

THE HISTORICAL DEVELOPMENT OF HIERARCHICAL BEHAVIOR IN ECONOMIC THOUGHT

BY

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I. INTRODUCTION

One of the basic ideas underlying the established conception of rational behavior is the unlimited substitutability of preferences. Economic agents are assumed to compare and reduce everything to a common denominator: utility. The most obvious example of such preferences can be found in standard consumer theory where complete substitutability of every good is assumed in the sense that a loss of some units of one bundle can always be compensated by gain of some units of another commodity (such preferences are sometimes called Archimedean—see Borch 1968). This conception of preferences has a long history in economic thought and forms the basis of the standard rational choice theory (Hicks and Allen 1934, Samuelson 1938, Hicks 1946, Houthakker 1950).

However, a considerable number of theorists have examined the case of limited substitutability of preferences and its implications for a number of economic issues.¹ In the context of modern choice theory, such preferences have been called hierarchical, or in the more narrow case of non-substitutability, lexicographic.² Apart from the pure theory of choice, this behavior has been examined in relation to theory of the firm, social choice theory, trade union theory, theory

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¹Some of the most-well known examples are: Little (1957), Georgescu-Roegen (1954), Encarnacion (1964a, 1983), Ferguson (1965), Chipman (1971), Day and Robinson (1973), Canterbury (1979), Pasinetti (1981), Mosley (1984), Earl (1986), Eichner (1987), Brooks (1988), Falkinger (1990), Lavoie (1994), and Pfouts (2002). The hierarchical approach has also been used by the followers of the humanistic economics tradition (e.g. Lux and Lutz 1986, Lutz 1999).

²For a formal modern presentation of lexicography and the more general case of target hierarchy, see Appendix

of economic development.³ Variations of this idea have been used in other fields, the most famous examples being the philosopher J. Rawls (1971) who uses it in his “difference principle” and I. Levi’s (1986) use of “admissible options.” There are also examples of its application to other social science subjects like psychology and politics (e.g., Maslow 1954; Ardrey 1970).

As many of the above mentioned authors have demonstrated, hierarchical preferences represent a reasonable system of choice, yet many contemporary authors have overlooked its potential, quite often without apparent justification. The most obvious reason for this is that most authors concentrate on the special and more well-known case of lexicographic ordering that violates the axiom of continuity and thus has limited application in economic issues (see for instance Malinvaud 1972; Deaton and Muellbauer 1980; Gravelle and Rees 1981).⁴ The basis of the above tendency is probably Debreu’s well-known assertion that lexicographic orderings produce nonconvexities and discontinuities which are problematic for the existence of general equilibrium (Debreu 1959, pp. 72–73). In the last decades, however, hierarchical preferences have attracted considerable attention without making it yet in influential microeconomic texts (notable exceptions are Hargreaves Heap *et al.* 1992; Earl 1995; Himmelweit, Simonetti, and Trigg 2001).

The idea of hierarchical behavior is not at all new. On the contrary, a quick look at the history of economic thought reveals that this idea has been recurring in many economic writings. In its general form, this idea has been around since pre-classical economic thought. It can also be found in the writings of many well-known figures like Adam Smith, J.B. Say, W. S. Jevons, Carl Menger, Friedrich von Wieser, Alfred Marshall, and others. The purpose of this paper is to review the development of this idea in the history of economic thought and the possible reasons for its current status in the economic literature. Thus, the first section of this paper will start with the presence of hierarchical behavior in preclassical economics. The next section will concentrate on classical economists. The role of this idea in marginalist economic thought will form the third section. Finally, a concluding section will end the paper.

II. PRE-CLASSICAL PERIOD

As was mentioned in the introduction, the idea that preferences, wants, or needs might be structured in a hierarchical way is an old one and can be found in philosophical writings as old as Plato. In his *Republic* (II, 369D; see also Karayiannis 1990, p. 12) Plato writes, “But the first and the greatest of our needs is the provision of food to support existence and life . . . The second the provision of a dwelling-place, and the third of clothing, and so on.”

³For a general review see Drakopoulos (1994). For an application to the theory of economic development see Streeten (1981). Furthermore, the hierarchy idea can also be used in production theory in the sense of a sequential acquisition of capabilities or prerequisites for the production process (for an early attempt see Encarnacion 1964b). A possible example of such a production process is a university degree with prerequisite structures.

⁴One can also note here that for many neoclassical authors lexicographic choice fits better in a maximization framework. Target hierarchy can be linked more easily with satisficing.

One can note here the term “need” that Plato uses facilitates the hierarchical approach. A need implies something that it is universally necessary in contrast to the term “want”, which implies a personal preference characteristic of the individual. Since wants are a personal inclination, it is easier to think in terms of substitution, while the universal character of needs implies that there is only limited room for need substitution.⁵ On the other hand, there is some recent work that argues that personal inclination is strongly linked with personal identity and this might imply that some choices are not admissible because they are not part of the person’s self-understanding (Parsons 2000, pp. 143–44).

In contrast with Plato, Aristotle favors comparability and thus complete substitutability. Thus, according to Aristotle, “all things that are exchanged must be somehow comparable . . . [and] must therefore be measured by one thing . . . [therefore there is no] exchange if there were not equality, nor equality if there were not commensurability” (*Nicomachean Ethics*, 1133a–b). Aristotle, however, realized the difficulty of reducibility of needs. As he admits: “in truth it is impossible that things differing so much become commensurate, but with reference to demand (need, *χρεία*) they become so sufficiently” (*Nicomachean Ethics*, 1133a). The Aristotelian approach became dominant in the subsequent history of economic behavior.

Many centuries later, the idea reappears in economic thought in the work of N. Barbon, who distinguishes between the “Wants of the Body [which] are all things necessary to support life” and the “Wants of the Mind [which] are all such things that can satisfy desire and are infinite” (Barbon 1690, pp. 10–11).⁶ David Hume implicitly accepts a system of needs hierarchy by attributing certain goods to certain needs. In his discussion of the issue of revenue from taxation, he writes: “In GREAT BRITAIN, the excises upon malt and beer afford a large revenue; because the operations of malting and brewing are tedious, and are impossible to be concealed; and at the same time, these commodities are not so absolutely necessary to life, as that the raising of their price would very much affect the poorer sort” (*On Public Credit* ed. 1970, p. 97).

In the same spirit, Hume justifies a proper taxation system by supporting taxes on luxury goods in order to leave real wages intact “because such taxes are least felt by the people” (*Of Taxes* ed. 1970, p. 85). It is interesting to note that the notion of necessary or primary goods that Hume and, as we shall see, other economists use, is basic in Rawls’s idea of lexicographic rules (see Rawls 1971, p. 250 and also Appendix, p. 22).

Richard Cantillon (1755, p. 173) discusses extensively the impact of price increases of various goods on consumption. He realizes the different needs that

⁵For an extensive discussion of the conceptual difference between these two terms see Doyal and Gough (1984) and Baxter (1988). It is also worth noticing that the term “wants” is used more frequently by economists who promoted more the continuous substitution idea (e.g., Jevons). This term is also used by the founders of modern choice theory who exclude the possibility of hierarchical behavior (e.g., Hicks 1946, pp. 17–18).

⁶As one would expect in the period between, there are other examples of the presence of this idea in well-known works. One such example is Shakespeare’s Richard III, “A horse, a horse my kingdom for a horse” (see also Steinbruner 1974, p. 105). Another example is the philosopher Berkley who clearly distinguishes between pressing and not pressing wants (Berkley 1735–37, queries 58, 168).

different commodities satisfy. For instance, bread is considered to be basic good corresponding to basic need and consumed by all inhabitants, while meat is consumed by a small section of the people. The important idea here is that the consumption of meat can be reduced considerably if there was an increase in price because it does not correspond to a basic need, while the opposite holds for bread (see also Cantillon 1755, p. 75). One can argue here that Cantillon by using the concept of basic good corresponding to basic need, comes close to the idea of price and income elasticities. In fact, modern writers on hierarchical behavior have used it as a much better way of understanding the basis of income and price elasticity than the one used by the standard approach (e.g., Pasinetti 1981; Earl 1986, pp. 233–28; see also Appendix).⁷

III. CLASSICAL PERIOD

Adam Smith and the classical school represent a more systematic analysis of economic phenomena. Thus, ideas concerning individual economic behavior are more common. However, the preoccupation of the classical school with the objective theory of value did not facilitate the detailed discussion of economic behavior at the individual level. In spite of this, there is some evidence of realizing the importance of separating basic from non-basic needs and its consequences for demand theory.

In Adam Smith one can find evidence of his attention to the idea of different needs corresponding to different goods and their hierarchical structure.⁸ In his *The Wealth of Nations*, he was aware that there exist different categories of goods fulfilling different needs. He distinguished the consumption expenditure or the “immediate consumption” to be “spend upon subsistence, conveniences, and amusements” (1776, pp. 287, 289). Furthermore, the non-basic consumption is abandoned first: “When we are in want of necessaries we must part with all superfluities, of which the value, as it rises in times of opulence and prosperity, so it sinks in times of poverty and distress” (1776, p. 210). These ideas are quite close to the general hierarchical choice as shown in the Appendix.

Smith recognized that individuals first fulfill their more oppressive needs and then proceed to the consumption of the conveniences and luxuries. As he comments, “[men] are secure of enjoying the fruits of their industry, they naturally exert it to better their condition, and to acquire not only the necessaries, but the conveniences and elegancies of life” (1776, p. 405). He elaborates this idea by stating that:

⁷Cantillon’s idea of basic goods can also be connected to Sraffa’s (1960) subsequent analysis in a neo-Ricardian framework (for a detailed discussion see Earl 1983, pp. 22–27).

⁸Sir James Steuart, whose economic thought exercised a considerable influence on Adam Smith, was also aware of the idea of hierarchy. As he writes:

A man enjoys the physical necessary as to food, when he is fully fed: if he is likewise sufficiently clothed, and well defended against every thing which may hurt him, he enjoys his full physical necessary. The moment he begins to add to this, he may be considered as moving upwards into another class, to wit, that of the luxurious, or consumers of superfluity: of which there are to be found, in most countries, as many stages upward, as there are stages downwards, from where he stood before (Steuart 1767, p. 269).

as subsistence is, in the nature of things, prior to conveniency and luxury, so the industry which procures the former must necessarily be prior to that which ministers to the latter. The cultivation and improvement of the country, therefore, which affords subsistence, must, necessarily, be prior to the increase of the town, which furnishes only the means of conveniency and luxury (1776, p. 377).

Namely, not only the consumption of necessary goods is first fulfilled but also the primary sector of economy develops prior to the secondary and tertiary ones.

For Smith, this hierarchy of goods could take place when the total production is high enough to cover subsistence levels. In other words, when economic growth has been advanced to a higher stage: “The common complaint that luxury extends itself even to the lowest ranks of the people, and that the labouring poor will not now be contented with the same food, clothing, and lodging which satisfied them in former times, may convince us that it is not the money price of labour only, but its real recompense, which has augmented” (1776, p. 96). Thus, the passing from the consumption of the one category of goods to the next more luxurious one, is taking place through the increase in wealth, namely: “the demand for the precious metals, as well as for every other luxury and ornament, would naturally increase with the increase of riches” (1776, p. 199). Smith provides further support for this argument by mentioning that “Gold and silver naturally resort to a rich country, for the same reason that all sorts of luxuries and curiosities resort to it; not because they are cheaper there than in poorer countries, but because they are dearer, or because a better price is given for them” (1776, p. 234).

The issue of satiation is also relevant here. Smith believed that the consumption of necessary goods is satiated while that of luxury is non-satiated, *viz*:

The desire of food is limited in every man by the narrow capacity of the human stomach; but the desire of the conveniences and ornaments of building, dress, equipage, and household furniture, seems to have no limit or certain boundary. What is over and above satisfying the limited desire is given for the amusement of those desires which cannot be satisfied, but seem to be altogether endless (1776, p. 180).

The idea of hierarchy continued in the work of Lord Lauderdale who followed an approach quite similar to the general hierarchical model (see Appendix, p. 23). As he writes:

It is obvious, that no rise in value can induce men to renounce the acquisition of the necessaries of life, provided any sacrifices they can make will procure them; and this check will therefore operate, just in proportion to the degree of inclination which either necessity, habit or taste, had created for the commodity; that is, it will be more inconsiderable, in proportion as the inclination to obtain the usual quantity of it is less urgent (1804, p. 76; see also pp. 95–96).

The term “urgent” and its connection to necessity and habit is very close to the idea of the irreducibility of needs. Lauderdale used his idea for the hierarchy of consumption behavior in examining “the Effects of the Alteration in the Order of Expenditure occasioned by” the following circumstances: (a) “a Diminution in the Quantity of any Commodity” (1804, p. 81); (b) “an increase of Demand

for any Commodity” (1804, p. 86); (c) “an Increase in the Quantity of any Commodity” (1804, p. 93); and (e) “a Diminution of Demand for any Commodity” (1804, p. 96). Thus, by employing this idea he explained the changes in the consumption pattern of individuals produced by some drastic changes in the state of demand and supply of various goods.

During the same period, J.B. Say recognized two categories of wants. As he states, “Such as conduce to the satisfaction of positive wants; by which term I mean those, upon the satisfaction of which depends the existence, the health, and the contentment of the generality of mankind; being the very reverse of such as are generated by refined sensuality, pride and caprice” (1803, p. 397). In addition, he stressed that the demarcation criterion between necessary and luxury goods is an ever-changing one. He argued that “For my own part, I am at a loss to draw the line between superfluities and necessities” as its “line of demarcation . . . shifts with the fluctuating conditions of society” (1803, p. 4–5).

The same line of thought in this respect is followed by D. Ricardo who recognizes the concept of necessary goods and luxury goods consumed by different social classes.⁹ He argued that the main part of laborer’s remuneration is spent on “food, necessities and conveniences” (Ricardo, 1817, pp. 48, 93). He also recognized an hierarchy in the category of necessary goods asserting the consumption of corn to be of prime importance (1817, p. 243). On the other hand, he thought that “silks, velvets, furniture” as not “required by the labourer” and as “enjoyments of human life” (1817, pp. 118, 276). Furthermore, it seems that Ricardo assumed a hierarchical consumption behavior when he argued that:

The increased wages are not always immediately expended on food, but are first made to contribute to the other enjoyments of the labourer. His improved condition however induces, and enables him to marry, and then the demand for food for the support of his family naturally supersedes that of those other enjoyments on which his wages were temporarily expended” (1817, p. 163).

In other words, Ricardo believed that there is a hierarchy in consumption including target levels (see Appendix) but in the long run the level of real wage does not permit laborers to consume other than necessary goods.

In a similar manner as we observed in Cantillon, Malthus connects the idea of necessary goods corresponding to basic needs with demand elasticity: “There is a radical difference in the cause of demand for those objects which are strictly necessary to the support of human life, and a demand for all other commodities. In all other commodities the demand is exterior to, and independent of, the production itself; . . . while this demand is comparatively unlimited” (Malthus 1815, pp. 187–88).

In the same conceptual framework, Longfield followed a hierarchical approach by stating that “The most natural and most urgent of our appetites are those which can be the soonest and most certainly satisfied. Those which in their extent are the most insatiable, can be repressed or denied without any diminution

⁹Apart from Ricardo, James Mill (1821, pp. 54–55), J. McCulloch (1826, pp. 27, 34–35), and R. Torrens (1834, pp. 5, 11–12, 309) also recognize the concept of necessary goods (corresponding to basic needs) and luxury goods consumed by different social classes

to our happiness” (1834, p. 44). Similarly, Lloyd connects the categories of wants with their intensities. As he writes:

Each different kind, therefore, of human wants may like that of food, be compared to a spring; and, in the comparison, the different wants, according to their several differences, will be represented by spring of different degrees of strength. For example, the wants which food can satisfy will be represented by a spring of great power. So also those to supply which water is required. For representing the wants of clothing and fuel, which are articles not so indispensably necessary to human existence, spring of an inferior degree of power may suffice. Passing on to the artificial wants, we may represent them according to their intensities, by lesser spring of various degrees of strength (1833, p. 13).

Thus, Lloyd’s analysis is quite similar to the one advocated by Menger as is presented in his well-known table (see also 1833, p. 12 and comments on Menger in the coming pages). The idea of hierarchical consumption behavior is also used by some other late classicists. More specifically, the Scot-Canadian John Rae (1834, p. 203) explicitly states that if there was an increase of the propensity of saving, the consumer would decrease the consumption of luxury and not of basic wants. Nassau Senior classified consumption goods into necessities, decencies, and luxuries corresponding to similar wants (Senior 1836, p. 36). According to Senior, decencies are “those things which a given individual must use in order to preserve his existing rank in society” (1836, p. 36). This adds a further dimension to consumption as a socially interdependent activity, an idea that reappears in modern literature.¹⁰ Senior’s ideas concerning consumption patterns have been identified as quite close to a hierarchical system (e.g., White, 1992, pp. 71–72 and Karayannis 2001, p. 22). Similarly, the American, Samuel Newman (1835, p. 289), recognized the hierarchical classification and fulfillment of needs. J. S. Mill implicitly seems to accept a similar classification when he argues for the taxation of luxury and not of necessary goods since these kind of taxes do not reduce the welfare of the workers (Mill 1848, pp. 806–807). Furthermore as J. Vint states: “Mill imagines a hierarchy of goods and while consumption of the higher level luxuries by workers is allowed for it is only when their more basic needs are being met” (Vint 1994, p. 94; see also Mill 1848, pp. 67–68; the general hierarchical model applies here, see Appendix).

Thus, it is clear that the idea of hierarchical needs corresponding to certain goods was present in classical economic thought. In spite of the “macro-economic” viewpoint that most classical economists adopted, the role of hierarchy was identified and, in some cases, emphasized. It is also worth noticing that some classical economists like A. Smith and J.B. Say attach a dynamic aspect to this issue by arguing that economic growth enables more people to satisfy non-basic needs.

¹⁰One might make a connection of Rae’s and Senior’s views with modern consumption function theory and especially with the relative income idea. For instance, Duesenberry’s (1949) work implies that people might have some hierarchical structure when they reduce their savings in order to maintain appearances, and thus current consumption, in bad times. The implication here is that there is a hierarchical preference concerning present over future consumption (see also Mason 1989; 2002 for a review of the conspicuous consumption literature).

IV. MARGINALISM

It is well known that the marginalists placed emphasis on questions of allocation in contrast with the classical preoccupation with questions of economic growth and distribution. More importantly, there was a shift from a supply-based explanation of value and prices to a demand—based explanation. Demand theory requires a model of individual economic behavior to a much greater extent than the analysis of cost, which is the basis of supply. All the above led the members of the marginalist school to a more detailed study of concepts like wants, needs, and preferences. This in turn resulted in a more detailed discussion of consumer behavior.

There was also another methodological development of great importance, which was characteristic of early marginalism: the increasing trend towards the formalization of economics. The systematic use of mathematics started with Jevons and continued to the second generation marginalists (Schabas 1990).¹¹ This tendency influenced the conception of hierarchy in two ways. First, the trend towards a mathematical methodology demanded a well-defined economic agent with standard, predictable, and uniform behavior (see also Mirowski 1989; Drakopoulos 1997b).¹² Second, a single dimension, comparable and reducible concept of utility facilitated the application of formalist methodology. Thus, the more complicated structure of hierarchical approach was perceived not to be as easily adaptable to formalism as the standard approach.

Jevons was one of the first theorists who explicitly proposed the idea of the reducibility of all wants. Jevons was much influenced by J. Bentham who argued for the reducibility of all pleasures so as to get their arithmetic sum (Bentham 1823, p. 30). In a very indicative statement Jevons writes: “The algebraic sum of a series of pleasures and pains together . . . Our object will always be to maximize the resulting sum in the direction of pleasure” (1871, p. 38). In spite of this, he realized the more complicated nature of this important issue. First of all, Jevons’s theories of value and wages were influenced by the work of R. Jennings. Jennings argued that consumers fulfill their pressing wants first by consuming “primary commodities” and then use the rest of their income for the consumption of “secondary commodities” or luxury goods (1855, pp. 94–96). Furthermore, Jevons quotes his other major source of inspiration, T. C. Banfield (see also Marshall 1890, pp. 76–77n), who argued:

The first proposition of the theory of consumption is, that the satisfaction of every lower want in the scale creates a desire of a higher character. If the higher desire existed previous to the satisfaction of the primary want, it becomes more intense when the latter is removed. The removal of a primary want commonly awakens the sense of more than one secondary privation: thus a full supply of ordinary food not only excites the delicacy in eating, but awakens attention to clothing . . . Thus the demand for, and the consumption of, objects of refined enjoyment has its lever in the facility with which the primary wants are satisfied. This, therefore, is the key to the true theory of value (Banfield 1845, pp. 11–21).

¹¹Some historians of economic thought attribute such importance to Jevons’s formalism that they call it the “Jevonian Revolution” of mathematical economics (e.g., Schabas 1990, p. 137).

¹²One can also argue that this “narrowing” of economics taking place during the marginalist period was reinforced by prevailing views concerning differences among human races. For a detailed discussion, see Peart and Levy (2003).

Jevons agrees with the above statement, noticing that “the satisfaction of a lower want . . . merely permits the higher want to manifest itself” (Jevons 1871, p. 54).¹³ The threshold effects, as described in the Appendix, are clear here. Furthermore, as Georgescu-Roegen notes “[this] is a more fortunate way of describing the *Principle of the Subordination of Wants*” (1966, p. 195). In another example, Jevons quotes the early utilitarian philosopher W. Paley who writes that “all pleasures and pains are of one kind only.” Jevons, however, does not agree with Paley: “It seems hardly possible to admit Paley’s statement, except with an interpretation that would probably reverse his intended meaning. Motives and feelings are certainly of the same kind to the extent that we are able to weigh them against each other; but they are nevertheless, almost incomparable in power and authority” (Jevons 1871, p. 26).

There seems to be a clear inconsistency in Jevons’s views, and, as Georgescu-Roegen (1966, p. 196) points out, “it is difficult to explain it.” However, one possible explanation is that Jevons thought that economics should adopt comparability of feelings and not the “hierarchy of feelings,” as an assumption. According to Jevons, (1871, p. 27) a “higher” subject might be more appropriate in dealing with this.

The concept of the human need is fundamental in Menger’s work since it constitutes the cornerstone of his definition of economic good and consequently of the theory of value. According to Menger (1871, p. 52) a thing acquires its goods-character only with reference to a human need. His well-known classification of goods into orders depends on their directness in satisfying human needs. Furthermore, the differences in the magnitude of value of goods depend on the degree of importance of satisfactions. As Menger states: “it is above all a fact of the most common experience that the satisfactions of greatest importance to men are usually those on which the maintenance of life depends, and that the other satisfactions are graduated in magnitude of importance according to the degree (duration and intensity) of pleasure dependent upon them” (1871, pp. 122–23).

He clearly implies here that needs cannot be reduced and that they have a hierarchical structure. In Menger’s hierarchy of needs, the satisfactions, which correspond to the maintenance of life, are more important, *viz*: “Thus if economizing men must choose between a satisfaction of a need on which the maintenance of their lives depends and another on which merely a greater or less degree of well-being is dependent, they will usually prefer the former” (1871, p. 123).

Menger (1871, p. 123) proceeds by classifying the categories of needs. Food, clothing, and shelter are considered to be basic needs while transport and entertainment are secondary. Menger’s hierarchical model is so essential for his consumer theory that it was taken up by his disciples.¹⁴ For instance, in his early work von Wiser (1889, p. 7) followed Menger’s approach of the hierarchy of

¹³Collison Black (1987, p. 182) also points out Jevons’s approval of the relevant statement.

¹⁴The contrast of Menger’s approach with the standard marginalist analysis has been identified by other commentators such as Hutchison (1953, p. 141), Georgescu-Roegen (1954), White (1990, pp. 354–55), Alter (1991, pp. 100–103), and Drakopoulos (1997a). Furthermore, for an extensive analysis of Menger’s ideas concerning the structure, growth, and fulfillment of various needs, see Endres (1997, pp. 24–40).

goods and services. Furthermore, his theory of imputation contains a hierarchical model of the means and services of production (1871, p. 190).

The same problem as in the case of Jevons exists with Pareto. Although he follows the standard utility theory, and even simplifies it by not attaching any meaning to the concept of utility, Pareto seems to be aware of the hierarchical case. For instance, he writes about the hierarchy of goods in his discussion of tastes:

These phenomena reveal a certain hierarchy of goods. If, for example, the goods A, B, C . . . are capable of satisfying a certain need, an individual will make use of good A because he cannot obtain others, which are too expensive. If his affluence increases, he will use A and B at the same time; if it increases still further, he will use only B; then B and C, then only C and D etc" (1908, p. 186).

Pareto proceeds to represent the hierarchical structure of goods by a Hasse-type diagram in which the individual moves up the goods hierarchy as income increases (1908, pp. 206–207). Furthermore, he comes even closer to the idea of a hierarchical model (more specifically lexicographic model, see Appendix) in his example of a choice between bread and ostrich feathers (see Chipman 1971, p. 285).

Marshall is considered to be the founder of the neoclassical viewpoint. Yet there are many indications that he had realized the importance of the concept of irreducibility of wants and their hierarchical structure. As he states, "This brings us to consider the terms Necessaries. It is common to distinguish necessities, comforts, and luxuries; the first class including all things required to meet wants which *must* be satisfied, while the latter consist of things that meet wants of a less urgent character" (1890, p. 56). Furthermore, Marshall proceeded to argue that the term necessities is relative to a given place and time (1890, p. 57). The implication here is that Marshall (in the same way as Smith and Say) attaches a dynamic dimension to the concept of wants: economic growth might alter the meaning of basic and non-basic wants. Furthermore, Marshall's idea of progress consisted of people developing new and better wants (see also Birch 1985). In his discussion of the concept of the elasticity of demand, Marshall distinguishes different wants with varying urgency: "Water for instance is needed first as food, then for cooking, then for washing of various kinds and so on" (Marshall 1890, p. 91). Marshall's idea here is close to the hierarchical model shown in the Appendix, p. 23, where one good can satisfy more than one need. This is reinforced by his observation of the existence of "absolute necessities." As he comments: "On the other hand, demand is, generally speaking, very inelastic firstly, for absolute necessities (as distinguished from conventional necessities and necessities for efficiency)" (1890, p. 91).

Marshall's view concerning the hierarchical structure of wants has been identified by a number of authors. For instance, Georgescu-Roegen (1966, pp. 194, 196), openly recognizes Marshall's belief in the principle of the "Irreducibility of Wants" and that human needs and wants are hierarchized. Whitaker (1977, p. 183) has suggested that Marshall describes a lexicographic preference system in his *Principles of Economics*. In the same spirit, Endres (1991, p. 336) states that "Marshall definitely had something like a structured needs hierarchy in

mind but he did not pursue the matter formally. At a very high level of abstraction Marshall subscribed to the principle of the irreducibility of wants, that is, to a common, commensurable basis such as utility by either the economist or economic agents." Also Marshall frequently suggested that individuals can misjudge the order of their wants (1890, p. 337).¹⁵

Thus, one can see that even the protagonists of the marginalist thinking had discussed the possibility of hierarchical behavior. However, this approach did not gain momentum. One possible reason for this was that the formalization process of economics that took place during this period did not facilitate the adoption of hierarchy, given its complicated nature. It is indicative that Menger, who was the least mathematical of the marginalists, discusses at great length, and puts much more emphasis on, hierarchical behavior. Furthermore, this point is reinforced by the subsequent transition to the modern theory of choice in the first decades of the twentieth century. More specifically, one of the basic assumptions of John Hicks's theory of choice is the non-existence of kinks in the preference map, which essentially excludes the possibility of hierarchy (continuous marginal rate of substitution). Hicks justifies this assumption by appealing to simplicity: "This is the simplest assumption possible, it is a good assumption to start with" (Hicks 1946, p. 24). Furthermore, Hicks uses of the term "want," which is thought to facilitate complete substitution. This was one of the main reasons that hierarchy was largely ignored by subsequent formulations of the standard theory of individual behavior. Although the vast majority of texts present the marginalists as having laid the foundations of modern choice theory, they fail to mention that clear indications of an alternative model of choice can also be found among the leading marginalist economists.

V. CONCLUSIONS

As we saw, the idea of hierarchical behavior can be found in the writings of important figures in the history of economic thought. However, it has to be noted that because of the long time period under examination, we followed a broad definition of hierarchical behavior. The same comment holds true for the number of terms (i.e., needs, wants, preferences) used by various authors referring to substitution (see note 3). This is usually the case in studies of conceptual development spanning a considerable number of years. The idea in its general form, has had a long presence in economic thought. It gradually took a more definite shape with the appearance of the marginalist economists. More specifically, it was seen that economists such as Smith, Say, Jevons, Menger, and Marshall, among others, were aware of the distinction between basic and non-basic needs and the importance of this distinction for demand theory. It was also seen that many of them proceeded to sketch the outlines of a system of choice based on this idea. It seems, though, that the difficulties in incorporating hierarchy into the new formalistic methodology of the marginalists were an obstacle for its wider acceptance. This continued in the transition to the modern

¹⁵One can link Marshall's comment with the everyday expression that "you need to get your priorities right."

theory of choice. However, this has not been recognized by most history of economic thought texts, which argue that hierarchical behavior is an alternative choice system which was developed relatively recently as a theoretical offshoot of the standard theory of choice.¹⁶

As far as the more recent formulation of hierarchical choice is concerned, one can offer a number of reasons for its current status. The first possible reason might be the formalistic difficulties of hierarchical choice. The mathematical formulation of hierarchical choice implies utility functions that have different properties than the utility functions that arise from the standard model (in the extreme case of lexicographic choice, utility functions might not exist). This can be linked with Debreu's reservations concerning the incompatibility of hierarchical choice with general equilibrium. A second reason can be found in the perceived pedagogic advantages of the reducibility and comparability of all needs into one common denominator: utility. This can be linked with recent work on economics and language, where it is shown how ordinary language descriptions might place constraints on the representation of preferences (see, for instance, Rubinstein 2000, chapter 4). Another reason might relate to the idea that the pattern of hierarchical needs varies across individuals and this gives less generality to the idea of hierarchy. As has been suggested (see Georgescu-Roegen 1966, pp. 197–98), this might be true after the basic needs—identical for all people—have been satisfied.

However, in the last few decades, an increasing number of authors have realized the significance of hierarchical formulation and have applied it to a number of economic problems. Furthermore, over the last two decades, the idea of hierarchy has been gaining acceptance among behavioral economists and consumer research specialists, especially in topics dealing with complex, multi-dimensional products (see, for instance, Bettman 1979; Earl 1986, 1995). This can be linked with the early writings on hierarchical preferences in the goods characteristics space. Lancaster's (1966) "new theory of consumer behaviour" and Ironmonger's (1972) "new commodities" can be seen in this perspective. All these points call for a more careful tracing of the idea in the history of economic thought. And as this paper indicates, the historical presence of hierarchical behavior (in the broad sense) is quite long and it occupies an important place in the economic thinking of many influential economists. By showing this, the present work might assist in the further rediscovery of the hierarchical behavior and its usefulness for economic analysis.

APPENDIX

As was mentioned, modern standard theory of choice implies that all preferences can be substituted or that preferences are Archimedean (Borch 1968). This means that if there are two bundles of goods x and x' and that

$$(x_1, x_2) > (x_1', x_2')$$

(where $>$ means "preferred to")

¹⁶Of the twenty-four leading texts that we surveyed, only J. Vint (1994) and C. Staley (1989) recognize the element of hierarchy in J. S. Mill and Menger, respectively.

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