

# **Risk Attitudes and Reservation Wages of Unemployed Workers: Evidence from Panel Data\***

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## *Abstract*

This paper studies risk attitudes of unemployed job seekers and their relationship to self-reported reservation wages, using a repeated measure of individual risk attitudes from representative German panel data. We find that risk aversion is prevalent among unemployed job seekers, and that individual reservation wages tend to decrease slightly over time. Furthermore, we observe a significantly negative relationship between risk aversion and reservation wages in fixed-effects regressions.

JEL-Classification: J64, D83, C23.

Keywords: Risk Attitudes, Reservation Wages, Job Search, Panel Data.

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## 1. Introduction

Experimental evidence on individual job search behavior suggests that because job seekers are risk-averse, they select reservation wages that never exceed those of an optimal risk-neutral worker (Cox/Oaxaca 1992). However, outside the laboratory there is little evidence on the distribution of risk preferences among job seekers. Moreover, no direct evidence is available on the impact of individual risk attitudes on the reservation wage in the general population. From a policy point of view, this lack of evidence is challenging, since the degree of risk aversion of workers and the corresponding level of reservation wages are pivotal for the optimal design of an unemployment insurance system (e.g., Acemoglu/Shimer 1999, Shimer/Werning 2007). In this paper, we first describe the distribution of risk attitudes of unemployed job seekers using representative panel data from Germany. We then provide first empirical evidence of the relationship between risk attitudes and reservation wages.

Using representative panel data to analyze the relationship between individual risk preferences and reservation wages has several advantages over using lab data. First, our analysis is based on a representative sample of unemployed job seekers compared to a self-selected student population in most experiments. Since unemployment is a drastic event for most people, this might be important. Second, decisions on job offers in the real world involve high stakes compared to relatively low stakes in most job search experiments. Third, job search normally takes time, while lab experiments only last a few hours and there is evidence of remarkable differences between short-run and long-run behavior (Levitt/List 2007). Fourth, we can relate information on risk attitudes and individual reservation wages over time to a rich set of socio-economic characteristics including information on the unemployed job seekers wage in the previous job. This allows us to control for a simple search heuristic as well as for observed confounding factors. Fifth, we can control for unobserved individual characteristics like cognitive ability, which might lead to biased parameter estimates, by means of fixed effects panel specifications with a repeated measure of individual risk attitudes.

However, using representative panel data comes at a price. First, our subjective reservation wages are collected as part of usual survey interviews once a year. Therefore, it is not entirely clear whether job seekers in our sample really use their reported reservation wage as a binding minimum remuneration level in their job offer acceptance/rejection decisions later on. In contrast, in experiments, researchers can use a design where subjects report reservation wages which are binding when job offers arrive later on (e.g., Cox/Oaxaca 1992, Falk/Fehr/Zehnder 2006). Second, by design survey measures of individual risk preferences are typically not linked to contemporaneous risk taking behavior of the respondents. Therefore, we provide and

discuss evidence that supports our view that the panel data on individual risk attitudes and reservation wages used in this paper is informative for the research question at hand.

The main aim of our empirical work is to complement existing evidence on job search behavior from the lab with evidence from the general population and thereby to help understand which results are robustly generalizable. The paper unfolds as follows. Section 2 describes the data and presents some descriptive evidence. Section 3 contains the regression results. Section 4 concludes.

## 2. Data and descriptive evidence

The empirical analysis is based on the German Socio-Economic Panel (SOEP) (Wagner et al. 2007, Haisken-DeNew/Hahn 2006). We use data for the years 2004 to 2006. Our sample consists of unemployed job seekers aged 18-65 in the respective years.

Our direct measure of individual risk attitudes is based on the following survey question: *“How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?”* Respondents indicate their risk preference on an eleven-point scale; with zero indicating total unwillingness to take risks and ten indicating total willingness to take risks. This general risk measure was collected in the years 2004 and 2006. Dohmen et al. (2005) show that the general measure of risk preferences in the SOEP is a reliable predictor of risk-taking behavior in a field experiment.

Figure 1 shows the distribution of the willingness to take risks in general for our subsample. A first observation is that there is substantial heterogeneity in risk attitudes in 2004 and 2006. Moreover, if we classify respondents with “0-5” answers in the questionnaire as risk-averse, around 60% of all unemployed job seekers are risk-averse in both years. Figure 2 plots the individual differences in the reported willingness to take risks in general between 2004 and 2006. The distribution is fairly symmetric around 0 and indicates no systematic shifts of individual risk preferences over time.

- Figure 1 / Figure 2 -

Table 1 reports some descriptive statistics of subjective net reservation wages in Germany.<sup>1</sup> If we calculate first (second) differences in reservation wages over time, the median of the individual differences always decreases, while with respect to the mean this does not hold for the period 2005-2006. Rows 7 (8) of Table 1 reveal that the mean (median) of the individual ratio of the reservation wage and current unemployment benefits is always greater than one.<sup>2</sup>

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<sup>1</sup> All monetary variables are deflated using the CPI with base year 2000.

<sup>2</sup> Moreover, 9 out of 10 respondents report a reservation wage that is higher than the respective level of unemployment benefits (not documented).

The mean (median) of the individual ratio of the real net reservation wage and the last real net wage is always close to one, which is in line with results from the lab (Falk/Fehr/Zehnder 2006). If we calculate the ratio of reservation wages and the first post-unemployment wage, the mean of this ratio is always greater than one but close to it in 2005 and the overall median is fairly close to one. Hence, the self-reported reservation wages in the SOEP appear to be of reasonable quality.

Table 1

### 3. Regression results

In our empirical specifications, self-reported net reservation wages are specified lognormally as a linear function of our direct measure of individual risk attitudes and vectors of control variables. The sets of control variables differ with respect to the information available on financial support during an unemployment spell and whether information on the previous wage is available.<sup>3</sup> For the sake of a more intuitive interpretation we recode the eleven-point scale of the measure of risk attitudes for our regression analysis in reverse order, i.e., “0” indicating strongly risk-prone and “10” strongly risk-averse. Observations with missing values on relevant covariates are dropped.

In a first step we use pooled OLS specifications based on a subsample of unemployed job seekers in the two years 2004 and 2006, for whom (repeated) information on individual risk attitudes is available. Since measurement error might be an issue with respect to our risk measures, we additionally employ an “errors in variables (EIV)” approach, where the measure of reliability is Cronbach’s alpha ( $\alpha=0.63$ ). Columns (1)-(4) of Table 2 reveal that there is a significantly negative correlation between the individual degree of risk aversion and the level of self-reported reservation wages in all specifications. Moreover, the negative correlation remains significant, if we additionally control for a simple search heuristic, i.e., include the previous wage as a regressor. These correlations are in line with evidence from the lab (e.g., Cox/Oaxaca 1992, Braunstein/Schotter 1982, Schotter/Braunstein 1981). Moreover, they are consistent with predictions from finite horizon job search models that reservation wages of risk-averse job seekers never exceed those of risk-neutral workers.

In the presence of omitted variables like cognitive ability the parameter estimates of our pooled OLS/EIV specifications are biased. To tackle this issue, we apply two fixed effects panel specifications to control for unobserved time-invariant individual heterogeneity. We start with a standard linear fixed effects specification based on a panel for the two years 2004 and 2006, where information on risk attitudes is available. However, the standard approach

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<sup>3</sup> Descriptive statistics of all control variables are presented in Table A1 of the Appendix.

exhibits three disadvantages in our particular case: First, we cannot identify the impact of time-invariant variables like the previous wage of the unemployed job seeker, which might serve as a simple search heuristic. Second, a standard fixed effect approach might intensify the attenuation bias due to measurement error. Third, if we use only data from 2004 and 2006 and combine it with valid information on previous wages and unemployment benefit payments, our sample sizes decrease to such an extent that we cannot identify the parameters of interest. Therefore, we additionally pursue the following empirical strategy. In 2005, psychometric information based on the so-called “Big Five” five-factor personality inventory (Borghans et al. 2008, John/Srivastava 1995) was collected in the SOEP. We exploit information from the question whether the respondent “has an active imagination,” which is reported on a seven-point scale, since risk preferences and the ability to envision future consequences of decisions are related. We combine this psychometric measure from 2005 with information on individual risk attitudes in 2004 and 2006 and use principal component analysis to generate time-invariant orthogonal components for the underlying risk preferences. It turns out that we only find one component with an eigenvalue larger than one.<sup>4</sup> The regression-scored factor is used as a proxy for the underlying individual degree of risk aversion, which should reduce attenuation bias due to measurement error in our risk variable. We then apply the following two-step fixed effects estimation procedure (for details see: Wooldridge 2002, pp. 325-326): (1) Use the within-transformation of the linear fixed effects estimator to identify the effects of time-varying variables ( $x_{i,t}$ ) on individual reservation wages ( $rw_{i,t}$ ):  $rw_{i,t} - \overline{rw}_i = (x_{i,t} - \overline{x}_i)\beta + (u_{it} - \overline{u}_i)$  (2) Calculate person-specific averaged residuals over time based on FE-estimates of the first step ( $\overline{rw}_i - \overline{x}_i \hat{\beta}_{FE}$ ) and use them as dependent variable in an OLS-regression on all time-invariant individual characteristics including our proxy for individual risk aversion. Test in the second step OLS regressions whether the individual risk measure is endogenous, since it might be correlated with the unobserved individual effects<sup>5</sup>. Standard errors come from a nonparametric panel-bootstrap procedure with 1000 replications to take into account that the dependent variable of the second step as well as the proxy for stable individual risk preferences is estimated.

Columns 5-8 of Table 2 present the results of our two fixed effects panel specifications. A first observation is that we find a significantly negative relationship between individual risk aversion and the level of self-reported reservation wages across all specifications conditional

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<sup>4</sup> The factor loadings on the first component are respectively 0.81, 0.81, -0.50 for the risk measure in 2004, 2006 and the psychometric measure in 2005.

<sup>5</sup> We use „individual height“ as an instrument, since there is evidence of a significantly positive correlation of the willingness to take risk and individual height (Dohmen et al. 2005). Note however, that some tests indicate that “individual height” might be a weak instrument.

on individual fixed effects.<sup>6</sup> Hence, given the identifying assumption of the fixed effects panel approach, we discover a negative impact of the individual degree of risk aversion on the level of individual reservation wages. The size of the estimated marginal effect is remarkable: Someone who switches from being extremely risk-loving ('0') to being extremely risk-averse ('10', after recoding) exhibits a roughly 40% lower reservation wage *ceteris paribus*. Therefore, our result indicates that reservation wages of risk-averse job seekers are indeed lower than those of risk-neutral job seekers. Hence, based on representative panel data we find evidence that is consistent with results from the lab.

One might argue that the underlying optimization problem of various job search models is quite complex and job seekers instead use naïve rules to determine their individual reservation wage. A simple search heuristic one might think of is that job seekers use their previous wage as reservation wage. The estimated parameter in column 8 indicates that previous wages indeed have a significantly positive impact on reservation wages. This finding is in line with evidence from the lab (e.g., Falk et al. 2006). Note however, that we still find a significantly negative link between individual risk aversion and reservation wages in the fixed effect regression controlling for a simple search heuristic.

The estimated elasticity of reservation wages with respect to unemployment benefits across all specifications is about -0.10. This is lower than the elasticities found by Feldstein/Poterba (1984) for the US but similar to those provided by Lancaster/Chesher (1983) for the UK. The parameter estimates for the set of control variables in Table 2 are in line with previous results also based on the SOEP (Prasad 2004).

### *Selectivity Issues*

Our estimates are based on reported reservation wages. However, roughly 50% of all unemployed job seekers in the years 2004 to 2006 answer “*can't say, it depends*” instead of reporting a positive reservation wage. Hence, one might be concerned that those with observed self-reported reservation wages are not a random sample of all job seekers. This issue is addressed by means of Heckman-type sample selection models. With respect to the pooled sample we apply a standard Heckman selection model while with respect to our fixed effects panel specifications, we follow a suggestion by Wooldridge (2002, p. 582). In both cases, we exploit information on whether a computer-assisted personal interview (CAPI) is used to collect the data in the selection-equation to identify the parameters of interest. The argument is that the mode of the interview has an impact on the likelihood of reporting monetary variables, but has no impact on the actual reported level of the monetary variable.

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<sup>6</sup> Note that the results from C-Tests do not indicate that our proxy of individual risk aversion is endogenous in the second-step OLS-regressions.

We find that the use of CAPI indeed increases the individual likelihood of reporting net reservation wages. However, across all specifications taking into account potential selection effects, we cannot reject the null hypothesis that sample selection is not an issue in our data, since the two-sided significance levels are in the range of [0.15, 0.89].<sup>7</sup>

#### **4. Concluding remarks**

The present study is the first empirical evidence on whether individual risk attitudes of unemployed job seekers have an impact on their reservation wages based on representative panel data. We find that (a) risk aversion is prevalent among unemployed job seekers and (b) there is a significantly negative relationship between individual risk aversion and reservation wages. Our results considerably strengthen existing evidence from the lab which rejects the risk-neutral job search model.

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<sup>7</sup> Detailed results are available from the author on request.

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Figure 1: Risk Attitudes of Unemployed Workers in Germany

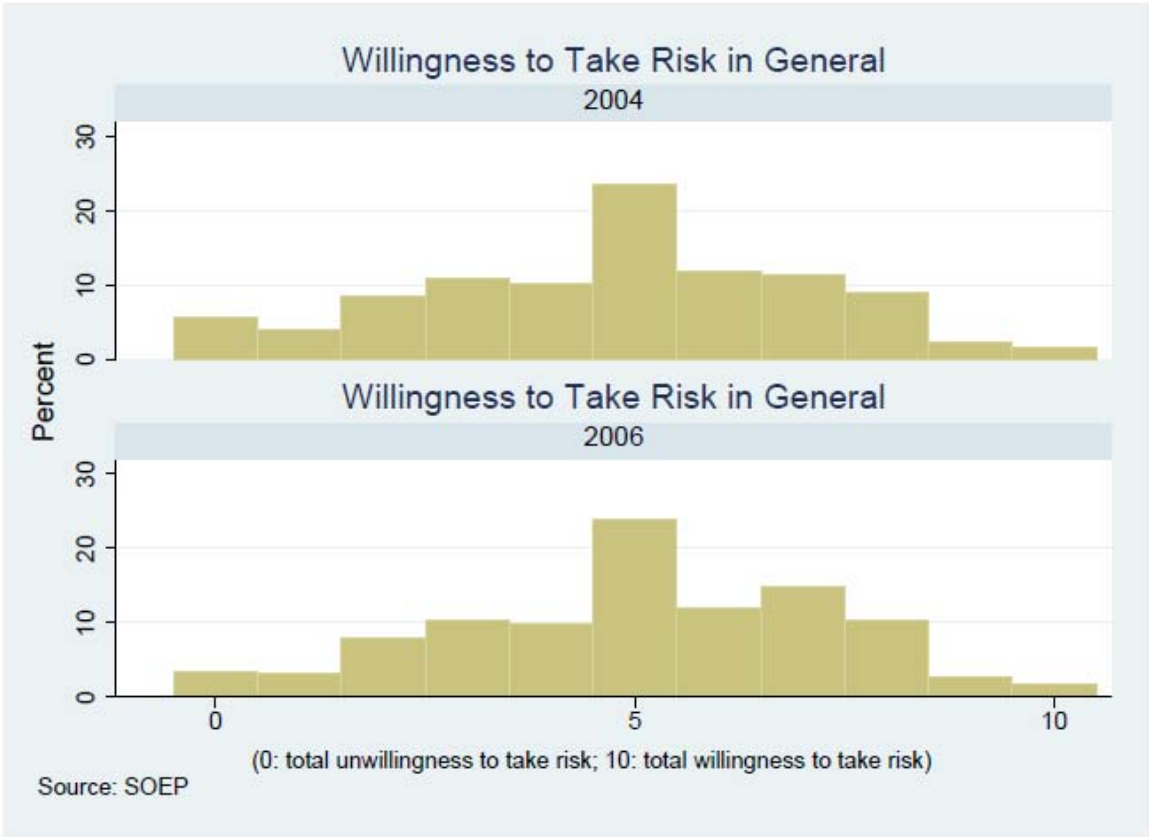


Figure 2: Changes in Risk Attitudes over Time

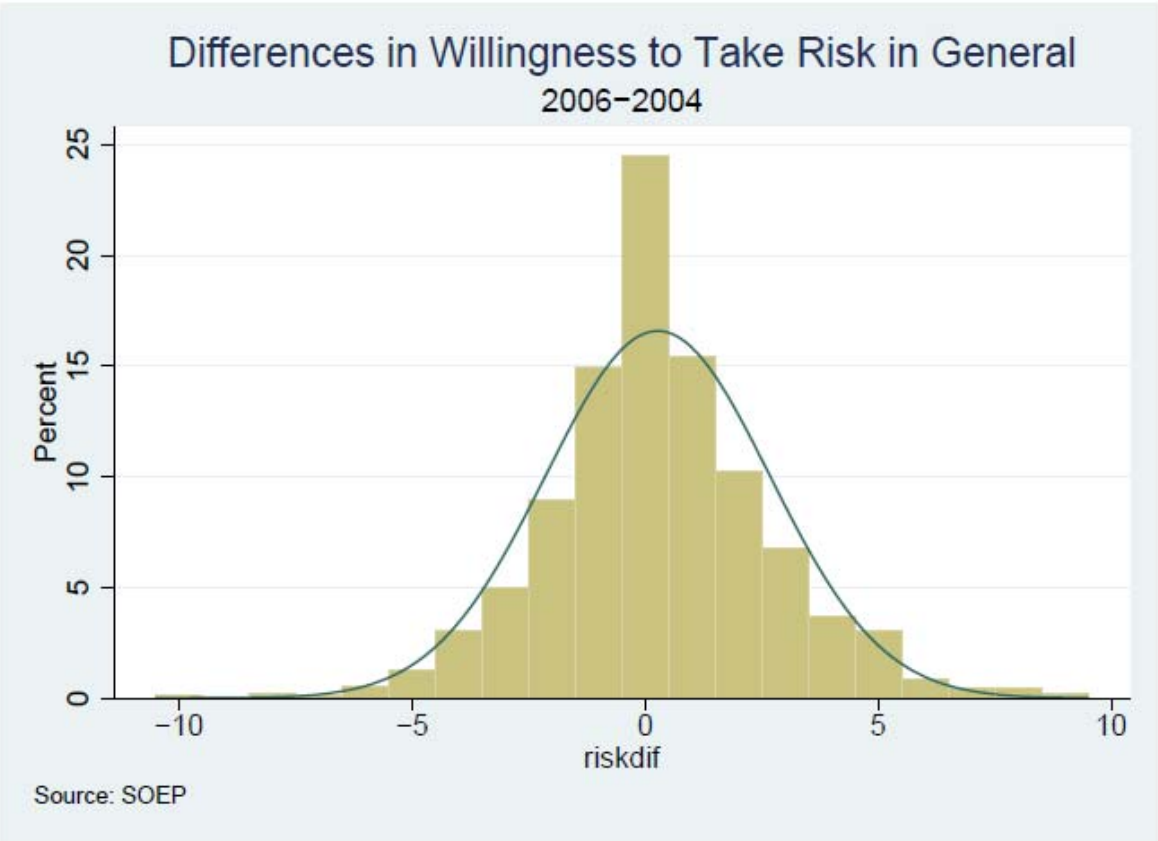


Table 1: Reservation Wages in Germany

	2004	2005	2006	Total
	<i>Mean/Median (in €): first/second row</i>			
Reservation wage (net, $rw_{i,t}$ )	1074.45 941.62	930.21 923.36	975.02 908.27	999.74 923.36
First Difference: ( $rw_{i,t} - rw_{i,t-1}$ )	-- --	-95.01 -27.39	25.42 -12.08	-38.58 -18.11
Second Difference: ( $rw_{i,t} - rw_{i,t-2}$ )	-- --	-- --	-9.56 -33.35	-- --
Ratio: $rw_{i,t}$ /Benefits	2.12 1.76	2.04 1.54	2.37 1.78	2.18 1.70
Ratio: $rw_{i,t}$ /Last Net Wage	1.03 0.97	0.99 0.97	1.05 0.98	1.02 0.97
Ratio: $rw_{i,t}$ /Next Net Wage	1.57 1.18	1.07 0.98	-- --	1.42 1.07

Note: SOEP 2004-2006. N=2550. Survey weights are used.

Table 2: Determinants of Reservation Wages in Germany

	<i>Specifications based on Pooled Sample</i>				<i>Fixed Effects Panel Specifications</i>			
	<i>OLS</i>	<i>OLS</i>	<i>EIV</i>	<i>EIV</i>	<i>FE</i>	<i>FE 2step</i>	<i>FE 2step</i>	<i>FE 2step</i>
Risk Aversion	-0.019** (0.005)	-0.010+ (0.005)	-0.033** (0.008)	-0.017+ (0.010)	-0.019+ (0.010)	-0.063** (0.017)	-0.048* (0.020)	-0.032+ (0.018)
ln(Benefits)	--	0.089* (0.035)	--	0.090* (0.036)	--	--	0.120** (0.042)	0.120** (0.042)
ln>Last net wage)	--	0.353** (0.049)	--	0.349** (0.048)	--	--	--	0.393** (0.062)
Dummy: Unemp. Benefits	0.084** (0.026)	--	0.088** (0.027)	--	0.006 (0.054)	0.026 (0.029)	--	--
Dummy: Unemp. Assistance	0.054 (0.037)	--	0.057 (0.036)	--	0.047 (0.050)	0.056 (0.048)	--	--
Dummy: Social Assistance	0.148* (0.062)	--	0.152* (0.060)	--	-0.092 (0.095)	-0.028 (0.087)	--	--
Dummy: Unemp. Support (ALG)	0.063* (0.032)	--	0.064+ (0.033)	--	0.023 (0.049)	-0.030 (0.029)	--	--
Dummy: Parental Leave	0.142* (0.068)	--	0.147* (0.070)	--	-0.139 (0.126)	-0.074 (0.107)	--	--
ln(other_household_income_net)	0.044** (0.010)	0.014 (0.010)	0.043** (0.009)	0.015 (0.010)	0.019 (0.016)	0.033** (0.012)	0.040+ (0.022)	0.040+ (0.022)
Unemp-Duration (registered, years)	--	0.005 (0.009)	--	0.005 (0.009)	--	--	-0.016 (0.029)	-0.016 (0.029)
Male	0.157** (0.025)	0.062* (0.028)	0.150** (0.025)	0.059* (0.029)	--	0.297** (0.039)	0.189** (0.050)	0.056 (0.045)
Married	-0.040 (0.025)	-0.009 (0.028)	-0.038 (0.025)	-0.008 (0.028)	--	-0.104** (0.038)	-0.069 (0.057)	-0.087 (0.056)
Age	0.025** (0.008)	-0.001 (0.008)	0.027** (0.008)	0.000 (0.008)	--	0.026* (0.011)	0.031* (0.012)	0.024+ (0.012)
Age_squared	-0.000** (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000 (0.000)	--	-0.000+ (0.000)	-0.000* (0.000)	-0.000+ (0.000)
Years_education	0.035** (0.006)	0.014+ (0.008)	0.034** (0.007)	0.014+ (0.008)	--	0.021* (0.009)	-0.011 (0.012)	-0.021+ (0.012)
Job: hard to find	-0.082+ (0.050)	-0.055 (0.052)	-0.080 (0.051)	-0.055 (0.051)	-0.272* (0.111)	-0.106 (0.081)	-0.009 (0.052)	-0.009 (0.052)
Job: impossible	-0.059 (0.055)	-0.075 (0.060)	-0.052 (0.054)	-0.073 (0.058)	-0.284* (0.118)	-0.129 (0.084)	-0.008 (0.060)	-0.008 (0.060)
Search_full_time	0.196** (0.030)	0.164** (0.037)	0.201** (0.029)	0.165** (0.038)	0.143* (0.072)	0.083** (0.029)	0.006 (0.034)	0.006 (0.034)
Search_part_time	-0.361** (0.048)	-0.147+ (0.080)	-0.354** (0.048)	-0.149+ (0.083)	-0.071 (0.299)	-0.009 (0.084)	-0.106 (0.074)	-0.106 (0.074)
Constant	5.720** (0.198)	3.689** (0.331)	5.771** (0.209)	0.006 (0.022)	6.940** (0.153)	6.642** (0.124)	5.923** (0.335)	5.923** (0.335)
Time Dummies	yes				yes			
Regional Dummies	yes				no	yes	no	no
C-Test: [ $\chi^2(1)$ ]	--	--	--	--	--	0.053	0.340	0.064
R-squared	0.35	0.47	0.36	0.47	0.22	0.05/0.22	0.08/0.09	0.08/0.21
N	1374	551	1374	551	420	1112/461	516/223	516/175

Notes: SOEP 2004-2006. OLS, EIV and FE estimates based on samples from survey years 2004 and 2006. FE\_2step estimates based on samples from survey years 2004, 2005 and 2006. Dependent variable is log of net reservation wage. All standard errors are robust with respect to clustering at the person level. Standard errors of EIV and FE\_2step are panel boot-strapped with 1000 replications. Variable Risk Aversion for FE\_2step stems from a Principal Component Analysis based on risk attitudes measures in 2004 and 2006 and “Big five” information from 2005. OLS: Ordinary Least Squares Regression. EIV: “Errors-in-Variables”-Regression. FE: Linear Fixed Effects Regression. FE\_2step: two-step linear fixed effects regression. C-Test: GMM distance test of endogeneity of individual risk measure in second step regression of FE\_2step; individual height is used as instrument. R-squared and N for FE\_2step: first step/second step. Significance levels: \*\* (0.01), \* (0.05), + (0.1).

## Appendix:

Table A1: Descriptive Statistics

Variable	Mean	Std. Dev.
Male	0.49	0.50
Married	0.49	0.50
Age	39.26	11.76
Years_education	11.59	2.27
Job:hard to find	0.66	0.47
Job: impossible	0.26	0.44
ln(other_house_hold_income_net)	6.75	1.25
Search_full_time	0.57	0.50
Search_part_time	0.22	0.42
Dummy: Unemp. Benefits	0.29	0.45
Dummy: Unemp. Assistance	0.15	0.36
Dummy: Social Assistance	0.03	0.17
Dummy: Unemp. Support (ALG)	0.21	0.41
Dummy: Parental Leave	0.04	0.20
Unemp-Duration (registered, years)	2.05	1.82
ln(Benefits)	6.33	0.54
ln>Last net wage)	7.00	0.40

Notes: SOEP 2004, 2006. Pooled Sample. Number of observations varies across variables.