

From Samuelson to Marshall and Beyond

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This paper is divided into three sections. The first section goes over the major developments in consumer choice theory¹ over time and contrasts the approaches of Marshall, Hicks and Samuelson. In the second section is an inquiry into the nature of utility and a hypothesis is developed in the Marshallian tradition. The hypothesis is built on the grounds that utility is not a homogenous concept as is conventionally believed. The last section is concerned with identifying some theoretical and philosophical implications of the hypothesis for economics.

The Theory of Consumer Choice and its Development

The development of consumer choice theory over the century has been in a very definitive direction, but this modern direction is certainly different from the direction in which the theory first started out. Utility theory finds its roots in the discovery of the notion of utility in 1738 by the Swiss mathematician Daniel Bernoulli and its introduction into the social sciences by Jeremy Bentham. Bentham in 'An Introduction to the Principles of Morals' (1789) talked about the 'principle of utility' which he defined as the 'property of an object... to produce pleasure, good or happiness or to prevent... pain, evil or unhappiness.' Then in the early/mid 1800s neoclassical economists such as William S. Jevons and later Alfred Marshall extended the notion of utility to consumer choice. Ever since, J. Hicks and Paul Samuelson have developed on the theory considerably, giving it its modern shape.

Marshall's exposition of consumer choice theory had a firm grounding in the description of the *nature of human wants*. Says he, "There is an endless variety of wants, but there is a limit to each separate want. This familiar and fundamental tendency of human nature may be stated in the "law of satiable wants" or of the "diminishing utility" thus: The "total utility" of a thing to anyone (that is, the total pleasure or benefit it yields to him) increases with every increase in his stock of it, but not as fast as his stock increases. If his stock increases at a uniform rate the benefit derived from it increases at a diminishing rate.... That part of the thing which he is only just induced to purchase may be called his "marginal purchase", because he is on the margin of doubt whether it is worth his while to incur

¹ I shall be referring only to the theory of choice under certainty and hence am not including developments like the Neumann-Morgenstern Statistical theory, Armstrong's Marginal Preference theory, etc. in the paper.

the outlay required to obtain it. And the utility of his marginal purchase may be called the “marginal utility” of the thing to him. Or, if instead of buying it, he makes the thing himself, then its marginal utility is the utility of that part which he thinks is only just worth his while to make. And thus the law just given may be worded: The marginal utility of a thing to anyone diminishes with every increase in the amount of it he already has.² An important observation was made: ‘If a person has a thing which he can put to several uses, he will distribute it among these uses in such a way that it has the same marginal utility in all. For if it had greater marginal utility in one use than another, he would gain by taking away some of it from the second use and applying it to the first.’³ Hence the condition for consumer equilibrium came about, i.e. the ratio of marginal utility of each thing to its price must be equal for all things, or that the ratio of the marginal utilities of two goods must equal the ratio of the prices of the two goods.

As may be evident the above approach is concerned very closely with the individual and exactly what it is that goes on inside of him that eventually leads him to make a choice as a consumer. However, when Hicks came into the picture he had a different objective in mind. In his own words, ‘My work on the subject began with the endeavour to supply a needed theoretical foundation for statistical demand studies; so that there is a definite relevance to that field. Other matters of fundamental methodological importance are thrown up as well.’⁴ So Hicks had actually set out to derive the demand curve (as opposed to Marshall’s aim to study the nature of choice-making behaviour) so that it may have significance for econometrics. His criticism of the Marshallian consumer choice theory is expressed in the following sentences: ‘But now what is this “utility” which the consumer maximises? And what is the exact basis for the law of diminishing marginal utility? Marshall leaves one uncomfortable on these subjects.’⁵ Rejecting the marginal utility theory on the basis that utility is unquantifiable, and that the law of diminishing marginal utility is nothing more than an unproven axiom, Hicks and Allan developed Pareto’s indifference curve analysis into the theory of consumer choice as we know it today.

The principle of Occam’s Razor was used to make redundant the Marshallian theory. The principle states that if two theories draw the same conclusion, then the theory with the less restrictive assumptions and the fewer axioms is superior to the other. And indeed, in the derivation of the demand curve the Hicksian indifference curve theory employs fewer

² A. Marshall, ‘Principles’, p 93.

³ *Ibid.*, pp 117-118.

⁴ J.R. Hicks, ‘Value and Capital’, 2nd edition (Oxford: Clarendon Press, 1946), p 5.

⁵ *Ibid.*, p 12.

assumptions than the Marshallian theory. Indeed there is no need for unmeasurable concepts such as the concept of utility or of a utility function in the Hicksian approach. 'The quantitative concept of utility is not necessary in order to explain market phenomena. Therefore, on the principle of Occam's razor, it is better to do without it. For it is not, in practice, a matter of indifference if a theory contains unnecessary entities. Such quantities are irrelevant to the problem in hand, and their presence is likely to obscure the vision... We have... to undertake a purge, rejecting all concepts which are tainted by quantitative utility, and replacing them, so far as they need to be replaced, by concepts which have no such implication.'⁶

Arrow was to say that '...the proponents of measurable utility have been unable to produce any proposition of economic behaviour which could be explained by their hypothesis and not by those of the indifference curve theorist.'⁷ Samuelson declared that 'the whole end and purpose'⁸ of consumer choice theory was the derivation of demand functions in prices and income. It was a clean sweep.

Then Samuelson came up with the theory of Revealed Preference which employed even less restrictive assumptions than did the indifference curve theory and so made the Hicksian approach redundant in the same way that Hicks did the Marshallian approach. Samuelson did not require the consumer to go so far as to be able to write out a whole list of goods to identify all the bundles between which he was indifferent. Samuelson ruled out the possibility of this 'weak ordering' by postulating that choice reveals preference, and thus for him indifference was not an operationally significant concept. The consumer was required to do nothing but make a choice, and thereby reveal his preference of one bundle of goods over another. Hence, for Samuelson if one was able to consume any points of all points on a Hicksian indifference curve, the fact that he would eventually choose one particular bundle makes all other bundles inferior to the chosen one. The consumer has revealed his preference. There is no cardinal utility, no continuity of choices, no indifference curves, no nothing. Just choice.

An examination of the above-mentioned three theories shows that a certain pattern is developing. Marshall's emphasis was to explain consumer choice on the basis of the internal mechanisms involved in choice-making behaviour, Hicks' emphasis was gearing consumer choice theory towards deriving the law of demand, and Samuelson's emphasis was achieving the same through the discarding of a psychological explanation for choice

⁶ *Ibid.*, pp 18-19.

⁷ Kenneth J. Arrow, 'Social Choice and Individual Values', 2nd edition (New Haven, Conn.: Yale University Press, 1963), p 9.

⁸ Samuelson, 'Foundations', p 97.

altogether in favour of observed behaviour. This 'behaviourism' is a very stable ground to walk on because actual observation merges with the theoretical explanation, the latter trying to explain the former. Hence there is no going wrong. It is all safe play.

And certainly the changes in consumer choice theory to the present form can be seen as the development of the theory, as its evolution. But there is a point that needs to be made here. Exactly what have the later theories of consumer choice contributed to answering the question of *why* a consumer makes any choice? On the inquiry into the actual *nature* of choice, what have these theories added to our understanding?

It seems as if contemporary consumer choice theory jilted Marshall's concern of discovering the *principles* of choice in favour of what is, in my view, a possibly relatively less substantial and less philosophically meaningful question of theoretically proving the law of demand. Proving the observation of demand being inversely related with price by using observation itself does not explain why the demand curve is negatively sloped in the first place. All it says is that the demand curve *is* negatively sloped, not *why* it is so. What would be more meaningful is to come up with the precise mechanisms that work within the consumer, which determine his choice. It is only once greater insight is gained in this regard that one can actually, first, start answering the question as to why the demand curve is downward sloping and, secondly, make more precise predictions and estimations of demand. A true contribution would be an understanding of why a certain equilibrium arises in the first place, and for that we require a theory of the nature of consumer choice.

The above two paragraphs challenge the meaning of the term: 'the development of consumer choice theory'. As with everything else that exists, the meaning of the word 'development' is relative to what premise we employ when we speak of development. If we speak of development of a theory as being its simplification in terms of less assumptions and less axioms while the theory's conclusions/implications are the same, then the movement from Marshall to Samuelson has surely been development. But if the principle of Occam's razor was to be redefined so that it did not compromise on substance and insight, then there really has not been much development in the theory of consumer choice since Marshall.

Marshall still stands if we consider his purpose. To start off with, Marshall said nothing to the effect that utility was measurable. The terms 'cardinal' and 'ordinal' came after him. The maximum that he said in this regard was that the quoted price at which the consumer makes his purchase measures the marginal utility to him. Other than this he himself has said in

his 'Principles of Economics' that desires cannot be directly measured, that price may measure marginal utility but cannot measure utility in general, that the quantities of two benefits cannot be compared. His purpose was to describe choice and he rested on axioms that were capable of being tested physiologically, psychologically and of course through common observation and experience.

Hicksian indifference curve theory rests almost entirely on the grounds laid by Marshall. Every 'higher' indifference curve reflects greater utility, and thus if one wants to force the 'cardinal pill' down the throats of the indifference curve theorists one certainly can do so by simply arguing that every indifference curve can be assigned a number or a value. After all if we are talking about greater utility then we are talking about greater values of utility, are we not? And if it is argued that such an exercise is not necessary for the theory to operate then the fact is that such an exercise is not necessary for the Marshallian theory either. Further, the fact that indifference curves are convex to the origin is nothing other than the law of diminishing marginal utility itself. Just as the Hicksian consumer maximises utility, so does the Marshallian consumer. The principle is the same, and the indifference curve-budget line tangency is identical to $MU_x/MU_y = P_x/P_y$. It may be argued that the Hicksian theory is nothing more than a diagrammatical exposition of the Marshallian theory.

When it comes to Samuelson, nothing new is added on the 'insight' front. His doing without indifference curves is ingenious, but at the end of the day if we are to use his theory to explain consumer choice then we get no answers. Actually Samuelson takes a step away from the consumer to simply observe his choices from a distance. The internal workings become immaterial in his analysis.

Arrow was quoted earlier saying that '...the proponents of measurable utility have been unable to produce any proposition of economic behaviour which could be explained by their hypothesis and not by those of the indifference curve theorists.' It would not be incorrect to say that the proponents of the indifference curve theorists have been unable to produce any proposition of economic behaviour which could be explained by their hypothesis and not by those of the proponents of Marshallian utility theory.

While Hicks and Samuelson were standing on similar ground, Marshall was standing on a ground different from theirs. His theory had a different function to perform and *no improvements have been made on his theory on his own ground*. His exile is not justified when we are on his premises. His theory belonged to a different plane, and we must look into what insights developments on his plane could give us. No doubt we would

be delving into pure theory which could be very difficult to substantiate. But the philosophical implications of such an inquiry into the internal functionings of the economic unit (which we call the consumer) could add some depth to our understanding of economics.

An Inquiry into the Nature of Consumer Choice

I shall now present a few thoughts developed in the Marshallian tradition of inquiring into the nature of choice. While these thoughts can be seen as serving the purpose of discovering knowledge for knowledge's sake, a few of its implications will be discussed in the next section.

The concept of utility is a reality the existence of which all of us can testify to. Indeed the mechanism governing the behaviour of all living things, from the simplest amoebae to man, can be easily identified in terms of two impulses – the pleasure impulse and the pain impulse. It is through this pleasure-pain mechanism that the brain governs the actual actions taken by any living organism. A stimulus received is interpreted by the brain as causing pain or pleasure, and the brain sends a response to the appropriate parts of the body to react to the stimulus. This system of impulses, of stimulus-response, of pleasure-pain is the basis of behaviour.

At best the above 'model' can only be called an 'intermediate' model of behaviour. The whole explanation of choice through the pleasure-pain mechanism, through the utility-disutility mechanism gives only the immediate explanation of behaviour. That is to say that it says nothing more than the fact that if a person buys a commodity then it is because he wants to, or because his preferences are such. But a complete model of behaviour would explain *why* his preferences are such, why one thing gives him more utility than the other, etc. For that one would probably have to look to the brain sciences to answer the questions that economists can not. But given that the state of knowledge is limited, then for our purposes an intermediate theory will have to suffice.

To Marshall's postulate that the consumer's equilibrium is at the level of consumption where the marginal utility of spending \$ 1 on the good(s) equals the marginal utility of money (the opportunity cost of that \$ 1) there is something that needs to be said. What Marshall has actually implied implicitly was that utility and disutility are directly comparable. That is to say that one can actually weigh a pleasure against a pain (in this case the pleasure of a marginal unit of consumption against the pain of losing the marginal utility of simply holding that money). It is only once one assumes direct comparability of the two that one can ever say that $MU_c = MU_m$ (where MU_c is the marginal utility of a dollar of consumption and MU_m is the marginal utility of

money). To press the point further, the fact that it is postulated that MU_c is *equal* to MU_m means that both the pleasure and the pain have identical units. It is only when the units are identical that such a term as net utility can ever be used. But the common knowledge that Marshall used to substantiate his utility theory can actually go against him.

Common knowledge and common observation would reveal that no two pleasures, no two pains, and no single pleasure and pain are identical. The pleasure one gets from a good meal is different from the pleasure one gets from reading a good book. The pain of a pinprick is different from the pain of losing a beloved. The feeling one gets from losing a dollar of money is different from the feeling one gets from consuming an ice cream, which was bought with that same dollar. One can go on giving a huge range of examples from everyday life to substantiate the claim that pleasures and pains are not identical. Comparing pleasure with pain means comparing cows with pigs, and subtracting pain from pleasure means subtracting pigs from cows. Common experience tells us that *we actually feel pains and pleasures simultaneously*. A person enjoys a drink of alcohol even though it tastes bitter. Hence pleasure and pain do not have identical units, and thus they do not cancel out or anything of the sort. Utility is heterogenous in nature, not homogenous.

Hence utility is not a term that can be used so lightly and so simply because the actual picture is a little more complicated than that. If one accepts the claim that pleasure and pain are not directly comparable then one cannot make the famous textbook diagram of a downward sloping marginal utility schedule intersecting the price line to reveal the single-good consumer equilibrium. If there is no direct comparability then the intersection is meaningless.

But to say that pleasure and pain are not comparable at all is certainly an absurd statement to make because we make choices everyday that involve both pleasures and pains, and making such a choice certainly means that the pleasure outweighed the pain. Hence a comparison has actually been made. The utility derived from the choice exceeds the utility derived from the money that is spent, although both have different units. Where does this lead us?

The fact is that there are two different feelings that one feels inside prior to making a choice and that both these feelings pull the choice-maker in opposite directions. Eventually one of these feelings 'wins' and the other 'loses'. They are not the same and yet at the end of the day a comparison is made. Such comparisons cannot be represented mathematically given the rules of mathematics, and yet every day every one of us makes such comparisons.

Hence what can be understood by all this is that although pain and pleasure are different feelings, they are indeed comparable, *but only loosely so*.

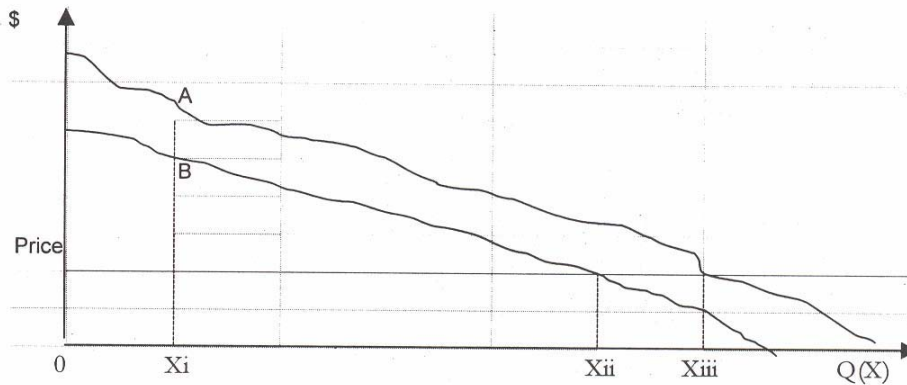
This hypothesis of weak comparability, if I may be allowed to coin the term, can be substantiated with a simple experiment. Assume that you are asked the question of how much money you would accept such that it compensates you for carrying out a 'painful' task, like swallowing a very bitter pill for no reason. \$ 10, \$ 30, \$ 50? If you conduct this experiment you will actually be able to identify a *range of values for which you would feel compensated, as opposed to a single value*. One will never be able to say, for instance, that \$ 20.59 is the exact amount that will just compensate him for the act. Rather, one will be confused over a range of values (for example \$17 to \$25) where he is not certain whether he is just compensated or not. Weak comparability leads to a whole range of possible values of one kind of utility (or disutility) which seems to be equal to one unit of utility (or disutility) of another kind.

Going through the experiment will give rise to this 'gray area', a range of values for which one will not be sure if he/she is under-compensated, compensated, or more than compensated. The lower limit of this range would arise in the vicinity of those values of money for which he is certain that he is not compensated and those for which he is not so sure. The upper limit of this range is in the vicinity of those values of money for which he is not sure that he is compensated and those for which he is certain that he is more than compensated. The exact values of these limits are not definable with any kind of certainty whatsoever. If this result of the existence of such a range is difficult to absorb, the realisation of the actual difficulty of trying to evaluate this compensation level serves sufficiently to make the point. It becomes clear that comparison is not a simple addition/subtraction operation. It is not so clean a process, but rather a messy one.

The above experiment also demonstrates that the hypothesis of weak comparability assumes much greater significance when it comes to marginal analysis. It is much easier to say that a very large pleasure outweighs a very small pain or vice versa, but when it comes to comparisons at the margin, then the difference in the feelings of pleasure-pain makes comparability very hazy. This implies that economic theory is not simply a 'calculus of pleasure and pain' as Jevons believed. Behaviour, by its very nature, can not be as precise as that.

The figure below illustrates the hypothesis of weak comparability. The axes give the quantity of 'X' consumed on the x-axis and units of money (\$) on the y-axis. Because only units of pleasure of a specific kind are meaningful, here we consider the utility from money to be our standard for

comparison. The curved lines give the range of values of \$ the utility of which approximates (in the mind of the consumer) the marginal utility of the consumption of X. So the marginal utility of the consumption of the Xi'th unit of X is similar to the utility of \$A to \$B of money. The exact value between \$A and \$B cannot be determined by the consumer due to the nature of pleasure-pain. The final equilibrium, i.e. where the money valuation of the utility of the marginal purchase equals the marginal utility of money itself⁹, is indeterminate between the range Xii and Xiii.



When the hypothesis of weak comparability is extended to Hicksian indifference curve analysis we find that indifference curves cease to be curves and turn into indifference areas, because bundles surrounding the indifference curves cannot be clearly classified as superior or inferior bundles (in terms of utility). No longer is it possible to define an indifference map. For areas that are sufficiently to the north-east of other areas on the x-y plane one can say that the former are superior to the latter, but for bundles and areas close to each other no such statement can be made because the consumer himself is unable to make such a statement. Hicksian theory, therefore, would fail in its objective of deriving the demand curve unless it employed sufficiently large changes in price.

Even Samuelson's Revealed Preference Hypothesis would find itself in a problem of ambiguity regarding choice even though all it is concerned with at the end of the day is the actual choice made, regardless of how it

⁹ We assume that the marginal utility of money is constant, or that the range of the values of money that is involved is small enough for marginal utility of money to be practically constant.

was made. Samuelson's assumption of a positive income elasticity of demand would not yield the results it does unless, once again, a large enough price change was taken. Neither would he be able to use the concept of the 'superior zone' because the zone would not include points to the northeast of the original equilibrium bundle that are close to it.

When it comes to the demand curve itself the implication of the hypothesis of weak comparability would be demand areas rather than curves because at a given price the consumer would find himself choosing from a range of quantities which he is unable to establish as his single unique equilibrium level. The figure drawn above is also the consumer's demand curve (area) as it tells us how much (in terms of money) a consumer values the consumption of each marginal utility of X. Only large price falls would lead to an unambiguous rise in the quantity demanded. A small fall in price may lead him to leave his consumption level unaltered or it may encourage him to increase his consumption by a smaller or greater proportion than the fall in price. At a different time he may feel that he really does not value the product all that much and may end up decreasing his consumption of X. For narrow price ranges the demand curve may be elastic, inelastic or positively sloped between different time periods.

Perhaps the main significance of the above discussion is the fact that it brings to the fore an inescapable uncertainty regarding anything concerned with human behaviour, and that it identifies the exact reason for this. There is a certain minimum standard deviation that must exist in the calculation of all variables affected by the choices of human beings. The error term is no longer simply a nuisance. Part of it is a variable that involves the inability of humans to conform to the marginal analysis applied to their behaviour by economists. Perhaps a statistical inquiry into this minimum standard deviation could lead to findings that could be of significance to econometric analyses, as will be discussed in greater length in the next section.

In criticism and defense the following points can be made:

1. The practical importance of the above hypothesis of consumer choice cannot in any way be deemed significant unless the size of the standard deviation mentioned above is significant. This is something that can be subject to statistical testing. If a significant uniform standard deviation is found to exist then it can be used in calculations to determine the width of the possible range of outcomes of a certain policy, etc. If the standard deviation is insignificant then the whole discussion is insignificant for the purpose of applied research. The larger the standard deviation the greater the uncertainty that will be an inherent part of economic analysis.

On the issue of taking the expected value of such an error term as equalling zero the actual size of the standard deviation becomes important. The 'average' is an extremely useful device in throwing dispersions into the background where they lose importance. However the credibility of this average depends on the dispersion in the first place. Thus whether the expected value of the error terms can justifiably be taken to be equal to zero depends on the size of the standard deviation itself.

2. The hypothesis can be shot down if we define the development or superiority of a theory in a way so as to give practical applicability prime importance. The above may give insight into behaviour or may give us an idea of the limits we can hope to achieve in estimations of demand but it may be termed as unimportant because of the difficulty in the measuring of this standard deviation.
3. A further potential criticism that can be made is the fact that the hypothesis given above does not in any way explain the mechanisms that lead a consumer to actually choose out of the range of choices which he cannot decipher between in terms of superiority or inferiority utility-wise. It is silent on what happens between the identification of the range, and the final choice made. This can be seen as a factor making the hypothesis incomplete.

But making this criticism could be seen as the result of missing the essence of the hypothesis because what one is trying to establish is that the indeterminism is a very real and unavoidable aspect of consumer choice and this indeterminism is indeterminism precisely because it cannot be determined or explained. It may be possible that an actual mechanism does indeed exist, but as mentioned in the beginning of this section the limits of the state of knowledge requires us to make the best out of such 'intermediate' modes of human behaviour.

4. The criticism of utility being unmeasurable can also be applied as it has been applied to utilitarianism, etc. However, as discussed in the previous section, no such measurement is required to achieve the results of the hypothesis, namely that at the margin a unique consumer equilibrium does not exist and hence there is ambiguity, and that the demand schedule can be shown to be downward sloping only for large changes in price.

The insight that the hypothesis provides is that economic analysis cannot be applied to small changes in variables. Large changes are necessary because even the most rational consumer will be unable to escape from a

minimum level of uncertainty regarding his choices, and this is something that can only be diminished by considering large changes in prices, incomes, etc. The demand curve has to include this unavoidable factor of indeterminism in consumer choice if it is to reflect reality.

A further insight that is provided by the hypothesis is an explanation of the concept of bounded rationality. It is no surprise that someone who is not clear in a marginal case will depend on any pieces of relevant information for support in the choice. A choice that he made in the past, or the choice that people normally make, helps a person make a choice whose accuracy and certainty is impossible for a human being. Bounded rationality is more human than pure rationality, and why this is so has been the point of this inquiry into the nature of choice.

Some Implications of the Hypothesis of Weak Comparability for Economics

The Expected Value of Choice

The homo-economicus is a man that conforms to all the theories of economics that explain and predict his behaviour. It is not very surprising that economists then are able to predict his behaviour with a greater amount of accuracy. But when it comes to actual human beings, economists have always found it most useful to assume that all consumers, or at least the vast majority, behave like the homo-economicus.

And such an assumption could be justified too. After all, everyone does try to maximise perceived utility, and it may be argued that perceived-utility maximisation can explain all choices as it allows for all errors in perception as well. One step and we reach the economist's ground: in the long run a person's choice is going to approximate the rational choice. Perceived utility approaches 'actual ex-post utility' over time. If nothing else, a person is much clearer about his preferences as time goes by. Hence it may be postulated that, in the long run, the consumer approximates the homo-economicus.

There is yet another possible justification that can be made for assuming such levels of rationality amongst all economic units. It can be argued that given that there is one and only one rational (utility maximising) choice in a certain situation, and given that all people are in search of maximum utility, then, for large numbers, the average choice must be the rational choice. That is to say that even if people, for some reason, are unable to identify that single unique utility maximising choice, everyone will indeed be attracted to it, and on average the people that make a choice $C_i > C_o$ (where C_i is the choice of the i 'th individual and C_o is the optimal choice) will

approximately equal the number of people that make the choice $C_i < C_o$. Hence the actual market demand curve should be identical to the market demand curve that would result in a perfectly rational world. The expected value of the choice of each $E(C_i) = C_o$, and thus for the aggregate $\sum C_i/n = C_o$. Because everyone *tends* towards this choice, hence the probability distribution of C_i around C_o must be normal, or approximately normal, with many more individuals choosing $C_i \cong C_o$ (i.e. C_i approximately equal to C_o) than not. With this then, the assumption of rationality becomes justified.

But if we accept the weak comparability hypothesis then matters would be much different. The inability of human beings of comparing pleasures and pains at the margin leads to a range of possible choices. The individual is unable to pinpoint which choice in this range is superior or inferior to the other. This leads to an indeterminate solution at the end of the day. What does this say for $E(C_i)$? Quite a bit, actually.

It must be clear that the only reason we could assume that the probability distribution of C_i around C_o was normal was because of the belief that *there is actually one* utility maximising choice C_o . Given this, we very simply needed to take the average choice ($\sum C_i/n$) and we could feel confident that this (observed) average must be the optimal choice. However weak comparability leads to a different result:

Weak comparability actually implies that the probability distribution of C_i is an even or uniform distribution, not a normal one. It is uniform because *each possible choice C_i in the range has an equal probability of becoming the eventual choice*. What this actually does is seriously dent the credibility of the average or mean of the distribution. In the case of a normal distribution the probability of C_i being approximately equal to C_o is very high, actually the largest probability is that $C_i \cong C_o$. But in the case of an even distribution the probability of every single choice in the range is identical. For 'n' number of choices within the range, the probability of $C_i = C_o$ is identical to C_i being at either extreme of the range, i.e. probability of any and all choices equal $1/n$. Hence the econometrician can no longer rest behind the thought that all deviations from C_o will 'cancel' out or 'average' out. The probability that in any sample the number of people that choose from one extreme end of the range will equal the number that choose from the other is *identical* to the probability that all the people will choose from one end of the range. The value $\sum C_i/n$ loses its credibility in an indeterminate range.

To illustrate with the help of a simple example, imagine a market with 1000 identical consumers. This means that each consumer has the same indeterminate range of, say, the quantity of X demanded at \$y. Say all

have a range of 10 to 20 units of X. The conventional approach would assume that on average everyone would choose 15X, and for every one consumer that chooses C_i less than 15X there will be a consumer that chooses C_i higher than 15X by the same amount. Hence the market demand for X at price \$y would be 15,000X. However if we assume an indeterminate range then no such thing can be said about market demand. The only credible thing that could be said would be that market demand for X at price \$y is 10,000X to 20,000X. Hence the probability that one will find values around 15,000X to appear most of the time would be identical to the probability that, say, 19,999X would persist every time.

Just before leaving this point I would like to reiterate the fact that mathematically everything works out very well. Even for a uniform probability distribution $E(C_i) = \sum C_i/n$. But the 'average' can very conveniently sweep aside complications and the point of this discussion was to emphasise the fact that this average, mean, expected value, etc. may take us away from reality faster and more smoothly than may be evident. And indeed how close this average is to reality depends on the nature of pleasure-pain.

The Homo-Economicus is Human

The hypothesis of weak comparability can give us a new understanding of what the nature of the homo-economicus actually is. Conventionally the homo-economicus is assumed to be the epitome of rationality, and economics develops only after assuming that such rationality will be adhered to. He is the guinea pig on which rigorous economic models and theories are tested. Why? Because, as we have discussed before, it is believed that real economic agents can be justifiably approximated to him. However, the thesis reveals one thing. If the homo-economicus is a human (which at least the name suggests), then even his rationality is limited by a human inability to perform calculus when it comes to one's pleasure-pain.

Less has to be expected of the homo-economicus for he is human. His preferences cannot be complete because it is simply not possible for every bundle to be comparable to another for all the reasons presented in the previous section. His preferences can not be reflexive. To say that any bundle is at least as good itself, i.e. (X_0, Y_0) is equal to or greater than (X_0, Y_0) would require for a consumer to be dead sure about the utilities of each X_0 and Y_0 and the comparison of these two (unidentical) utilities in terms of each other. Worse still his preferences cannot be transitive because for bundles close enough to each other if $(X', X'') > (Y', Y'')$ and $(Y', Y'') > (Z', Z'')$ then it is as likely for $(X', X'') < (Z', Z'')$ than $(X', X'') > (Z', Z'')$. Within certain ranges even the homo-economicus will give an unavoidably uncertain response.

Hence there can be no justification for building economics with purely rational building blocks because even the best custom-made guinea pigs used for their formulation do not support their predictions. The standards of rationality applied to economic agents have to be lowered, as these levels do not exist.

Indifference or Confusion?

The hypothesis can be used to argue for a re-definition of the concept of 'indifference' as it is applied in economics. Indeed if utility is homogenous in nature then utilities and disutilities can cancel each other out, leaving behind 'zero net utility'. If making a choice gives zero net utility then one is said to be indifferent between making the choice or not. In choosing between two bundles if one finds no difference in utility derived from consuming either bundle, then one is indifferent in one's choice between the two bundles. However, the hypothesis reveals that there is no such thing as zero net utility. If there is a pain and a pleasure associated with a choice, then, regardless of the magnitudes of the two, on making that choice one will feel *both* the pain and the pleasure. Whenever the pain and pleasure resulting from a choice has a magnitude, there is no such thing as one having 'no feeling' as a result of making the choice.

So what this means is that when one cannot decide between two bundles (because supposedly they give the same utility), it is not so much a state of indifference as it is a state of confusion. When one is stuck on a decision of whether to spend or save, it is not because he is indifferent between the two choices. Both choices give him pleasure (albeit of a different kind). It would be closer to the truth to see the situation as one of confusion that arises as a result of an inability to compare. Confusion would arise if one cannot determine whether the utility that one gains from the consumption of one bundle exceeds the utility from that of another. And the inability to compare comes from the heterogenous nature of utility.

Indifference means something different. Indifference would arise if the levels of pleasure and pain arising from a choice were too small to make the choice an important one. It is choosing between two choices that have larger pleasures and/or pains that leads to choices that have a significance to the individual. And the difficulty in choosing between two such significant choices means confusion, not indifference. If the two choices did not have large pleasures and/or pains attached with them, then the individual is in a state of indifference.

For this reason it may be correct to rename 'indifference curves/areas' as 'confusion curves/areas'!

Implications for the Theory of Value

The hypothesis of weak comparability could have some relevance to the theory of value. The theory of value tries to answer the question of what creates value within a commodity. There are two theories of value that have significance. On the one hand there is the Marxian theory of value which argues that the (exchange) value of a commodity is labour value. On the other there is what may be called the *laissez faire* theory of value, i.e. the value of a commodity is determined by the utility its consumers derive. We are back to Marshall then.

Now, let us study the quantitative relation given by the equation $2x=1y$, where x and y are commodities. This means that 2 units of x are exchangeable for 1 unit of y . But what must be looked at closely is the equality sign between the two commodities. Equality means that the left-hand side and the right-hand side are identical. Thus, in $2x$ and $1y$ there must exist something that is common in both, and that too in equal quantities, such that it makes the two different commodities equal. Both x and y must be equal to some third 'thing'. And it is because the commodities contain this common 'something' that we are able to write the equation $2x=1y$. Otherwise the equality sign would not hold.

We can never say that a horse and a cow are equal unless we are referring to something that is common to both of them. A certain many number of horses may be equal to one cow in weight, or in volume, but they will not be equal if we do not refer to some common 'thing' that exists in them. By similar argument, we must ask the question that if $2x=1y$ then what is it that is common to them that allows them to be equal. In other words, what is it that gives them both an equal value?

Here Marx argues that the 'thing' that is common to both sides of the equation is the fact that both commodities are the products of labour (and so the value of a commodity is created by the value of labour in it), whereas the *laissez faire* economists argue that $2x$ and $1y$ represent equal marginal utilities per unit of money. Leaving Marx aside, let us look at the *laissez faire* view.

If $2x$ and $1y$ both contain an equal amount of marginal utility (per unit of money), then utility being homogenous is a prerequisite. However the weak comparability hypothesis reveals that utility is not homogenous but is heterogenous. If the utility derived from x and the utility derived from y

are not identical in their natures, then MU_x and MU_y do not represent a 'thing' that is common to both x and y .

Contrary to what is commonly believed, the search, then, for a complete *laissez faire* theory of value is still on.

Implications for the Philosophy of Determinism

The concept of the homo-economicus reflects a certain theme that seems to run through the rest of economics. The homo-economicus is a rational animal whose choices work according to a certain mechanism. This mechanism is triggered off by a certain set of stimuli. Once the stimulus is applied, the mechanism is put to work, and man being the slave of the electrical impulses that drive his body acts accordingly. In this whole concept (which exists in contemporary economics) there is a very clear representation of the doctrine of Determinism¹⁰

For consumer choice to have any predictability whatsoever, Determinism is required. If the behaviour of an individual can not be found to be strongly correlated with conditions that could have caused it, then the scope of any sort of analysis of human behaviour becomes limited. The whole 'if this-then that' approach is crucial. Similarly it is required by the economist to be able to say that by taxing income from a rich person and redistributing the money to a poor man would lead to the greatest happiness of the greatest numbers. If a consumer's utility is not firmly correlated with the amount of money he has, then the utilitarian redistribution of money would run into serious problems. By hypothesising mechanisms and strong links, economics tells us that it believes in the doctrine of Determinism.

Determinism has its justifications. If a person makes a choice, then why does he do so? It is because his brain sent impulses to the relevant parts of his body to act so. But why did the brain do that? It is because the brain received a stimulus and hence gave the appropriate response. Hence his choice was determined by the impulse, and the impulse by the stimulus. And what about the role of the brain in this process? The brain just did its job by reacting to the stimulus. How? Through some kind of process that went on in the brain as a result of being triggered by the stimulus (and so even this process is being determined by something). Hence every thing is

¹⁰ The doctrine of Determinism is the doctrine that all events are the inevitable result of antecedent conditions, and that the human being, in acts of apparent choice, is the mechanical expression of his heredity and his past and present environment. This is an anti-thesis of the doctrine of Free Will, i.e. the doctrine of the freedom of the individual, in acts of conscious choice, from the determining compulsion of heredity, environment, and circumstance.

determined by something, and in the same way even the stimulus was determined by something else. This is Determinism.

This certainly does not say much for Free Will because this apparent act of choice is actually the result of a series of antecedent events (starting from the stimulus all the way to the final response). Man might feel like it is he and only he who has made the choice and that he was never in any kind of compulsion to behave in that manner. But no. The only reason why he feels like that is because for him that choice was the most appropriate and the most pleasurable (utility maximising). Compulsion would have existed if he was forced to make a choice that he did not wish to make. But that does not say much about any freedom of his Will because this system of pleasure-pain is determining the very feeling of freedom of Will. If he is determined by nothing else, then he is certainly determined by the system of pleasure-pain. And it is precisely because this is what his choice is determined by that he feels confident saying that he chose what he wanted or felt like choosing (for he will not wish to choose anything other than what he wants or feels like choosing). To prove my point let us consider the argument that one would give in favour of his Will, i.e. that there was no compulsion because he did not make a choice that he did not wish to make. If there was some new 'pain' attached with the choice that he wanted to make, such that the second-best choice now becomes his best choice, then what will he do? Certainly he will make the choice of this option that he once did not wish to make. Thus the thing that makes him choose is not the choice itself, it is the pleasure-pain associated with the choice. Hence, if nothing else, the doctrine of Determinism exists in the system of pleasure-pain.

A very heavy argument against Free Will indeed. In my mind it actually proves to us that there is no such thing as Free Will as we understand it. Our Will is determined by pleasure-pain, so what Free Will can anyone talk about? But the hypothesis of weak comparability can actually contribute to a case I would like to present against Determinism.

I believe that a very important question is often forgotten to be asked whenever the Determinism-Free Will debate is underway: Whenever anyone uses the term 'my Will', then who exactly is 'I'? I believe that unless the 'I' is defined the debate is incomplete. The case I shall be presenting is a two-part case, and it runs thus:

The process of choice-making involves a chain that can be given by 'stimulus-brain-response'. In this chain, the brain refers to all the internal processes that go on inside of a person which eventually lead to his response, his choice. The brain is something that is still in the process of discovery and as I said earlier it is the Brain Sciences that will eventually tell us what exactly

the brain is. Nevertheless, given the present state of knowledge we know that the processes in the brain have to do with pleasure-pain.

Now, contemporary economics would have us believe that the processes in the brain involve a clear process of utility-disutility comparison. At least, on average the response will be the optimum choice. Hence this understanding actually binds the three elements of the process of choice making (stimulus-brain-response) very closely together. The hypothesis of weak comparability tells us something else. Weak comparability reveals that processes in the brain are in no way exact, in the sense that for any given stimulus or set of stimuli, the brain can not give us one single response. Rather its response is indeterminate within a range of possible responses. Uncertainty is an inherent characteristic, an idiosyncrasy of the brain. Hence, according to the hypothesis, the 'stimulus-brain-response' chain is not tightly bound.

This was the first part of the case. The second part concerns the question of who 'I' is. Now, the behaviourism of contemporary economics implies that 'I' am the sum-total of what I do, of my choices, of my observed final choices. 'I' am what my actions make me. This means that economics defines 'I' as being only the last part of the chain stimulus-brain-response. That is to say that 'I' am the response part of the choice-making process. Once this is clear then it is easy to see how Determinism finds its place in contemporary economic thought. If 'I' am just the response, then there is no doubt about the fact that 'I' am Determined. The chain says lucidly that the stimulus eventually determines the response. Whatever the brain processes may be or may not be, they do precede the response, and hence the brain processes do indeed determine the response. At the end of the day, all of us make choices, and all these choices are determined by at least a process that precedes it. Hence, 'I' am Determined.

However if we define 'I' to include the processes that go on inside us to determine your choices then a different story can arise. If 'I' am the 'brain-response' portion of the 'stimulus-brain-response' chain then matters change. But this is dependent on what we understand by the nature of the brain processes.

If we accept the tightly-bound view of the chain then Determinism can be shown to exist in the chain. The response is tightly bound to the brain processes, and brain processes to the stimulus. Hence the response is still tightly bound to the stimulus. The response is still determined by the stimulus and the brain acts like a medium that is simply transmitting. It just 'passes on' the stimulus, so to speak. However, the hypothesis of weak comparability gives us a different interpretation. *The fact that the brain*

produces indeterminate responses weakens the link between the stimulus and the response. And given that the brain processes are a part of 'T', 'T' am thus not determined by the stimulus.

It must be clarified that the above case is not in any way a case for the Free Will. It does nothing to show that in the choice-making process there is an element of control that 'T' has over 'T'. Hence, there is no support for Free Will, as we understand it. The case was basically one against Determinism and, at best, it can be used to support non-Determinism, i.e. that man is not Determined. This may imply either that Free Will might exist in a different way, or that choice is a result of a mix of Free Will and Determinism, or that choice is a result of a mix of uncertainty and Determinism, etc.

So if the economic agent cannot be subject to the doctrine of Determinism, then economics needs some revision. All economic theories involve the economic agent, the human beings, and if these theories are to explain reality then economics must work towards a more realistic model of man and his behaviour. After all, we are, at the end of the day, talking about real human beings.

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