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Direct Evidence on Risk Attitudes and Migration

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Abstract

It has long been hypothesized that attitudes towards risk play a central role in determining whether an individual migrates, but the empirical evidence, to the extent that it exists, has been indirect. In this paper, we use newly-available data from the German Socioeconomic Panel (GSOEP) to directly measure the relationship between migration propensities and attitudes towards. We find that individuals who migrate between labor markets in Germany are more willing to take risks. This result is robust to stratifying by age, sex, education, national origin, and a variety of other demographic characteristics, as well as to the level of aggregation used to define geographic mobility. We estimate a variety of cross-sectional and panel models and find that being relatively willing to take risks is associated with an increase of 1.2 percentage points in the probability of ever migrating between 2000 and 2004, even after conditioning on individual characteristics. This effect is fairly substantial relative to the unconditional migration propensity of 4.8 percent. When estimating a random effects probit model, in which covariates such as employment, income, and marital status are allowed to vary over time, we continue to find a positive and statistically significant relationship between being willingness to take risks and the probability of migrating, although in relative terms the marginal effect of willingness to take risk is only about one-eighth as large as the unconditional probability of annual migration.

Keywords: risk aversion, migration, Germany

JEL Classification: J61, D81, R23

It has long been hypothesized that risk-averse individuals are less likely to migrate than those who are risk-neutral or risk loving (Smith 1979, Levhari and Stark 1982, Katz and Stark 1986, Xu 1992). Risk attitudes potentially affect migration if there is greater uncertainty about future income in potential locations than in the current location. This uncertainty can come from differences in the distribution of income or from imperfect information about income-earning possibilities in future locations. The existing empirical evidence, to the extent that it exists, however, does not directly measure individual's risk attitudes (Daveri and Faini 1999, Heitmueller 2005). This paper attempts to fill the gap in the literature by examining directly how risk attitudes affect the propensity to migrate.

In this paper we present evidence that the propensity to migrate is determined in part by attitudes towards risk. We use newly-available data from the German Socioeconomic Panel (SOEP) to directly measure the relationship between migration propensities and attitudes towards. These new data on risk attitudes are derived from a series of questions given in the 2004 wave of the SOEP and were found to be highly correlated with "objective" measures of risk behavior from a field experiment (Dohmen, et al. 2005). We find that individuals who migrate between labor markets in Germany are more willing to take risks. This result is robust to stratifying by age, sex, education, national origin, and a variety of other demographic characteristics, as well as to the level of aggregation used to define geographic mobility. We find that being relatively willing to take risks is associated with an increase of 1.2 percentage points in the probability of ever migrating between 2000 and 2004, even after conditioning on individual characteristics. This effect is fairly substantial relative to the unconditional migration propensity of 4.8 percent. When estimating a random effects probit model, in which covariates such as employment, marital status, and school enrollment

status are allowed to vary over time, we continue to find a positive and statistically significant relationship between being willingness to take risks and the probability of migrating. We also estimate random-effects Tobit models and conclude that most of the effects of risk attitudes are felt on the decision of whether to migrate or not rather than the distance migrated.

The next section of the paper describes the data and gives descriptive results on the relative risk attitudes of movers and stayers while the subsequent section examines the relationship between migration and risk attitudes in a multivariate context. The last section offers some conclusions.

I. Data and Descriptive Statistics

Our data source is the German Socio-Economic Panel (SOEP), a representative panel survey of the resident population of Germany (for a detailed description, see Wagner et al., 1993, and Schupp and Wagner, 2002). The initial wave of the survey was conducted in 1984 and the panel was extended to include East Germany in 1990, after German reunification.¹ The SOEP surveys the head of each household in the sample as well as all other household members over the age of 17. Respondents are asked for a wide range of personal and household information, including information incomes and employment, and for their attitudes on different topics, including political and social issues.

In this paper we focus on the determinants of migration behavior of survey respondents. For reasons of sample size, we restrict the sample to the years 2000 until 2004, including data since the most recent survey refreshment in 2000. We concentrate on prime age individuals who are between 18 and 65 years of age during the entire survey period.²

¹ For more details on the SOEP, see www.diw.de/gsoep/.

² This implies that only individuals born between 1940 and 1981 are contained in our sample.

Migration is measured moving domicile between spatial districts (*Raumordnungsregionen*).³ The data contain information on 97 spatial districts, which are defined by the German Federal Office for Construction and Spatial Organization and reflect an aggregation of administrative districts (*Landkreis*) in which individuals live. Due to the relatively spread-out nature of these spatial districts, a high proportion of moves between districts corresponds to a change in workplace. The detailed information on spatial districts includes data on the longitude and latitude of the center of the districts, which allows us to construct a measure of the average distance covered by regional migration.

The interest of our study lies in investigating whether migration behavior is affected or determined by individual attitudes towards risk, beyond the usual determinants of migration studied in the literature. The 2004 wave of the SOEP contains a novel set of questions about individuals' risk attitudes that can be used for this purpose. The primary variable of interest is the question that asks individuals for their attitude towards risk in general, allowing respondents to indicate their willingness to take risks on an eleven-point scale, with zero indicating complete unwillingness to take risks, and ten indicating complete willingness to take risks.⁴ Risk attitudes are also elicited in several distinct contexts, including financial matters, career issues, and sports and leisure activities. The behavioral relevance of the responses has been documented in an experimental validation of the

³ In addition, we have conducted all of the analysis in the paper defining migration as moving between German states (*Bundesländer*) or by various thresholds of distance (e.g. 25km, 50km, 100km, etc.). While, of course, the coefficients in our models change because of the different definitions, in no case were the qualitative conclusions of our study altered by using these alternative definitions. Because the *Raumordnungsregionen* are the best approximations for labor markets available to us in the SOEP, we present results using those to define migration.

⁴ The exact wording of the question (translated from German) is as follows: "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? Please tick a box on the scale, where the value 0 means: 'unwilling to take risks' and the value 10 means: 'fully prepared to take risks'." German versions of all risk questions are available online, at www.diw.de/deutsch/sop/service/fragen/personen/2004.pdf.

question, in which a pool of 500 subjects with comparable characteristics to the respondents of the SOEP was confronted with real stakes lotteries. The self-reported attitudes towards risk as elicited by the SOEP questionnaire turned out to be good predictors of actual behavior under risk (Dohmen et al., 2005). In order to minimize measurement error stemming from different uses of scales, we also use a binary variable, in which individuals with a response of six to ten on the scale from zero to ten are coded as “risk loving”. This binary variable has also been used in the validation study.⁵ Because we observe risk attitudes only in 2004, we must treat these as fixed characteristics of the individual (like sex).

Figure 1 shows the distribution of the 11-point risk scale for “movers” (individuals who changed *Raumordnungsregionen* at least once between 2000 and 2004) and “stayers” (individuals who did not change *Raumordnungsregion* in that period). While both distributions have a modal index value of 5, it is also clear that the distribution for movers has less weight in the left hand tail and more weight in the right hand tail, and that the average of the risk index is greater for movers than for stayers.

Using both the average risk index and our indicator for “risk loving,” we present results for movers (again, defined as having ever changed *Raumordnungsregion* between 2000 and 2004) and stayers stratified by a variety of demographic characteristics. As reflected in Figure 1, the average risk measure and “risk loving” indicator are substantially larger for the 4.8 percent of the sample who moved than for those who never moved. Moreover, those who moved more than once are more risk-loving than those who moved only once. These results are strong confirmation (albeit not conditional on any individual characteristics) of the hypothesis that migrants are less risk-averse than non-migrants.

⁵ Robustness checks conducted by Dohmen et al. (2005) reveal that choosing a threshold of six and above on the eleven point scale is without consequence for the behavioral validity of the responses. Regressions using indicator variables for each response category show significantly different behavior for responses of six and above.

Across nearly all of the demographic categories (sex, age, education, marital status, and origin/ethnicity) we find strikingly consistently, using either risk measure, that movers are more risk-loving than stayers.⁶ Roughly speaking, for most of the demographic groups, ten percent more of the movers in our sample indicate being “risk loving” than do stayers. Note, too, that the migration propensities differ substantially across the various demographic groups, in the expected direction – older individuals are less likely to migrate, those who are married are less likely to migrate, better-educated individuals are more likely to migrate. Nevertheless, the difference in risk attitudes between the movers and stayers is remarkably similar.

II. Regression Analysis

Table 1 makes clear that risk attitudes are correlated with a variety of personal characteristics and therefore it is important that we control for these characteristics when examining how risk attitudes and migration are related. In Table 2, we present estimates from a probit model where the dependent variable is an indicator of whether the individual ever moved during 2000-2004. In columns (1) and (2) we present results using our risk index as the measure of risk attitudes, while in columns (3) and (4) we use the “risk loving” indicator described above. In columns (2) and (4) we control for a cubic in age, sex, marital status, years of education in 2000, and origin/nationality.⁷

⁶ The only exception is the “risk lover” indicator for individuals who are 18-25 in 2000, although the difference is very small. That this measure as well as the average risk index measure are so close to one another may reflect that many individuals in this age group are still in school and that their migration decisions may be affected by relative incomes in the origin and destination areas.

⁷ We have also estimated these models controlling for age and education non-parametrically, i.e. with dummy variables for each age and each year of school. The coefficients on our risk measures were virtually unchanged and remained statistically significant at any conventional level.

In all four models we find statistically significant evidence that individuals who are more “risk loving” are more likely to move. In column (1) we estimate that a one-unit change in the risk index increases the probability that an individual migrate between labor markets by about one half of one percent, implying that the difference between the least risk loving (where the index equals 0) and the most risk loving (where the index equals 10) about 5.4 percent. While the absolute level of these effects is not large, they must be interpreted relative to the unconditional migration probability of 4.8 percent. Similarly, in column (3) when we measure risk using our “risk loving” indicator, we find that the probability of migration is about 2.2 percentage points higher for “risk lovers,” or about of the unconditional probability.

In columns (2) and (4) we control for a variety of demographic characteristics. Given the results in Table 2, it is not surprising that the estimated coefficients on our risk measures decline, in both cases by approximately half. Both measures remain statistically significantly different from zero at any conventional level, however. Individuals who are “risk loving” having a migration probability 1.2 percentage points higher than individuals who are not, or about one-third of the unconditional migration probability.

The regressions in Table 2 are static and do not take into account any time varying characteristics. In Table 3 we present results from estimating random-effects probit models, with the dependent variable defined as migration across *Raumordnungsregionen* in the year after the observed characteristic. That is, the results are forward-looking in the sense that all of the regressors prior to the determination of the outcome. As with the “static” results in Table 2, columns (1) and (3) present results of the migration indicator on just the risk measures, while columns (2) and (4) we add individual characteristics. To the regressors in Table 2, we add unemployment status, self-employment status gross income in the month prior to the survey, whether the individual owns their own dwelling, and the number of

children in the household to the specification. All variables, where appropriate, vary over time. Because these measures, our primary focus in the analysis, do not vary over time, we cannot estimate fixed-effects models. We estimate random-effects probits instead to take account for the non-independence of the error term across observations due to unobserved time-invariant individual characteristics.

As in Table 2, we find that the risk measures are positively and statistically significantly correlated with migration. The magnitudes of the coefficients are substantially smaller than in the static probit model, but this is to be expected given that the unconditional (annual) migration probability is 1.3 percent (as opposed to the four-year migration probability of 4.8 percent). In column (1), the coefficient on the risk index indicates that a movement from 0 to 10 on the index would lead to a 0.57 percentage point increase in the probability of migration (about 42 percent of the unconditional migration probability), while in column (3) the marginal effect for the “risk loving” indicator indicates that a 0.29 percentage point increase in the probability of migration (slightly more than one-fifth of the unconditional probability).

Controlling for the various fixed- and time-varying characteristics reduces the coefficients on both risk measures by about 45 percent. In both cases, however, these coefficients, while small, are statistically significantly different from zero. Moreover, the magnitude is *not* small relative the marginal effects of the other covariates. For example, the “risk loving” indicator is larger in absolute value than the effects of being unemployed, being female, or any of the origin/nationality indicators. The effect of being a “risk lover” on migration probabilities is the same (again, in absolute value) as roughly three years of education or four children. So, while small in magnitude, the risk attitudes would appear to be among the most important determinants of the propensity to migrate.

As a final check of the impact of risk attitudes on migration, we estimate random effects Tobit models, using the distance of migration as the dependent variable. The Tobit model allows us to decompose the effect of risk attitudes on the probability of migration and on the migration distance, conditional on having migrated. In Table 4 we present results using the risk index as the determinant of migration, including all of the fixed and time-varying regressors that we employed in Table 3. We perform a similar analysis using the “risk loving” indicator in Table 5.

As with our previous results, we continue to find that risk attitudes play a significant part in determining migration. The effect of the risk index and the “risk loving” indicator positively and significantly affect both the probability of moving and the distance moved. However, relative to the unconditional probability of moving (about 1.3 percent) or the distance moved, conditional on moving (about 177 kilometers), the marginal effect of either risk measure is (relatively) greater on the probability of moving. For example, in the model in which we control for other covariates, the marginal effect of being a “risk lover” on migration is about one quarter of the unconditional probability of moving, while the marginal effect on distance moved (conditional on moving) is only about 3.6 percent of the average distance moved (conditional on moving). Thus, it would seem that risk attitudes play a much larger role in determining whether or not people migrate than in determining how far they migrate.

III. Conclusions

In this paper we provide the first direct evidence that individuals’ risk attitudes affect their migration propensities. While relatively few Germans migrate (about 1.3 percent per year), risk attitudes would appear to play an important role in determining who does and does not move from one labor market to another. Migration attitudes, measured in a variety of

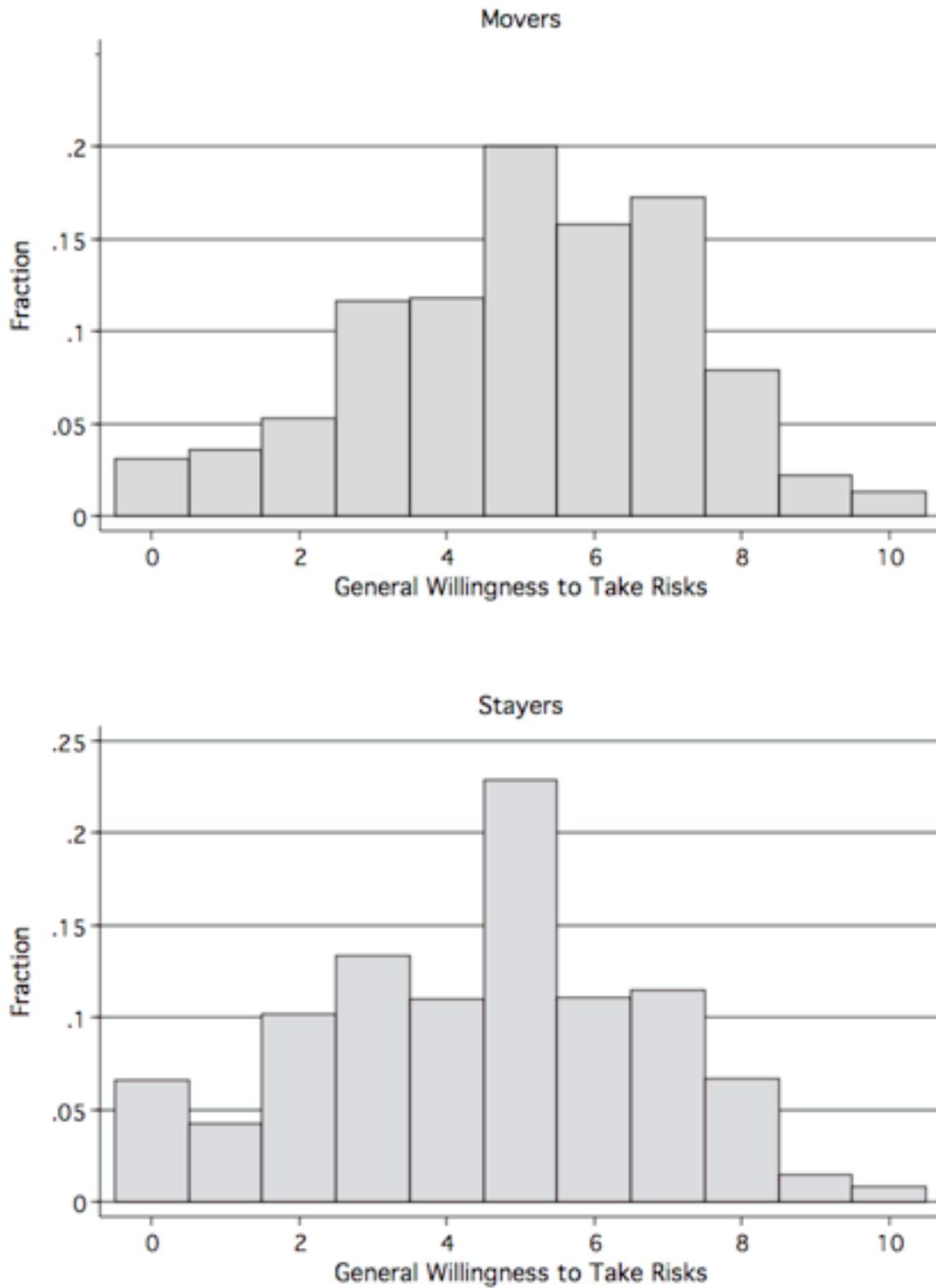
ways, positively and significantly affect the probability of migration and, to a much lesser extent, the distance of those moves. Roughly speaking, the marginal effect of being a “risk lover” is about 25 percent of the unconditional probability of migrating, and this effect would appear to be larger than those of conventional determinants of migration like being married or unemployed.

While these effects are large and important, it is worth noting that because of the structure of our data, we must treat risk attitudes as a fixed characteristic of the individual. Moreover, because our measure of risk attitudes occurs *after* the observed migrations, we cannot rule out that the fact of migration may alter people’s risk preferences, leading to reverse causality in our estimates. This must remain an open question, however, until future waves of the SOEP, and therefore future migrations, are observed. We also anticipate that the risk attitude questions may be asked again in the future, which would provide direct evidence on whether migration causes risk attitudes or vice versa.

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Figure 1
General Risk Attitudes for Movers and Stayers
2000-2004



Source: Authors' tabulations from the 2000-2004 waves of the GSOEP.

Table 1
Average Measures of Risk Attitudes for Stayers and Movers

	Risk Index		"Risk Lover"		N		Share Movers
	Stayers	Movers	Stayers	Movers	Stayers	Movers	
All	4.457	5.075	.316	.441	11,547	576	.048
One move		4.970		.417		508	
Two or more moves		5.853		.618		68	
Sex							
Men	4.930	5.405	.401	.511	5,575	264	.045
Women	4.016	4.795	.237	.381	5,972	312	.050
Age (in 2000)							
18-25	4.937	5.047	.409	.404	1,089	171	.136
26-35	4.654	5.295	.340	.496	2,861	224	.073
36-45	4.537	4.835	.323	.413	3,508	109	.030
45+	4.123	4.819	.269	.403	4,089	72	.017
Years of Education (in 2000)							
1-9	3.560	4.684	.214	.447	1,324	38	.028
10.5-11	4.324	4.962	.293	.390	3,535	105	.029
11.5-13	4.633	5.066	.333	.438	4,245	242	.054
13.5+	4.829	5.225	.384	.471	2,443	191	.073
Married (in 2000)							
No	4.769	5.248	.363	.460	3,693	383	.094
Yes	4.310	4.731	.294	.404	7,854	193	.024
Origin							
West German	4.512	5.226	.319	.474	6,783	327	.046
East German	4.722	5.021	.347	.416	3,165	190	.057
Born Abroad	3.701	4.407	.242	.339	1,599	59	.036

Source: Authors' tabulations from the 2000-2004 waves of the GSOEP.

Note: Movers are individuals who changed "Raumordnungsregion" at least once from between 2000 and 2004. "Risk index" is an a measure of general risk attitudes, with 1 being least risk-loving and 10 being most risk-loving. "Risk Lover" is a indicator variable which is 1 when the risk index is 6 or greater.

Table 2
Risk Attitudes and Probability of Migrating

	(1)		(2)		(3)		(4)	
	Marg. Effect	S.E.	Marg. Effect	S.E.	Marg. Effect	S.E.	Marg. Effect	S.E.
Risk Index	.0054	(.0008)	.0022	(.0007)				
"Risk Lover"					0.0259	(.0045)	.0121	(.0035)
Age (2000)			-.0018	(.0002)			-.0018	(.0002)
Female			.0053	(.0031)			.0052	(.0031)
Married (2000)			-.0361	(.0045)			-.0363	(.0045)
Years of Education (2000)			.0049	(.0006)			.0049	(.0006)
Origin/Nationality								
West German				ref.				ref.
East German			.0055	(.0036)			.0056	(.0036)
Born Abroad			.0053	(.0055)			.0047	(.0055)
Pseudo- R^2	.0088		.1075		.0088		.1081	

Source: Authors' tabulations from the 2000-2004 waves of the GSOEP.

Note: Entries in table are marginal effects from probit estimation, evaluated at sample means.

"Risk index" is an a measure of general risk attitudes, with 1 being least risk-loving and 10 being most risk-loving. "Risk Lover" is a indicator variable which is 1 when the risk index is 6 or greater. Mean of dependent variable is .0475. Sample size is 12,123.

Table 3
Risk Attitudes and Probability of Migrating: Random Effects Probit

	(1)		(2)		(3)		(4)	
	Marg. Effect	S.E.	Marg. Effect	S.E.	Marg. Effect	S.E.	Marg. Effect	S.E.
Risk Index	.00057	(.00009)	.00033	(.00009)				
"Risk Lover"					.00292	(.00056)	.00161	(.00045)
Unemployed			.00031	(.00008)			.00051	(.00074)
Gross Monthly Income			-.00000	(.00000)			-.00000	(.00000)
Self-Employed			.00133	(.00092)			.00135	(.00093)
Owns Dwelling			-.00454	(.00055)			-.00451	(.00055)
Age			-.00020	(.00002)			-.00020	(.00002)
Female			.00052	(.00036)			.00033	(.00037)
Married			-.00221	(.00059)			-.00225	(.00060)
Number of children in HH			-.00055	(.00021)			-.00055	(.00021)
Years of Education			.00059	(.00008)			.00059	(.00008)
Origi								
West German			ref.				ref.	
East German			.00001	(.00039)			.00003	(.00039)
Born Abroad			-.00070	(.00048)			.00059	(.00008)
Log likelihood								
			-3379.00		-3098.63		-3379.00	
								-3097.92

Source: Authors' tabulations from the 2000-2004 waves of the GSOEP.

Note: Entries in table are marginal effects from probit estimation, evaluated at sample means. "Risk index" is an a measure of general risk attitudes, with 1 being least risk-loving and 10 being most risk-loving. "Risk Lover" is a indicator variable which is 1 when the risk index is 6 or greater. Mean of dependent variable is .01333. Sample size is 48,488 person-years.

Table 4
Risk Attitudes and Migration Distance: Random Effects Tobit

	(1)			(2)		
	Coeff.	Marg. Eff.: P(Move=1)	Marg. Eff.: E[Dist Move=1]	Coeff.	Marg. Eff.: P(Move=1)	Marg. Eff.: E[Dist Move=1]
Risk Index	25.2796 (3.8233)	.0017 (.0002)	2.5693 (.3884)	14.846 (3.769)	.00067 (.00017)	1.366 (.345)
Unemployed				31.348 (31.105)	.00151 (.00161)	2.927 (2.945)
Gross Monthly Earns.				-.013 (.006)	-.000 (.000)	-.001 (.001)
Self-Employed				48.685 (32.001)	.002 (.002)	4.583 (3.078)
Owns Dwelling				-202.923 (19.657)	-.00939 (.00087)	-18.696 (1.753)
Age				-9.326 (.914)	-.00042 (.00004)	-.858 (.082)
Female				17.088 (17.210)	.00077 (.00077)	1.572 (1.583)
Married				-96.533 (19.456)	-.00477 (.00104)	-9.049 (1.846)
Num of children in HH				-24.299 (9.834)	-.00109 (.00044)	-2.237 (.905)
Years of Education				28.918 (3.272)	.00130 (.00014)	2.662 (.296)
Origin/Nationality						
West German					ref.	
East German				7.860 (17.897)	.00036 (.00082)	.725 (1.653)
Born Abroad				-35.299 (27.270)	-.00148 (.00107)	-3.206 (2.443)
Log likelihood		-7352.85			-7046.17	

Source: Authors' tabulations from the 2000-2004 waves of the GSOEP.

Note: Marginal effects are evaluated at sample means. "Risk index" is an a measure of general risk attitudes, with 1 being least risk-loving and 10 being most risk-loving. "Risk Lover" is a indicator variable which is 1 when the risk index is 6 or greater. Unconditonal mean of move distance is 2.37, mean of move distance conditional on moving is 177.10, share of sample with positive move distance is .0133. Sample size is 48,488 person-years.

Table 5
Risk Attitudes and Migration Distance: Random Effects Tobit

	(1)			(2)		
	Coeff.	Marg. Eff.: P(Move=1)	Marg. Eff.: E[Dist Move=1]	Coeff.	Marg. Eff.: P(Move=1)	Marg. Eff.: E[Dist Move=1]
"Risk Lover"	111.181 (17.305)	.00809 (.00133)	11.546 (1.888)	68.802 (16.749)	.00331 (.00086)	6.420 (1.577)
Unemployed				32.460 (31.077)	.00157 (.00162)	3.034 (2.947)
Gross Monthly Earns.				-.013 (.006)	-.00000 (.00000)	-.001 (.001)
Self-Employed				49.621 (31.954)	.00250 (.00179)	4.675 (3.078)
Owns Dwelling				-201.416 (19.630)	-.00934 (.00087)	-18.566 (1.752)
Age				-9.371 (.913)	-.00042 (.00004)	-.863 (.082)
Female				15.920 (17.164)	.00072 (.00077)	1.466 (1.580)
Married				-97.754 (19.452)	-.00485 (.00105)	-9.170 (1.847)
Num of children in HH				-24.289 (9.824)	-.00109 (.00044)	-2.237 (.905)
Years of Education				28.879 (3.272)	.00130 (.00014)	2.659 (.297)
Origin						
West German					ref.	
East German				8.705 (17.900)	.00040 (.00082)	.803 (1.655)
Born Abroad				-38.769 (27.223)	-.00162 (.00106)	-3.518 (2.434)
Log likelihood		-7355.04			-7045.61	

Source: Authors' tabulations from the 2000-2004 waves of the GSOEP.

Note: Marginal effects are evaluated at sample means. "Risk index" is an a measure of general risk attitudes, with 1 being least risk-loving and 10 being most risk-loving. "Risk Lover" is a indicator variable which is 1 when the risk index is 6 or greater. Unconditonal mean of move distance is 2.37, mean of move distance conditional on moving is 177.10, share of sample with positive move distance is .0133. Sample size is 48,488 person-years.