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Risk and Uncertainty

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Abstract

Attitudes regarding risk and uncertainty are important to the economic activity. This is the reason why the purpose of this paper is to point out to the differences between the risk phenomenon, on the one hand and the probability and uncertainty, on the other hand. An event has greater impact when it turns impossibility into possibility more or less likely. A series of studies provides support for this principle in decision under both risk and uncertainty and shows that people are less sensitive to uncertainty than to risk. That's way this paper provides a simple conceptual framework for discussing about risk and uncertainty. Communicating about risk and uncertainty may be difficult because uncertainty is multi-dimensional and there are different practical and philosophical approaches to it.

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1. Introduction

Uncertainty and risk have a relatively short history in the economic theory, although the literature shows progressive concepts in appreciation of this concepts. The economic activity involves risk, and the changing word cause uncertainty to become an everyday reality, than the reaction to uncertainty and risk must become a constant concern.

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The idea that the risk and uncertainty can be relevant for the economic analysis was suggested in 1921 by Frank H. Knight who established the important distinction between them: " Uncertainty must be taken in a sense radically distinct from the familiar notion of risk, from which it has never been properly separated.... The essential fact is that 'risk' means in some cases a quantity susceptible of measurement, while at other times it is something distinctly not of this character; and there are far-reaching and crucial differences in the bearings of the phenomena depending on which of the two is really present and operating.... It will appear that a measurable uncertainty, or 'risk' proper, as we shall use the term, is so far different from an unmeasurable one that it is not in effect an uncertainty at all." Knight, Risk, uncertainty and profit, 1921. The same opinion is shared by Radu Florea arguing that although the terms "risk" and "uncertainty" are often used to express the same thing, there is a clear difference between them Florea, 1999.

Typically, the risk analysis begins with shaping the term "uncertainty", the uncertainty about the future.

2. Distinction between RISK AND PROBABILITY

To better understand the concept of risk, it is necessary to make a clear distinction between risk and uncertainty. Risk refers to situations in which probabilities targets can be identified for possible results. In other words it can be quantified. Instead, uncertainty refers to situations or events about which there is sufficient information to identify objective probabilities. Therefore, when the information necessary for understanding and anticipating developments, or changes that may occur in a particular context are either insufficient or unavailable, the situation is defined as uncertain. The key- element in making the distinction between risk and uncertainty is probability. Probability refers to a particular phenomenon or event to occur under well -defined conditions. Depending on the probability can be distinguished three categories of situations can be distinguished:

- absolute certainty
- uncertainty
- risk Iancu Silviu Costin, Mondoca Nicolae Razvan, 2006.

The state of absolute certainty implies an accurate knowledge of influent economic phenomena and factors, a strict control of the time of occurrence of effects obtained which in terms of mathematical probability theory is a probability of occurrence and development of that economic phenomenon equal to 1. This is a situation difficult to encounter even in the physical-chemical laboratories, even more so in social and economic life or in nature. If there is a state of absolute certainty, this is over a relatively short interval of time.

The state of uncertainty means a set of conditions and factors, unidentified and unpredictable in terms of occurrence and evolution; even if they are identified and predicted they are highly unstable, their probability being 0.

The state of risk is when, with an economic probability greater than 0 but less than 1, it may be determined the occurrence and evolution of economic phenomena, the influence of factors and their possible effects.

The same opinion is shared by Irina Isaic Maniu the "Statistical characterization of risk", who says that "risk is a feature of all probability distributions. Both probability and risk can be interpreted objectively and subjectively " Isaic -Maniu, 2006. Thus:

Table 1

	Objectively	Subjectively
Risk	<ul style="list-style-type: none"> • It is inherent in any action characterized by the variation of probable results • Represents a variable 	<ul style="list-style-type: none"> • Is an estimate of the objective risk • Depends on the individual, its information, its temperament

Probability	independently of individual <ul style="list-style-type: none"> • Simply relies on historical records of the statistical data • Is an estimate of probable situations, based on previous changes 	<ul style="list-style-type: none"> • Bears the imprint of individual personality • Reflects mentality, habits and so far as they are based on intuition or on false observations
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Own source inspired by Isaac-Maniu, 2006

Table 2. Distinctions between risk and probability

Risk	Probability (in contradiction to risk)
A feature of all probability distributions	It indicates to what extent is it possible to produce an event under well defined conditions
. It is associated with a probability of occurrence of undesired events. The more undesired the consequences , the more risky the decision taken	For each event there is a certain probability of occurrence.
The key methods of risk measurement are those using probability theory, in the opinion of businesses agents	Character or feature of what is probable.
Objective risk inherent to any action characterized by variability of probable results is an individual- independent variable	Objective probability is based on historical records of statistical data
Subjective risk is an assessment of the objective risk and depends on the individual	Subjective probability and subjective assessment of the risk bears the imprint of the personality of each individual, reflecting attitudes, habits and the extent to which they are based on intuition or, on the contrary, on careful observations for decision taking

Source: [http://www.perfect-service.ro/intelinet/2010/ianuarie/intel\(i\)net.php?legatura=4](http://www.perfect-service.ro/intelinet/2010/ianuarie/intel(i)net.php?legatura=4)

Frank Knight set out to parse the difference between risk and uncertainty and the significance of that difference. In "Risk, Uncertainty and Profit", Knight distinguished between three different types of probability, which he termed: "a priori probability"; "statistical probability" and "estimates" Knight, Risk, Uncertainty and Profit, 2002.

Risk is defined according to classical theory as the probability of occurrence of certain deviation on the course of achieving a goal. This deviation is determined by the interacting factors and the risk is the probability that a failure or disharmony may occur and prevent the system from moving on. The occurrence of an event that causes a certain change that needs redefining the way of going on is past of the risk phenomenon. Classical methods of measuring risk refer to calculating probabilities of occurrence of certain risks in order to avoid them or minimize the consequence Bolos Marcel; Florina Popovici, 2010.

3. Distinction between RISK AND UNCERTAINTY

The relation between uncertainty and risk, just like the one between certainty and uncertainty, is not only of unquestionable theoretical importance, but also a very practical-application one. The latter is particularly relevant in making decisions, because the processes and phenomena that influence the situation of a company or a business context may be in different circumstances of uncertainty or risk, which differently affects the outcome of the system operation. This is why it is necessary to recognize uncertainty and risk along with the notes that distinguish them, so that the attitude towards them can be further nuanced "Prunea, 2003.

"The present-day economic approach is increasingly giving up the distinction between risk and uncertainty and is focuses on modeling the behavior of the business agents (producers and consumers) and the market behavior. Currently, uncertainty is a feature of the economic life and risk implies quantification for the purpose of measuring so that such tools can be used to mitigate its effects "Motocu, 2009.

"Risk derives from uncertainty. If the risk can be associated with danger, uncertainty can be a negative component or a positive component generated by unpredictable favorable states. In this circumstance the negative component is associated with risk " Nistor Costel believes in" Risk management in international economic relations "Nistor, 2005. Thus, various scientific trends and various authors present economic, clear and vague, approaches to risk and uncertainty, as follows:

Table 3.

Trands and authors	The uncertainty means:	The risk means:
The entrepreneur	Objective attitude	Subjective attitude
Dual trend	Ignorance of the future	Consequences of decision-makers' actions
Hey J.	Lack of certainty	Uncontrolled certainty
Keynes J.M.	Unquantifiable	Quantifiable
Knight F.H.	No probabilistic determination	Certainly a probability
Neo-classical	Vague non compensatory risk	Certain equivalent uncertainty
Neo-Keynesien	Unpredictable damage	Predictable loss
The skeptics	Indifference	Reticence
Subjectivists	Independently from the decision maker	Mainly belonging to decision-makers
Roumasset	State of mind	Customize a given situation

Source: (Duran, 2007)

Including risk and uncertainty in the economic theory raised at least two problems:

- definition and delimitation of the concepts of risk and uncertainty;
- Risk is limited to situations where the decision maker may attach mathematical probability to any random events that can occur;
- Uncertainty refers to situations in which events cannot be expressed in precise mathematical terms of probabilities;
- Assessment of risk and uncertainty and the way these concepts affect economic decisions;
- Risk involves dispersion of possible outcomes relative to their average in a positive way relative gains and in a negative way relative loss;
- From this perspective, risk can be defined as the possibility of favorable or unfavorable results/outcome.

Table 4. Summarizes the differences between risk and uncertainty

Risk	Uncertainty (in contradiction to risk)
It can be made certain assumptions about events that may occur and the associated probability of their occurrence	It is described the situation when the decision maker cannot identify all or none of the possible events likely to occur and much less is he able to predict the likelihood of their occurrence, having the mathematical meaning of incompletely defined variable
A condition in which there is the possibility of undesired changes to a desired outcome that is	When defining uncertainty, one thing is sure: „nothing is sure or predictable”.

expected or hoped for	
Uncertainty affecting the outcome	A situation is uncertain when the decision should be taken but subsequent developments and associated probabilities are not known enough or at all.
Combination of circumstances including losing opportunities	The mental state opposite to certainty is a simple reaction to the lack of knowledge about the future
Creates uncertainty for some persons when risk is realized	The state of uncertainty, characterized by doubt, because of lack of knowledge of what will happen or not in the future
Whether risk is recognized or not, this does not change its existence	An action is uncertain when several results may be achieved, without knowing the likelihood of occurrence of any of them

Source: [http://www.perfect-service.ro/intelinet/2010/ianuarie/intel\(i\)net.php?legatura=4](http://www.perfect-service.ro/intelinet/2010/ianuarie/intel(i)net.php?legatura=4)

4. CONCLUSIONS

Genuine risks and uncertainty characterize the past, present and future and must be taken into account in any decisions that affect the organizations objectives. In any economic activity risk and uncertainty are found combined in different proportions, but uncertainty cannot be eliminated completely, no matter how complete the risk management may be. Situations and interdependencies not initially taken into account can occur anytime. Such unforeseen events can cause deviations to fundamentally change the data configuration. Thus, uncertainty becomes a potential source of risk when arising from imperfect information or resorting to sources often incompatible with the actual situation of a business or the competitive market.

In terms of costs and risks borne by the community, it is better first to reduce uncertainty wherever it is cost-effective to do so. Remaining risk should be diversified by pooling or hedging. Remaining risks should then be allocated to the stakeholder best able to minimize and bear them. Some uncertainty and risk can be reduced by collecting more and better information and making it available inexpensively to decision makers, or by introducing ways to ensure that commitments to supply and/or purchase are binding and enforceable. This can be a net gain to everyone because total uncertainty is reduced. Where it is economic to do so, this is the best way to reduce the cost of uncertainty. Risks that cannot be reduced, diversified or laid off should be allocated to the stakeholder able to bear them at lowest cost. In general, this means ensuring that risks are borne by the agent for which the amount of uncertainty and information costs are lowest; and the costs of bearing risk are lowest.

Considering the foregoing, we believe that:

- Risk and uncertainty are two distinct economic categories;
- The risk does not exclude uncertainty and vice versa;
- Pragmatically the state of uncertainty is reduced in the end by assigning subjective probabilities to a state of risk;
- Dynamic view of risk and uncertainty always leads us to observe the permanent interdependence that exists between these two categories in the sense that what today is considered uncertain, as a historical zone is being created, it can be shifted to the risk zone and at the horizon other uncertainties will always occur;
- Risk and uncertainty can be measured both quantitatively and qualitatively. The state of risk is assigned a probability of occurrence while uncertainty is not associated with only a probability but truth values using fuzzy methodology to measure them.

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