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# Rationality, irrationality and economic cognition

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# RATIONALITY, IRRATIONALITY AND ECONOMIC COGNITION

JOHN WHALLEY

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# RATIONALITY, IRRATIONALITY AND ECONOMIC COGNITION


## Abstract

This paper contrasts the modern use of the assumption that rationality guides individual economic behaviour, as reflected in simple models of utility and profit maximization, to literature between 1890 and 1930 which sharply challenged the use of such an assumption, as well as to later literature in economic psychology from Herbert Simon onwards which sees economic (and other) cognitive processes in different ways. Some of the earlier literature proposed objective and operational notions of rationality based on the availability of information, ability to reason (cognitive skills), and even morality. Learning played a major role in individuals achieving what was referred to as complete rationality. I draw on these ideas, and suggest that developing models in which economic agents have degrees (or levels) of economic cognition which are endogenously determined could both change the perceptions economists have on policy matters and incorporate findings from recent economic psychology literature. This would remove the issue of whether economic agents are dichotomously rational or irrational, and instead introduce continuous metrics of cognition into economic thinking. Such an approach also poses the two policy issues of whether raising levels of economic cognition should be an objective of policy and whether policy interventions motivated by departures from full economic cognition should be analyzed.


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*John Whalley*
*Department of Economics*
*University of Western Ontario*
*London, Ontario, N6A 5C2*
*Canada*
*jwhalley@uwo.ca*

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"Concentration on the rational aspects of human behaviour should not be construed as an assertion that human beings are always or generally rational. That misconception, which permeated utilitarian political theory and a large part of classical economic theory has been decisively refuted by modern developments in psychology and sociology"

***-Herbert Simon, Administrative Behaviour, 4th Edition, p.72***

"In consumption the concrete phenomenon differs from the abstract phenomenon. This is so especially because certain types of consumption are determined by custom, and because for other types man is a very imperfect scale for weighing ophelimities. Hence the equality of weighted ophelimities only occurs approximately."

***-Vilfredo Pareto, Manual of Political Economy, p. 337***

"The laws of economics are to be compared with the laws of the tides, rather than with the simple and exact law of gravitation. For the actions of men are so various and uncertain, that the best statement of tendencies which we can make in a science of human conduct must needs be inexact and faulty."

***-Alfred Marshall, Principles of Economics, 8th Edition, p. 32***

## 1. Introduction

Is humankind (or animal or plant kind for that matter) really capable of making the complete range of perfectly executed optimizing decisions that we as economists often assume them to make, or is simple optimizing behaviour really only a rough and ready approximation to a far more complex reality. The quote above from Herbert Simon has long represented a challenge to the widely held view among economists that simple models of optimisation are realistic.

In this invited lecture I suggest a possible recasting of our notions of rationality in economics away from the discreteness that the concepts of rationality and irrationality suggest towards metrics reflective of degrees of economic cognition, more consistent both with earlier economics literature between 1890 and 1930 and some of the economic psychology literature of today. I also reflect on the basis of introspection and personal experience on some of the limits I have encountered from my own experience to the ability of models of simple welfare maximizing and profit maximizing behaviour to account for everyday phenomena all around us.

Inexplicable irrationality in economic decision making is seemingly an abandonment of the principle that reason and logic underlie all order, and the belief that formalization and clarity in deductive logic will eventually account for all; even if on occasion simple common sense observation points the other way. Many 19$^{th}$ and early 20$^{th}$ century economists believed that while a working hypothesis, the assumption that optimizing behaviour characterizes economic decision making is only a useful analytical abstraction that must inevitably at best be inexact in its practical application (see the quotations from Pareto and Marshall above). Jevons (1871), for instance, viewed the assumption of utility maximization as second best compared to direct measurement of happiness and human feelings. Veblen (1909), Clark (1918), Mitchell (1910), and other economists at the turn of the century criticized the assumption of simple economic

rationality as unrealistic.[1] Dickinson (1919, 1924), and Hoyt (1926) among others suggested operational concepts of rationality for use by economists in the spirit of the psychology literature of the day.

While not downplaying the elegance of modern economic theorizing, Simon (see his 1982 collected papers) repeatedly suggested that experience points in the direction that we have neither the time, the information nor computational capacity to correctly make all the optimizing calculations that economic theory would have us make and introduced the concept of bounded rationality to suggest rational behaviour as taking place within operational constraints. Recent writings in economic psychology (see Kasser and Kanner (2004)) go further and present evidence showing that individuals with high motivational value orientation measures (MVO) are more prone to depressive episodes and other disorders if possession of material objects receives higher weight over other goals (such as self esteem, or the quality of interpersonal relationships).[2] They discuss various disorders associated with life in modern materialistic society, such as compulsive buying, and evaluate clinical approaches including therapies and medications aimed at dealing with such over consumption. All these views thus suggest that the real world will inevitably yield elements of observed behaviour that are hard to accept as fully consistent with rational behaviour as assumed in the simple models that economists use.

In such areas as political science, psychology, animal behaviour and others there are active and ongoing debates about the extent of irrationality in actual decision making. Yet despite the use of different approaches to rationality in other disciplines most modern economists

[1]McDougall (1908) in an introductory text on social psychology used the colourful language that "it would be a libel, not altogether devoid of truth, to say that the classical political economy was an issue of false conclusions drawn from false psychological assumptions".

[2] See also the earlier writings in a related vein by Scitovsky (1976, 1986), who was a pioneer among analytically oriented economists in discussing the relationship between economic theorizing and psychology literature on consumer satisfaction.

seem to hold to a position that optimization has a more exact role than our forerunners seemingly believed. Becker (1962) for instance discusses irrationality in terms of random departures from rationality making making little direct reference to this earlier literature.

The assumption of exact optimizing economic behaviour may well be untestable in any formal sense and in the limit is seemingly tautologous, but its realism and usefulness as an approach to accounting for seemingly all social phenomena does seem worth discussing. Economists raised in the positivist (and hence formalist) tradition inherited from Popper and Friedman[3] typically try to derive testable hypotheses from analytical logic, but usually refrain from directly testing the realism of the assumptions underpinning their analysis.[4] In recent years, my contacts with psychologists, political scientists, sociologists, anthropologists and other scholars of social phenomena have brought home to me the wide gulf that seems to exist between modern economics and other social disciplines on this issue,[5] a gulf recognized by Simon (1947) many decades ago and little addressed by analytical economists of today.

In what follows I ask myself from my own personal day to day experience where I have trouble accepting the notion that the behaviour I see in front of me is consistent with a simple utility or profit maximizing model of economic behaviour. I proceed from the trivial and ridiculous to the more major and significant through a series of anecdotes and reflections. Usually, with enough contortions, some kind of behaviour consistent optimizing model can be

[3] And which displaced much of the discursive literature between 1890 and 1930 referred to above.

[4] See Simon's (1982) remark's on Friedmans' Essay on Positive Economics and more specifically on the issue of how we test the applicability of simple optimising models, and whether we should directly test assumptions as well as model implications. In Simon's words "In imagining that theories are used in their simplest idealized form, ignoring real world complications, Friedman has drawn a fictitious picture of how theories are actually employed in physical science and engineering, and given bad advice as to how they should be employed in economics" and later "Whatever our admiration for Galileo's law describing the fall of a body in a vacuum, we do not use it to predict the movement of parachutes or of meteors in the earth's atmosphere. If we wish to test the law, we test it in a vacuum or a reasonable approximation thereof – that is under conditions where the assumptions are nearly true, not unclear conditions where they are egregiously false."

thought of. But I suggest that there are areas where seemingly simple optimizing models used by modern economists seem inadequate to the task. More complex optimizing models may be able to accommodate the phenomena at issue, but effectively this seems next to impossible to do in a simple and convincing way in some instances.

Seeking operationality in concepts of rationality in terms of clear tests relative to data is what some of the work in other disciplines such as psychology suggests (see Tversky and Simonsen (1993) and Shafir, Waite and Smith (2002) as examples), and I suggest that this together with earlier neglected work in economics may provide directions for future research. Determining the extent of irrationality in economic behaviour must, in my view, involve adopting some operational notion of rationality, rather then a tautologous definition. One suggestion I make is to use continuous measures reflecting degrees of economic cognition (which may be multi dimensional) in models in the spirit of IQ and EQ (emotional intelligence) scores rather than rely on a dichotomous rational/irrational distinction. This raises issues as to whether economic cognition is learned or inherited, whether it can be improved on by repeated economic transactions, and whether policy interventions should try to raise cognition levels.

The power of economics to me lies in its ability to simplify, formalize, and to arrive at analytically based conclusions relevant to social decision making of the day. But this is also its Achilles' heal if we as economists are to claim largely on grounds of plausibility and elegance rather than on empirical test that our simple analytics can be mechanically and immediately applied to the real world as fully accurate and with no risk that major social calamity will ensue if assumptions go unsubstantiated. Modifying and extending our analytics to capture degrees of economic cognition (which may also be endogenously determined) may be one way forward. In some subfields of economics, such as behavioural finance, it now seems widely accepted that it

[5] Oakshott's (1991) influential essay on rationality, for instance, had a significant impact on thinking in political

is difficult to produce simple models of optimisation consistent with a range of phenomena observed in financial markets. If this is the case for one sub-field of economics, one might ask why should it not also apply to most or all other sub-fields of economic behaviour? And if so, one might ask what can we conclude with any certainty from results obtained as to the policy significance for results from models based on simple optimization? If analytics are suggestive rather than definitive, enriching our analytics using alternative concepts of cognition may be a fruitful research direction for economists.

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science on this issue, but little or no impact on economics.

## 2. Rationality and Degrees of Cognition

What do economists (or other scholars) mean by the two terms rational and irrational, and how do the uses of these concepts relate to wider notions of cognition used in other disciplines? What basis should be used for evaluating whether or not the assumption of rationality is a reasonable working hypothesis in the simple models economists frequently adopt to represent an inevitably more complex reality?

Enlightenment philosophers (such as Descartes) saw reasoning as the basis for all human decision making and action, and hence rationality is inevitably seen the motivating force behind all human behaviour, whether economic or otherwise in most Western thought. Websters Dictionary defines "rational" as "of, pertaining to, or attained by reasoning". It also offers the alternative definition "sensible; judicious". "Reason" in turn is defined somewhat circuitously as "the ability to think logically and rationally", and "a motive or basis for action, opinion, etc; a statement which explains or accounts for an action, belief, etc".

Seen in these ways, rational behaviour is usually seen as counter to emotional reaction, an abandonment of reason and reliance on seemingly inexplicable feelings as the guide to action. Why economists (and other scholars) are so strongly drawn to using assumptions of relatively simple rationality as underlying human behaviour remains an open question when a considerable psychology literature sees much behaviour as guided by an interplay between emotion and reason (see Lewis and Granic (2002)). But for me, the issue is less whether rationality is a useful way to analyze what motivates economic behaviour, than whether what we observe is adequately captured by the simple models of optimizing behaviour that economists routinely employ. Put differently, is rationality defensible as an operational construct in the simple terms in which it appears in most economic models which assume maximizing utility subject to a budget constraint or profit maximization.

A considerable if older literature in economics devotes itself to the issue of whether operational notions of economic rationality supported by data and/or clinical evidence can be usefully constructed and used in economic analysis. Hoyt (1926)[6], for instance, in an early discussion of how literature in economics and psychology might be linked discussed the notion of "objective" rationality. She suggested that objective rationality may refer any one of three characteristics. The first is the basis of information on which individuals act (or knowledge); the second is the ability of individuals to make use of this information (or sagacity); the third is a willingness to make use of information, consciously or unconsciously, which she suggested was a form of moral will. She characterized objective rationality as a state where all three characteristics apply. Related discussions can be found in Bosanquet (1897) and Dickinson (1924, 1919) who, like Hoyt, also attempted to integrate psychology into economic theory in the 1920's.

Hoyt suggested that the informational basis for action and the ability to learn were the critical factors in the development of rational economic behaviour in individuals. As a result, varying degrees of economic rationality would be observed in any population, and individuals could raise their level of rationality by a learning process. She also acknowledged the wide variation which exists in practice in the abilities of individuals to perceive, discriminate and execute plans; in her words to "put two and two together and grasp a situation and solve a problem". The link between rationality and morality was based on the contention that no decision is free of moral significance. As she put it, if I poison my neighbour it is irrelevant how much knowledge I have of poisons or my skill at administering them, my act according to Hoyt would be an immoral one and hence irrational. This earlier literature thus tried to think through

[6] Elizabeth Hoyt was a graduate student at Harvard under Taussig, and went on to teach for 50 years at Iowa State University.

the operationality of rationality as a construct for analyzing economic behaviour and proposed measures reflecting degrees of rationality rather than asserting full rationality as in most modern literature in economics.[7]

Later, the use of simple rationality postulates in economics was further challenged by Simon (1947, 1955, 1982) (also see Augier (2001)) in work which laid the groundwork for the subfield of today's economic psychology. Simon made no explicit reference to this earlier literature in economics, but nonetheless criticized the use of rationality assumptions as manifest in simple utility and profit maximization models. He criticized these assumptions as naïve and focused on two implications of the use of these assumptions, namely perfect information and the seemingly unlimited computational capacity of the human brain. He argued both that individuals can only process a limited amount of information, and that in practice individuals often let feelings or emotion override logic. He argued both that individuals can only process a limited amount of information, and that in practice individuals often let feelings or emotions override logic. He also argued that in practice people took short cuts when they made decisions due to limited computational ability. The term bounded rationality that he proposed was to capture these ideas. Bounded rationality he suggested, in turn required individuals to construct simplified models of real world situations and while they may behave rationally relative to their constructed models, their real world behaviour may not be well approximated by utility and profit maximization models since in practice various rules of thumb typically guide behaviour.[8]

[7] Confusion over the term rationality in modern economics is also further compounded by unfortunate use of terminology. Micro theorists will frequently discuss rational preferences, i.e. preference orderings that satisfy such conditions as transitivity and the irrelevance of independent alternatives (see the discussion in MasColell, Whinston, and Green (1995) for instance). But rationality outside of economics is usually understood as a term linking reason and action, and as providing the basis for action, rather than a characterization of postulates that might (but are not proven) to underlie the action.

[8] Also see the more recent discussion in Kurz (1997).

Discussion of rationality as an assumption used in economics modelling has continued since Simon's day, but the central use of such assumptions continues to be the heart of modern economic analysis. In contrast, my sense is that today in other disciplines outside of economics rationality is thought of more as a testable proposition which allows for violations in data from properties suggested for rational behaviour to be examined than an accepted set of postulates. Violations of rational behaviour, in turn, are often though to represent some form of behaviour disorder, potentially capable of being corrected by treatment or therapy. In psychology literature, there are numerous examples of tests of rationality of both human and animal behaviour relative to suggested empirically based norms.[9] Shafir, Waite, and Smith (2002), for instance, show how honeybees and grey jays are influenced by the addition of an option to their choice set in foraging behaviour so that their relative preference between two original options is changed by the introduction of a third relatively unattractive option. This is interpreted as context dependent choice, which is taken to violate a principle of irrelevant alternatives which presumes that preferences between options do not depend on the presence or absence of other options.

Another example is Real (1991) who constructed a series of well known experiments showing how bumblebees exhibit a shortcoming in cognitive behaviour in so far as they seemingly base their estimates of the average amount of nectar potentially available from alternative flowers only on a small number of recently visited flowers rather than all flowers visited. A related discussion of experimental analysis of context dependent choice violations in human behaviour can also be found in Tversky and Simonson (1993). Thaler (1995) discusses similar traits in investor behaviour. In the political science literature there is extensive discussion of whether rationality prevails in matters of collective action such as voting and other areas such

[9] See, for example, the texts by Ashcroft (2002) and Alcock (2001).

as participation in associations. The edited volume by Green and Shapiro (1994) presents much of this work, and Blais and Young (1999) provide explicit tests of rationality in voting in student elections, which they partially reject.

Thus, tests of whether axiomatic postulates of rationality accepted as basic properties of rational choice are violated in data reflecting actual behaviour provide the basis for discussions of seeming irrationality in literature outside of economics. Currently economists do less of this, although experimental work is clearly moving in this direction (see Kahneman (2002) and Smith (2001)). Psychologists have also for some years used test based measures of cognition for intelligence, emotional capabilities and other behavioural traits.

In postwar economic literature, Becker (1962) characterized irrationality as random departures from the predictions of simple models based on assumed rational behaviour rather then attempting to construct measures of degrees of rationality (or metrics of economic cognition), and makes no reference to the extensive earlier literature on economic rationality. Becker's procedure implicitly accepted the notion of rationality as being consistent with model formulations of optimal behaviour as the norm, with random departures from such behaviour termed irrational. Becker and Murphy (1978) later follow this approach to suggest that what may seem to be irrational behaviour, such as dieting, may be rational smoothing of food consumption over time.

More current literature, including that on neuroeconomics (see Camerer, Lowenstein, and Prelec (2003) and on addictive behaviour (see Bernheim and Rangel (2000a, 2000b)), maintains the same approach and attempts to take notions of rationality in economic modelling further by suggesting that different regions of the brain control different aspects of economic behaviour and rational choice also extends to which portion of the brain should make which decisions. This literature claims that such behaviour as addiction can be well captured in optimising models in

which individuals are presumed to rationally decide which portion of the brain should influence their behaviour (i.e. whether to be an addict or not and which Bernheim and Rangel test).

Camerer, Lowenstein, and Prelec (2003) cite Jevons (1871), “I hesitate to say that men will ever have the means of measuring directly the feelings of the human heart. It is from the quantitative effects of the feelings that we must estimate their comparative amounts” and note that to Jevons more than a century ago, assuming that unobserved utilities are revealed by observed choice was a second best way to proceed in economic analysis compared to direct measurement of feelings and thought, and analyzing how they motivate economic behaviour. Jevons viewed the latter as infeasible. Camerer et al then argue that today with advances in neuroscience “Jevons was wrong. Feelings and thoughts can be measured directly, for the first time in human history, because of recent break-throughs in neuroscience.” Whether this claim proves to be convincing and that a simple and slightly extended notion remains largely as in its current widespread use in economics in light of both practice and literature in disciplines other than economics is what to me is at issue for the years ahead.

## 3. Personal Experiences with my own Economic Cognition

To reinforce my own sense of unease with the use of simple assumptions of rationality when analyzing economic decision making, in this section I use simple introspection and reflection on personal experience to discuss in a common sensical way whether I am able to accept simple optimization (full cognition) as a realistic characterization of what determines my own economic behaviour in all instances. My excursion into the world of my own seeming economic irrationality in certain circumstances begins somewhat tongue in cheek with an account of personal experience involving purchase of homewares during recent home renovations.

*Buying Bed Linen*

My experience with homewares involved purchases of new bed linens at a local department store. On paying for the linen I asked the clerk if I could return the linen in the event that I found it unsatisfactory. She indicated that no difficulty was involved and that if I should do so all I needed to do was to keep my receipt. I then asked what would happen if I put the bed linens on my bed first and was told again no particular problem was involved. I was just to bring them back, not necessarily even with the packaging. As long as I kept my receipt I could return them at any time. I then asked how long could I do this for and the response was as long as I keep my receipt.

On returning to home I then began to reflect on what seemed to me the obvious question an economist would ask faced with this incentive structure: namely why would anyone ever wash their bed linen. After all, if after a week or however many days one can return to the store with soiled bed linen and return it and change it for new bed linen this seemed obviously to be a utility maximizing course of action. And if I could keep doing this for the rest of my life logically I would asymptotically never wash my bed linen. Indeed I could do this with other

articles of clothing. Taken to its logical conclusion, one could well ask why I would ever buy a washing machine.

So I was faced with a seeming paradox. Economic rationality and utility maximizing behaviour in its simplest form would suggest that I would never wash my bed linen and yet I did not observe other individuals returning their bed linen to the store. I can even confess that I have never in my life returned bed linen in this way. Why? Maybe I am stupid. Maybe other factors (social stigma from standing in line in the store with used bed linen) dissuade me. Maybe it takes too much time and it is easier to wash them. Maybe I assume that the store will not, in reality, honour its pledge should everyone try to return their linens. None of these elements, however, seem to appear in our simple utility maximizing models of economic behaviour.

I have recounted this experience to several of my economist friends and I have been given numerous responses. A common one is that that the store would not allow you to do this repeatedly and hence you wouldn't try do it and this is rational behaviour by both parties. Another is that it's just not done, put another way it's simply not customary to do this and it is individually rational to obey custom. Both of these reactions involve responses with elements of rational behavioural response which we do not usually include in our simple models of economic behaviour. We usually do not include in our optimization what others accept as customary behaviour as a constraint on our action, nor do we include expectations that others will view our own behaviour as in some sense irresponsible. Thus, rationality if used to refer to more complex and only loosely formed models than those economists usually use can become tautologous, and though I might accept that in these senses there is a rational interpretation to my behaviour regarding my purchase of bed linens, what seems needed are elements that are not typically built in as constraints on economic behaviour in simple optimizing models.

A more sophisticated response from other colleagues has been to focus on the transactions costs involved. One argument is that if you repeatedly have to jump into your car and drive to the store to change your linen when you could put your bed linens in your washing machine in your house, the time cost involved in returning linens would typically outweigh the time cost of the bed linens. Some have even noted that some people prefer to wash new linen before putting it on the bed anyway to remove any excess chemical treatment. There is of course logic to both of these suggestions, but for individuals who are anyway repeatedly going to stores one would think that it would pay to return bed linens while you were at the same time doing other shopping.

As I started puzzling why it is that people do not wash their bed linens I also mused over why it is that this is not an issue which welfare economists would take seriously in terms of confronting the realism of the assumption of utility maximizing behaviour. I came to the following conclusions. Economists typically seek general theories, and are not especially interested in the particular since they believe at end of the day there must exist some kind of optimizing model that ultimately will accommodate all observed behaviour and so it is foolish to focus on the particular. In this case, perhaps it is interdependent preferences, and our preferences really are such that the derision of others (including store clerks) dissuades us.

This may be the case, and maybe it is an acceptable working hypothesis to say that optimizing behaviour is both tautologous and a norm since we as economists have no other way of accounting for behaviour. But other disciplines have other ways of proceeding. Experimental psychologists study rat behaviour through repeated experimentation and the use of stimulus response. So when I observe no one returning their bed linen to stores, the experimental psychology response might be to simply say there is no response to the stimulus of the incentive to return. This is established as an empirical regularity of behaviour without the need to explain

it in grander terms. To me this experience thus suggests that there may be some support for the position that we try to place some limits on claims of the ability of simple notions of optimizing behaviour to explain all phenomena as a form of general unified theory of economic behaviour.

*Interest On Credit Cards*

My second experience during home renovation involved the acquisition of a series of credit cards. If you ask any economist that you meet to open their wallet they will have many pieces of plastic, and many of them will be credit cards like most of us seem to do in the OECD (and now beyond in the modern world). The extraordinary thing to me is the range of interest rates which apply to the use of credit on these cards, and the fact that people carry them and use them at a variety of rates. In store credit cards which are issued by retail outlets commonly have interest rates well into the 20% range. One recent credit card which was issued to me by a retailer who will remain anonymous carries an interest rate of 28.6%. This credit card sits in my wallet along with other credit cards which relate to secured lines of credit from commercial banks which have interest rates as low as if not lower than 5%.

Why then would I keep let alone use this credit card? In my particular case this credit card was issued to me because the store had a promotion which provided for 6 months free credit if I purchased goods above a dollar ceiling amount, and I intended to pay the balance off at the end of 6 months. Perhaps many individuals forget to pay their balance, get into a financial situation where they finish up servicing the debt, and the stores benefit from having issued expensive credit. Card issuers know there is a non zero default rate on such cards, but the inexactness in people's optimizing behaviour and the high interest rates paid by those who forget or make mistakes and actually pay gives them the opportunity to make money.

But this does not explain why people accept credit cards from stores and use other unsecured lines of credit with high interest rates if they could visit a bank and simply consolidate

all their debt into one single line of credit as a secured loan at an interest rate at a fraction of that which they are paying on all their cards. I know from my own experience that I could remortgage my house to consolidate all my debt into one much cheaper loan and at a large saving in terms of interest costs, and yet I don't do it. Friends and other contacts report similar experiences and seem either reluctant or slow to act and are seemingly in someway economically irrational in their behaviour.

Economists can perhaps rationalize such behaviour in terms of the transaction costs involved, even though banks and other financial institutions frequently offer costless refinancing as an inducement to take on a new or refinanced loan. But my friends and family talk instead most of the time in terms of not trusting themselves with debt. If they remortgage the house it increases their allowable debt limit. They fear they will get carried away and they do not trust themselves. They perceive a need to be protected from themselves; a need to have someone else place limits on their behaviour and that this is good for them. Their objective, they say, is to pay down existing debt, not take on new debt. And if one of their cards has a 28.6% interest rate they may even go so far as to argue all the better since this gives them added incentive to pay off the loan more quickly. Low interest rate loans are never paid off they might say; they will just keep spending because credit will be cheap. To the neo-classical economist this line of argument (commonly heard from my own experience) again provides clear indications of potential irrationality economic behaviour.

Indeed a recent experience of mine involved a trip to a car showroom for the purchase of a new car during which I inquired about the interest rates on loans on different models I was told that the second best-selling model had a promotional interest rate of 3.8%, but the most popular model had an interest rate of 6.8%. I then indicated that if I bought the most popular model I could go down to any local bank and borrow money under 5% and pay for the car in cash. The

sales person agreed that this was a possible course of action, and I asked whether if I did this and obtained cash from the bank they would also be able to give me a better price on the car because I was paying in cash and not using credit. The response I was offered was that this would not be possible because the car company in question made a significant amount of their profit not just from the car, but from selling financing at 6.8%. When I again indicated that most people could simply just go down to the bank and get a loan at 5% and pay in cash and not use the 6.8% financing, the response was that I was more sophisticated than most of their customers. Most of their customers, from their experience, would not think of doing such a thing. Again a further clear indication of potential economic irrationality to a modern day neo-classical economist.

*Dieting*

My third experience with seeming irrationality involves dieting; a phenomena which also strikes me as posing a challenge as to its reconciliation with simple assumptions of utility maximizing behaviour. To me, the perceived need to diet clearly seems to indicate some form of mistake being acknowledged relative to earlier behaviour in life. If people are able to utility maximize in deciding what and how much they eat at one point of their lives, and then to come to the conclusion later that they need to lose weight later on this seems to point to errors in the original calculation; i.e. less than full economic cognition.[10]

A response of a modern neo-classical economist might be to argue that people get utility both when they first consume the food and then again later when they lose weight. Put another

[10] An alternative approach to understanding the need to diet is reflected in literature in zoology which characterizes humans as the one species where change from a natural state of foraging behaviour, via farming and subsequent industrialization and urbanization has occurred more rapidly than biological evolution via natural selection would typically accommodate. In the wild, animals faced with large amounts of food will gorge and over indulge since they are unsure where their next meal is coming from. Our biological (and only partially adapted) behaviour causes us to over eat, and only by explicit planned response can we adapt, and not all of us do. See Morris (1969) for an account of this way of thinking.

way, all dieting may be rational and fully planned.[11] From my own personal experience having shed many pounds in my early to mid 50's, I am sure that going through this process was not something I consciously planned for as I consumed large platefuls of food in my 30's and 40's. Indeed, talking to friends and relatives about their own diets and their food consumption the discussion is repeatedly of the extent to which people seem to feel they need help in losing weight. And it is more than just being told what to eat. People plead with their friends and family to lock away the ice cream, serve them smaller helpings; anything to help them lose weight. The suggestion is that they cannot execute their own plan to diet on their own; they need help to be protected from themselves. How one might ask can they possibly be maximizing their own utility function; how can their behaviour be economically rational?

The phenomenon of dieting, in my view, also critically exposes the large difference in philosophical traditions between Western thought (which underlies most modern economics) and Eastern thought as to how human action and thought underlying actions are linked. In Western thought there is a belief that there is separation between mind and body. There is one individual; the mind decides and the body executes. The mind maximizes utility; the body executes by consuming food. In Eastern thought, however, this separation of mind and body is not acknowledged. Eastern systems of medicine (Ayurveda, Chinese Medicine, Reiki, and other systems) stress how the mind can influence the body, and how a poorly functioning body dulls the mind. Individuals can show strength by using their mind to improve their body (Yoga, Qigong), or their weakness by allowing their body to deteriorate. The tussle between mind and body is a central feature of human existence, an example of Yin and Yang, and the need to diet is a clear manifestation of the recognition of imbalance and the need for change. Those who recognize the need to return to balance seek to diet, those who do not degenerate further. Utility

[11] This effectively the approach taken in Becker and Murphy (1988).

maximizing behaviour in a simple Western sense seemingly cannot account for the phenomenon, while other philosophical traditions seem to provide a more convincing explanation.

Similar arguments can be applied to wider notions of addiction, why it is that individuals seem to need help to stop smoking, drinking, compulsively buying, or exhibiting other behaviour psychologists would label as a disorder. The word addiction seems to suggest an inability of the individual to break away from past behaviour which is clearly agreed by all (including the individual themselves) to be harmful. Utility maximizing behaviour would suggest that addicts behave rationally, and are in control of their actions[12]. Taken to its logical conclusion, many economists would seemingly be in favour of decriminalization of drug consumption on the grounds that an unnecessary constraint on human behaviour imposts a cost since it limits choice. But the approach to addictive behaviour that most non economists are instinctively drawn to is that people who are addicted need help in being protected from themselves. Decriminalization, especially of hard drugs, is a bad thing.

Interestingly, older economists seemed to have no difficulty with the notion that individuals need help with dealing with addiction. Irving Fisher, for instance, wrote a well known pamphlet in 1926 in which he reported his estimates of the gains to the US economy from prohibition and the termination of consumption of alcohol. Fisher, who used utility maximizing behaviour[13] to underpin his many and major contributions to economic analysis, at the same time seemingly had no difficulty accepting the notion that economic rationality does not

[12] Recent papers by Bernheim and Rangel (2002a, 2002b) build in part on the formalizations by Laibson (1997, 2001) of optimising behaviour with endogenous regime choice to analyze addictive behaviour. They develop a model in which there are two states that the brain can inhabit (hot and cold), and model individuals as rationally choosing their state and hence whether to become addicts. They test their model and conclude it fits US behaviour and provides a basis for public policy towards addictive substances. As a theory of rational irrationality this represents the further application of technique in economic analysis and stands as an impressive intellectual accomplishment, but the issue is whether this is realistic and whether all seeming economic irrationality can be accounted for by such models. Perhaps all can be in some way, but more complex and nuanced models are seemingly needed going well beyond the simple structures that characterize current practice in economics.

everywhere determine all behaviour. The older economists seemingly accepted that there were limits to the principles their analytics suggested seemingly more easily than many of the theorists of today.

[13] Interestingly, Fisher (1892) suggested the term "want ability" be used in place of uility because of the ethical considerations which link utility and desirability. See the discussions in Dickinson (1924).

## 4. Irrationality and The Economics of Emotions

If simple rationality as reflected in traditional models of optimization do indeed fail in some circumstances, how should any irrationality that is implied be approached. If, in turn, emotional responses are inherently irrational, can they be sensibly analyzed by economists? If simple models of optimizing behaviour fail to fully characterize all economic activity should economists study emotions if emotions also determine economic behaviour? How would movement through emotional states be captured operationally in economic models?

Symbolism in gift giving, and the use of commodity exchange to convey emotional signals is a theme in much anthropological literature (see Hertzfeld (2001) who in turn draws on Bird-David's (1992) discussion). It is also in literature on the interaction of exchanges of tangible assets, such as goods and property, and intangibles such as love and empathy (see Ahuvia and Adelman (1993), who also cite Becker (1976, 1981)). Should emotions enter all our models of how economies actually work and how does one do this in extending simple economic models of optimising behaviour? How does economic analysis apply to joy, to gratitude, to peace, to tranquillity, to anger, to grief, even to love?

Psychologists seemingly accept that individuals pass through emotional states during their life and we can also transit emotional states during a day, and during different emotional states will both want and seek different kinds of economic activity. Lewis and Granic (2002) summarize literature on the development of emotions, focusing on the biological bases of emotions, relations between cognition and emotional states, interpersonal relations and emotions and other issues. While one can perhaps argue that a utility function simply aggregates over ones emotional states, as such this seems an unsatisfactory aggregation device because it provides no predictive mechanism as to how individuals (or economies) change behaviour as movement occurs across individual emotional states.

A starting point in any economic analysis of emotions is the observation that while emotional states are widely believed to be important motivators of human behaviour they remain difficult to precisely define. We are told stockmarkets are exuberant, depressed, tranquil, words that seemingly convey an acceptance that emotions influence economic behaviour. We all think we know what joy, grief, anger, gratitude and other states are, or at least what the words convey. But definitions of emotions and emotional states themselves seem to always remain elusive. Emily Dickinson remarked that "whatever love is, love is the only thing". We don't know what love is and yet most people seemingly seek it, and to the point that the pursuit of love can become the dominant force in peoples lives.

Seemingly there are no fully satisfactory models of optimizing behaviour which explain how individuals pass through emotional states and how this influences economic behaviour. Take love, for instance. Love (whatever it is), in the opinion, of some psychologists is inherently irrational.[14] The statement that one loves someone else is at first sight a statement that in the name of love you are willing to do anything for that person. But we all know that is not realistic, and yet we both profess love for others and seek love from others. At the same time, were the object or our love to request of us that we, say, kill ourselves, or give them $5 million when our income is $20,000/year, or spend 24 hours a day massaging their feet we know that we would be either unwilling or unable to comply with the request. We expect and hope that if the object of our love also loves us, that they will not make such requests (which they usually don't!). We seemingly offer unrealistic love to others in the hope that we will receive unrealistic love in return. If we are lucky and we are both realistically unrealistic, then reality and happiness can prevail. If we (or they) are unrealistic, the result is conflict and turmoil (a frequent state for lovers).

It is said that the true course of love never runs smooth and that love is not for sale. So what are economists to make of it. Whatever it is, is there a price for love? Is there a market for love? Is it stupid to be in love, or even seek love? Can the pursuit of love be rationalized with conventional utility maximizing behaviour. Little literature from economists seem to exist on these matters. In the 19th century, economists were seemingly content to leave economics to the domain of the economy (whatever that is) and not stray into the full range of so-called non-economic activity. This gave economics as a discipline clearer definition, perhaps a more orderly state of affairs than in modern day economics.

This discussion of love, in my view, also has further implications for modern economics since from my own personal experience it is clear to me that significant fractions of economic behaviour and economic activity involves the purchase of items for others and are motivated as much by the desire to care for others or on in some way to show affection or concern as they are by narrower self interest in the use made of the items by the purchaser. This view is stressed in marketing literature (see Hirschman (1987), and Ahuvia, Adelman and Schroeder (1991)). Do such departures from purely individualistic self interested behaviour reflect some form of irrationality; or is this simply altruistic behaviour that is hard to fully explain?

Anthropological literature places substantial stress on the role of gift based exchange in traditional society, and its evolution into market based exchange in the economies of today. Bird-David (1992) drawing on Mauss (1954) draws the important distinction between gifts and commodities as forms of exchange of physical items between people. Sahlin (1972) discusses Stone Age Economics involving economies organized through domestic groups and kinship arrangements in which people underutilize their productive resources and labour, households

[14] See the older discussion of love in Berl (1924), and more recent discussion in Grant (1976) and Aron and Aron (1986).

produce for use as against exchange, and occasionally engage in exchange directed towards use with most exchange being symbolic.

In this vein, one could argue that much food, for instance, is bought for family members rather than the person who directly purchases the food. Clothing, houses, cars, items are similarly purchased. People take friends and relatives with them when they shop to see if they approve before they purchase items. People seemingly assess how their relationships with others (which value people) are affected when acquiring things, and one can argue that physical items are acquired possessions used in interpersonal relationships as a way of either expressing or obtaining responses from other individuals. Individuals seek emotional responses such as love from others and offer their own emotional responses as part of this search. Goods and commodities become part of the way in which responses between individuals are traded.

If this view of the world is accepted, the interconnection between individuals emotions can then be a significant driver of economic activity and the goods and material things whose production and exchange that economists study are but part of wider mechanisms in which individuals seek to obtain emotional responses from others and in which goods play a role. Put differently, individuals do not exist in isolation one from another as simple models of utility maximizing behaviour portray; their economic behaviour reflects a search for emotional responses from other individuals.

The limits to the credibility of simple models of optimizing behaviour on such grounds is illustrated by the literature on the welfare economics of Christmas. The pioneering paper in this area by Waldfogel (1993) admittedly written somewhat tongue in cheek sought to quantify the welfare costs of Christmas by conducting two surveys of Yale undergraduates in 1993 in which he asked them each how they would value the gifts which they had received at Christmas. Their

response was to place valuations on these gifts at between 60-70 cents per dollar for the gift received by comparing the average value of gifts to the average prices paid.

Waldfogel then concluded that if Christmas gifts every year in the US economy in the early 1990's account for around $40 billion, a conservative estimate of the welfare cost from Christmas is around 1/10$^{th}$ of the welfare cost of the US income tax. The range he suggests is between 1/10 and 1/3 of literature estimates welfare cost of the income tax. This is significant compared to wider estimates of the costs of taxes, trade policies and other policy interventions which economists analyse quantitatively using sophisticated behavioural models based on utility and profit maximizing behaviour.[15]

If taken seriously the prescription for Waldfogel's work would be that major economic advance would be obtained by banning Christmas. Yet to those in other disciplines the very idea that economists could approach a question such as the welfare costs of Christmas in this way fills them with incredulity and disbelief. The grinch that stole Christmas could even turn out to be a practitioner of that dismal science!

A response from other disciplines might be to accept that one could logically come to this conclusion, but this seemingly denies the main focus of gift giving as an expression of emotion and caring conveyed by the gift rather than the gift itself. The argument is that people value things by recognizing the intent and expression of emotion of the person who gave them the gift and the thought which lay behind the purchase of the gift, not the item itself which was received. The further argument would be that by not taking into account such considerations economists wrongly understand what is going on.

The reality that seems to be neglected in applying simple economic models to phenomena such as Christmas is that people use commodities to obtain an emotional response from others.

Emotional exchange is achieved in part by an exchange of gifts. To analyze the economics of this form of gift giving not recognizing the emotional interaction involved seems incomplete. It also raises the issue as to how pervasive economic behaviour is that largely reflects emotional exchange, and whether caring can be relied upon more than the market to allocate resources.

Titmuss (1970) some years ago wrote extensively on the blood relationship, trying to explain why it is that people give blood freely. He conjectured that the organization of the blood supply is much better coordinated and operated on the basis of voluntary donation than it would be were it on a market oriented commercial basis where bad blood drives out good. He went so far as to suggest that this demonstrates that whole economies can be run and operated on an altruistic basis, relying on individuals caring for others and that the caring relationship in reality dominates all economic activity and economic behaviour.

The literature on the welfare cost of Christmas might be taken as demonstrating the limitations of economists building individually based optimizing models which they claim capture and represent all phenomena around them. To suggest that when analysing Christmas gift giving one should ignore emotional interaction seems extreme. But it seems equally extreme to suggest that, say, stock and other financial markets could be organized on an altruistic basis. In this case, intellectual traditions from each of two disciplines seemingly claim intellectual jurisdiction over phenomena beyond their traditional place, and it seems unsatisfactory to seek a grand unifying theory based on either approach. Perhaps, the middle road is to accept that models based on simple economic rationality have limits, as does the belief that irrationality characterizes behaviour. Not everyone is rational all of the time in the sense represented in simple optimising models used by economists, neither are they irrational about everything.

[15] Welfare costs of distortions of OECD tax systems run in the region of 5 to 10% of GDP in numerical general equilibrium models (see Whalley (1988), but also see Jorgensen and Yun (1989) who report much larger estimates).

## 5. Towards Measures of Economic Cognition

If the possibility that individuals may display less than full economic cognition is accepted then it may also be helpful to explore the reasons for such outcomes. One could be that individuals are not able to fully take advantage of opportunities open to them. This may be because some individuals lack the same information available to others, or their ability to solve complex optimisation problems is limited by the computational capacities of their brain. These are some of the ideas that motivated Simon's (1955) discussion of bounded rationality, the notion that individuals are only rational within certain operational constraints. Simon also suggested that most individuals approach problem solving in practice by developing their own models of the more complex reality they face, and then developing operational rules of conduct applicable to a range of situations from their models.

A different reason for displaying less than full economic cognition, and one stressed by Hoyt (1926), is that some individuals may be lacking compared to others in sagacity, the ability to clearly see and grasp what might be possible and then using this vision to achieve their objective. Under this view, unlike in Simon's writings, individuals may indeed be able to formulate and solve optimisation problems similar to those found in current economic theory, but they lack the ability to fully implement the solutions to such optimisation problems. Executing optimal plans is their weakness, and provides the source of departure in observed data from what simple theory might predict. These are departures from the predictions of simple economic rationality emphasized in the literature between 1890 and 1930 referred to earlier.

Yet another reason why individuals may in some way be lacking in ecomomic cognition is that they have disorders of various types (compulsive buying, over consumption) which result in departures from what would otherwise be a rational economic behaviour. This approach would view some economic behaviour by some individuals as significantly influenced by

emotion or other irrational thought processes. These in turn could yield regularities in behaviour, which were seemingly hard to explain. This view of deficiencies in economic (and other forms of) cognition is what is emphasized in Kasser and Kanner (2004) and related recent literature in economic psychology (also see Wright and Larsen (1993)). This view also has the seeming implication that these deficiencies can be taken advantage of by others. This would include influences through advertising, branding, product display, and other issues discussed in marketing literature. This, in turn, leads to discussion of possible policy interventions based on a paternalistic view of the world.

Whatever the source of departures from full economic cognition, my thrust is to suggest that economists should perhaps first accept and then classify and analyze such departures rather than simply treat them as hard to explain and absent from their simple models of optimizing behaviour. This might involve focussing more on understanding how cognitive processes in economic decision making actually work (as Herbert Simon tried to do throughout his career (see Augier (2001)) rather than simply assume and assert simple rationality in its present widely used form (characterized by Simon as naïve).

This approach leads to a series of further questions. One is how departures from full cognition are to be measured. An obvious place to start is with economic cognition test scores comparable to the intelligence and emotional tests used in psychology. While there are many accepted difficulties with such tests, as an operational tool in day to day decision making in business such tests seem to have proven useful and effective.

Another question is whether policy interventions either aimed to raise cognitive levels or to counteract less than full cognition and motivated by studies showing less than full economic cognition would be defensible. If, for instance, one argues (as some do) that advertising is able to exploit cognitive deficiencies and to encourage spending which would otherwise not occur to

the point that socially inefficient consumption occurs, should advertising be specially taxed. Should other elements in exploitation of opportunities arising from less than full cognition, such as sought after locations on supermarket shelves used to display soft drinks and detergents also be taxed?

A further issue is whether policy should be directed towards improving and raising levels of economic cognition. Are particular people poor in part because they lack economic sagacity? While this may only be one reason for poverty alongside other factors such as limited access to social benefits (education and health care) or social factors (single parent status), there may be arguments to focus programmes on the poor designed to raise their economic cognition levels. The design of such programmes would then be a matter for further research.

A central purpose of this lecture is to suggest that rather than debate whether individuals are rational or irrational in their economic decision making, we instead develop notions of economic cognition as underpinning observed behaviour. If this is accepted, then a discrete index which determines whether one is either rational or irrational might be replaced by a metric reflecting ones degree of economic cognition according to some objective measure. Under such an approach full economic cognition may be a rarity. Close to full economic cognition may occur for some individuals in some transactions but not in others: Low economic cognition scores may be the situation in which the disadvantaged in society find themselves. And if economic cognition is learned it raises the possibility that policy interventions raising cognition in subsets of the population may be desirable. Existing models of economists which assume 100% cognition may be able to be recast by incorporating degrees of cognition, and existing structures modified to include learned cognitive abilities. How such modifications might alter economists' views of markets and appropriate economic policy is then the issue.

In recent decades economics has acquired a sense of complexity and impenetrability to non-economists which they often find both perplexing and frustrating. The central element behind the formalism which presents this side of the discipline is the belief among economists that most (if not all) behaviour can be represented as the outcome of optimization in models based on simple rationality postulates. In this lecture I suggest that discrete concepts of rationality and irrationality could be usefully replaced by notions of economic cognition and continuous metrics (or degrees) of cognition developed to better understand economic actions. Such measures of cognition might then be constructed and incorporated into the analytics economists use.

None of this is to suggest that modern economics does not provide powerful analytics. But the 19th century economists, in my opinion, understood only too well that economics is a philosophical discourse rather than a discipline closely aligned with what today we see as natural sciences, such as physics or chemistry. This is also not to suggest that economists current analytical models have no use. They yield powerful insights and provide arguments for policy actions based on powerful deductive logic. But if taken literally as exact representations of all behaviour the approach can lead to overly mechanical application of simple models and in the end potentially lead to counter-productive social policy.

In conclusion, while working on a draft of this lecture I visited my local Eastern European delicatessen who was selling, among other things, Bulgarian honey. They were selling the same identical brand and type of honey in two differently shaped jars. One contained 450 grams of honey and sold for $6.75, the other 500 grams which sold for $3.75. I bought the larger jar to reward the store keepers for their prowess at rational profit maximization. I now see similar phenomena every day of my life since I look out for them and speculate on the degrees of economic cognition which might be involved and how they could be improved upon.

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