Evolution, Structure and Strategy

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The Question Summarised

The matter considered in this paper can be briefly stated. Economists, notably Nelson and Winter, have described how competitive selection, by favouring the expansion of the more successful firms, shapes economic development in an evolutionary fashion. I shall endeavour to establish how market structures and business strategy affect the efficiency of this process. We are interested in evolutionary change not merely in order to find out how things happen; we wish also to know under what conditions such change is most likely to promote an efficient use of resources. Our interest, that is to say, has a normative as well as a positive dimension.

This important question, it seems to me, has not received proper attention. The theorist commonly appraises alternative market structures according to properties of the *equilibria* with which they are deemed to be associated, thus side-stepping their effects, with which I shall be concerned, on the *process* of competitive selection. The man in the street usually takes the view - if only implicitly - that selection will be most efficient when competition is at its most intense, but without giving clear meaning either to the efficiency of selection or the intensity of competition. I hope to provide an analysis that will go some way to remedy what I see as these deficiencies. [1]

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[1] I regret being unable to furnish the reader with a full list of bibliographical references, the provision of which has now become customary. Perhaps I can plead, in extenuation, the fact that, having ceased to be a professional economist some thirty years ago, I have found it difficult to keep up with the literature. Furthermore, and despite the associated hazards, I find it difficult to work other than in conformity with the natural bent of my mind, this being to ponder at length on the phenomena, at the cost of failing to read all that has been written about them. I should like to mention, however, by way of exception, Brian Loasby's *Knowledge, Institutions and Evolution in Economics*, Routledge, 1999, which offers an analysis which is both learned and profound.

Competitive Selection and Economic Welfare

As Nelson and Winter show, economic change may come about in ways analogous to the process of biological evolution. But there are some important differences, two of which directly concern us.

In the process of biological selection "heartless, witless Nature" causes the less suited of the randomly produced varieties to perish in very large numbers, but I do not know whether the concepts of "wastefulness" or its correlative "efficiency" have any significance in that context. When concerned with competitive selection in the economic sphere, however, they most certainly do; some waste of resources has to be accepted as a price worth paying for the benefits yielded by a plurality of endeavour, in effect for social experimentation, but it is in itself undesirable, to be avoided or at least minimised whenever it can be. In economics, the occurrence of "waste" implies a misallocation of resources, the implication being that an alternative allocation could have better satisfied human wants. There is no clear analogue to this notion, as far as I know, in the theory of biological evolution. We do not view the evolutionary processes of the natural world teleologically, at least nowadays, whereas evolution within the economic world is seen by us as having a purpose, that being the satisfaction of our wants. It is for this reason that the degree of wastefulness occasioned by the process of economic evolution properly concerns us. We accept that, the world being uncertain, resources will often be invested mistakenly, as in a process of trial and error, but the extent and possible avoidability of waste is important, most immediately, of course, to those who bear the brunt of misallocation in the form of the financial losses which, in market economies, normally result from it. Those who commit resources will therefore seek to take what steps they can to reduce both the uncertainty associated with their investment decisions and the penalties that mistaken decisions will impose.

We are interested in natural selection, as it takes place in the economy, not simply as an explanation of how change takes place, but as a process which furthers economic efficiency, control over resources being gained by firms which have proved themselves either better able or, through luck or judgment, better placed to use them. For this process to be beneficial, of course, an essential condition -that which provides the fundamental justification of the market system - must be

fulfilled; profitability must be a reliable indicator of where, in the general interest, resources should be applied.

It is obviously not for me now to address the question, with which a large part of economics is concerned, as to the circumstances in which this condition will or will not be fulfilled. Nelson and Winter propose the "abandonment of the traditional normative goal of trying to define an 'optimum' and the institutional structure that will achieve it, and an acceptance of the more modest objectives of identifying problems and possible improvements." [2] Perhaps the Gordian knot can indeed be cut in this way, but I am myself remain unwilling to jettison the traditional Pareto criteria, believing as I do that, unless they are broadly met throughout the economy, the profitability of an activity will not indicate its social utility. Profitability depends on input and output prices, and unless these prices reflect degrees of scarcity and of strength of demand, I do not see how the connection between profitability and welfare, and thus the connection between competitive selection and welfare, can be made.

A second difference between biological and economic selection has to do with that fact that those subject to the latter behave consciously and deliberately on the basis of plans based on expectations regarding relevant future circumstances. Firms' behaviour has to be explained in this way; some decisions, such as that to invest in additional capacity or to introduce a new product, will receive careful and explicit consideration, but even if decisions are taken on a routine basis, even perhaps on the basis of a computer program - as they may be, for example, in setting the level of inventories - we have to remember that these routines will usually also have been consciously designed. It is of course true that not only human animals act purposefully; with the approach of winter, squirrels store nuts and birds migrate. Nevertheless, there is no doubt that conscious prediction and complex planning are much more characteristic of human behaviour and perhaps especially so in the economic sphere.

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[2] Richard R Nelson and Sidney G Winter "An Evolutionary Theory of Economic Change" Belknap Harvard 1982, p.366 and Chapter 25 passim.

Nelson and Winter's Account of Evolutionary Change

The account of evolutionary change provided by Nelson and Winter requires that there should be differences between firms, and that these differences should tend to persist to over time. Firms are represented as differing in the lines of activity for which they are fitted, and as being "typically much better at the tasks of self- maintenance in a constant environment than they are at major change, and much better at changing in the direction of 'more of the same' than they are at any other kind of change."[3] Differences will tend to persist because "As a first approximation.... firms may be expected to behave in the future according to the routines they have employed in the past."[4] Given these circumstances, different firms will respond to changing opportunities with differing degrees of success and the resultant differences in their profits will affect their respective rates of growth. The authors do not assume that firms' operating characteristics will never change; through a process defined as "search" firms will develop new ways of doing things and success in this will affect their relative profitability and, in consequence, their rates of growth. A firm's operating characteristics (or "routines" as the authors call them) and the process of "search" are said to have roles respectively analogous to that played by genes and by mutation in biological evolution.

The notion of routines, in this context, is clearly similar to that of "capability", as used notably by Edith Penrose as well as by other economists, including myself. But the latter notion is perhaps wider, if less precise, and was used, at least by me, in a somewhat different way. [5] A firm's capabilities, which shape the activities it could more readily undertake, are understood to depend on a range of attributes wider than its "routines"and including its experience, its internal organisation and external connections, as well as the character, knowledge and skills of those working for it. And

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[3] Op.cit. p.11.

[4] Op.cit. p134.

[5] I in fact observe that "The notion of capability is no doubt somewhat vague, but no more so perhaps than that of, say, liquidity and, I believe, no less useful". See my article "*The Organisation of Industry"* (The Economic Journal, 1972).

whereas Nelson and Winter represent a firm's routines as producing an almost automatic response to changing circumstances, I represented its capabilities as determining the range of options for which it was differentially qualified and between which it could consciously choose.

Perhaps the two approaches do not so greatly differ. It is true that firms may respond to changing circumstances according to their established routines, without senior management exercising conscious choice. But we should bear in mind that the devising and establishing of these routines, at least for the most part, is itself a conscious act of management. It is taken with two purposes in mind. The first is to economise in thinking; we could never negotiate our way in life if we had always to work out, from first principles, what to do. Wherever practicable we need to establish stock responses, albeit subject to revision, and save our mental energy for special situations. The second and, in the present context, more interesting purpose of routines, is the need for delegated decisions to cohere within a centrally chosen strategy or plan.

The effective coordination of a firm's activities requires those within it to work according to allotted roles and rules, requires, that is, an appropriate organisation. The tasks that they are set, the procedures they are expected normally to follow, and the pattern of working relationships between them, have to be designed so that their activities fit together in furtherance of the firm's purposes. In this way a firm's organisation affects its response to changing circumstances, but there is perhaps a danger that, by focusing on "routines", we may come to underestimate properties of a firm's organisation which, although they also affect its response, are not captured by this terminology, properties such as the character and qualities of the staff and the corporate culture within which they work. Economists have tended to concentrate on the importance of knowledge in this context, whether of the "knowledge that" or "knowledge how" variety, but it is well to bear in mind the obvious fact that doing is not just knowing, but also depends for effectiveness on attributes such as willingness to cooperate, determination, initiative and vision.

The Efficiency of the Selection Process

The efficiency of a process of selection will depend on what we may term its direct and indirect effects. The direct effect is that of transferring control over resources from the less profitable to the more profitable firms. The most obvious indirect effect is motivational, that of keeping firms up to the mark. A less obvious indirect effect, with which I shall be much concerned, is upon the ability of firms to predict and plan.

Let us first consider the direct effect. A firm may make superior profits merely because it happens to be in the right place at the right time. It may, for example, benefit from an increase in the demand for the products it makes, or for other products which its particular capability fits it to make, even although the increase was not foreseen; or it may introduce some new marketing technique which proves, in the event, to be more effective than was envisaged. Such firms will benefit from the resulting process of competitive selection, even if the benefit is, in a sense, "undeserved". And this is as it should be; the profits earned by the increased demand can fund the increased supply needed to meet it, and the new marketing technique will be shown to be advantageous and therefore copied. Nevertheless, the social benefit from competitive selection in these cases is limited, there being no presumption that a lucky firm will continue to be lucky - unless, of course, what appears to be luck has a firmer foundation. If a firm is rewarded on the basis of its foresight and efficiency, on the other hand, the social benefit is greater, in that the firm is likely to continue to display these strengths for some time.

This being the case, competitive selection will work best when geared to performance over a period of time long enough for the inherent strength or weakness of a firm, rather than just its good or bad luck, to show itself. It follows, therefore, that although firms should be vulnerable to the consequences of their mistakes, it is not desirable that, should they trip, they should straightaway fall. The extent to which mistakes or misfortunes affect, through profit, the process of selection, depends not only on their magnitude but, as we shall see, on the structure of the market in which a firm operates and on such defensive strategies as it can itself adopt [6], there being no a priori reason

[6] I shall have something to say about these policies later in this paper; they are discussed more fully in Chapter VIII of my *Information and Investment* (Clarendon Press, Oxford, 1960 and 1990).

to assume that the reduction in vulnerability need impair, rather than improve, the efficiency of selection.

Let us now turn to the indirect effects of the process of competitive selection. [7] Little need be said about the most obvious indirect effect; everyone would accept that the constant threat of losing ground stimulates exertion. The other indirect effect, that operating on firms' ability to predict and to plan, is less widely recognised. And yet it would seem obvious, at least on the face of it, that the presence of competitors in a market will affect a firm's ability to predict its own likely sales. Indeed, if there were a large number of competitors equally aware of, and equally qualified to supply some future demand, it is hard to see how any one of them could take an informed decision about how much it should itself plan to produce. In practice, this extreme situation does not generally arise, but, if competition makes it at least more difficult to take informed output and investment decisions, then the *net* efficiency of the process of selection will be affected, the gains obtained through the differential growth of the more profitable firms being in some degree offset by the diminished ability of all firms to predict and plan. No competitive regime would endure, of course, if it made

[7] On the face of it there is nothing far fetched about the idea that a process of competition, designed to promote winners, may have a negative effect on performance, even if the positive effects ensure in practice that there will be a net gain. Half a century ago, it was still the common practice in Oxford to elect into fellowships, which in practice had tenure, rather young men and women, who were then left, competing for little more than esteem, with a life time in which to justify the electors' decision. Nowadays, successful candidates are typically older, having already obtained doctorates, and funding bodies, seeking to improve the quality and quantity of research, continously inspect and assess the work of individuals and departments as part of a process of competitive selection. Governments believe that these procedures are on balance beneficial, but it is hard to deny the existence of some negative effect where the pressure to publish denies young scholars the opportunity to embark on a long-term progamme of work, in the hope of making an important and original contribution. The rights or wrongs of this issue are not our present concern; I offer it as an example, close to home, of ways in which a process of selection may effect the average performance of the competitors.

enterprise planning virtually impossible;[8] business is a not a game of chance, but a game of skill in which chance plays a part, those who engage in it being volunteers, not gladiators forced by the threat of summary execution to enter the arena. A regime which prevented planning would soon be replaced by one which did not; market structures themselves evolve, with firms' own strategies playing a part in the process. It is the relationship between these structures and the possibility of enterprise planning that will now concern us .

Market Structure and Enterprise Planning

What makes it possible for firms to plan? In order to do so, they must be able to form reliable[9] expectations about what the future holds. All this is so obvious as scarcely to be worth saying. It is also obvious that the possibility of forming such expectations often depends on being able to assume that the future will not differ too much from the present. However paradoxical it may seem to maintain that stability is necessary for planned change, there is no doubt that we can plan for the future only if there are constraints binding the future to the present; we know, of course, that change continuously takes place, to which our own actions contribute, but we are usually justified in believing that at least most things will stay more or less the same within the period of time relevant to what we intend to do. We organise our lives largely on the basis of the observation with which Marshall prefaces his *Principles*: the observation that *Natura non facit saltum.*

When a firm plans, say, to introduce a new product, or to invest in additional capacity, or to increase output from existing capacity, then it will wish to have reliable expectations about the circumstances that chiefly concern it, and therefore, in particular, with the likely future availability of products both complementary to and competitive with its own. The possibility of forming such

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[8] The word "planning" if often used synonymously with "state planning"; I shall use the term "enterprise planning" to make it clear that I am referring to planning undertaken by firms.

[9] In saying than expection is "reliable" I mean that is regarded, by whoever entertains it, as secure enough to justify the action to which it relates.

expectations depends on a variety of factors which we shall come to consider, but of foremost importance is the fact, to quote again from Nelson and Winter, that firms are "much better at changing in the direction of 'more of the same' than they are at any other kind of change" and that they may "as a first approximation..... be expected to behave in the future according to the routines they have employed in the past." This feature of the world is important, for Nelson and Winter, in the process of competitive selection. But is important also, for my current argument, in that it endows the system with a degree of stability which may permit the formation of reliable expectations. As we shall see, the stability thus provided is not always sufficient to do so, but an understanding its role helps towards a more general understanding of the processes of coordination and adjustment in market economies and of the organisational arrangements that mediate them.[10]

Where products complementary to its own are concerned, firms will generally be able to assume that, without any intervention by them, general purpose inputs - such as electricity and fork-lift trucks - will continue to be available in the future as in the present; no doubt there will be increased demand for such inputs from some users and decreased demand from others, but if the sources of

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[10] The reader will find a fuller and more formal treatment of these issues in my *Information and Investment*. When I wrote this book (over forty years ago) I was much concerned, perhaps too much concerned, to demonstrate the defects of the perfect competition model, which was, at that time at any rate, used very extensively by economists in their theoretical work, both, positively, as an approximation to reality, and normatively, as representing, in its supposed equilibrium configuration, an optimal allocaton of resources. This partly explains why the book begins with lengthy analyis of the confusions inherent in the model and a refutation of the claims based on it. I do go on, however, to discuss the working of competition as it exists in the real world and to identify what it can and cannot achieve. Denis O'Brien said, in criticism of my work, that I was myself "deeply affected by the programme of perfect competition"with which I found fault; I should rather say that, while rejecting the claims of the model, I did not wish to jettison the notions of equilibrium and optimality with which were therewith entangled. It is noteworthy that much modern writing about firms and markets, although deepening our understanding of how the economy works, has little to say about allocative efficiency, the principles of which are represented, in an older tradition, as what economics was very much about.

demand are many and various, the overall balance between demand and supply will generally show some stability. But firms will not be able to depend in this way upon the natural availability of inputs which, being highly specific to their requirements, are not in general demand. In these cases, organisational arrangements have to be devised to make up for what continuity cannot provide. A firm may arrange that the required inputs will be available, of the right specifications, in the right quantities and at the right times, by itself undertaking their supply. Indeed, it may be fair to say that the primary rationale of a firm's existence is to secure close coordination of this kind. But, as we have observed, firms are better at some things than at others, and may choose to ensure the supply of needed inputs that they are not well fitted themselves to produce though entering into agreements and associations with firms which are. This circumstance is the basis of the presence within market economies the networks of association and affiliation which are now, much more than formerly, the object of analytical attention. [11]

Arrangements such as those described, which are to do with the coordination of complementary activities, inevitably modify the process of competitive selection. The assurance which a simple long-term contract provides both parties is at the cost of excluding competitive supply during its agreed term, but, as neither of them will wish its hands tied for very long, the effect is limited. Similarly, the existence of patterns of association and affiliation, designed to ensure the coordination of complementary activities, does not unduly trammel the selection process, although it will affect the way in which selection operates, firms being rewarded or penalised in part according to the effectiveness of the alliances they make.

Let us now turn to the expectations that firms must form about likely competitive offerings. It is here that we see most clearly that there is a relationship between market structure and firms' ability to predict and plan. A firm, before deciding to supply a market, will wish to have reasonable assurance that the volume of competitive supply will not be excessive. That it is generally able to do so depends, for the most part, on such natural stability as exists in its business environment. It will commonly, but not always, be able to assume that the number of firms readily capable of producing and marketing closely competing products, as well as the scale on which each can readily do so, are

[11] They are discussed in my article *The Organisation of Industry* referred to above.

both limited. That there is a limit to the number of firms likely to offer a serious competitive threat depends on the fact that - to quote yet again Nelson and Winter - firms are "typically much better at the tasks of self- maintenance in a constant environment than they are at major change, and much better at changing in the direction of 'more of the same' than they are at any other kind of change". The limit to the likely competitive supply planned, within the relevant period, by each of these "qualified" firms is set, for the most part, by managerial constraints on a firm's rate of expansion. These factors - the limit to the number of qualified firms, and the limit to the supply that each of them is likely to plan - taken together, will limit the possible competitive supply that a firm is likely encounter; they are therefore favourable to prediction and planning while being wholly compatible with the process of competitive selection; indeed, as we have noted, the fact that firms have different capabilities is the basis on which selection operates.

I have referred so far to the need for firms to estimate the likely volume of competitive supply; in the case of industries which make more or less homogeneous products, the older industries such as coal, steel and cement, the term "volume" is reasonably appropriate. It becomes less so, however, where there is much product differentiation and continuous product development. Product differentiation, like transport costs or goodwill, gives firms "particular markets" in which they have a natural advantage and which other firms are unlikely to seek to supply unless they believe themselves to have countervailing advantages. Invading such markets, moreover, requires not just a suitable product but a sustained marketing drive to get it distributed and accepted. These circumstances are likely to improve the net efficiency of the process of selection, as they provide a degree of stability which favours output planning without preventing firms with genuine competitive advantages from gaining ground.

Modern industry is characterised not only by product differentiation but by an increasingly fast rate of product development. Firms, in estimating the future sales of a product, will have to think very much in terms of the nature rather than the volume of competitive products likely to be put on the market. The fortunes of a producer of a relatively homogeneous product, such as cocoa or coal, depend crucially on the future balance between the relevant aggregate demand and supply and there is little or nothing that can be done to escape the effect of a glut; where there is scope for product improvement or specialisation, on the other hand, the producer can, to some extent, find his own

salvation. Success or failure will then depend more on product quality and marketing skill than on whatever balance between demand and supply results from the aggregate output decisions of competing producers. Products which prove unsuccessful will represent a waste of resources, but a waste which represents the necessary cost of the process of experimentation, of trial and error, taking place throughout the economy. No similar justification exists for the waste associated with the under-investment or over-investment which may result because the producers of a homogeneous product are not in a position to make sufficiently reliable estimates of likely competitive supply.

On the whole, therefore, even if surprisingly, enterprise planning seems more likely to be facilitated rather than impeded by the product differentiation and continuous product development characteristic of modern industry. But the possibility of foresight will still remain largely dependent on the stabilising circumstances we have earlier identified, on the fact that firms are limited in the directions they can seek to develop new products and in the rate at which they can produce and market them. A firm putting a new product on the market will expect it in due course to be superseded, but know that it will take rivals time to displace it. The possibility of profit requires the presence of inertia within the system sufficient to provide such lags.

It may seem that we have found an answer to the question earlier posed; how is it possible for firms to plan within a competitive economy ? The possibility depends on the existence within any economy of naturally stabilising circumstances - to do essentially with the imperfection and division of knowledge - which are favourable to both enterprise planning and selection. It is therefore tempting merely to take for granted that enterprise planning will always be possible within competitive regimes whatever the structure of markets and the prevalent forms of business behaviour. But it would be wrong to jump to this comforting conclusion, for we have no good reason to assume that the naturally stabilising circumstances that we have identified will always be present to the degree required to provide *sufficient* stability, that they will in all circumstances enable firms to plan to supply a market in the reasonable assurance that the volume of competitive supply will not prove excessive. We must therefore ask ourselves whether, in the structures or practices to be found in actual market economies, there are additional circumstances which further facilitate enterprise planning. And we must then ask whether these circumstances will be compatible with the effective working of competitive selection.

Pricing Policies

We may begin by considering how firms' pricing policies affect their ability to plan output levels. In the markets for manufactured products, as contrasted, for example, with financial or commodity markets, prices are relatively stable. There are reasons for this which have nothing to do with market structure; price changes incur administrative costs within a firm, and, if frequent, would be unpopular with retailers and consumers. But, where the number of producers in a market is relatively small, price stability is further promoted by what Marshall referred to as firms' reluctance to "spoil the market", reluctance, that is, to reduce price in response to a temporary falling off in demand where such reductions become rapidly known to rivals, and rapidly matched by them. Pricing policy will be influenced, in such markets, by firms' perception of common interests as well as by their individual ambitions. And the result is likely to be some degree of stability, both in relative prices and absolute price levels.

There are three reasons why this circumstance favours output planning. First, short- run stability in the relative prices charged by competitors will be associated with short- run stability in market shares, thus facilitating the prediction of the demand for which any one firm should plan. Secondly, it is usually easier to plan output levels in response to short-run changes in demand when these are registered quantitatively in changes in stocks and order books rather than in price movements. Thirdly, where fixed costs are high, and demand is variable and inelastic, some stability stability of prices in response to demand fluctuation will stabilise profits and facilitate financial planning. [12]

[12] Professor F M Scherer, in his valuable book *Industrial Market Structure and Economic Performance* (First Edition; Rand McNally, Chicago 1970) disagrees with my account of these matters. He argues (p.202-6) that, giving a fluctuating demand, profits over the cycle are likely to be greater with prices varying according to marginal cost than they would be were prices stable. Even if and when this is true, however, an unpredictably fluctuating profit is in itself a deterrent to investment, given the need for liquidity sufficient for a firm to cope with it. Nor will a firm, in the depths of a decline in demand, be able confidently to predict whether and when a compensating boom can be depended upon.

I by no means wish to imply that stability in prices is in all circumstances a proper response to short-run demand fluctuations. If demand is elastic, a firm may be prepared to cut prices in response to declining sales even if it knows that rivals will follow suit. The correct reponse will vary according to the circumstances of each market, the firms supplying it being those most likely to know what these are. Very commonly, responses in practice will tend to be rather ragged, as different firms take different views of the situation and some of them, by means of price cuts disguised in one way or another, seek to exploit a temporary advantage.

We have been considering the different pricing policies that firms may adopt when there are short - run increasing returns occasioned by a temporary excess of capacity over demand. But it is well to remember that in many modern industries firms may also experience long-run increasing returns as may be occasioned, for example, by the magnitude of set- up or development costs in relation to the variable costs of production; pharmaceuticals are an example and software products an even stronger one. Many years ago, Piero Sraffa pointed out that, if faced with fully elastic demand as in perfect competition, a firm operating under increasing returns could not be in equilibrium [13]; as long as average cost was falling, then it would gain by increasing output. This was sometimes taken to imply that goods produced under continuously decreasing average costs would end up being monopolised; we know, of course, that this does not normally happen, and that active competition is

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Professor Sherer also draws attention to statistics that appear to show that industrial concentration and investment stability as inversely related, this being taken to him to indicate, against the case I advance in my *Information and Investment*, that concentration facilitates foresight. I find it hard to decide how much weight to give to the finding; investment in industries with low concentration may show greater stability because the capital employed in them is less lumpy, because the firms in them tend to have "particular markets" because of transport costs or for other reasons, or because demand is inherently more stable. I did not argue, in any case, that large numbers would lead necessarly to instability; a difficulty in prediction and planning could act as a deterrent to long-term investment and an incentive to adopt measures, which would incur a cost, to cope with risk.

[13] "The Laws of Return under Competitive Conditions", P. Sraffa, *Economic Journal* 1926.

commonly found among firms experiencing decreasing production costs. The reasons for this are several. The competing firms may offer products sufficiently differentiated to present each with a falling demand curve, but even if the products are effectively homogeneous, they may not be perceived as such, so that it will take time and marketing effort for their manufacturers to increase sales. Competition is thus kept going by the viscosity present in the system, by the very imperfection of knowledge which, in theoretical models, sometimes features as inimical to it. It may be objected that, given enough time, the underlying cost conditions will ultimately determine the outcome and leave but one surviving firm in markets characterised by long- run increasing returns. And some markets may indeed become monopolised in this way; much more commonly, however, the rate of technical change is such that the determinants of equilibrium will have altered long before this equilibrium is attained.

The continuing co-existence of a plurality of firms may sometimes also be favoured by the effect which an appreciation of oligopolistic inter-dependence exercises on the pricing policies. Although this restraining influence may deny consumers the benefit of increasing returns, it may nevertheless enable them to enjoy the benefits which flow from having a number of firms engaged in continuous rivalry. In any case, and particularly if technical progress is continuous, it is unlikely to be desirable to establish, on the basis of current technology, production facilities large enough to supply all the demand that will develop for a product, even if this maximises the exploitation of scale economies. The public interest may be better served by the co-existence of several firms with plant of different ages, by a structure, that is to say, which enables new technologies to be introduced on a more frequent and less risky basis. It is of course right that scale economies should exert a powerful influence on industrial structure, but it is not the only circumstance that should do so. The hold that formal equilibrium analysis exerts on our minds may somtimes blind us to the obvious fact that competition produces no settled state but is a never-ending process causing firms to rise or fall in accordance with their response to the constant challenge of change. [14]

[14] I am uncomfortably aware of the deficiencies of this very summary account, of competition under increasing returns, truncated as it has been to fit into the principal argument of this paper. But the reader, if he or she so wishes, can find a fuller account in my article *Competition, Innovation and Increasing Returns* first published in 1996 as a DRUID working paper No.96-10 and republished in *The Economics of Imperfect Knowledge, Collected Papers of G B Richardson.* Edward Elgar 1998.

If I am right in claiming that "oligopolistic" pricing policies may facilitate enterprise planning, may reduce the risks of investment, and may, in certain markets, be necessary to maintain in the market the plurality of products upon which selection can operate, we must still ask whether they may still take the edge off competitive discipline. Unwillingness to "spoil the market" when demand falls below capacity need not prevent a firm with a cost or product advantage from reducing price in order to gain the sustained increase in market share. And it is upon such "long - run price competition", rather than the "short - run price competition", which seeks only a temporary tactical advantage, that efficient selection depends. [15] It may be, of course, that firms try, through tacit collusion, to avoid both short-run and long- run competition, thus sacrificing their individual ambitions in the hope of higher profits and a quieter life for all. Plain observation suggests, however, that they cannot often successfully do so, for the short- run price stability that is a recognisable feature of the industrial landscape does not prevent sizable shifts, over time, in market shares. The present day reality would seem to be that firms do compete fiercely, while at the same time tending to avoid behaviour leading to a degree of instability injurious to them all. And, this behaviour, I argue, is likely to increase the net efficiency of the selection process.

Oligopoly has had a bad press. Economists have commonly viewed the pricing policies associated with it as designed to exploit buyers and obtain an easier life. Such motives do play a part, but only a part, in the complex reality; we need to accept that business arguments about the need for "orderly marketing" can amount to more than mere humbug, and that the public interest may be in fact served by policies informed by the sense of inter-dependence characteristic of competition among the few.

What is to be said, however, about formal inter-firm agreements on prices and market shares ? Such agreements were commonplace in Europe during the first half of the last century but are now rare,

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[15] A fuller account of these matters is given in my article *The Theory of Restrictive Trade Practices* reprinted in *The Economics of Imperfect Knowledge,* G B Richardson. Edward Elgar 1998. Originally published in *Oxford Economic Papers* 17 (3) November 1965.

partly because the law forbids them and partly because they are inappropriate to much modern industry in which product differentiation and development are the norm. [16] Agreements on prices facilitate production planning by providing stability; if quotas are also agreed, uncertainty may be further reduced. In either case, however, there is damage to the process of competitive selection. It is true that, even when a common price obtains, the more efficient firms earn higher profits and thus obtain the resources to fund differential expansion, but, without the freedom to reduce price, such expansion is made much more difficult. A price agreement, moreover, may have a perverse effect; by remaining outside it, a firm, by charging somewhat less than the agreed price, can gain sales and keep its productive capacity fully employed. This may well cause the agreement to crumble, but if insiders meet this challenge by persuading outsiders to join them, the result is likely to be excess capacity and pressure for an increase in price sufficient to cover the resultant increase in costs. The excess capacity which foresight, facilitated by the agreement, might have prevented, will then be a direct result of the agreement itself. We should also bear in mind that whatever quotas may be set will depend on the accuracy of the forecasts of total demand made by the cartel rather than on those

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[16] See Professor O'Brien's *Information and Investment in a Wider Context* in *Economic Organisation, Capabilities and Coordination; Essays in Honour of G B Richardson* edited by Nicolai J.Foss and Brian J. Loasby, Routledge 1998, p.114 and passim. I am sometimes taken aback by the violence of the anathema which, in this context, the slightest sign of heresy brings down upon one's head. Professor O'Brien, who writes approvingly of parts of my *Information and Investment,* finds me, on the basis of what he takes to be my views on restrictive agreements, guilty of ignorance, naivete and what he describes as " "Ivory Tower empiricism", peculiarly Oxbridge in form". For an account of a particular set of circumstances in which I believed that natural stabilising factors were not sufficient to permit enterprise planning, the reader could consult my article *The Pricing of Heavy Electrical Equipment: Competition or Agreement* in the Bulletin of the Oxford University Institute of Economics and Statistics 28; 73-92, 1966. I do not know enough to offer an opinion of how this market should be organised today, and it may be that the recommendations I made these many years ago can now be seen, in the light of hindsight, to have been inappropriate. But only those with the strongest faith in the infallibility of the invisible hand will maintain that free price competition will necessarily provide the best outcome in markets of this kind.

made by member firms individually; centralised prediction will have replaced the system according to which the quality of a firm's own foresight is a determinant in competitive selection.

The disadvantages and dangers of cartels are sufficient to create a general and justifiable presumption against their adoption. But it is important to judge them not against the standard of a theoretically ideal competitive market, but by comparing their likely effects in a particular set of circumstances with the likely effects of free competition in the same set of particular circumstances. If we consider, as we should, the dynamics of adjustment in competitive markets, and not merely the equilibrium configurations which are supposed somehow or other to be realised, then we come to appreciate how the enterprise planning needed to secure adjustment of supply to demand depends on circumstances which, although usually present, need not be present in every case. Observation and experience may incline us to believe that competitive markets, even when they work badly, are still preferable to cartelised markets, so much so even as to justify the proscription of all cartels. But we would be wrong to claim that theoretical reasoning supports such a categorical conclusion. It is not difficult to hypothesize situations in which the underlying circumstances which permit enterprise planning are not present; it is not impossible for many firms to become aware of a profit opportunity at more or less the same time, and to be more or less equally well placed to respond to it, in which circumstances none of them will be able rationally to decide what to do.

It is interesting to consider what the effects of proscribing cartels, as far as we can ascertain them, appear to have been. [17] In the United Kingdom at any rate it seems usually to have brought about a reduction in prices, followed by a reduction in capacity and the concentration of output in fewer firms. Agreements on prices were frequently superseded, at least for a time, by the exchange of information on prices and by price leadership. As far as one can judge, the abolition of cartels seems generally to have changed industrial structures in ways which, through more favourable to

[17] It is not easy to establish the course of these events or how matters now stand. Business men, for one thing, are not likely to cooperate enthusiastically in investigations designed to do so, particularly if the restraint of trade is made illegal *per se*. The reader will find a fairly detailed account, however, in Chapter 4 of *Competition in British Industry* by Dennis P.O'Brien., W.Peter J. Maunder and W. Stewart Howe, Unwin University Books 1974.

competition, maintain a degree of stability, which by facilitating enterprise planning and reducing risk, contributes to the net efficiency of competitive selection.

These considerations lead to questions of policy which are not my present concern. My principal purpose has been to focus on the *efficiency* of competitive selection and to enquire as to the structures and policies most favourable to it. In the course of doing so, I have had to consider the dynamics of the *process* by which enterprise planning and competitive selection together produce an economic order. Economic theory, by relating market structures to equilibrium configurations the attainment of which is taken for granted, typically attributes market failure, as represented by the over or under- supply of particular goods, to monopoly and externalities. It has become hard for us now to escape from this imprisoning perspective and explicitly recognise two obvious facts: first, that resources are frequently misallocated through lack of foresight, and, secondly, that the exercise of foresight may be facilitated or impeded by prevailing market structures and business behaviour. If we are to understand how markets work we cannot rely merely on the apparent short- cut offered by traditional equilibrium analysis; it is necessary to study the process by which adaptation takes place. Both enterprise planning and competitive selection, which together shape this process, require the presence within the system of stabilising conditions, usually sidelined as "time lags", "imperfections"or "frictions". Only by bringing these conditions fully into our analysis are we likely, in my view, to further our understanding of the dynamics, the scope and the limits of coordination through markets.

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