

REFLECTIONS ON THE INVISIBLE HAND*

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Reflections on the Invisible Hand

Introduction

That a society of greedy and selfseeking people constrained only by the criminal law and the law of property and contract should be capable of an orderly and coherent disposition of its economic resources is very surprising. Marx called such a society anarchic and so it is. Yet ever since Adam Smith economists have been concerned to show that such anarchy is consistent with order and indeed with certain desirable outcomes. Smith proposed that the market system acted like a guiding - an invisible - hand. It was invisible since in fact there was no actual hand on the rudder. The metaphor which he chose was exactly apposite.

Two hundred years on, the basic theory has been much refined, and we know a good deal more about those instances where the hand trembles or fails. Yet there is no agreement on some of the fundamental ingredients of the story and there is also much which we simply do not understand. In this lecture I shall give my evaluation of our present theoretical state in this matter and draw a number of lessons of a somewhat practical kind.

Although I shall be concerned with theory the practical significance of the subject is self-evident. It certainly is at the center of a great ideological divide. It matters a good deal whether Mrs Thatcher or Mr Benn, or for that matter President Reagan, are appealing to coherent and grammatical arguments when they espouse the market or the planned economy. Certainly non-economic considerations, for instance the fate of liberty under either system, are involved. But even these cannot be evaluated and argued about until we can describe and understand the economic stage on which the scenarios develop. In any case it would be a pity if, for instance, we embarked on large and portentous changes in our society on the basis of arguments as flawed and incomplete as those recently presented by six of Mr Benn's supporters. It is also undesirable that we should allow

Mrs. Thatcher to engineer large reduction in employment and national income on the basis of an unsubstantiated belief that this is required for the invisible hand to do its job. All these people take it for granted that somewhere there is a theory, that is a body of logically connected propositions based on postulates not wildly at variance with what is the case, which support their policies. It must be of some significance to enquire whether this is in fact so.

To do this I shall have to give some account of the pure theory of the invisible hand as formulated now. I shall need this as a benchmark but I shall keep it short since its main outline is probably familiar. I shall then take up what seem to me to be important objections to this theory, or significant lacunae. I shall lastly then try to support the view that on our present state of knowledge it would be prudent not to place all our eggs into one or the other of the ideological baskets on offer. To some this conclusion will appear wishy washy and unpalatable; I shall want to argue that it is reasonable.

The Pure Theory of the Invisible Hand

We think of a society where private property and contracts are adequately supported by law. The economic environment of any one person is fully specified once the prices of all tradeable objects are given. These prices give the terms at which one good can be exchanged for another and it is a basic assumption that all individuals can trade to any extent they wish to at these prices. One notices that the economic information is conveyed very economically - the individual knows everything that he needs to know once he knows prices.

However for the pure theory which I am now considering one has to make the unpalatable assumption that there are terms of exchange given for every pair of goods which an individual might wish to exchange. In the text books this assumption is formulated to read: markets are complete. It is a very important postulate and Keynes for instance placed great emphasis on the fact that he did not invoke it.

To understand the significance of the postulate of complete markets one has to understand the economic classification of goods. It is obvious that butter today in Warwick is from any trader's point of view not interchangeable one for one for butter today in Cambridge. So certainly we want to distinguish goods not only by their physical characteristics but also by their location. But butter today in Warwick is not, from any trader's point of view, the same as butter tomorrow in Warwick. So we must also distinguish goods by the date at which they are available. However we are not yet through. Butter today in Warwick when the weather is hot will be valued differently by individuals from butter today in Warwick when it is cold. So we must also distinguish goods by what we call the state of nature. The latter is a description of the environment which is independent of anyone's action.

So we have finished up with a collection of goods each of which is distinguished from the other by any one of the four attributes: physical description, location, date of delivery and state of nature obtaining. The postulate of complete markets now implies for instance that there is given to the individual, terms on which he can trade butter in Warwick tomorrow if cold for bread in Warwick today when it is hot. That is every good as defined has a price and so a market on which it is traded. The postulate is wildly at variance with the facts and we have some theory to explain why this should be so. But the postulate is quite crucial for some of the claims made on behalf of the invisible hand and its rejection has far-reaching consequences.

The decision units - agents as we, alas, call them - are now divided into two groups: households and firms. The latter are owned by households and in the pure theory the managers of firms, in making decisions of what and how much to produce with what inputs, will act to maximise profits at prevailing prices, which in this case is exactly what shareholders will want them to do. This again is a consequence of the complete market hypothesis which ensures that uncertainty has been eliminated from the

production decision since markets permit complete insurance. This quite counterfactual implication I shall take up again later. I now add that each firm is supposed to have available to it a "book of blueprints" that is a list of input-output activities which are technologically feasible.

Households decide on trades including the trade in the leisure they are endowed with. They are assumed to have a preference ranking over all possible trades, that is, they can decide which of two trading activities they prefer or which they are indifferent between. This ranking is consistent, so that it never happens that trade a is preferred to trade b and trade b to trade c and trade c to trade a. Given all prices and the households' ownership of goods, leisure, and shares of firms we can deduce the set of trades which is market feasible for the household. Any trade in that set has the property that expenditure on purchases does not exceed earnings from sales. Notice that borrowing and lending are included in this description. For instance one borrows by selling a good (or money) for future delivery and one lends by buying a good (or money) for future delivery. Insurance is also included by the hypothesis that there are contingent future markets. Thus it is possible to make a contract for the delivery of goods in the future if the state of the world is that one is sick and no delivery if one is well. It is now assumed that the household will choose a trade from among those that are market feasible such that there is no other market feasible trade which it prefers to the chosen one.

Given then the ownership of goods and shares and the available books of blueprints each agent will make a decision which is best for it given the prices - the decision thus depends on prices only. We now come to the first question concerning the invisible hand. There clearly is no reason why for an arbitrary set of prices the multitude of decisions taken by each agent in the light of his own motives only, should be consistent. By this I mean that there is no reason why at arbitrary prices trades should balance so that the amount of anything offered for sale is equal to what is

demand for purchase. However it was proved in the fifties that under certain conditions there always exists at least one set of economically meaningful non-negative prices at which the individually arrived at decisions will just mesh - that is are consistent.

Whatever criticism I shall level at the theory later I should like to record that it is a major intellectual achievement. One must be far gone in philistine turpitude not to appreciate the quite surprising nature of this result or to be unmoved by the elegant means by which it is proved. It establishes the astonishing claim that it is logically possible to describe an economy in which millions of agents looking no further than their own interests and responding to the sparse information system of prices-only can nonetheless attain a coherent economic disposition of resources. Having made that clear let me nonetheless emphasise the phrase "logically possible". Nothing whatever has been said of whether it is possible to describe any actual economy in these terms.

However there is more to come. It can be shown under certain conditions that the allocation of goods achieved at the prices which lead to consistent choices - let us call them equilibrium prices - is such that there is no reallocation of goods between households possible which they all prefer to the allocation they have in equilibrium. Any reallocation must lead at least one household to a bundle to which the equilibrium bundle is preferred. We say that the equilibrium allocation is Pareto-efficient. But we can also establish a deeper and potentially much more useful result. Suppose the Cabinet decides on some Pareto-efficient allocation. If it is fully informed it would be rather foolish of it to decide on some allocation which is not Pareto-efficient since it would gratuitously miss the opportunity of allowing all its citizens from reaching a position which they prefer. Then it can be shown again under certain conditions that provided it can impose any desired distribution of the ownership of goods amongst its citizen, there is one such distribution which, if it obtained

in the unplanned economy, would lead the latter to reach an equilibrium allocation which coincides with the allocation the Cabinet had chosen. That is every Pareto-efficient allocation can be decentralised - handed over to the invisible hand. These two results are known as the Fundamental Theorems of Welfare Economics. They have led many to claim that the invisible hand is not only smart but also beneficent. However we notice at once that the beneficence is somewhat limited. For there are many Pareto-efficient allocations and each one of them will have a different distribution of welfare. Mrs. Thatcher's choice of a Pareto-efficient allocation for instance seems unlikely to correspond to any acceptable notion of distributive justice. Mr. Benn's choice on the other hand may not even be Pareto-efficient. In any case the sloppy habit in the literature in speaking of a Pareto-optimum has misled many people into believing that their duty of serious moral argument has been fulfilled when they can show that some policy outcome is Pareto-efficient. As a matter of fact of course this is just the beginning of such an argument.

We can now look at some (but by no means all) the limitations on the basic results which I have so far encapsulated in the phrase "under certain conditions". These limitations are separate and additional to those which I shall discuss when I turn to the descriptive power of the pure theory. To make this clear I shall now speak of logical limitations.

Logical Limitations of The Pure Theory

The whole theory is at risk if there are increasing returns which are 'large relatively to the size of the economy'. This last phrase can be made precise but I shall not do so here. This risk is not only due to the circumstance that large increasing returns are usually associated with large firms and hence monopoly power which is excluded by the hypothesis that agents take prices as beyond their control. It arises from the fact that even if firms continued to act as price takers there may exist no equilibrium

prices. Again I shall not now document this, But it is clear that this logical limitation may itself rule out an appeal to the theory in concrete instances. If however an equilibrium exists it will again be Pareto-efficient while it is no longer true that every Pareto-efficient allocation can be decentralized. So even in the pure world of the pure theory the invisible hand may falter, and such market outcomes as appear may be unsatisfactory since they may have to involve monopolistic elements.

But this remark leads to a deeper problem. The theory has a lively sense of original sin - all people act entirely in their self-interest quite narrowly defined. But if that is so will not individuals or groups of individuals seek to find ways to exert market power? By market power I mean to denote a situation in which an individual's action can influence equilibrium prices. How can we be sure that the hypothesis that individuals act as if prices were given is not in conflict with the postulate that they are rational self seeking agents? The answer is that we can only be sure of this if there is no market power for individuals to exploit. This can be shown to entail the condition that everyone in the economy other than a given agent can do as well when that agent trades as when he does not and this must be so whoever the given agent is. In general this 'no surplus' condition will only be satisfied in "large" economies. That is in economies in which in counting agents we reckon any one individual as we would a single point in a collection of points on a continuous line - that is not at all. Of course one can rest satisfied if this is approximately true. But once again the purely logical limitations of the theory will restrict its range of applicability.

When market power is present the Smithian vision of the invisible hand is lost. Instead of the machine-like responses of agents to prices they will find themselves engaged in a game. That is it will be necessary for them to take account of the decisions of other agents and in particular it may be necessary for them to consider how these decisions are affected by their own

decisions. Their choices will now be among strategies. Economists are not agreed here even on what the appropriate notion of an equilibrium should be. But it becomes easy to show that plausible equilibria are no longer Pareto-efficient. Moreover it has not been established that all plausible candidate notions are non-vacuous, that is that they are logically possible. In short there is no accepted theory of the invisible hand when the no surplus condition is not satisfied.

One must thus conclude that one cannot invoke the classical theory of the invisible hand in dealing with economies in which agents have market power. If such an economy attains some coherent state to be called equilibrium it will not do so in a context in which all market information is summarised by prices. The signals to which agents respond will be much richer and the kind of things they would like to know to arrive at decisions much more varied. One can however assert that whatever outcome one claims to occur will in general not be Pareto-efficient.

I have already noted that the complete market hypothesis is crucial and also counterfactual. Here I want to draw attention to a purely logical difficulty which on reflection has rather wide implications. Two agents cannot enter into a contract in which delivery is contingent on an event which they cannot both observe. For certainly our greedy agents do not trust each other. Hence (except for some special incentive compatible cases) if information differs between agents, certain contingent markets cannot exist as a matter of logic. This was first noticed by Radner.

But now that we have considered the possibility of differences in information all sorts of other problems arise. Recall that we distinguished goods by, among other things, their physical description. But what exactly is the physical description of a second hand motor car or for that matter any of the multitudinous objects which we use and whose properties we know nothing about? Similar problems arise in the market for labour and in insurance markets. In all these cases agents on one side of the market have information which is superior to that possessed by agents on the other. The role of prices

now becomes much more complex. In particular prices will induce 'sorting' or 'selection' and they may also serve to transfer some of the information of the informed to the-uninformed. For instance in certain not as yet fully explored cases the prices of a class of goods may be correlated positively with their quality and so serve as a signal of quality.

But there are many difficult and interesting problems here which at the level of the whole economy have only been partially resolved. One thing is clear: in such situations the set of signals is again likely to be larger than that consisting only of prices. Thus for instance educational qualifications will be used to signal one's quality to prospective employers. Once again the Fundamental Theorems of Welfare Economies will fail.

This also brings me to the last two of the logical limitations of the pure theory which I shall take up.

Information is something that can be acquired by expanding resources, but once one has it, it is not diminished if someone else has it as well. It is an example of a public good. For quite obvious reasons the Fundamental Welfare Theorem cannot hold when there are public goods. Indeed the market economy will perform disastrously in such cases. No one will invest in the production of information if its market price is necessarily zero. That is of course why we have patent and copyright laws. Such devices are forced on us by the logic of the invisible hand. Of course there are many other examples of public goods.

In the example of the education signal of my quality, it will be clear that the effectiveness of my signal will depend on the signals used by others. There is here what we call an externality - that is an effect of one agent's action on the welfare of another. There are many cases of externalities both positive and negative. But this is so well known and the failure of the invisible hand in such situations so widely understood that I will not dwell on them. I only want to make one observation which is inspired by some recent work by Makowski. If the "no surplus" condition is not met then there

must be an externality almost by definition. But that means that externalities are implicit in any departure from perfect competition. This in turn seems to imply that one cannot ascribe failures of the invisible hand in the face of externalities exclusively to defective property rights. In any case ever since Marshall and Pigou it has been agreed that externalities constitute a prima facie case for Government intervention in a market economy. Hence economies which significantly depart from perfect competition - that is in general actual economies - would be candidates for the deployment of a visible hand.

This brings me to Fred Hirsch's famous book: The Social Limits of Growth where he considers the obstacles in the way of the invisible hand which are occasioned by non-augmentable 'social' or positional' goods. A simple and old example is the case of a common pasture where what your cow eats reduces what is available for mine. Another example is congestion on a motorway or in a beauty spot. In general these are cases of externalities.

For many such cases corrections can be achieved without essential damage to the price mechanism. This can be done by a levying of suitable taxes and subsidies and by the creation of appropriate property rights. In some cases one may have to impose direct controls. But even here the price system can be utilised as for instance it would be under a licensing arrangement with tradeable licenses. On the other hand there are externalities, and these are the ones which preoccupied Hirsch, where the only remedy appears to lie in changing what people want. For instance, as Gilbert and Sullivan remind us there may be no way to satisfy everyone's desire to be "somebody". If we all desire to dine in an exclusive restaurants then this cannot be met by giving us all equal access. The externality of envy is perhaps also only correctible when there is nothing to envy.

Hirsch considers these matters to be a source of what Marx would have called a "contradiction". In the early stages of a market economy most

people are concerned with eminently reproducible necessities of life. The invisible hand here works in harmony with expectations and leads to the growth in the output of goods which people desire. At a later and more materially opulent stage people develop wants for goods which are intrinsically non-augmentable and thus become increasingly concerned with positional goods. Their expectations are then bound to be disappointed and disappointment will lead to disaffection. The invisible hand cannot provide what people desire. The sum total of human happiness can now only continue to increase by a change in what makes people happy. In particular greed and the desire for self advancement must give way to the gentler social virtues of affection and co-operation. But these virtues are not consistent with the motives which provide power to the invisible hand. The intrinsic limitations in the supply of those things capitalist economies come to desire most must essentially herald the end of that particular social arrangement.

Clearly there is here an important and interesting point. But I must confess to some discomfort with theorising on such a grand and ominous scale. For instance it is not clear beyond doubt that the limits which Hirsch has in mind are absolute. To put it differently, Hirsch may have underestimated the availability of substitutes. For instance while we cannot all enjoy comparative solitude in the same beauty spot, we may be able to do so in our garden. While we cannot all be equally esteemed as musicians or mathematicians we can almost endlessly multiply the activities which provide opportunities to be esteemed. Moreover one of the fruits of growth is the increase in leisure and I am unconvinced that there are intrinsic limitations to its beneficence. Lastly the purely physical invariety of the system sees to it that we continue to have a healthy appetite for augmentable goods. What self respecting person does not now desire a video-tape recorder? In short I think that Hirsch has undoubtedly shown that externalities in the most general sense are more pervasive and

sometimes more intractable than had often been supposed. To that extent also he has diminished the scope of the invisible hand and enlarged that of collective action. But it remains to be seen whether he has discovered a poison that will kill the hand altogether.

Adam Smith and John Stuart Mill, to name only two classical exponents of the invisible hand theory were certainly aware of some of the limitations on the efficacy of the market. Indeed they used these to formulate a theory of the legitimate, or at least appropriate, sphere of action of Governments. But they and many of their modern successors undoubtedly underestimate the extent of the ground that has to be yielded. Moreover their line of argument runs into another danger. To demonstrate the logical possibility of market failure, indeed to demonstrate that such failure actually occurs on a large scale, is not in itself a demonstration of the desirability of Government intervention. Market failure is not a necessary ground for intervention - the market outcome may be associated with great injustice even when there is no failure. Nor is such failure sufficient grounds for intervention since it remains to be demonstrated that "Government failure" is less damaging than market failure. Hence while there may be a prima facie ground for intervention when the invisible hand fails and no such grounds when it does not, there is a bit of arguing and thinking to be done before a case for intervention has been clinched.

But before I do some of this arguing I now want to consider - however briefly and superficially, some of the descriptive limitations of the pure theory.

The Descriptive Limitations of the Pure Theory

I have already mentioned the logical grounds which arise from the circumstance

that markets may be incomplete. I now notice that as a matter of plain fact they are incomplete. The proof is readily at hand: we observe that there is trading at every date, which would not be the case in a complete market world. In fact the complete market hypothesis is convincingly falsified.

But economists and particularly theoretical economists do not give up easily. Granted that markets are incomplete is it possible that (a) the theory has made unnecessarily strong assumptions in asking for complete markets and (b) that there are considerations not depending on all markets existing which allow the pure theory to look the facts in the face and continue serenely on its way?

As an example suppose there are only two physically distinct goods and only one date and location to consider. Let there be five possible states of the world. Then the complete market hypothesis suggests that we need two times five, that is, ten markets. But Arrow noted that whatever allocation might be achieved by ten markets could also be achieved by seven. That is two markets for the two goods and five markets for securities each one of which would pay something positive in one of the states and nothing in the other four. An individual can always find a trade in these seven markets which allows him to do as well as he would do by trading in ten. So the pure theory does make stronger assumption than it needs. But even so one can assert with confidence that even the reduced number of markets suggested by Arrow is much larger than the number of markets which we observe. This I think is clear when we think of many future dates and states.

Recently Bewley has suggested that the holding of money balances can in certain circumstances provide almost all the insurance possibilities afforded by complete markets. His analysis is very impressive but he would agree I believe that it is impossible to claim that it applies to actual economies.

The second line of defence involves the invocation of 'Rational Expectations', a move widely favoured at present. By rational expectations one means that

individuals who, because of incomplete markets, now have to form market expectations, do so by using all the information available to them and do so consistently. The notion of an equilibrium is enlarged: not only must markets clear and individuals do as well for themselves as they can, but also there must be no systematic falsification of rationally formed expectations. The new concept has been christened Rational Expectations Equilibrium. It has been vastly influential especially with people who would not find it easy to really understand the idea. For instance the view that inflation can have no permanent effect on employment or that monetary policy has no real consequences even in the short term, if rationally anticipated, is based on the rational expectation equilibrium hypothesis. As empirical evidence one can point to the result that prices of securities traded on the stock exchange perform a random walk which is consistent with the theory that the price of any security reflects all the information which can be rationally comprehended plus a random error term which cannot.

The first point to make now is that this move does not re-establish the beneficence of the invisible hand: Rational Expectation Equilibria need not be Pareto-efficient. Indeed there seem in general to be many rational expectations equilibria and it is possible that some of these can be Pareto-ranked. Secondly while the theory points in at least one right direction, namely that systematic errors in expectations will lead to their revision - it is hard to consider this new equilibrium as descriptively satisfactory. For instance to make it consistent with our observation of fluctuations in real magnitudes like employment and output its proponents have had to resort to ad hoc postulates of mistakes rationally made. They often argue that it is government policy which induces people to make such mistakes. For instance unknowable or unobservable changes in the money supply will cause people to confuse price changes caused by 'real' events and those which are purely nominal.

But introspection and observation suggests that we are quite capable of making mistakes unaided. More importantly most people do not have sufficiently well formulated forecasts to allow them to be mistaken in the first place. Thus we all make some sort of guess at the inflation rate but few of us are sufficiently coherent and patient to form a probability distribution over such rates nor are we clever enough to use all the information at our disposal correctly. If we lived in an essentially stationary environment and if we lived long enough or knew history well enough we might nonetheless somehow come close to satisfying the postulates of the theory. But we do not.

The Rational Expectations approach has its theoretical uses. For instance it allows us to examine economies free from expectational disturbances and thus perhaps isolate other sources of ill behaviour. It permits us to show that even in such a world the invisible hand may cease to guide before it has made citizens as well off as, in the given circumstances they could be. It also allows us to sidestep an issue which is enveloped in ignorance, namely how actual expectations are actually formed. But people who base policies for real economies on the belief that citizens form their expectations rationally and that the invisible hand, if left to its own devices, will guide us to a rational expectations equilibrium with not much delay cannot, I think, be taken seriously. By this I mean that I consider the direct evidence overwhelmingly against this view and I regard the 'as if' evidence from such econometric models as there are, as I do evidence for miracles. The story is simply too much at variance with experience.

However we should notice a spin-off from this approach which is at once obvious and important. In forming their expectations, in whatever manner and however imperfectly people do form them, account will be taken of expected government policy. An act of policy which has been more or less foreseen will in general have different consequences from one which has not. This not very

deep observation has often been neglected in discussions of economic policy. In analysis it can give rise to some tricky and interesting problems. Rational Expectation theorists although they have characteristically embraced rather extreme models have nonetheless made an important contribution in making everyone aware of this consideration.

In so far as rational expectations are descriptively unsatisfactory we would expect the invisible hand to falter and perhaps to mislead in its actual intertemporal operations. For instance speculative bubbles which eventually burst are possible. That such bubbles have been observed can be shown to be evidence against rational expectations. Quite generally there is no logical obstacle to an economy pursuing a path which runs into feasibility constraints and so experiences discontinuous dislocation. It is not unimportant that this should be more widely understood than seems to be at present the case. I shall therefore make the same point again in a slightly different form.

If the invisible hand is to operate then there must be sufficient opportunities for intertemporal and contingent intertemporal trade. In fact there are not enough of these opportunities. The lack of contingent markets means that the market economy is associated with more uncertainty than pure theory allows. The lack of intertemporal markets means that great weight must rest on market expectations. The rational expectations hypothesis substitutes an internal and psychic hand for the market. Each individual somehow has learned how the invisible hand would have performed if it had been given markets to perform in. If it is agreed that this is not of high descriptive merit then there is in fact no obvious mechanism by which intertemporal decisions can be co-ordinated. This was Keynes's view. I have yet to see it refuted. The French drew the conclusion that they at least required indicative planning. The Japanese have for a long time employed non-market institutions to supplement private investment decisions. In Germany the banks seem to act as market substitutes. In Britain where politicians

now follow gurus rather than arguments we are all set to rely on the invisible hand doing a job which in practice it will not and cannot do.

The other large misfit between the pure theory and the world I have already noted under the heading of logical limitations. It is of course the postulate of perfect competition. That is the assumption that economic agents know all they need to know when they know prices. That this is false many observations confirm. Advertising and market research, Trade Unions and Market sharing arrangements, expensive business investigations to forecast demand are just a few of the falsifiers. The theoretical consequence of this misfit is that even when a coherent disposition of resources is achieved one will not be able to claim that it is Pareto-efficient. That is, in general one can describe some form of collective or co-operative action which would improve the lot of everyone. But I will not pursue this quite important scent further now, for there are still many more central issues to be discussed.

The Invisible Hand in Motion.

So far I have considered only situations in which the invisible hand has already accomplished its task. That is, I have been concerned with equilibrium states. But that must be no more than half the story. Suppose for instance it is possible for an egg to stay standing on its tip until it is disturbed. We should not attach great practical significance to this equilibrium of the egg until we were told some causal story of how it comes to be in the state it is. In exactly the same way the proposition that in certain circumstances there is a set of prices which ensures equality between demand and supply in all markets tells us nothing of whether these prices will indeed be established by a market economy. Now it so happens that on this central question neither economic theory nor evidence is at all satisfactory.

Before I enlarge on this I want to stress what a significant lacuna this represents and how dangerously it can be ignored by policy advocates. Seeing our ignorance a number of Chicago and other economists have decided that the best way to proceed is to pretend that it isn't really there. This they

do with the aid of some pseudo-philosophical remarks concerning the meaning of equilibrium and the autonomy of human action. In any case they simply assume that the invisible hand performs its task instantaneously and, as it were, super-invisibly. Thus for these economists wages at any moment of time have just those values which, given other prices, ensures that everyone willing to work finds a willing employer. This is not a theory or a deduction from a theory, but an axiom. Fluctuations in employment are then explained by the expectational errors which I have already discussed. For instance Britains^b unemployed workers are without a job because at the going wage they do not want one. They do not want one because either they prefer subsidised idleness or because they expect real wages to rise and are thus trading present for future leisure. On the basis of this specious nonsense Keynes has been pronounced dead and Mrs Thatcher advised.

Although I am sure this is nonsense as descriptive economics I am, as a theorist, more concerned with the intellectual move which axiomatically ensures that the invisible hand is never observed in its operation of reconciling inconsistent plans and so provides no account of how it might actually do this. It seems to me clear that this leaves the theory essentially incomplete. It seems also obvious that it cannot be usefully confronted with other theories. For it is no answer to the Keynesian proposition that there may be states in which willing workers cannot find a job at the going wage to announce it as an axiom that this can never happen.

Less extreme theories have recognised that some story must be told and to the non-economist the chosen one is known as the 'law of supply and demand'. Here the invisible hand is actually set in motion. When demand exceeds supply for anything its price will go up and vice versa when supply exceeds demand. In taking this account seriously one finds oneself studying a rather complex dynamical system. It is a fact that this study has not led to the conclusion that this behaviour of prices must guide the economy to its tranquill equilibrium. Indeed almost the converse is true: only very special assumptions

seem to ensure this happy outcome.

But this may be so because we have not told a correct story. Great difficulties are encountered in this undertaking when one insists on retaining the perfect competition hypothesis. For then strictly speaking there is no one agent who can actually be taken to do the price changing. Largely for this reason the analysis has followed Walras in postulating a fictional auctioneer whose task it is to adjust prices in accordance with the 'law of demand'. But while there are auction markets in actual economies they are pretty rare and it is not at all clear what actual process the fictional auctioneer represents. If however we recognise that actual agents are involved in changing prices because they have transitory or permanent market power we shall also start to get a grip on the theory by exploiting the really basic axiom that agents are out to improve themselves. This kind of analysis is in its infancy and there are no general results to report.

But certain rather important implications of this unsatisfactory approach can be observed. Thus during the process individuals will not only encounter prices but also trading experiences which will influence their subsequent actions. If you find that the baker is frequently out of bread you may buy crackers instead. If the baker in turn is slow to notice that he has unsatisfied customers he may never notice it because in the meantime they have gone to the cracker shop. If there are workers who cannot find a job then this will affect what they can buy and so the job prospects and actions of others. Employers noticing the unemployed willing workers may find it profitable to lower wages. They may not since this might lead existing trained workers to leave or to strike or the firm may fear for its reputation as a good employer. It may also not be possible, for reasons to be explained by a theory of implicit labour contracts, to pay new workers less than existing ones. But in spite of all this money wages may indeed fall. But since the demand signals were unfavourable it is not at all certain that employment will rise. The analysis of the process is hazardous even in

ruthlessly simplified models and not at all always favourable to the invisible hand.

In particular there is now a possibility that the invisible hand may cease to move before its task is accomplished - I have elsewhere referred to this as the hand getting stuck. For if price changes are the outcome of the calculations of actual participants in the economy then they may certainly miscalculate. That is they may judge the price change not to be to their advantage when it really is. But even when they calculate correctly this may happen. For the consequences to you of your price change depend on the calculations of others as to the consequences to be expected from their price change in turn. Keynesians refer to such situations as bootstrap situations. A given employer's willingness to lower wage and a potential employee's willingness to accept the job on these terms will not be independent of whether other employers have calculated it to be to their advantage to lower the wage. Or as Negishi has noted, a worker who would be willing to work at a wage below that ruling may nonetheless correctly calculate that the effect of lowering his wage on the probability of finding a job is too small to make it worthwhile.

While I want to re-emphasise that these are all possibilities in particular constructions rather than general propositions I feel confident enough to conjecture that very shortly a very large and rigorous collection of models with these possibilities will be available. In game theory we are quite familiar with the notion of multiple equilibria and with the insight that co-operative solutions may dominate non-co-operative ones. The paths which I am now indicating are much more familiar to game theorists than they are to orthodox pure theorists.

Of course there is a great deal more to say on this matter but I can allow myself only one more observation. The pure market proponents sometimes argue against the possibilities which I have just described by noting that they would result in there being unexploited gains to trade. This they regard as inconsistent with a world of rational agents. In this last view I consider

them to be profoundly mistaken. Opportunities of mutually advantageous trade must be recognised and hence signalled. We can imagine a world where groups of individuals bump into each other at random and proceed to explore the possibility of trade. It is not our world and it is not the world under discussion. In that world trade opportunities are supposed to be signalled by prices which are public and anonymous - they do not depend on the persons engaged in the trade. Of course there are exceptions to this but the theory under review does not consider these. In such a world it is false to propose that because there are unexploited gains from trade it will always be rational to signal this by price changes. The manner in which potential traders can communicate is of basic significance. One should have thought that in an age where the Prisoner's Dilemma is known far and wide, this point hardly needed making.

Some General Remarks and Some Tentative Conclusions

I have for much of the time been arguing that the emperor's clothes are not quite as fine as is often supposed. Although I have not been as precise and detailed as a more leisurely account would have permitted me to be, I nonetheless hope to have shown that, both on purely logical considerations as well as on the basis of quite simple observations, the invisible hand is likely to be unsure in its operation and occasionally downright arthritic. However as I have already warned it is an unwarranted inference from this that there is some social device which will perform more satisfactorily or that we should cut off the hand altogether.

One of the reasons for the failings of the invisible hand, at least in theory, is that the task assigned to it is extremely complex. This task will not go away when, for instance, we propose to replace the market by the planner. In this connection Professor Hayek, whose doctrines on many economic matters I do not consider sound, made a very important point. He argued that economically relevant information was highly decentralised. A professional

cook for instance will know more about the dishes he could prepare from a chicken and be better informed of his customer's tastes than would be a plumber or an economist. Indeed it is quite clear that such specialised knowledge and information is commonplace. Now one of the claims made for the price system by Hayek was that it successfully aggregates the information so that the economy behaves as it would do if there had been no specialised knowledge in the first place. Hayek did not prove this to be so and it is only very recently that we have understood the circumstances in which the claim made is correct.

I will not now discuss this particular issue in that particular way, it for no other reason than that the matter is quite technical. However we do not need to do that in order to see the force of Hayek's point that any planner must find means to utilise and to aggregate the private information of citizens. Even when the invisible hand performs the task imperfectly it does perform it after some fashion. It is not at all clear in what fashion it could be performed without the price system altogether. This may be the reason why so many socialist economies have progressively allowed the invisible hand to regain some of its old importance.

The economising in information and the utilisation of widely dispersed information is one feature of a market economy which has only recently been studied with the seriousness it deserves. It is already evident that the outcome will not always be as good as it could have been if an all-knowing agent were in control. It also seems possible that a more limited agent could nudge the system to prevent it settling on unsatisfactory or downright bad outcomes. But no discussion of a planned economy begins to tackle the issues seriously when it ignores these informational tasks. Certainly the literature on economic planning has for a good time been aware of this and, indeed, of other potential virtues of the price system. Indeed sometimes the pure theory which I have outlined is not taken descriptively but prescriptively. That is, the task of the planners is to make the invisible hand work as the textbook says it does: for instance by instructing functionaries to follow marginal cost pricing rules or to attain some prescribed rate of return in their

investment plans.

But this leads naturally to another problem which I have already touched upon in my discussion of Hirsch. In so far as the invisible hand moves, it is moved by greed. To buy in the cheapest and sell in the dearest market, to change job to earn a higher wage, to raise prices to tap some of the surplus from unsatisfied buyers, these are all virtues for the market system. If business managers were to take decisions in the light of what they perceive to be their 'social responsibility', or if in general agents were to value the welfare of others outside their family at all seriously, the invisible hand might still do this and that but it would cease to do what Adam Smith claimed for it. This to many people is an unattractive feature of the hand although I myself incline to the Johnsonian view that a man is in normal times rather innocently engaged when he is making money. But that is evidently contentious. What I believe is not so is the insight that the market system operates on relatively simple motivational precepts which in principle leave agents open to manipulation by authority while substitute systems are partly unfathomable because they leave the motives of the actors nebulous. Once again the history of socialist countries suggest that the dislike of bourgeois greed has frequently had to give way to the necessity of providing coherent and appealing motives for people to do what it is wanted they should do. Kornai has given an interesting account of how greed can be replaced by apathy and lassitude when greed has nothing to bite on, and of how unsatisfactory this proved to be in Hungary. In any case to ask individuals or groups of individuals to act 'in the common interest' is, except in well-defined exceptional cases, not to ask anything comprehensible of them at all.

Of course the market system not only allocates resources, it also powerfully influences the distribution of the enjoyment of resources between individuals. The Fundamental Theorem of Welfare Economics suggests that to some extent one should be able to divorce these two sides of the same coin. In fact we know that even in our most simplified models this cannot in general be perfectly done: one may have to make trades between equity and efficiency.

Pigou noted this over 50 years ago and his arguments have since been refined without being altered in their essentials. The actual terms of such a trade are not really known. Greed may take many forms. For instance it may be satisfied by rewards which, while they exceed one's neighbour's reward, do so only slightly. This is what Keynes believed and he thought that the greed game could be played successfully for much smaller stakes. No one knows whether he was right. But this question will arise whatever the mode of economic organisation - if one wants people to act in a certain way one must give them a reason for doing so.

At this stage also it is proper to note an objection to the manner which I have dealt with the market economy. Many people will argue that the allocative rôle of a market economy is not by any means the most important rôle. Rather it is the opportunities which it affords for innovation and ingenuity and for the risk-taking entrepreneur and thus for growth in welfare. It is Schumpeter rather than Walras who saw down to the essence of things, and it was Keynes on animal spirits rather than Arrow-Debreu on general equilibrium who understood the motor in the capitalist machine. On this view obstacles placed in the path of greed and self-advancement such as result from an egalitarian public finance are liable to have much more serious consequences than 'just a misallocation of resources.' Such obstacles may lead to stagnation or continuous decline. Moreover proponents of this view will argue that there is no substitute for the hero of the market. Civil servants are not readily cast in the mold of captains of industry or that of Schumpeterian innovators.

My first comment on this view is defensive. The critics are not right when they suggest that the market theory is not relevant to the story of growth. In fact that theory is just as much concerned with the inter-temporal, as it is with the intra-temporal, allocation of resources. For instance it is highly relevant to the understanding of the investment-consumption choice which, in turn, is very near the center of an understanding of processes

of growth. It is simply a mistake to believe that the equilibrium which I have discussed is bound to be stationary or even quasi-stationary.

My second comment is that nonetheless the critics have a point. Certainly economic theory does not provide an answer to Weber's famous question why Britain rather than China should have been the first to have an Industrial Revolution. Nor indeed has economic theory much helped in accounting for the Japanese post-war sprint or for the relative British decline. Plainly there are here crucial elements which go beyond market signals and market behaviour. On these grand matters economics is comparatively silent.

But it is not entirely mute either. To take one example, recent studies, based on the traditional view of market choice, have much illuminated the relation between market structure and research and R and D expenditure. Such expenditures are undertaken with peculiarly uncertain outcomes, they are part and parcel of competitive battles and they are likely, because of the operation of the law of large numbers to be subject to significant increasing returns. Oligopolistic industries will, in this area, take decisions which differ from those of monopolistic or competitive ones and we can actually pin down that difference. Similar insights have been gained on the question of what the main determinants of the adoption of inventions, once made, are. In all of this the invisible hand plays a part in guiding the direction of innovative activity. I need only remind you of the effects of the rise in the real price of oil on motorcar design to make the point obvious. Moreover there are good reasons to suppose that the invisible hand will work imperfectly. This is partly due to the increasing returns and to the public good aspect of invention and discovery. The theory also suggests some ways in which these failures can at least be rendered smaller with market-using policies.

However many people have a liking for grand questions and some of them have been arguing that economics should give way to Political Economy. Sometimes that is a disguised invitation to enter the claustrophobic world of

Marx, often it is a plea for "universal social science". The latter is not a self-evidently plausible project. If it is then it will certainly require a genius which makes such advice unhelpful. At its best the invitation is to look circumspectly and in a precise manner a little beyond traditional boundaries. Hirsch has shown that this can be fruitful.

But we should not, I think, be surprised by our large areas of ignorance. Indeed I would find it more surprising if there were available or possible a total theory of history and society. Such theories as have been proposed are pretty clearly bogus. The questions of the theory which I have been propounding are more modest and more useful. In the first instance it is a powerful test for organising one's thought and for detecting unsound arguments. For instance the insight that the pursuit of self interest need not have undesirable social consequences as well as a precise account of the case where it does do so is of great utility. Should fisheries be left to the market? Do we need an energy policy? Should the poor be aided by rent control? In these and hundreds of other instances the theory is not only the most powerful but the only available means by which we can attain coherence of argument. Robertson thought that benevolence was one of the scarcest of goods and that it should therefore be demanded only sparingly. Many politicians propose programs which suppose that it is a free good. It is a great virtue of the theory that it suggests ways in which institutions and policies might be devised which harness self-interest and render it socially acceptable. It thus allows one to proceed while humanity is what it seems to be.

At the end of all this there is no crisp and clear final reckoning. The limitations on the applicability of pure market theory are numerous and some of them are quite serious. The exceptions to the beneficence of the invisible hand have been piling up since Adam Smith, and much later, Pigou considered them. Our knowledge of the actual movements of the hand is rudimentary and vastly incomplete. The increase of market power of all kinds has produced formidable conceptual problems in the construction of

theories. The Smithian vision still provides a reference point but an increasingly remote one. It can also be dangerously misleading when this limited rôle is not recognised. This, as I have argued, is illustrated by some recent American writings on the relation of wages and employment and is further exemplified by the exponents of supply economics. All these advocates say much more than even the pure theory allows them to say and infinitely more than the applicability of that theory permits. Although Mrs. Thatcher has recently denied vehemently that her policies are based on any economic theory, that is that the policies have coherent origins - this must not be taken at its face value! She has after all diagnosed unique cures for our ills and in her pronouncements the Smithian hand is quite visible.

The predominant conclusion must be that we are quite uncertain of what really is the case. The pretence that it is otherwise comes under the heading of religion or magic. Once the uncertainty is recognised it will greatly affect the set of rational or reasonable actions. Traditional theory is quite powerful on the question of the control of systems which are imperfectly understood. It suggests that, exceptional and near catastrophic circumstances apart, it will not in general be wise to put all your eggs in one basket or to give harsh pulls on levers. That is unless you are what economists call a risk-lover. That is unless you are willing to pay much more than the actuarial value of a bet. But risk-loving itself is unreasonable. In any case these are the reasons why as I said at the outset, the wishy-wash, step by step, case by case approach seems to me to be the only reasonable one in economic policy.

But many people, to my surprise, prefer to go out with a bang rather than a whimper. Very few people can live with a shadowy and ill-defined picture of our world. So I place no bets on the reasonable approach winning through. In this country it is very likely that the non-fulfilment of the vastly exaggerated claims for the invisible hand will lead to a reaction in which the hand, to our great loss, will be amputated forever. The age of prophets and of witches is upon us and such an age is not friendly to reason.