

WHY ECONOMIC-MAN THEORIES OF QUALITY ARE WRONG

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ABSTRACT

Theories based on "rational man" making perfectly informed, perfectly logical, choices between goods on the basis of their objective characteristics are important in marketing and marketing economics. Some of the theory also underpins theories based on more realistic assumptions. In this paper the theories are shown to have weaknesses which are serious from a range of epistemological viewpoints.

It is shown here that the theories have not been tested by their predictions and it is formally impossible to test them in this way. The assumptions are not simplified, but quite unrealistic. There is nothing to distinguish the theories from an infinite number of possible theories based on unrealistic assumptions. There are major logical and conceptual problems. The fundamental, boundary and ad hoc assumptions are so restrictive as to prevent application to the real world.

Fortunately, there is no shortage of alternative theories without these problems.

INTRODUCTION

Economic approaches to quality are dominated by economic-man theories, which assume a perfectly rational individual consumer who always makes the optimum decision based on perfect information. These theories include Houtakker (1952), Thiel (1952), Brems (1948, 1957), Becker (1965), Muth (1966), Lancaster (1966, 1971, 1979) Rosen (1974), Leland (1977) Ladd and Zober (1978) and Ratchford (1979). There are now well over 10,000 papers following from these. There are many alternative theories both within economics (e.g. information economics models, decision theory heuristics and market level hedonic analysis) and marketing (e.g. compensatory models, perceived quality models, behavioural and behaviourist models). There are also rich and inclusive research programmes in the new mainstream economics (e.g. Earl, 1986), in market economics (e.g. Bowbrick 1992) and in agricultural economics, as well as in marketing. Accordingly, lack of viable alternatives is not a justification for sticking with bad theory.

In this paper the economic man theories will be assessed for their use in allocating scarce resources in the real world, rather than for the elegance with which they derive the maximum of conclusions from the minimum of assumptions.

Testing theories is not as easy as testing models specific to a single situations,

which is a matter of seeing whether the assumptions are appropriate to the situation, the logic is correct or the model gives accurate predictions. An approach to testing theories is developed here.

CAN PREDICTIONS BE TESTED?

Theories, including the theories under consideration, are generally based on highly simplified assumptions which do not apply directly to any particular situation, and so do not make any testable predictions. They provide paradigms or strings of logic which can be included in specific, testable, models. Popper would not classify such theories as scientific though he emphasises that they may still be important in inspiring work that is scientific, as with Darwin's theory (1976, pp168, 171-80; 1972 pp69, 241-2, 267-8).

Since the predictions of the theory cannot be tested directly, the possibility of testing them indirectly must be considered. If models using Theory X consistently make more accurate predictions than ones using Theory Y, we may have more confidence in Theory X. However, testing models is difficult and unreliable as the "sophisticated falsificationists" (including Popper himself) have pointed out. The less reliable the test the more often it must be replicated. If their arguments are applied to theories, indirect testing appears impracticable, for the following reasons.

Comparative tests are not powerful when the theories compared share the same fundamental assumptions (when they are all economic man theories for instance) and so make similar predictions, and are impossible when the theories compared have boundary assumptions which mean they apply to different domains. Critical tests demand that the theories make predictions different in kind, not that they make the same predictions with different accuracy. Theory X is only a small part of any model and the model may fail for reasons unrelated to the theory. The model may not in fact use the theory the author thinks it does, as Lancaster (1971, pp163-4) complains. Results may be affected by sampling problems, data errors, experimental error, specification error etc. This means that evidence that is unfavourable to someone's pet theory may be given little weight and is unlikely to be published. For all these reasons, meta studies which trawl the literature to find out which theory is the best predictor, are invalid.

Below it will be argued that such indirect tests of the economic man theories of quality are not just impractical, they are impossible: it is not possible to say in any real life situation whether the assumptions hold, so it is not possible to say whether the theory ought to work there.

LOGIC AND ASSUMPTIONS

Rigour demands a lot more than that the argument flows logically from assumptions that are not self contradictory. In addition, assumptions must not rule out all of the real world. If the theory is to have any practical value, its assumptions must be realistic, albeit simplified. Assumptions must also be logically correct: there is a strong theoretical content in the assumptions of this research programme (they are derived from the logic of consumption theory related to goods), so the assumptions may be logically wrong.

SIMPLIFYING ASSUMPTIONS

The theory is necessarily simpler than a specific model, in order to have a broader applicability. Judicious simplification retains realism, but injudicious simplification can make the theory meaningless. This research programme works by starting with a few assumptions and building up the paradigm cases. More realistic assumptions can then be introduced to produce specific results. Some other economic approaches reach the paradigm case of theory by simplifying from specific models.

FUNDAMENTAL ASSUMPTIONS

The research programme has fundamental assumptions on a) consumer preferences, b) the supply price of characteristics and c) the objectivity of characteristics, which are implicitly or explicitly taken by most authors to apply generally, not just in the confines of their own theory.¹

PREFERENCE ASSUMPTIONS

The research programme assumes that each consumer always prefers a good with more of at least one characteristic² so that an indifference curve in characteristics space looks like the traditional indifference curve between goods (Figure 1). This has been formalized by Lancaster (1971 p26) who assumes transitivity, completeness, continuity, strict convexity, non-satiation and all characteristics positively desired in order "that the

1 Since there are many thousands of papers in this research programme, it would be surprising if there were not a few exceptions to the generalizations made in this paper. However, I have not come across them.

2 The term "characteristic" refers here to the objective properties of a good, and "attributes" to the subjective. A good is a unique mixture of characteristics; a different blend of tea perhaps, while tea is considered to be a group of goods.

consumer's preferences can be expressed in terms of an ordinal utility function of the neo-classical kind with all its first order partial derivatives positive".

There is a fundamental conceptual error here: the economic theory built on discrete goods cannot be adopted without change to a theory based on the characteristics of goods. It is quite reasonable to assume that two goods are bought separately and consumed separately, so preferences and supply for each good can be considered independently. However, the characteristics of a good are necessarily supplied together and some at least must be consumed together, so the independence in preferences or supply cannot be assumed.

Table 1 shows utility from a product which has two characteristics supplied and consumed together, but where the utility from one characteristic is not influenced by the amount of the other characteristic consumed - an extreme assumption. There is rising, then constant, then falling marginal utility from each characteristic. When there is rising marginal utility, the individual will buy a good with all one characteristic or all the other. As levels of characteristics rise the indifference curve is a bull's eye round the maximum utility. Extreme assumptions like positive but declining utility at all levels are needed to get curves like those of Figure 1.

In general, though, the utility obtained from one characteristic is strongly influenced by the level of others. An individual's preferences for sweet and acid wines might be as in Figure 2, where a medium-sweet, medium-acid wine is the optimum and too much sugar or acid is as bad as too little, again producing a bull's eye around the optimum. A very sweet, very acid wine is not preferred - contrary to the assumptions of the research programme.

In practice many quite different shapes of indifference curve can be expected (Bowbrick, 1992). In Figure 3 there are two peaks, a high-acid, high-sugar cooking apple and a normal dessert apple. Certainly, there are two end uses here, but the claimed strength of characteristics-based theories like Lancaster's is that they can ignore the reasons underlying choices, and concentrate on the characteristics purchased. In Figure 4, a pure product is preferred to a mix. In Figures 5 and 6 preferences for a mixture of kerosene and milk are shown. The mixture is revolting in taste and does not burn so the indifference curve in Figure 5 consists of points on the axes. In Figure 6 the product possibility curve is shown by the diagonal, and any indifference curve would be points on this diagonal (and in the extreme case would be where the diagonal meets the axes).

From the examples given here it is clear that Figure 1 is not the norm. The milk/kerosene preference, for instance, gives an idea of what one would expect for any food contamination possibility, so it would be surprising not to find some such shape for some characteristics for all foods. However, the theory demands that the assumptions

hold for all characteristics of a good. It must be concluded that the assumptions are most unlikely to apply in any real life situation. The economic man theories cannot proceed to their basic paradigm cases if these assumptions do not hold.

A fundamental error which pervades the literature is the assumption that there is a single characteristic space defined by axes like "[Level of] Characteristic A" and "[Level of] Characteristic B". In fact one can expect very different shapes of indifference curve when one plots consumer preferences for characteristics, sugar and chili powder say, -in the stew on one's plate; in one's ice cream; in the meal as a whole; in this week's diet; in one's diet as a whole; or in total consumption (and while most of the literature is concerned with characteristics in total consumption, I question whether people have a concept of chili in total consumption). The shape of indifference curves also change with definitions, with one curve for "sugar in total consumption" another for "fructose in total consumption", and another for "wine sugars in total consumption." Figures 5 and 6 show the effect of a slight change in the definition of the axes. Most writers switch from space to space without realising it and without noticing the implications. Lancaster, for instance uses the following axes interchangeably, and without changing the shapes of his curves:

1. Total amount of characteristic in total consumption.
2. Total amount of characteristic in diet (1971 p17).
3. Total amount of characteristic in one unit of a good, an automobile (1971 pp157-174).
4. "Cleaning power per dollar" for detergent (1966 p153).
5. Level of characteristic obtained from one or more goods within a group of goods, but not obtained from other goods. (especially 1971 pp 125-139)
6. Characteristics per unit of a good (1979 p28).
7. A "normalized" characteristic, defined such that all consumers have the same efficiency frontier - his second paradigm case. This may however be built on any of the above - characteristics in total consumption, an automobile, unit quantity of a good etc.

It is perhaps easiest to think of plotting different utilities in different characteristics spaces. It is certainly wrong to think in terms of different utilities being plotted in the same characteristics space.

SUPPLY PRICE

The theory assumes, usually implicitly, that the supply price is such that a consumer who is making the optimal choice can only buy a good that has a higher level

of characteristic by paying more. Just as characteristics are positively desired, so they are positively priced. Although it is reasonable to assume that you can get more of a single good by spending more, it is not obvious that you can get more of a characteristic by spending more when the characteristics come together in a single good. Without this fundamental assumption none of the optimizing criteria of the theory hold.

In Figure 7 the CO curves indicate the constant outlay curves for a bottle of wine, each indicating the various characteristics mixes which can be obtained for a given sum of money. The price is higher nearer the centre as, it is assumed, demand is greatest for medium-sweet, medium-acid wines, and the supply of all wines is the same. Indifference curves for an atypical consumer who prefers slightly sweeter, more acid wine to the average, are shown. Both constant outlay and indifference curves are bull's eyes. The optimum purchase is a trade off between quantity and quality which cannot be shown in two dimensions: however both constant outlay and indifference curves are concave to the origin at the optimum - contrary to the theory.

Production-cost considerations do not give much support to the idea that goods with more of a characteristic normally cost more. The relationship is far from a general one when input characteristics are not the same as output characteristics, as with most goods where taste or beauty are significant. Even when a product is just a mix of ingredients, or is made by bolting together components, the assumptions of Neo-Chamberlinian approaches like Lancaster (1979) do not hold.

Any effects of production costs may be masked by market effects.

In price-taking markets in particular these supply/demand relationships, rather than production costs, set the supply price to the individual. In price-making markets production costs have a more direct relationship to prices, but in these markets the assumptions of the economic man theory do not hold - all buyers perceiving the same characteristics in each good for instance.

The possibility of price formation like that in Figure 7, or the more complicated relationships that can be expected with other preferences and prices, suggest that it will not be possible to derive individuals' indifference curves from their observed behaviour, and so it will not be possible to use observed behaviour to determine whether the assumptions of the theory apply in any case. The very limited number of comparable observations possible in a period of consistent prices and alternatives is quite inadequate for plotting a curve of any complexity, much less an n-dimensional indifference surface.

Hedonic Prices

Rosen (1974) is an attempt use an economic-man theory to justify the tradition of market-level hedonic analysis following from Waugh (1928) and Lancaster (1966, 1972) is often said to have the same effect (e.g. by Earl 1986 and Steenkamp 1989).

The justification fails because, apart from the other theoretical weaknesses discussed here, the appropriate price for economic, man theory is not the one used in hedonic theory and used by Rosen.³

Economic man does not base choices on a regression equation but rather on a price list, which gives the prices for all available alternative. The individual can give equal weight to any available option while a regression concentrates on those prices at which most transactions take place. A normal hedonic regression equation will give misleading results in Figure 7. If the observations are scattered evenly, a linear regression will give a poor fit. If most of the observations are in the NE quadrant both characteristics will be reported as negatively priced, if in the SW both will be reported as positively priced and if in the NW or SE, one will be reported as positively priced, one as negatively. Regression equations carried out over a period of time do not indicate the options open to an individual at a moment in time, when choosing at a display in a shop perhaps.⁴

It is sometimes feasible to carry out regressions on price lists rather than observed transactions, but this tends to be in price-making markets where the assumptions of the theory do not hold.

The fact that hedonic prices are not the prices faced by individuals in the markets assumed in this research programme does not detract from their value in market-level hedonic analysis. Nor do the weaknesses in these attempts to justify hedonic analysis by economic man approaches mean that hedonic analysis is wrong.

SUBJECTIVE OR OBJECTIVE

Most economic man theories of quality are based firmly on the assumptions that all goods have objective characteristics: that it is on these alone that consumers'

3 "Hedonic prices are defined as the implicit prices of attributes and are revealed to economic agents from observed prices of differentiated products and the specific amount of characteristics associated with them ... Econometrically, implicit prices are estimated by the first-step regression analysis (product price regressed on characteristics) in the construction of hedonic price indexes". (Rosen, 1974, p.34).

4 Rosen (1974) appears to assume that the set of prices facing buyers is at the same time:

- a market clearing price,
- an average equilibrium price at the end of a day's trading
- the price facing each buyer and each seller at all periods through the day.

decisions are made; that the characteristics are objectively measurable; that all consumers perceive the same characteristics and see them identically (though they may value them differently); and that they always make optimal decisions. (See particularly Rosen 1974, Lancaster 1971). In fact the assumptions are written in such a way that they may be interpreted as being about the properties of goods, rather than about how consumers perceive them.

The research programme is very different in this way from market level hedonic theory where in some cases the logic may simply be "Goods with what the researcher perceives to be more of characteristics A, B and C tend to get higher prices, so the marginal producer may get a higher price by increasing the level of these characteristics in his product." or "Market research shows that consumers consistently have certain attributes with regard to different goods in this group. Regressions show that goods with more of attributes, X, Y and Z get a higher price. If the marginal producer increases the level of these attributes, whether by changed specifications or advertising, he may get a higher price." It is not implied that objective characteristics determine consumer decisions: at most, the first argument attempts to use objective characteristics as a proxy or indicator for the attributes on which the decisions are really made, while the second argument ignores them entirely.

There is a strong assumption throughout this research programme that people really would like to make decisions on the objective characteristics and that they make decisions on what they perceive characteristics to be for lack of anything better. This must be contrasted with the view that quality is in the mind of the consumer, that consumers buy on the basis of the qualities they attribute to a good, and that these attributes need not be in any way associated with a characteristic. (What objective characteristics determine the quality of the Mona Lisa? of a lottery ticket? of a television sitcom? of a meal? of a Dior dress? of Patou's Joy?) In so far as characteristics are known, they are used by individuals as a guide to the attributes of a good. Attributes are not used as an indicator of characteristics. If therefore a theory is constructed which requires the assumption that the economist is omniscient with regard to characteristics (like these economic man theories) why should it not also assume omniscience with regard to attributes?

The assumptions of the economic man theories - of objectivity, perfect knowledge, and optimal decisions - are contrary to common experience and the results of empirical research, and are totally rejected by marketing, the economics of information, the economics of advertising, market economics and much of the rest of economics. In fact people do not perceive characteristics correctly, nor do they correctly relate characteristics to the satisfactions they produce, nor do they make optimal decisions. In fact, too, there are major differences between individuals in these respects.

Once this is accepted the research programme is in trouble because:

"If different individuals were to 'see' the same goods in fundamentally different ways, there would be little point in devising an analysis to take account of the objective properties of goods. For then either it is meaningless to speak of "objective" properties, or those properties which are objective are irrelevant to people's relationship to goods." (Lancaster, 1971 p6).

The implications may be examined by imagining a case where a producer, a retailer, a market researcher and some consumers each have a different perception of the objective characteristics of the goods in a group. Let us also imagine that each of these people can plot their own indifference curves (this is extremely unlikely, but it is an assumption favourable to the research programme).

It is only possible to plot all of these curves on the same diagram if everybody sees the same characteristics as being relevant and significant, so the same axes can be used. (In Lancaster, in particular, if they are not relevant they are not "characteristics"). However, consumers may be influenced by non-existent but imagined characteristics, or they may not appreciate the relevance of some of the characteristics of a motor-car to the utility they get from it, for instance. Producers, retailers and consumers may have quite different perceptions of what characteristics are relevant.

In addition, these characteristics must be perceived and measured in the same terms by everybody if they are to be plotted on the same diagram, even if there is perfect knowledge. For instance different individuals may perceive the engine power of a car in terms of top speed, ability to pull a caravan, speed from 0-30 mph, ability to pass on the motorway, BHP or engine capacity. Even with perfectly accurate perceptions, these people would plot the power of a given car engine differently.

If the characteristics are incorrectly perceived, individuals will plot the same good in different positions in the diagram. If consumers realize that they have imperfect perception they may take risk and the strength of their belief into account. Incorrect perception of the satisfactions obtained from a given characteristic mix may have similar results.

It may be expected that an individual will draw one indifference curve when relating preferences to level of characteristic in the abstract and another when relating preferences to specific branded goods, both because of imperfect perception of the characteristics of the branded goods and because of the attributes associated with them. If the two curves were replotted on axes related to objective characteristics, they would

be very different and one might appear to be irrational.

If and only if everyone considers the same characteristics relevant and measures them in the same way, it is possible to relabel the axes as "Perceived level of Characteristic A" etc. Imperfect knowledge means that individuals will plot the same goods in different positions and will perceive different budget lines, though this effect is reduced by the extent to which there is a common subjectivity.

Is it possible for the economist or market researcher to take all the indifference curves and bring them together? It is conceivable that each individual might plot indifference curves relating to a large number of specified identifiable goods, saying only which were valued identically. The economist or market researcher could then collect this information from everybody and plot it on his or her own diagram using those axes he or she thought relevant. Each good would then occupy only one point on the diagram. Again, even if the consumer's indifference curve met the conditions of convexity, transitivity, all products positively desired and so on when plotted against his or her own perceptions of level of characteristic, this could not be expected to be so when they were plotted against the researcher's perceptions or indeed against objective measures. There is no reason to suppose that decisions are in fact made on the attributes the researcher thinks important.

One of the biggest attractions of the characteristics approach is that it claims to predict sales when the objective characteristics of a product are changed. In practice though there may be major changes in characteristic while perceptions remain constant or vice versa. The good may be completely different with its characteristics unchanged, as a result of changes in advertising, information, availability, guarantees, location, uniformity, tolerances, end use etc.

It is clearly not possible to derive the indifference curves of individuals from their actual purchases, for the reasons given in the sections on preference assumptions and supply assumptions, and this section has given more reasons. Equally, for the reasons given here, it is not possible even with self explication to determine indifference curves plotted against truly objective characteristics. It is not possible therefore to plot the diagrams used in the economic man theories.

BOUNDARY ASSUMPTIONS

Boundary assumptions set out the domain in which the theory is intended to work, and each of the economic man theories has a different set of boundary assumptions. Lancaster (1966, 1971, 1979) is used as an example here as his theory is far and away

the dominant approach and indeed Lancaster 1966 is one of the most cited papers in economics. Remarkably, his own writings still are the paradigms in this theory. His is also the most rigorous presentation. He assumes inter alia that

- a) the satisfaction obtained from a characteristic is independent of the good in which it is supplied or consumed, so one gram of sugar gives the same utility, whether it is in wine or ice cream or curry.
- b) Any goods can be consumed jointly and it is the total level of the characteristics in total consumption from the combination that determines the satisfaction gained, not the level in any one good.

None of his optimization and aggregation procedures apply where these assumptions do not hold. These assumptions are wrong if they are self contradictory or if, as he admits is true of the assumptions of his 1975 paper, they rule out all reality.

These assumptions are highly restrictive, and largely restrict application to situations similar to the agricultural economist's least-cost pig food problem (from which Lancaster's theory evolved). To some economists the first task of an economist is to allocate his or her own time rationally, and an economist who concentrates on a theory with such little practical application is ipso facto incompetent (Bowbrick, 1988). Others disagree, and it is significant that only 1.5% of papers citing Lancaster (1966, 1976, 1975, 1979) in recent years cited Hendler (1975), Ladd and Zober (1977) or Lucas (1975) who criticized Lancaster's boundary assumptions.

AD HOC ASSUMPTIONS

Ad hoc assumptions are ones that are added not to make a simple theory more realistic, but because the theory will not work without special assumptions (See Popper 1972, pp15-16, 30; 1975 pp40, 42). The new assumptions each restrict the possible applicability of the theory. Since each new explicit assumption also introduces implicit assumptions, this increases the probability of contradictions in assumptions passing unnoticed.

Again, the example of Lancaster may be used.⁵ One book, Consumer Demand

⁵ In most other theories the bulk of the boundary assumptions and ad hoc assumptions are implicit, and may change through the analysis.

(1971) contains 63 explicit assumptions, and at least 40 of them are ad hoc. (There are also implicit ad hoc assumptions. Some examples are

- When one is dealing with a group of closely related goods, all other goods may be treated as equally close substitutes for this group (Lancaster 1971 pp128-9). [He uses "goods" in the sense of a single product line.]
- There is a uniform distribution of income so that average income is constant over preferences and there is a rectangular distribution of preferences, with constant density taken to be unity (Lancaster 1971 p79).
- The consumption technology is linear, after ignoring invariant characteristics and a characteristic is irrelevant if there is a linear dependence in the technology (Lancaster 1971 p142).
- "The most heroic assumption is the uniformity assumption on the nature and distribution of preferences". "In geometric terms it implies that the transformed indifference curves in specification-quantity space are all of identical shape and are tangent to the [Product Differentiation Curve] at the specification corresponding to the most-preferred good" (Lancaster, 1979, p.47).

Many of the remaining assumptions are ceteris paribus. The ceteris paribus assumption is a powerful analytical tool at some stages of an analysis, but if it is not eventually dropped they are just ad hoc assumptions, or possibly boundary assumptions, in another guise. Lancaster does not drop them.

After examination of the fundamental and boundary assumptions it was shown to be virtually impossible that the theory would apply to any real life situation. As more and more ad hoc assumptions apply, the possibility of practical application reaches vanishing point. What is more, it is clearly impossible to identify a situation where the assumptions hold, even if one does exist. In view of this it is extraordinary that Lancaster should make a wide range of generalizations on welfare, including the welfare effects of international trade and political systems, derived from these assumptions in Variety, Equity and Efficiency (1979).

Two Stage Models

Lancaster starts with a model where the goods give rise to characteristics directly but also mentions briefly a possibility that "characteristics are derived from consumption activities in which goods, singly or in combination, are the inputs (Lancaster 1971 p47). This would appear to mean eating a meal cooked from the goods in a market basket.

This requires the extraordinarily restrictive additional assumption that all his assumptions continue to apply equally for all individuals in spite of the process of cooking a meal, when each consumer cooks in his or her own way. This model was given only two pages in Lancaster (1971) and Ratchford (1975 p66) concludes. "This model proved difficult analytically and was abandoned..."

PROBLEMS WITH METHOD

The theories in this research programme are very bad when judged as tools for the efficient allocation of scarce resources and are hardly any better as an exercise in extracting the maximum of conclusions from the minimum number of assumptions. How did thousands of economists create, maintain and use a such a theory? Some possible reasons are as follows:-

The theory produced was determined by the objectives of the researchers, which do not seem to have included producing a workable tool for the allocation of scarce resources.

For the reasons given above, testing of the theories by their predictions, direct or indirect, is not possible, and economists in the research programme do not appear to have the concept of testing theory by its assumptions or logic.

The researchers do not seem to share the practical economist's belief that concepts and definitions are of fundamental practical importance. This may be because they used a logical language, mathematical economics, which is powerful for handling resource flows, but weak at concepts. It is for just this reason that philosophers do not use symbolic logic, even though they invented it.

Clearly, if a theory is derived from assumptions are known are unrealistic, it is extremely unlikely that it will produce conclusions that are realistic. Similarly, if a theory is derived from assumptions which exclude a lot of what is known to be true, it cannot be expected to produce conclusions that are realistic: a fully specified model will produce significantly different results. Where Occam used his razor to exclude from theory entities for which there was no empirical evidence (categories of angel), Occam's razor has been used in this research programme as a justification for excluding from the theory phenomena for which there is a great deal of empirical evidence, in order to construct a theory with the minimum of assumptions (e.g. Lancaster 1966 p132).

There is a logical fallacy underlying the theories, that if we can produce some credible results from a selected handful of assumptions, then all possible conclusions based on these assumptions are correct. Only some of the conclusions can be said to be credible or not, and the conclusion that they are credible is a matter of popular belief rather than hard evidence. In practice, ad hoc assumptions have been introduced before the further conclusions are produced. In practice, too, the concepts and assumptions seldom remain constant through the analysis, even in those not too common cases where they are made explicit at the beginning of an analysis.

A fundamental difference in approach which divides the economics profession is that some economists start from a handful of assumptions about economic man and build up the theory from there by adding assumption after assumption, while others, the vast majority I believe, create theory by abstracting from highly specific models, removing known minor realistic assumptions to produce a theory of more general application. Abstracting from reality nearly always produces a theory that is richer in assumptions and realistic. Building up from economic man means that a vast amount of reality is ruled out, not because it has been explicitly assumed away, but because it has never been explicitly ruled in. Nobody knows what has not been ruled in.

The reasons for the popularity of the characteristics approach appear to be that its theory appeared familiar, using accepted indifference curve theory for instance; that it appeared to be rigorous; that it followed in the economic-man tradition that many economists were trained in, and which they consider is "proper economics"; that it appears to support the practically successful hedonic approach; that measuring characteristics is cheaper than measuring perceptions; and that characteristics are closer to production specifications than perceptions are. These appearances have been shown to be deceptive.

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