The literature disagrees about the malleability of noncognitive skills in adulthood (see, for example, Roberts et al. 2008). Given the strong effects of unemployment on cognitive skills and wages (Edin and Gustavsson 2008; Pissarides 1992; Ortego-Marti 2016), unemployment is a good candidate to assess whether conscientiousness can be affected by events in adulthood.
This paper has three contributions. First, it improves our to-date limited understanding of the malleability of noncognitive skills in adulthood by considering the effect of unemployment on noncognitive skills; second, it shines light on the mechanism by which unemployment ‘scars’, that is, reduces health and future employment; and third, it adds a novel outcome to the recent literature on the effects of recessions, which has focused on health (Currie et al. 2015; Lenhart 2017) and labor market outcomes (e.g., Kahn 2010), by investigating its effect on noncognitive skills.

I find that unemployment reduces conscientiousness significantly, for women by 0.15 of a standard deviation and for men by 0.25. This shows that noncognitive skills are changing in adulthood, may explain some of unemployment’s long-term effects, and provides evidence for negative effects of recessions on noncognitive skills.

2 Econometric Approach

To causally estimate the effect of unemployment on noncognitive skills, I control for past noncognitive skills and instrument unemployment with unemployment rates at the state level. This addresses potential endogeneity and reverse causation since it is possible that noncognitive skills affect the likelihood of current and past unemployment (for example, directly through behaviors at work, and indirectly through educational achievement or occupational choice).

I use “Not Working” as explanatory (endogenous) variable rather than being unemployed to account for those who dropped out of the labor force because of discouragement, went on disability, or retired early. Since this variable is a dummy, I estimate the following model using linear regression with endogenous treatment using maximum-likelihood (Cameron and Trivedi 2009):

\[ \text{Conscientiousness}_i = \beta_1 \text{NotWorking}_i + x'_i \beta_2 + u_i , \text{ where} \]

\[ \text{NotWorking}_i^* = x'_i \gamma_1 + \text{unemployment'}_i \gamma_2 + v_i \]
and \( \text{NotWorking}_t = \begin{cases} 1 & \text{if } \text{NotWorking}_t^* > 0 \\ 0 & \text{if } \text{NotWorking}_t^* \text{ otherwise} \end{cases} \).

Control variables \( x_t \) are those likely to affect conscientiousness or the probability of becoming unemployed. All models include up to the third-degree polynomial in age. Additional variables are the prior level of conscientiousness as well as dummies for marital status, having at least one child, and education. I also include a dummy for whether the respondent was not working at time \( t-4 \) to account for its potential effects on conscientiousness and to investigate potential differential effects of not working on conscientiousness by prior work status. This latter is the preferred specification because identification relies on controlling for prior unemployment that may be correlated with current conscientiousness. Standard errors are clustered by individual in order to account for multiple observations.

OLS regressions similar to those above but restricting the sample to those currently working and adding the unemployment rate or log wage (or both) as explanatory variables show that neither of them is statistically significant (and all coefficients are smaller than 0.008), lending credibility to the validity of the instrument since it is correlated with the probability of not working but not with conscientiousness directly or through other avenues.

3 Data

This paper uses data from the German Socioeconomic Panel (SOEP), an annual representative survey of private German households conducted by the German Institute for Economic Research (DIW) (Wagner et al. 2007).\(^2\) Questions assessing self-reported noncognitive skills were included in the 2005, 2009, 2013, and 2017 waves. The working sample includes

\(^2\) I use the 95\% sample of Version 34, available to researchers outside of Germany.
German-born individuals between the ages of 22 and 60 (when most have completed their education and before a common retirement age) who answered in at least two consecutive waves when questions on noncognitive skills were included. 1,756 individuals were dropped with missing information at the previous such wave. Compared to the working sample, those dropped are slightly negatively selected - they are younger, more likely to be male and not working, and have lower conscientiousness and wages.

The variable of interest is Not Working. Those currently in school are defined as working, as are parents on parental leave. The instrument, the rate of unemployment in the state of residence, ranges for the sample years from 3.6% to 16.4%.

Conscientiousness is derived using factor analysis of the answers to three questions designed for its assessment: Whether the respondents see themselves as someone who does a thorough job, tends to be lazy, and does things effectively and efficiently. By design, conscientiousness has a mean of zero and a variance of one. Women are more conscientious than men by about 0.4 of a standard deviation.

4 Results

The results of OLS as well as the instrumental variable regressions are shown in Tables 1 (Women) and 2 (Men). Moving from left to right, the models only include age polynomials, add conscientiousness at t-4 as well education and family status dummies, and add a dummy for whether the respondent was working at t-4.
Table 1: Results for Women: Conscientiousness

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>IV</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>Not Working</td>
<td>-0.158***</td>
<td>-0.105***</td>
<td>-0.091***</td>
<td>-0.158***</td>
<td>-0.110***</td>
</tr>
<tr>
<td></td>
<td>(0.027)</td>
<td>(0.020)</td>
<td>(0.024)</td>
<td>(0.042)</td>
<td>(0.039)</td>
</tr>
<tr>
<td>Conscientiousness at t-4</td>
<td>0.540***</td>
<td>0.539***</td>
<td>0.540***</td>
<td>0.539***</td>
<td>0.540***</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.011)</td>
</tr>
<tr>
<td>Not Working at t-4</td>
<td></td>
<td></td>
<td>-0.026</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.022)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age polynomials</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Education and family status dummies</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Instrument</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment rates by state</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.006</td>
<td>0.281</td>
<td>0.281</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wald Test of independent equations (P&gt;Chi²)</td>
<td></td>
<td></td>
<td>0.997</td>
<td>0.850</td>
<td>0.140</td>
</tr>
<tr>
<td>Statistical significance level of instrument in 1. stage</td>
<td></td>
<td></td>
<td>0.073</td>
<td>0.000</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Notes: Standard errors are clustered by individual. Statistical significance levels shown are * p<0.10, ** p<0.05, *** p<0.01. N = 11,131.
Table 2: Results for Men: Conscientiousness

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Not Working</td>
<td>-0.308***</td>
<td>-0.173***</td>
</tr>
<tr>
<td></td>
<td>(0.038)</td>
<td>(0.029)</td>
</tr>
<tr>
<td>Conscientiousness at t-4</td>
<td>0.557***</td>
<td>0.556***</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Not Working at t-4</td>
<td>-0.030</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td></td>
</tr>
<tr>
<td>Age polynomials</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Education and family status dummies</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Instrument**
- Unemployment rates by state

<table>
<thead>
<tr>
<th>R²</th>
<th>0.015</th>
<th>0.295</th>
<th>0.295</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wald Test of independent equations (P&gt;(\text{Chi}^2))</td>
<td>0.648</td>
<td>0.321</td>
<td>0.029</td>
</tr>
<tr>
<td>Statistical significance level of instrument in 1. stage</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Notes: Standard errors are clustered by individual. Statistical significance levels shown are * p<0.10, ** p<0.05, *** p<0.01. N = 9,798.
In all cases and for both genders, Not Working reduces conscientiousness by at least one tenth of a standard deviation. This is a sizeable effect, considering that it is about as big as the sample difference in conscientiousness between single and partnered individuals. Controlling for the endogeneity of Not Working strengthens its effect, though Wald Tests show that Not Working is only endogenous when a dummy for not working at t-4 is included. The instrument is statistically significant in all first stages. Conscientiousness is highly persistent - the coefficients of conscientiousness at t-4 are over 0.5 in all regressions.

For women, in the OLS results the negative effect of Not Working decreases as more variables are included. Comparing OLS and IV regression results for the preferred third model (shown in Table 1, columns (3) and (6)), shows that addressing endogeneity of Not Working increases its importance by about half, implying that less conscientious women are more likely to be not working. This means that for those who stopped working as a result of higher unemployment rates in their state, conscientiousness decreased by 0.15 of a standard deviation. Predictive margins show that there is no difference in this margin depending on prior work status, as is also apparent from the fact that Not Working at time t-4 is not statistically significant in the second stage.

For men, the effects of Not Working are up to twice as big as for women, depending on the specification (see Table 2). Again looking at the results of the regressions that include prior work status, accounting for endogeneity of Not Working increases its effect on conscientiousness by 0.1 of a standard deviation, or about two thirds, to one fourth of a standard deviation. As in the case for women, there is no difference in this effect by prior work status.

The gender differences found could be related to the stronger stigma of not working for men, especially in Germany where women are less likely to be employed than men and more likely to work part-time (OECD 2017).
The results are robust to not standardizing the measure of conscientiousness, excluding individuals on parental leave, and including year dummies (the latter leads to a stronger rejection of exogeneity for women at the 7%-level).

5 Discussion

I find that unemployment reduces conscientiousness in adults using German state unemployment rates as an instrument to account for potential endogeneity of unemployment and conscientiousness. Thus noncognitive skills are affected by recessions, which may explain some of the long-term effects of unemployment. These findings also provide support for the malleability of noncognitive skills into adulthood.

Acknowledgments

A special thanks to Marco Caliendo at the University of Potsdam and Carsten Schroeder at the DIW for hosting me during my sabbatical and to an anonymous referee.

References


Kahn, LB. 2010. The long-term labor market consequences of graduating from college in a bad economy. *Labour Economics* 17, 303-316.


