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THE ROLE OF CONSUMER FOR ENVIRONMENTAL IMPROVEMENTS: A THEORETICAL ASPECT

di

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1. Introduction

In environmental policy, it is increasingly accepted that more emphasis should be placed on consumption and its implications from the point of view of the environment.

Environmental issues are, to an increasing extent, becoming a part of the modern consumer society. This is recognized both at the international and national levels: international agreements on cutting the emissions of greenhouse gases are signed, national and local strategies for sustainable development are launched; and industries have adopted environmental management programmes.

A more recent feature in environmental policy-making is that consumers are expected to be able and willing to make more environmentally conscious choices. Means and prospects of changing consumption patterns have been one of the subjects of the United Nations Environment Programme Agenda 21[1]. Discussion on consumption and environment has ranged from definitions and concepts to policy strategies.

The variety of products in the market is ever increasing and so are the economic possibilities to consume, at least for most of the people in the Western countries. From the consumer's perspective, increasing consumption opportunities, together with increasing awareness about the global interrelationships between consumption, production, environmental degradation and questions of global equality and intergenerational equity mean an increasingly complicated world. The circumstances and conditions in which consumers have to act and make their consumption decisions are

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[1] This Agenda 21 was adopted by the Plenary in Rio de Janeiro, on June 14, 1992.

becoming more complex. This leads us to the question of how consumers make decisions and arrive at the choices they make in this complicated world?

The answer to this question brings to identify what are theoretical bases on which we can make a correct analysis of consumer choices concerning environmental themes.

Numerous ineffectiveness of traditional neoclassic theory have been emphasized by ecological economist, socio-economists, psychologists and other researchers belonging to heterodox economic schools. About them I will give a brief synthesis in the first paragraph.

To individualize an useful theoretical structure which can furnish convincing elements to analyze the choices of consumers, in the general cases and especially in presence of environmental problems, is useful to make reference to the Post-Keynesian approach.

The second paragraph of our work will be devoted to this new alternative to the neoclassic consumer theory which has been neglected for a long time. It finds its foundations in the indications left by the best-known and most productive Post-Keynesian authors[2]. After a careful examination of the literature regarding such address it will be pointed out the fundamental principles that can allow us a best analysis of consumer choices. Their importance for the environmental economics will be underlined in the third paragraph.

The fourth paragraph will be devoted to one of the fundamental themes of environmental economics: the "contingency valuation". It represents an aspect very debated, as it aims to find non-market prices of environmental goods.

In conclusion it will be shown as, thanks to the Post Keynesian approach, a lot of uncertainties that are put in prominence both to experimental level and to theoretical level can be overtaken.

[2] From these authors, it is sufficient to cite: J. Robinson, (1956), L. Pasinetti, (1981), E.J. Nell, (1992), P. Arestis, (1992), B. Schefold, (1997).

2. A critique to Neoclassical theory of consumer choice

The traditional approach to study consumer decisions has been based on the assumption of a *rational decision-maker* with well defined and stable system of preferences. The decision-maker is assumed to have knowledge of all the relevant aspects of the product available for choice as well as the consequences of each alternative choice. It is assumed that the consumer is able to calculate which option, product or service, will maximize his received value or expected utility. This rational choice theory, which has its roots in basic micro-economic theory, has for a long been widely accepted as the basis for research on consumer decision-making and reasoning.

During the past couple of decades, this economic-based view has been challenged by those researches who stress that people make decisions based on simplifying strategies, *heuristics*, which often lead to biases end errors in the resulting decisions. They sustained an approach, which stresses the limits in human *information-processing* and argue that rational choice theory is inadequate to explain how consumers make decisions in real life[3]. Because of their limited information-processing capacities, people tend to rely on some heuristic principles, which reduces the complexity of problems. These principles can be describe as "rules of thumb", which are used in everyday life, for example, in shopping situations.

A variety of decision-making strategies has been identified in research on human information processing. These strategies can be thought of as methods for searching through the decision problem space. The basic assumption of *heuristics* is that consumers use choice strategies in their decision-making to simplify the choice process. The use of *heuristics* involves a trade-off between accuracy and effort: on the one hand, consumers strive for good decisions, on the other, they desire to minimize the cognitive effort needed to reach a decision.

Even if the heuristics approach seems to oppose the neoclassical rationality approach, these two view have more in common than is apparent at first glance. According to psychological researches, both theoretical approaches are based on a view that rationality necessarily implies calculation and probabilities even though the two approaches disagree about whether it is reasonable to assume that human decision-making results in the optimum situation. They strongly criticize the heuristics-and-biases approach, "which . . . . would lead us to believe that humans are hopelessly lost in the face of real-world complexity, given their supposed inability to reason according to the canon of classical rationality…"[4]

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[3] J.R. Bettman, M.F. Luce and J.W. Payne (1998).

[4] G. Gigerenzer and D.G. Goldstein (1996).

A third way of looking at decision-making calls into question the assumption of "good" and "proper" reasoning that characterize both neoclassical rationality and heuristics-biases approaches. The best-know proponent of this third perspective is Herbert Simon[5], who emphasizes the *bounded nature of rationality*. Simon describe this as approximate rationality, and takes into account both limitations in the decision-maker's capabilities and the limitations set about knowledge by the circumstances in which decisions are made. Simon argues that "minds are adapted to real-world environments". He also suggests that, instead of having well organized and stable preferences, people may develop them when needed. The notion of bounded rationality is consistent with the growing belief among consumer researchers that preferences are often constructed on the spot, in the specific situation where the decision is made. But psychological school[6] asserts that most theories of human inference focus exclusively on the cognitive side of decision-making, ignoring the specific contexts in which decisions are made.

Despite this critique, proponents of the heuristics approach acknowledge that situational and other factors influence decision-making and that it is adaptive to specific choice situations. As Bettman et al.[7] have asserted, choices depend on individuals, the social context and a variety of factors characterizing decision problems. However, the psychologically oriented research has not focused on studying what these factors mean in the context of decision-making and how they contribute to decision outcomes.

Furthermore, the psychological approach often assumes a conscious and deliberate decision process. This view has been challenged by Olshavsky and Granbois[8], who characterize human decision-making as follows: " Purchases can occur out of the necessity: they can be derived from culturally mandate lifestyles or from interlocked purchases; they can reflect preferences acquired in early childhood; they can result from simple conformity to group norms or from imitation of others; purchases can be made exclusively on recommendation from personal or non-personal sources; they can be made on the basis of surrogates of various types; or they can even occur on a random or superficial basis". The authors were among the first to emphasize the socially constructed and complicated nature of consumer decision-making and to challenge the approach which presumes deliberate choice processes.

In conclusion, we can see a change in focus in research on consumer reasoning during the past couple of decades. Of special interest is the view that decision are inevitably context-dependent.

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[5] H. Simon (1959), H. Simon (1962), H. Simon. (1976).
[6] G. Gigerenzer and D.G. Goldstein (1996), op. cit.
[7] J.R. Bettman, M.F. Luce and J.W. Payne (1998), op. cit.
[8] R. W. Olshavsky and D.H. Granbois (1979).

This argument is particularly valid for the problem studied in this article, where it is analyzed the consumer behaviour in front of the specific case, regarding his choices about environmental improvements.

3. Another alternative to traditional consumer theory: Post Keynesian contribution

Together with the critical contributions versus the neoclassical theory of consumer by socio-economists, psychologists and individuals such as Hebert Simon, which are been presented in the precedent paragraph, there has been the elaboration of many important concepts principally by Post-Keynesian economists particularly useful to explain the consumer choices in environmental economics.

Traditionally, there have been few attempts to form a systematized Post Keynesian theory of household choice, although recently one can detect an increasing interest with the appearance of works on the subject. In spite of this, there is a considerable degree of coherence concerning the elements that constitute what might be called a Post Keynesian theory of choice. These elements do not originate from Post Keynesian works only but also from a number of economists broadly falling in the non-orthodox category. Thus, elements of a Post Keynesian oriented theory of choice can be found in the works of J. Robinson, L. Pasinetti, N. Georgescu-Roegen, A Eichner, E.J. Nell. P. Earl and Keynes himself. The underlying framework can be describe in terms of six principles.

Most of the names of these heterodox principles of consumer behaviour arise from the terms used by Georgescu-Roegen[9]. "Separability" is taken from Lancaster[10], while "non- independence" is taken from Galbraith[11] . These principles are: 1) the principle of procedural rationality; 2) the principle of satiable needs; 3) the principle of separability of needs; 4) the principle of needs hierarchy; 5) the principle of the growth of needs; 6) the principle of non-independence; 7) the principle of hysteresis.

Procedural rationality, also known as bounded rationality, was suggested by H. Simon[12] and it is one of the presuppositions of the Post Keynesian paradigm. The additional characteristics of the Post Keynesian approach is that rationality is also bounded by the essentially unknowable future. This type of rationality denies that the economic agent's decisions are characterized by optimizing in the sense of mainstream economics. Bounded knowledge, irreducible uncertainty and limited computational abilities

[9] N. Georgescu-Roegen (1954).
[10] K Lancaster (1991).
[11] J.K. Galbraith (1958).
[12] H. Simon (1959), op. cit.

undermine optimizing behaviour. They also imply that agents avoid complex calculations and considerations and therefore base most of their decisions on rules of thumb, conventions, customs and habits. The second principle of **satiable needs** implies that there are threshold levels of consumption beyond which a good gives no additional satisfaction. The standard theory has a similar view with the idea of diminishing marginal utility, but satiation, from that theoretical point of view, occurs when incomes are infinite or prices are zero. The principle is connected to the view that some needs are more basic than others (the principle of needs hierarchy). The important consequence here is that a distinction between wants and needs is necessary. Wants evolve from needs and they constitute the various preferences within a level of need[13]. The principle of **separability of needs** says that needs can be distinguished from each other. The mainstream approach has implicitly recognized the existence of separate needs in ideas like the separability of the utility function. The principle can be associated with Lancaster's theory[14] in which characteristics possessed by a good correspond to a specific need. The obvious consequence of need separability is the restriction of the degree of substitution between goods. The fourth principle **needs hierarchy** states that given the separability of needs, needs are subordinate or that they exhibit a hierarchical structure. This idea is quite old and can be found in many economic writings and in Keynes[15].

One can combine the principles of satiation, separability and hierarchy in a hierarchical preference ordering with thresholds levels. A special case of such on ordering is the lexicographic ordering that many orthodox texts mention as a perfectly rational system of choice but never develop it further. The next principle, **growth of needs**, implies that the needs of individuals will grow as their lower level needs are gradually fulfilled. This is mainly due to income effects, since in order to go from lower needs to higher ones, an increase in real income is necessary. Thus income effects seem much more important in explaining the change of expenditures on goods than are substitution effects. The principle of **non independence** implies that decisions and preferences are not made independently of those of other agents (this is very similar to Keynes's idea that relativities matter). In particular, consumers of similar incomes fulfil their needs in the same order and have the same thresholds. Thus norms of consumption will depend on past standards and on imitation as the consumer attempts to emulate those that belong to a higher social strata or his reference group[16].

[13] M. Lutz and K. Lux (1979).
[14] K. Lancaster (1972).
[15] J.M. Keynes (1936).
[16] A. Eichner (1986).

The last principle *hysteresis* refer to path-dependence of consumer choices. They are a consequence not only of the actual factors which influence them. But they depend from precedent choices (history dependence). At macroeconomic level global consume is not only determinate in a single period from the income level of this period. But it is influenced by its past levels.

4. The link between environmental economics and Post Keynesian economics.

A key consequence of these seven principles, in particular the "principle of needs hierarchy", is that the utility index cannot be represented by a scalar anymore, but rather by a vector, and that the notions of substitution and trade-offs, which are so important for neoclassical economics, are brought down to a minor phenomenon, which only operate within narrow boundaries. The Keynesian approach to consumer theory does not rely on the principle that "everything has a price". In particular, it is presumed that the "principle of needs hierarchy" is particularly relevant when dealing with moral issues, for instance questions of integrity, religion or environmental issues.

Past work in environmental economics has shown indeed that a substantial proportion of individuals refuses to make trade-offs with material goods when biodiversity, wildlife and other environmental problems are concerned. This has implications for contingency value analyses, based on willingness to pay or willingness to accept compensation, that attempt to take into account the non-market value of environment. The claim made is that Post-Keynesian approach to consumer choice theory is highly relevant to environmental economics, going beyond the critiques that can be addressed to *homo economicus* from the standpoint of experimental economics[17].

A quick survey of the literature on environmental economics demonstrates that the more radical environmental economist – ecological economists – have used unknowingly all seven principles mentioned above in their effort to present a consumer choice theory that would be an alternative to the standard neoclassical model. The claim made here is that the Post-Keynesian approach to consumer choice theory is highly relevant to ecological economics.

It should first be pointed out, as explained by Holt[18], that many of the themes evoked by Post-Keynesian economist are ranked highly by ecological

[17] H. Gintis (2000).
[18] R.P.F. Holt (2005).

economist. First and foremost, there is the "precautionary principle"[19] associated with fundamental uncertainty. When information is lacking, business people act prudently. They usually postpone taking decisions that might increase the probability for bankruptcy of their institution. The same principle should be applied to environmental issues. In doubt, no decision that increases the probability of an environment catastrophe should be taken.

Second, there is the "histeresis principle", a variant of what is called the principle of "non-independence". Preferences are endogenous and context specific. For the Post-Keynesians "utility depends on past experience, the duration and the intensity of this past experience and the length of time that has passed since the relevant experience took place"[20]. Habit formation can be seen as a particular case of path dependency[21]. In this framework, the theory on choice reflects the complexities of human nature rather than the mathematical requirements of tractability. As Crivelli[22] points out, " the longest standing invocation of hysteresis seems to be in the context of the theory of choice". The path taken by consumers will have permanent effects on future choices. This linked to the other feature of the principle of "non-independence", i.e., the fact that advertising and fads have an impact on the choices made by individual consumers reinforces the arbitrary nature of consumer choices and the possibility of intransitive preferences and multiple equilibria. Indeed, Gowdy[23] claims that the "histeresis principle" is tied to the large discrepancies that have been observed between willingness to pay (WTP) and willingness to accept (WTA) in contingency valuation studies. Gowdy argues that agents will be less likely to give up some environmental landscape that they have had the opportunity to experience.

A third theme which is common to both ecological economist and Post-Keynesian economists is that of multidimensional choice. This point was made on by Bird[24], who argued that in contrast to neoclassical economics "the choice between alternative environmental policies must necessarily therefore be made in more than one dimension" This theme is recurrent one among the proponents of sustainable development.

The principle of the "separability of needs" restricts the substitution effects that could arise between elements that belong to different groups of needs, but it does not totally eliminate them. One could presume that multicriteria decision techniques that rely on weak comparability would still

[19] The "precautionary principle", was identified by Howarth (2001). It has created a large debate between ecologists and economists, related to uncertainty, risk, cost-benefit analysis and science. For more indications about it to see N. Genovese and M.G. La Spada (2006).
[20] J.M. Gowdy (1993).
[21] S. Zamagni (1999).
[22] R. Crivelli (1993).
[23] J.M. Gowdy (1993), op. cit.
[24] J.W.N. Bird (1982).

entertain substitution effects. If monetary compensation is high enough, they will win the day. Consumers will be swayed by a high enough monetary trade off, even if they hesitate to do so. But several ecological economists have denied any role for substitution effects, at least in some circumstances for some categories of households.

Substitution effects are totally wiped out when lexicographic choices are entertained. This is tied to the post-Keynesian principle of the "subordination of needs".

Lexicographic choice in the field of environment have been explicitly put forward by Edward, Stevens, Lockwood, Spash and Hanley, Spash, Gowdy and Mayumi and Kant.[25] The first five of these authors present a graphical representation of a lexicographic choice, pointing out that it dismisses the neoclassical axiom of indifference, also called the axiom of substitution, which is so essential to price-base neoclassical environmental policies. These authors do not claim that all agents exhibit behaviour based on choices of a lexicographic nature. Rather they argue that a substantial proportion of consumers – sometimes called ethicists or altruists – exhibit such a behaviour on matters tied to environment and that neoclassical representations of these consumers are misleading and lead to inadequate interpretation of surveys on the opinions of people about their environment. This applies in particular to the contingency valuation surveys.

The difference between standard neoclassical consumer analysis and the heterodox approach based on the separability and the subordination of needs, within the context of environmental issues, can be shown most clearly with the help of following two diagrams.

[25] S.F. Edwards (1986), T.H. Stevens (1991), M. Lockwood (1996), C.L. Spash and N. Hanley (1995), C.L. Spash (1998), J.M. Gowdy and K. Mayumi (2001).

Fig. 1

The neoclassical indifference approach and the hesitation region

Ecological
Hesitation areas
Intransitive choices

Neoclassical:
B > A
C > A
there exists D = A
DAD' indifference curve

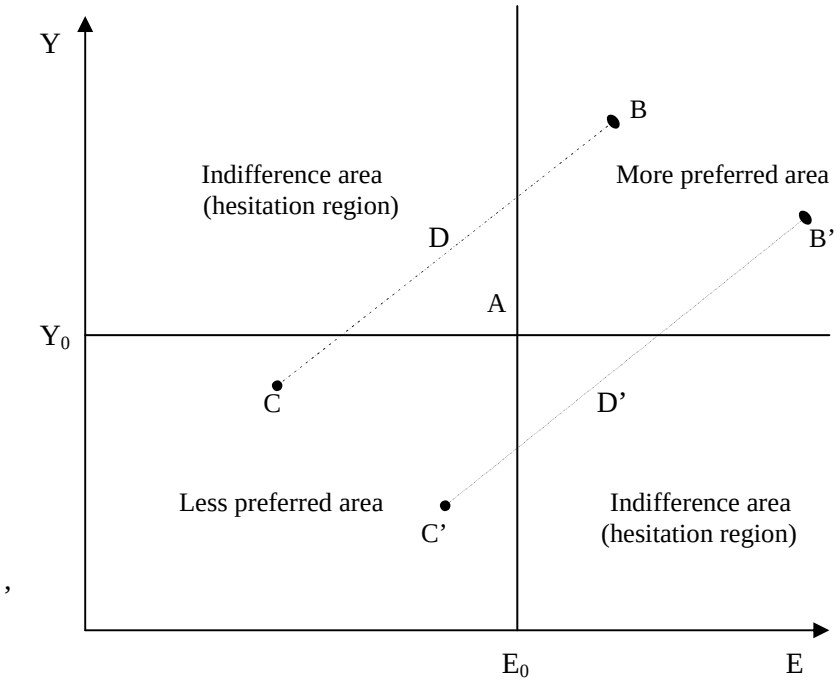

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Figure 1 illustrates standard neoclassical analysis and possibly the principle of "separability of needs" with its associated region of hesitation. Income devoted to private goods is on the vertical axis, while an environmental good is represented on the horizontal axis. Consumers are assumed to be choosing between keeping a certain provision level of environmental good, on the one hand, and the income amount which they can devote to private good consumption, on the other hand. The former is called E and the latter is Y. Suppose that the starting situation is one where the size of environmental good is E_0 while income level is Y_0 which corresponds to point A. The plane can thus be divided into four quadrant, divided by the

vertical and horizontal lines passing through the starting endowment. The north-east quadrant, including the two horizontal and vertical lines defining it, is an area that represents combinations of private consumption and environmental good size which are preferred, compared to bundle A. Symmetrically, the south-west quadrant, with its two line frontiers, represents an area of less preferred combinations, relative to A. The two remaining zones, the north-west and south-east quadrants, are areas of indifferences. These are areas where some trade-off is assumed to be possible. It is possible to have more private consumption in exchange of a smaller environmental good, or some larger environmental good in exchange for a lesser amount of private consumption. The consumer is willing to make the trade-off because, if the marginal rate of substitution is high enough, the trade-off will keep constant the satisfaction (the utility) of the consumer.

In each of the two areas of indifference, there will be a multiplicity of combinations that will keep constant the satisfaction of the consumer. This locus of points, along with combination A, will define the neoclassical indifference curve. What the neoclassical axiom of indifference says, now called the axiom of continuity, is that if there exists a combination B which is preferred to the starting bundle A, while there is another combination C which is less preferred to A, as shown in Figure 1, then there must exist a combination D on the segment linking B to C which is indifferent to the initial bundle A. This segment is shown by the dashed line in Figure 1. Another such dashed line illustrates the axiom of continuity in the other area of indifference, in the south-east quadrant, which boundless B', C', and D'. The neoclassical indifference curve would then goes through the three points D, A and D'.

A first criticism of this indifference curve construction is that of Godwin and Mayumi[26]. They assert that the two areas of indifference, when environmental issues are at stake, are instead areas of hesitation, which are likely to carry inconsistent and hence intransitive choice. These are caused by the high level of fundamental uncertainty associated with environmental issues. Inconsistency is the symptom of the lack of information about the future and it also reflects the inability and the reluctance of consumers to compare bundles that include weakly comparable components.

The second critique of this neoclassical indifference curve construction is that based on the "principle of subordination" and its associated choices of a lexicographic nature. This is illustrated with figure 2, inspired by Spash[27]. Once more, the individual consumer is assumed to start from bundle A. Let us suppose that the achieved bundle constitutes the thresholds levels that must be minimally obtained for the individual to retain the present level of

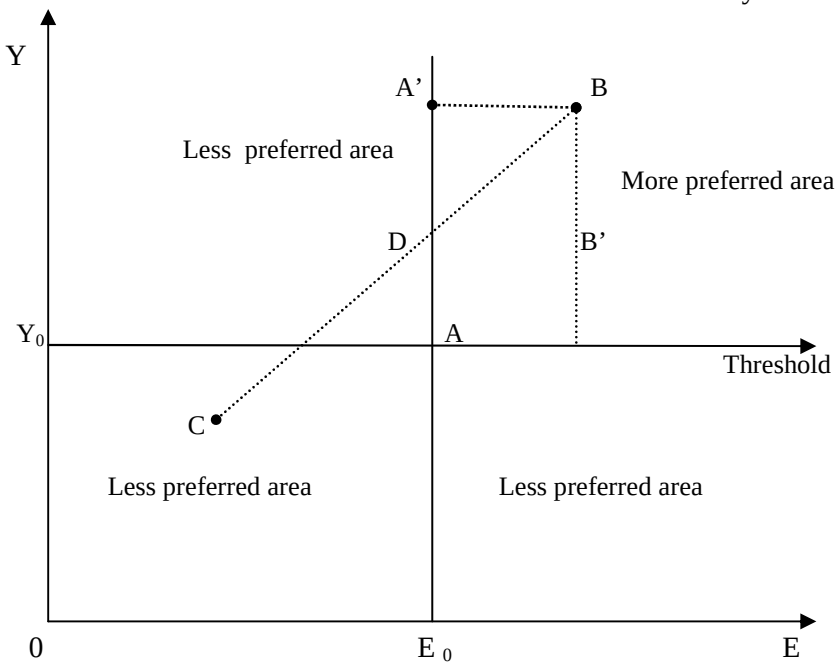
[26] J.M. Gowdy and K. Mayumi (2001), op. cit.
[27] C.L. Spash (1998), op. cit.

satisfaction. Any combination that provides an income inferior to Y_0 would bring about a lower level of satisfaction, whatever the size of environment good. Symmetrically, any combination that would reduce the environmental provisions below E_0, whatever the amount of private consumption, would also lead to a lower level of satisfaction. On the other hand, provided the threshold level of income Y_0 is attained, it is possible to presume that the primary determinant of the satisfaction of the consumer is the size of environmental goods E. For instance, bundles B and B' on Figure 2 would always be preferred to bundle A or A'. Only with bundles providing equal size of environmental good the income level Y would become a determinant of the combination choice. For instance B would be preferred to B'. The plane is thus divided into two zone. The north-east quadrant, with its horizontal and vertical frontiers, is the area of more preferred combinations relative to A. The other three quadrants are all areas of less preferred combinations relative to the initial bundle A.

Fig. 2

Choices of a lexicographic nature with thresholds

B > B' > A' > A > D> C
No continuity: D not = A



Such an alternative consumer behaviour does not fulfil the conditions of the axiom of continuity. As was done in Figure 1, we may draw in Figure 2 a dashed segment line connecting bundle B, which is preferred to A, and bundle C, which is less preferred than bundle A. However there does not exist any point D on this segment which corresponds to a bundle providing an amount of satisfaction which is equal to that of combination A. No combination of environmental good size and income level is indifferent to that indicated by A. The axiom of continuity, or of indifference, does not hold anymore, because of the lexicographic nature of choices. This implies that neoclassical theory, according to which, everything has a price, do not hold anymore either.

5. Consumer behaviour analysis and contingency valuation

As is well-know, within the standard neoclassical choice theory framework, the willingness to pay (WTP) and the willingness to accept (WTA) are well defined measures of the Hicksian consumer surplus. Which should be equal to each other. Still, numerous studies have shown that WTA assessments largely exceed those of WTP. The discrepancy is easily a factor of three to ten[28] , and even a factor of 3 to 50 when environment issues are considered[29].

Various explanations have been offered for this phenomenon. The first obvious one is the "non-independence principle", more precisely the "hysteresis principle", according to which we hold on more dearly to something which we already have than to something which we never got. The second explanation has to do with lexicographic ordering. Consumers might be willing to give up a limited amount of money to improve their environment; but they would demand an unlimited amount of compensation to accept a reduction of the same environment. In fact, they might be unwilling to trade for any reduction in the quality of their environment.

This brings to the fore the large number of zero or infinite bids, as well as refusals to bid, that are encountered in contingency valuation studies. Zero bids or refusals to bid are often interpreted as signalling no interest in improving or preserving the quality of environment. On the other hand, bids that appear absurdly high are waved off, on the basis that they cannot fit the neoclassical theory of the consumer surplus. These anomalous responses, however, are anomalous only within the strict neoclassical framework. As was pointed by Edwards[30], the willingness to accept will be undefined for

[28] J.L. Knetsch (1990).
[29] J.M. Gowdy (1993), op. cit.
[30] S.F. Edwards (1986). op. cit

agents that hold preferences of a lexicographic nature whenever their income exceeds their minimum standard of living.

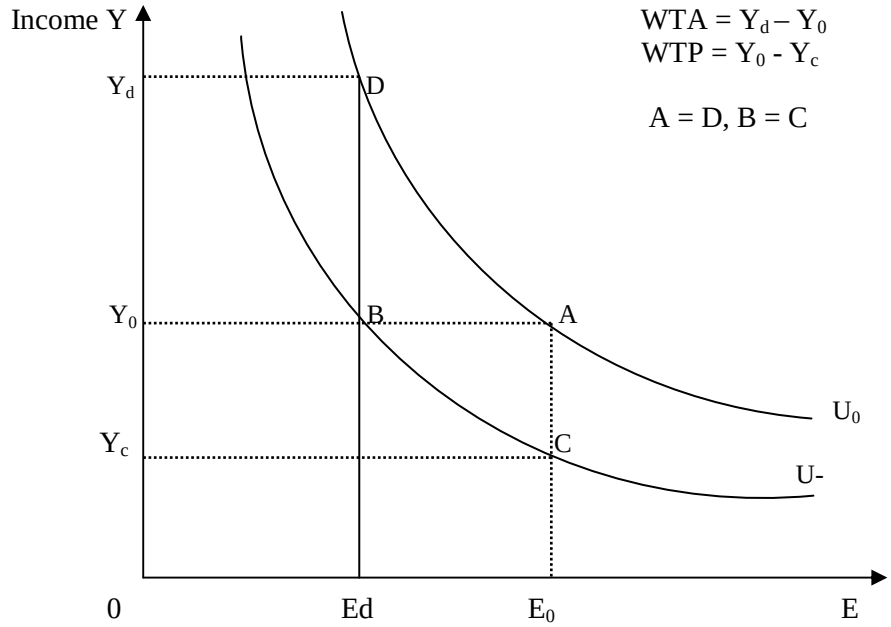
Some researches have investigated these possibilities. Lockwood[31] concludes that his study shows "that some individuals do have complex preference maps which include regions of lexicographic preference for the protection of native forests from logging". Spash and Hanley[32] have investigated the motives behind zero bids. They found that nearly none of the zero bids were given for reasons of zero value. Rather, some participants to the study said that they could not afford to pay anything, while most zero-bidders claimed that ecosystem rights ought to be protected at all costs, and hence should be protected by law. This is consistent with Kahneman and Knetsch[33], who claim that participants to contingency valuation are bound to respond with indignation to questions about accepting more pollution over existing pristine landscapes. This indignation is expressed by "the rejection of the transaction as illegitimate, or by absurdly high bids".

Once again it is possible to give a graphical illustration of these difficulties for neoclassical choice theory. As a basis for comparison, let us start with the illustration of the standard neoclassical case, with indifference curves. Let us assume once again that consumers are concerned with the income level that they can devote to private consumption as well as the size of environmental good.

[31] M. Lockwood (1996), op. cit.
.[32] C.L Spash. and N. Hanley (1995) op. cit
[33] D. Kahneman and J.L. Knetsch (1992).

Figure 3

Neoclassical contingency value assessment, with indifference curves



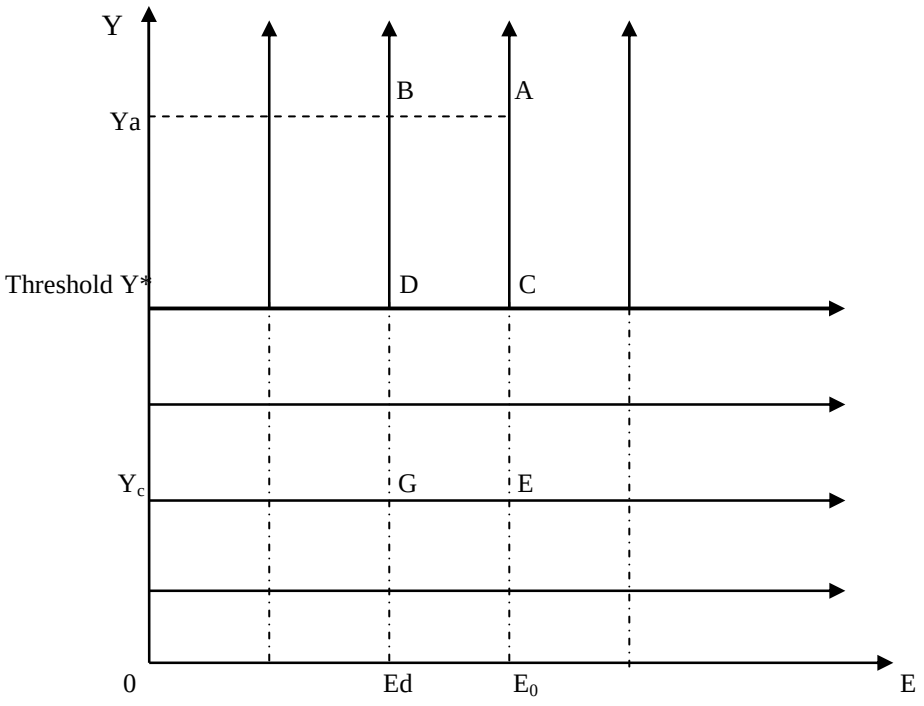
In Figure 3 it is assumed the existence of two well-behaved indifference curves, with the consumer being initially located at combination A on the U_0 utility indifference curve. Suppose the size of the environmental good is projected to be reduced from E_0 to E_d . As is well know, willingness to accept (WTA) is measured by the distance $(Y_d - Y_0)$. The consumer will be indifferent to combinations A and D. As a trade-off for the reduction $(E_0 - E_d)$ in the size of the environmental good, the consumer is willing to accept a monetary compensation of $(Y_d - Y_0)$. Alternatively, if consumers need to pay to preserve the quality of their environment, the consumer may either forsake environmental good, in which case the person moves horizontally from combination A to combination B (into the lower indifference curve U-) or the consumer may be willing to pay (WTP) an amount $(Y_0 - Y_c)$ to retain the quality of environment at E_0 in which case consumers move down vertically from point A to point C (on the same lower indifference curve U-). With well-behaved indifference curves, WTP and WTA would be approximately equal, save for the decreasing level of satisfaction in two last cases considered.

Let us now examine the case of choices of a lexicographic nature. Let us take the simplest case, beyond pure lexicographic choice. Given the assumption that the primary element of choice, until income level Y* is

achieved, is the level of income, this means that, for any income level below Y*, the combination with the highest level of income will be preferred, regardless of the size of the environmental good. The secondary element of choice, the size or quality of environmental good E, plays a role only with combinations that feature equal levels of income. By contrast, once the threshold level of income Y* is achieved, the primary element of choice becomes the size of the environmental good, while private income reverts to a secondary element of choice, which plays a role only when combinations that feature equal environmental good sizes are compared. This is tied with the "principle of satiation". Figure 4 illustrates this case.

Figure 4

Contingency value assessment with choices of a lexicographic nature: quasi-indifference curves



In figure 4, where it is illustrated the above preference framework of a lexicographic nature, there is not a single indifference curve. No two combinations carry equal satisfaction. Each point on this two-dimensional plane is ordered. The continuous lines with the arrows represent quasi-indifference lines, sometimes called behavioural curve[34]. Below the level of income Y*, these quasi-indifference lines are horizontal, implying that the consumer prefers higher private consumption to lower private consumption, regardless of how much of the environmental good is being provided (D is preferred to E). The higher the horizontal quasi-indifference curve, the happier the consumer. However, for a given level of income, say Yc the person prefers more to less environmental good (E is preferred to G). This is what the arrows represent.

When the threshold level of income Y* has been attained, the size of the environmental good becomes the primary ordering criterion. The quasi-indifference curves become vertical. The further to the right the quasi-indifference curve, the better off the consumer is (bundle C is preferred to B). But for a given amount of environmental good, say E_0, the higher the income level the higher the satisfaction of the consumer (bundle A is preferred to C), which is that the arrows on each vertical quasi-indifference curve want to indicate.

What are the implications of such a preference set for contingency valuation studies? If the consumer starts with combination A, with an income exceeding the minimum threshold and if this consumer is asked about a possible reduction in the size of the environmental good from E_0 to E_d. What will be his reply? The likely willingness to pay (WTP) of this person will be (Y_a -Y*), that is the entire discretionary income of the consumer, beyond the threshold income level. The consumer would wind up at combination C. However the consumer is not indifferent between combination C and combination B, as was presumed in the neoclassical analysis of Figure 3. In figure 4, the consumer still prefers combination C to combination B. The measured WTP thus underestimate the true value of environmental good in the consumer mind. In addition whatever is the proposed reduction in the size of the environmental good, the income that can be given up remains the same, unless the reduction is so small that it does not determine any negative consequence on the part of the consumer. On the other hand, if the consumer was to start with combination E, below the threshold level of income, WTP would be zero, or near zero, since more income is always preferred to less in this region.

What about the willingness to accept compensation (WTA)? Starting from the above threshold combination A, the WTA is undefined, or it is infinite, since no amount of money will compensate for any loss in the quality of

[34] M.A. Lutz and K. Lux (1979), op. cit.

environment. Even an infinite amount of additional income would not procure enough compensation for the loss in the size of the environmental good to keep constant the consumer's level of satisfaction. Any reduction in the environmental good causes a reduction in the satisfaction of the consumer, since the environment is the primary criterion of choice.

Choices of a lexicographic nature thus demonstrate that contingency valuation studies that solicit WTP and WTA estimate can arrive at widely different estimates. The use of one method, when the other should be more appropriate, is not a matter of indifference, and the WTP estimate does not correctly reflect the willingness to trade of the consumer.

6. Conclusion

At the end of my analysis, I can point out the necessity to give a lot of importance to consumer role in the field of environmental theory. To study its behaviour it is necessary a big realism, even if the requirement of a certain degree of abstraction cannot be neglected.

To analyse the consumer behaviour in the specific case of a public good how it is the environment, the neoclassical approach, just for its characteristics of general wide theory presenting a mathematical and rigorous analysis, can be considered insufficient.

In the case of environment problems the critics versus neoclassical theory, which have been synthesized in this article, are justified. The reason is that we are in front of a particular public good, which requests a more realistic theory. Moreover, the environment consumer choices have others motivations also, which presents ethics aspects and are founded on cultural level of consumers. Therefore the contribution of Post Keynesian economist to microeconomic level and that of heterodox studious, valued in this article, result determinant. This importance, both for the perfect correspondence with the reality and the consideration of particular consumer motivations, is truly notable.

In this article, indeed, above considerations have been examined closely with reference to various problems of environment economy.

It is possible to say that thanks the contribution of Post Keynesian economist and the others heterodox economists some conundrums identified by numerous empirical works may be explained. Especially that regarding the problem of the "contingency valuation". It is sufficient to cite the question about the difference founded between the WTP (the demand price) and the WTA (the offer price), which can be have a rational solution making reference to the lexicographic choices also. Neoclassical theory cannot explain this phenomenon.. In this article I give a clear graphic representation explaining the hypothesis on them lexicographic choices are based. Then the

aforesaid lexicographical choices can be considered realistic as regard the decisions of consumers concerning the environment.

In environmental economics another important theme is the fundamental "uncertainty" that the neoclassic theory partially faces only when it is possible to calculate the probability of verifiable events.

The ecological economists use the " precautionary principle." It is decidedly thrown back by the neoclassic researchers. But the Post-Keynesian economists permit us to find some rational foundations to such principle.

In conclusion the theoretical Post-Keynesian theory offers a way forward to make future choices on difficult public issues, as environmental problems. A proper foundation of consumer analysis can provide an appropriate agenda for the environmental regulation.

BIBLIOGRAPHY

ARESTIS P. (1992), *The Post Keynesian approach to economics*, Edward Elgar, Aldershot.

BETTMAN J.R. - LUCE M.F. - PAYNE J.W. (1998), "Constructive Consumer Choice Processes", *Journal of Consumer Research*, 25, 187-216.

BIRD J.W.N. (1982), "Neoclassical and Post-Keynesian environmental economics", *Journal of Post Keynesian Economics*, 4, 586-593.

CRIVELLI R. (1993), "Histeresis in the work of Nicholas Georgescu-Roegen", in J.C. Dragan and M.C. Demetrescu (Eds), *Entropy and Bioeconomics*, Nagard, Milan.

EDWARDS S.F. (1986), "Ethical preferences and the assessment of existence values: does the neoclassical model fit?" *Northeastern Journal of Agricultural and Resource Economics*, 15, 145-50.

EICHNER A. (1986), *Toward a new economics: essay in Post-Keynesian an institutionalist theory*, London, Macmillan, M.E. Sharpe.

GALBRAITH J.K. (1958), *The affluent society*, Hamish Hamilton, London.

GENOVESE N. – LA SPADA M.G. (2006), "Macroeconomia dell'ambiente: lo sviluppo sostenibile", in Economia, Impresa e Mercati Finanziari, 1, 43-69.

GEORGESCU-ROEGEN N. (1954), "Choice, expectations and measurability", *Quarterly Journal of Economics*, 48, 503-534.

GIGERENZER G. - GOLDSTEIN D.G. (1996), "Reasoning in the fast and frugal way: models of bounded rationality", *Psychological Review*, 4, 650-669.

GINTIS H. (2000), "Beyond homo economicus: evidence from experimental economics", *Ecological Economics*, 35, 311-322.

GOWDY J.M. - MAYUMI K. (2001), "Reformulation the foundations of consumer choice theory and environmental valuation". *Ecological Economics*, 39, 223-237.

GOWDY J.M. (1993), "Georgescu-Roegen's utility theory applied to environmental economics", in J.C. Dragan and M.C. Demetrescu (Eds), *Entropy and Bioeconomics*, Nagard, Milan.

HOLT R.P.F. (2005), "Post Keynesian economics and sustainable development", *International Journal of Environment, Workplace and Employment*, 1-13.

HOWARTH R. (2001), "Intertemporal social choice and climate stabilization", *International Journal of Environment and Pollution*, 14, 1-29.

KAHNEMAN D. - KNETSCH J.L. (1992), "Valuing public goods, the purchase of moral satisfaction", *Journal of Environmental Economics and Management*, 22, 57-70.

KEYNES J.M. (1936), *The general theory of employment, interest and money*, London Macmillan.

KNETSCH J.L. (1990), "Environmental policy implications of disparities between willingness to pay and compensation demanded measures of values", *Journal of Environmental Economics and Management*, 18, 227-237.

LANCASTER K. (1972), *Consumer demand: a new approach*, New York, Columbia University Press.

LANCASTER K. (1991), *Hierarchies in goods-characteristics analysis in modern consumer theory*. Edward Elgar, Aldershot.

LOCKWOOD M. (1996), "Non-compensatory preferences structures in non-market valuation of natural area policy", *Australian Journal of Agricultural Economics*, 40, 85-101.

LUTZ M.A. - LUX K. (1979), *The Challenge of Humanistic Economics*. Benjamin/Cummings: Menlo Park.

NELL E. J., (1992), *Demand, pricing and investment. In transformational growth and effective demand: economics after the capital critique*, Macmillan, London.

OLSHAVSKY R. W. - GRANBOIS D.H. (1979), "Consumer decision-making: fact or fiction*?" Journal of Consumer Research*, 6, 93-100.

PASINETTI L. (1981), *Structural change and economic growth*, Cambridge University Press, Cambridge.

ROBINSON J. (1956), *The accumulation of capital*, Macmillan, London.

SCHEFOLD B. (1997), Normal prices technical change and accumulation, Macmillan, London

SIMON H. (1959), "Theories of decision-making in economics and behavioural sciences", *American Economic Review*, 49, pagg.253-283.

SIMON H. (1962), "The architecture of complexity". *Proceedings of the American Philosophical Society*, 106 (6), 467-482.

SIMON H. (1976), "From substantive to procedural rationality", in S.J. Latsis (Ed.), *Method and Appraisal in Economics*, Cambridge University Press, Cambridge.

SPASH C.L. - HANLEY N. (1995), "Preferences, information and biodiversity preservation", *Ecological Economics*, 12, 191-208.

SPASH C.L. (1998), "Investigating individual motives for environmental action: lexicographic preferences, belief, attitudes", in J.Lemons, L. Westra (eds), *Ecological Sustainability and Integrity: Concepts and Approaches*. Kluwer Academic Publischers, Dordrecht, London.

STEVENS T.H. (1991), "Measuring the existence value of wildlife: what do CVM estimates really show?", *Land Economics*, 67, 390-400.

ZAMAGNI S., (1999), "Georgescu-Roegen on a consumer theory: an assessment", in K. Mayumi and J.M. Gowdy (Eds), *Bioeconomics and*

Sustainability: Essay in Honor of Nicholas Georgescu-Roegen , Edward Elgar, Cheltenham.