Nature, Nurture or Chance?
The Debate on the Status of Pareto's Law

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Introduction

In the Inaugural Address to the Royal Statistical Society in 1960, M.G. Kendall wrote that Pareto's law of the distribution of incomes was "the first notable law" in the economic and social field "to be written down mathematiccally and checked against observation"[2]. Numerous authors before Pareto had suggested the existence of universal laws in human society analogous to those of nature: nonetheless no one before him had managed to propose a rigorous mathematical formulation supported at the same time by a vast empirical-statistical support. Pareto's law therefore holds a place in the history of the social sciences as one of the most representative of the idea that society, like nature, is governed by universal laws.

As is known, on the political and social plane, Pareto's law has fed unending controversy, inherent precisely to the problem of its "universality". On this front there have always been heated arguments for and against Pareto. Diversely, from the strictly statistical point of view, there has been major consensus on the idea that "Pareto's law" represented a decisive step in the study of the personal distribution of income and wealth, perhaps even the first contribution in applied econometrics. His "law of income" is not certainly as universal as he thought; however it has been shown to be a heuristic instrument of undoubted cognitive potential, which is furthermore efficient and still valid for describing the upper tail of the distribution of wealth.

The problem of the status of Pareto's law is nonetheless still uncertain, not only from the strictly historical point of view, but also from an epistemological standpoint: is it an "empirical" formula, a "statistical" law, a "social-institutional" law or a "natural" law? Those who have interpreted it have given highly contrasting responses to this question; even Pareto himself showed a certain ambiguity, assuming positions that were partly contradictory. As we will argue here, however, in the author of the *Cours* the

idea that his "law of incomes" has sufficient universality to legitimize its interpretation as a natural law prevails.

Perhaps the most paradoxical aspect is instead the absence of any interpretation in a strictly "economic" sense for Pareto's law. The invariability in time and space of the forms of social hierarchy – and of the consequent unequal distribution of wealth – is justified by Pareto basing his theory only in part upon arguments of an economic nature. The terrain chosen by the author of the *Cours* to explain the universal nature of his law of distribution is that of anthropology. Taking from that science the anthropological concept of social heterogeneity he poses it as the foundation of his own theory of distribution. This allows him to set aside, on one hand, albeit with some hesitation, explanations of a socio-institutional nature for inequality and, on the other, explanations which lead to attributing the distribution of income and wealth to probabilistic events of a casual nature.

The three terms chosen for the title of this present work mirror the three potential causes that Pareto considers may explain his law: "nature", or rather the ineluctable anthropological diversity of individuals in terms of capacity and aptitude; "nurture", or the influence exercised by environment, institutions and in general by social and political organisation; and, finally, "chance", that is the action of random events of a stochastic nature (random occurrences). Having named these three possible causes, Pareto openly favours the first. Despite the caution with which he invited the reader to examine the statistic regularities, he in fact went so far as to attribute to his own law the status of a "natural" law.

In this paper we will discuss the problem of the status of Pareto's law analysing both Pareto's thought and some moments of the intense debate that followed. As is known, Pareto's law has generated vast literature, both on the theoretical and historical planes, which will however only partially be examined here. In this paper we will concentrate our attention only on the initial, prevalently Italian, phases of the debate on the status of Pareto's law.

The paper is organised as follows. After a presentation of the Pareto's law, in which its genesis as an "empirical" or "statistical" law will be shown, in the second section the two interpretations most discussed towards the end of the nineteenth century and the beginning of the twentieth will be dealt with: the "naturalistic" reading, as held by Pareto himself, and the "socio-institutional", advanced, amongst others, by Rodolfo Benini and Costantino Bresciani Turroni, and taken up later also by Arthur C. Pigou. The stochastic reading of Pareto's law will instead be dealt with in the final part of the paper, discussing some of the most recent developments in the theories of the personal distribution of income: we intend in particular to show how the theories which have most explicitly set themselves the objective of explaining Pareto's law have come to reverse the priority of the causes suggested by the Lausanne economist, placing the casual nature of the distribution process in the primary position. The most singular aspect of the debate on the status of Pareto's law is therefore precisely

how the stochastic dimension, expressly set aside by the author of the *Cours*, has in the end been revealed as the most efficacious mode of explaining the Paretian type of distributions.

The empirical foundations of Pareto's law

Are there universal "laws" that govern the distribution of honours and privileges in human society? And what is the specificity, in the field of modern market economies, of the distribution of honours and privileges when these take on the aspect of income and wealth? The celebrated income "curve" elaborated by Vilfredo Pareto at the end of the Nineteenth century is without doubt one of the most potent instruments ever proposed in the history of social sciences in the attempt to answer these questions.

Through the work of J.S. Mill the classical tradition had left the inheritance of a compromise solution: only in the area of "production" do "universal" economic laws exist, diversely from the "distribution" front, where instead the historical, political and institutional conditionning appears decisive. Some neoclassical economists also make reference to this compromise, as, for example, L. Walras. The Lausanne economist shared in fact with Mill the idea that among the tasks of the economy was that of judging the distribution results sanctioned by the market "ethically", arriving at expressly legitimizing the demand for major equity in the distribution of wealth.

In succeeding to Walras in the chair at Lausanne, Pareto immediately manifested his intention to proceed in a totally different direction from his predecessor. He held that it was necessary to leave every consideration of an ethical character out of the analysis of the distribution phenomenon, judging any concept of "justice" (and in particular that posed by Walras as the base of his "social" economics) to be lacking in scientific foundation. In Pareto's view, the problem of distribution had to be dealt with differentiating the areas of "facts" and "values" in a net fashion. Thus his choice of dealing with the problem of distribution through a rigorously empirical-statistical approach[3], keeping scrupulously to the factual data and never descending to compromises with "evaluative" criteria.

The statistical data which he had begun to collect from 1893, coinciding with his arrival in Lausanne[4], became therefore the starting point for his investigation. He began to carry out statistic interpolations on this data, verifying the possibility of deducing empirical formula that would reveal

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3.– The "empirical/inductive" approach further contributed to invalidate one of the most consolidated prejudices against "statistics", considered for the whole of the nineteenth century by the "pure" economists as an ancillary discipline to political economy, or at least as sterile from a theoretical point of view. It must be remembered in fact that during the XIXth century theoretical economists had always maintained a certain reserve towards statistics, considering it as knowledge which was excessively unbalanced towards facts and above all a dangerous precursor to "state interventionism" (famous in this context are the positions taken by Say or Ferrara).

4.– As far as concerns France, Britain, Belgium and some German states (Prussia and Saxony), Pareto uses the statistical series from the first official reports on the declarations of income. In other cases – in particular the data which concerns some cities and countries of the past – the incomes are instead deduced from publications of a historical nature.

the presence of eventual uniformity in the area of distribution of income. As is known, in 1895 he expounded for the first time the celebrated "law which describes how citizens' incomes are distributed", using a symbolism partially different from that used in later works[5].

The most important aspect is the emphasis initially placed by Pareto on the concept of "empirical law". The "law of income" is held in fact to be a first step in filling in one of the major lacunae in economic theory, that is the lack of "empirical laws" that sustain the "formulas of pure economics". Although a simple statistical induction, the law of incomes presents nonetheless some singular characteristics. Above all the fact "that such a simple formula" offers a good approximation of the effective data. But it is "even more singular", Pareto adds, that "interpolating the data" from very dissimilar countries we find analogous slopes to the graphs, that is with "very similar value for h". These results therefore lead Pareto to advance the hypothesis that the phenolmenon of the distribution of wealth is regulated by a sort of "general law"[6].

In a successive publication in 1896, when Pareto expounded the "law of incomes" in a more organic fashion, this singularity is further underlined. Displaying the values of the incomes and the number of individuals who possess at least every given income on a graph with a double logarithmic scale[7], Pareto confirms the constancy of the slope of the curve[8]. The idea merely foreshadowed in 1895, became thus more decided. That which in the beginning was a simple statistical regularity, began in Pareto's eyes to be a real and proper "natural law". As G.S. Sahota observes, Pareto "was so impressed by the results, obtained from income tax data, that he thought he had discovered a natural law for the stability of the inequalities of income"[9]. He writes in fact that from the statistical data "the presence of a natural law which reveals to us the tendency of incomes to group themselves in a certain manner" emerges. These results – Pareto points out –

5.– In 1895 Pareto proposes the formula $y = \dfrac{H}{x^h}$, where x represents the income and y the number of families having income comprised between x e dx, while H and h represent constants to find through interpolation. The values of h indicated by Pareto – which oscillate around 2,5 – differ from those proposed in the successive works, when the symbol h will be substituted by , in that the incomes equation will no longer be formulated in terms of number of taxpayers comprised between x e dx but as number of taxpayers having *at least* a given income x.

6.– V. Pareto, «La legge della domanda», p. 279.

7.– As is known, Pareto's equation takes the form $LogN = LogA - \alpha Logx$, from which $N = \dfrac{A}{x^\alpha}$ (where x represents a certain income and N the number of taxpayers with an income equal to or superior to x, while A and   are the variables to be found through interpolation).

8.– Taking further data into consideration, Pareto in fact observes, "not only do we again find that these points tend to arrange themselves along a straight line, but we also note that the straight lines thus drawn form angles which are substantially the same with the axis of the abscissa" (V. Pareto, *La courbe de la répartition de la richesse*, p. 233).

9.– G.S. Sahota «Theories of Personal Income Distribution», p. 3.

"are quite remarkable", and "it's absolutely impossible they can be ascribed to chance"[10].

Pareto worked at first on an exclusively empirical plane: his "income curve" was in fact the result of a statistic interpolation of the limited data available at the time regarding the taxpayers in some European countries. The apparently analogous form of such a curve for the different countries taken into consideration induced him to go well beyond the simple empirical plane: on more than one occasion he advanced the hypothesis that there is a "universal" law underlying the distribution of incomes, proven by the identical inclination of the curve in the different cases considered. A conviction further reinforced by the discovery of data concerning countries out with Europe, in this instance Peru, which would seem to confirm the universality of the law of incomes. Writing to a friend Maffeo Pantaleoni, Pareto proudly emphasises the point:

> "I have found a document from which it may be seen that in Peru, at the time of the Spanish domination, incomes were disposed according to a curve similar to those that I found for the civilised peoples of our own times. Thus confirming that *that* curve is the expression of a natural law[11]."

Pareto manifested also a certain caution regarding the validity of the laws taken exclusively from statistic induction. However his words are explicit: the distribution of incomes is subject to a "general" law that he does not hesitate to define as "natural". The problem for Pareto at this point is how to explain why distribution is reproduced in human societies in this universal form, a task made moreover necessary by the first objections that began to be raised against his "law".

Pareto's law as a "law of nature": the anthropological foundations

One of the first criticisms which deals with the problem of the scientific status of "Pareto's law" is that made by Edgeworth. The English economist commences by highlighting the fundamental "political" corollary which springs from Pareto's law: if the form of distribution is analogous in all societies, there is little chance that it can be modified by social and economic reforms of any nature[12]. Edgeworth does not dwell upon this aspect, as he shares in substance the idea that the hierarchy of income and wealth is a universal fact, not easily modifiable. He discourses at length instead on the statistical aspects, and in particular on the problem of the efficacy of the formula suggested by Pareto for describing the distribution phenomena. He believes that the curve identified by the Italian economist cannot be generalised – despite its high level of conformity to the data – at least until its rational and theoretical foundations are made specific.

10.– V. Pareto, *La courbe de la répartition de la richesse*, p. 233-236.

11.– Pareto to Pantaleoni, 14 July 1896, *in* V. Pareto, *Lettere a Maffeo Pantaleoni. 1890-1925*, p. 460-461.

12.– "The approximate identity of the law as ascertained for different countries, point to the dependence of the distribution of income upon constant causes not to be easily set aside by hasty reformers" (F.Y. Edgeworth, «Supplementary Notes on Statistics», p. 533).

It appears to me [...] that a close fit of a curve to given statistics is not, per se and apart from à priori reasons, a proof that the curve in question is the form proper to the matter in hand (F.Y. Edgeworth, «Supplementary Notes on Statistics», p. 533).

Edgeworth objects moreover that the Paretian formula is ineffective for describing the lower tail of incomes, in truth ignoring the caution, so often repeated by Pareto, that his law had value only over a certain level of minimum income. In substance, Edgeworth reproves the Italian economist for not having used one of the formulas generally used for representing normal distributions, observing that authoritative statisticcians, as for example Karl Pearson, had underlined how the probabilistic distribution of errors was revealing itself to be universal not only in nature but also in society.

 Edgeworth's criticism obliged Pareto to intervene to clarify his own ideas on the status of his "law of incomes". He immediately declared that he had never confused "the empirical laws with the rational laws". The problem arises from the fact that a multiplicity of causes, some of which are still unknown, act on the distribution of incomes and wealth. This makes it impossible to identify a "rational" law which contemplates all of these infinite causes. "It would be best to know a more precise law, but finally knowing that approximate law is always better than knowing nothing"[13]. Natural laws too, Pareto points out, are not "known to us in all their details". Nonetheless, in the natural world, there are numerous empirical regularities which can be deduced from certain simplifying hypotheses: in such a case we are in the presence of empirical laws that are at the same time rational laws. The elliptical movement of the planets observed empirically, for example, can be deduced from some axioms regarding the gravitation of the heavenly bodies. In the same fashion, if we assume that individuals are socially heterogenic, the law of incomes observed empirically becomes a "rational" and "natural" law. Pareto proposes in this context an efficacious synoptic comparison between the laws which govern the movement of the stars and the laws of the distribution of incomes.

The law of the distribution of wealth is in substance compared to the universal law of gravitation, suggesting the idea that the sharing out of wealth is governed by a law equivalent to that which governs the "natural" movement of the stars. The key point, the element which holds up the entire analogy proposed by Pareto, is the existence of a hypothesis which can be compared to the Newtonian one of universal gravitation. In the opinion of the Lausanne economist such a hypothesis, or axiom, lies in the anthropological concept of "social heterogeneity". It is necessary to begin with the concept of "social heterogeneity", held to be a postulate analogous to that of universal gravitation, therefore, in order to understand the motives that lead Pareto to attribute the status of "natural" law to his own law of incomes.

13.– V. Pareto, « La curva delle entrate e le osservazioni del prof. Edgeworth », p. 253.

Movement of the stars	Distribution of income
The curve traveled by the planets is very complicated. Even today it is only known approximately.	The income curve is very complicated.
Kepler empirically found a curve which is not at all that traveled by the planets, but which is very close, in certain cases.	For incomes, we find, within certain limits, a very approximate curve.
Newton made some hypotheses regarding attraction from which Kepler's laws follow rationally, from further hypotheses.	Some hypotheses can be made regarding social heterogeneity from which the formula found empirically for the incomes follows rationally.
Subsequent astronomers' studies have shown that the law of universal gravity sufficed to calculate the real curves traveled by the planets. These curves are not ellipses.	Subsequent studies will tell us whether that doctrine of social heterogeneity will suffice to explain all the phenomena, or else, as is more probable, indeed almost certain, if other causes should be taken into account[14].

The aspect worth noting is above all the shift made by Pareto from the economic plane to the anthropological one. In the *Cours* the presentation of the "law of incomes" does not appear in fact in the chapters dedicated to the general economic equilibrium but within the sphere of the so-called "social physiology", as the title of the last chapter of the *Cours*. The "naturalism" of Pareto springs from this terrain; from the fact that he rejects – or at least re-evaluates to a significant degree – the socio-institutional factors, choosing instead to focus on the "anthropological" characteristics of human nature. In the *Cours*, he recognises three potential "causes" that could explain the uniformity identified in the distribution of wealth: 1) "chance" 2) social organisation; 3) the nature of man. Pareto underlines, a propos, that the choice between these causes must be evaluated on the sole basis of the empirical data, excluding the possibility of an "a priori" choice. He observes in fact that

It is observation that must inform us in regard to the part that such causes effectively play in the sharing out of wealth. If we find that the sharing out of wealth varies in a considerable measure and an irregular fashion then we will conclude that "chance" plays a considerable part in the production of this phenomenon. If the variations in the sharing out of wealth follow the variations of the economic organisation, it is to this organisation that we should attribute a preponderant role. If, finally, the sharing out of wealth varies little by region, epoch or diverse organisations, then, without wishing to overlook the other causes, we must conclude that we should look for the principal cause that determines the phenomenon in the nature of man (V. Pareto, *Cours d'économie politique*, II, p. 334).

14.– V. Pareto, *op. cit.*, p. 253.

Pareto emphasises that the empirical data reveal a substantial uniformity of the distribution in different countries and epochs[15]. This is the motive for which the first two causes are set aside in favour of the last, which is presented in every respect as the central nucleus of the Paretian theory of social hierarchies.

As has already been said, Pareto's argument develops around the concept of "social heterogeneity". The sources Pareto draws on in proposing such a concept are expressly declared: in particular he is dealing with the works of Otto Ammon and of Georges Vacher de Lapouge, leading exponents of the so-called school of "anthroposociology", an end of the nineteenth century version of social Darwinism with an explicit racial and eugenic orientation. Pareto will never come to explicitly take up "racial" and "eugenic" positions; however his social anthropology results as being strongly indebted to the concepts formulated by the founders of the discipline[16].

The idea of "social heterogeneity" constitutes one of the pillars of the Paretian conception of the social hierarchies. It is used in opposetion to the "Enlightenment" idea of equality, which Pareto reproves for having rooted "prejudices" that have lead to "a miscomprehension of the heterogeneity among the individuals of a same society"[17]. Human society, in fact, instead of being homogeneous, "is made up of elements which differ more or less, not only according to the very obvious characteristics such as sex, age, physical strength, health, etc., but also according to less observable, but not less important, characteristics such as intellectual qualities, morals, diligence, courage, etc."[18].

For "social heterogeneity" Pareto intends in substance the fact that the "qualities", the "capacities" and the "aptitudes" of people, or, more generally, the "psychological and physiological qualities" of the individuals, are distributed in such a way as some "possess them [….] in a more eminent measure than others". From this derives the hierarchy of incomes and wealth, typical of all human societies, which is not due to institutional causes such as "the education received" or the family's "social condition"[19]. The form of the distribution of incomes and of the wealth of a market economy was substantially nothing less than a subset of a more general law regarding the distribution of abilities.

15.– Pareto adds in 1897 "that there is no other statistical law which is backed by so numerous and such similar facts as the law of income distribution" (V. Pareto, «Aggiunta allo studio sulla curva delle entrate», p. 269).

16.– Pareto expressly declares that "the doctrine of social heterogeneity" is in large part drawn from the writings of "Ammon, Lapouge and other anthropologists" (V. Pareto, *op. cit.*, p. 253).

17.– V. Pareto, *Cours d'économie politique*, p. 390. See also *Manuale di economia politica*, p. 90 : "The assertion that men are objectively equal is so absurd that it does not even merit being refuted. On the other hand, the subjective idea of equality of men is a fact of great importance, and one which operates powerfully to determine the change which society undergoes". On the concept of social heterogeneity in Pareto, see J.J. Spengler, «Pareto on Population», p. 116-122.

18.– V. Pareto, *Manuale di economia politica*, p. 90.

19.– V. Pareto, *Cours d'économie politique*, II, p. 390.

Pareto however distanced himself from the radical interpretation in the racist sense of the theory of social heterogeneity given by Ammon and Lapouge. The author of the *Cours* believed in fact that the factual data on which the doctrine of the hierarchy of races was constructed was still insufficient[20]. Instead he underlined how the merit of the two authors lay in having challenged "egalitarian" prejudice and in having once more brought the irreducible diversity of individuals to the center of attention.

Pareto's social anthropology rests in substance on the fact that there are "innate" differences among individuals from which there cannot but derive the unequal distribution of wealth described by the income curve. It is in this sense that the attribution of the status of "natural law" to Pareto's law is to be understood. Social heterogeneity is the primordial law of the human species and to those inequality of human beings *per se* correspond economic and social inequalities, which we observe among all peoples, from the most ancient times to the present, everywhere in the word, and such that this characteristic is always present. Human society my be defined as a hierarchical collectivity (V. Pareto, *Manuale di économia politica*, p. 281).

Conceived as a simple "empirical formula", Pareto's income equation is thus transformed, first into a "statistical law" and then into a "natural law". Pareto's anthropological concepts are decisive in this passage since they permitted him to put flesh on the skeleton structure he found through statistic induction.

The role of "nurture" in the distribution of wealth

As we have seen, availing himself of the theories of "social heterogeneity" and of "social selection" – taken from the works of the two founders of social anthropology, Otto Ammon and Georges Vacher de Lapouge – Pareto argued that the social hierarchy described by the income curve did not reproduce anything other than the differences in origin of human beings. The social and economic stratification illustrated by the statistic was the reflection of the different "genetic" endowment of the individual in regard to intelligence and ability. Aware of the distinction formulated by Galton in the second half of the nineteenth century between "nature" and "nurture"[21], Pareto did not hesitate to sustain the supremacy of the first over the second, that is of "innate qualities" over the role played by formal education and by the type of economic set up[22]. From this spring the strongest implications from the political point of view: no social change would radically upset the form of the economic hierarchies, in that these

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20.– "Saying that there are in society men who possess certain qualities in a more eminent measure than others and saying that there is a class of men absolutely *better* than the rest of the population is already not the same thing" (V. Pareto, *Cours d'économie politique*, p. 392).

21.– "Nature is all that a man brings with himself into the world; nurture is every influence from without that affects him after his birth" (cit. *in* J.A. Field, «The Progress of Eugenics, p. 14).

22.– As far as concerns the idea that it is the institutional mechanisms that regulate the mode of sharing out income, this is excluded by Pareto in that it is contradicted by the circumstance that the same curve is present in the most diverse social organisations, however distant these are in time and space (V. Pareto, *Cours d'économie politique*, p. 344).

were the product of a natural law and would therefore tend to be repro-
duced even in a society organised diversely from the capitalist model.
Pareto in fact emphasises that

   The inequality in the sharing out of income seems therefore to depend
much more on the nature of man itself than on the economic organisation
of society. It may well be that profound modifications made in this organi-
sation have but little influence in the sense of modifying the law of the
sharing out of incomes (V. Pareto, *Cours d'économie politique*, p. 404).

   Mills' idea that distribution is a phenomenon acted on by conditioning
which is primarily historical, political and institutional is therefore largely
redimensioned by Pareto. At the beginning of the twentieth century, some
of those who interpreted Pareto's law considered that it was instead ne-
cessary to re-evaluate precisely this socio-institutional component. This was
the direction taken princepally by some Italian economists and statisticians,
including Rodolfo Benini and Costantino Bresciani Turroni, whose position
would later be shared by Arthur C. Pigou. These authors attribute an indis-
putable heuristic value to Pareto's law: yet they do not consider the natu-
ralistic explanation offered by Pareto as sufficient, even more so given that
it was contradicted by the lack of correspondence between the form of the
income curve and that of ability.

   This is one of the most controversial aspects of Pareto's law historically
speaking: In maintaining his thesis that the distribution of incomes repro-
duces the distribution of ability, the author of the *Cours* found himself
facing an unexpected difficulty: if the distribution of income depended on
the ability of the individual, it should have had a "normal" symmetrical
form around the mean, such being the distribution of capabilities.

   Among the first to underline this discordance was Rodolfo Benini. In
1901 the Italian demographer and statistician pointed out how the socio-
economic position of individuals as measured by income did not always
correspond to their "aptitudes" or "capacities". If this had been true, then
the curve of wealth and income ought to have been distributed normally.
"The reason for the divergence", Benini explained, was "to be sought for in
the judicial institution of the hereditary transmission of material goods",
which impeded "the free manifestation of Galton's law of regression". In
particular, "the hereditary transmission of goods" allowed "many mediocri-
ties to enjoy the fruits of substantial fortunes accumulated by genial fore-
bears", with the consequence that "the corresponddence between the divi-
sion of individuals by income and that by aptitude" resulted as "profoundly
disturbed"[23].

   Pareto admitted this anomaly, but did not consider that it compromised
the explanation that traced the distribution of income back to individual
aptitudes and capacities. The author takes note of Benini's criticism, which
he again answers using an anthropological concept, that of "social selec-

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23.– R. Benini, *Principii di demografia*, p. 291-292.

tion"[24]. In Pareto's opinion, selection in human society has a "double sco-pe": on the one hand that of collocating the individuals on the appropriate level of the social hierarchy; on the other that of eliminating those inept and incapable subjects that could undermine the survival of the social aggregate[25]. The fundamental aspect is the role played by selection in designing the form of the social hierarchies: Pareto in fact avails himself of the selective mechanism which operates in the lower levels of society to explain the discrepancy between the income curve and the curve of apti-tudes. As Benini pointed out, the latter had always been held, from Quete-let and Galton on, to be a "normal" curve, symmetrical in respect to the median and modal value. The income curve, diversely, presented strong asymmetry, which Pareto tried to justify using, precisely, the theory of selection.

Pareto recognises that the income curve is not symmetrical around the mean: "the upper part" results as "very elongated" and the lower part "quite compressed", thus asymmetrical in respect to the upper. But "from this simple consideration one cannot conclude that there is no symmetry in the qualities of the individuals who deviate equally from the mean". What makes the distribution of income asymmetric is the fact that there is a limit towards the bottom beyond which it is not possible to descend, a limit which is absent from the upper part of the scale. "Indeed, of two indivi-duals who deviate equally from the mean of the qualities, the one who has exceptional aptitudes for making money may have a very high income; but the one who has qualities equally different from the mean but in the nega-tive direction, cannot, without dying, drop below the minimum income sufficient to sustain life[26]. Social selection, therefore, operates by elimina-ting the individuals who found themselves under the minimum subsistence level, thus justifying the asymmetrical form of the distribution of incomes.

Pareto's clarifications were not considered as sufficient to settle the question. Costantino Bresciani Turroni and, once more, Benini, intervened to repeat that the anthropological explanation neglected the fundamental aspect of the problem. Bresciani Turroni believed in fact that the element which most effected the distribution was precisely the "institutional" factor, that is the type of social and economic organisation in the countries consi-dered, in substance all organised on a capitalistic basis[27]. Bresciani Turroni came in this fashion to overturn one of the principal political corollaries of Pareto's law: the idea that changes in the distribution of property rights

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24.– On "natural selection", *in* Pareto, see J.J Spengler, «Pareto on Population», p. 116-122 ; A. Macchioro, *Vilfredo Pareto*, p. 568-569 ; A. Legris, « La distribution des revenus chez Walras et Pareto : une analyse comparative », p. 512-514.

25.– V. Pareto, *Les Systèmes socialistes*, p. 541.

26.– V. Pareto, *Manuale di economia politica*, p. 284.

27.– "From the figures presented by Pareto it is perhaps natural to draw the conclusion that the typical shape of the income curve […] is determined by the economic-private organisation of our society, common to all, rather than by the nature of man, and that the oscillations in the shape of the curve are caused by the special economic conditions in which each single eco-nomy finds itself" (C. Bresciani Turroni, «Dell'influenza delle condizioni economiche sulla forma della curva dei redditi», p. 345).

cannot influence the distribution of incomes. Bresciani Turroni thought on the contrary that in a society capable of greater equality in conditions, the distribution would be much less unequal. Taking into account, in fact, that in the capitalist societies many individuals "owe their economic position to the institution of inheritance", in an economy where this did not exist, where that is the "initial position" would be "the same for all, the shape of the income curve would be profoundly different from that seen today". Only in an economy "without hereditary rights" can the distribution of material goods come about "according to the 'yield of each'", realising an income curve "similar to the aptitude curve"[28]. Bresciani Turroni's conclusion not only contrasts the supposed "universalism" of the law formulated by Pareto but also summarises in a few lines the principal implication of the question, that is the role exercised by heredity and by the "initial position of the individuals" in generating a given distribution of income[29].

In 1906 Benini too returned to his criticism, contesting the two principal conclusions that Pareto reached: one the one hand the inference that even in a different social organisation "the sharing out of goods could not differ from that which it is today"; on the other, the idea that inequality and the consequent form of the curve are the exclusive outcome of the "diverse qualities or physical, intellectual and moral gifts" of individuals[30]. Benini clarifies that even if the data collected by Pareto reveal "the characteristic constant form of the sharing out of incomes", it is still necessary to find out whether there is "some common antecedent to the cases observed", in order to evaluate whether "the cause of the phenomenon" is "wholly or only partially" attributable to the diversity in aptitudes:

The investigation is even more justified, in as much as the division of individuals by physical, intellectual gifts, etc., seems to follow the law of accidental errors; therefore if it were the only cause of the division of wealth, its curve, instead of being hyperbolic, would appear as binomial. What might be the other common antecedent to the cases observed? It could be the hereditary succession of goods, which in fact exists with very few differences in the diverse countries observed; to it must be principally prescribed the reason why many individuals of inferior aptitude manage to maintain themselves on a high level of the scale of wealth and others of a superior aptitude do not manage, save in exceptional cases, to rise above a golden mean of income. The hyperbolic curve of total incomes would therefore result from a deformation of the binomial curve, due to the disturbatory element of the hereditary transmission of material goods. Therefore once again, in a hypothetical collectivist society which suppressed the he-

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28.– C. Bresciani Turroni, «Dell'influenza delle condizioni economiche sulla forma della curva dei redditi», p. 349.

29.– "[…] Many men whose aptitudes would enable them to enjoy an average income, are instead rejected and confined to the lower classes of income; while others, whose aptitudes would allow them to claim but an average or small income, are instead elevated by hereditary right into the upper classes" (C. Bresciani Turroni, «Dell'influenza delle condizioni economiche sulla forma della curva dei redditi», p. 346).

30.– R. Benini, *Principii di statistica metodologica*, p. 309.

reditary regime, the division of individuals by wealth would not maintain its actual form, but would be more likely to follow the known law of errors (R. Benini, *Principii di statistica metodologica*, p. 310).

As has been seen, the comments by Benini and by Bresciani Turroni tend to re-evaluate the influence of the economic-social organisation on the distribution of income, redimensioning the naturalistic interpretation offered by Pareto[31]. Whether these criticisms were accepted by the author of the *Cours* is still controversial. It is nonetheless a fact that in the *Manuale* there is a decidedly less categorical tone in respect to that in the *Cours* in regard to the universality and the invariability of the "curve". In the *Manuale* Pareto seems indeed to have greater hesitation than in the *Cours* regarding the universality of his own law, recognising that it principally concerns capitalist societies[32]. Thus, the role of "nurture" – institutions, economic set up, social setting – is not excluded at all by Pareto. On the whole, however, he continues to reevaluate its importance, preferring to focus on the "natural" distribution of abilities as a factor from which the distribution of incomes depends in a decisive fashion. The institution of inheritance, for example, at times permits degenerate descendents to occupy social positions for which they are inadequate. However, the opinion of Pareto is that a healthy social organism will only allow the "chosen few" of the lower classes to take the place of the "degenerate" of the upper classes and that this movement can take place even when, in terms of material wealth, the initial condition of the classes is vastly different.

Concluding remarks: the Pareto's heritage

The questions raised by Pareto are still at the center of the theoretical debate, even when his name is not expressly evoked. His lucid listing of the three possible causes to which the distribution of income may be attributed – nature, nurture and chance – seems to perfectly outline the actual state of the debate. In 1978, Gian Singh Sahota wrote a famous survey on the theories of personal income distribution. His comprehensive taxonomy of the diverse theories[33] anticipates at several points the questions discussed in this paper.

31.– Benini and Bresciani Turroni's theses would also be later taken up by Pigou. The English economist "conjectured that the observed discrepancy between the distribution of abilities and incomes was due to a skewed distribution of inherited wealth and the existence of 'noncompeting groups'" (G.S. Sahota, «Theories of Personal Income Distribution», p. 3).

32.– "The data we have for determining the form of the curve […] refer principally to the 19th century and to civilizes peoples; consequently the conclusions drawn from then cannot be applied outside these limits. But it is possible, as more or less probable inference, that in other times and among other peoples a form fairly similar to what we find today can be obtained" (V. Pareto, *Manuale di economia politica*, p. 289). See also the letter to Maffeo Pantaleoni dated 28th October 1896, where Pareto writes: "I myself have indicated to G. Sorel one of the objections that the socialists might make: this lies in saying that that is the curve of the 'capitalist' societies. I believe that there is some truth in it and that it would be useful to pursue the question to the end" (V. Pareto, *Lettere a Maffeo Pantaleoni*, I, p. 475-476).

33.– Ability theory; stochastic theory; individual choice theory; human capital theory; theory of educational inequalities; inheritance theory; life-cycle theory; public income redistribution theories; more complete theory; theory of distributive justice.

The first approach considered by Sahota is that known as "ability theory", within which Pareto's theory of distribution has a prominent role. One of the major difficulties encountered by this approach has been, as we have already said, the difficulty in reconciling the form of the distribution of ability with the distribution of income. In underlining the asymmetry of the distribution of income, Pareto had realised the discrepancy with the normal distribution of ability and to justify such discrepancy he availed himself of the concept of "social selection", inspired by the work of social anthropologists like Otto Ammon[34]. "Since then economists have been engaged in reconciling and explaining the discrepancy between the distribution of abilities and incomes, and their research has been the source of many theories"[35]. Prominent among these theories is that proposed by Pigou, drawn on even after the Second World War[36], according to which the divergence between the two distributions was to be attributed to the highly unequal hereditary transmission of wealth. From this standpoint, Pigou literally adopts arguments amply debated in Italy by authors such as Benini e Bresciani Turroni. Their comments on Pareto's law have moreover been shown to be fruitful in the sphere of a further theoretical approach: "inheritance theory". Authors like Meade or Thurow, for example, have underlined how "inherited wealth remains a significant factor of income inequality, especially at the upper tail"[37]. Without any doubt, from this prospective, there is an emphasis on the political and social institutions as determining forces in distribution that harks back to Mill's concept, which was instead strongly opposed by Pareto. The contrast naturally concerns precisely the evaluation of the naturalness of the distribution phenomenon, which the institutional approaches tend to trace to the social conventions that underpin human society rather than to any supposed universal law.

Initially disregarded, in the course of the twentieth century stochastic theory came to be one of the most popular theories of the personal distribution of income. And it is singular that precisely the cause to which Pareto gave least credit has in fact shown itself to be the most fertile in developments. The author of the *Cours* had in fact excluded "chance" as a foundation for the explanation of the distribution of incomes. The exclusion of "chance" rests on the diverse nature of the income curve and the casual curve of errors, a divergence that Pareto demonstrates in the mathematical note to paragraph 87 of the *Cours*[38]. The modern stochastic approach in the theories of distribution has instead re-evaluated precisely the chance component, tracing the principal force that generates stable and

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34.– Pareto and Ammon are frequently associated for having first highlighted "that the distribution of incomes is strongly skewed" (H. Saehle, « Ability, Wages, and Income », p. 77; S. Labergott, « The Shape of the Income Distribution », p. 328).

35.– G.S. Sahota, « Theories of Personal Income Distribution », p. 3.

36.– Amongst others, H.P. Miller, *Income of the American People*.

37.– G.S. Sahota, « Theories of Personal Income Distribution », p. 24.

38.– V. Pareto, *Cours d'économie politique*, p. 348. See H. Staehle «Ability, Wages, and Income», p. 78 – "When Pareto said that his results did not depend on mere chance, he really meant that the distribution of incomes had nothing whatsoever to do with either the normal curve or any of its skewed variants" – and M. Corsi, *Le disuguaglianze economiche*, p. 65-70.

regular distribution of income and/or wealth back to probabilistic "chance"[39]. "The gist of this theory is that even if a generation started from a state of strict equality of incomes and wealth, inequalities of the degree of Pareto distribution could emerge due to stochastic forces"[40]. This could appear as a response to the objections raised by Bresciani Turroni, who had criticised the interpretation of Pareto's law as a natural law, disagreeing precisely with the idea that from an original state of equal distribution of endowment there would ensue a final distribution of the Paretian type. Nonetheless there remains an irremediable contrast between Pareto's theories and modern stochastic theories: these postulate homogeneity among individuals from the point of view of their capacities and abilities, which is as divergent from the ideas of the author of the *Cours* as it is possible to get. "Thus, in all the present models which can explain the empirical Pareto wealth distribution the only reason for inequality is the stochastic process – chance – and homogeneous talent is a necessary condition if a stochastic wealth accumulation process is to lead to the Pareto distribution"[41]. In substance it is difficult to maintain that the stochastic theories have gathered Pareto's legacy from the point of view of the way in which they deal with the question of the distribution of income. In the reconstruction proposed in this paper, we have highlyghted the multiform levels on which Pareto's reasoning developed and his unitary conception of the social sciences. In the stochastic approaches, there is indeed the tendency to separate the economic-statistic component of his "law of incomes" from its anthropological and sociological frame, although they form part of a single whole.

The approach which seems to have inherited something from Pareto – albeit not in direct measure – is instead that of human capital. While not always made explicit, there is undoubtedly an analogy in the way in which the major exponents of the theory of human capital deal with the distributive question, in which forces traceable to "nature" rather than "nurture" emerge as central once more. "The development of the modern theory of human capital […] has all but obscured the ability basis of income inequalities" and "in their models *innate* ability has been replaced by *acquired* human capital as the source of competency"[42]. The emphasis on the fact that the human capital is an "acquired" rather than innate factor would seem to place the process of economic differentiation among individuals within the compass of nurture rather than that of nature. However the major theoreticians of human capital have shown themselves to be loath to consider the distribution of income as a fact that can be manipulated by the social and political institutions, placing themselves – perhaps more

39.– Among the principal models that explain Pareto's distribution based on a stochastic approach, see those by D.G. Champernowne, « A Model of Income Distribution », p. 318-351; H. Wold, P. White, « A Model Explaining the Pareto Distribution of Wealth », p. 591-595, and H.A. Simon, « On a Class of a Skew Distribution Function », p. 425-440.

40.– G.S. Sahota, « Theories of Personal Income Distribution », p. 7.

41.– S. Levy, H. Levy, *Investment Talent and the Pareto Wealth Distribution*, p. 2.

42.– G.S. Sahota, « Theories of Personal Income Distribution », p. 3-4.

from an ideological point of view than a theoretical one – in strict continuity with the theory held by the author of the *Cours*.

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