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Abstract

CONCEPTS OF COMPETITION IN THEORY AND PRACTICE

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Begins by critically reviewing Vicker's list of reasons why business competition is likely to lead to productive efficiency, and then argues that traditional economic concepts of competition and productive efficiency need to be broadened to take account of dynamics and uncertainty, and of the importance of economic interdependence which is not based on competition. The structuralist approach to competition policy is examined and particular attention is given to the 'structure – conduct – performance' paradigm. It is suggested that competition policy in practice tends to emphasize structure rather than conduct and is highly static in orientation. Although earlier, most members of the Chicago School e.g. Stigler, supported a structuralist approach to competition policy, more recently several Chicago economists have proposed the "efficiency defense" of market concentration, namely that dominance in an industry is almost always a result of superior efficiency. This evolutionary Darwinian-type defence is based on dynamics and converges towards the Schumpeterian view. Hayek, like Schumpeter, had an interest in competitive processes but the competitive models of these two Austrian-trained economists are very different. The model of Schumpeter is open whereas the system of Hayek is relatively closed and unable to take account of the competitive complexities of modern economic systems. Despite Hayek's interest in processes, his recommended competition policy is structuralist in character and similar to Stigler's.

Keywords: Allocative efficiency, competition policy, concepts of competition, dynamic efficiency, innovation, productive efficiency, uncertainty

Concepts of Competition in Theory and Practice

1. Introduction

There is a common belief shared by many academics, business leaders and government officials that increased business competition promotes economic efficiency. This belief has its roots in the first fundamental theorem of welfare economics: under specific assumptions, any competitive equilibrium is associated with Pareto optimal allocation of resources. So, in this approach, economic efficiency is considered to be synonymous with allocative efficiency.

The first theorem is a pleasing and powerful result but it is also a theoretical result, i.e. a result which is not easy to prove in practice. Moreover, this theorem has been demonstrated in a static framework. In fact, on the one hand, Pareto improvements are generally considered desirable but are also hard to find, and on the other hand, it is relatively easy to find Pareto-optimal situations but there are always infinitely many Pareto-optimal allocations for any economy.

There exists an element of Paretian efficiency which appears easiest to measure: it is productive efficiency. Broadly speaking, it concerns the incentive of producer to produce at minimum cost. In the neo-classical approach, the measurement of productive efficiency has been defined by Farrell (1957). Since widespread deregulation in USA in the early 1980s, many studies[1] have shown that competition promotes productivity. Furthermore some studies, such as Winston's (1993) survey of economic deregulation in the United States, conclude that vigorous rivalry has brought large welfare gains.

However, two questions arise: on the one hand, what are the links between competition and productive efficiency (section 2) and on the other hand, to what extent is the definition of productive efficiency well designed to assess the productive efficiency of large, dynamic social and economic systems (section 3). Furthermore, can less than perfectly competitive economic situations have positive implications for the economic system as a whole?

[1] See Porter (1990) and Nickell (1993).

Belief in the virtues of competition have resulted in the formation of policies in several countries to promote market competition. It has led to the formulation of the antitrust doctrine. One of the earliest stages of this doctrine was the passage of the Sherman Act in the United States in 1890.

Section 4 is devoted to the structuralist approach to competition policy; this approach is usually considered as the mainstream. The starting point of competition policy is the definition of perfect or pure competition which is considered as being the ultimate goal to be achieved. Thus, competition in the markets must first be defined. For this purpose, industrial organization theory provides us with a useful tool, namely Mason's (1939) and Bain's (1956) paradigm. This paradigm is based on three features: the structure of the market, the conduct of firms and finally their performance. The two latter features are not really easy to evaluate so competition policy is mainly based on the former. Although this structuralist approach to competition policy has been recently improved by the addition of contestable markets to its criteria of appraisal, it remains unsatisfactory because it is based on a static approach to the market and the economy as a whole and so other approaches to competition policy are studied in section 5.

2. Competition and Economic Efficiency: The Relationships

In the mainstream neoclassical economics, competition is considered as a state or as an equilibrium state. So, the closer to that state a market is, the more "perfect" it is.

Besides the concept of competition is the concept of economic efficiency. Broadly speaking, efficiency deals with using the appropriate means to achieve one's desired ends. If one uses the lowest cost means to achieve a given end then that action is efficient. Most economists of the mainstream distinguish between productive and allocative efficiency. Some of them also distinguish dynamic or innovative efficiency from the two other types. Let us first deal, as Vickers (1995) did, with the relationships between competition and productive efficiency.

2.1. The common belief

By using the word "competition", Vickers (1995) does not consider especially "perfect competition". Indeed, his purpose is to show what happen when the degree of competition increases. This implicitly means that first there exists some market power in the economy.

Vickers summarizes the common belief concerning the links between competition and productive efficiency. He gives three reasons why competition is important for productive efficiency.

First, competitive pressures coming from outside the firm may lead it to an improvement of its internal organization. In other words, competition implies less X-inefficiency. With greater market competition the technically inefficient can be expected to earn lower profits and in extreme cases their business survival may be at stake. Consequently, they have an incentive to improve their efficiency as a result of competition. So the first reason that Vickers mentions is defined at the micro-economic level (the firm level) and in a one-period[2] framework.

The second reason suggested by Vickers is that those firms improving their internal organization relative to others, can be expected to gain larger market shares, larger profits and so they are more likely to get ahead in the competitive race. Competition introduces a selection process and at the end of the process, the survivors are the best performers. This selection process is often considered to be like a biological selection process. The survivors being the best performers, therefore the efficiency of the entire economy increases. So, this second reason is defined at the macro-economic level, the aggregate one, and is intrinsically dynamic and evolutionary in nature.

The third reason is that competition forces firms to invest or to be left behind. Through these investments, mainly through R&D expenditures, new products or new technologies appear on the market. Indeed, competition stimulates technical progress and then the 'level' of productive efficiency is enhanced. Technical progress may occur for both productive processes and for products. But as Nelson (1987) pointed out, usually firms do not know their production function, so it may be easier to assess the existence of technical progress through the emergence of new products rather than through the changes of the frontier of production possibilities. This element applies to a single firm as well as all firms because innovations are shared by all after a certain time and hence is a purely dynamic one.

[2] Of course this reason is still true in a multi-period framework.

2.2. Critique

These three reasons may be criticized because they are built on ill-defined concepts and mainly because they don't give enough attention to specific features of any dynamic processes such as changes of the context and uncertainty.

The improvement of firm's internal organization as a result of greater competition may not occur because profit maximization may not be the firm's main objective. For instance, the firm may want to keep a certain level of employment even if some workers are paid above their marginal productivity. In other words, a certain level of employment may be optimal in order to have 'social peace', especially in respect to relationships with unions. Moreover, if today the firm decides to lay-off some workers because they reduce its current productive efficiency, it may incur large transaction costs (in Coase (1937)-Williamson (1975) sense) if it needs tomorrow to engage some additional workers. Therefore, the existence of implicit contracts in the labour market (and also in other markets and economic areas) implies that uncertainty about the future and problems in getting information can actually explain the existence of some level of X-inefficiency. Finally, a given firm may survive even it is productively inefficient, depending on what the other firms in the market are doing. In a situation where there are many 'competitive' firms but all have a similar and large degree of X-efficiency, little competitive pressure is present for greater productive efficiency.

Vickers argues that competition promotes aggregate efficiency. However, he implicitly assumes the existence of a dynamic process. In this evolving process, the context is changing at any moment, for instance through external shocks. So it is possible that a strategy or an action which was optimal in a given period will not be optimal in the next period. In other words, the survivors of a given selection process may not be well adapted for the next selection process. So we have to distinguish between the short-run and long-run.

In other words, competition is often considered as a selection process in a biological sense. However, it is important to distinguish between Darwinian and Lamarckian selection processes. For Vickers, it seems that the selection process considered is a Darwinian's one where selection results mainly from stochastic events. On the contrary, the selection process among firms should be defined in Lamarck's sense: the firms who survive are those who have been able to adapt themselves to a continuously changing context. Firms' learning ability is then central. In the evolutionary theory of the firm (which is a mix of Darwinian and

Lamarckian theories), actual survival is due to a combination of a corporate philosophy which leads to the choice of strategies appropriate to a firm's economic environment, and sheer chance.

As shown by Kovacic and Shapiro (2000), the United States experience from 1915 to the mid-1930s provides support for a doctrine different to absolute promotion of market competition. Indeed, during this period, an 'associationalist' vision of business-government relations was developed. After World War I, it was considered that the business-government collaboration that guided the wartime mobilization of the US provided the best way to organize the economy, mainly because it curbed the wasteful features of competition. This vision was strengthened by the economic collapse of 1929 which has repudiated the reliability of the competitive model of economic organization. This period shows that, in response to external shocks, maintenance of strong market competition policy is untenable. Thus, it implicitly suggests that even when there are no external shocks, promotion of competition policy should be parsimonious.

The third reason assumes the existence of a relationship between competition and innovation. However, as Schumpeter (1942) pointed out, innovation is an uncertain process rather than a risky strategy[3]. If, as it is assumed through the common belief, more competition reduces extra-profits, then innovation will hardly happen. Indeed, innovation requires extra-profits in order first to finance it[4] and second to prevent losses and/or compensate for uncertainty. In many industries (such as the software industry), large profits are necessary because they enable a given firm to finance at the same time many research programs and hence to work by pooling the risks on a number of separate projects. Moreover, large firms are more able to innovate because innovations require coordination of several activities[5] and because risk pooling is one source of advantage for larger organizations relative to smaller ones. By definition, competitive firms which are assumed to be price-takers are not able to do that because they ignore interdependence among firms.

[3] See Tisdell (forthcoming 2001).
[4] As shown by the endogenous growth theory, there exists a positive correlation between the level of R&D expenditures and the extent of innovations.
[5] See Lazonick (1991).

Thus it appears from the last reason that in an Austrian view, a stronger emphasis is placed on the productive or dynamic sorts of efficiencies rather than on the static, allocative notion (favoured by the mainstream economists).

More deeply, the mainstream's definition of economic efficiency is criticized by Austrians adopting this viewpoint. Indeed, efficiency pertains to a relationship between a means and a given end. But, in the Austrian perspective, on the one hand, no action can be considered efficient because information is imperfect[6] and so nobody knows all the possible means, and on the other hand, ends change in the course of an action. Thus, through the Austrian view, the concept of efficiency becomes almost meaningless.

3. Competition and Productive Efficiency: some extensions of the concepts

First, productive efficiency is mainly defined in a static manner. Indeed, given some inputs and their associated costs, the frontier defines the combination of inputs which are minimizing the total cost. However, the shape of this frontier changes when the cost of some input is changing. Furthermore, a given firm usually uses inputs in a process of production which is dynamic. So, at any time, different vintages of fixed capital exist in this process. Thus, using old capital may lead the firm to be below the frontier but the benefits provided by old capital can exceed the costs that the firm would incur in order to buy new capital (cf. Salter, 1969). There are economic reasons linked to dynamic optimization in the presence of some irreversibility which may explain why it is optimal for some firms to be below the frontier.

Secondly, productive efficiency is defined through the assumption that all firms have the same ability to produce. However, some firms may be more efficient in innovation and some others for production by 'imitation' (cf. Tisdell, 1996, p.321). So, by considering in a same country the product life-cycle, it seems possible that some firms produce a good by using an 'old' technical process while some other firms are producing the same good by using an up-to-date technology.

Thirdly, Vicker's analysis is based on the mainstream's definition of competition. However, there exists another view of competition, the process-view of competition, which stands in

[6] This may concern information about future events or technological options.

contrast to the equilibrium view of competition held by mainstream economists. The view of competition as an "ongoing process" was dominant in classical economics and is also shared by Austrian economists. The two fundamentals ingredients of the Austrian process-view of competition are rivalry and discovery. Indeed, Austrian economists consider competition as a dynamic, rivalrous process through which business compete with one another to best satisfy the demands of consumers. This process is motivated by entrepreneurial action which attempts to discover[7] opportunities for profit in an environment of inherent ignorance and uncertainty. As soon as competition is considered not only as a state but as a process, then its relationships with economic efficiency must deal with productive efficiency as well as with dynamic or innovative efficiency.

Fourthly, competition is often considered as a race or as involving rivalry. Indeed, Stigler (1987) describes competition as: 'a rivalry between individuals (or groups or nations), and it arises whenever two or more parties strive for something that all cannot obtain'. Thus, following Stigler's definition and Vickers's analysis, it seems that a bonanza can only come from rivalrous competition. However, some economists such as Kaldor (1977) have also emphasized on the importance of complementarity rather than competition between industries and factors of production. Moreover, we learn from ecological systems that beneficial results for individuals can be provided by relationships among 'agents' that differ from competition.

For instance, there may be some 'mutualism' among firms. In that case, there is an implicit agreement among firms. For instance there may be non-market exchange of information which is mutually beneficial to all parties. It is a cooperative strategy but it is not restrictive because it is not done at the expense of consumers. In Japan, the MITI's policy which consists in coordinating research and business programs may be considered as a case of mutualism.

There may also be some 'commensalism' between agents, that is, the existence of a given firm may depend on the existence of another but the latter does not act as a parasite or competitor of the former, nor does it provide its benefactor with any benefit in return.

[7] This is Israel Kirzner's (1997) definition of entrepreneurial discovery.

Both cases may be illustrated through the notion of "complements products" or "complements ways of making products". Mutualism corresponds to bilateral complements[8] while commensalism is associated with unilateral complements.[9]

4. The structuralist approach to competition policy

Broadly speaking, competition policy refers to Government policy concerning competition. This may be concerned with the structure of industries, or with the behaviour of firms within them. As regards the structure of industries, Governments have sometimes favoured monopolies[10] or regulated entry.[11] However, the main purpose of Governments (especially nowadays) is to protect competition. In the United States there exists a long tradition in competition policy based on antitrust laws. These laws, the most famous being the Sherman Act (1890) and the Clayton Act (1914), have changed forever the relationships between Government and business. The Sherman Act makes illegal "...every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce...". The Clayton Act introduces more details about illegal practices such as price discrimination, tying contracts, and mergers which "..may substantially ...lessen competition or...tend to create a monopoly."

At the same time, the mainstream of industrial organization began and the 1930s saw the rise of the structure-conduct-performance paradigm.[12] Until recently, the SCP paradigm was the only economic foundation on which competition policy had been built. This paradigm states that the causality runs from structure to conduct to performance. In other words, the success of a firm is in large part due to the structure of the industry of which it is a part. Issues analysed through the SCP paradigm are mainly market concentration, oligopoly and the costs of monopoly power. The emphasis being on market's structure, it is important first to know what is considered as a "normal market's structure". According to the mainstream, the normal structure is the one associated with a perfectly competitive market.

[8] For instance, the value of any software platform (such as « Windows ») depends on the applications written to run on that platform and vice-versa.

[9] If we still consider software industry, the mouse and the mouse-pad are unilateral complements. The latter exists only if the former do but the converse is not true.

[10] As with the UK postal service.

[11] As with telephones, television and public transport.

[12] See Mason (1939).

4.1. Definition of pure competition

A perfectly competitive market must satisfy four assumptions. First, the number of agents (buyers as well as sellers) in the market should be so large that no agents expects to affect the market price through its own action. Agents are then 'price-takers'.

Second, there is free entry and exit. In other words, there are no barriers and each agent can enter or exit the market whenever it finds it profitable to do so.

Third, the product is homogeneous. It is also identical in the minds of consumers. Thus, prices are identical between firms.

Fourth, all agents have perfect information about the market price and hence the price prevailing in a market is unique.

Many economists have focused their attention on the first assumption, namely on the number of firms in a given market. From their work, two questions arose: on the one hand, the competitive equilibrium is an extreme case associated with a large number of firms. However, if we start from an oligopolistic market, what will be the outcome when the number of firms is increasing? On the other hand, is competition among the few necessarily bad?

4.2. From imperfect competition to perfect competition

It is possible to consider the market for a homogeneous product and a few firms. Starting from this oligopolistic market, what is going to happened when the number of firms is increased[13]? In fact, there are two different ways to consider the introduction of additional firms.

First, if we consider a free entry equilibrium, it means that the number of firms is endogeneously determined by the market's features such as the costs and the demand functions. Novshek (1980) has demonstrated that a free entry equilibrium with imperfect competition is close to the long-run competitive equilibrium. However, a specific assumption is needed: firms must be relatively small with respect to the market size. Furthermore, as

[13] This is a question first stated by Cournot (1838).

shown by Mankiw and Whinston (1986) for a two-stage game, free entry may lead to social inefficiency. The equilibrium with free entry may lead to over-entry of firms with respect to the optimal number of firms that will be chosen by a social planner. This result comes from what the authors called the 'business stealing effect'. The existence of this effect depends on the features of the inverse demand.

Second, we may consider an equilibrium with entry, that is an equilibrium where the number of firms is exogeneously modified. Corchon (2000) showed that convergence to the competitive outcome is not necessarily warranted. It crucially depends on assumptions about the inverse demand, namely on the fact that firms' actions are not strategic complements.

4.3. Contestable markets

Economists have not always considered that business concentration has negative economic effects. Some economists argued that in some cases it provides large gains from economies of scale and scope. They also considered that unbridled competition endangered industries with high fixed costs and low marginal costs, like railroads and utilities. Some argued that government ownership or price discrimination were needed to enable such industries to recover fixed costs.

The theory of contestable markets, introduced by Baumol, Panzar and Willig (1982), has provided a useful tool in order to analyse competition policy among the few. Its aim is to show how potential competition can discipline market behaviour when only a few firms are established because of non-convex technologies. The key assumption is that of free entry and exit. With this assumption, incumbent firms will choose to price at average cost, thus offering consumers the benefit of Marshallian long-run perfect competition. Indeed, any deviation from this pricing rule would exposed them to hit-and-run entry or would lead them to make losses. Thus, this theory showed that there is interdependence not only among established sellers but between established sellers and potential entrants. A market may then be 'competitive' even if the number of firms is not large.

An interesting policy development worldwide in recent times has been to make the supply of public utilities more contestable in cases where networks or essential facilities are involved.

Important network industries include gas, electricity, telecommunications, broadcasting and transport (rail, airports, ports and shipping). It is recognized that duplication or excessive multiplication of networks themselves will be uneconomic. However, contestability can be encouraged in relation to services or commodities which rely, for their distribution, on the network. The owner of the delivery grid or essential facility has a monopoly. In many countries legislation has been enacted to ensure access to these facilities by competitors both upstream and downstream. This increased contestability is intended to benefit consumers. At the same time, revenue caps or limits on the returns of non-contestable facilities are usually imposed by regulatory authorities.

One can observe that while this may promote static or short run economic efficiency it may not facilitate dynamic efficiency. If contestability is high, those in the contestable sector will have little surplus to indulge in Schumpeterian-like R&D and innovation. Owners of non-contestable networks may be put in an even more difficult position in that regard because of the regulation of their returns. Furthermore, the incentive to innovate may be stifled because at the end of the day they may receive no more than normal returns. The gamble of innovation and the trouble it involves requires more than normal return to make it worthwhile. So there is a real risk that while static economic efficiency is achieved, dynamic economic performance is sacrificed.

It might be noted that extensive privatisation of public utilities which has been undertaken in many countries in recent years and associated schemes to increase contestability have had the aim both of increasing productive efficiency (reducing productive inefficiency) and lowering monopoly power and the prices of the commodities supplied.

4.4. The 'Structure-Conduct-Performance' paradigm

It is often argued that competition policy is based upon the SCP paradigm introduced by Mason (1939) and Bain (1956). However, it appears that in actual competition policy, the attention is mainly focused on the market structure and on concentration. Basically, conduct and performance are much more difficult to assess.

Conduct may change very often over time. It is also difficult to determine when some conduct leads to an 'agreement', e.g. is oligopolistic interdependence a form of agreement? Some illegal conduct such as price collusion are directly linked to the market structure. Thus

the more efficient policy in order to avoid price collusion is to promote competition. Indeed, collusion is much more difficult to conclude as the number of firms in the market increases.

The cost incurred in order to monitor firms' performance is very high. Moreover, performance measures such as price/cost margins are inevitably limited by the quality of the data on market structure.

Given the previous problems associated with assessment based on conduct and/or performance, competition policy is built on a structuralist approach. Hence, high market shares are used as proxies for monopoly power.

However, departures from the perfect competition model are normal, indeed inevitable even in 'competitive industries'. For instance, Launhardt (1885) questioned the validity of the price -taking assumption by observing that firms dispersed over space have some market power over the customers situated in their vicinity, thus allowing them to manipulate their prices to their own advantage. Behind this question appears the problem of accurately delineating the market's boundaries. Of course these boundaries are defined w.r.t. a spatial dimension but may also be defined w.r.t. the existence of close substitutes of the product. By considering the fact that the market's boundaries are changing over time through the introduction of substitutes, Clark (1940) has defined criteria dealing with 'workable competition'. Of course, these new products are the outcome of innovation but, innovation being associated with a dynamic process, it implies that the market's boundaries and then the market structure is continuously changing whereas competition policy is based on a structuralist approach which is definitively a static approach.

5. The Other Approaches to Competition Policy

Firstly, there are other approaches to competition policy since competition for markets is affected not only by price but by various forms of non-price competition. These include quality, delivery dates, guarantees, reliability, availability of credit, and after-sales service.
Secondly and more important, there are different views of fundamental concepts such as competition and efficiency and therefore this leads to different approaches to competition policy.

5.1 The Chicago School

The Chicago School has had various phases with quite different characteristics. Concerning competition policy, we may consider three phases.

In the first or pre-1950 Chicago School, it was considered by many scholars[14] such as Knight (1921) and Simons (1948) that the economy is a very complex and unstable thing. Therefore, interventionism was considered as being dangerous since programs of Government interventions are not able to take into account the complexities of a market economy. Thus, *laissez-faire* is recommended not because it works but rather because it holds individual freedom as an absolute good an the alternative may be much worse.

The second Chicago School (1950-1970) led by Stigler strengthened the conclusion of the former school. Economists of this second school were major proponents of the antitrust doctrine. They advocated robust antitrust enforcement, including steps to deconcentrate industry. They were champions of free markets and supported a structuralist approach to competition policy. They promoted antitrust and competition as preferable to government regulation, planning or ownership.

The third Chicago School (1970s-today) is quite different from the two previous one. The concept of competition is re-defined and therefore new competition policy recommendations emerge. Indeed, as pointed out by Bork (1978, p 61), the identification of competition with rivalry in antitrust analysis has led to the wholly erroneous conclusion that the elimination of rivalry must always be illegal.

Since the 1970s, Chicago School economists have challenged the SCP paradigm and have criticized the aggressive enforcement of antitrust laws. For instance, in the early 1970s, it appeared that U.S. firms were losing ground in international markets and surrending market share at home. According to some members of the Chicago School, this was due to the extreme level of activism in antitrust laws from the 1940s to the early 1970s. They claim that some conduct such as vertical restraints, considered as illegal, were in fact benign or pro-competitive. Thus, they considered that a higher degree of competition in the domestic market had had perverse effects for U.S. firms on the international markets.

[14] It should be noted that some other members of the first Chicago school welcomed active government policies (see Viner's recommendations on « reinflating » the economy).

In fact, these scholars invert the SCP paradigm. They argue that the structure of an industry is ultimately determined by the performance of firms. They are proponents of the "efficiency defense". In other words, they consider that dominance in an industry is not harmful *per se*. Indeed, it is almost always the result of superior efficiency.

Since the early 1980s this school has influenced competition policy in the United States. For instance, the Antitrust Division of the Department of Justice revised the *Merger Guidelines* after that some authors such as Bork (1978) and Posner (1976) have argued that situations such as vertical mergers often generate important efficiencies and can present no competition problem. Efficiency is now taken into account by courts and has also been introduced in official statements.[15]

5.2 The Austrian school

In the Austrian approach, there is a common interest in process rather than in static analysis. While Walrasians are analysing the properties of anonymous equilibrium positions, Austrian economists consider the time-consuming, disorganised competitive "market process" driven by specific actors in desiquilibrium. Even if they recognise the market as a process, Austrian economists have very different position in relation to competition. We deal first with Hayek and then with Schumpeter.

For Hayek (1948), market competition is believed to economize on information required for economic coordination. In other words, in perfectly competitive markets, prices summarize most of the information agents need to make their production or consumption decisions efficiently. Thus, from this information perspective, perfect competition dominates all other forms of competition and other means of economic coordination.

Therefore, Hayek and other members of the Austrian school have stressed the informative and coordinating value of market systems as a source of their efficiency. However, this aspect can easily be exaggerated since in perfectly competitive systems producers are already assumed to be perfectly informed about production possibilities (technical possibilities) and

[15] See the current *Merger Guidelines* (1984) and also the Federal Trade Commission decision (1983) concerning General Motors and Toyota common branch.

the qualities and productivities of their factors of production. Similarly, consumers are assumed to know perfectly the characteristics of the products available to them while most markets (such as the "lemons" market) are characterised by market failures due to asymmetry of information. Furthermore, Hayek's theory has been criticised on additional points. Indeed, Hayek fails to address many issues involving economy-wide competitive process. These include for instance externalities and increasing returns to scale. In addition to this, Hayek and the neoclassical economists assume that use of markets *per se* is costless, that is market transaction costs are absent.

The work of Coase and Williamson has made it abundantly clear that market transaction costs are important, and Williamson in particular has stressed the significance of asymmetry of information for economic activity including productive efficiency. From Williamson's work, it can be concluded that hierarchical or command-type systems of resource allocation are more efficient than market systems in some domains. Thus, in economic systems as a whole a mixture of command/non-market and market methods is likely to constitute the most efficient available matrix for production and economic activity.

Considerable evidence exists that in several important circumstances economic efficiency can be increased by public or collective provision of information and regulations about the bearing of risk and uncertainty arising from possible deficiencies in information. For example, collective provision of technical and managerial information in industries consisting of many small firms may be justified on economic efficiency grounds. Without such provision they may be ill-informed and technically less efficient. In a dynamic setting, actual markets do not operate efficiently in this regard. Also due to ignorance on the part of market participants, it has been necessary to enact protective legislation, for example concerning protection of consumers against false or misleading advertising or against the risks and uncertainties associated with new products the characteristics some of which may not be fully known by anyone. In these circumstances, it is clear that while markets have informative value in a dynamic world this informative value is significantly limited.

In fact Hayek's approach is closer to the type of closed systems familiar in neoclassical economics. He considers that the general equilibrium can be approached in a system involving decentralised information. For this reason he favours small firms. Therefore and as pointed out by Machlup (1976, p 38), Hayek really comes close to having the same view as

Stigler, namely a libertarian structuralist point of view. In other words, Hayek's main purpose is not wanting firms with much market power. The necessary and sufficient conditions for the existence of the competitive process is only a secure private property rights.

This view is very different from Schumpeter's one. Indeed, Schumpeter emphasized on fundamental uncertainties arising from the continual introduction of new products and techniques whereas Hayek did not. Therefore, Schumpeter's view there may be different natural outcome of the competitive process, including monopoly, non-legal barriers to entry, costs which impede the ease of entry into an industry. When for instance firms differentiate their products, this is not considered to be monopolistic but it is simply viewed as the result of consumers' preferences. So, Schumpeter's view is close to the evolutionary Darwinian-type theory to which are refereing the economists of the latest Chicago School.

5.3 Competition policy in atypical industries

Even in the structuralist approach, some sectors or activities are considered as specific, that is to say there are cases where the usual competition policy rules do not applied.

For instance, R&D programs shared by several firms are not considered as non-competitive. Indeed it is well known that when R&D expenditures are commonly incurred, then risks and costs are reduced, spillovers and externalities are enhanced. The particular status of R&D is recognized in the US[16] as well as in the EC[17].

Recently, Schmalensee (2000)[18] defined the software industry as a Schumpeterian industry. He showed that in such industries, the traditional tests and tools of antitrust policy are not well designed. An industry is Schumpeterian when it is not driven by price competition but by competition from the new commodity, the new technology. Three features identify such industries. Firstly, marginal costs are low and quality is critical. Secondly, systems and networks effects are obvious. Thirdly, technological change occurs rapidly. These three features imply that competition policy must be adapted. Indeed, firms seem to have a high degree of market power since price-cost margins are large and network effects are important. However, leadership positions in these industries are fragile because market shares depends

[16] See the National Cooperative Research Act, 1984, revised 1993.
[17] See the rule 418/85, based on section 85(3) of the Treaty of Rome.
[18] This comes partly from his testimony in United States versus Microsoft Corporation, Civil Actions.

almost entirely on intellectual property. It is obvious that traditional tests for monopoly power do not measure this sort of fragility. Moreover, market definition is problematic since products tend to add features over time.[19] Finally, in these industries, the rule "winner takes most" applies, and so predatory acts are not harmful because any strategy that does not exclude competitors will not result in survival.

6. Concluding Observations

In most countries, competition policy is based on the structuralist approach. So, this policy considers perfect competition as the main objective and so checks on the market by considering the number of firms, their market shares, the degree of concentration. This policy also takes into account the fact that some concentrated markets, do not need to be deregulated if these markets are contestable.

However, there may be a dilemma if we consider Schumpeter's and the evolutionary theorists points of view. Indeed, on the one hand without competition policy, the market structure may become highly concentrated, this being reinforced by the implementation of entry barriers. One consequence of this high degree of concentration is a decrease of diversity (e.g. diversity of products, process as well as behaviour). Thus, with lower diversity, the diffusion as well as the introduction of technical progress may be slowed.

On the other hand, if competition policy is strict, firm's profits are decreasing and are tending to zero. Without sufficiently large profits, firms are unwilling to invest in R&D and undertake innovation which are intrinsically risky and uncertain activities. Indeed, a positive profit margin is often needed to finance R&D expenses and undertake the gamble involved in innovation.

Furthermore, given that markets for much intellectual knowledge either are missing or incomplete, monopolistic elements prevent the initial profits of a successful innovator from being rapidly eroded and creating a loss. The importance of such factors are widely recognized in relation to the existence of multinational companies.

[19] For instance, in software industry, some products are merging.

So, short-term efficiency and long-term optimality are not consistent. An intermediate level of concentration seems to be most appropriate. In other words, the 'optimal competition policy' needs to be based on a mixture of short run and long run considerations.

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