An Empirical Note on the Relationship between Unemployment and Risk-Aversion[♣]

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Abstract

In this paper we use a direct measure of individual risk-aversion to examine the relationship between risk-aversion and unemployment. Contrary to what the simple search model predicts, we observe that more risk-averse individuals are more likely to be unemployed. We present extensions of the search model that can reconcile the theory with the relationships observed in the data.

Keywords: Unemployment, job-search, risk-aversion

JEL classification: D81, J64

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In this paper we use a direct measure of individual risk-aversion to examine the relationship between risk-aversion and unemployment. Contrary to what the traditional search model predicts, we observe that more risk-averse individuals are more likely to be unemployed. We present extensions of the search model that can reconcile the theory with the relationships observed in the data.

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Introduction

Although an individual's attitude to risk is often crucial in predicting behaviour there appears to be little empirical research linking risk attitudes to individual characteristics[1] and even less on the relationship between unemployment and risk-aversion. Feinberg (1977) examined the relationship between risk-aversion and unemployment and found that more risk-averse individuals had shorter unemployment spells. However, Feinberg used an indirect measure of risk-aversion, based on observed outcomes, such as having car insurance, the use of seat belts, and drinking and smoking habits. While these may be related to an individual's attitude to risk, the estimated effects may also reflect other factors such as income or social class. In contrast to Feinberg we use a direct, non-parametric measure of risk-aversion to look at the relationship between risk and unemployment. We find no support for the basic job-search model; on the contrary we find that more risk-averse individuals are significantly more likely to be unemployed. In the final part of the paper we discuss extensions of the search model that can reconcile the theory with these observed findings.

[1] Exceptions include Hartog et al (2002) or Guiso and Paiella (2001).

Theory

The simplest partial equilibrium job search model assumes that infinitely lived agents are risk neutral and receive job offers at a rate λ from a known exogenous wage offer distribution, F(*w*), at a cost *c* per draw. The agent can accept the offer currently in hand and work forever at that wage. Alternatively, they can refuse the wage offer, without the possibility of recall, and wait for the next job offer. It is well known that the solution to this model is characterised by a reservation wage strategy; workers accept a wage offer if it exceeds a predetermined threshold, w^r which is called the reservation wage, and reject it otherwise. In this model the probability that a job seeker will find employment during a given period of search is simply $\lambda(1\text{-}F(w^r))$.

Pissarides (1974) extends this model to allow for the possibility of risk-averse decision makers who maximise expected utility rather than expected income. He argues that more risk-averse individuals attach less value to the *expected* future gains of search and therefore will be more inclined to turn down the opportunity of continued search, in favour of employment. As a consequence more risk-averse individuals will spend less time unemployed but conditional on employment will receive a lower expected wage. In this model the probability of employment at time T is $\sum_{t=0}^{T-1}\left(1-\lambda(1-F(w^r))\right)^t * \left(\lambda(1-F(w^r))\right)$. Assuming that the offer arrival rate does not depend on the level of risk-aversion, this probability increases with the level of risk-aversion, ρ, for all T. This follows from the fact that $dw^r / d\rho < 0$. In this paper we test this prediction.

Empirical Results

The data we use in our study are taken from the 1995 and 2000 waves of the Survey of Household Income and Wealth (SHIW) carried out by the Bank of Italy.[2] The measure of risk-

[2] For a more detailed description of these data see Guiso and Paiella (2001).

aversion is based on individual responses to the following question: "You are offered the opportunity of acquiring a security permitting you, with the same probability, either to gain **10 million lire** (about €2,582) or to **lose all the capital invested**. What is the most you are prepared to pay for this security?" If we let P_i denote the answer to this question (measured in units of a million lire) then we can use the results established in Hartog et al (2002) to approximate the Arrow-Pratt measure of absolute risk-aversion as:

$$\rho_i(y) = \frac{(5 - P_i)}{[\frac{P_i^2}{2} + 0.5\frac{10^2}{2} - 5 \cdot P_i]} \tag{1}$$

For individuals who are risk neutral P_i=5, so that ρ_i(y)=0; for risk-averse individuals $\rho_i(y)$>0 (with a maximum value of $\rho_i(y)$=.2 when P_i=0) and for risk-loving decision makers $\rho_i(y)$<0 (with a minimum value of $\rho_i(y)$=-.2 when P_i=10. Furthermore, the measure is symmetric around the point of risk neutrality. Summary statistics for our risk-aversion estimates are given in table 1. Our distribution of risk-aversion is in line with those reported by Guiso and Paiella (2001), using a subsample of our data, and Hartog et al. (2002) for The Netherlands.

Table 2 estimates two simple models to examine the determinants of risk-aversion. The first estimates a linear regression of ρ_i on a set of regressors X. The second estimates a probit model where the dependent variable is 1 if the individual is risk-averse and zero otherwise. The results are much as expected. Consistent with decreasing risk-aversion, we observe a negative and significant effect of household income on risk aversion. On the other hand, women tend to be more risk-averse, whereas more educated individuals exhibit lower levels of risk-aversion.[3]

Since our data provide no information on the duration of unemployment, we look at the relationship between risk attitudes and the probability of unemployment at the time of the survey. To do this we estimate a probit model where the dependent variable is 1 if the individual is

[3] The theoretical relationship between risk aversion and education is ambiguous. Shaw (1996) provides a model that is consistent with our result.

currently unemployed and zero otherwise. The simple search model outlined above predicts that the coefficient of risk-aversion in this model should be negative.

Measured risk-aversion based on hypothetical lotteries is sometimes criticised by researchers who doubt whether such questions can be answered in a meaningful way, and whether the resulting measures correlate with actual decisions made under uncertainty in a meaningful way. To address this issue we also examine the relationship between our measure of risk-aversion and two other outcome variables; investment in risky assets and the propensity to become self-employed[4,5] In so far as our measure of risk is suitable we would expect to observe a negative relationship between risk-aversion and both the holding of risky assets and the probability of being self-employed.

The main results of our paper are presented in Table 3. The results from both the asset equation and the self-employment equation are consistent with prior expectations. These results would seem to suggest that the lottery question we use provides a reasonable measure of risk aversion. With the basic job search model we would expect the risk-aversion measure to be negatively related to unemployment status. However, when we look at the unemployment probit we find the opposite result; more risk-averse individuals are more likely to be unemployed even when we include a set a large number of control variables. Furthermore the coefficient on risk-aversion is precisely estimated with a p-value of 0.059.

While our results reject the predictions of the basic search model, extensions of this model can yield the observed negative relationship between risk aversion and the probability of unemployment. The basic search model assumes that at each point in time the distribution of risk attitudes is randomly distributed among the stock of unemployed job-seekers and furthermore that the offer arrival rate is the same for all workers. There are a number of reasons as to why these assumptions may not hold. Firstly, since search itself is costly more risk-averse individuals may search less intensively. This in turn would reduce their offer arrival rate, which would in turn

[4] For related analysis of these issues see also Guisso and Paiella (2001).

[5] When presenting the results we focus only the simplest specification. We have also estimated selection equation to try and take account of non-response to the lottery question and a Tobit model to account for truncation at zero in the asset equation. The estimated coefficient on the risk parameter in these models was similar to those reported in the paper.

reduce their probability of employment. Alternatively, it may be that by searching longer less risk-averse individuals secure a more stable job match, which would reduce the likelihood of these individuals quitting or being fired. The simple job search model we presented does not allow for this. Once these features are included it is possible to derive a model in which risk aversion is positively related to the probability of unemployment.[6] Unfortunately given the structure and size of our data set we are not able to address these issues empirically. Nevertheless we see them as important avenues for future research.

Conclusion

In this paper we use a direct non-parametric measure of risk-aversion to empirically test the relationship between attitudes to risk and unemployment. The basic search model predicts that the probability of unemployment should be lower for more risk-averse individuals. However, we find that more risk-averse individuals are significantly more likely to be unemployed. We suggest that studies of the search intensity of unemployed job-seekers and/or analysis of the relationship between job matching and risk-aversion may shed further light on our findings.

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[6] An example of such a model is presented in van den Berg and Ridder (1999). Their model allows for both on the job search and job loss. In equilibrium the probability of being unemployed at a randomly chosen date equals $\frac{\delta}{(\delta+\lambda)}$ where δ is the rate of job destruction and λ is the offer arrival rate for unemployed searchers. Clearly the probability of unemployment in this model increases with risk aversion if either $\frac{d\delta}{d\rho}>0$ or $\frac{d\lambda}{d\rho}<0$.

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Table 1: Participation shares in the "lottery" question.

	1995		**2000**	
Non participation	4,739		2760	
Do not know	1,586		720	
Unwilling to answer	648		20	
Missing	87			
with 0€	2,418		2,020	
Participation (>€0)	3,396		1,173	
Total	8,135		3,933	
	(1)	**(2)**	**(1)**	**(2)**
Risk-averse (P<€2,582)	86.26%	76.47%	97.21%	92.41%
Risk Neutral (P≅€2,582)	9.92%	16.99%	2.47%	6.73%
Risk Lovers (P>€2,582)	3.82%	6.54%	0.31%	0.85%

Note: (1) All respondents; (2) Responses with positive outcome

Table 2: Determinants of Risk-aversion. The endogenous variable is ρ as defined in (1)

	All responses				Responses with positive outcome			
	OLS		Probit		OLS		Probit	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Constant term	0.2656	16.59	3.7053	9.60	0.3131	11.19	3.3800	7.72
Number of children	0.0004	0.47	-0.0160	-0.82	-0.0005	-0.31	-0.0253	-1.13
Log(Income)	-0.0088	-5.70	-0.2100	-5.61	-0.0126	-4.63	-0.1875	-4.43
Age	0.0003	5.03	0.0097	6.12	-0.0001	-0.88	0.0007	0.36
Years of schooling	-0.0014	-5.27	-0.0245	-4.09	-0.0021	-4.47	-0.0235	-3.44
Female	0.0088	3.66	0.2175	3.63	0.0200	4.64	0.2997	4.41
Married	0.0026	0.98	0.0839	1.34	0.0049	1.02	0.1196	1.67
Sample size	8,180				4,265			

Note: All models include dummies for region, city size and for year 1995.

Table 3: Probit models on the probability of unemployment, self-employment and investment in risky assets.

	All responses						Responses with positive outcome					
	Unemployment		Self-employment		Investment in risky assets		Unemployment		Self-employment		Investment in risky assets	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Constant term	-4.014	-7.32	-1.733	-6.49	-2.181	-8.35	-3.676	-5.03	-1.365	-4.09	-1.940	-5.99
ρ (ARA)	0.734	1.89	-1.652	-7.96	-0.740	-3.63	0.595	1.36	-1.598	-7.08	-0.780	-3.56
Age	0.131	5.50	0.048	4.66	0.089	8.34	0.124	3.72	0.031	2.38	0.082	6.07
Age squared	-0.002	-6.99	0.000	-4.91	-0.001	-10.42	-0.002	-4.87	0.000	-2.26	-0.001	-7.54
College	-0.576	-3.73	0.697	12.09	0.059	0.96	-0.816	-3.12	0.675	9.21	0.004	0.05
Female	-0.287	-3.27	-0.203	-3.60	-0.589	-10.56	-0.148	-1.20	-0.163	-2.17	-0.609	-8.12
Married	-0.349	-4.16	0.134	2.41	-0.062	-1.19	-0.407	-3.40	0.123	1.66	-0.099	-1.42

Sample size	8,037	8,203	8,203	4,185	4,278	4,278

Note: All models include dummies for region, city size and for year 1995. The probit models for unemployment also include dummies for current and previous job for employed and unemployed individuals, respectively.