

Maier, Michael; Argaw, Bethlehem A.; Maier, Michael F.; Skriabikova, Olga J.

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RISK ATTITUDES, JOB MOBILITY AND SUBSEQUENT WAGE GROWTH DURING THE EARLY CAREER*

February 29, 2016

Abstract: In this paper, we investigate the relationship between individuals' willingness to take risk and job mobility during the early career. Job change is a risky decision since it involves substantial costs without entirely foreseeing the benefits at the time the decision is made. We incorporate risk preferences as an additional parameter influencing the individual job change behaviour in an on-the-job search model accounting for nonwage job characteristics. Empirically, we show that more risk-averse individuals voluntarily change their jobs less often compared to more risk-tolerant individuals. In addition, since risk-averse individuals demand higher compensation for the risk associated with uncertain nonwage job characteristics, we find that their job changes are associated with higher wage gains. However, more risk-averse individuals do not obtain higher overall wage growth as a result of the early career compared to more risk-tolerant individuals.

JEL classification: D81, J31, J62

Keywords: risk attitudes, early-career job mobility, wage growth

1 Introduction

The importance of job mobility for individuals' success on the labour market is a widely discussed topic. Empirical analyses have extensively investigated the role of job changes for wage growth. Especially job changes within the first years on the labour market are important, as decisions that are made in this period can strongly influence labour market prospects of the whole career (Topel and Ward, 1992; von Wachter and Bender, 2006; Möller and Umkehrer, 2014).

While search and matching theories specify the wage of the current and the new job as determinants for job changes, a growing literature has demonstrated the relevance of nonwage job characteristics for on-the-job search (e.g. Bonhomme and Jolivet, 2009; Sullivan and To, 2014; Bonhomme et al., 2015). In particular, job characteristics other than the wage such as the possibility of promotion, actual hours worked, the flexibility of working time and other working conditions can not fully be specified ex-ante in working contracts but reveal only after some time being on the job.

Relatively few studies on job mobility have investigated the importance of risks or uncertainties which individuals face when they decide whether to change their job. An analysis by van den Berg (1992) emphasises the costs of job changes such as fringe benefits, moving costs and costs to adjust to the new environment. Even if these costs can be entirely foreseen by the individual at the time the decision is made, the individual's benefit from the job change is not certain. To change one's job is therefore risky, and hence individuals evaluate the expected utility from a job offer depending on their risk attitudes. More risk-averse individuals should be less likely to change their job, *ceteris paribus*, because they are willing to bear risks associated with a job change to a lesser extent than less risk-averse individuals.

We therefore investigate in this paper the relationship between risk attitudes, job mobility and subsequent wage growth. Conceptually, we incorporate risk preferences as an additional parameter influencing the individual job change behaviour in an on-the-job search model where nonwage job characteristics are accounted for. In this framework we want to answer two research questions in the empirical part: Do more risk-averse individuals change their jobs less often during the early career compared to less risk-averse individuals? Is wage growth different between more risk-averse and less risk-averse individuals due to the difference in their job changing behaviour induced by risk attitudes? We only consider voluntary job changes to exclude selection effects associated with involuntary quits. Our results show that more risk-averse individuals change their jobs less often during the early career compared to less risk-averse people. As a second finding, more-risk averse individuals have on average higher wage gains from each job change but the difference in the job changing behaviour during the early career does not yield different overall wage growth as a result of this career phase.

Our findings show that the assumption of homogeneous risk attitudes commonly made in theoret-

ical as well as empirical studies on job mobility and wage growth can not be supported at all times. Introducing risk aversion offers several explanations for differences in the relationship between job mobility and wage growth. One reason for differences in wage growth can be that more risk averse individuals demand a higher instantaneous compensation in terms of the contracted wage in the new job because they face risks associated with the job change. Besides realising a higher wage level in the new job the purpose of a job change can also secondly be to avoid low wage growth on the current job. As more risk-averse individuals are on average more reluctant to change their job, given a fixed wage offer, their overall wage growth - in the perspective of the early career - can be lower compared to a more risk-tolerant individual who quits the current job faster due to experiencing low wage growth.

Thirdly, overall wage growth can be different between more risk-averse and more risk-tolerant individuals due to their difference in the number of job changes during the early career. Fewer job changes increase tenure and risk-averse individuals might thus receive comparably higher returns from accumulated firm-specific capital. Furthermore, match quality of the job and thus wage growth on-the-job can not be entirely foreseen ex-ante. Thus, by changing the job less frequently during the early career more risk-averse individuals reduce the probability of choosing jobs where the match quality reveals to be worse yielding less or even no wage growth. On the other hand, less frequent job changes of more risk-averse individuals provide less opportunities to learn about one's own ability and preferences. This may lead to less improvement in the ex-ante uncertain match quality for each job and thus more risk-averse individuals obtain less returns from information with respect to their fit to different job requirements (Farber and Gibbons, 1996; Antonovics and Golan, 2012; Papageorgiou, 2014).

The paper is related to two literature strands in accordance to our two research questions. The analysis first contributes to studies which investigate the influence of risk attitudes on labour market decisions. This comprises studies on the role of risk attitudes for the decision to invest in human capital and its related returns (Shaw, 1996; Brown and Taylor, 2005; Budria et al., 2012), the decision to become self-employed (Caliendo et al., 2009; Fossen, 2011; Skriabikova et al., 2014) and sorting into occupations (Fuchs-Schündeln and Schündeln, 2005; Bonin et al., 2007). Second, our study relates to the literature which investigates the relationship between job mobility and wage growth. While there is much evidence that job mobility is related to positive wage growth (e. g. Bartel and Borjas, 1981; Topel and Ward, 1992; Dustmann and Meghir, 2005), studies have also found a negative relationship between job mobility and wage growth (e. g. Light and McGarry, 1998; Neumark, 2002). We therefore contribute to this literature by investigating how the introduction of heterogeneous risk attitudes influences the relationship between job mobility and wage growth.

The paper proceeds as follows. In section 2 we sketch our conceptual framework to explain why

risk attitudes affect job changes and how the relationship between job changes and associated wage growth depends on the willingness to take risks. In section 3, our empirical approach and the data are described. Section 4 presents our main findings and sensitivity analyses. The last section concludes.

2 Conceptual framework

In the following, we present a theoretical model that formalises the relationship between risk attitudes and job mobility. In the canonical on-the-job search model (Burdett, 1978; Mortensen, 1986), a worker changes her job based on the comparison between the current wage and the offered wage from the new employment. Hwang et al. (1998) introduced nonwage components in an on-the-job search framework indicating that besides wages other job characteristics might be important for on-the-job search such as working time, hours worked, the working environment and working conditions. Several subsequent empirical analysis have confirmed that the wage is not the only determinant but individuals decide whether to stay or to change the job also based on nonwage job characteristics (e.g. Bonhomme and Jolivet, 2009; Sullivan and To, 2014; Bonhomme et al., 2015).

We extend the recent on-the-job search model by Sullivan and To (2014) by incorporating individual risk attitudes which considers a worker's uncertainty about the utility of nonwage characteristics at the time when deciding about a job offer and at the same time facing costs of moving (van den Berg, 1992). Our model additionally reflects that workers might value job characteristics heterogeneously (Bhaskar and To, 1999).

To derive an on-the-job search model which includes nonwage job characteristics and incorporates risk attitudes, we firstly display the discounted expected value of lifetime utility for a worker in the current job as

$$V_e(U_0) = U + q[V_u - V_e(U_0)] + \delta[\lambda E \max\{V_e(U_1), V_e(U_0)\}] \quad (1)$$

Unlike the canonical on-the-job search model, the utility from employment U is determined by the wage w and the utility from nonwage job characteristics ω such that

$$U = w + \omega \quad (2)$$

New job offers arrive at a rate of λ as a random draw (w, ω) from the distribution $F(w, \omega)$ which is ex-ante unknown to the worker with respect ω . Workers decide whether to change their job or not based on the expected value of the better option $E \max\{V_e(U_1), V_e(U_0)\}$ evaluating the discounted expected value of lifetime utility of the current job $V_e(U_0)$ and of the job offer $V_e(U_1)$. Comparable to the canonical on-the-job search model V_u is the expected utility of unemployment where q is the

job destruction rate.

Individuals change their job if the utility level of the offered job is greater than the utility level of the current job ($U_1 > U_0$) as $V_e(U)$ is increasing in U . In this case, the offer is exceeding the reservation utility U_r such that

$$V_e(U_1) \geq V_e(U_r) \quad (3)$$

In our analysis, individuals differ in their degree of risk aversion π such that the individual having the degree of risk aversion π_1 is more risk averse than the individual with the degree of risk aversion π_2 :

$$\pi_1 > \pi_2, \quad \pi_1, \pi_2 \in \Pi \quad (4)$$

Thus, the expected utility of a new job is evaluated differently by the individuals according to their risk aversion. We assume that the reservation utility increases by the risk premium P which depends on the degree of risk aversion π

$$V_e(U_r) \geq V_e(U) + P(\pi) \quad (5)$$

The discounted value of employment of an employed person changes to

$$V_e(U_0) = U + q[V_u - V_e(U_0)] + \delta[\lambda E \max\{V_e(U_1) - P(\pi), V_e(U_0)\}] \quad (6)$$

Individuals change their job only if the expected utility of the job offer exceeds the expected utility of the current job by the risk premium $P(\pi)$. The exit rate out of the current job is then defined by

$$\theta(U_0, U_1, \pi) = \lambda \mathbb{1}[V_e(U_1) > V_e(U_0) + P(\pi)] \quad (7)$$

The reasoning that $P(\pi)$ is higher for more risk averse individuals is independent of how the shape of the utility function is specified. In the case where individuals are more or less risk averse $P(\pi_i) > 0$, as there exist a certain disutility from facing risks for all individual. Contrary, if individuals are more or less risk tolerant $P(\pi_i) < 0$, as individuals are to some extent willing to pay for the provision of risky opportunities. This means in our context that individuals would prefer the risks associated with a job change. This behaviour can be dubbed as job shopping (Johnson, 1978; McGoldrick and Robst, 1996) or experimenting on job choice (Antonovics and Golan, 2012).

Based on the theoretical considerations, our main hypothesis is that more risk-averse individuals change their jobs less often compared to less risk-averse individuals. In the empirical part, we

explicitly test this hypothesis while individuals are in their early career.

Our exploration of the relationship between risk attitudes and job mobility has important implications on the question how job mobility influences wage growth. From a theoretical perspective there is disagreement on the question whether job-to-job transitions yield positive wage growth. On the one hand, on-the-job search theory predicts that individuals change their job only when a wage offer exceeds the wage of the current job determining wage growth from job-to-job transitions to be positive (Burdett, 1978; Jovanovic, 1979a). On the other hand, matching models even allow the possibility of a negative wage growth. Based on the assumption that the quality of a job match only reveals after some time while being on the job, wage growth related to job-to-job transitions can theoretically cease or even be negative.

The introduction of risk attitudes into these models provides several predictions on the relationship between job mobility and wage growth. First, if we assume that a job's uncertain utility is only related to the nonwage job characteristics ω , the contracted wage of the new job can be considered as an instantaneous compensation. Wage growth accompanied with each job change should therefore be higher for more risk averse individuals, as they require more compensation when choosing a risky alternative compared to less risk averse individuals.

If we consider wage growth on the current job, the prediction on the influence of job mobility in association with risk attitudes is ambiguous. More risk-averse individual are less likely to change their job ($\theta(U_0, U_1, \pi_1) < \theta(U_0, U_1, \pi_2)$) which could lead to higher wage growth, as the probability of choosing jobs where the match quality reveals to be worse yielding less or even no wage growth is reduced. On the other hand, as more risk-averse individuals are more reluctant to change their job with lower match quality, they might tolerate less or no wage growth associated with their current job longer compared to less risk-averse individuals.

The fact that the frequency of job changes during the early career varies due to differences in risk attitudes also provides ambiguous predictions on overall wage growth during that period. A lower frequency of job changes $\theta_1(U_0, U_1, \pi_1)$ can lead to higher wage growth due to returns from accumulated firm-specific capital. On the other hand, the behaviour of more risk-averse individuals provides less opportunities to induce learning about one's own ability and preferences with each job change. Wage growth for more risk-averse individuals could be thus lower, as with each job change the individual gains returns from information thus increasing job match quality via learning (Farber and Gibbons, 1996; Antonovics and Golan, 2012; Papageorgiou, 2014).

On grounds of the ambiguity of theoretical predictions we empirically investigate in the following the relationship between job mobility and wage growth accounting for risk attitudes. Based on the empirical relation between risk attitudes and job mobility, we analyse the correlation between risk attitudes and wage growth for one job change as well as the overall wage growth during the early

career depending on the chosen job change frequency of more and less risk averse individuals.

3 Data and variables

The empirical analysis is based on data from the German Socio-Economic Panel Survey (SOEP). The SOEP is a representative household panel survey conducted yearly since 1984 in Western Germany and since 1991 in Eastern Germany (see Wagner et al. (2007) for the details). Our research question pertains to early-career job mobility. There is no widely accepted numbers of years in the labour market that captures 'the early career'. For instance, Topel and Ward (1992) and Manning and Swaffield (2008) define the early career as the first ten years after labour market entry whereas other studies consider the first five years (Neumark, 2002), seven years (Johnson, 1978) or a combination of different years (Light and McGarry, 1998). We use the first seven years after labour market entry as 'the early career' in order to capture sufficient job mobility patterns and to maintain an adequate number of observations for the analysis.

Our sample consists of individuals who are observed entering the labour market in the SOEP since 1992. The main outcome variables in our empirical analysis are job changes and wage levels and these variables are measured in the SOEP for individuals who are employed at the time of interview. Following this, we use two samples of labour market entrants depending on their labour market status at the time of interview. Our main sample consists of individuals who are employed at the time of interview during their first seven years in the labour market. Alternatively, we use a less restricted and more heterogeneous sample of labour market entrants with out putting restriction on their employment status at the time of interview.

We further limit both samples to those who started as full-time or regular part-time employees in order to exclude student jobs and other irregular employments. Individuals who were below 18 or above 32 years of age at the time of entry as well as those who entered the labour market as self-employed are excluded from the analysis. Table B.1 describes the step-by-step sample selection procedure and the sample of labour market entrants available for the analysis. The restricted sample is our preferred sample since it contains a more homogenous sample of labour market entrants who has strong labour market attachment. This, however, comes at a cost of smaller size (280 observations) compared to the unrestricted sample which has 1370 observations albeit missing yearly information on job changes and wage levels.

The first variable of interest is the total number of job changes that individuals experience during the first seven years in the labour market. The variable is measured using the survey question on whether respondents have started a new job since the previous interview. Our focus is on voluntary job changes, i.e., job changes that are initiated by the worker. We focus on only voluntary job

changes since there is no clear theoretical prediction on the relationship between risk attitude and involuntary jobs changes and the subsequent wage growth. We distinguish voluntary from non-voluntary job changes using the unemployment duration workers experience between jobs as in Perez and Sanz (2005) and Pavlopoulos et al. (2014). We consider a job change as voluntary if workers experience at most three months of unemployment after leaving a job.

The other approach to distinguish voluntary from involuntary job change is based on the reasons provided by respondents for changing a job (Hunt, 2001; Fuller, 2008). Due to substantial missing information, we are not able to fully exploit the subjective information on job changes. We test the robustness of the results by defining a job change as voluntary if i) a worker experience at most three months of employment gap during a job change, and ii) a worker changed the job for reasons other than termination by employer and company closure. Of those job changers with non-missing information on reasons for a job change, about 18 percent specify "terminated by employer" and "company closed down" as the reasons for a job change. This alternative definition of voluntary job change allow us to exclude job changes that, most likely, occurred involuntarily.

Our measure of job change comprises voluntary job changes within and across firms, industries and/or occupations. The risk associated with changing a job across firms, industries and/or occupations is likely to be bigger than job changes within the same firm, industry and/or occupation. In the subjective assessments of the reasons for job change, survey respondents are asked whether they change jobs within the same firm or to a new firm. Of those job changers with non-missing information, about 63 percent of the job changes are to a new firm and about 10 percent are job changes within the same firm. Given the sample size, it is not possible to separately analyse job changes within and across firms, industries and occupations. We instead control for industry and occupation fixed effects to capture industry and occupation level differences in job mobility.

Our main explanatory variable of interest is individuals' willingness to take risks. During certain survey years starting in 2004, respondents are asked to provide their attitude towards taking risk in different domains such as occupations, health, finance and etc. We use individuals' willingness to take risk in occupational matters. Individuals were asked about their willingness to take risk in occupational matters during the survey years 2004 and 2009. The variable is measured on a scale from zero to ten, in which higher values reflect greater willingness to take risks. The exact wording of the question, translated from German, reads "People can behave differently in different situations. How would you rate your willingness to take risks in the following areas. How is it in your occupation? Please give me a number from 0 to 10, where the value 0 means: "Risk-averse" and the value 10 means: "Fully prepared to take risks". You can use the values in between to make your estimate." Dohmen et al. (2011) have shown that this question is significantly related to paid lottery choices,

and it explains behaviour in a range of important real life decision domains ¹.

There is a recent literature that addresses the stability of risk preferences over time, using measures based on subjective assessments and (hypothetical and incentivised) lottery choices (e.g. Harrison et al. (2005); Sahm (2007); Andersen et al. (2008); Baucells and Villasís (2009); Reynaud and Couture (2010)). These studies do not find evidence for systematic changes in risk preferences, with the exception of age. Sahm (2007), for example, reports a general increase in risk aversion with age, but finds that risk preferences are rank-order stable. Dohmen et al. (2012b) also provide evidence that risk attitudes measured by the survey question that we use in this study, are rather stable, although measured with error. In our restricted sample of labour market entrants, the mean and median differences between reported risk attitude in 2004 and 2009 is 0.60 and 1 respectively. When we define risk attitude as a binary indicator for being risk-averse, the mean and median difference between 2004 and 2009 are zero. This implies that the risk attitude measure is rather stable over time.

Descriptive statistics are shown in appendix Table B.2 for the restricted sample in column (1) and the unrestricted sample in column (2). The average number of job changes that workers experience in Germany is considerably lower compared to the United States and the United Kingdom. About 60% of labour market entrants changed their job voluntarily at least once during the first seven years in the labour market. Without differentiating voluntary from non-voluntary jobs changes, Dustmann and Pereira (2008) show that workers in Germany hold on average about 2.7 jobs during the first ten years in the labour market. Workers in the United States and in the United Kingdom hold about 6.96 and 4 jobs respectively during the same period. The low job mobility in Germany is attributed to the higher costs of firing and the substantial job entry screening made by employers.

Figure 1 shows the average number of voluntary job changes experienced by risk-averse and more risk-tolerant individuals. Risk-averse individuals experience about 0.69 voluntary job changes during the first seven years on the labour market whereas more risk-tolerant individuals make one voluntary job change on average. As years of experience in the labour market increases, the gap in the number of job changes experienced by risk-averse and more risk-tolerant individuals widens.

¹ For ease of interpretation, we define a binary risk attitude measure by grouping individuals with risk attitude below the median as risk-averse and those with risk attitude above the median as more risk-tolerant.

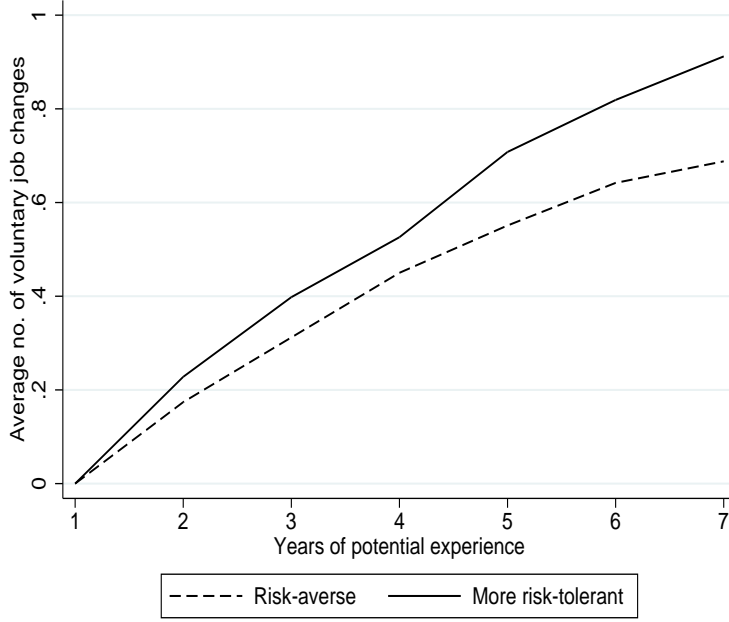


Figure 1: Average number of voluntary job changes during the early career by level of risk aversion.

4 Results

4.1 The influence of risk attitudes on voluntary job changes

We use the following specification to estimate the relationship between risk attitude and job mobility during the early career.

$$TJC_i = \alpha_0 + \alpha_1 RA_i + \delta X_i + \mu_i \quad (8)$$

where TJC_i is the total number of voluntary job changes during the first seven years in the labour market. RA_i is a binary measure of risk attitude which takes the value one if individual i 's risk attitude is below the median of the distribution. X_i includes controls for demographic, socio-economic characteristics and business cycle effects and μ_i is an error term. Our coefficient of interest is α_1 which gives the influence of risk attitude on job mobility.

We use OLS regression to estimate equation (8). α_1 gives a consistent estimate of the effect of risk-attitude on the number of voluntary job changes under the assumption that risk attitude is uncorrelated with μ_i . We control for various factors and undertake different sensitivity checks to arrive at causal interpretation. Individuals who experience a good match at the first job, in terms of productivity and preferences, are less likely to change jobs compared to individuals who experience a bad match. To rule out the possibility that job match quality could differ by risk attitude, we control for wage and job satisfaction at the labour market entry job. In addition, we also control for the type of contract (temporary or permanent), the type of employment (part-time or full-time),

previous experience with the firm and the size of the firm at the labour market entry job ².

Previous studies have shown that individuals with high risk tolerance invest more in human capital (Brown and Taylor, 2005; Budria et al., 2012), sort into occupation with high earning variance (Bonin et al., 2007; Skriabikova et al., 2013) whereas risk-averse individuals sort into public sector employment (Pfeifer, 2010). We capture differences in initial sorting factors by controlling for the highest education degree, whether one is employed in the public or private sector, occupation-specific earnings variance at 2-digit level and occupation and industry fixed effects at 1-digit level. Furthermore, if individuals from rich families are more risk-tolerant and at the same time change jobs more often, family background characteristics could lead to a positive correlation between risk attitude and job mobility³. We use paternal education and occupation to control for such an intergenerational link. Finally, estimation bias arising from reverse causality is less of a concern since the empirical evidence and our descriptive analysis show that risk attitudes are stable over time.

Table 1 shows estimation results. In column (1), simple correlation between risk attitude and the number of job changes is displayed. In the following columns, sets of variables are added to control for basic demographic and socio-economic characteristics, business cycle effects, measures of initial job match quality and sorting factors. In the last column, estimation results from a Poisson regression are shown.

The coefficient on risk attitude remains negative and significant irrespective of the specification. This result is in line with our theoretical prediction supporting the proposition that risk-averse individuals experience fewer number of voluntary job changes compared to more risk-tolerant individuals. Interpreting the magnitude of the effect of risk attitude from column (5), being risk-averse in occupational matters reduces the average number of job change experienced during the first seven years in the labour market by 0.276, which is one third of a standard deviation. The influence of risk attitude becomes stronger in terms of statistical significance in Column (6) when we apply a Poisson regression to take into account the discrete nature of the dependent variable. This is not surprising as a poisson regression model gives a more efficient estimate than OLS⁴.

² X_i also includes the basic background characteristics such as gender, age, indicators for residing in West Germany (in 1989) and for being a German national.

³ For an empirical evidence on the intergenerational transmission of risk attitude, see Dohmen et al. (2012a)

⁴ Given the considerably low number of job changes that workers experience in Germany, we also estimated an ordered logit model using a categorical job change variable for experiencing no job change, one job change, two or more job changes. The effect of risk attitude on job changes remains significant. The estimated odds ratio is 0.476 (standard error: 0.133).

Table 1: The influence of risk attitude on total number of job changes

	(1)	(2)	(3)	(4)	(5)	(6)
1 if Risk-averse	-0.224** (0.099)	-0.246** (0.100)	-0.252** (0.102)	-0.262** (0.102)	-0.276** (0.109)	-0.340*** (0.127)
1 if Male		-0.098 (0.101)	-0.089 (0.111)	-0.065 (0.112)	-0.068 (0.125)	-0.040 (0.147)
1 if Originates from West Germany		0.055 (0.126)	0.021 (0.123)	0.042 (0.126)	-0.029 (0.126)	-0.050 (0.140)
1 if German national		0.213 (0.139)	0.134 (0.172)	0.154 (0.184)	0.074 (0.189)	0.187 (0.259)
1 if Low or missing degree		0.016 (0.214)	-0.002 (0.231)	-0.075 (0.231)	-0.013 (0.223)	-0.056 (0.263)
1 if Tertiary degree		0.249 (0.154)	0.226 (0.169)	0.246 (0.176)	0.090 (0.214)	0.135 (0.233)
Age at first job		-0.024 (0.022)	-0.027 (0.024)	-0.027 (0.024)	-0.028 (0.024)	-0.038 (0.030)
Wage at first job			-0.253* (0.141)	-0.243* (0.136)	-0.244* (0.134)	-0.267* (0.151)
Job satisfaction at first job			-0.031 (0.025)	-0.029 (0.026)	-0.032 (0.026)	-0.038 (0.029)
1 if Public sector at first job			-0.016 (0.126)	0.036 (0.144)	-0.038 (0.150)	-0.065 (0.177)
1 if Pemanent contract at first job			-0.066 (0.113)	-0.110 (0.118)	-0.117 (0.121)	-0.139 (0.133)
1 if Part-time employment at first job			0.004 (0.163)	-0.069 (0.156)	-0.074 (0.156)	-0.092 (0.161)
Tenure at first job			-0.052 (0.044)	-0.044 (0.045)	-0.047 (0.045)	-0.061 (0.055)
Wage variance in occ. at first job			-0.311 (0.757)	-0.643 (0.197)	-0.034 (1.034)	0.242 (1.206)
Constant	0.912*** (0.067)	1.265*** (0.485)	3.657*** (1.239)	3.872*** (1.200)	3.893*** (1.342)	3.291** (1.342)
Year dummies		✓	✓	✓	✓	✓
Parental background		✓	✓	✓	✓	✓
Industry dummies and firm size				✓	✓	✓
Occupation dummies					✓	✓
Model	OLS	OLS	OLS	OLS	OLS	Poisson
(Pseudo) R-squared	0.017	0.041	0.113	0.141	0.182	0.070
Sample	280	280	280	280	280	280

Source: SOEP. Sample: labour market entrants. Dependent variable: total number of job changes during the first seven years on the labour market.

Notes: Estimation: OLS in column (1) -(5) and Poisson in column (6). Heteroscedasticity-consistent standard errors are in parentheses. ***, **, * denote significance at the 0.01, 0.05, and 0.10 levels.

Higher initial wage and higher level of job satisfaction are associated with experiencing fewer number of job changes during the early career. This is consistent with Jovanovic (1979b)'s model of job matching according to which workers change jobs when the value of an outside offer is higher than the value of the current productivity match. The likelihood of receiving a higher wage offer relative to the current wage is lower if the initial draw is from the higher end of the wage distribution. University educated workers make more job changes compared to workers with vocational education

or less skilled workers. This is because higher education provides a broader set of skills, which increases the range of job opportunities whereas vocational education provides better match quality at labour market entry thereby reducing the probability of changing a job.

As expected, individuals employed in the public sector as well as those who started their career with a permanent contract are less likely to experience frequent job changes. Moreover, individuals with work experience at the firm prior to their first job, e.g., as an apprentices, are less likely to change jobs. However, the coefficients are not statistically significant. In column (4) and (5), we show that adding fixed effects of the industry and occupation at the labour market entry job does not affect the estimated coefficients. This implies that risk attitude matters for voluntary job changes within as well as across industries and occupations.

Table 2 provides estimation results for three robustness checks. In column (1) and (2), we use the unrestricted sample which contains all labour market entrants irrespective of their employment status at the time of the interview. In column (3) and (4), we show estimation results where we use the subjective information available in the SOEP to define voluntary job change⁵. In column (5) and (6), we restrict the estimation sample to labour market entrants who started their career in the year 2000 and onwards instead of 1992 to reduce the possibility of reverse causality. The survey question on risk attitude in the SOEP was asked for the first time in 2004. By starting the year of entry in 2000 (and not in 1992), we only consider job changes that took place after (close to) the year when individuals' attitude towards risk are measured. Over all, the estimation results show that the effect of risk attitude remains negative and statistically significant.

⁵ When we further restrict the estimation sample to job changes that occurred across firms, the estimated influence of risk attitude becomes -0.314 (standard error: 0.097). The estimate is not statistically different from the estimate we obtain without putting the restriction which is -0.328 (standard error: 0.095).

Table 2: The influence of risk attitude on total number of job changes: Robustness checks

	Unrestricted sample		Alternative definition of voluntary job change		Year of labor market entry since 2000	
	(1)	(2)	(3)	(4)	(5)	(6)
1 if Risk-averse	-0.103*** (0.040)	-0.087** (0.036)	-0.277** (0.095)	-0.381*** (0.102)	-0.302** (0.127)	-0.366** (0.156)
1 if Male		0.073* (0.044)		-0.053 (0.128)		-0.172 (0.152)
1 if Originates from West Germany		0.009 (0.042)		-0.014 (0.132)		-0.052 (0.122)
1 if German national		0.156** (0.066)		-0.034 (0.185)		0.122 (0.281)
1 if Low or missing degree		0.001 (0.052)		0.003 (0.235)		0.260 (0.308)
1 if Tertiary degree		0.117* (0.065)		-0.024 (0.189)		0.015 (0.272)
Age at first job		-0.017** (0.008)		-0.015 (0.022)		0.006 (0.034)
Wage at first job		-0.123*** (0.035)		-0.254* (0.136)		-0.125 (0.174)
Job satisfaction at first job		-0.019** (0.009)		-0.048* (0.025)		-0.059* (0.034)
1 if Public sector at first job		-0.075 (0.055)		-0.025 (0.142)		0.026 (0.171)
1 if Pemanent contract at first job		-0.037 (0.040)		-0.123 (0.114)		-0.262 (0.159)
1 if Part-time employment at first job		-0.114** (0.049)		-0.090 (0.152)		-0.098 (0.208)
Tenure at first job		-0.037*** (0.014)		-0.046 (0.043)		-0.013 (0.051)
Wage variance in occ. at first job		0.758** (0.312)		0.250 (1.094)		-0.820 (1.510)
Constant	0.538*** (0.028)	2.049*** (0.351)	0.847*** (0.068)	3.503** (1.423)	0.912*** (0.086)	3.024 (1.875)
Year dummies		✓		✓		✓
Parental background		✓		✓		✓
Industry dummies and firm size		✓		✓		✓
Occupation dummies		✓		✓		✓
R-squared	0.005	0.242	0.029	0.235	0.031	0.313
Sample	1370	1370	257	257	166	166

Source: SOEP. Sample: labour market entrants. Dependent variable: total number of job changes during the first seven years on the labour market.

Notes: Estimation: OLS. Heteroscedasticity-consistent standard errors are in parentheses. ***, **, * denote significance at the 0.01, 0.05, and 0.10 levels.

4.2 Risk attitude, job changes and wage growth

In the conceptual framework in section 2 we discuss three potential links between risk attitudes and wage growth associated with a job change. Firstly, more risk-averse individuals demand a comparably

higher wage when they change their job but on the other hand they might secondly tolerate less or no wage growth on the current job for a longer time without changing to another job than more risk-tolerant individuals do. Thirdly, risk-averse individuals change their job less frequently during the early career compared to more risk-tolerant individuals which potentially yields higher returns to tenure but also lower returns to information on job requirements as they have invested less in finding a job with an optimal match to their ability and preferences during the early career.

In order to first test the prediction that a voluntary job change of more risk-averse individuals is accompanied by higher wage gains compared to that of more risk-tolerant individuals we use the following wage growth equation:

$$\ln W_{it} = \beta_0 + \beta_1 JC_{it} + \theta Z_{it} + \lambda Q_i + c_i + \epsilon_{it} \quad (9)$$

where $\ln W_{it}$ is the log of real hourly wage at time t ; JC_i is an indicator variable for making a voluntary job change. Z_{it} includes time-variant individual and firm level characteristics such as work experience, tenure, firm size, industry and occupation dummies. Q_i includes time-invariant demographic characteristics and measures of job match quality and initial sorting factors.

We estimate equation (9) using a fixed effect estimator. In doing so, we control for any time-invariant unobservable characteristics which may bias the estimate for the effect of voluntary job change on wage growth. We also estimate equation (9) separately for risk-averse and more risk-tolerant individuals. This is important because risk attitudes have been shown to influence other factors that are associated with wage growth. For instance, Shaw (1996) provides both theoretical and empirical evidence showing that more risk-tolerant individuals invest more on human capital which in turn leads to higher wage growth. Budria et al. (2012) replicate Shaw (1996) using data from Germany, Italy, Spain and additional observations from the US. The authors find mixed results. For Germany, they find that more risk tolerant individuals obtain higher wage growth via investing in work experience.

We estimate the wage growth equation for a sample of labour market entrants who experienced at least one voluntary job change during the first seven years in the labour market. We restrict the estimation sample to movers in order to get a homogenous group of individuals with comparable wage growth as in Bono and Vuri (2011). Individuals who have never made a job change could be substantially different from job changers and hence their wage growth might not be comparable. Estimation results are shown on Table 3. Column (1) and (2) show results for the pooled sample of risk-averse and risk-tolerant individuals whereas separate regression results are shown for risk-averse individuals in column (3) and (4) and for more risk-tolerant individuals in column (5) and (6).

Table 3: Influence of risk attitudes in the relationship between job change and wage growth

	All		Risk-averse		Risk-tolerant	
	(1)	(2)	(3)	(4)	(5)	(6)
1 if Voluntary job change	0.053** (0.021)	0.053*** (0.020)	0.060 (0.037)	0.060* (0.033)	0.049* (0.026)	0.048* (0.025)
Experience		0.090*** (0.011)		0.092*** (0.019)		0.088*** (0.014)
Experience square		-0.003** (0.001)		-0.001 (0.002)		-0.003** (0.002)
Tenure		0.004 (0.006)		-0.007 (0.012)		0.006 (0.007)
Occupation dummies		✓		✓		✓
Industry dummies		✓		✓		✓
Within R-squared	0.006	0.312	0.007	0.400	0.006	0.281
Overall R-squared	0.002	0.103	0.005	0.134	0.001	0.091
Observations (person)	165		58		107	
Observations (person*year)	1155		406		749	

Notes: Dependent variable: Monthly real wage. Model: Fixed effect regression. Sample restricted to movers. Standard errors are in parentheses. ***, **, * denote significance at the 0.01, 0.05 and 0.10 levels.

Sample: Labour market entrants (aged 18-32 at the time of entry) during the first seven years after labor-market entry.

Source: SOEP 1992-2013.

As a result, voluntary job change is associated with a 5.3 percent increase in wages. The influence of voluntary job change on wage growth is about 6 percent for risk-averse individuals and 4.7 percent for more risk-tolerant individuals. However, the estimated coefficients for risk-averse and more risk-tolerant individuals shown in column (4) and (6) respectively are not statistically different from each other.

When we estimate equation (9) using the unrestricted sample of labour market entrants (Table 4), the association between voluntary job change and wage growth is substantially larger for the sample of risk-averse individuals. The estimated coefficients for risk-averse and more risk-tolerant individuals becomes significantly different from each other at the 5 percent significance level. A concern when comparing results from the two samples is that the sample of movers in the unrestricted sample might differ from the one in the restricted sample not only in terms of size but also in its composition. However, the descriptive statistics shown in Appendix Table B.2 indicate that there are no substantial differences in composition between the two samples. Hence, we can take the results as an indicative but not conclusive evidence that there is a heterogeneous return to voluntary job change depending on individuals' attitude towards risk. Furthermore, in our sample of labour market entrants, we do not find any evidence that the returns to human capital variables such as experience and tenure vary by risk attitude. This is in contrast to Shaw (1996) and similar to the replication study by Budria et al. (2012). Similar to the later study, we also find a marginally significant difference (at the 10

percent level) in the return to years of experience squared between risk-averse and more risk-tolerant individuals.

Table 4: Risk attitude, job change and wage growth: based on movers from the unrestricted sample.

	All		Risk-averse		Risk-tolerant	
	(1)	(2)	(3)	(4)	(5)	(6)
1 if Voluntary job change	0.109*** (0.017)	0.086*** (0.017)	0.143*** (0.028)	0.131*** (0.029)	0.088*** (0.021)	0.061*** (0.022)
Experience		0.087*** (0.011)		0.066*** (0.018)		0.096*** (0.013)
Experience square		-0.002* (0.002)		0.001 (0.002)		-0.004** (0.002)
Tenure		0.018*** (0.006)		0.023** (0.010)		0.016** (0.007)
Occupation dummies		✓		✓		✓
Industry dummies		✓		✓		✓
Within R-squared	0.020	0.228	0.003	0.255	0.013	0.225
Overall R-squared	0.001	0.199	0.002	0.201	0.001	0.174
Observations (person)	504		199		305	
Observations (person*year)	2608		1007		1601	

Notes: Dependent variable: Monthly real wage. Model: Fixed effect regression. Sample restricted to movers. Standard errors are in parentheses. ***, **, * denote significance at the 0.01, 0.05 and 0.10 levels.

Sample: Labour market entrants (aged 18-32 at the time of entry) during the first seven years after labor-market entry.

Source: SOEP 1992-2013.

So far our empirical findings are that firstly more risk-averse individuals experience fewer job changes, secondly voluntary job changes are in general positively associated with wage growth but thirdly each job change of more risk-averse individuals is on average associated with a relatively higher wage gain compared to more risk-tolerant individuals. In the following we aim additionally to answer the question whether the group of more risk-averse individuals or the group of more risk-tolerant individuals have obtained a higher wage level at the end of the early career compared to their initial wage in the first job. Put it differently, does the difference in the job changing behaviour between more risk-averse individuals and more risk-tolerant individuals result in different wage growth obtained in the first years on the labour market?

In order to answer the question, we compare the gap between the wage at the first job and the wage in the seventh year in the labour market among risk-averse and more risk-tolerant individuals. Specifically, we first run a regression where the dependent variable is the overall wage growth. Our main explanatory variables of interest are the total number of voluntary job changes, a dummy variable for being risk-averse (compared to being more risk-tolerant) and their interactions. Estimation results are shown on Appendix Table B.3. We then compute the average predicted overall wage

growth and compare the figure between individuals who are risk-averse and those who are more risk-tolerant. The results show that the predicted overall wage growth is very similar between risk-averse and more-risk tolerant individuals (i.e., the overall wage growth gap is 0.023 with a standard error of 0.039. The average predicted wage growth is about 39 percent for a risk-averse individual and about 37 percent for a more risk-tolerant individual.⁶

One of our propositions with respect to overall wage growth depends on the assumption that individuals respond differently with a job change to wage growth on the current job. To disentangle this from the proposition that the frequency of job changes relates to overall wage growth, we would need to have at least monthly data which would give a detailed description on the development of wages on the current job and the responding job changing behaviour. However, we can try to tackle this question with the data at hand, if we compare the time when individuals change for the first time their jobs. We do not see a significant difference between the two groups of more risk-averse and more risk-tolerant individuals.⁷ Given that the occurrence of one job change is quite representative for our sample - an individual changes voluntarily her job on average roughly once during the first seven years on the labour market in our sample (see Table B.2) - this evidence is a hint that individuals do not respond differently with respect to the timing of the job change to the wage growth and other characteristics of the first job. Thus, we can infer that wage growth at least in the first job is similar for both groups.⁸

To sum up, we find evidence that more risk-averse individuals have on average higher wage gains from each job change compared to more risk-tolerant individuals. However, we find no evidence for different overall wage growth between more risk-averse individuals, who on average change their job less frequently during the early career, compared to more risk-tolerant individuals, who change their jobs more often during that phase. On base of the conceptual framework, an explanation for this result is that the proposed links between risk attitudes and overall wage growth do exist but cancel each other out so that there is no difference between the two groups. For example, more risk-averse individuals might generate higher returns to tenure by changing their jobs relatively few times but more risk-tolerant individuals might have a similar benefit from more job changes by finding a good a match with respect to their ability and preferences.

⁶ The average predicted wage growth is also very similar in the unrestricted sample. The gap is -0.011 with standard error of 0.024 (i.e., 30.6 percent for risk-averse individuals and 31.7 percent for more risk-tolerant individuals.)

⁷ More risk-averse individuals change their job for the first time after 3.6 years compared to more risk-tolerant individuals who change their job for the first time after 3.8 years

⁸ This result hinges on the assumption that there is no selection based on unobservable characteristics with respect to wage growth in the first job and that the control variables cover all other initial heterogeneity.

5 Conclusion

In this study, we provide a theoretical model and an empirical analysis examining the relationship between risk attitudes, job mobility and subsequent wage growth. We propose and test using the German Socio-economic panel that individuals' attitude towards taking risks is an important factor that influences job mobility decisions thereby generating heterogeneous wage growth patterns. Job change is a risky decision as it entails significant costs while benefits cannot be entirely foreseen. We find that risk-averse individuals change their jobs less often during the early career. Furthermore, the wage growth associated with each job change made by risk-averse individuals is higher in magnitude than that of more risk tolerant individuals. When we compare the overall wage growth by taking the difference between the (predicted) wage level at the first job and at the job held after seven years in the labour market, we found a similar overall wage growth for both groups. We undertook a number of sensitivity tests whose results confirm the robustness of our main findings.

Our empirical findings have important implications when examining differences in labour market outcomes across individuals who presumably differ in their attitudes towards risk. For instance, the literature shows that heterogeneity in willingness to take risks exists between men and women (Dohmen et al., 2011) as well as between native and migrants Bonin et al. (2009). Given our finding that risk attitudes is a crucial behavioural trait that influences individuals' job mobility decisions, the existing wage gap across groups could partially be explained by their differences in job mobility decisions.

Our measure of job changes may not comprise all the risks inherent to job changes. In particular, some job changes in our sample might have been job changes within the same firm, which entails less uncertainty than a job change to another employer. Job mobility in our analysis might therefore overestimate the associated risks. Our estimates of the effect of risk attitude on job mobility and the subsequent wage growth can thus be considered a lower bound.

Due to data limitations we can not empirically investigate the importance of job search before individuals actually change their job. The job search intensity or job mobility intentions might be related to risk attitudes as the costs and benefits of on-the-job search are uncertain for individuals in a similar way than it applies to actual job changes. It would be therefore interesting for future work to disentangle the influence of risk attitudes on the job search intensity and on actual job mobility as well as on the resulting heterogeneity in wage growth.

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B Appendix

Table B.1: Sample selection procedure

Respondents	Sample selection steps
4077	Labor market entrants in SOEP sample starting from 1992
–1428	not employed as full-time or regular part-time at first job
2649	
–95	not between 18 and 32 years of age at first job
2554	
–52	self-employed at first job
2502	
–907	missing data on risk attitudes
1595	
–225	missing data on control variables
1370	Unrestricted sample
–1090	not employed consecutively during the first seven years after labor market entry
280	Restricted sample

Notes: Step by step deletion of respondents which do not fit the sample definition or for which essential information is missing.
Source: SOEP 1992-2013

Table B.2: Descriptive statistics

	Restricted sample				Unrestricted sample			
	(1)				(2)			
	Mean	SD	Min	Max	Mean	SD	Min	Max
1 if atleast one job change	0.59	0.49	0	1	0.37	0.48	0	1
Number of job changes	0.83	0.84	0	4	0.49	0.75	0	4
Number of job changes (at least one)	1.40	0.62	1	4	1.34	0.61	1	4
Risk attitude	4.85	2.42	0	10	4.52	2.43	0	10
1 if Risk-averse	0.39	0.49	0	1	0.43	0.50	0	1
1 if Male	0.51	0.50	0	1	0.47	0.50	0	1
1 if Originates from West Germany	0.78	0.42	0	1	0.73	0.44	0	1
1 if German national	0.89	0.32	0	1	0.89	0.31	0	1
Degree (Intermediate degree)								
1 if Low degree or missing	0.09	0.28	0	1	0.17	0.38	0	1
1 if Tertiary degree	0.30	0.46	0	1	0.22	0.41	0	1
Age at first job	23.58	3.15	19	32	23.31	3.05	18	32
Job satisfaction at first job	7.42	1.94	1	10	7.24	1.98	0	10
1 if Public sector at first job	0.27	0.44	0	1	0.24	0.43	0	1
1 if Permanent contract at first job	0.59	0.49	0	1	0.50	0.50	0	1
1 if Part-time employment at first job	0.09	0.29	0	1	0.17	0.38	0	1
Tenure at first job	1.58	1.48	0.0	6.6	1.37	1.36	0.0	6.60
Wage variation in occ. at first job	0.51	0.09	0.2	0.7	0.54	0.09	0.19	0.84
Log of monthly wage at first job	7.22	0.44	5.63	8.22	7.00	0.61	4.54	8.40
Observations	280				1370			

Notes: SD stands for standard deviation. Sample: Labour market entrants (aged 18-32 at the time of entry) during the first seven years after labor-market entry.

Source: SOEP 1992-2013.

Table B.3: Determinants of overall wage growth

	(1)	(2)
1 if Risk-averse	-0.046 (0.069)	-0.089 (0.055)
Total job changes	0.033 (0.035)	-0.011 (0.036)
Risk-averse*Total job changes	0.111* (0.062)	0.084* (0.043)
1 if Originates from West Germany		0.164*** (0.052)
Wage at first job		-0.660*** (0.067)
Job satisfaction at first job		0.021* (0.012)
Firm size at first job (Base: less than 20)		
20 - 200		0.107* (0.058)
200 - 2000		0.151*** (0.058)
Greater than 2000		0.237*** (0.066)
Constant	0.340*** (0.045)	3.710*** (0.618)
Year dummies		✓
Parental background		✓
Industry dummies at first and last job		✓
Occupation dummies at first and last job		✓
Model	OLS	OLS
R-squared	0.032	0.607
Sample	280	280

Source: SOEP. Sample: labour market entrants. Dependent variable: over all wage growth measures as the difference between the wage at the job help at the seventh year after entering the labour market and the initial job. Only statistically significant coefficients are shown. In addition to the same controls as in equation (8), the regression on Column (2) includes total work experience, tenure, industry and occupation at the last job.

Notes: Estimation: OLS. Heteroscedasticity-consistent standard errors are in parentheses. ***, **, * denote significance at the 0.01, 0.05, and 0.10 levels.