7 Swiss Geoscience Meeting 2009

RISK, MEASURED RISK AVERSION AND INDIVIDUAL CHARACTERISTICS

New evidences from a representative and experimentally-validated survey

Abstract

Risk and uncertainty play a key role in everyday life: during the past several years the world has witnessed some unprecedented disasters that heavily crushed societies and living systems.
Individuals, institutions, and communities have the ability to deflect, withstand, and rebound from serious shocks in terms of the course of their ordinary activities or through ingenuity and perseverance in the face of a crisis.
Is therefore very important to record and estimate risk aversion.
What is the impact of contexts on willingness to take risks? How do risk perception changes hazard perception and thereby risk?
Unfortunately this task is still extremely difficult: the individual behavior depends on a lot of characteristics with elicitation bias, preference reversal and so on.
Using a question that asks about willingness to take risks (on a eleven points scale) we performed some tests on a cohort composed by young students. Using questions about their risk perception in specific domains, as car driving or training, we analyzed the risk aversion and the impact of context.
We finally validated results though a lottery question for an hypothetic investment.
Aiming to improve our understanding of risk perception and how to represent it we found some evidences: distribution to take risks is quite heterogenic across individuals, females and old aged people are more risk averse than males and young people, a general risk question can actually be used to model a general risk behavior.
The initial results, although still rough, can be very useful to represent actual risk aversion across a society or a group and can be used to validate risk management studies in the field of natural or technological hazards.

Locarno 2000: Risk and uncertainty play a key role in everyday life; what is the impact of contexts on willingness to take risks? How do risk perception changes hazard perception and thereby risk?

Source: PCI Locarno - IST/SUPSI

The Survey

Questionario "Avversione al rischio"

1. Come vedi te stesso:
In genere sei una persona assolutamente pronta a correre rischi o cerchi di evitarli?

*Per favore poni una crocetta nella casella prescelta, dove il valore 0 equivale a: **"avverso al rischio"** Il valore 10 equivale a: **"assolutamente pronto a correre rischi"***
Puoi utilizzare i valori intermedi per esprimere la tua autovalutazione.

Avverso al rischio									Assolutamente pronto a correre rischi
1	2	3	4	5	6	7	8	9	10

2. La gente può comportarsi in modi diversi nelle diverse situazioni.
Come valuteresti la tua disponibilità a correre rischi nelle seguenti circostanze?

Mentre guidi

Avverso al rischio									Assolutamente pronto a correre rischi
1	2	3	4	5	6	7	8	9	10

In questioni finanziarie

Avverso al rischio									Assolutamente pronto a correre rischi
1	2	3	4	5	6	7	8	9	10

Durante il tempo libero e lo sport

Avverso al rischio									Assolutamente pronto a correre rischi
1	2	3	4	5	6	7	8	9	10

Nella tua occupazione

Avverso al rischio									Assolutamente pronto a correre rischi
1	2	3	4	5	6	7	8	9	10

Con la tua salute

Avverso al rischio									Assolutamente pronto a correre rischi
1	2	3	4	5	6	7	8	9	10

La tua fiducia negli altri

Avverso al rischio									Assolutamente pronto a correre rischi
1	2	3	4	5	6	7	8	9	10

3. Per favore pensa a cosa faresti nella situazione seguente:
Immagina di aver vinto 100'000 euro alla lotteria. Immediatamente dopo aver riscosso la vincita, hai l'opportunità di partecipare a un progetto imprenditoriale innovativo alle seguenti condizioni:

Esiste la possibilità di raddoppiare i soldi entro due anni.
È ugualmente possibile che tu perda la metà della somma investita.

Hai l'opportunità di investire l'intera somma, parte della somma o di rifiutare l'offerta.

Quale quota della tua vincita saresti pronto ad investire in questa rischiosa operazione finanziaria, che potrebbe però rivelarsi un investimento redditizio?

Investimento	
100'000 euro	
80'000 euro	
60'000 euro	
40'000 euro	
20'000 euro	
Nulla, declinerei l'offerta	

4. Per favore fornire le seguenti informazioni

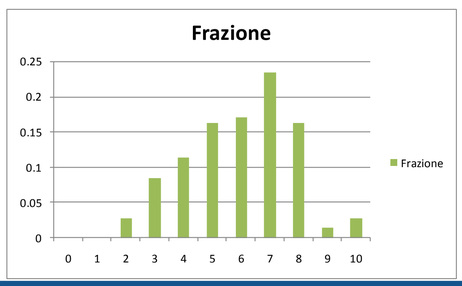
Sesso	f	m
Età		
Nazionalità		
Studi superiori		
Ammontare delle spese settimanali per extra (esclusi vitto e alloggio)		
Abiti in famiglia?		
Numero di persone facenti parte del nucleo familiare		
Numero di automobili nel nucleo familiare		
Con quale mezzo raggiungi l'università?		
Professione padre		

Grazie per la partecipazione
Prof. Rico Maggi

It was scheduled a survey campaign, using an established questionnaire, based on that used in a previous survey in Germany, and submitted to a wider test bed. The survey has in fact been submitted to final year students of the SUPSI/Department of Environment, Construction and Design, SUPSI/Business and Social Sciences Department and of the Faculty of Economics of the University of Lugano.
Finally 156 observations (31 SUPSI/DACD, 53 SUPSI/DSAS, 72 USI) were collected.
The survey contained a general question on risk, more specific questions and a final question about an investment in a lottery with a chance of winning or losing with equal probability. The questionnaire was slightly changed depending on the type of student: to DACD/DSAS student a lottery form of investment in a business project was proposed and for USI students additional questions investment thresholds have been introduced .

Results

Regarding the first two questions, in the questionnaire collected data are simply expressed on the proposed scale and statistical analysis are performed and histograms are created .
A coefficient of risk aversion on the question of "lottery" is then calculated.



Risk aversion visualization

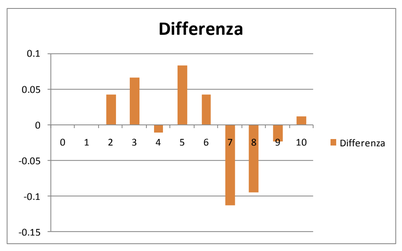
In this case we consider a maximization problem, believing that the individual maximizes his expected utility and is subject to budget constrains:

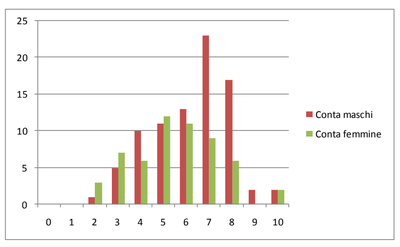
$$max\ (\alpha U\ (x + inv) + \alpha U(x - inv/2)) = max\ (f(inv))$$

$$s.t.\ 0 \leq inv \leq 100000$$

The problem is solved by finding the zero of the first derivative (using here a development in Taylor's formula):

$$\rho ara \approx 2/(5inv)$$





Initial results are consistent with the literature and indicate that:

- USI Students are more favorable to the risk that those SUPSI;
- The calculation ρrra throws up exactly the same (!)
- Architects seem a bit more risk takers;
- Among economists, the Swiss are the most conservative; in the case of Engineers/Architects is the opposite;
- Males seem to be more risk takers than females.

Next steps

The work, still at the beginning, shows however very promising results. In agreement with some experiments already performed in the EU it should move to a *logit* or *probit* model by extending the method to other data sets. A further development might consider using Prospect Theory instead of the expected utility theory (however, all the methodological approach should be changed).

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