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Mary R. Hedges

Auckland University of Technology

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Research Informed Teaching: Myth or Reality?

Research Informed Teaching: Myth or Reality?

Mary R Hedges
Economics Academic Group
Faculty of Business
Auckland University of Technology

Abstract

This paper takes a wider perspective on post-graduate research and training than that offered recently in this journal by Lodewijks (2001). The motivation for this paper comes from conflicting trends occurring at two levels of academia with regard to the role of the rationalist, optimising microeconomic model. Within most tertiary institutions the move has been toward a narrowing of curricula and an increasingly mathematical formalisation of neoclassical theory and approaches derived from it. In contrast there is a growing strand in economic literature over the same time period that has expressed increasing difficulties with this model and the hegemonic dominance of it in tertiary institutions worldwide.

The approach of this paper is that of a survey paper, providing a brief introduction to four areas of development in economics – psychological and experimental economics, information economics, incentive difficulties with academic tenure and the post-autistic economics movement. The discussion is aimed at raising the awareness of lecturers and practitioners of the limited way in which research is often integrated into teaching.

Introduction

The curse of knowledge will lead me to think that others will have read the same articles that I have, and have learned the same lessons from them (lessons that I now take for granted), when in fact others have been busy reading entirely different material and have never even heard of the findings that have so influenced my thinking.
(Thaler 2000, pp. 133-134)

This quote provides a nice framework to introduce the rather bold objective of this paper. Firstly there is this assumption that everyone tends to hold, that others will have read the same articles. From talking to a number of colleagues on the topics of psychological economics and critiques of the rational behavioural approach taken in most institutions, it appears that this is not the case. In fact, many were virtually unaware of the growing body of literature and debate on these topics. Even many of the concerns raised by the American Economic Association's *Commission on Graduate Education in Economics* discussed by Lodewijks (2001) have not had wide discussion locally. While many acknowledged the heterogeneity within economics as a whole few explicitly covered this in their courses. If the frame of reference is shifted from professional economists to graduate students the results are even more disturbing.¹ For these reasons this paper is largely a literature review of papers in the

¹ This is purely anecdotal evidence based on discussion with a number of students from various universities both here and in Australia. This comment is in no way peculiar or restricted to any particular university.

areas of psychological economics, experimental economics and critiques of the rational behaviourist model. The purpose of this paper is merely to introduce these topics to the reader and provide far richer literature sources for the inspired reader to turn to.

Secondly, there is a presumption that everyone who has read these same articles will have taken the same lessons. Even a very cursory view of psychology literature would suggest that this would be a virtually impossible assumption to support. The reasons for this can be found in both psychology and experimental economics. A range of this research shows a tendency to 'anchor' one's hypotheses. Psychological evidence reveals that people tend to read evidence as additional support for their initial hypothesis. Experiments have shown that providing the same ambiguous information to people who differ in their initial beliefs on the same topic can move their beliefs further apart (Rabin 1998, p. 26). Clearly this type of bias will lead to both the rational behaviourist and the psychological school becoming further entrenched in their views. It is for this reason that the intent of this paper is not conversion but to sow the seeds of interest in a new range of topics. It will perhaps be left to new generations of economists, schooled in a pluralist manner, to find ways to assimilate the apparently divergent ideas of psychology and economics.

Thirdly, is the idea that some of the lessons learned from this literature are now taken for granted. How often do educators presume the students know and understand knowledge they themselves take for granted. For example, all microeconomics lecturers know about the Ellsberg and Allais paradoxes but are they ever mentioned to students? Similarly, expected utility theory is the standard theory of individual choice in economics. Most economists also know of a few alternatives to this model but are students made aware of them? How many are aware that these so-called alternative models now number well into double figures (Starmer 2000, p. 332). While the details of these alternative models are not important here, what stimulated development of the non-expected utility models should be of widespread concern. Starmer (2000, p. 332) bluntly expressed it as 'the standard theory did not fit the facts'.

Fourth, and lastly, from the Thaler quote is the link between this paper and the need for greater pluralism in teaching and research agendas. That link is the ability of educators to influence the thinking of students and the direction of that thinking. Are critical thinkers being trained about real world problems – the reason that most students start in economics – or are they becoming technicians whose models and tools have limited real world application? More to the point what should be produced and what do employers want (Lodewijks 2001, p. 4). One measure of success in the classroom is when students will debate something rather than just accept what they are told. Then, without doubt, their thinking brain is engaged and this is when new ideas, new perspectives and new knowledge is generated.

Psychological Economics

So where does this story begin: the debate really begins in the mid-nineteenth century. Both economics and psychology descend from a common body of philosophical ideas. It was as a result of the marginal revolution in economics from the 1870s that

the real divergence between these two schools occurred. By the 1920s there were three distinct views on the relationship between psychology and economics;

1. that any kind of psychology was irrelevant to economics;
2. the opposite contention that psychology underpinned the very foundations of economics;
3. an intermediate response that believed the new ideas could be assimilated through various means (Coats 1988, p. 212).

By 1930 this debate was largely settled with the 'victory' going to those in the first group, who believed that psychology was irrelevant to economics.

Since that time considerable effort and research has gone into the construction of a logically consistent rational choice paradigm based on utility theory. However, it was the development of expected utility theory that led indirectly to psychology again entering the economics debate. The failure of expected utility theory as both a descriptive and predictive model stems from an inadequate recognition of various psychological principles of judgment and choice (Coats 1988, p. 214). Thus, in the late twentieth century the psychology-economics debate was back where it was in the 1920s, with the same three views on the relationship.

As already mentioned, economics and psychology are descendants of a common body of philosophical ideas. Both disciplines are interested in human choice behaviour. However, it is at this point they diverge in focus (Hogarth & Reder 1987, p. 1). Economists tend to focus on outcomes based on assumptions of stable and consistent preferences while psychologists are interested in the process of choice making. Another way of viewing this conflict is that mainstream economics² makes use of, but does not depend on, the normative or logical approach, and the psychologists try to understand and describe frequently observed anomalies and/or paradoxes, often by looking at the motivations. In economics this relates to the rationalist versus behaviouralist views (Smith 1991, p. 877). Put in another way, in economics prescription dominates description, while the reverse is true in other social sciences that study real human behaviour, including psychology (Thurow 1983, p. 216). Despite these fundamental differences there are many areas where each discipline could benefit from considering the alternative perspective.

The benchmark starting point is a paper by Amos Tversky and Daniel Kahneman entitled 'Rational Choice and the Framing of Decisions'. The thesis of their article was that,

..in spite of these *a priori* arguments, the logic of choice does not provide an adequate foundation for a descriptive theory of decision making. We argue that the deviations of actual behaviour from the normative model are too widespread to be ignored, too systematic to be dismissed as random error, and too fundamental to be accommodated by relaxing the normative system....We conclude from these findings that the normative and the descriptive analyses cannot be reconciled.

(Tversky & Kahneman 1987, p. 68)

² By mainstream economics I refer to the Chicago school and those who follow who reduce preference theory to a set of behavioural propositions. They look solely at behaviour or at aggregate data like prices and quantities and are suspicious of investigating motivations. (Lewin 1996, p. 1293)

Clearly this is a very strong conclusion that has generated much discussion and dissension since. In order to assess their conclusion and the discussion that has followed, it is necessary to see how they arrived at such strong conclusions.

Microeconomic theory is based on an assumption that each individual has stable and coherent preferences and that they rationally maximise those preferences (Rabin 1998, p. 11). This theory is flexible enough to treat an extensive array of real economic choice problems; yet it is an inherently simple concept (Luenberger 1995, p. 4). Over time a number of paradoxes and anomalies have been found that appear to contravene the predictions made under consumer choice theory. Tversky and Kahneman (1987) take the approach that 'paradoxes'³, which have been explained by relaxing the axioms, are just samples of much deeper problems in the normative approach. They suggest a hierarchy of normative rules that have been progressively relaxed until only invariance and dominance remain as normatively essential (Tversky & Kahneman 1987, p. 70). They then investigate violations of these axioms and trace these failures to how the question is framed.

The typical way that Tversky and Kahneman have demonstrated the violation of invariance is through asking sets of respondents to choose between two 'bundles'. The two bundles are the same for each group but the framing of the bundle changes. For example, in the medical treatment example (Tversky & Kahneman 1987, p. 70) the same statistics were presented to some respondents in terms of mortality rates and to others in terms of survival rates. The respondents then indicated their preferred treatment. This difference in formulation produced a marked effect in the treatments chosen by the respondents. This effect was just as large when experienced physicians were faced with the same choices. In this way they demonstrated that variations in the framing of decision problems produce systematic violations of invariance and dominance that cannot be defended on normative grounds. The rest of the paper then looks at possible solutions to this problem and the implications for microeconomic theory.

Tversky and Kahneman argue that preferences should depend only on relevant differences between options, not on how these differences are labelled or framed. As long as labels matter it has important consequences for public

³ Among these are the Allais and Ellsberg paradoxes. (Kreps 1990)

policy⁴. The presence of these framing effects both enriches and complicates the analysis of choice. Because the framing of decisions depends on the language of presentation, on the context of choice, and on the nature of the display, the process is incomplete. They argue that the assumption of rationality has persisted in economics through,

bolstering assumptions that restrict the significance of any observed violation of the model. (Tversky & Kahneman 1987, p. 89)

In addition to this they argue that it is commonly assumed that any observed violation of the standard rationality model is

1. restricted to insignificant choice problems, or
2. quickly eliminated by learning, or
3. irrelevant to economics because of the corrective function of market forces. (Tversky & Kahneman 1987, p. 89)

These three arguments are where the critique of Tversky and Kahneman's view starts.

Experimental Economics

The views expressed by Tversky & Kahneman and others suggest a conflict between the economic theory of rationality and the falsifying evidence from psychology, such as that used in the Tversky & Kahneman article (Smith, 1991, p. 878). However, a third view, that of experimental economics, is now providing some meeting point for these views. Experimental economics criticises both psychology and economics for testing the rationality of individuals isolated from interactive experience in social and economic institutions (Smith 1991, p. 878).

There is no such thing as 'true' independent individual preferences. Human preferences are like an onion, because when the layers of social influence are peeled away, nothing is left. So the rock of stable preferences on which equilibrium price-auction markets are founded is in fact little more than quicksand. (Thurow 1983, p. 220)

Arrow also recognised this point:

..rationality is not a property of the individual alone...It gathers not only its force but also its very meaning from the social context in which it is embedded. (Arrow 1987, p. 201)

What is not understood is exactly how institutions serve as social tools that reinforce, even induce, individual rationality.

It is from experimental economics that a growing body of evidence is emerging that simultaneously deepens the economic concept of rationality and increases the

⁴ Schelling (1981) has described the striking framing effect in a context of tax policy. He points out that a single policy can be framed as a tax credit or a tax surcharge depending on the initial point of reference. For example if the two child family is taken as the reference point a tax regime to benefit families will actually be framed as a tax surcharge on childless families. Conversely, if the childless family is taken as the reference point (as is done) the same policy then appears as a tax credit for the two-child family.

consistency between the observations and the models (Smith 1991, p. 878). What is interesting here is that while individuals will frequently offer up answers in violation of the axioms of consumer choice when tested as individuals, as in the Tversky and Kahneman tests, in the context of experimental exchange institutions the same individuals deliver results consistent with rational choice models. (Smith 1991, p. 894) Furthermore, experimental work shows that the verbal behaviour of subjects often strongly contradicts what their actual behaviour achieves.

The mortality-survival experiment of Tversky and Kahneman is specifically criticised. Smith argues that it is necessary to determine whether the strong framing effects identified are related to physicians actual decisions to use one therapy or another. Presumably 'best practice' therapies evolve in a social context not from individuals' thinking about alternatives in terms of probabilities (Smith 1991, p. 879). By including these social contexts in the experiments the result is a programme of research similar to that of experimental economics market games.

Chu and Chu (1990) constructed a market-like con game for subjects so that repeated games and arbitrage could occur. The results they gained showed a dramatically reduced incidence of preference reversal.

three transactions were all that was needed to wipe out preference reversals completely.' (Chu & Chu 1990, p. 909)

These results clearly support the argument that observed violations of the standard rationality model are quickly eliminated by learning and also that they are mediated through the corrective function of the market. This is in clear contradiction to Tversky and Kahneman's claims.

Experimental economics has also offered answers to the argument that observed violations are restricted to insignificant choice problems. The answer to this is based on prospect theory⁵. There is evidence that shows peoples' preferences are often determined by changes in outcomes relative to some reference levels, and not merely by absolute levels of outcomes (Rabin 1998, p. 11). Furthermore, experimental findings show that people dislike losses significantly more than they like gains. This loss aversion may also explain many observed discrepancies between what people are prepared to pay for the good versus what they demand in order to give up the good (Tversky & Kahneman 1987, p. 74). Clearly this has important implications in environmental economics.⁶ Rabin suggests that this can easily be incorporated into traditional economic theory by including a reference level in the utility function. He argues that although some economists have done this for years the degree to which this reference level influences behaviour has not been appreciated by economists (Rabin 1998, p. 13).

⁵ In Markowitz (1952) (as cited in Tversky & Kahneman 1987) outcomes are expressed as positive or negative deviations from a neutral reference outcome, which is assigned the value of zero. Numerous studies since that time including Tversky and Kahneman (1979) develops this into an s-shaped value function. While they deal in prospect theory themselves T&K have not tried to incorporate it into rational choice theory or the utility functions used by economists.

⁶ This raises the whole issue of contingent valuation of environmental assets such as the impact of the Exxon Valdez disaster (Smith 1989) and valuations of Kakadu National Park in Australia that brought the value of that park out higher than prime, Sydney waterfront real estate.

The significance of the reference level is also supported by the work of Battalio et al. (1977). Their experiments attempted to test consumer demand theory using price, quantity and expenditure data for individual consumer's entire expenditure in an ongoing token economy. One of the significant findings of the study was,

the switch in composition of consumption was a gradual process and it is the gradualness which was responsible for the contradictions The gradualness of response to price changes observed may be attributed to the residual effects of the previous periods consumption patterns.

(Battalio et al. 1977, p. 424)

Clearly the implications of this finding should be of great interest

given the relatively frequent use of temporary price decreases, either direct of through coupons, as a competitive business strategy.

(Battalio et al. 1977, p. 427)

Smith, in his review of Hogarth and Reder (1987), puts forward a similar argument. He argues that economic reality consists of both the immediate or direct consequences of any decision and also the indirect or flow-on consequences of that decision. The indirect consequences are that future decisions start from a different point because of the effects of your immediate decision. That is, the reference point from which future gains and losses are assessed has changed. Opinion polls (or the psychological view) tend to reflect only the direct consequences or direct perception of reality and ignore the economist's view that includes the indirect effects of that decision as well (Smith 1991, p. 883). Thaler (1980) frames this in more economic terms by arguing that it is the neglect of opportunity costs and the excessive focus on out-of-pocket expenses that is frequently the cause of cognitive irrationality. The neglect of the opportunity cost of the time taken to make a decision is also an important and pervasive source of irrationality (Elster 1998, p. 60).

Another argument taken in dealing with the significance of the choice problems is that rational choice theory assumes high stakes whereas experimental choices do not provide these. There is a large volume of literature on the effect of rewards on decision making. Tversky and Kahneman draw the conclusion that

there is little evidence of improvement when monetary rewards are introduced.

(Tversky & Kahneman 1987, p. 90)

However, just as many writers have drawn other conclusions. Thaler asserts that,

systematic mistakes will always disappear if the stakes are large enough.

(Thaler 1987, p. 96)

Plott takes a more balanced view citing cases where money did and did not matter (Plott 1987, p. 120). A considerable number of studies⁷ can be found to support either point of view and, as already mentioned, the impact of these various studies will tend to support the hypothesis held prior to the new information.

Sippel (1997) attempts to test more directly the validity of new-classical consumer choice theory. In this study

⁷ As a starting point see Hogarth & Reder (1987) and other articles listed in the bibliography of this work.

data were obtained through a controlled experiment that involved real consumption of the goods chosen. We find that most subjects violated the axioms. (Sippel 1997, p. 1431)

After careful analysis of the violations observed Sippel concluded,

We should therefore pay closer attention to the limits of the theory as a description of how people actually behave, ie. as a positive theory of consumer behaviour. Recognising these limits, we economists should perhaps be a little more modest in our 'imperialist ambitions' of explaining non-market behaviour by economic principles. (Sippel 1997, p1443)

What these results from experimental economics have offered us is considerable evidence that better decisions are made in context than in isolation and that there are clear limits to the usefulness of consumer choice theory. Experimental economics provides more useful insights than psychology alone and these insights are more directly applicable to economic models. Furthermore, it provides a starting point for modeling context and extending the traditional rational model in a new and potentially more useful direction. But what are rational decisions?

Turning briefly to neurobiological psychology reveals some rather surprising experimental results. In this area there is a growing body of evidence that suggests that emotions are essential, firstly for making a decision and secondly, for making a better decision. The cognitive psychologists Philip Johnson-Laird and Keith Oatley (1992) argue that the ideal of impeccable rationality (*homo economicus*) assumes that there are no surprises, no misunderstandings and no irresolvable conflicts. Moreover, it cannot guide action in situations that are characterized by these features. Rather it is,

emotions (that) enable social species to co-ordinate their behaviour, to respond to emergencies, to prioritise goals, to prepare for appropriate action ... even though individuals have only limited abilities to cogitate.

(Johnson-Laird & Oatley, 1992)

Rationality as per the traditional *homo economicus* model (even under risk and uncertainty) amounts to an addiction to reason (Elster 1998, p. 117). Many science fiction series have a character modelled on this hyper-rational ideal⁸ yet they usually aspire to gain emotions. A suggestion is that these models of hyper-rationality should be left in the movies where they belong. This addiction to reason actually makes an individual irrational rather than rational.

A rational person would know that under certain conditions it is better to follow a simple mechanical decision rule than to use more elaborate procedures with higher opportunity costs.

(Elster 1998, p. 60)

Information Economics

Thus far this paper has been focused on what economics does not do, where economic models and theory contravene findings within the discipline and from associated (however loosely) fields. This gives quite an erroneous picture of the developments in economic theory in the twentieth century. One of the areas of the greatest

⁸ For example from Star Trek there is Spock (Original) and Data (The Next Generation).

development is in the area of information economics. Authors from the nineteenth century recognized the consequences of imperfect information and recognized its importance (Stiglitz 2000, p. 1442) but chose to omit it from their analysis (often explicitly) because it would 'greatly complicate' the analysis (Marshall 1938).

For a more detailed analysis of the contributions of information economics during the twentieth century read the Joseph Stiglitz article in November 2000s *Quarterly Journal of Economics*. However, a brief summary of some of the traditional theory that information economics overturns is worth including here. The first of these was the idea that so long as the information imperfection was not too imperfect the market would still be close enough to the idealized models to suffice.

Modern information economics turned these presumptions on their head: even small information costs can have large consequences, and many of the standard results – including the welfare theorems – do not hold even when there are small imperfections of information.

(Stiglitz 2000, pp. 1443-1444)

The earliest work that focussed on issues of information came from the Austrian school where the discovery process for information was one of the driving forces of the economy. This led to evolutionary models rather than static equilibrium models. It also meant that *homo economicus* had to 'learn' which took time. Half a century later this is the same conclusion coming out of information economics. This is all based on the idea that information is fundamentally different from other commodities. By definition every piece of information is fundamentally different from other pieces. If this were not the case it would not be 'new' information (Stiglitz 2000, p. 1449). This means that the markets for information are inherently imperfect and that there will be surprises, misunderstandings and irresolvable conflicts. The very things that 'rational' decision making cannot cope with very well.

Another aspect of conventional wisdom overturned by information economics has to do with the standard preference restrictions. This returns to Tversky and Kahneman's conjecture that the axioms of consumer choice theory have been relaxed to the point of being fallacious. Within information economics discontinuities abound. This means that there are non-convexities in the relevant sets (Radner & Stiglitz, 1984). Hence the mathematical restrictions that have formed the basis of general equilibrium theory seem unconvincing when applied to a situation where information concerns are important. Look at most theory courses, however, and the emphasis is still strongly on these axioms and the conclusion derived from them with little or no acknowledgment of the deep problems inherent in this approach.

Another important contribution of information economics is the overturning of the assumption that history and institutions do not matter. As soon as there are irreversibilities, common in the creation of knowledge, history has to matter (Stiglitz 2000, p. 1459). Economies with the same deep properties could have markedly different outcomes depending on their histories. Similar overturning of conventional wisdom applies when explaining the role of institutions. Information economics has not only showed that institutions matter (remember Arrow's statement on the role of institutions) but why they matter. Conventional wisdom suggests that institutions arise out of market failure in order to solve the cause of failure and improve the market efficiency. Arnott (1991) showed that even in equilibrium, non-market institutions could exacerbate the consequences of market failure rather than alleviate them.

This paper is a summary of only a few of the results of the impact of information economics on standard economic theory discussed by Stiglitz (2000). His list, while more extensive and more detailed is also by no means exhaustive. He concludes with the very strong point that

Much of what economists believed – what they thought to be true on the basis of research and analysis over almost a century – turned out not to be robust to considerations of even slight imperfections of information. ...Information economics has made us realise that much of standard economics is based on foundations resting on quicksand.

(Stiglitz 2000, p. 1461)

Academic Incentives

The developments in economics that have been surveyed in this paper are increasingly getting published in 'mainstream' journals. These theoretical developments do not appear to be transferred into the teaching programmes at any level but most particularly at post-graduate level. At a time when the literature of economic discipline is becoming richer and more diverse the content of curricula is becoming narrower and more theoretical.

The economics of the textbooks and of the graduate schools not only still teaches the price-auction model but is moving towards narrower and narrower interpretations. The mathematical sophistication intensifies as an understanding of the real world diminishes.

...Economics cannot do without simplifying assumptions, but the trick is to use the right assumption at the right time. And this judgement has to come from empirical analyses (including those employed by historians, psychologists, sociologists and political scientists (Arts faculties)) of how the world is, not of how our economics textbooks tell us it *ought* to be.

(Thurow 1983, pp. 236-7)

Over the last ten to fifteen years the offering at all New Zealand Universities has become narrower.⁹ Descriptive, applied and survey papers have largely given way to more pure theory, econometric and mathematics papers in an economics degree. The entry criteria and compulsory modules for post-graduate courses have gone the same way. Why are these course offerings not reflecting the diversity of the discipline? One answer could be that it has become focused on formalized technical skills rather than pluralist thinking skills. This is not peculiar to New Zealand. In fact, New Zealand seems to be simply following a trend started in the United States so perhaps the answers may be found in the American academic system.

The academic system is built on the principle of 'publish or perish'. Tenure and reputations are built on a record of publishing. Therefore, in order to gain tenure and promotions academics (of all disciplines) publish immense amounts – thousands of papers each year, in scores of obscure journals.

⁹ Evidence of this is available through looking at the post-graduate course offerings at New Zealand universities over this time period (as listed in the university calendars). These were then reduced further when courses that were offered but were not run were excluded. Discussion with colleagues at all of these universities further supported this view.

Many of these papers aren't worth reading, and many of them are pretty much impossible to read in any case, because they are loaded with dense mathematics and denser jargon. (Krugman 1995, p. 8)

It is equally easy to become somewhat cynical about how these publish or perish incentives work at eroding the quality of that published output. It would be nice to think that every paper contained blindingly original ideas and/or applications but this is not the case. Most are unable to do that and even the best admit to being unable to do that consistently. They tend to look instead for more surefire approaches.

The most popular economic theories among the professors tend to be those that best allow for ingenious elaboration without fundamental innovation – ways to show that you are smart by putting old wine in new bottles, usually with fancier mathematical labels. (Krugman 1995, p. 8)

In fact one of the features that often defines good research is a paper's fecundity.

While these tenure and promotion incentives can cause negative results they do not preclude a huge amount of very valuable work being carried out. However, it does mean that new and perhaps controversial ideas are often difficult to publish and frequently involve long time lags before they receive wider acceptance. This is an important function however as it does provide a test of the idea. The very fact that many of these psychological ideas and criticisms of theories of choice have persisted so long and are gaining strength is an indication of the robustness of these results. The increasing respectability of these alternatives is demonstrated by the range of journals that these articles are being published in and, more recently, in Matthew Rabin being awarded to John Bates Clark Medal in America. Previous winners of this medal include Samuelson, Friedman, Tobin, Arrow and Solow.¹⁰ Many of these medal winners have also gone on to win the Nobel Prize for Economics.

This time lag also indicates an interesting difficulty with theories that do gain the dominance of choice theory. Choice theory in economics is a little like the theory of relativity in physics. If history has its value it also has its dangers. The danger in history is that in contemplating the great work of the past, such reverence for it is developed that it isn't possible to reassess its place in the core theory of our discipline (Weinberg 1998, p. 154).

Post-Autistic Economics

Any paper that discusses the role of theory in the research-teaching nexus and expresses the need for greater pluralism would be incomplete without some reference to developments in the last two years.

In June 2000 a small group of French students published on the web a petition protesting against:

- economics 'uncontrolled use' and treatment of mathematics as 'an end in itself' and the resulting 'autistic science',

¹⁰ A full list of medal winners and the year they won the medal can be found on <http://www.aae.wisc.edu/~thc/zhu/jbcm.htm>. The site also includes the year of winners' of the Nobel Prize.

- the repressive domination of neo-classical theory and derivative approaches in the curriculum, and
- the dogmatic teaching style, which leaves no place for critical and reflective thought.

The students' petition argued in favour of:

- engagement with empirical and concrete economic realities,
- prioritizing science over scientism,
- a pluralism of approaches adapted to the complexity of economic objects and the uncertainty surrounding most of the big economics questions, and
- their professors initiating reforms to rescue economics from its autistic and socially irresponsible state.

Almost immediately, a group of French economics teachers responded with a petition of their own, supporting the students' demands, adding to their analysis, and lamenting the cult of scientism into which economics has in the main descended. The professors' petition also called for an opening of public debate (Post-Autistic Economics Network, 2000).

Since that time debates, national conferences and a worldwide network has developed to support this quest for greater pluralism. In *Le Monde*, an article by Robert Solow (2000) suggested that there was not much difference between what the French students were wanting and what was offered in the North American (and largely New Zealand) core curriculum. In fact the difference between the post-autistic and neo-classical approaches is radically different in epistemological and pedagogical principles. The traditional approach lets the theory-generated tool kit determine what aspects of economic reality are admitted for consideration, while the post-autistic approach, in line with the natural sciences, reverses the order of determination (Halevi, 2001). The differences go further than this and discussion of these points and copies of the opposing curricula can be found at the Post-Autistic Economics website.

These newsletters also provide some debate on the role of mathematics in economics. Some critics of the movement claim that it is a movement designed to do away with the mathematical models in economics. This is an erroneous conclusion. The point about mathematics being made by the movement is that it must be a means to an end and not the end. In fact many of the alternative theories being suggested in this paper require mathematics at least as complex as that of the more traditional models. Thus the debate in this movement is about the proper role of mathematics. Marshall pointed out that

the chief use of pure mathematics in economic questions seems to be in helping a person write down quickly, shortly and exactly, some of his thoughts for his own use: ... but when a great many symbols have to be used, they become very laborious to anyone but the writer himself.

(Marshall 1938, p. x)

Conclusion

Unlike the conclusions to many papers, this one makes no attempt to provide 'the definitive answer'. Instead it highlights some possible avenues for further reading and research - avenues that will enrich the discipline and the teaching. This paper is one example of pluralism at work – it demonstrates some awareness and working knowledge of traditional microeconomic theory, economic history, alternatives to expected utility theory, experimental economics, economics of information, cognitive psychology, behavioural psychology and neurobiology.

This paper is not saying that what economics is teaching today is wrong. It is asking the question whether it can be done better - for lecturers, for students and for the future of the discipline. There is no doubt that traditional consumer choice theory is an extremely powerful tool that is widely applicable and offers relatively quick answers to complex problems. However, it is not the only tool available and in many instances it is not the best one. Instead of continuing the trend of the last ten to fifteen years of narrowing the curricula to focus more on the technical skills, academia should be looking at extending the curricula so that students have access to a wider range of tools and approaches to real world problems.

This is also not a paper aimed at removing the mathematics from economics. For much economics the formulation of the model in a mathematical way is an incredibly elegant and simple expression of what are often complex ideas. As the students in France pointed out however, the problem arises when the mathematics becomes the end rather than just the means. You are challenged to look to your institutions and see where your post-graduate students come from. Clearly the majority will come from economics majors in undergraduate business degrees. Of the others, how many come from science or mathematics degrees and how many from arts degrees. In the last ten to fifteen years there has been a shift in where these students have come from – away from the arts and other social sciences and toward the mathematical sciences. This has effectively created barriers to entry to those with different skills and backgrounds (Lodewijks 2001, p. 4)

As long as a single track post-graduate programme, focused on the triple core of micro, macro and econometrics is provided, students for whom economics can provide some useful tools for analysis and from whom economics can be further developed and taken forward are being precluded. The *Journal of Economic Perspectives* ran a series of articles in the Winter 2000 edition that asked a number of regular contributors for their prediction of economics in the twenty-first century. All of these articles took the approach that it is in the areas of information and decision making that the next big changes and developments would occur. Thaler (2000) took the approach that economics would move from the *homo economicus* assumptions to a *homo sapien* model. Colander (2000, p. 123) thought the unidimensional nature of post-graduate work would give way to designated specialities and that the core modules would shift toward micro theory, statistics and systems and model analysis. However, these courses would not be the technical versions that are taught today but survey courses given to acquaint students with the broad field of economics. Some New Zealand institutions have already attempted to introduce survey type courses at some levels but often these courses tend to revert to technical courses in ever more narrow fields.

Research informed teaching? The support for a more pluralist approach is growing in the literature, in the student bodies and among academics but has not yet made it to many classrooms. The challenge of this paper is to open your minds and your futures to these possibilities, to become better acquainted with a wider range of literature, to discuss ideas with each other in forums such as this and to ensure that this discipline moves forward.

Economics has come a long way in the twentieth century but can go further in the twenty-first. Instead of spending whole careers developing elaborate formalisms that aim to look at rational consumer choice theory and expected utility theory in ever more sophisticated ways in the hope that the anomalies within these theories will go away maybe it is time to look at these problems in a fresh light. One danger of the past is that great, successful and heroic ideas can weigh upon economists preventing them from seeing things in a fresh light for reasons already discussed. Said another way, it is those ideas that were most successful of which everyone should be most wary (Weinberg 1998, p. 156). Keynes expresses the difficulty of accepting new ideas such as this in the preface to 'The General Theory'.

For if orthodox economics is at fault the error is to be found not in the superstructure, which has been erected with great care for logical consistency, but in the lack of clearness and of generality in the premises....The difficulty lies, not in the new ideas, but in escaping from the old ones which ramify, for those brought up as most of us have been, into every corner of our minds.(Keynes 1936, p. v-viii)

And Thurow,

The transition from one mode of thought to another is difficult, since it involves abandoning a beautiful sailing ship – the equilibrium price-auction model – that happens to be torn apart and sinking in a riptide. So a raft must be built to catch whatever winds may come by. That raft won't match the beauty or mathematical elegance of the sailing ship, although it has one undeniable virtue – it floats.(Thurow 1983, p. 237)

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