

KEYNES LECTURE IN ECONOMICS

ANIMAL SPIRITS¹

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I

LET me begin by reading three well-known passages from Chapter 12 of Keynes's *General Theory*, the chapter on 'The Long Run State of Expectation'.

... it is probable that the actual average results of investments ... have disappointed the hopes that prompted them ... If human nature felt no temptation to take a chance, no satisfaction (profit apart) in constructing a factory, a railway, a mine, or a farm, there might not be much investment as a result of cold calculation. (p. 150)

Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as a result of animal spirits—of a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities. Enterprise only pretends to itself to be actuated by the statements in its own prospectus. (pp. 161–2)

... human decisions affecting the future, whether personal or political or economic, cannot depend on strict mathematical expectation, since the basis for making such calculations does not exist; ... it is our innate urge to activity that makes the wheels go round ... (pp. 162–3)

Thus animal spirits are conceived by Keynes as a feature of human nature that serves to give a pervasive, positive impulse to investment. It is a feature intimately related to uncertainty. The reason

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for this is that animal spirits manifest themselves largely in the way that people respond to uncertainty:

Individual initiative will only be adequate when reasonable calculation is supplemented and supported by animal spirits, so that the thought of ultimate loss . . . is put aside as a healthy man puts aside the expectation of death. (p. 162)

The passage about the satisfaction of building a railway could be taken to mean that the activity of investment carries with it a non-pecuniary utility, in principle quite independent of uncertainty. That may be part of what Keynes had in mind, but no more than part. He clearly regarded the connection with uncertainty as being of the essence.

Uncertainty is the main theme of Chapter 12. Keynes there draws on his *Treatise on Probability* to reject the frequency theory of probability as applied to uncertainty (in the sense of Frank Knight). The associated concept of animal spirits takes second place in Chapter 12 to a separate associated question, the volatility of investment—and, incidentally, animal spirits are not mentioned in the article in *QJE*, 1937, in which Keynes developed his treatment of uncertainty further. The volatility arises partly because the bases of expectations about the future of the real economy are so insecure that those expectations are subject to violent changes. It also arises partly because of Stock Exchange fluctuations. Those have a different source, namely the instability of a purely speculative market where everyone's chief preoccupation is to outguess everyone else. As Richard Kahn has pointed out,¹ the discussion in Chapter 12 shifts about rather confusingly between decisions about real capital formation and decisions about operations on the Stock Exchange. There are some inconsistencies in it about whether Stock Exchange fluctuations have important effects on real investment or not.² These inconsistencies are not relevant to what I have to say tonight. But it *is* relevant, and introduces a further point, to note the words Keynes uses to indicate *how* equity prices may affect investment:

. . . there is no sense in building up a new enterprise at a cost greater than that at which a similar existing enterprise may be purchased; . . . [likewise]

¹ R. F. Kahn, *The Making of Keynes's General Theory* (1984), pp. 150–7.

² Ch. 12 was apparently written less carefully and in a more light-hearted spirit than most of the *General Theory*. It was not subjected to the scrutiny of the group of younger colleagues assembled by Keynes to help him (information from Richard Kahn).

there is an inducement to spend on a new project what may seem to be an exorbitant sum if it can be floated off on the Stock Exchange at an immediate profit. (p. 151)

This passage follows immediately after the first of the quotations that I read to you about animal spirits. It's introduced as a complication that applies in a world of quoted joint stock companies as opposed to a world of owner-managers. The suggestion is evidently that there are limits to the influences of animal spirits; people are not so inebriated by them that they prefer course A to course B if course B *certainly* brings a greater profit.

The hypothesis, then, is that people—or at least some people—are predisposed towards action rather than inaction and hence are predisposed to ignore some of the downside risks of action; that this serves as a stimulus to investment to an extent that is positive on average; but that it does not override unambiguous prospects of gain or loss. The hypothesis is thus a reasonably specific one; it certainly doesn't imply, as it's sometimes been supposed to do, that the determination of investment is entirely arbitrary.¹

What I should like to do is to try to relate this type of idea to some more recent thinking about the psychology of economic behaviour, and then to revert to appraise its significance for investment and also for other aspects of economic life.

This is not intended as a lecture on the history of thought, but a few words first on antecedents will be useful to broaden the idea somewhat.

I asked Don Moggridge if he knew the origins of the phrase 'animal spirits' in Keynes's own thinking. He has very kindly sent me the following interesting information.

The origins of 'animal spirits' seem to go a long way back in Keynes. The earliest reference comes in a set of lecture notes, which are in the Marshall Library collection, entitled 'Notes on Modern Philosophy I—Descartes, Leibnitz, McTaggart's Lectures, Ertemann's History—[includes Spinoza's Ethics]'. In the part concerning Descartes as regards life and biology the text runs 'The body is moved by animal spirits—

¹ The hypothesis was made more specific still in later work by Joan Robinson.

For purposes of our model, therefore, the 'animal spirits' of the firms can be expressed in terms of a function relating the desired rate of growth of the stock of productive capital to the expected level of profits. (*Essays in the Theory of Economic Growth* (1962), p. 38)

This definition does not bring in uncertainty, but Mrs Robinson no doubt regarded the role of uncertainty in investment decisions as so pervasive as not to need to be explicitly underlined.

the fiery particles of the blood distilled by the heat of the heart. They move the body by penetrating and moving the nerves and muscles . . . But does not this increase the amount of motion? No, for the animal spirits are always in motion—the will only directs them.’

Keynes then adds a comment that reads ‘unconscious mental action’.

I don’t know what was the process by which this youthful reflection matured in Keynes’s mind. It’s noteworthy that animal spirits is a phrase that was also used by the philosopher Hume, so greatly admired by Keynes.¹

Be that as it may, it had been characteristic of the Cambridge school of economics since Marshall to give a significant amount of attention to the psychological springs of economic behaviour; admittedly, they were never placed in the forefront, nor were they very satisfactorily accommodated in the main body of doctrine. We have the well-known invocation by Pigou of waves of optimism and pessimism in the explanation of the cycle, an idea which builds on a passage by Marshall (*Principles*, p. 711) attributing the persistence of recessions to lack of confidence. There is a good passage, in a similar sense, in a book by another Cambridge economist of that time, F. Lavington’s *The Trade Cycle* (1922). Lavington illustrates the epidemic quality of business confidence by a comparison with skaters who judge the safety of the ice on the pond by the number of people already upon it (pp. 31–7). He points out interestingly that although this *may* lead to disaster, it is in itself not wholly unreasonable—there *is* some sense, in face of uncertainty, if a person supplements his own judgement by the judgements formed by other people; for all he knows, they may have access to information that he lacks.

These ideas from Pigou and Lavington concern uncertainty generally and its relation to fluctuations, rather than animal spirits. But going a little further back in the Cambridge canon,

¹ *A Treatise on Human Nature*, Book i, Part iv, Section vii. I am grateful to Gay Meeks for pointing this out to me. See her ‘Keynes on the rationality of the investment decision under uncertainty’, Cambridge, mimeo, 1984. Don Moggridge suggests to me that Keynes’s continuing interest in Hume and Descartes in the 1930s was connected with his activities as a book-collector. He was buying Descartes’s writings in 1934, the year when Ch. 12 was substantially written, and his interest in Hume was stimulated by his acquisition of a copy of the very rare *An Abstract of a Book Lately Published; Entitled a Treatise of Human Nature* . . ., attributed by Keynes and Sraffa to Hume himself. *Collected Works of John Maynard Keynes*, xiii (1973), 423; *ibid.*, xxvii (1980), 373–90; A. N. L. Munby, ‘The Book Collector’ in Milo Keynes (ed.), *Essays on John Maynard Keynes* (1975), pp. 292–3; Exhibition Catalogue of the Fitzwilliam Museum (1983), p. 66.

that notion is also present. The combination of uncertainty and animal spirits could hardly be expressed more clearly than it is by the conjunction of the two quotations which Dennis Robertson used to preface his 1915 *Study of Industrial Fluctuation*. The first is from Heraclitus: πάντα ῥεῖ ('everything is in flux'): uncertainty. The second is from Walt Whitman: 'Urge and urge and urge, always the procreant urge of the world': animal spirits. A little later, some similar ideas, applied to the theory of consumption, were put forward by R. G. Hawtrey, another associate of Keynes, in *The Economic Problem* (1924). Perhaps most interesting of all is the chapter from the fountain head itself, Marshall's *Principles*, entitled 'Wants in Relation to Activities' (pp. 86–91). Marshall refers there to the desire for variety for its own sake and the desire for distinction, and then goes on to say 'The desire for excellence [in performance] for its own sake, is almost as wide in its range as the lower desire for distinction'. He concludes as follows:

It is not true therefore that "the Theory of Consumption is the scientific basis of economics". For much that is of chief interest in the science of wants, is borrowed from the science of efforts and activities. These two supplement one another; either is incomplete without the other. But if either, more than the other, may claim to be the interpreter of the history of man, whether on the economic side or any other, it is the science of activities and not that of wants; and McCulloch indicated their true relations when, discussing "the progressive nature of man", he said:—"The gratification of a want or a desire is merely a step to some new pursuit. In every stage of his progress he is destined to contrive and invent, to engage in new undertakings; and when these are accomplished to enter with fresh energy upon others."

Potentially, as I shall argue, these are ideas with some radical and far-reaching implications for economics. Activity itself—travelling hopefully—assumes as much importance as a motive for economic behaviour as the consequence of action—arriving. However, Marshall didn't follow up the suggestion—nor, to tell the truth, is it very clearly spelt out in the chapter I've been quoting. As far as I can find, he made no further use of it, either in the *Principles* or in *Industry and Trade*.

II

In coming now to more recent thinking on the psychology of economic behaviour, it's convenient to distinguish two aspects: the motivational (corresponding to animal spirits) and the cognitive (corresponding to the response to uncertainty). The two interact in the way I've been describing.

First, motivation.

Marshall's remarks don't relate exclusively or even primarily to business investment. The same can be said of the modern economist whose ideas have most in common with Marshall's, Scitovsky. Scitovsky was writing mainly about consumption, but his ideas can quite well be applied to business behaviour as well.¹

He distinguished between comfort and pleasure. He related both to arousal, which he understood in a quite strictly physiological sense, relating to the stimulation of the cortex. In this he was drawing on the writings of psychologists of the 1960s, especially Daniel Berlyne. Roughly speaking, Scitovsky's idea is that comfort is a function of the level of arousal and pleasure is a function of the rate of change of arousal, and arousal in turn depends on stimulus. Arousal increases when something is going on: in the absence of ups and downs in arousal you may be comfortable but it's boring. The same idea was expressed, in more cynical form, in an alleged cocktail party aphorism of Frank Knight. 'Tell me, Professor Knight', he was asked, 'what is it you think that people really want in life?' He replied: 'Trouble'.

Arousal in Scitovsky performs the same function as 'activity' does in Marshall. Arousal leads to activity and activity leads to arousal. Keynes and Marshall, Knight and Scitovsky, represent a family of theories rather than a single theory. There are differences between them. What they have in common is the hypothesis that the motive to economic behaviour arises from doing as well as having, from becoming as well as being. The ultimate reason could lie in genetic evolution: it is functional to be stimulated to action in certain circumstances, and the arousal mechanism evolved accordingly in *Homo sapiens*, as in other animals. It could further be held that the general arousal mechanism, once implanted, has made people respond to a variety of stimuli, including some quite different from those for which the mechanism was functional in the prehistory when evolution was taking place.

I said doing as well as being. As well as, not instead of. It would be absurd to write off the conventional kind of economic motivation. In fact, the two kinds can interact in interesting ways. For example, if the system is formalized in Scitovsky's manner, in terms of both the level of a variable (arousal), determining comfort, and its rate of change, affecting pleasure, cycles can result. Karl Marx's model of the trade cycle can be interpreted in that

¹ T. Scitovsky, *The Joyless Economy* (1977); 'The desire for excitement in modern society', *Kyklos*, 1981, pp. 3-13.

way: the capitalists' urge to accumulate propels the upswing until it's brought to a halt by the adverse effect on their comfort caused by the resulting fall in the rate of profit.

Any form of hypothesis that attributes pleasure to activity or (still more) to novelty has an element of paradox. It requires to be reconciled with such widespread views as that people dislike having to make up their minds and that they are hostile to change and that the chief reward of monopoly is a quiet life. A number of possible reconciliations may be offered, not inconsistent with one another. It may be a matter of degree, too much stimulation and too little both being disagreeable (Wundt's Law).¹ Or it may be a matter of personality differences, some people being more plentifully endowed with animal spirits than others. Or a distinction may exist between (alarming) change imposed from outside and (interesting) change initiated by oneself.²

How does this kind of theory, if valid, affect the theory of investment? Investment is a means of changing things, and as such is a non-routine activity. It satisfies the procreant urge, gives an outlet to the animal spirits. Hence it is capable of being a source of satisfaction in itself, independently of its actual consequences. Does this mean simply that investment is in part a consumer good, conferring a non-pecuniary utility? If so, the *theoretical* consequences are not particularly radical, even though the presence of this non-pecuniary utility will affect the outcome. Its effect is like that of a subsidy to investment. But there are also more radical implications.

In the first place, in so far as the non-pecuniary utility is a function of change, a stationary equilibrium is precluded, at least for the individual economic agent.

In the second place, although people's tastes may remain constant in the sense that they always have a need for arousal, there are systematic forces operating to prevent constancy in their

¹ Scitovsky, *The Joyless Economy*, pp. 34-5.

² Two supporting findings may be cited for this distinction, one from social psychology, the other from experimental psychology. (1) Decision-making has been found to be unpleasantly stressful only if all available options look likely to involve loss (I. L. Janis and L. Mann, *Decision Making*, 1977, Ch. 1). This condition will not be fulfilled in the case of self-initiated changes, since there the option exists of keeping the status quo. (2) Rats, as is well known, will work to administer electrical stimulation to the so-called 'pleasure centres' of the brain. However, they have been found to work to *prevent* the stimulation when it is recorded and played back to them under the control of the experimenter. S. S. Steiner *et al.*, 'Escape from self-produced rates of brain stimulation', *Science*, 1969, pp. 90-1.

tastes as expressed in action. Having achieved one thing, they seek a new goal.

Indeed the question how their energies are channelled indicates that the theory is in need of supplementation. The underlying psychological theory is not a theory of investment as such, although it's capable of being applied to investment. In the language of Descartes, the animal spirits are always in motion but the will directs them. What determines the direction in which it channels them? People set themselves tasks and get a kick out of the effort to achieve them. But what determines the tasks they set themselves? Business expansion by means of gross fixed capital formation is only one of the ways in which an outlet may be sought for the procreant urge, even among those in a position to undertake it. Altogether different outlets might be chosen. People might find their outlet in purely speculative activity, or in the pursuit of personal promotion within a bureaucratic hierarchy, or simply in making money as an end in itself by whatever means serve best. Or else their self-imposed tasks might lie in some entirely non-economic field—politics or community activity or sport. If animal spirits are to be invoked in the explanation of economic behaviour, it becomes an important matter, separate from the underlying psychological idea, to determine what forces channel them. This is likely to depend to a significant extent on the cultural environment, hence, obviously, creating scope for differences between countries and periods. It will also depend on individuals' personalities. That in turn will again depend partly on the cultural environment, in so far as a given organization of society causes people with a particular temperament to get into a position where investment decisions fall to them. Such non-random selection of individuals for jobs makes inter-personal differences in channelling likely to be a more important complication in the application of arousal theories to business (or political) decisions than to consumption decisions—everyone is a consumer, albeit not on an equal scale, but not everyone is called on to make substantial investment decisions. I shall have more to say about channelling presently.

What basis for the whole approach is provided by psychologists? As far as I have been able to ascertain, the answer from the more rigorous, physiological, kind of psychological research is rather unsatisfactory. Psychologists appear to have been more successful in refuting broad theories of motivation than they have been in devising one that commands general support. We know that Descartes was very far from the mark. The nineteenth-century

German psychologists referred to by Marshall in his footnotes are now largely forgotten. The more recently developed theory of generalized 'drive' was found to be open to serious objections.¹ The same, unfortunately, seems to have happened to some extent to the arousal theories used by Scitovsky. They have been found to contain an element of truth but they have less all-embracing application than was supposed in the 1960s. The motivational state, it appears, is a complex one, made up of a number of elements that are not too well correlated with one another. Psychologists have identified various behavioural regularities, but the reasons for them are not too well understood.²

These findings suggest that we should be chary of trying to explain too much by a single grand theory of motivation. However, it is not disputed that animals (and hence probably *Homo sapiens*) do work for stimulation and that novelty is a source of stimulation. It is also agreed that the motivational state is largely conditioned by society, both in respect of what we seek to do and of how we seek to do it. Influences of the kind discussed by Marshall, Keynes, Knight, and Scitovsky are therefore by no means precluded and may well be important. Whether it is best to conceptualize all such influences as alternative, substitutable, sources of arousal is more debatable. Just as it would be straining language to regard the procreant urge (in its literal sexual sense) in this way, so also it may be more appropriate to regard other impulses, of a kind more relevant to economics, as genetically implanted in their own right, with arousal an incidental feature only. Perhaps most prominent among such impulses are aggression and the desire for victory as an end in itself—apparent in many economic contexts, some of them capable of affecting investment: in takeover bids and in debates in the board room, as well as in industrial relations.

Behavioural and social psychologists, as well as physiological ones, exhibit lack of agreement on motivation. However, there is a fair amount of support for hypotheses couched, like the hypothesis of animal spirits, in terms of activity. At the most general level, one leading writer recently went so far as to say 'our utilities for ways of getting things are normally much higher than our utilities for the goods themselves' and he asked 'when people take action in order to achieve certain objectives, do they really know whether they are going to like what they get when they get

¹ R. A. Hinde, 'Critique of energy models of motivation', *Symposium of the Society for Experimental Biology*, Vol. 14 (1960), pp. 199–213.

² For a survey see R. C. Bolles, *Theory of Motivation*, 3rd edn. (1975).

it?'¹ The general notion can be related to a number of more specific ones: satisficing, enquiring, and goal ambiguity.

In so far as *satisficing* is taken as a theory of utility (rather than as a theory of search), it implies the choice of an objective, with utility being derived from progress towards that objective, whatever it may be. Once the objective is attained, a new one is chosen. The successive choice of objectives is equivalent to channelling, and it may be subject to forces of culture and personality, not to say arbitrariness.

An interesting expression of the equivalent to satisficing, as a theory of utility, is the model that has been put forward by the psychologists Kahneman and Tversky under the heading of prospect theory. The model was designed to explain the apparently anomalous attitudes towards risk exhibited by subjects in laboratory tests.² According to this model people value outcomes with reference to a base-point. At the base-point, there is a kink in their valuation functions. For outcomes above the base-point, the valuation function is concave, in the conventional manner, but for outcomes below the base-point, it is convex. The base-point can be interpreted as the goal set by the satisficer. He does not set much store by doing *better* than that. He minds very much if he fails to reach it. He is diminishingly sensitive to larger shortfalls, on the principle that a miss is as good as a mile. In the limiting case, his valuation curve might reduce to a step function, with only two levels of utility, one for success and the other for failure. How he values any given outcome thus depends on his self-selected objective. Scope exists for important differences in the valuation set by different people on the same outcome, according to how high they set their sights.

In so far as this is the sort of way people behave, it helps one understand the first question commonly put by management consultants to their clients: What are your objectives? To an economist, this seems rather an odd question: one wonders whether firms can really differ much in their answers. But if objectives are self-selected, the question makes sense. The notion of self-selected objectives has something in common with the idea of activity as *enquiry*, put forward by the clinical psychologist Kelly, who saw the motivation of the economic agent as similar

¹ D. Kahneman, 'Bureaucracies, minds, and the human engineering of decisions' in G. R. Ungson and D. N. Braunstein (eds.), *Decision Making: an Interdisciplinary Inquiry* (1982), p. 122.

² D. Kahneman and A. Tversky, 'Prospect theory: an analysis of decisions under risk', *Econometrica*, 1979, pp. 263-91.

to that of the research scientist, for whom the exact field of his research is of secondary importance.¹

The management consultant's question is posed in awareness of the possibility also of *goal ambiguity*, another concept prominent in the behavioural literature.² If an individual or an organization is subject to goal ambiguity, yet remains active, it would appear that activity has become an end in itself even more than under satisficing. On this reckoning, goal ambiguity is not necessarily a bad state of affairs—though if those concerned were not conscious of the ambiguity of their goals, the management consultant's question may help to clear their minds.

I have been speaking of the motivation of individuals or organizations, without distinguishing the two. Naturally, the collection of people into organizations does introduce fresh considerations. Proper discussion of those lies outside the scope of my address today. However, for present purposes, the differences may not be too important in principle; both individuals and organizations are capable, in their different ways, of being motivated by activity as such and of developing goals to guide that activity.

A hypothesis that does come into a rather different category from those I am discussing is one version of the so-called managerial theory of investment, based on the separation of ownership and control. This is the hypothesis that managers choose policies for their companies with a view to the maximization of their own personal earnings, to the possible disregard of the interests of shareholders. This has nothing to do with animal spirits (though the effects of the two may be difficult to distinguish from each other in practice). It is simply an example of the principal-agent problem. As such it is a matter of institutions rather than psychology. Psychology comes in only in so far as the managers are deceiving *themselves*—persuading themselves that their plans are in the shareholders' interests when they are really just in their own.

The reference to self-deception takes me conveniently from the motivational aspects of economic psychology to the cognitive aspects.

¹ G. A. Kelly, *The Psychology of Personal Constructs* (1955). I owe this reference to P. E. Earl, 'A Behavioural Analysis of Choice', Cambridge University Ph.D. dissertation, 1984, where the application of Kelly's ideas to economics is discussed and developed.

² J. G. March, 'Bounded rationality, ambiguity, and the theory of choice', *Bell Journal of Economics*, 1978, pp. 587–608.

III

The role assigned to cognition in textbook economics is Humean: cognition is and ought to be the slave of motivation. Keynes, in effect, made two observations on this. First, in the matter of investment decisions, the slave is given an impossible task, because the future is unknowable. Secondly, the slave is prone to do a bad job, by telling his master only what he wants to hear. The two observations are, I must say, not wholly consistent: if the job is impossible, who can say whether it is done well or badly? But this need not prevent us from asking how the slave does do his job.

Let me first note in parenthesis one cognitive implication of activity theories of motivation. That is to downgrade the importance of expectations. The immediate question for any decision-maker is: what shall I do? It is not: how do I think the future will unfold? How far he chooses to address himself to the second question as a preliminary to answering the first depends, amongst other things, on his motive for action. If the motive is purely consequentialist, expectations are of the essence. If it is not, he may quite reasonably take action without having formed any very explicit expectation about the future at all. Most obviously is this so if activity is purely an end in itself. If it is directed to some self-selected goal, he will certainly want to take a view on whether that goal looks likely to be attained, but he will not project further than that. The academic analyst may find it convenient to say that people behave *as if* they had certain expectations, but that should not be mistaken for a description of their actual thought processes. It is noteworthy that in the case of investment decisions, where firms often do make explicit projections, the projections are customarily made at a different and lower level of the organization than the level where the actual decisions are arrived at. One may question how firmly the decision-makers really believe in the projections of their staff. They may well not be in a position to assess the validity of the projections anyway.

On cognition more generally, the starting point for much of the recent discussion among the economists has been Simon's concept of bounded rationality: perfect rationality is a chimera, because no one possesses the mental powers to marshal in his head all the information relevant to a difficult decision. The relevance of bounded rationality is not confined to situations characterized by Knightian uncertainty. The situation may just be too complicated to grasp comprehensively. Chess provides an example. But there is a good reason why bounded rationality should be particularly

important under uncertainty. Situations where there is certainty or where uncertainty takes only the form of exactly calculable risk are in principle *simple*, in that the amount of information needed for action is limited. The thought needed may therefore lie well within the bounds of our rationality. It is easy, therefore, to understand the force of Keynes's idea that mental processes undergo some alteration if the cloud of uncertainty dissolves: the entrepreneur then need not hesitate to turn arbitrageur. Even if the situation is complicated, the amount of information that is required is still limited—if necessary the decision-maker can hire an actuary or other such expert to give him advice. But in the case of Knightian uncertainty, there is no limit to the information that *might* turn out to be relevant—you could go on collecting it for ever. Even if you did, it would be pointless, because the boundedness of your rationality would prevent you from using it all.

The existence of bounded rationality means that we are liable to make mistakes. It does not as such mean that the mistakes have a systematic tendency to be in one direction rather than another. However, psychologists have also accumulated a good deal of evidence to suggest that our rationality is in certain respects systematically twisted, not merely bounded.¹ This evidence admittedly comes largely from laboratory tests on volunteer subjects, who have nothing real at stake; it's reasonable to argue that some of the biases observed would not apply to important business decisions that will be preceded by careful deliberation on the part of intelligent people. Examples include various tendencies to elementary fallacies about the laws of probability. That sort of mistake is not too difficult to avoid, given experience or time for thought (it is avoided by even moderately skilful bridge players). On the other hand, the potential fallacies are not so neatly isolated for identification in business decisions as they are in bridge; and many decisions do have to be made under great pressure.²

Furthermore, a number of apparent systematic errors have

¹ A. Tversky and D. Kahneman, 'Judgment under uncertainty; heuristics and biases', *Science*, 1974, pp. 1124-31; H. J. Einhorn and R. M. Hogarth, 'Behavioral decision theory: processes of judgment and choice' in Ungson and Braunstein, *op. cit.*, pp. 15-41; K. J. Arrow, 'Risk perception in psychology and economics', *Economic Inquiry*, 1982, pp. 1-9.

² An entertaining and vivid account is in A. Mintzberg, 'The manager's job: folklore and fact', *Harvard Business Review*, July-Aug. 1975, pp. 49-61. 'Despite the widespread use of capital budgeting procedures . . . executives in my study made a great many authorisations on an *ad hoc* basis. Apparently, many projects cannot wait or simply do not have the quantifiable costs and benefits that capital budgeting requires.' (pp. 58-9)

been identified by psychologists that are not of this relatively trivial kind. We apparently have a tendency, for example, to give excessive weight to evidence that is immediately within our personal experience: thus even persons who are perfectly aware that statistical evidence has shown interviews to be very unreliable continue to attach a lot of importance to interviews conducted by themselves. This is a rather obvious example of boundedness in our rationality, a form of boundedness that is easy to identify in theory but evidently difficult to correct in practice. In the same category, and more directly connected with investment decisions, comes our apparent tendency to underestimate the overall likelihood of failure of a project that has many independent sources of possible failure, none of them perhaps very likely by itself. Unwise attempts at over-large leaps in technology come to mind in this connection.

In speaking of apparent cognitive failings, I have been careful to keep reiterating 'apparent'. What constitutes rationality (including attitude to risk) is conditional on objectives and circumstances. For example, if you are engaged in repeated plays, it is rational to value the probability p of an outcome x at an amount equal to p times the valuation you would set on x if it were the certain outcome. But in relation to one-off matters like investment decisions, it is not necessarily irrational to set a separate valuation on the degree of certainty as such, as experimental subjects apparently do.¹

It is a much discussed and open question among behavioural theorists how far the appearance of cognitive failings reflects simply a wrong identification by the observer of people's objectives.² This applies both to apparent systematic biases and to the choice of how to allocate the limited amount of attention that our bounded rationality makes available. It is not disputed that rationality is bounded, and that mistakes will be made. But one can choose, in the light of one's objectives, where to be most careful to avoid them.

Our objectives may even in some cases dictate the commission of cognitive errors as such. Take the kind of errors analysed by the psychologists' theory of cognitive dissonance.³ According to this

¹ Kahneman and Tversky, loc. cit.

² J. G. March and Z. Shiapira, 'Behavioral decision theory and organization decision theory' in Ungson and Braunstein, op. cit., pp. 92-115.

³ L. Festinger, *A Theory of Cognitive Dissonance* (1957); G. A. Akerlof and W. T. Dickens, 'The economics of cognitive dissonance', *American Economic Review*, 1982, pp. 307-19.

theory, we have some degree of choice over the things that we choose to consider and hence over the beliefs that we choose to hold. It is disagreeable to contemplate evidence that militates against the soundness of some interesting idea we've had for action or some past idea that we've currently been acting on. So we are reluctant to devote as much thought to it as we are to thoughts about evidence tending to confirm our own rightness. We are in love with our own ideas. Related to this, though not quite identical, is the suggestion that we take particular pains to avoid a decision we may regret if it should prove to have been wrong, because the regret will be a source of disutility in itself in addition to the disutility caused by the ill-effects of the decision.¹ This particular consideration is often quoted as an example of bureaucratic malfunction—the desire to avoid demonstrable error. But it can also occur within the mind of an individual. Cognitive dissonance can be regarded as rational if self-esteem or the avoidance of regret are included in the utility function. Admittedly some doubt is cast on this interpretation by the finding, established in a famous experiment on visual perception, that faulty adherence to ideas once they have been formed occurs even in situations where emotions are not involved.² But for many purposes the outcome will be the same on either interpretation.

Cognitive dissonance is not, as such, a reason for undertaking enterprises. But it is a reason for not giving them up. The implied mulishness may seem rather a far cry from the procreant urge. However, single-mindedness is often cited as one of the most important entrepreneurial attributes, and single-mindedness and mulishness are perhaps not too far apart.

If cognitive errors do occur systematically, the question arises why they are not eliminated by competition in a Darwinian manner.

One possible answer is that in certain circumstances they may actually be functional. Keynes's reference to the healthy man dismissing from his mind the thought of death conveys a suggestion that you won't make a good job of anything if you are perpetually pondering the possible objections. Given the limitations of our reasoning capacity and our energy, resolution and devotion may be the key elements in success, and in the nature of things, they must involve some disregard of the pale cast of thought. Most

¹ G. Loomes and R. Sugden, 'Regret theory: an alternative theory of rational choice under uncertainty', *Economic Journal*, 1982, pp. 805–24.

² J. S. Bruner and M. C. Potter, 'Inference in visual recognition', *Science*, 1964, pp. 474–5.

babies, by definition, are nothing out of the ordinary, but adequate child care requires that their parents should think they are. Cognitive error may serve a higher rationality.

Much the same consideration may apply to the allocation of functions within the economy between individuals with differing personalities. Energy may come in joint supply with proneness to make mistakes. Steady men who avoid cognitive errors may have a tendency to lack the forcefulness needed to run a rapidly expanding business. Darwinism selects for relative fitness, not for absolute fitness, and paragons are not usually available.

More broadly, it may be the case that, given our bounded rationality, the best that we can do is to adopt modes of thought that *in general* lead to better results than alternative ones, even though they may lead to less good results in certain types of situation. (This is similar to Lucas's idea in macro-economics that cyclical fluctuations may be part of the price of allocative efficiency in so far as misperceptions of absolute prices is an unavoidable concomitant of alertness to relative prices.) The extent to which this happens will depend on the extent to which we are free to adapt our modes of thinking to particular circumstances. This in turn will depend on how far we are free to choose our modes of thought and how far they are ingrained in us genetically.

The conclusions of psychological and behavioural studies, as they bear on the animal spirits hypothesis, can therefore be summed up briefly as follows. There is good reason to suppose that people are motivated, in part, by the satisfaction they get from activity as such, particularly activity towards a self-selected goal. Goals lie in the future and the future is uncertain; so the connection with uncertainty is inherent. Our objectives are liable to have an effect on our cognitive processes and on our attitudes towards risk, both for rational reasons and for irrational ones.

It remains now to consider the application of these general psychological ideas more specifically to investment.

IV

It is one thing to show that certain interesting psychological propensities exist, another to show that they are important quantitatively. I should not wish to deny that conventional economic reasoning can explain much about investment. Moreover there is a familiar methodological problem. Even if behavioural evidence establishes that people persistently think and act in a certain

way—which can scarcely be claimed in the present instance—it is almost always possible to devise some way of arguing that it really amounts indirectly to profit-maximization, despite appearances to the contrary. In the case of the animal spirits hypothesis, a further difficulty is that it can take a variety of forms. For example, animal spirits may operate persistently, or alternatively they may be subject to periodical checks in the Marxian manner as they are brought up against reality, so that their effect cancels out in the long run.

Let's consider the hypothesis that they operate consistently. The standard kind of econometric investment function is not very helpful as a test, because models of that kind are usually concerned to explain fluctuations in investment, or intersectoral differences in investment, rather than its average level. This applies even to the class of model most closely akin to the Keynesian one, in which investment is expressed as a function of the valuation ratio (Tobin's q), that is to say the ratio of the market value of a company's equity to the value of its physical assets, or, equivalently, the ratio of the profit rate on its assets to the yield on shares. On *any* reckoning one would expect a positive correlation between fluctuations in the valuation ratio and fluctuations in investment, and so it turns out. More relevant in the present context is the absolute level of the valuation ratio. On orthodox theory one would expect it to average around unity, or perhaps slightly above unity so as to provide an inducement to positive investment. How this is affected by animal spirits in the sense of optimism depends on the exact assumptions made. I do not propose now to go into the algebra of possible alternative cases. However, there are reasonable assumptions one can make that lead to the conclusion that one might expect intuitively, namely that either optimism in the minds of managers or (a different point) greater optimism in the minds of managers than in the collective mind of the stock market will tend to make for an equilibrium valuation ratio below unity.

Unfortunately, statistical calculation of the valuation ratio in the relevant sense turns out to be far from straightforward. Non-trivial complications are introduced by such causes as inflation, corporate taxation, exclusion of land and goodwill from the book value of assets, and arbitrariness in the estimate of depreciation. By the time attempts have been made to adjust for these, one is not left with much faith in the reliability of the *absolute* levels shown for the valuation ratio, though its fluctuations are no doubt tracked well enough. For what they are worth, the figures for the United Kingdom in the last twenty-five years or so come out about

equally often above and below unity.¹ They have been below unity for most of the past ten years, during which none the less positive net capital formation is recorded. But overall the result must be considered quite indecisive, neither confirming the animal spirits hypothesis nor refuting it.

Since this attempt at a direct test proves unhelpful, I shall enumerate a few phenomena to which the animal spirits hypothesis *may* be relevant, while conceding that for almost all of them attempts have been or can be made to devise explanations of a more orthodox kind.

The first is the fact, too well known to require documentation, that firms finance a large proportion of their investment out of ploughed-back profits. Possible explanations can be sought from the effects of transactions costs and information costs and in some cases tax considerations. But the phenomenon is also compatible with firms being systematically more optimistic about their prospects than the market is. One may look at the question from the other side and ask why companies, if they do decide not to distribute all their earnings, choose to plough the profits back in their own expansion rather than buying shares in other companies, or gilt-edged, or property, or whatever. On the face of it, that would be the more profitable thing to do for the many companies that have a valuation ratio persistently below unity. Force is added to the question by the fact that buying a general portfolio of financial assets is exactly what companies do do with their pension funds. Why do the interests of their pensioners call for a different use of funds from the interests of their shareholders? Of course, buying exclusively financial assets would not work if everyone did it, because ultimately there would be no businesses to hold equities in, but there would be no need to go to that length. Companies do indeed hold financial assets, and conglomerates acquire portfolios of real assets that are very widespread. But holding shares in other companies is still not regarded as the normal practice for a trading company.

Unless a company is in difficulties, it typically regards it as axiomatic that it should carry out replacement investment when necessary, and moreover that it should finance it internally—otherwise the equity is being diluted. A similar consideration may underlie some of the internal financing of new investment as well. That consideration is concern about the company's share of its market. A common belief in business is that if you do not retain

¹ N. H. Jenkinson, 'Investment, profitability and the valuation ratio', Bank of England Discussion Paper No. 17 (Sept. 1981).

your share of the market, you're on the way out, even if your sales remain constant absolutely. This then raises the question why staying in business itself is regarded as so axiomatic. If you could get a better result from holding financial assets, you might do better to *let* the business run down. Reluctance to go along that path suggests the possibility of cognitive dissonance.

The remaining applications I shall mention involve the question of channelling.

The first relates to cycles. There is no inherent reason why people should not get a kick out of the sort of non-routine activity that consists of identifying loss-making elements in a company and closing them down. Particularly is this so if the people are newcomers to the business and free from emotional ties to it. In recent years this outlet for energies has been at a premium and the expansionist outlet has been at a discount. This suggests a possible source of over-shooting. Trends in expansion or retrenchment, which are themselves appropriate to surrounding economic conditions, or even enforced by them, may become exaggerated: not only because they create a climate of opinion, but also because they bring to the fore in company management individuals who are predisposed by their personalities or by their professional background to find job satisfaction in moving the company in the one direction or the other, as the case may be.

The effects of inter-personal differences in channelling may be observed also in the life-cycle of the individual firm. It has been common for the expansion phase in the life of a firm to be dominated by a single personality at its head, someone with strong expansionist impulses. This person in the end overreaches. His successors have different personalities and different objectives. It falls to them to reorganize and rationalize and, in some cases, cut back.¹

Both in the business cycle and in the life-cycle of the firm, changes in policy may occur, without any change in management, from changes in the amount of influence wielded by creditors, especially banks. The firm's leaders and its bankers have different objective functions in relation to its operations. If it runs into cash flow problems, increasing weight will come to attach to the views of people whose animal spirits are not engaged in it. The point is not that bank officials necessarily are lacking in animal spirits, but, rather, that they find a different outlet for them (acquiring Crocker National Bank, say).

¹ A. Silberston, 'Factors affecting the growth of the firm—theory and practice' in D. Currie *et al.* (eds.), *Microeconomic Analysis* (1981).

Finally, an example relative to trends over longer periods and the possible influence of institutional change. In considering long run trends in British investment, my collaborators and I have commented on the following curious phenomenon.¹ Over the century or so up to 1973, the profit rate fell very substantially relative to the interest rate; yet investment, as a proportion of income, did not fall as might have been expected, but actually rose. That might appear to suggest a progressive *rise* in animal spirits, contrary to the normal stereotype of trends in British entrepreneurship. In one book, we attributed this surprising phenomenon mainly to a progressive reduction in capital market imperfections. But one could also postulate a change in the channelling of animal spirits in consequence of an increased separation of ownership from control.² The argument would be that the managers of a public company are officials, people of relatively little account financially apart from their company, so that the only outlet they can share for their animal spirits is in the company's success and expansion. By contrast, the old fashioned entrepreneur, once he had succeeded in business, could if he chose, without having to consult anyone else, transfer his animal spirits to some other sphere of activity altogether, by building up a country estate or acquiring race horses or going into parliament. Similar speculations suggest themselves about possible consequences of institutional differences that exist between countries rather than over time. A different channelling of animal spirits may be expected according to whether executives are mobile between companies, as in the US, or stay with one company for a lifetime, as in Japan.

V

A few remarks in conclusion. Neglect of the psychological forces that I have been discussing is a lacuna in conventional economic theory. At the same time, there are some qualifications. Neither all the non-consequentialist motivations nor all the cognitive biases will necessarily be of quite the type described by Keynes as animal spirits, significant though that type be. Perhaps more important,

¹ R. C. O. Matthews, C. H. Feinstein, and J. C. Odling-Smee, *British Economic Growth, 1856-1973* (1982), pp. 359-61.

² A cross-section finding consistent with this is that owner-controlled companies on average appear to earn a higher profit rate than management-controlled companies. S. Nyman and A. Silberston, 'The ownership and control of firms', *Oxford Economic Papers*, 1978, pp. 74-101. Both this and the trend noted in the text could, of course, be attributed to managerial personal income-maximization.

it is doubtful how far it is right to relate the effect of these psychological considerations so exclusively to investment in physical capital as a reading of Keynes might suggest. One would certainly wish to extend it at least to takeovers; and one might conjecture that animal spirits play a part in the motivation of both physical investment and of takeovers, but that the choice between these two modes of expansion, with their potentially different macro-consequences, is largely, though not necessarily wholly, determined by rational calculation of the kind familiar in economics. The broad idea should also be extended to other forms of investment, such as investment in human capital and investment in the development of new products and new processes. Such an extension might be helpful in the explanation of technical change and productivity growth, which we have actually been a good deal less successful in modelling by conventional theories than we have with investment. But almost all economic decisions, except the most routine ones, have long drawn out effects in the future and thus involve uncertainty; and almost all non-routine activities are a potential source of stimulus. The wider-ranging the possible outlets for animal spirits, the more pervasive are their possible effects. The greater, too, is the potential importance of shifts between outlets over time and, hence, the greater is the importance of understanding the forces that bring about those shifts.