

# Toward Global Neoclassical Economics: A Critical Point of View

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## Summary:

It is argued that in Lakatosian sense the Expected Utility Model - which is the core operating block of the Neoclassical Research Programme and its globalization faces serious challenges. It could be accused of relative degeneration. The following notes focus on the evolution of the model and on the failure to describe its generalization, though its axiomatic foundation is relaxed.

The following remarks aim to present a relatively critical view on the prospects of the globalization of the Neoclassical Research Programme, focusing on the Expected Utility Model (EUM). This model represents the methodology of the programme after World War Second (WW2). As a result its evolution in the decades after WW2 and especially in the last two decades have come to serve as a benchmark for the evaluation of the dynamics and prospects in the development of the dominating Neoclassical economics, including its globalization.

Globalization, or the establishment of the so-called Global economics, are terms that imply internationalization, global positioning and the application of leading contemporary economics, that is Anglo-Saxon economics, which is officially operating in the developed

economies and throughout the world, no matter whether it is referred to as Mainstream economics or Neoclassical economics. The so-called Global economics has the distinguishing features of the neoclassical theoretical economics, namely *axiomatization, formalism, and modeling*.

As these features are typical of the construction of Expected Utility (EU), developed by John von Neumann and Oscar Morgenstern (1947 [1944])<sup>1</sup>, which has considerably influenced the development of the post WW2 economic theory – the evolution and the state of EUM since 1940s exposes the trends in the development of neoclassical economics and its globalization.

*Three are the main starting points* that are used, without going into detail, to present the relatively critical view of the theoretical and descriptive efficacy of the globalizing neoclassical economics.

1. *The axiomatization of EUM in mid and late 1940s, the clarification of its axiomatic foundations and the interpretation of its meaning and importance in 1950s*. This point is crucial for the organization and the explicit statement of this critical point of view because, in principle, the rationalizing of individual choice and decision making in last decades is treated in specialized literature in the context and in the light of this axiomatization.

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<sup>1</sup> Von Neumann, J., and O. Morgenstern (detailed edition 1947 [1944]) *Theory of games and economic behavior*. Princeton, NJ: Princeton University Press.

2. *The evolution of the general form of EUM.* The paper presents this point in a brief and schematic manner, paying attention to the specific multiplicative form of the model, which undergoes many changes primarily along the line of the development of the two subjective transformation functions - the subjective transformation function of the outcome and the subjective transformation function of the probability for the occurrence of the outcome. Such a schematic presentation offered below does not go into detail with regard to the complexity of the presentation of the individual choice using EU (this requires more concrete and in depth analysis), but provides for outlining the overall evolution, while presenting in a specific form the evolution of EUM, focusing on its general trends of development.

3. *The evaluation of the role of axiomatization to support or reject a model or a theory.* This is done from the perspective of the weakening EUM axioms, in order to accommodate the so called anomalies (descriptive contradictions, descriptive failures) which EUM encounters, and specifically from the point of view of the descriptive failure of the *weakened* generalizations of EUM. As is well known, such failures are registered. And this is the decisive argument. The observed descriptive failures of the weakened EUM are interpreted in *Lakatosian sense* as a *relative degeneration* of the methodology of this programme.

This paper formulates the arguments and structures the defense of the view in *two parts*.

### 1. The overall evolution of the construction of EU and the general direction in the change of EUM

I first present a conclusion for the general direction in the change of EUM. This conclusion summarizes the research and evaluations on the evolution in EUM made by Cris Starmer (2000)<sup>2</sup>, Paul Schoemaker (1982)<sup>3</sup> and many others. Cris Starmer, who is one of the leading figures in this field of research, in the publication mentioned above speaks of up to two dozens of variants of EUM, and Paul Schoemaker, in Schoemaker (1982) shows a table, containing summarized nine variants of EUM<sup>4</sup>. It suffices here just to present the variants of EUM in this Schoemaker's (1982) table. The aim is to outline in brief the evolution of the multiplicative form (see the mathematical formulation) of the model, focusing on the presentation, i.e. on the construct, of the outcome and of the probability for the occurrence of the outcome. If we look at the table up down, we could see and reach the conclusion, first, that *the general form of EUM evolves* and, second that the presentation of the general construction is done using *conventions* and is characterized by many *alternatives*. This is evident in the changes both in the presentation of the outcome and of the probability.

<sup>2</sup> Starmer, C. (2000) "Developments in non-expected utility theory: the hunt for a descriptive theory of choice under risk", Journal of Economic Literature, Vol. XXXIII (June 2000).

<sup>3</sup> Schoemaker, Paul J. H (1982 "The expected utility model: Its variants, purposes, evidence and limitations", Journal of Economic Literature, vol. XX (June 1982), Number 2, pp. 529-563.

<sup>4</sup> See Schoemaker, Paul J. H (1982 "The expected utility model: Its variants, purposes, evidence and limitations", Journal of Economic Literature, vol. XX (June 1982), Number 2, pp. 529-563; p. 538: Table 1.

Table 1. Nine variants in EUM, after Schoemaker (1982)

Nº	Formula	Name of the theory	Basic authors
1.	$\sum p_i x_i$	Expected money profit	
2.	$\sum p_i v(x_i)$	Bernoulli's expected utility	Bernoulli (1738)
3.	$\sum p_i u(x_i)$	Von Neumann - Morgenstern's expected utility	Von Neumann-Morgenstern (1947[1944])
4.	$\sum f(p_i)x_i$	Certainty equivalents theory	Schneeweiss (1974); Handa (1977); de Finetti (1937)
5.	$\sum f(p_i)v(x_i)$	Subjective expected utility	Edwards (1955)
6.	$\sum f(p_i)u(x_i)$	Subjective expected utility	Ramsey (1931); Savage (1954); Quiggin (1980)
7.	$\sum w(p_i)x_i$	Weighted money profit	
8.	$\sum w(p_i)v(x_i)$	Prospect theory	Kahneman and Tversky (1979)
9.	$\sum w(p_i)u(x_i)$	Subjective weighted utility	Karmarkar (1978)

Source: Schoemaker, Paul J. H (1982 "The expected utility model: Its variants, purposes, evidence and limitations", *Journal of Economic Literature*, vol. XX (June 1982), Number 2, p. 538, Table 1.

A Note:

- $f(p)$  stands for subjective probability (for the subjective transformation of probability);
- $w(p)$  stands for "decision weights", which are characterized by a substantial weakening of the mathematical features of the probabilities;
- $v(x)$  denotes an interval evaluation of utility, constructed for the cases of outcomes under certainty;
- $u(x)$  denotes an interval evaluation measure of utility of outcomes of lotteries, i.e. under risk.

Approaching the concrete albeit brief analysis of the two above-mentioned subjective transformations in the mathematical form of EUM, we have to

make four important remarks. *First*, the very concept of probability is not a simple construct. *Second*, the multiplicative combination of the measure of probability and the measure of the outcome from a normative point of view are not convincingly defended in economic theory. *Third*, the basic characteristics of the general formula are the holistic evaluation of the present alternatives and the independent transformations of the probabilities and the outcomes<sup>5</sup>. *Fourth*, diversity of EUMs depends on the way utility is measured, on the types of transformation of the probabilities, and on the way the outcomes are measured.

Here are emphasized **two main lines** in the construction of the models: along the presentation of *probability* -  $p$ ,  $f(p)$ ,  $w(p)$ , and along the presentation of utility under certainty,  $v(x)$ , and under risk,  $u(x)$ . The attention is **primarily** focused on the presentation, i.e. on the construct, of the **probability**, because - not undervaluing the developments in the realm of defining utility - the evolution of EUM in the last decades mainly follows the steps along the line of the presentation of probabilities. What could be observed in Table 1 along the vertical of the probability measure up down is **weakening**, starting from **objectively** given probabilities,  $p$ , through epistemologically defined, i.e. **subjectively** transformed, probabilities,  $f(p)$ , to "**decision weights**",  $w(p)$ . Decision weights, as point out Kahneman and Tversky (1979) are not probabilities, they are not governed by probability axioms and are not necessarily interpreted as measures of confidence<sup>6</sup>. As commented by Paul Schoemaker, in their Prospect theory Kahneman and Tversky introduce decision

<sup>5</sup> Holistic model means a model in which the attractiveness of every separate alternative is evaluated independently of the attractiveness of all other alternatives within a given set of choice. The opposite of this type of model is a model in which the alternatives are directly compared, for example component by component, without assigning a level of utility to every one of the alternatives being compared.

<sup>6</sup> See Kahneman, D. and A. Tversky (1979) "Prospect theory: An analysis of decision under risk", *Econometrica*, 47, pp. 263-291, p. 280.

weights in order to reflect the influence of events on the attractiveness of games; that is why they are monotonic with respect to probability but are not necessarily linear<sup>7</sup>.

Substantially important notes should be made also in relation to the understanding of the concept of **utility** under certainty,  $v(x)$ , and under risk,  $u(x)$ . The history of the term "utility" is very long, and it is not dwelt on here. What is important in the construction of the critical view in this paper is to stress that one can find a rich diversity in the interpretation of the concept of utility too, and especially the **entirely new theoretic meaning given to utility** in Von Neumann – Morgenstern's contribution (1947 [1944]). The two - after more than 200 years since Bernoulli (1738) – succeeded to axiomatically incorporate risk in the economic science. Their axioms and their conception have been discussed in 1950s as topics of interest per se and as proof of the principle of rationality. The heated debate calms down accepting Baumol's (1958) conclusion, according to which Von Neumann – Morgenstern's construction is at the same time both cardinal and ordinal - i.e. it theorizes cardinal utility, which is ordinal<sup>8</sup>. This view is shared by the economic theoreticians now. Such an understanding is maintained and developed among others by Schoemaker<sup>9</sup>. He analyses cardinal utility in neoclassical context and in the context of Von Neumann – Morgenstern's construction, and underlines that the cardinal nature of Von Neumann – Morgenstern's theory must be interpreted very carefully. Not dwelling on the differences between Bernoulli's utility versus Von Neumann – Morgenstern's utility, and also not discussing the differences between the neoclassical utility versus

Von Neumann – Morgenstern's utility<sup>10</sup>, it is worth emphasizing that the connection between neoclassical utility and Von Neumann – Morgenstern's utility is not severed. The contemporary developments within Expected Utility Theory (EUT) have evidenced projections and conceptions connected with both defining utility under certainty, i.e. relating to  $v(x)$ , and a great number of modifications of Von Neumann – Morgenstern's functional of utility under risk, i.e. relating to  $u(x)$ .

In the context of the evolution observed in EUM (evident from Table 1), there are some **other peculiarities**, besides the already discussed. For example, in Prospect theory (PT) outcomes are defined as changes in the financial level, not as final magnitude of wealth. Most of the models are descriptive. Exceptions are Von Neumann – Morgenstern's model and Leonard Savage's model, which are normatively (axiomatically) founded. The general construction, however, which is implied in all contemporary comparisons in this evolution within EUM, is Von Neumann – Morgenstern's utility.

The evolution outlined above could be presented by paying attention and focusing on other aspects too.

Thus, for example, having in mind the **linearity/nonlinearity** of the discussed transformations with respect to probability and utility and the **degree** to which EUM remains in the frames of the axiomatic presentation of the preference, it could be noted the following.

- The *classical model of the Expected Value*, developed by mathematicians in the 17<sup>th</sup> century, assumes that the attractiveness of a game, offering rewards

<sup>7</sup> See Paul J. H. (1982) "The expected utility model...", p. 537.

<sup>8</sup> Baumol, W. (1958) "The cardinal utility which is ordinal", Economic Journal, cited through: Fonseca, Goncalo L. and L. J. Ussher, website at the New School University, <http://cepa.newschool.edu/het/essays/uncert/debates.htm> [file not paginated].

<sup>9</sup> See Schoemaker, Paul J. H. (1982) "The expected utility model...", pp. 533-535.

<sup>10</sup> See Schoemaker, Paul J. H. (1982) "The expected utility model...", p. 533 and the following pages.

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with given probabilities, is presented by its **expected value**, where **both rewards and probabilities are linear functions**.

- *Von Neumann – Morgenstern's model* implies **nonlinear function for the utility and linear function for the probability distribution**.
- A revised utility model appears a model with **nonlinear utility and nonlinear probabilities**, developed in order to accommodate the systematic violations of linearity of probabilities assumption.

Finally, the models deviating from the EU standard enhance the generalization for moving away from the linearity of probability and utility. They offer specific nonlinear functional for modeling the individual preference. These specific functions of the preference drift from the features of EUM and the standard EU. The moving away of these models is to such a great extent that one can think of **leaving the theoretical framework of EUM**.

This is my first part of the argument. I confine here to only point out the fact that there are different conventions and many alternatives in the research field constructed by the notion of expected utility. I formally identify the general direction of the observed evolution and accentuate that this posits the question of **leaving the EUM territory and looking for alternative criteria of rationality**.

### 2. The relative degeneration in Lakatosian sense of conventional EUT

I now turn to the *second part* of my argument. It concerns the role of axiomatization in model building and theory testing; its essence is **the relative degeneration in Lakatosian sense of conventional EUT**.

In the general context of Von Neumann – Morgenstern's utility indexes, it is said that, if certain sets of conditions are fulfilled, there exists the so called Von Neumann – Morgenstern's utility function (this is the basic theorem in EUT). Looked at conversely, from the opposite point of view, this Von Neumann – Morgenstern's utility function is operatively needed, in order to be able to fulfill all manipulations with utilities and lotteries, to be able to multiply utilities and probabilities, to evaluate a compound lottery and to calculate what the decision-maker will prefer; this utility function is derived from the ordering of the preference of the individual.<sup>11</sup> The utility function in this context is a way to assign weights to outcomes, so that calculating expected utilities of arbitrary complex lotteries, - i.e. multiplying utilities of outcomes by their probabilities and summing up for all outcomes, - the received expected utility of a lottery must be greater than the expected utility of another lottery, if and only if the individual prefers the former lottery to the latter.<sup>12</sup>

As a whole, the axiomatic presentations which followed after 1950s avoid dealing with the original source. The formulations and the number of axioms in the various axiomatic presentations differ. New conditions (axioms) have been added or the original ones have been modified, in pace with the attempts made for possible generalizations of EUM and its evolution. Thus, the basic theorem could be derived using alternative sets of axioms. I will not dwell here on this. I will not discuss the different set of axioms, nor the initial critiques against the descriptive validity of the axiomatic presentation of the choice of the individual. I will just note that the critiques which originated in the first discussions and during the confirmation of Von Neumann –

<sup>11</sup> See Harvard continuing education forums. MATH-126 General discussion. Topic: Clarification of utility axioms. 2004, 6 April; <http://ubb.dce.harvard.edu/Forum99/HTML/000400.html>.

<sup>12</sup> See *ibid*.

Morgenstern's axiomatics, generally define the directions of the developments which followed. The latter aim to accommodate contradictions EUT faces. The main attention is focused on the place and the role of axiomatization, and specifically on the actual degree of axiomatization, in building and testing theorems and models and in order to support or reject theoretical statements.

An important methodological note should be made at this point: I treat the question of the place and the role of axiomatization and the degree of actual axiomatization in a broader framework, adhering to a moderate critical approach to the interpretation of the evolution in the axiomatic foundations of EUM. I do so envisaging the methodological aspects discussed by Michael Birnbaum (2004)<sup>13</sup>. Birnbaum discusses the concepts of axiom, testable features or theorems, and rejection of a model. He defines more accurately the feature of a model as a clearly stated and testable meaning (theorem); in his opinion axioms are the propositions one can use to derive the presentation. In many cases the axioms of the model are at the same time testable implications of the model. However, not all axioms are testable and not all axiomatic implications of presentation are testable, so showing that all axioms of the system are plausible does not guarantee that all theorems which can be derived from the axioms will also be empirically reasonable. To show that an axiom is incorrect does not necessarily refute the model, unless the axiom is also a theorem of the model.<sup>14</sup>

Taking into account the above said, I draw the attention to an argument of support of

neoclassical rationality, where the place and role of axiomatization in economic theory is heavily emphasized. This line of defense of the neoclassical approach is maintained and elaborated by leading figures like Peter Fishburn, David Schmeidler, Peter Wakker, Itzhak Gilboa, and others. David Schmeidler develops a model considered by the exponents of this line as the most significant achievement in the last decades in the field of modeling and decision-making under incomplete information. Peter Wakker and Itzhak Gilboa, who are PhD students of David Schmeidler, reach new findings and develop further the modern generalization of EUM. I will briefly focus here on a position, expressed in Wakker (2003)<sup>15</sup>. The position is worth discussing, and also for the understanding of the value of Schmeidler's contribution. This is important because along such lines goes the fundamental discussion on the evolution of the canonical Von Neumann – Morgenstern's EUM (the contemporary search for legitimacy of the construction of the model, and the related discussion against its plausibility).

Wakker, in Wakker (2003), studies the axiomatizations of decision-making models and their specific forms, accentuating the place and role of axiomatization. Succinctly put, from the point of interest of the current paper, according to him a decision model is normatively sound if and only if its axioms are sound, and it is descriptively valid if and only if its characterizing axioms are such.<sup>16</sup> In this meaning the axiomatizations can be used either in order to confirm, or in order to criticize a model. According to him, axioms are useful for the refutation of models, because of the fact that they

<sup>13</sup> Michael H. Birnbaum (July 20 2004), a participation in discussion: [Jdm-society] Empirical Testing of Ordinal Preference Representations; <http://www.sjdm.org/mail-archive/jdm-society/2004-July/001902.html>.

<sup>14</sup> Ibid., p. 1.

<sup>15</sup> Wakker, Peter (2003, July) "Preference axiomatizations for decision under uncertainty", in Itzhak Gilboa (Ed.), *Uncertainty in economic theory: A collection of essays in honor of David Schmeidler's 65<sup>th</sup> birthday*, Routledge, London, forth coming, chapter of a book; <http://www1.fee.uva.nl/creed/wakker/pdf/Schmdlrbook.pdf>.

<sup>16</sup> See Wakker (2003, July), p. 2.

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(the axioms) are formulated in terms of directly testable empirical fundamentals.<sup>17</sup> These tests are related on the first place to the so called "intuitive", or characterizing, axioms (for EUT such an "intuitive", or characterizing, axiom, albeit developed later, is the Independence axiom, which has undergone many modifications and is the main influence in the evolution of EUM).<sup>18</sup> In this context, the test for the descriptive validity of the characterizing axioms is the main line in the discussion both to support and to refute EUT. Wakker underlines the fact that this is what Morris Allais is doing criticizing EUT – his critique is concentrated on the validity of its Independence axiom. The same holds about the theory of utility. According to Wakker, most economic models assume that consumers maximize utility, but consumption utility functions are rarely estimated; instead, the assumption of utility maximization is thought justified if the axioms of completeness and transitivity of the preference are assumed reasonable. These axioms of the preference of the individual, together with the axiom of continuity, axiomatize the utility maximization and throw light upon its validity and limitations.<sup>19</sup> Thus, the criterion for testability of the concepts implied in the models (e.g., utility maximization) is satisfying certain axioms.

Wakker (2003) underlines the place and role of axiomatization from two points of view – from the point of view of its crucial importance at the initial stage of the

development of the new models or concepts, and from the point of view of the logical construction of the models. According to the defended position, the axiomatizations not only actually show how to confirm or to refute, how to defend and how to criticize given models, but they demonstrate which are the substantial parameters to be measured or defined.<sup>20</sup> For example, in particular, without the axiomatization of the expected utility it would not be clear whether concepts such as utility etc., are consistent and whether these are the parameters to be estimated.<sup>21</sup>

In support of the theoretical meaning of the degree of axiomatization, it should be noted that according to Wakker the difficulties to axiomatize some models is a signal that something is wrong (not sound)<sup>22</sup>. He gives an example with models, studied by Ward Edwards (1955)<sup>23</sup> and Kahneman and Tversky (1979)<sup>24</sup>, emphasizing that these models have never been axiomatized, and bases his argument on finding done by Peter Fishburn in 1978; according to Fishburn, no consistent axiomatization for these models will be found, because they violate basic axioms like the axiom of continuity and (which is more serious) the axiom of stochastic dominance.<sup>25</sup> That is why, underlines Wakker, when John Quiggin (1982) and David Schmeidler (1989, first version 1982) introduce alternative models of nonlinear probabilities, they take care to ensure their axiomatic foundations.<sup>26</sup>

<sup>17</sup> See *ibid.*, pp. 2-3.

<sup>18</sup> See *ibid.*, p. 4.

<sup>19</sup> See Wakker (2003, July), p. 3.

<sup>20</sup> See *ibid.*, p. 3.

<sup>21</sup> See *ibid.*, p. 3.

<sup>22</sup> See *ibid.*

<sup>23</sup> Edwards, Ward (1955) "The prediction of decisions among bets", *Journal of Experimental Psychology* 50, pp. 201-214, cited through Wakker (2003, July), p. 3.

<sup>24</sup> Kahneman, D., and A. Tversky (1979) "Prospect theory: An analysis of decision under risk", *Econometrica* 47, pp. 263-291.

<sup>25</sup> Wakker (2003, July), p. 3.

<sup>26</sup> Wakker (2003, July), p. 3. The cited sources of Quiggin and Schmeidler are as follows: Quiggin, John (1982) "A theory of anticipated utility", *Journal of Economic Behavior and Organization*, 3, pp. 323-343, cited through Wakker (2003, July), p. 3; and Schmeidler, David (1989) "Subjective probability and expected utility without additivity", *Econometrica*, 57, pp. 571-587.

This, according to Wakker, clarifies what is the empirical meaning of their models, that these models do not contain internal inconsistencies, and that their concepts of utilities and nonlinear probabilities are reasonable.<sup>27</sup> On this ground it is stated that Quiggin and Schmeidler, independently, are the first to present sound models, incorporating a new component in the theory of the individual decision-making: the subjective attitude in decision-making under incomplete information, i.e. under risk and uncertainty, and that this is the main step forward, made in the field of decision-making under incomplete information in the last decades.<sup>28</sup>

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In the context of the above said, one can envisage a number of important steps in the evolution of EUT. This can be illustrated mainly along the line of reformulating (weakening) the Independence axiom. The expected utility construction responds to the descriptive failures it faces also by weakening the axioms of transitivity, continuity, completeness. Does it lead to a new paradigm in the choice theory? Do the changes in the axiomatic base of EUT and in the axiomatic base of its continuation as Subjective Expected Utility Theory (SEUT) save the standard conception of expected utility as the central operating methodological and ideological block of contemporary neoclassical economics?

The answer could be **antipodal**.

Robert Nau's (2002)<sup>29</sup> answer is almost negative. According to him, the old paradigm has its continuations, but is not undermined or destroyed. He suggests that the foundations of Rational Choice Theory (RCT) and of EUT are not affected, and that the continuations, in their essence, have **additive character** (though he finally comes to a conclusion that at least they are **locally valid**<sup>30</sup>). Using a metaphor he accentuates that some new wings are added to the old building, giving work to new generations of scientists, but the original building and its foundation is there, in its place<sup>31</sup>. Nau (2002) summarizes the following.

- According to him, the economists have found that many of the main results remain valid under the more general assumptions in preference modeling, a position maintained by the authoritative Mark Machina – one of the leading figures in this field<sup>32</sup>. The additional parameters of the theories, deviating from expected utility, according to Nau, allow the new models to respond to empirical data more adequately, if necessary<sup>33</sup>.
- It is acknowledged that the theoreticians in behavioral decision-making are interested in the nonlinear reaction with respect to probability (in the form of research on the probability-weighting functions)<sup>34</sup>.

<sup>27</sup> Wakker (2003, July), p. 3.

<sup>28</sup> See Wakker (2003, July), pp. 3-4. John Quiggin develops his idea for decision-making under risk, and David Schmeidler works on the important and more delicate problems of decision-making under uncertainty (see Wakker, 2003, July, p. 4). It deserves mentioning that by the early 1990s the focus in research is on the decision-making under risk (see Wakker, 2003), albeit the more fruitful approach is to start from the analysis of decision-making under uncertainty.

<sup>29</sup> Nau, Robert (2002) [Notes..., 05] (available as pdf). The source contains notes of professor Nau, fifth unit of notes on individual choice, of seminar for PhD students, conducted by professor Nau at the University of Duke, Northern Carolina, Fuqua School of Business, in October 2002.

<sup>30</sup> See Nau, Robert (2002) [Notes..., 05], p. 7. About his final conclusion in favour of local validity, bringing general validity into question, see *ibid.*, p. 21.

<sup>31</sup> See Nau, Robert (2002) [Notes..., 05], p. 7.

It should be noted, however, that the Generalized Expected Utility Theory (GEUT), developed by Machina, operates directly on the utility functional and does not treat in the immediate vicinity problems of axiomatization.

<sup>32</sup> See Nau, Robert (2002) [Notes..., 05], p. 7.

<sup>33</sup> See *ibid.* (Nau, Robert (2002) [Notes..., 05], p. 7).

<sup>34</sup> See Nau, Robert (2002) [Notes..., 05], p. 7.



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- It is established that in late 1980s the theories, diverging from expected utility have lead to confusion among theoreticians.
- It is suggested that the new axiomatic utility theories explain some subset of experimental phenomena, but **none of them appear to be entirely valid** (i.e., no one has presented an effective and concise generally valid model).
- According to the findings in leading research studies, EUT "behaves" quite well where probabilities are not too close to zero or one (unity), and is at the forefront of the "working" theories<sup>35</sup>. It is asserted that it behaves well with respect to large stakes, but fails with respect to moderate ones.

So according to Robert Nau, no one of the new theories succeeds to displace SEUT, the further elaboration and continuation of EUT, as a cornerstone in decision-making analysis and in the economics of uncertainty<sup>36</sup>. He even suggests that most of the theoreticians in decision-making and most of the economists, if ever deviated, have come back to old religion<sup>37</sup>. Robert Nau bases this assertion on the unanimous according to him answer in favour of SEUT, given to two questions about its validity, posed by Ward Edwards on a conference, organized (by Edwards) in Santa Cruz in 1989, with the invitation and participation of representatives of all camps of leading researchers in the field of decision-making. The first question was whether maximizing subjective expected utility (SEU) is the appropriate normative rule for

decision-making under uncertainty. The second question was whether experimental evidence and evidence from observation confirm that people do not maximize SEU, i.e. that maximization of SEU could not be defended as a descriptive model of the behavior of unaided decision makers. Nau summarizes that the unanimous position of the conference was in favour of Subjective Expected Utility Theory (SEUT).

The antipodal answer is a **fundamental objection** to such a position.

In Ekenberg et al. (1996)<sup>38</sup>, P. Mongin ([1997])<sup>39</sup> and in other contributions **the evolution in axiomatics and its place and role for defense or refutation of a model or a theory is understood differently**. The *weakening* of the axioms in search of accommodation of EUT which is encountering descriptive difficulties, and in defense of the rationality principle, are treated, within the standard of expected utility, as a response to the registered violations of the axioms, especially with the aim to **explain** the violations, but, at least from a certain point onwards ***the weakened axiomatization is not supported descriptively***. The lack of initial descriptive implication is illustrated by making an analogy with the comparison in the philosophy of physics between Einstein's Relativity theory and Newton's physics. This is the main substantive point in the construction of my critical view on the *theoretical viability* of the emerging, or maybe formed, contemporary global neoclassical economics.

There are two opposite positions.

<sup>35</sup> See Nau, Robert (2002) [Notes..., 05], p. 7.

<sup>36</sup> See *ibid.*

<sup>37</sup> See *ibid.*

<sup>38</sup> Ekenberg, L., Danielson, M., Boman, M. (1996) "From local assessments to global rationality", International Journal of Cooperative Information Systems, <http://citeseer.nj.nec.com/context/172632/0>.

<sup>39</sup> Mongin, P. ([1997]) (available as pdf).

- Wakker and other researchers associate the place and role of axiomatization with "bringing up-to-date" axiomatization and maintaining Rational Choice Theory (RCT).
- Ekenberg, P. Mongin and other researchers argue in favour of a position, which attacks the old Rational Choice Theory (RCT).

As for the strength of the second position, attacking the old RCT, one may take into consideration at least two circumstances. That P. Mongin is one of the leading researchers on utility, and that Ekenberg et al. (1996) directly envisage the theory of anticipated utility, developed by Quiggin, and the theory of generalized utility, developed by Machina; these theories are seen as outstanding generalizations within the first approach (the first position), defending expected utility, even more: Quiggin's theory competes to be one of the best behaving among such new generalizations (John Quiggin's model is defined as conventional rank-dependent model with comonotonic dominance).

Ekenberg et al. (1996), basing their argument on Fishburn (1981)<sup>40</sup>, discuss all this from the point of view of the rationality incorporated in EUT. They note that expected utility maximization is the essence of rational agent behavior, but suppose that this principle is not the only reasonable candidate as behavioral rule in individual decision-making. On the one hand, according to them, it is often argued that the different axiomatic systems offered

in order to support the principle of expected utility maximization, are **too strong**, and, on the other hand, just the opposite, that it is demonstrated that several axiomatic systems appear to be **too weak** to imply this principle, and that it seems **too difficult to construct such an axiomatic system**.<sup>41</sup>

This evaluation of Mongin about the state of the conventional developments in expected utility is seriously emphasized by the example he gives with the difference, made in philosophy of physics, between **more general** and **more partial** theory. Relativity theory is more general than Newton's mechanics, but the philosophers of physics, no matter what school they belong to, when discuss this never imply that the former is a logical weakening of the latter. Just the opposite: they have in mind that for some values of the relevant parameters, **the former implies the latter**. According to Mongin, ***this is not so with the theory of choice under risk***.<sup>42</sup> He explicitly states, that ***this is not so***, even if one qualifies the discussion in Machina's Generalized Expected Utility Theory (GEUT) and the study of probability-weighting function in Quiggin's theory of anticipated utility as crude attempts in identifying parameters, whose special values would transform and reduce the more general theories to the partial case of EUT.<sup>43</sup> By viability of a partial theory here I mean ***the free existence of the partial case under a given parameterization of the general theory***.

<sup>40</sup> Fishburn, P. (1981) "Subjective expected utility: a review of normative theories", *Theory and Decision* 13 (1981), pp. 139-199, <http://citeseer.nj.nec.com/context/172632/0>.

<sup>41</sup> See <http://citeseer.nj.nec.com/context/172632/0>.

<sup>42</sup> See Mongin, P., the cited pdf, p. 8.

<sup>43</sup> See *ibid.*

This overall characteristic of the alternative conceptions (that they are **not viable partial cases of the more general theories**, based on weakened axiomatics) opens the door to endless discussions on the normative, prescriptive and descriptive aspects of the contemporary developments of EUT, and on the place of the rational agent in economic theory.

### 3. Conclusion

The general conclusion reached, is that the core of the contemporary neoclassical platform – Expected Utility Theory (EUT), relatively degenerates in Lakatosian sense. This poses difficult methodological problems before the emerging, or in the process of formation, or already formed to an extent, neoclassical "global economics". Once Imre Lakatos heavily emphasized that Marxian research programme evidently failed in that it **did not predict such new facts** as the war between two socialist countries – China and Vietnam, and searched for **ex-post explanations. This inability to predict new facts**, as is well known, *is a distinctive feature of the Lakatosian criterion for*

*degeneration*. According to this criterion, Marxian research programme degenerated. What is more, in the strict Lakatosian sense - formulating conjectures and their (possible) refutation - it is not a theory, but faith. The same can be said about the current official neoclassical doctrine. It did not predict such new fact as the global economic crisis. As a rule, warnings and anticipations of such crisis phenomena came from the heterodox critique. Finding out such a new fact was not (and is not) implied by the methodology of the neoclassical research programme, albeit, most probably, as in the case with the war between the two socialist countries - China and Vietnam, ex-post explanations will be found, and they will have the task to legitimize the dominant neoclassical economics.

Adopting this interpretation – that there are certain difficulties and a tendency of relative degeneration of EUT (as inherent operating theoretical and methodological core of contemporary neoclassical economics) constitutes my critical viewpoint with respect to the current pretension for "global" (neoclassical) economics.