

## Individual and Collective Attitude Towards Risk

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### Abstract

*The paperwork considers all aspects connected with the individual perception of risks but also the perception of the investors. Theoretically, there were formulated a series of hypotheses which represented the basis to econometrics patterns, thus surprising the risk dominance and the market dominance about the attitude towards the risk. One of the important aspects considered was the subjectivism of the investors when they appreciate and identify different risk classes. An initial condition for axioma elaboration and construction of mathematical framework is the rational behaviour of the investors. As a mathematical pattern, it is treated under various aspects the futile function of the risk. The theoretical approach supported by the mathematical demonstration underlined the abomination to risk both at an individual level as well as at the market level.*

**Key words:** theoretical risk model, financial decisions, rational behaviour of the investors, useful function, risk useful function.

**J.F.I. classification:** F30, G01

### 1. Introduction

The mere exposure of the risk typology highlights a complex analysis field that is difficult to quantify and has uncertain results. Risk analysis is the research subject of the financial science which has developed, in the economic theoretical environment, a series of mathematical risk assessment patterns and risk management models. The limits of these models in quantifying the environmental factors and the subjectivity of the investor make that the individual risk attitude to be different, but in a narrow range it makes possible the assessment of the general behaviour of the market.

### 2. Theoretical background

Building a theoretical risk model on which the financial decisions are substantiated imply a rational behaviour of the investors which can be transformed in working assumptions (Halpern, 1998):

- Investors are able to choose between two alternatives. After analysing them they can highlight the strengths and weaknesses of each alternative (SWOT analysis) and then they are able to make a correct decision;
- All kinds of alternatives of such possibilities are transitive i.e., if alternative A is better than alternative B, and if the alternative B is better than alternative C, then alternative A is better than alternative C;
- Investors cannot distinguish between them when the alternatives have the same risk or the same ratio return / risk;
- For any investment with uncertain recovery, the investors are able to specify, a number of equivalent alternatives with safe recovery.

Remaining within the limits of the analysed assumptions and of the rational behaviour, there are three categories of investors depending on their attitude towards risk (Stancu, 2010):

*Risk seekers* are those who take risks even when the risk probability is very high. Psychologically, this is explained by the satisfaction they get when they take risks even if the fate is against. Their stake is the "hidden" profitability potential, namely the one that only they can seize it. It can be noticed that the distinction between rational and irrational behaviour in the market is difficult and in addition both influence the supply and demand.

*Risk averse* exhibit risk aversion and they take risks only within manageable limits, and if the foreseen odds seem to be favourable.

*Risk neutral* are indifferent to risk dispersion focusing on the favourable odds.

### 3. Useful function and risk

Starting from the axioms listed and from the categories of investors and their attitudes towards risk it can be defined a *useful function* (Halpern P.,1998 ), which indicates how to take decisions about risky alternatives both individually and collectively pursuant to the market dominant feature.

Table no. 1 Assessment of a useful function

Gain/Loss	Useful	Probability
+ 6.000	1	P
- 3.000	0	1 - P

Source: (Vlad, 2015)

We shall take into consideration the investment alternative opportunity offering two extremes:

- a gain of 6,000 units, in the absence of risk;
- a loss of 3,000 units, if the risk would fully manifest.

Those two possibilities can be marked with "1" for gain and "0" for loss.

The utility expected from this pair of probabilities shall be:

$$U = p \times 1 + (1 - p) \times 0 = p$$

Mathematically, we have obtained the theoretical expression of a risk-free investment. In the real economic environment between these two extremes can be achieved an infinite number of probabilities pairs influenced by the manner how the individual is willing to undertake the risk.

Table no. 2. Assessment probabilities of the projected outcome

Indexes	Probability %					
	1	2	3	4	5	6
Gain	100	80	60	50	40	30
Loss	0	20	40	50	60	70
Projected result (Rs)	6.000	4.200	2.400	1.500	600	- 300
Invested capital (Ci)	5.712	3.652	2.087	1.304	522	x

Source: (Vlad, 2015)

$$6.000 \times 0,80 = + 4.800$$

$$- 3.000 \times 0,20 = - 600$$

$$\text{Projected result} = 4.200$$

For each considered pair of probabilities are obtained different characteristics of the same project (projected different result). From the point of view of the investor, the projected result should ensure the recovery of the allocated capital and the expected return, which in our case is considered to be 15%.(Vlad C., 2015)

$$\text{maximum invested capital} = \frac{\text{projected result}}{(1 + R_p)}$$

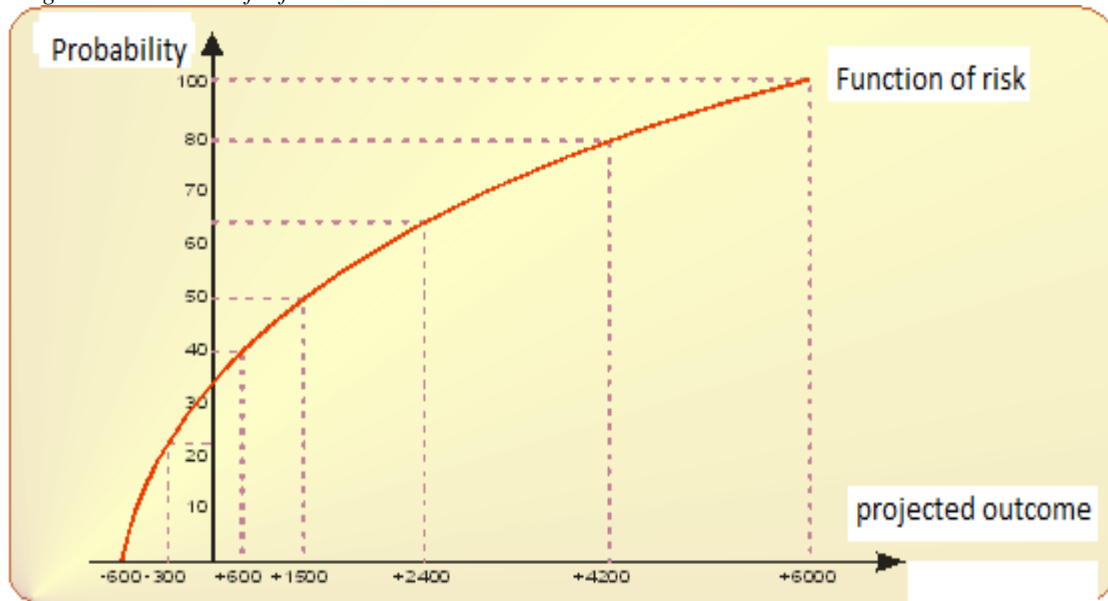
where:  $R_p$  - the return rate claimed by the financial market

The comparative analysis of the projected outcome with the maximum amount of capital willing to be invested, involves in each case choosing a lower equivalent than what is expected from the project.

### Invested capital < Projected result

A second pair of probabilities (80%; 20%) can be compared with the behaviour of a risk seeker, the 3<sup>rd</sup> pair and the 4<sup>th</sup> pair characterize the attitude of a neutral investor and the 5<sup>th</sup> pair reveals a risk-averse behaviour. The 6<sup>th</sup> pair of probabilities (30%; 70%) characterizes an irrational risk taking attitude of exceeding the limits of the model presented by the four axioms. However, let us not forget, the hidden potential which was noticed by the investor who was labelled by the market as risk-averse or irrational investor. The difference up to the earning potential of the alternative investment (6.000 units) represents the "risk premium" which is proportional with the risk aversion. (Vlad, 2015)

Figure no. 1 Risk useful function



Source: (Pierre, 1994)

The graphical representation show a concave trend of the useful function, which leads to the conclusion that both the market level and the individual level risk aversion is the dominant attitude, and that the dispersion and over-dispersion is due to the individual position towards the risk. At the individual level, the useful function would have a convex shape for the risk-seekers, a concave shape for risk-averse, and for those with neutral attitude it takes the form of a line. The different form of the individual utile function is explained by the different expectations for achieving the profitability potential. Risk appetite relies on a higher effective profitability than the expected one, the risk adversity relies on a lower effective profitability than the expected profitability and the neutral risk relies on achieving the expected return.

#### 4. Alternative investment with different utilities

From previous statement results a dominant market position of risk aversion and different individual attitudes, but within certain limits, which ultimately form the market. Therefore, the market trend is to select the projects with the higher return-risk ratio.

Table no.2. Alternative investment with different utilities

Analysis variants	Project A			Project B		
	Expected financial flows	Occurrence probability	Usefulness	Expected financial flows	Occurrence probability	Usefulness
Optimistic	4.000	0,30	0,90	1.000	0,50	0,80
Moderate	2.500	0,40	0,80	750	0,20	0,70
Pessimist	-1.000	0,30	0	500	0,30	0,60
Expected return	1.900	x	x	800	x	x

Source: (Vlad, 2015)

At the individual level, the selection is made according to the following investment reasoning:

- establishing the maximum accepted risk level;
  - the project with the greatest return risk is selected for equal risks.
- In real circumstances, the investor is forced to compare the investment alternatives which have different returns and risks, and therefore which have different utilities.

Utility function for these two projects shall be:

$$f(U_A) = (0,30 \times 0,90) + (0,40 \times 0,80) + (-0,30 \times 0) = 0,590$$

$$f(U_B) = (0,50 \times 0,80) + (0,20 \times 0,70) + (0,30 \times 0,60) = 0,720$$

As  $f(U_B) > f(U_A)$ , in terms of utility, project B will be preferred that gives to the investor the maximum possible satisfaction, even if project A has a much higher expected return.

Basically such a model cannot have the needed accuracy in order to be applied. In addition, the attitude towards risk can change and that involves successive revaluations of the function. The very usefulness is seen differently depending on the individual income (Stancu, 2010):

- a low income required the assessment to be made pursuant to the survival needs;
- a high income exceeds this stage and is generates greater rewards, including the rewards of the game itself.

The two projects being analysed through risk-taking decisions show that a risk-seeker investor would prefer a project which puts him in conflict with the utility and a risk-adverse investor would prefer project B, which is according with the utility.

## 5. Conclusions

The exhibition of the axioma set necessary to build the theoretical pattern is considered to be enough to measure the behavior of a rational investor for the appreciation and the administration of risk variety of the economic environment. Specific for the investment activities is to identify all feasible possibilities and to compare them in order to select the most efficient. Actually, the identification process of the profitability and the risks for each variant presents important difficulties and there is no certainty about the identification of all risks to their manifestation extent which appears during the temporal investment. Taking a fair decision meets a series of difficulties especially in the different points of the profitability/risk report and in specifying alternatives with safe return.

The subjective aspects play a major role when selecting an alternative with the highest degree of recovery, reason for which the investors are grouped in three typologies as they also form the market as a cluster. Generally, a correct but singular position cannot win as long as the majority has a different opinion. There is also mentioned that the hazardous actions must actually identify the hidden potential of a business.

Starting from the hypotheses set formulated or constructed, a multitude of econometrics patterns try to identify with a high probability the elements of the profitability/risk report. The important fact is that each pattern has its own limits which can be reduced by experience and investment intelligence. Out of all, there has been selected the futile function of the risk. Mainly, the pattern

establishes the extreme winning and losing limits. Between these limits different scripts can be obtained by considering different ways of reaching them. Like that it is defined the inner probable range to obtain the hoped result for an assumed risk according to the typology of the investor: risk seeker or risk averse. The empirical tests administrated show that both as a cluster or as an individual, the dominant attitude is the aversity to the risk and the digression from the general trend appears because of the subjectivism in estimation.

Although, the presented pattern does not seem to present a practical side, the urge to identify and compare the multitude of possible alternatives can be performed with a mental efficient exercise for every investor.

## 6. References

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