Unclassified **CCNM/GF/COMP/WD(2002)19**

Organisation de Coopération et de Développement Economiques
Organisation for Economic Co-operation and Development **07-Feb-2002**

English text only

CENTRE FOR CO-OPERATION WITH NON-MEMBERS
DIRECTORATE FOR FINANCIAL, FISCAL AND ENTERPRISE AFFAIRS

CCNM/GF/COMP/WD(2002)19
Unclassified

OECD Global Forum on Competition

CONTRIBUTION FROM MEXICO

-- Session I --

This note is submitted by Mexico as a background material for the Session I of the second meeting of the Global Forum on Competition, to be held on 14-15 February 2002.

JT00120506

English text only

COMPETITION, COMPETITION POLICY AND ECONOMIC DEVELOPMENT: SOME THOUGHTS ABOUT THEIR RELATIONS AND THE IMPLICATIONS FOR COMPETITION POLICY IN DEVELOPING COUNTRIES

Introduction

There is a growing consensus that under a wide variety of circumstances competition, both actual and potential, has beneficial effects on social welfare and on various indicators of economic development such as consumer prices, technical efficiency of firms, economic growth, income distribution and last but not least technological innovation. The central hypothesis is that competition, as the moving force, promotes economic development by encouraging businesses to enhance their efficiency, which in turn leads to greater productivity, reduces costs and prices to the consumers and improves the competitiveness of firms and industries. There seems to be a sound theoretical basis to assume the existence of such a positive influence, which is amply confirmed in the literature on the subject. From an empirical perspective there is also a vast literature on the causal relationship between competition, on one hand, and a variety of indicators of economic development, on the other. However, there the picture is less clear. Different studies arrive at widely differing conclusions, if not about the sign, then at least about the magnitude of the supposed influences.

If competition encourages economic development, then competition policy, to the extent that it promotes competition, must have effects upon economic development similar to those of competition itself. However, here the empirical evidence is much weaker yet. This is not surprising and can be attributed to various factors. In the first place, competition policy is not the only policy that seeks to enhance competition in markets. There is also trade and foreign-investment liberalization, regulatory reform and privatization, all of them having an important impact upon competition and not always in the same direction as competition policy. Often it is far from easy to separate one factor from others. In the second place, many of the competition regimes in vigor today were only installed during the last decade of the twentieth century so that an evaluation of their effects, particularly through cross-country studies, may be somewhat premature. In contrast, most trade liberalizations are longer lived and although the assessment of their effects is also inconclusive, there is much more empirical work done on that subject. Last but not least, there are hardly any appropriate quantitative parameters available to measure the strength of competition policy in a country. Where trade liberalization can be measured by average tariff levels, coverage of different types of quantitative import restrictions and the like, measures of the efforts of a competition regime hardly go beyond simple proxies such as a dummy for the presence or absence of a competition authority, the number of years the competition regime has been in force, the ratio of the budget of the competition authority to GDP, etc.. Obviously, this strongly limits the scope for an empirical assessment of the effects of competition policy.

The purpose of this document is twofold. First it is to share some thoughts about the theoretical underpinning of the relation about competition policy, competition and development. It is argued that in a static approach competition contributes to once-and-for-all gains in social welfare but that it is only in a dynamic perspective that competition can be expected to contribute to a permanently higher economic growth. However, dynamic competition is fundamentally different from competition in a static setting. In fact, as argued by various authors, to promote and protect dynamic competition a number of criteria used in traditional competition law enforcement need to be revised completely. Moreover, under the winner-takes-all features of dynamic competition in innovation markets and network industries there is little room for the sort of “gradual unfolding” that is supposed implicit in the word “development”. This is particularly

worrisome to developing countries that may be interested in a more stable kind of development and that are wary of the shockwise redistributions of gains, which often occur as a result of dynamic competition.

The second purpose is to report about some recent empirical studies addressing the causal relationship between competition, and more particularly competition policy, on one hand, and economic performance, on the other. With empirical studies we mean systematic econometric efforts to trace some aspects of the relationships mentioned, which go beyond anecdotal evidence about the positive influence that competition or competition policy may have had in some country, in some sector, on some variables representing economic development. Our selection is not at all exhaustive. Just a few examples are given. For a more comprehensive survey of empirical work on the subject matter, see Sanghoon Ahn (2002)[1].

The organization of the document is as follows. In the second section we deal with the relation between competition and various aspects of economic development from a theoretical point of view. For that purpose a distinction is made between static and dynamic competition. The third section is about competition policies. The raison-d'être of competition policies is discussed and the importance to distinguish between competition and competition policy is underscored. Then, the interactions with other policies influencing competition are briefly touched upon. In the fourth section we discuss one of the main obstacles to empirical studies in this field, which is basically measurement problems. How to measure the intensity of competition? How to measure the strength of competition policy? etc. In the fifth section we summarize the results of some recent empirical studies in the field: a cross-country study about the influence of competition on price in telephony services, an analysis of the efficiency enhancing role of competition in manufacturing industries in the UK, a study about the effects of competition on the incentives to innovate whose results run counter the Schumpeterian paradigm that to innovate one must be large, and finally a cross-country study about determinants of economic growth among which competition policy is one of them. Section 6 is about the role competition and competition policies can play in developing internationally competitive industries. The section is based on Michael Porter's book "The Competitive Advantage of Nations".[2] In the final section a summary of the main findings is given and some conclusions are drawn.

Competition and Economic Development: The Theory

By competition we mean the process of rivalry among firms and we call market structures competitive if they are conducive to such rivalry. Competition is characterized by agents who, following their own interests of profit maximization, try to obtain preferential positions in the markets in which they operate (or in which they seek to operate) by the use of competitive parameters such as price, quality, quantity, service, product innovation, etc.. We make a distinction between static and dynamic competition. Static competition is typical for stable mature markets; dynamic competition for markets subject to rapid technological change and product innovation. The instruments of static competition are price, quality, quantity, service etc.; the instruments of dynamic competition are basically technological and product innovation. Both types of competition allow markets to reward good and punish bad performance, thus providing businesses the proper incentives to employ their specific capabilities and information advantages to the benefit of the society as a whole.

Economic development is usually conceived as a process of economic progress in which the inherent potentials of the country under consideration are gradually unfold. Economic development has also a wide variety of dimensions. The ultimate goal is usually considered to be high economic growth

[1] Sanghoon Ahn (2002), "Competition, Innovation and Productivity Growth: A Review of Theory and Evidence", OECD, Economics Department, Working Paper 317, ECO/WKP(2002)3.

[2] Michael Porter (1998), *The Competitive Advantage of Nations*. Free Press.

together with a reasonable distribution of income and wealth among people in the society. Intermediate goals are such diverse parameters as the level of prices to the consumers, technical efficiency of firms, employment, technological innovation, each of them presumably conducive to economic growth and income redistribution. As a rule economic development is considered as a gradual and continuous process, but in reality progress is often shockwise and irregular.

A Static Perspective

It is generally accepted that under some not all too realistic assumptions - decreasing returns to scale at the supply side, absence of externalities at the demand side and complete information to all market agents - competition in a static market improves social welfare by bringing the market price closer to marginal cost of production. Under less than perfect competition price deviates from marginal costs resulting in allocative and productive inefficiencies. Allocative inefficiency implies missed opportunities to match sellers and buyers in welfare enhancing transactions, resulting in a deadweight loss. Productive inefficiency implies that it is not the lowest-cost producers that serve the market, among others.

What has this to do with economic development? It is easy to see that in the traditional partial equilibrium approach perfect competition, as compared to monopoly or oligopoly, leads to higher real output and lower prices, thus also to a higher domestic product. Moreover, as long as it is supposed that price-cost markups go to equity holders, competition also redistributes income in favor of production factors.

However, in such a setting increased competition leads to a once-and-for-all gain in economic output, not to a permanent increase in economic growth. Moreover, estimates of the magnitude of the deadweight losses from imperfect competition, though heavily dependent on the assumptions made, suggest that they are not very significant. For example, Harberger (1954) found with some heroic assumptions about price elasticities and price-cost margins deadweight losses of the order of magnitude of one tenth of a percent of GNP for the US.[3] Other authors come to much higher estimates, but their assumptions are even more heroic and still one has to do with a once-and-for-all gain, not with a lasting increase in growth.[4]

In the same static model competition also enhances productive efficiency, which implies that output is produced by the lowest-cost firms. There, it is implicitly assumed that the cost functions of the firms are the result of a cost-minimization process within the firm, which implies an optimal mix of factors and technical efficiency. In principle, even in the absence of competition firms have incentives to minimize their own costs but under tough competition cost minimization within the firm is often a matter of survival whereas it is more a matter of gaining a bit more or a bit less when competition is weak. Moreover, as under imperfect competition suppliers face a finitely-elastic residual-demand curve they can pass on part of the costs of inefficiency to the consumers, which they can not under perfect competition. Thus, the more competition the stronger the incentives to reach efficiency. Therefore, it is generally believed that fierce competition also enhances technical efficiency within firms.

When the conditions for the proper working of competition are not met in the static model, allocative and productive efficiency may be disturbed, or there may be conflicts between allocative and productive efficiency. The most common example is the existence of increasing returns to scale which

[3] See Arnold Harberger (1954), "Monopoly and Resource Allocation", *American Economic Review*, Vol.44, pp. 77-87.

[4] For a summary of such studies see Paul Ferguson (1988), *Industrial Economics: Issues and Perspectives*, MacMillan, London.

make markets tippy. I.e. the most efficient way to serve the market is through a single firm that forms a natural monopoly. Starting from a situation where several firms, all with decreasing returns to scale, serve the market the natural evolution is towards a situation in which only one of them survives, i.e. there is a tendency for competition to destroy itself. In equilibrium the survivor needs not even be the lowest-cost producer. First-mover advantages may sometimes favor less efficient firms and even if the most efficient firm happens to be the winner, there is a conflict between productive efficiency and allocative efficiency. Productive efficiency calls for a single firm serving the market but allocative efficiency is only reached under competition among many firms. This is the classical argument for price regulation of natural monopolies.[5]

A similar situation occurs when there are positive externalities at the demand side. Such positive externalities are found typically in network industries but are not exclusive to such industries. Positive externalities mean that additional subscribers to the network make it more attractive to existing subscribers to belong to the network. This may cause a snowball effect in demand and the suppliers of competing networks that are mutually incompatible will do everything possible to get their ball rolling. At the end of the road there will only be room for one single supplier which is selected in a winner-takes-all race much like in the case of increasing returns to scale at the supply side. Once again, in such a race first-mover advantages count and there is no guarantee that the winning network is the best or that the winning supplier has the lowest costs. Moreover, the predictive power of static games of this sort is usually limited due to the existence of multiple equilibria.[6]

A Dynamic Setting

Although the above given examples can perfectly be treated in the static setting of one-stage partial-equilibrium games they carry many dynamic elements. Moreover, in assessing the positive influences of competition upon economic development we are more interested in longstanding benefits from competition for growth than in the once-and-for-all gains considered in the static models. Therefore, we turn now to the dynamic picture. First we treat the phenomenon of firm dynamics and creative destruction. Then, we consider dynamic competition in R&D markets for product innovation.

Firm Dynamics and Creative Destruction

In a dynamic setting competition is no longer a one-shot variable; it is a process. As mentioned before, this process of competition rewards good and punishes bad performance by firms. Rewards and punishments come in the form of higher or lower profits but also in the form of market shares. I.e. efficient firms increase their market share, while inefficient firms shrink and eventually exit. Likewise, new firms enter the market and if they are sufficiently efficient they gain a position in it. This gives rise to what is called firm dynamics which implies continuously changing market structures with firms leaving the market and others entering, limited life expectancy for firms, etc.

In a scenario of technological progress competition gives rise to a process of what Schumpeter called “creative destruction”.[7] Prospective firms lucky enough to adopt the correct new technologies are

---

5 See Kip Viscusi, John Vernon and Joseph Harrington Jr., *Economics of Regulation and Antitrust*, The MIT Press, Cambridge, Massachusetts, 3rd edition, Chapter 10, p. 314.

6 There may be as many equilibria as there are participants in the race, each of them corresponding to a specific winner.

7 See J.A. Schumpeter (1934), *The Theory of Economic Development*, Harvard University Press, Cambridge.

selected by the process. Firms that do not move, or happen to choose the wrong technologies, are reproved. The process is also comparable with a Darwinian process of natural selection in which only the most efficient firms survive for as long as it lasts. In this way industries subject to competition undergo a continuous upgrading to the benefit of the surviving firms and the consumers, enhancing the international competitiveness of the industries involved.

Firm dynamics and creative destruction introduce a new dimension in the relation between competition and development. In the static approach an increase in competition would typically give rise to a once-and-for-all gain in social welfare. In the dynamic approach considered here competition leads to a continuous process of efficiency improvement which in turn may lead to permanently higher economic growth rates.

It is important to notice that creative destruction is not limited to a process among firms. It may also happen within firms among different product lines. Successful products continue and are expanded; unsuccessfull product lines are abandoned. In this way firms renew themselves and remain competitive. Such creative destruction within firms is usually less painful than creative destruction among firms as long as workers can easily be relocated from one product line to another. At the other extreme, creative destruction may take place among industries as a whole, i.e. all firms in one industry exiting and new firms coming up in other industries. With an open trade regime and comparative advantages moving against specific industries in the country under consideration competition from abroad may cause those industries to substantially contract or completely disappear in the process. In such cases creative destruction may be extremely painful as it may cause many people to lose their jobs.

Particularly the latter type of situations use to be controversial and may put competition authorities in a position conflicting with the objectives of other policies aimed at preserving national industries and protecting employment. The position of competition authorities would typically be to consider the resulting unemployment transitory and to “let it happen” for the sake of the long-term goals of creative destruction. Those concerned with protecting national industries and employment would typically counterargue that it is the adverse circumstances that are transitory and defend temporary protective measures for the industries involved. All too often such “temporary” measures turn out to become permanent in order to keep agonizing industries alive on the shoulder of the taxpayer or the consumer.

In many such cases competition authorities are not directly involved, especially when the instruments employed to protect the industries (antidumping duties, outright subsidies etc.) are not within the reach of their competence. In such cases their role is limited to one of advocacy. However, it also frequently happens that national firms, with the support of public officials pursuing other objectives, try to merge or conspire to collude to the detriment of domestic consumers in an attempt to keep an agonizing industry afloat. This is definitely one of the most controversial situations in which competition authorities in both developing and developed countries may find themselves entrenched.

Dynamic Competition

Firm dynamics indicators are sometimes used as a measure for competition[8]. I.e. in a market in which shares continuously change, failing firms exit and new firms enter, competition is considered intense, whereas in markets with stable shares and low firm mortality competition is considered weak. It should be realized, however, that firm dynamics not only depends on competition but also on technological change and changes in consumer preferences. In mature markets where technological change has come to a

[8] See, for example, Sanghoon Ahn (2002), op.cit.

level of saturation and consumer preferences are well established fierce competition can go hand in hand with relatively stable market shares and low mortality rates of firms.

Perhaps the best way to express the link between competition and firm dynamics is to make a distinction between static and dynamic competition. Static competition is through price, product quality and quantity, service, etc. and is measured through traditional variables such as concentration indices and price-cost markups. Dynamic competition, on the other hand, is not correctly measured by concentration ratios or price-cost margins. On the contrary, as argued below, intense dynamic competition is often characterized by transitory but extremely high concentration indices and price-cost markups. This makes traditional measures of competition inadequate. Firm dynamics indicators seem to be more appropriate to measure dynamic competition.

Dynamic competition is often described as competition for the market not in the market. Companies compete with each other not by setting low prices for their existing products but by developing new products expecting to enjoy a monopoly position for some time once the new product is successfully patented. Often such products have a limited life cycle and are overtaken after a while by other superior products developed by competitors or by the firm itself attempting to keep competitors at a distance by improving its own product. It is creative destruction at the product level.

In such a scenario temporary reaping of monopoly rents is a necessary condition to make R&D attractive. Thus, high price-cost markups and concentration indices, rather than a being a symptom of a lack of competition, are normal consequences of dynamic competition in R&D markets and fighting such abuse of temporary dominance, even though it might lead to a once-and-for-all gain in social welfare in the short run, in the long run it might kill dynamic competition. There is a tradeoff between static and dynamic competition. Therefore, the traditional tools used by competition authorities to evaluate anticompetitive behaviour and mergers in relatively stable markets may be inadequate for assessing such conduct in markets where technology and product characteristics change rapidly, such as communication and information technology, software industries, pharmaceuticals, among others.[9]

One other feature that makes the traditional criteria of competition law enforcement inadequate for application in antitrust cases in high technology markets is the fact that there are usually strong increasing returns to scale. Particularly for high R&D intensive products, to make the first unit is extremely costly and costs are mainly sunk, whereas adding additional units is virtually costless[10]. This makes traditional criteria for the assessment of predatory pricing inoperable because any price is above marginal costs. Moreover, imposing short-run profit-maximization obligations upon firms all along the product cycle, as predatory pricing criteria do, could be disastrous for the firms involved. Their first objective is winning the race by expanding sales volumes sacrificing immediate profits; reaping the fruits is handled in the next stage.

The situation is further complicated when there are positive network externalities. In the presence of such externalities the supplier of a network incompatible with competing networks needs a critical mass of sales (or subscriptions) for his own network to "fly". Therefore, in an introduction phase he would be willing to sell at very low prices, or even giving the services for free in order to build such a critical mass. Such conduct could be perfectly welfare enhancing although it might clash with traditional antitrust standards for predatory pricing. Prohibiting network providers to apply such introductory pricing

---

[9] See David Evans and Richard Schmalensee (2001), "Some Economic Aspects of Antitrust Analysis in Dynamically Competitive Industries", NBER, Working Paper 8268, www.nbr.org/papers/w8268.

[10] See for example David Evans et al., op.cit. or Carl Shapiro and Hal Varian (1999), *Information Rules: A Strategic Guide to the Network Economy*, Harvard Business School Press, Boston, Massachusetts.

schemes may even impede the very emergence of the network because of the possibility that without introductory pricing the necessary critical mass would never be reached.

For the above-mentioned reasons, antitrust intervention in predatory conduct in high-technology markets, where variable costs use to be very low and where demand is subject to positive feedback externalities should be considered with skepticism. Similar concerns apply to tying and bundling practices. In fact, trying to establish a statically competitive market structure (many firms supplying one homogeneous or several competing differentiated products) in essentially dynamically competitive markets may do more harm than good. The case against antitrust intervention in such conduct becomes even stronger when one considers the information disadvantages of antitrust authorities vis-à-vis the real market participants (the producers and the consumers)[11].

Competition Policy and Economic Development

Raison-d'Être of Competition Policies

The purpose of competition policies is to protect and promote competition, but ever since the enactment of the first antitrust statutes at the end of the 19th century academics, politicians and business people have wondered why such protection or promotion is necessary. As explained in the previous section one of the circumstances in which, as a general rule, competition does not lead to optimal social welfare is that of natural monopoly. However, it is widely acknowledged that in such circumstances it is not competition policies but regulation that should bring the solution. The theory of market contestability goes one step further by suggesting that even if an industry is characterized by infinite economies of scale, the price behavior of the natural monopolist in such an industry would be disciplined by potential entry of competitors. However, this is an argument to deregulate not to introduce competition policies.[12]

In the presence of positive externalities at the demand side and in markets subject to rapid technological change or product innovation the arguments are much the same. It is recognized that in such markets (static) competition does not lead to optimal social welfare in a dynamic sense but such deviations from the competitive market model cannot be dealt with by means of competition policies. To the contrary, they rather make a case for abstaining from antitrust intervention.[13]

In his book "Whither Socialism?" Josepth Stiglitz argues strongly in favor of competition policy as an instrument to avoid or at least reduce welfare losses resulting from a lack of competition[14]. His arguments are threefold. In the first place, he criticizes the theory of contestable markets by underscoring the importance of entry barriers that make the threat of potential entry incredible. In the second place, according to Stiglitz in virtually all markets competition is less than perfect, giving rise to downward-sloping demand curves for individual competitors. Thus, all market players have some market power. In the third place, he argues that welfare losses from reduced competition can be much larger than what Harberger(1954) suggested, due to rentseeking behavior by monopolists or oligopolists.

Stiglitz distinguishes between two types of entry barriers: sunk costs and strategic barriers to entry. As regards sunk costs his argument is that the decision of potential entrants whether or not to enter is not just guided by the existence of profits in the market today. They rather anticipate the reaction of the

---

11 See David Evans et al. (2001), op.cit.

12 See Joseph E. Stiglitz (1996), *Whither Socialism?*, The MIT Press, Cambridge Massachusetts.

13 See David Evans et al. (2001), op.cit.

14 See Joseph Stiglitz (1996), op.cit., Chapter 7.

incumbent to their entry and because the costs of the incumbent are already sunk the latter would be ready to cut price down to variable cost to fight entry. Thus in the absence of variable cost advantages for the entrants there would be no hope for them to recover any sunk costs so that they never enter. In other words, if entrants have no other advantages over the incumbent, no matter how small the sunk costs are, they are always sufficient to deter all entry. The difference is that the costs of the incumbent are already sunk whereas the costs of the entrant at the moment they decide are not.

An incumbent can even go further and cut price below variable cost upon the entry of a competitor and he will do so if he expects to drive the competitor out and recoup his losses in the future. Such strategic entry barriers are always present and lead monopoly power, once established, to persist.

Moreover, Stiglitz argues that perfect competition does not exist in reality and that markets are much more segmented than what is generally believed. Individual market players perceive downward-sloping demand curves and base their pricing behavior on that feature. Incomplete information segments markets in the same way as transportation costs do and only small search costs for the consumers may cause potentially competing sellers to raise their prices all the way up to monopoly levels.

Finally, the welfare losses resulting from above-marginal-cost pricing are not limited to the deadweight-loss triangles estimated by Harberger but may include the full rectangle of income transfer from consumers to producers due to rent seeking behavior, i.e. monopolist and oligopolist are ready to waste scarce resources up to the amount of the rectangle in order to get the transfer.[15]

Altogether, according to Stiglitz it is far too optimistic to rely on the contestability of markets for disciplining the price behavior of the market players. Monopoly power, or just market power, is persistent and ubiquitous and the welfare losses derived from it are substantial. Therefore, competition policy is necessary.

The Controversial Character of Competition Policies

In most of the literature about competition and economic development no explicit distinction is made between competition and competition policy. It is generally assumed that if competition is good for economic development, the same applies to competition policy. However, it should be realized that enacting a competition law and creating a competition authority to enforce it is not a guarantee that competition will indeed be enhanced. One law is more appropriate than another, one agency may be more effective in its efforts than others and there is always the danger of a perverse application by the authority. At least in the long antitrust history of the US there are plenty examples in which the antitrust laws were interpreted in ways that were later proved to be inadequate and to have done more harm than good to competition.

Moreover, as argued in the foreging section, the competition that competition policies seek to strengthen is not just a one-dimensional phenomenon. Competition today is different from competition tomorrow and promoting competition today may go to the detriment of competition tomorrow and vice versa.[16] Likewise, there is static competition and dynamic competition and there are tradeoffs between the two. Thus, enforcing competition law is not at all straightforward. Competition laws are no unique

[15] See for instance Jean Tirole (2000), *The Theory of Industrial Organization*, The MIT Press, Cambridge Massachusetts, 11th printing, p.76.

[16] Predatory pricing is the typical phenomenon where competition today is weighed against competition in the future.

blueprints for the actions that should be taken; choices must be made, decisions are frequently controversial and the devil is often in the details.

From the foregoing one might be tempted to conclude that experienced competition authorities would be more effective in promoting competition than competition agencies with a short lived experience and that it would be particularly hard for developing countries to install a competition regime that effectively promotes competition in their economies. Although true to a certain extent, one should not forget that it is mainly the experienced competition enforcement agencies in the developed countries, particularly those of the US and the EU, that face the most difficult challenges in high-technology industries. Some examples are the Microsoft case and the GE-Honeywell merger.

In view of the controversial character of competition law enforcement it is sometimes recommended that newly installed competition regimes in developing countries should confine their enforcement activity to merger control and to comparatively clear cases of horizontal agreements on prices, output and market division, and that they should abstain from more complicated cases involving vertical restrictions, predatory pricing, tying and bundling and other (ab)use of dominance. At the same time it is suggested that they dedicate more resources to competition advocacy directed at removing entry barriers, at deregulation where possible and where this is not possible at making regulatory regimes more competition-friendly. Such recommendations should be taken seriously in order to avoid the danger that competition law enforcement would result in less rather than more competition.[17]

Interaction with Other Policies

In this subsection we treat interactions and complementarities of competition policy with other policies. The policies considered are: (i) trade policies, (ii) foreign investment, (iii) privatization and regulatory reform and (iv) intellectual property protection. Finally, we mention some interactions between competition policy and institutional change.

Trade Policies

It has been recognized in various forums and by various authors that international trade and competition policies can complement and buttress each other in promoting trade, market access, global economic efficiency, consumer welfare, and economic development.[18] Exposure to international markets plays a central role as imports directly impose international competitive pressures upon domestic markets. This pressure is also introduced indirectly, through exports, since domestic firms have to compete in the global marketplace.

Furthermore, it is argued that international trade is particularly useful in promoting competitive markets in developing countries, where there are information difficulties, inadequate contract enforcement, and human capital constraints.[19] According to this argument these circumstances could imply that it would

---

[17] See The World Bank (2001), *World Development Report 2002: Building Institutions for Markets*, Chap. 7, Competition.

[18] For instance, see The World Bank (2001), op.cit., World Trade Organization (1998), Working Group on the Interaction between Trade and Competition Policy, *Synthesis Paper on the Relationship of Trade and Competition to Development and Economic Growth*, WT/WGTCP/W/80 and Shyam Khemani (1997), "Competition Policy and Economic Development", *Policy Options*, October 1997, pp. 23-27.

[19] The World Bank (2001), *op.cit.*

be easier to use an instrument to promote competition that depends strictly on rules, such as international trade, compared with an instrument like competition law, which requires investigations and adjudication.

At the same time international trade can create pressures for the governments of these countries to address institutional barriers to competition in the domestic product and factor markets because these barriers undermine the domestic economy's ability to respond to foreign competition.

It is sometimes argued that trade and investment liberalization can be a substitute for competition policy, and that in economies where high levels of industry concentration prevail, anticompetitive business practices would be less feasible if domestic markets were exposed to international competition. It is considered that in the absence of barriers to trade domestic monopolists or oligopolists could lose their ability to exercise market power irrespective of actual import penetration in view of the threat of potential competition.

Nevertheless, it has been widely recognized that trade liberalization alone is not enough to guarantee competition in all circumstances. The reasons for this include the following factors:

- A large number of markets (e.g. non-tradeables or tradeables with high transportation costs) remain local in nature, and are, therefore, not subject to effective discipline from imports. So the benefits of trade liberalization in goods are often limited by the lack of competition in services.[20] This is particularly true for those services that are basic inputs or components of the economic infrastructure, including financial services, telecommunications, transport, and business services. Additionally, the share of services in production and employment in both industrial and developing countries is increasing. Many of the fastest-growing sectors are services –telecommunications, finance.

- Even with regard to tradeable goods, for which formal trade barriers have been removed, competition can be affected by several governmental or other measures including regulations, standards and licensing requirements. For example, there are troubling signs that progress in trade liberalization in developing countries is being rolled back through the increasing use of antidumping measures. In fact, as import tariffs are liberalized, the pressure to invoke countermeasures increases.

- Even in the absence of the type of measures mentioned, the ability of imports to discipline the exercise of market power can be limited by a wide range of anti-competitive practices of firms, particularly those of transnational companies.

- The procompetitive effects of tariff reductions may be diluted if import supply is not very responsive. Moreover, in an environment of floating exchange rates, if domestic firms fail to rationalise high-cost operations and improve productivity, the domestic currency is likely to depreciate, offering new protection from import competition.

Additionally, competition policy allows to address anticompetitive practices of enterprises participating in international trade. There are three broad categories of practices having such effects: (i)

[20] It is argued that the WTO's General Agreement on Trade in Services (GATS) has not produced significant liberalization. Current levels of protection in services are as high as, if not higher than those applied to goods 10 or 15 years ago. In many instances the available information on the level of protection suggests that ad-valorem tariff equivalents range from 50 to 100 percent. In general, barriers in transport, financial and telecom services are higher than in business and distribution services. Barriers are higher in developing countries than in industrial countries. See The World Bank (2001), op.cit.

practices affecting market access for imports; ii) practices affecting international markets, where different countries are affected in largely the same way; and iii) practices having a differential impact on the national markets of countries.

Practices falling in the first category include domestic import cartels, international cartels that allocate national markets among participating firms, exclusionary abuses of a dominant position, the unreasonable obstruction of parallel imports, control over importation facilities, vertical market restraints that foreclose markets to foreign competitors, certain private standard setting activities and other anticompetitive practices of industry associations.

Those falling in the second category include international cartels and also some instances of mergers and abuses of a dominant position affecting international markets.

Practices cited as falling in the third category include export cartels and situations in which mergers are benign or even beneficial in one market, but have detrimental effects in other markets. It is generally recognised that these types of practices can have significant detrimental effects not only on trade but also on economic welfare and development in the affected countries.[21]

There is also a growing concern that antidumping measures, carrying the flag of fair trade, are increasingly undermining the beneficial effects of trade liberalization on competition. All too often the complaints about unfair trade by domestic monopolists and oligopolists in underperforming industries with doubtful comparative advantages find an eagerly listening ear of antidumping authorities concerned about employment in the short run. In such cases competition authorities have an important advocacy role to play.

Foreign Investment

The implementation of a transparent and effective competition policy can be an important factor both for enhancing the attractiveness of an economy to foreign investment, and for maximising the benefits of such investment. More specifically, it is argued that competition policy can enhance the attractiveness of an economy for foreign direct investment (FDI) by providing a transparent and principles-based mechanism for the resolution of disputes involving such investment, that is consistent with norms that are widely accepted internationally. This increases investor confidence and therefore the propensity to invest. Vigorous competition in markets, reinforced by competition policy, also helps to maximise the benefits of such investment to host countries, by encouraging participating firms to construct state-of-the-art production facilities, to transfer up-to-date technology into host countries and to undertake appropriate training programmes, while at the same time preventing the exploitation of consumers.

The 1997 *World Investment Report* emphasises the growing complementarity between FDI liberalisation and competition policy as a building block of development.[22] It observes that, while FDI liberalisation can help to enhance the contestability of markets, which can provide an important stimulus for greater efficiency, it is not a sufficient condition to achieve this result. Rather, to the extent that FDI liberalisation creates greater freedom for firms to pursue their interests in markets, an effective competition policy and enforcement are necessary to ensure that pre-existing statutory obstacles to contestability are not replaced by anti-competitive practices of firms, thus eliminating the benefits that could arise from liberalisation.

---

[21] World Trade Organization (1998), op.cit.

[22] See UNCTAD (1997), *World Investment Report: Transnational Corporations, Market Structure and Competition Policy*, United Nations Publication, Sales nr. E.97.II.D.10

The Report also notes that there can be situations where FDI, although approved at the time of entry into a developing country market, is accompanied by ancillary agreements that may involve various restrictions of competition. For example, international franchisers establishing themselves in a country might require local franchisees to source certain inputs from specific sources they control, with the justification that this guarantees quality.

Also inter-corporate alliances that involve agreements between unaffiliated firms are becoming more numerous. Such alliances often involve contractual arrangements that limit the freedom of the parties in various ways. Given the many types of alliances and the different purposes for which they are created, the Report suggests that they constitute a "grey area" of competition law.

Consequently, the Report argues that the ongoing world-wide liberalisation of FDI policies needs to be complemented by the introduction of effective competition laws and policies, to foster a pervasive "culture of competition" throughout the world economy. This will provide governments with practical tools to address anti-competitive structural changes and business practices, and thereby enhance confidence that liberalisation will ultimately serve the best interests of citizens in the liberalising countries.

Privatization and Regulatory Reform

The important potential benefits to the society from regulatory reform and privatisation have been widely recognised. Regarding regulatory reform, it may take the form of deregulation when existing regulation is not needed. In general, however, regulatory reform consists of finding more effective and cheaper ways of regulating. This often involves moving towards incentive-based regulatory systems that rely to the maximum extent possible on market forces.

With respect to privatisation, it has been recognised that state-owned enterprises are generally less efficient than private ones, given that public enterprises are not likely to be allowed to fail and thus lack an incentive to operate efficiently. There are many economic benefits from privatisation, including improved public finances, a greater ability of private firms to raise funds for modernisation, and broader and deeper capital markets. In addition, it is often argued that private ownership of production tends to support democratic institutions, because it results in shared power, whereas public ownership tends to concentrate both political and economic power in the same hands.

To ensure the potential benefits to society from regulatory reform, privatisation must be implemented with careful attention to the underlying goal of using market forces to yield beneficial results. A sound competition law enforced by a strong competition authority is essential to assure the procompetitive potential of an economy and its regulatory regime.

Regulatory reform is also a complement of competition policy because efficient market competition requires a supportive legal and structural framework. One important challenge of regulatory reform specially in countries with economies in transition and in developing countries is to develop such a framework, which also includes a need for transparency in government and business operations.

Competition policy can reinforce, and may even be essential to realise the benefits of privatisation and deregulation programmes. Competition policy can provide a fundamental change in the incentives facing firms that will improve their overall behaviour and performance, ensuring inter-firm rivalry, and preventing the continuation or re-establishment of monopolistic market structures. Without a sound competition policy privatisation could simply replace a public monopoly with a private one.

Similarly, if deregulated industries are not subject to the discipline of a competition law, poor performance and the abuse of market power are likely to continue after deregulation.

It is also argued that the reliance on a comprehensive competition law helps to ensure policy coherence and consistency across sectors. Sector-specific regulatory regimes can also open the door to favourable treatment of incumbent players in an industry, and raise questions as to why one sector should be treated more favourably than another. Additionally, there could be a greater risk of "capture" of sectoral regulators as compared to an agency responsible for a generic competition law.

The advocacy role of competition policy is very important in this respect because competition policy may have objectives conflicting with those of privatisation and deregulation. For example, the privatisation process is influenced by the macroeconomic goal of obtaining financial resources for the government whereas competition policy attempts to ensure long-term efficiency of the economy. Advocacy by the competition authority, particularly with respect to the design of the privatisation schemes and the authorisation of prospective participants in the bidding, is important in this context.

Intellectual Property Protection

Intellectual property rights grant an exclusive right to control the commercial use of inventions for a certain period of time, aiming at creating incentives for innovation. However, by granting this exclusivity they restrict product market competition in the short run.

There is a broad consensus that some form of intellectual property safeguard is needed to protect innovation. All WTO members have made a commitment to implement TRIPS. It is often argued that stronger intellectual property rights benefit developing countries by promoting technology transfer through foreign direct investment, trade, licensing, and vertical integration of multinational firms.

Nevertheless it is an open question whether the potential benefits to economic development from intellectual property rights effectively materialise, specially regarding developing countries. For instance, The World Development Report 2002 considers that the empirical evidence on the potential benefits of intellectual property rights is weaker than might be expected or is mixed.[23]

It is also argued that, although ensuring a core level of intellectual property rights protection may increase developing country access to foreign technologies by safeguarding returns for foreign technology producers, excessively strong intellectual property rights can inhibit the diffusion of knowledge. In developing countries, knowledge is built more through access, imitation and diffusion of foreign technologies rather than through local research.

But there are also some potential gains to developing countries from stronger intellectual-property-rights protection. For example, if adaptation of imported technology to local needs requires a significant amount of investment, local firms may be willing to undertake the investment if they can be assured that their intellectual property rights are protected. Intellectual-property-rights systems may also benefit developing countries by protecting indigenous property rights and traditional knowledge. The World Bank considers that to maximise their net gains these countries need to take advantage of the flexibility built into the TRIPS agreement.

The impact of intellectual property rights on development depends on the broader institutional and policy environment. The establishment and enforcement of an adequate competition framework that

[23] See The World Bank (2001), op.cit., p. 146

addresses monopoly abuse of intellectual property rights is very important to prevent that increasing property rights protection could result in welfare losses from monopoly behaviour. Moreover, it is argued that intellectual property rights are more likely to create wealth if they are complemented by open trading rules. More liberal trading rules also reduce the risk of monopoly abuse of intellectual property rights by domestic firms. [24]

Institutional Change

There is an increasing recognition of the central importance of institutions in the development process, which are interdependent with the human, physical and macroeconomic sides of development. Appropriate design of institutions and institutional change are considered an important source of economic development. A growing body of research links institutional success (and failure) to economic growth and market development over time and across countries. Positive relationships between economic development and these indicators of institutional success have been widely documented.

In this context, competition may provide incentives for institutional change around the world, by modifying the effects of existing institutions. It is also considered that competition may occasionally substitute for other institutions, a role emphasised by the World Development Report 2002.[25] In fact, the Report considers that fostering competition is an important element for effective institution building.

For instance, there is evidence that competition can substitute to a certain extent for an effective bankruptcy system because it exerts pressures on inefficient firms to go into liquidation. Similarly, it is sometimes argued that competition can substitute for strong shareholder control in firms in raising productivity growth, particularly in the absence of important external shareholders.

Another example is the influence that competition may have in modifying factor market regulations. In some circumstances, removing or relaxing institutional rigidities to product market competition such as unnecessary entry barriers promotes competition directly and exerts pressures on governments to remove rigidities in factor markets, which can raise adjustment costs in the economy. It can also be argued that uncompetitive product markets allow the persistence of factor market restrictions. Thus, there is clearly a mutual interaction.

Competition from abroad resulting from trade liberalisation may also put pressure upon domestic institutions to change, particularly if such institution hinder the development of internationally competitive industries. There are many examples of such institutional changes triggered by trade liberalisation in developing countries and transition economies during the last two decades.[26] Perhaps one of the most important of these changes has been the enactment of competition laws and the institution of competition authorities, following trade liberalisation in many of those countries.

Measurement Problems

One of the questions empirical econometric studies about the relation between competition, competition policy and economic development have to address in how to measure the dependent and independent variables of such experiments. In this section we make some observations about the

[24] The World Bank (2001), op.cit.

[25] The World Bank (2001), *op.cit.*

[26] See World Bank (2001), op. cit.

difficulties encountered with the measurement of the degree of competition and the strength of competition policy. Most indicators of economic development have a long history of measurement and although they are not without problems we do not discuss them here.

Measuring Competition

Static Competition

The most common way to measure static competition in a market is through concentration indices. For example the joint market share of the four largest firms is such an index. Another measure is the wellknown Hirschman-Herfindahl concentration index. All those measures suffer from the following setbacks. In the first place, they only take into account actual market participation not potential participation. I.e. they only take account of actual competition not of contestability. This shortcoming can be partly addressed by taking production capacities instead of sales to calculate market shares but still concentration indices based on capacities do not take into account the possibility of new entry, which may discipline the behaviour of even the largest market players. A second inconvenience is that concentration indices miss to take account of the degree of agreed or tacit collusion between market players. Sometimes markets with only a few participants are more competed than markets with many players not competing actively. The market for cola drinks is often cited to illustrate this case. A third argument against the use of concentration indices to measure competition is that they are usually very sensitive to the specific way in which markets are delineated. Whether or not a good belongs to a market depends normally on the degree of substitutability with products already in the market, which may be controversial, and adding another imperfect substitute may change the value of a concentration index completely.

A second commonly used measure of static competition is the average price-cost mark-up of the industry considered. If the mark-up is at monopoly level (which depends on the own-price elasticity of demand) there is no competition; if it is zero competition is perfect. Price-cost mark-ups have the advantage of taking into account the effects of potential entry and the degree of collusion between market players, but the disadvantage is that they are much more difficult to estimate. In principle, price-cost mark-ups refer to marginal costs but as marginal costs are theoretical constructs, variable costs are often taken instead. For industries as a whole price-cost margins are often approximated by extranormal-profits-to-sales ratios where normal profits are defined as some industry-averaged profits rate. We do not know of cases where account is taken of industry-specific risk as is done in rate-of-return regulation of prices.[27] Evidently, such estimates are very rough approximations of what price-to-marginal-cost ratios really are. Moreover, by measuring the degree of competition through price-cost mark-ups it is assumed from the outset that competition has a disciplining effect upon prices so that econometric exercises about the relation between competition and prices become trivial.

A third indicator that is sometimes used to measure the degree of static competition is import penetration. Evidently, it is a partial measure of competition by only taking into account competition from abroad. Moreover, low import penetration may, on one hand, reflect situations of very concentrated domestic markets shielded from competition from abroad but, on the other, can also be due comparative advantages favouring the country under study even when the domestic market is fairly competed. Likewise, high import penetration may reflect a strong competitive pressure from abroad upon domestic industries as well as strong imports from a foreign export cartel with some sluggish domestic price followers. Thus import penetration ratios should be taken with care.

[27] See Kip Viscusi et al., op.cit., chapter 12, p. 366

Dynamic Competition

To measure dynamic competition is even more difficult than static competition. One possibility is to consider indicators of firm dynamics. How many of the five leading firms in an industry are still there ten years later? Similar indicators are such as a count of entry of new firms and of exit of existing ones, mortality rates of firms and life expectancy, etc.. However, such indicators miss to a certain extent the possibility that creative destruction can also take place within the firms. For example, in the pharmaceutical industry there is a good deal of product innovation going on but it is doubtful whether this would show up in indicators of firm dynamics such as the ones suggested above. Another difficulty is market definition. Firms mostly operate in many markets at the same time and new superior products may even eliminate existing markets and put new markets in their place. Dynamic competition does not respect the borders of traditionally defined markets.

Another way to proceed is to go directly to the innovation market. One may for example count the number of patents registered and consider the spread of such patents among different firms. Alternatively, one may consider the number of ongoing R&D projects for specific products as is sometimes done for the antitrust assessment of mergers or joint ventures. Still another possibility is to take the funds spent on R&D and its spread among firms as a proxy for dynamic competition. In the latter case it should be realised that there is a strong element of risk involved in R&D and that there may be important spillover effects of R&D efforts among different products. All of these measures are only rough proxies for dynamic competition.

Competition Policy

To measure competition policy is even more difficult than measuring competition itself. One way to proceed would be to measure it indirectly through its effects, for example by taking measures of competition as proxies for competition policy. However, as explained in the previous section, competition is not just a result of competition policy but influenced by many other factors among which other policies and technological development. Moreover, in light of the possibility of a perverse enforcement of competition law on would like to have an independent measure for competition policy in order to be able to test the hypothesis that indeed competition policy encourages competition and to what extent. To our knowledge no systematic studies of that kind have been carried out, at least no studies of an econometric nature.

Therefore, it is more attractive to measure competition policy directly, i.e. by taking certain indicators of the competition regime itself. Perhaps the simplest way is to take the absence or presence of a competition authority as a dummy, eventually taking into account the learning process through the age of the authority. A fully nondiscrete variable would be the ratio of the yearly budget assigned to the authority to GDP or the amount of fines imposed upon transgressors of the competition law. Alternatively, one can use counts of antitrust cases filed or resolved and in countries where there is a private right of action the number of damage claims brought before courts of justice for violation of the competition laws. Altogether, there are plenty possibilities to quantify the intensity of competition policy directly, each of them having its own advantages and disadvantages. However, econometric studies using such parameters are hard to find.

In the econometric study by Dutz and Hayri about determinants of economic growth which we discuss in the following section one of the independent variables measures competition policy. The variable called ANTITRUST is taken from the Global Competitiveness Report of 1996 and registers the results of a questionnaire held among prominent entrepreneurs in the countries covered by the report.[28] The

[28] World Economic Forum (1996), *Global Competitiveness Report*, Geneva.

question was: (to what extent do you agree with the statement that) antitrust or antimonopoly policy effectively promotes competition(?). The validity of such a measure is questionable for two reasons. The first is that it does not measure competition policy directly but rather through a subjective perception of its effects. The second is that the answers to the question by prominent entrepreneurs having experiences with antitrust interventions in the past in their own businesses might be biased. Still the study by Dutz and Hayri is the only econometric study we have found with a measure for competition policy that is not a measure for competition.

Empirical Studies

In this section we present the results of a few econometric studies about the relationship between competition or competition policy and economic performance indicators. In the first subsection three studies are dealt with in which competition measures are among the explanatory variables. In the second subsection we treat the study by Dutz and Hayri with the ANTITRUST variable as a proxy for competition policies.

Competition

Prices

We summarise the main results of the paper "An Empirical Analysis of Competition, Privatisation, and Regulation in Africa and Latin America" by Scott J. Wallsten.[29] It is an econometric cross-country study quantifying the effects of privatisation, competition and regulation on telecommunications (telephony) performance in 30 African and Latin American countries from 1984 through 1997.

The dependent variables reflecting performance are the per-capita number of mainlines, number of pay phones, connection capacity, number of employees per mainline and prices of local calls. The independent variables are, apart from a number of control variables such as income per capita among others, proxies or dummies for privatisation, competition, regulation and interaction terms. Privatisation and regulation are measured by dummy variables indicating whether or not the incumbent telephone operator is (partly) privatised and the existence of a separate regulator not directly under control of a ministry. Competition is measured by the number of wireless telephone companies not owned by the incumbent. Evidently, this is a very rough proxy for competition based on the assumption that wireless telephony is a sufficiently close substitute of fixed telephony to discipline the behaviour of fixed telephony incumbents.

The results of the study are that privatisation by itself does not generate important benefits. Actually it is negatively correlated with mainline penetration. However, privatisation combined with an independent regulator appears to be correlated with increased connection capacity and payphones per capita. These results suggest that reformers are correct in emphasising that privatisation should be complemented by independent regulation since privatisation without regulation may be costly to consumers.

[29] Scott J. Wallsten (1999), "An Empirical Análisis of Competition, Privatization, and Regulation in Africa and Latin America", The World Bank, May 1999.

As far as competition is concerned the results of the study show that competition has a positive influence on telecom performance. Competition appears to be associated with increased mainline penetration, more payphones, a higher connection capacity and lower prices for local calls. In all four cases the regression coefficient of the competition variable is statistically significant. Thus competition appears to have tangible effects across the board. Consistently with conventional wisdom, a more competitive telecom market increases quantities produced and reduces prices.

Admitting all the shortcomings of the study with respect to model specification, data availability, etc. the results make a strong case for governments to promote competition in telecommunication markets actively in order to improve their performance to the benefit of consumers.

Technical Efficiency

As explained in section 2, in a partial equilibrium approach there are different types of inefficiencies: allocative inefficiencies and productive inefficiencies, all of them resulting in welfare losses. However, in the partial-equilibrium model it is usually assumed that firm-specific cost functions are already the result of cost minimisation within the firms. Technical efficiency is a one of the components of productive efficiency and reflects shortcomings in the cost-minimisation process within the firms. As mentioned before, with or without competition, firms have incentives to eliminate technical inefficiencies, but in the presence of competition these incentives are stronger.

The purpose of this subsection is to discuss the results of an econometric study about technical inefficiency in manufacturing industries in the UK by Alison Green and David Mayes.[30] Using an approach based on stochastic frontier production functions to estimate technical inefficiency in almost 20,000 plants in 151 manufacturing industries the authors use an econometric model to explore the determinants of cross-industry inefficiencies, among which the strength of competition and the openness to international trade are the most important explanatory variables. Strength of competition is measured by a five-largest-firm concentration ratio and openness to trade as the ratio of value of imports plus exports to total sales of the industry.

The results are that the ten most efficient industries showed average inefficiencies - i.e. deviations from the frontier - of approximately 15%. They include industries as heterogeneous as cement, footwear and musical instruments. At the other extreme, the least efficient industries showed average deviations as high as 60%. They include industries such as jewellery and brewing.

As regards the way in which competition encourages technical efficiency, it was found that the strength of competition has a curvilinear relation with efficiency, both high and low levels of concentration being associated with higher inefficiency, with the minimum occurring at a concentration ratio of 40%. Studies using similar techniques for the USA and Japan arrived at similar results.[31] All of them show that an increase in market concentration above a certain threshold reduces technical efficiency.

The lesson that can be learned is that for the purpose of technical efficiency concentration should neither be too high nor too low. Considering the fact that the threshold of 40% for the five-largest-firm concentration ratio is fairly low (in most cases it would correspond to values for the Hirschman-Herfindahl index lower than 1000; i.e. well below the thresholds used for merger control in the US), competition

[30] Alison Green and David Mayes (1991), "Technical Inefficiency in Manufacturing Industries", *The Economic Journal*, Vol. 101, May 1991.

[31] Richard E. Caves and D. Barton (1990), *Efficiencies in US Manufacturing Industries*, MIT Press, Cambridge, Massachusetts.

policy aimed at controlling market concentration, such as M&A control, may, apart from preventing anticompetitive conduct, help companies to avoid technical inefficiency.

Innovation

The quantity of research devoted to study the relation between market concentration and innovation has become the second largest body of empirical literature in the field of industrial organisation, exceeded only by research associated with the relationship between market concentration and profitability. Most of this work has been propelled by the Schumpeterian hypothesis that the firm in a competitive market is the perfect device for resource allocation, but the large monopolistic firm is the "*most powerful engine of progress and… long run expansion of total output"*, thus, *"perfect competition is inferior, and has no title to being set up as a model of ideal efficiency."* [32]

These assertions render into the fundamental and defying hypothesis that *innovation increases with market concentration* and, consequently, competition and competition policy would damage the speed of technical innovation. This conjecture has not only represented a huge challenge to most of the knowledge about the role of competition in traditional economic theory, but it also to data collection and statistical techniques.

Indeed, most of the empirical work is filled with several methodological pitfalls: primitive econometric techniques, inadequate modelling of the feedback mechanism between market power and innovation, inadequate data, loosely specified equations, etc. One of the difficulties lies in how to measure accurately innovation and technological change. Clearly, if there is not a satisfactory measure of this variable, there cannot be an acceptable answer to the effects of competition either. Several measures of innovation have been used in the existing literature; however, the most frequently used has been the number of patent counts. The inconvenience of this approach is that it does not include differences due to the economic value of the patents.

The empirical work on the relation between market concentration and innovation is inconclusive. Scherer (1967) found and inverted U-shaped relationship between R&D and concentration; i.e. up to a certain level of concentration R&D efforts increase with concentration but beyond that level they decrease[33]. The critical level resulted to be at a four firm concentration ratio of approximately 55%. Contrary to Scherer's results Bound et al. (1984) and Pavitt et al. (1987) report a positive association between concentration and innovation at high levels of concentration and a negative association at low levels[34]. In other words both very large and very small firms tend to innovate more.

In the following we briefly summarise the results of a study by Richard Blundell, Rachel Griffith and John Van Reenen about the relation between market power and innovation.[35] The purpose of the study is to "model a count of the number of innovations commercialised by a firm in a year as a function of a

---

[32] J.A. Schumpeter (1942), *Capitalism, Socialism and Democracy*, Harper, New York.

[33] F.M. Scherer (1967), "Market Structure and the Employment of Scientists and Engineers", *American Economic Review*, Vol. 57, pp. 524-31.

[34] J. Bound, C. Cummins, Z. Griliches, B.H. Hall and A. Jaffe (1984), "Who Does R&D and Who Patents?", in Z. Griliches (ed.), *R&D Patents, and Productivity*, NBER, University of Chicago Press, Chicago and K. Pavitt, M. Robson and J. Townsend (1987), "The Size Distribution of Innovating Firms in the UK: 1945-1983", *Journal of Industrial Economics*, Vol. 35, pp. 297-316.

[35] Richard Blundell, Rachel Griffith and John Van Reenen (1995), "Dynamic Count Data Models of Technological Innovation", The Economic Journal, Vol. 105, pp. 333-44.

firm's market power and its tangible and knowledge capital stock". The authors ran a series of regressions of the number of innovations explained by two sets of variables: (i) firm level variables and (ii) industry level variables. Given that the dependent variable, the number of innovations, is a non-negative integer, the authors use "count data models", which are especially suited to handle this kind of variables. The authors propose a couple of econometric solutions to account for the weak exogeneity and the heterogeneity of the data. Actually, the database indicates the use of a panel data model. To account for fixed effects, a variable is included that measures differences in the innovation capacity of the firms. The data spans a period of eleven years, from 1972 to 1982. It comprises information on 375 firms listed on the London International Stock Exchange and a count of innovations. Around a third of the firms innovated at some point of time.

The main explanatory variables at the firm level are: (i) stock of knowledge, accounting in some way for past innovation experience, (ii) tangible capital stock, measured as the replacement value of fixed capital, (iii) market share in terms of sales and (iv) a fixed effect, which is the average number of innovations by the firm in the period 1945 to 1971. At the industry level the independent variables are: (i) market concentration as measured by the five-largest-firms share in sales and (ii) openness to international trade represented by the share of imports in domestic sales.

The for our purposes most important outcomes of the exercise are that (i) the sign of the regression coefficient for the firm-specific market share is positive and statistically significant and (ii) the sign of the regression coefficient for the industry-specific concentration ratio is negative and also statistically significant. This clearly suggests that there are two counteracting forces at work. On one hand, the *ability* to innovate increases with firm size resulting in more innovation by larger firms, a result congruent with the Schumpeterian paradigm. On the other hand, the *incentives* to innovate diminish with market concentration. These results seem to indicate that when a firm grows in a market its capability to innovate increases but to the extent that its growth leads to a higher market concentration both its own incentives to innovate and those of its competitors decrease.

The main lesson for competition policy seems to be that the authorities should not be all too concerned about the size of the firms per se but rather about the extent to which firm size contributes to market concentration.

Competition Policy

Economic Growth

The only econometric study we have found in which one of the explanatory variables refers to *competition policy*, not just competition, is the article "Does More Intense Competition Lead to Higher Growth?" by Mark Dutz and Aydin Hayri.[36] Even in that study, it should be admitted, the strength of competition policy is measured in an indirect manner susceptible to criticism as explained in our section about measurement problems.

The declared objective of the article is to "… *investigate whether higher levels of domestic competition, while controlling for the degree of trade liberation, are significantly and robustly correlated with faster current and future rates of per capita economic growth rates*". The analysis is organised in two stages. In the first, the authors run six different cross-country regressions, with the average annual growth rate of real GDP per capita as the dependent variable and different groups of explanatory variables. In the

[36] Mark A. Dutz and Aydin Hayri (1999), "Does More Intense Competition Lead to Higher Growth?" CEPR, Discussion Paper, No. 2249.

second stage, a correlation is tested between the residual growth rates from the first stage and a set of previously defined variables that tend to reflect the strength of competition policy among others. The reason for dividing the analysis in two stages is that the competition policy variable is only available for a subset of the more than 100 countries considered in the study.

The dependent variable of the exercise is the average annual growth of GDP over the period 1986 to 1995. The main explanatory variables of the first stage are: (i) pre-period GDP (to account for possible convergence[37]), (ii) trade openness, (iii) life expectancy at birth and (iv) physical capital accumulation. In the second stage the explanatory variables can be grouped in three categories: competition policy, static competition measured by economy-wide concentration indicators and dynamic competition measured by some firm dynamics indicators. As explained in section 4, one of the competition policy variables (ANTITRUST) reflects the answers of top managers to the question: "Does antitrust or anti-monopoly policy (in your country) effectively promote competition?" A second variable (UNFAIR) mirrors the answers to the question: "Do antitrust laws prevent unfair competition in your country?"

The results of most regression experiments are not all too promising. Generally speaking, the quality of the fit as measured by the squared correlation coefficient is low. Still, the variables measuring competition policy are positively related with economic growth in a statistically significant way in most of the experiments. Altogether, the study provides some weak evidence that competition policy is positively associated with long-run economic growth.

An additional objection that can be brought in against the favourable conclusions of the study about the role of competition policies is that the competition policy variables are taken from the Global Competitiveness Report of 1996 whereas economic growth refers to the period 1986 to 1995. This raises some doubt about the direction of the causal relation that may exist between the two phenomena. Still, if competition policies were a stable variable not changing over time, competition policies as of the mid 1990s would mirror competition policies one decade earlier which could have influenced growth during the period 1986 to 1995, but considering the fact that many of the competition regimes of the study were only put into place in the 1990s this objection must be taken seriously.

Perhaps the most important conclusion that can be drawn, not so much from the results of the study but from the way it is carried out, from the lack of precise data on the variables used and, in general, from its shortcomings, is that the present state of the art of empirical studies about the causal relationship between competition policy as the moving force and economic growth as the result is only in its infancy and that much more work need to be done to fill that gap.

Competition and Competitiveness

The Competitive Advantage of Nations

In the past 15 years there has been a dramatic shift of focus in the theories of economic development. There is a whole set of literature that deviates from the use of aggregate models, mainly with macroeconomic variables, and focuses on several analytical tools developed in the field of industrial organisation, using a microeconomic and sector approach.

[37] Convergence implies that richer countries (in terms of income per capita) tend to grow slower than poor countries.

The convergence of industrial organisation with management sciences and international economics has produced new analytical models that go beyond a static approach, by looking at the effects of interaction among firms and other dynamic elements of industry structure. Michael Porter has been a leader in the field of strategic management for the past 20 years and in his book "The Competitive Advantage of Nations", which is the result of collaboration with governments and industry leaders from more than ten countries, he puts together sound evidence about key issues of competitiveness and industry evolution.[38]

The author undertakes an extensive study in an effort to determine the basic elements that affect a country's competitive position in a global economy. His methodology emerged from more than 100 case studies of industries in specific countries world-wide, with a more detailed analysis of four cases in Germany, the USA, Italy and Japan. His approach is based on fundamental microeconomic principles of industry analysis and, instead of looking for "macro" elements or using an econometric model, the study tries to determine which factors play a role in helping companies of an industry or sector in a specific country to become world class competitors, by looking at common patterns in a great diversity of cases.

Porter found that national competitive advantage mainly depends on the following four basic elements: (i) the conditions of factors of production, (ii) the conditions of demand, (iii) the status and interaction of related industries and (iv) the degree of rivalry of leading companies in the country. Each of these elements is briefly discussed below.

Elements of Competitive Advantage

The Conditions of Factors of Production

How effectively and efficiently factors are deployed is essential to the development of competitiveness. It is important to distinguish between two different types of factors. Basic ones, such as natural resources, climate, location, unskilled and semiskilled labour, and advanced factors such as communications infrastructure, highly educated personnel and university research institutes. Porter's main argument is that most factors are not inherited by a nation but must be developed over time through investment. Advanced factors are the essential element of competitive advantage in sophisticated differentiated product markets and in sectors where the constant development of new technologies is a crucial element of competition.

Several examples are given to show that sustainable competitive advantage in a particular industry is achieved with both advanced and specialised factors: "In optics, for example, an important reason why German firms have been able to steadily improve product performance and quality is the availability of graduates from special university programs in optical physics and a pool of highly skilled workers trained in specialised apprenticeship programs". In Denmark, there are two hospitals specialised in treating diabetes, and they are owned by the two world-ranking insulin producers, Novo Industry and Nordisk Insulin. The USA is a world leader in computer sciences and agricultural technology, among other fields; it is no accident that the best universities in the world to specialise in these areas are in the US. There is no unique set of rules for factor development, but it is clear that international leadership in an industry depends significantly on the capabilities of a country to develop advanced factors.

[38] Michael Porter (1998), op. cit.

The Conditions of Domestic Demand

In spite of the effects of globalisation, Porter claims that home demand has a very significant impact on a firm's ability to interpret buyer needs and can provide the necessary initial stimulus for investment and innovation. "Nations gain competitive advantage in industry segments where the home demand gives local firms a clearer or earlier picture of buyer needs than foreign rivals can have". Proximity to buyers is an important element in product and service development. Sophisticated and demanding domestic buyers pressure local firms to meet high standards. For example, it is no accident that the Europeans are the leaders in the fashion sector. Even countries like Spain have become very competitive in the clothing business due, in part, to a relatively sophisticated domestic demand for clothing.

The size of the domestic market can help achieve economies of scale faster. Porter claims that in sectors with heavy R&D requirements or substantial economies of scale in production, the proximity of a large home demand can be helpful in making investment decisions.

Status and Interaction of Related Industries

The presence of world-class industries helps to develop neighbouring segments. There are plenty of examples where competitive supplier industries create advantages for downstream segments, especially by establishing dynamic patterns of process innovation and upgrading. Porter analyses in detail several examples; such as the case of the Italian leather footwear industry. Producers interact with leather manufacturers that gain early insights into fashion trends.

The existence of "clusters" of industries helps to develop specialised factors and distribution channels. There are plenty of examples of world-class companies of the same country in related sectors. Success in one industry can pull through demand for complementary products and services. The best example is the dynamics of the American computer hardware, software, peripherals and database services industries. These elements should be taken into account in implementing competition policy, because co-operation in certain areas, such as R&D, between companies of the same cluster could be beneficial.

Degree of Rivalry

Most relevant for competition policies is what Porter has to say about the degree of rivalry. He claims that the way firms are run is crucial to achieve a sustainable competitive advantage and size need not be a constraint. For example, in Italy, many successful international competitors are relatively small firms. One common element is probably the desire to compete globally and the right mix of governance structure to keep management with the correct incentives to pursue long-term goals.

The author looks into ten nations with leading world positions in specific industries. A common element found in all of them is that they have a number of strong local rivals. "Successful firms compete vigorously at home and pressure each other to improve and innovate". He gives a set of examples: Switzerland in pharmaceuticals (Hoffman-LaRoche, Ciba-Geigy and Sandoz); Sweden in cars and trucks (Saab-Scania and Volvo); Germany in chemicals (Basf, Hoechst, Bayer and others); the USA in computers and software.

Domestic rivalry is not restricted to static price competition; it is rather the race for product differentiation and innovation, which puts pressure on firms to sell abroad in order to grow. Porter goes beyond these arguments to show that there are plenty of examples of geographic concentration of rivals, such as Italian jewellery firms, which are located around two towns, Arezzo and Valenza Po. Similar

examples of firm concentration in successful industries are: Basel, Switzerland (Pharmaceuticals), Hamamatsu, Japan (motorcycles), Route 128 in Boston (minicomputers), Madison Av., New York (advertising). Moreover, intense domestic rivalry depends on new business formation, which can be partially substituted by a home market open to international competition.

Porter warns that competition policy has to watch carefully any kind of direct co-operation among domestic competitors, not necessarily the same type of co-operation of firms in the same cluster mentioned above, but in many cases the excuse of avoiding duplication and achieving economies of scale can eliminate diversity and inhibit the rate of industry improvement.

Stages of Competitive Development

National competitive development can be divided in four stages: (i) factor-driven, (ii) investment-driven, (iii) innovation-driven and (iv) wealth-driven. These stages do not explain everything about the evolution of competitiveness in a country, but they highlight some attributes of a nation's position in a specific period of time. The first three stages are associated with rising economic prosperity and the fourth with a decline.

Factor-Driven Stage

Throughout this period, basic factors are the essential source of advantage. The country competes on prices, mainly in commodity sectors or segments of industries where unskilled labour is required. Technology is sourced from abroad. Nations in this stage of development are very sensitive to world economic cycles. Porter claims that there are only two countries that have been able to achieve prosperity by using natural resources at the core of their national development: Australia and Canada.

Investment-Driven Stage

During this stage, the country invests aggressively in both human and physical infrastructure, and industries acquire more complex product and process technology, usually through licenses. Firms still compete in price-sensitive segments, with high demand-elasticities, but process technology is near state of the art. Home demand, in general, continues to be unsophisticated, but improving. During this stage there are continuous gains in employment creation and some basic factor costs start to increase. More important, domestic rivalry increases; traditional monopolies start to fall through deregulation and by opening the economy to international competition.

Innovation-Driven Stage

In this stage the country becomes competitive in specific industries and clusters. Companies not only improve technology in these sectors, but they create their own innovation base, accelerating improvement and increasing rivalry of domestic competitors, not in price, but in the race for intellectual property and diversification. The leading firms develop global strategies and factors are specialised and upgraded. In general, domestic demand becomes more sophisticated in this stage and adds to the "incentive-driven process of improvement". World-class supporting industries are developed.

Wealth-Driven Stage

During this stage firms are more concerned about preserving their position. They try to influence government policy to insulate themselves. There are widespread mergers and acquisitions, which should be a serious concern for competition authorities. Domestic rivalry is usually reduced and companies depend more on customer loyalty than on continuous improvement to retain customers. Cumulative investment can sustain competitive advantage in certain fields for a long period of time, such as the arts and highly specialised forms of higher education.

Implications for Government Policy

The author outlines a set of premises for government policy towards industry:

- The government can influence the shape of an institutional structure, such as trade policy, and help develop areas where externalities are present, such as education and environmental quality.

- Dynamism leads to competitiveness, not short-term cost advantages. The government should not interfere in determining relative prices; it should help to develop a framework so that the correct incentives filter through every sector of the economy.

- Geographic concentration of competitive industries is a common characteristic. The government can help develop better infrastructure to facilitate the creation of new companies and help extend the benefits of competitive clusters.

- In factor development, education is the basic element that governments should focus on, by helping enhance standards and investing in complementary infrastructure.

- Deregulation and privatisation of state monopolies should be a priority to enhance industry competitiveness. In describing national agendas, for the USA the author argues that: “a backing away from antitrust enforcement in the area of mergers, has undermined some positive developments that have taken place in the area of deregulation. Mergers and alliances among leading competitors should be prohibited.” Porter goes further to emphasise that these mergers should not be allowed, whether they are domestic or foreign.

- Regarding competition policy, the author concludes that governments should only help create the institutional framework to enhance competitiveness, not allowing mergers of leading firms in the same segment of an industry and promoting deregulation in most industries. Co-operation among companies of the same cluster should only be allowed when it has a positive effect on the rate of industry improvement, and does not eliminate diversity and reduces rivalry.

Summary and Conclusions

From a theoretical point of view competition enhances social welfare by bringing prices closer to marginal costs of production and by so reducing the allocative and productive inefficiencies that may occur under monopoly or oligopoly. In a static approach competition reduces price and increases output to consumers; thus increased competition brings a once-and-for-all increase in real product. In a dynamic setting competition has the additional feature that it generates a process of what Schumpeter called “creative destruction”, i.e. inefficient firms disappear while existing and emerging efficient firms grow in the market, and obsolete products are continuously being replaced by improved products. Such creative

destruction leads to ever increasing levels of productivity and in this way competition not only induces a once-and-for-all gain in real output but contributes to higher economic growth on a permanent basis. At the same time competition creates the proper incentives for firms to enhance their competitiveness and, in general, to employ their specific capabilities and information advantages to the benefit of the society as a whole.

There are a few wellknown exceptions to this general picture. First, in the presence of pervasive economies of scale competition tends to destroy itself and attempting to keep competition alive may lead to productive inefficiencies. Second, in the presence of network externalities prices close to marginal costs as a result of fierce competition may occasionally impede welfare-enhancing networks from emerging so that too much competition may reduce welfare. Third, in the process of product innovation a distinction should be made between static and dynamic competition. To provide the proper incentives for product innovation temporary monopoly positions for patented products should be allowed. Not allowing the exclusive exploitation of IPRs would frustrate the innovation process. Thus, there is a trade-off between dynamic and static competition.

Competition polices, to the extent that they effectively promote the competitive process and whenever they achieve to take proper account of exceptions such as the ones we just mentioned, will also have a positive effect on real output in the static sense and on economic growth in the dynamic sense. However, to achieve a higher economic growth on a lasting basis it is necessary that the process of *creative destruction* has its course. This may put competition authorities in a position diametrically opposed to the position of other authorities more concerned with short-term employment considerations. The competition authority would typically underscore the *creative* character of competition, other authorities its *destructive* character.

Competition policies are even more important because many markets are more segmented than what is generally believed. Incomplete information by customers and even small search costs may give rise to significant price-cost mark-ups. Markets are far from contestable because of strategic conduct by incumbents deterring entry so that dominant positions may be very persistent. All these factors, together with rent-seeking behaviour by dominant market players, may lead to substantial welfare losses.

Conflicts between competition and other policies may arise particularly where those policies interact. There are important interactions and also complementarities with trade and foreign investment policies, privatisation and regulatory reform, and intellectual property protection, among others. An important concern for competition authorities is the increasing use of antidumping measures rolling back previous trade liberalisation attempts.

As regards the empirical testing of the relationship between competition or competition policy and economic development indicators such as price levels, technical efficiency, innovation and economic growth, it should be admitted that for most variables involved there are serious problems of measurement. For static competition there are quantitative measures such as concentration indices and price-cost mark-ups, each of them with their own specific inconveniences; for dynamic competition indicators of firm dynamics or product dynamics (e.g. patent counts) are sometimes used. Measuring the strength of competition policy is even more problematic. Usually such measures do not go beyond simple dummies and proxies such as the existence or not of an independent competition authority, the ratio of the budget of that authority to GDP, etc. In the only empirical cross-country study we have found in which such a competition policy variable figured among the explanatory variables of the exercise, the measure used for competition policy was based on the subjective answers of topmanagers to the question whether they believed that competition policy in their country was an effective instrument in promoting competition.

There is a long tradition of empirical studies about the relation between competition and different variables reflecting performance. In fact a good deal of the literature on the structure-conduct-performance paradigm in the field of industrial organisation falls into this category. In this document we have given a few examples of empirical studies about this relation: one study confirming the positive influence of competition upon performance indicators in the telephony industry in a sample of 30 African and Latin American countries; one study suggesting a curvilinear relationship between concentration and technical efficiency in 151 manufacturing industries in the UK, and one about the relation between industry concentration and innovation also in the UK finding that there are usually two forces at work. First, large firms have more capabilities to innovate. But second, large firms have, to the extent that their size increases market concentration, less incentives to innovate.

Empirical work about the relation between *competition policies* (not competition) and economic performance are much scarcer. Often, it is simply taken for granted that competition policies enhance competition and thus have the same influence on performance indicators as competition itself but evidently this is not satisfactory. In a cross-country study covering more than 100 countries a positive association was found between the perceived effectiveness of competition policy and long-run economic growth. However, the study has many shortcomings which undermine to a certain extent the credibility of its outcomes. We conclude that empirical work on the relation between competition policy and economic performance is only in its infancy and that much work has to be done to fill that gap.

Finally, domestic competition is considered to be of crucial importance for the development of clusters of internationally competitive firms and competition authorities should watch with care co-operation and mergers going on in those industries.

REFERENCES

Ahn Sanghoon (2002), "Competition, Innovation and Productivity Growth: A Review of Theory and Evidence", OECD, Economics Department, Working Paper 317, ECO/WKP(2002)3.

Bound J., C. Cummins, Z. Griliches, B.H. Hall and A. Jaffe (1984), "Who Does R&D and Who Patents?" in Griliches Z. (ed.), *R&D, Patents, and Productivity*, NBER, University of Chicago Press, Chicago.

Blundell Richard, Rachel Griffith and John Van Reenen (1995), "Dynamic Count Data Models of Technological Innovation", *The Economic Journal, Vol. 105.*

Caves Richard E. and D. Barton (1990), *Efficiencies in US Manufacturing Industries*, MIT Press, Cambridge, Massachusetts.

Dutz Mark A. and Aydin Hayri (1999), "Does More Intense Competition Lead to Higher Growth?" CEPR, Discussion Paper, No. 2249.

Evans David and Richard Schmalensee (2001), "Some Economic Aspects of Antitrust Analysis in Dynamically Competitive Industries", NBER, Working Paper 8268, www.nber.org/papers/w8268.

Ferguson Paul (1988), *Industrial Economics: Issues and Perspectives*, MacMillan, London.

Green Alison and Mayes David (1991), "Technical Inefficiency in Manufacturing Industries", *The Economic Journal*, Vol. 101, May 1991.

Harberger Arnold (1954), "Monopoly and Resource Allocation", *American Economic Review*, Vol.44.

Khemani Shyam (1997), "Competition Policy and Economic Development", *Policy Options*, October 1997.

Pavitt K., M. Robson and J. Townsend (1987), "The Size Distribution of Innovating Firms in the UK: 1945-1983", *Journal of Industrial Economics*, Vol. 35.

Porter Michael (1998), *The Competitive Advantage of Nations*, Free Press.

Shapiro Carl and Hal Varian (1999), *Information Rules: A Strategic Guide to the Network Economy*, Harvard Business School Press, Boston, Massachusetts.

Scherer F.M. (1967), "Market Structure and the Employment of Scientists and Engineers", *American Economic Review*, Vol. 57.

Schumpeter J.A. (1934), *The Theory of Economic Development*, Harvard University Press, Cambridge.

Schumpeter J.A. (1942), *Capitalism, Socialism and Democracy*, Harper, New York.

Stiglitz Joseph E. (1996), *Whither Socialism?*, The MIT Press, Cambridge, Massachusetts.

The World Bank, (2001) *World Development Report 2002: Building Institutions for Markets.*

Tirole Jean (2000), *The Theory of Industrial Organization*, The MIT Press, Cambridge Massachusetts.

UNCTAD (1997), *World Investment Report: Transnational Corporations, Market Structure and Competition Policy*, United Nations Publication, Sales nr. E.97.II.D.10.

Viscusi Kip, John Vernon and Joseph Harrington Jr., *Economics of Regulation and Antitrust*, The MIT Press, Cambridge, Massachusetts.

Wallsten Scott J. (1999), "An Empirical Análisis of Competition, Privatization and Regulation in Africa and Latin America", The World Bank, May 1999.

World Economic Forum (1996), *Global Competitiveness Report*, Geneva.

World Trade Organization (1998), Competition, Working Group on the Interaction between Trade and Competition Policy, *Synthesis Paper on the Relationship of Trade and Competition to Development and Economic Growth*, WT/WGTCP/W/80.