

## Problems with Neoclassical Economics

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### *Illustrations of successful use of mathematics in neoclassical economics*

In the literature of mainstream (read, neoclassical) economics I can think of three examples of successful use of mathematics whose theorems are verified by proper empirical tests. The first is the Slutsky equation which was put forward by the Russian statistician Yevgeny (Eugen) Slutsky, which was translated into Italian and published in the Italian journal *Giornale degli Economisti* (Chipman and Lenfant 2002).

The Slutsky equation is supposed to decompose the change in demand for good  $i$  in response to a change in the price of good  $j$ :

$$\frac{\partial x_i(\mathbf{p}, w)}{\partial p_j} = \frac{\partial h_i(\mathbf{p}, u)}{\partial p_j} - \frac{\partial x_i(\mathbf{p}, w)}{\partial w} x_j(\mathbf{p}, w),$$

where  $h(\mathbf{p}, u)$  is the Hicksian demand and  $x$  is the Marshallian demand, at the vector of price levels  $\mathbf{P}$ , wealth level (or, alternatively, income level)  $w$ , and fixed utility level  $u$  given by maximizing utility at the original price and income, formally given by the indirect utility function  $v(\mathbf{p}, w)$ . The right-hand side of the equation is equal to the change in demand for good  $i$  holding utility fixed at  $u$  minus the quantity of good  $j$  demanded, multiplied by the change in demand for good  $i$  when wealth or income changes. You do not really need a utility function to separate the income and price effects as the theory of revealed preference has shown. The Slutsky results were newly discovered by Hicks and Allen (1934; see also in this connection Chipman and Lenfant 2002).

A second successful use of mathematical and statistical techniques was made by Allen and Bowley (1935), when they demonstrated that the proportion of family expenditures on food and other items systematically varied as between the workers and other classes. Their results were extended with larger samples by Prais and Houthakker (1955), who also demonstrated that in the long run, income effects outweighed the price effects. This result is of great significance, since it can be shown why industrialized countries will suck in expenditures from primary-producing countries and why the latter will lag behind the industrialized countries unless they themselves can climb on the trajectory of dynamic industrialization. It can be further generalized to show that if the laggard countries become specialized in the production of manufactures with low income elasticities of demand, they will not be able to catch up with developed economies.

A third successful use of mathematical techniques occurred with Friedman and Savage (1948). In that paper, the authors demonstrated why there are so many people entering the profession of a lawyer, when most lawyers earn so little, or so many people setting up as entrepreneurs when few of them make good. The reason lies basically in the aspiration of the entrants: even if few lawyers do well, a few do very well indeed. They aspire to become another Motilal Nehru, or another Chittaranjan Das or another M. C. Setalvad. If you plot the number of persons in such professions

on the y axis and the income they earn on the x axis, you get a long-tailed curve, with most of the professionals in low-income brackets. This demonstration can be extended also to strategies of politicians in poor countries, with a permanent reservoir of unemployed and unemployable people. Major politicians dangle the bait of enormous legal or illegal gains to members of that underclass, and get them to do their bidding. Even if few of them become rich, others follow the great man or woman, hoping that someday he or she will look at them with favour, and they will come into untold wealth. Such people can also be used to threaten members of the opposition. Such reasoning can explain the success of a Doc Duvalier in Haiti, or for that matter, that of politicians in many states of India.

*Illustrations of misuse of mathematics*

Experiment 1				Experiment 2			
Gamble 1A		Gamble 1B		Gamble 2A		Gamble 2B	
Winnings	Chance	Winnings	Chance	Winnings	Chance	Winnings	Chance
\$1 million	100%	\$1 million	89%	Nothing	89%	Nothing	90%
		Nothing	1%	\$1 million	11%		
		\$5 million	10%			\$5 million	10%

One of the oldest examples of misuse of mathematics occurs with the rigorous formulation of general equilibrium theory, of which Debreu (1959) is a splendid example. The book is beautifully written, and is still a good read, when you are in a leisurely mood. But look at its assumptions. All markets exist in all commodities for all time to come. Thus at any point of equilibrium, all the prices and quantities traded are given for ever and ever. If you introduce any change into the economy, you move into a different world altogether, as in Arthur Clarke’s science fiction or in Joan Robinson’s world of tranquillity. There is no possibility of carrying out any comparative static analysis. It is also a world without money. All the attempts to introduce money into a general-equilibrium world have so far been unsuccessful (Hahn 1971; Duffie 1997).

The introduction of the actuarial value of risky outcomes in a world of radical (uninsurable) uncertainty, that is the world of existing capitalism, has also led to numerous errors. Take, for example, the proposition that you should be indifferent about two events which have the same expected value. Maurice Allais, however, showed that it is not true. People weigh a gamble with a great chance of loss or gain differently from a gamble with a small chance of loss or gain even though the expected value may be the same in the two cases. The following is an example of the Allais paradox (Wikipedia), which arises when comparing participants' choices in two

different experiments, each of which consists of a choice between two gambles, A and B. The payoffs for each gamble in each experiment are as follows:

Several studies involving hypothetical and small monetary payoffs, and recently involving health outcomes, have supported the assertion that when presented with a choice between 1A and 1B, most people would choose 1A. Likewise, when presented with a choice between 2A and 2B, most people would choose 2B. Allais further asserted that it was reasonable to choose 1A alone or 2B alone.

Other examples of the failure of expected utility theory have been given by Daniel Kahneman and Amos Tversky in several papers (e.g., Kahneman and Tversky 1979). "Choices among risky prospects exhibit several pervasive effects that are inconsistent with the basic tenets of utility theory. In particular, people under weigh outcomes that are merely probable in comparison with outcomes that are obtained with certainty. This tendency, called the certainty effect, contributes to risk aversion in choices involving sure gains and to risk seeking in choices involving sure losses. In addition, people generally discard components that ae shared by all prospects under consideration. This tendency, called the isolation effect, leads to inconsistent preferences when the same choice is presented in different form" (Ibid, p. 263).

Yet another example of misuse of mathematics to derive empirically invalid results are the mean-variance analysis of portfolio choice and its extension to capital asset portfolio management (CAPM) model developed by Harry Markovitz, James Tobin and William Sharpe. Tobin's construction was supposed to provide a rigorous basis for Keynes's liquidity preference theory. In fact, it cannot do that. Keynes's theory essentially depends on dispersion of expectations, given the means and variances of returns of various investment projects. Moreover, a key result of the CAPM is that the market portfolio---the portfolio of all assets in which each asset's weight is proportional to its total market capitalization---lies on the mean-variance efficient frontier, the set of portfolios having mean-variance characteristics that cannot be improved upon. Therefore, the CAPM cannot be consistent with efficient frontiers for which every frontier portfolio has at least one negative weight or short position. We call such efficient frontiers "impossible", and derive conditions on asset-return means, variances, and covariances that yield impossible frontiers. With the exception of the two-asset case, we show that impossible frontiers are difficult to avoid" (Brennan and Lo 2008).

Another illustration of the absurdity of the neoclassical approach to risk is the efficient market hypothesis (EMH) relating to the behaviour of the stock market. According to EMH, stock prices display a random walk, so that nobody can make more than normal profit by playing the market (Fama 1970). As soon as the EMH was floated, counter-examples began to proliferate. For instance, there was the Mehra- Prescott equity premium puzzle. "Restrictions that a class of general equilibrium models place upon the average returns of equity and Treasury bills are found to be strongly violated by the U.S. data in the 1889-1978 period. This result is robust to model specification and measurement problems. We conclude that, most likely, an equilibrium model which is not an Arrow-Debreu economy will be the one that simultaneously rationalizes both historically observed large average equity return and the small average risk-free return""(Mehraand Prescott 1985, p. 145). Shleifer (2000) has given many other examples of the inefficiency of stock markets.

The final example of the absurdity of the neoclassical approach to markets and choices under risk is the options pricing formula of Fischer Black and Myron Scholes (1973) and Robert Merton (1973). A basic assumption of that formula is that the stock market can discover the fundamentals of a firm. Even before the advent of the theory of behavioural finance, pioneered by Robert Shiller, James Campbell and others, anybody who had read chapter 12 of Keynes's General Theory would have known that the stock market was noisy and was moved by irrational impulses. (Keynes, by the way, became wealthy by playing the stock market, so he knew what he was talking about).

Most of the people who peddled these absurd theories – Gerard Debreu, Eugene Fama, Robert Merton and Myron Scholes (Fischer Black had died before the prize was awarded) - were awarded the Swedish Bank prize (misleadingly called the Nobel Prize). So it is mainly ideology rather than scientific contribution that motivates the award of the prize.

Mainstream economics prides itself on treating human beings as rational beings. Yet as Amartya Sen (1977) has shown, such beings act as fools, paying no attention to the needs of family and friends, their own interests beyond guzzling as consumers and having no commitment as citizens and human beings.

Moreover, mainstream economics fails even to observe the tenets of its canon.

It can be easily shown that for an increase in the value of your wage, the income effect would normally dominate the substitution effect. Say you work a 40 hour week and your hourly wage jumps from Rs20 to Rs 100. You might work more, since an extra hour gets you an entertainment system instead of just a CD. You will also want to give your children a better education, which will be an added incentive. Only in the case of Giffen goods will the income effect be swamped by the price effect (see Green 1971 for an extensive discussion of income and price effects).

Furthermore, as Prais and Houthakker (1971) demonstrated in their detailed inquiry into the family budgets of the United Kingdom, apart from food stuffs, the income elasticities of all other goods are larger than one over time, irrespective of price changes. This has had serious implications for Third World countries which are producers of mainly primary commodities or crudely processed goods, the terms of trade of which have declined over time, except for a few episodes in the early twentieth century.

Eminent economists such as Wassily Leontief and many other social scientists have been complaining for a long time about the excessive use of mathematics and the lack of realism of economics as it is taught in class-rooms and practised by professional economists (Parker 1993). In the neoliberal order we are passing through, simple consumer theory cannot take us very far, if it ever did so:

People caught in the neoliberal order are also all the time compelled to consume, often beyond their real needs and paying capacity because of social pressures. These social pressures have been captured as snob, bandwagon and Veblen effects. Although the snob and Veblen effects are characteristic of the rich, the poor are also caught up in their snare. The consumerist behaviour of the Indian rich, as the behaviour of the rich elsewhere can be explained by combining Band Wagon, Snob

and Veblen effects (Veblen 2005[1899]; Leibenstein1951; Bagwell and Bernheim 1996; Bagchi 2005). Let us first see how Leibenstein (1950, p.109) distinguishes between band wagon, snob and Veblen effects:

By non-functional effect is meant that portion of the demand for a consumers' good which is due to factors other than the qualities in the commodity. Probably the most important kind of non-functional demand is due to external effects on utility. That is, the utility derived from the commodity is enhanced or decreased owing to the fact that the commodity bears a higher rather than a lower price tag. We differentiate this type of demand into what I shall call the 'bandwagon effect,' the 'snob effect' and the 'Veblen effect'. By the bandwagon effect, we refer to the extent to which the demand for a commodity is increased due to the fact that others are also consuming the same commodity. It represents the desire of people to get into the 'swim of things'... By the snob effect we refer to the extent to which the demand for a consumers' good is decreased owing to the fact that that others are also consuming the same commodity (or others are increasing the consumption of the same commodity). This represents the desire of the people to be exclusive; to be different; to dissociate themselves from the 'common herd'. By the Veblen effect we refer to the phenomenon of conspicuous consumption; to the extent to which the demand for a consumers' good is increased because it bears a higher than a lower price. We shall perhaps emphasise the distinction between the snob and the Veblen effect- the former is a function of the consumption of others, the latter is a function of price.

The bandwagon effect is not a characteristic of the rich. It primarily characterises the behaviour of those who are trying to keep up with the Jones. They are the kind of people who would flaunt a Gucci bag knowing it was a fake. Here we are concerned with the rich who want to signal their superior status through conspicuous consumption.

Anecdotal evidence suggests that Veblen effects may be significant for luxury goods. According to one marketing manager, 'Our customers do not want to pay less. If we halved the price of all our products, we would double our sales for six months and then we would sell nothing. Indeed The Economist (1993) emphasises that 'retailers can damage a glamorous good's image by selling it too cheaply'. A recent article in the Wall Street Journal noted that 'a BMW in every driveway may thrill investors in the short run but ultimately could dissipate the prestige that lures buyers to these luxury cars (Bagwell and Bernheim, p. 349).

This status-seeking behaviour of the rich also has policy implications. When the US government imposed a tax on luxury goods, 'Rolls Royce, Jaguar, and Jaguar [each ran] promotional campaigns in which they offered to reimburse customers for the full amount of the luxury tax' (Ibid, p. 352).

Of course, the major exploitation of workers takes place in the production process. As Marx and Engels (1976[1845-46], p. 83) wrote: "Competition separates the individuals from one another, not only the bourgeois but still more the workers before individuals can unite." This competition is constrained by worker solidarity and other bonds of social cohesion. But the relentless attack on workers under neoliberalism and mounting unemployment have shattered most of those bonds and left them prey to new modes of exploitation, such as flexi-work, rationing of employment and home-based work.

Apart from Veblen effects and intra-working class conflicts, there is the seductive power of a hierarchical society in which a mere Wally Simpson, an ordinary American woman can marry the king of England. So why should another ordinary woman who imbibes the values of that society and behaves according to values of that society not aspire to own a decent house and other good things of life, such as a rich husband, a decent house, a television set and a car, even though she belongs to the working class? Carolyn Steedman's mother originated from Lancashire labour aristocracy, namely, weavers, and migrated to London after the textile industry fell into bad times during the 1930s and ended up as a manicurist for rich ladies. She was a 'good mother' although her children were illegitimate, with a rather irresponsible husband. She voted Conservative, saved ferociously for a house which she never bought and left £40,000 in 1967, a tidy sum for a university professor at that time (Steedman 1986). One can understand how Margaret Thatcher could find solid support in the British working class from this story of Steedman's mother.

*The fallaciousness of neoclassical economics continues unabated*

In a widely-quoted article, Baumol (2000) judged that the marginal productivity theory of distribution, which he still thought was the correct theory of income distribution, had been largely anticipated by Alfred Marshall and his contemporaries such as J. B. Clark and P. H. Weeksteed. The fact is that as long back as 1953 Joan Robinson had demonstrated the essential circularity of the marginal theory of income distribution. According to that theory the rate of profit is equal to the marginal productivity of capital. But capital is not a physical entity and the valuation of capital requires the assumption of a given rate of profit, thus leading to circular reasoning. After that Sraffa (1960) conclusively demonstrated that income distribution can only be determined if either the rate of wages or the rate of profit is given from outside. One of the reasons, apart from the circularity argument, why one cannot posit a monotonic relation between the rate of profit and the marginal product of capital is that the same technique of production may prove to be the most profitable at two different rates of profit.

According to Baumol, the formalization of macroeconomics was a major achievement of post-Marshallian economics. That is certainly correct. For although there were anticipations of many elements of macroeconomics in the works of Sismondi and Karl Marx, it was left to Keynes and Kalecki to give a rigorous formulation of macroeconomics. While Keynes utilised the Marshallian partial equilibrium framework to motivate his departure from what he misleadingly called 'classical economics', Kalecki used a Marxian framework as the foundation of his theory. However, Baumol thinks that Robert Lucas's 'rational expectations' theory is a reformulation of macroeconomics to suit different circumstances, I have shown (Bagchi 1994), along with many others, that rational expectations is a travesty of Keynes's theory because, contrary to Keynes's theory and the facts of the real world, it abstracts from radical, uninsurable uncertainty.

Baumol thinks that the theory of the firm is a genuine innovation in modern economic theory. While there have definitely been advances in the theories of monopoly (duopoly theory had already been rigorously formulated by Cournot) and monopolistic competition, the elements of a theory of the capitalist firm were already present in chapters XIII-XV of Marx (1886[1867]). In fact, its insight is still to be fully absorbed in mainstream theory. For, Marx recognised that when employee enters

a capitalist firm, he enters into a political relationship with his employer. Every instruction of the employer to the worker cannot be evaluated. Within the limits of the necessarily incomplete contract, the worker is bound to obey the employer's order. The only social scientist who has come near Marx's formulation is Herbert Simon (1951), when he formulated his theory of 'the employment relationship', for he recognised the abstraction of the employee from the market during the duration of the contract.

But Baumol also mentions genuine advances in areas such as the principal –agent relationship, the theory of asymmetric information, the related theory of health care and health insurance and the theory of trade cycles. While the last theory requires some mathematics, such as Hopf bifurcation theory and chaos theory, most of the others do not really require much mathematics, although the initial authors had used mathematics, partly in order to convince their peers that they had command of sophisticated mathematical tools. And, of course, there have been advances in the areas of fiscal management techniques, though mostly to the benefit of the rich rather than the workers and peasants. Baumol also regards general equilibrium theory as an advance over Marshall's time, although he cannot justify his claim.

Acknowledgement: I owe the illustrations of the Slutsky equation and the Allais paradox to Wikipedia.

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