

# PATENTS WITHOUT MONOPOLIES

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## **ABSTRACT**

### **AN ALTERNATIVE METHOD TO COMPENSATE R&D MINIMIZING COSTS ASSOCIATED WITH MONOPOLY PATENTS OF PHARMACEUTICAL PRODUCTS**

Many people involved in academia, as well as various opinion makers and interest group members agree that the present drug patent regime means high drug costs for everyone except for a few select companies and people. Many people recognize the need to do something to change this situation. Problems that have recently arisen with the supply of HIV drugs in Africa have deepened this belief. Even in USA, many people have expressed a deep concern about patient accessibility to patented drugs.

In a recent meeting to discuss solutions related to African problems with HIV, the president of an important pharmaceutical company repeated the commonly held opinion that compulsory license is a killer of Research and Development (R&D) companies. This apparently naive affirmation, impossible to prove scientifically, prevents alternative solutions in a way that until we can resolve the conflict between the necessity of R&D and accessibility of patented products the problems will continue.

In fact, many of these problems arise because of monopolies granted under patent law. Consequently, if we are to effectively solve these problems, we have to find a legal alternative in patent law that can offer a better balance between costs and benefits than a legal monopoly. Compulsory license could be the basis of one of these alternatives, as it will be proved in this work. In order to do that, it is necessary to reformulate some aspects of the patent theory, taking into account the identification observed in some theoretical and practical issues between patents and monopolies. These are not accidental identifications as they serve as a strong support of the actual patent regime.

Monopoly costs is a well-known concept in economics as well as in other social and political sciences. Therefore, proposing a monopoly means a clear contradiction with the general economic analysis recommendations and an exception to the rules generally accepted about how markets have to function. Patent law grants, as one of its main provisions, the exclusivity clause in favor of the patent owner. Due to this clause, the patent owner is the only one who can use the patented invention since the law grants him the right to prevent third parties from producing or trading the patented product. Furthermore, by means of the so-called innovative clause, nobody can patent a similar product to the first one, assuring that no proximate substitute can be in the market place. When a product is patented, current patent law grants a legal monopoly in favor of the patent owner.

There are two main economic justifications for this legal monopoly. One is the need to give inventors and innovative companies incentives higher than free market gives. The other arises from the concept of technological knowledge as a free good.

The manner in which a legal monopoly functions is to generate scarcity on the patented product and through it, allows a patent owner to appropriate a quasi rent. Consequently, it gives them incentives to promote inventions in the amount, it is presumed, the society will need.

The above reasons for supporting a legal monopoly in patent law are indeed persuasive but at the same time, besides the general and well-known objections arising from a monopoly, deserve important and more specific criticism.

The first is that these reasons, notwithstanding the way some people use them, are not specifically in favor of granting a legal monopoly, but in favor of any system able to give incentives to the patent owner.

The second is that doubts are arising with the extension of standard patent legislation all over the world due to the conclusion of GATT's Uruguay Round, since there is not a consensus about the benefits this system generates in developing countries.

Finally, there is an increased concern about the cost, efficiency and fairness of the exclusivity system, not only because of its administrative and court problems, but also because of the higher prices society has to pay for certain patented drugs.

All of these problems, are strong enough to justify a rethinking of the traditional foundation of legal monopolies in patent law. Moreover, it is necessary to analyze the relative merits of a legal monopoly in comparison with other legal alternatives to try to find the one that assures the best balance between benefits and costs under patent law. Only in this way, we can be sure if we are focusing all our efforts in order to solve the problems related to the accessibility of patented drugs.

A legal monopoly is just a promotional method to encourage inventions, but it is not the only one to achieve that goal as there are several other alternatives that could create an incentive to generate and put inventions in the market.

Among these alternatives, the automatic license system can preserve market competitiveness to a substantial degree. When this alternative is adopted a legal monopoly is avoided all together and so are its particular and general objections.

When a system like this is in force any enterprise willing to produce or trade the product under a patent, can do so, by paying a royalty to the patent owner. An automatic license system provides, as does a legal monopoly, an additional incentive in the free market to innovative companies. It gives market value for inventions and establishes that competitors or imitators can produce or use the product under patent by paying a price - the royalty - to the patent owner. Therefore, this system permits a patent owner to collect R&D costs and profits, necessary to develop and put inventions in market.

Finally, it will be proved that an automatic license system affixing a royalty that compensates the total amount collected by the innovative companies in exercising a legal monopoly is clearly superior to creating a legal monopoly in patent law. It generates the same amount of income to the innovative companies but at the same time gives incentives for a substantial increase in the production and a substantial decrease of the prices

The automatic license system generates greater profits for the production factors, reducing prices and increasing production with substantial increase in the benefit to the consumers maintaining incentives which economic freedom and competition offer for investments and efficiency.

## ***CHAPTER I: GENERAL APPROACH***

### **1. INTRODUCTION.**

**Many people involved in academia, as well as various opinions makers and interest group members agree that the present patent regime means high drugs costs for everyone except for a few select companies and people. Many people recognize the need to do something to change this situation. Problems that have recently arisen with the supply of HIV drugs in Africa have deepened this belief. Even in EE UU, many people have expressed a deep concern about patient accessibility to patented drugs.**

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**In a recent meeting to discuss solutions related to African problems with HIV, the president of Glaxo, a pharmaceutical company, repeated the commonly held opinion that compulsory license is a killer of Research and Development (R&D) companies. This apparent naive affirmation, impossible to prove scientifically, prevents alternative solutions in a way that until we can resolve the conflict between the necessity of R&D and accessibility of patented products the problems will continue.**

**In fact, many of these problems arise because of monopolies granted under patent law. Consequently, if we are to effectively solve these problems, we have to find a legal alternative in patent law that can offer a better balance between costs and benefits than a legal monopoly. Compulsory license could be the basis of one of these alternatives, as I will try to demonstrate in this work. In order to do that, we have to reformulate some aspects of the patent theory, taking into account the identification observed in some theoretical and practical issues between patents and monopolies. These are not accidental identifications as they serve as a strong support of the actual patent regime.**

**My present work tries to demonstrate an alternative to a legal monopoly in patent law that encourages innovations as does legal monopoly, but with less social and economic costs. Additionally it tries to clarify the effect and real role of monopolies in patent law.**

## **2. LEGAL MONOPOLY IN PATENT LAW: ARE JUSTIFICATIONS ENOUGH?**

**Monopoly costs is a well-known concept in economics as well as in other social and political sciences (1). Therefore, proposing a monopoly mean a clear contradiction with the general economic analysis recommendations and an exception to the rules generally accepted about how markets have to function (1a). Patent law grants (2), as one of its main provisions, the exclusivity clause in favor of the patent owner. Due to this clause, the patent owner is the only one who can use the patented invention since the law grants him the right to prevent third parties from producing or trading the patented product. Furthermore, by means of the so-called innovative clause (3), nobody can patent a similar product to the first one, assuring that no proximate substitute can be in the market place. When a product is patented, current patent law grants a legal monopoly in favor of the patent owner (5)(6)(7).**

**There are two main economic justifications for this legal monopoly. One is the need to give inventors and innovative companies' incentives (higher than free market makes) in the free market. (8a) (9). The other arises from the concept of technological knowledge as a free good (10). Under this last point of view, a patent is considered necessary in order to give value to a scarce good, i.e. information, which does not have a market price but does have a production price. Therefore, production of this information, may be less than society needs (11). However, in relevant cases, positive costs are necessary to reproduce, incorporate or "imitate" technological knowledge, so, in these cases the market price of information will not be zero. This observation does not invalidate the argument in favor of special**

incentives as, in general, “imitation costs” (costs to imitate or incorporate new technology) are substantially lower than “innovative costs.”

In a market situation without legal and political measures to protect investments in R&D, buyers will pay nothing for R&D costs, since they can get the same products from competitors, or imitators, at a price that they did not initially bear (14). Competitors will have to take into account manufacturing costs and imitation costs of new products, but not R&D costs, which are costs only innovators, have to pay to obtain the inventions and put them in the market. If imitators want to have an extraordinary profit by charging for R&D costs, that they have not incurred, competitive forces will tend to reduce them and, finally, market forces will eliminate extraordinary profits, which means eliminate R&D minus imitation costs in their final prices (16).

Therefore, it is possible to conclude that in a market situation characterized by absence of special legal and political measures to protect investments in R&D, people or companies interested in obtaining them do not have the necessary reward or incentive to afford this kind of investment (17) (17a). Consequently, inventions and social welfare would be less than they would be if special incentives to protect innovative activities were adopted.

These are the reasons commonly accepted to explain why patent law has to create a legal monopoly in favor of the patent owner allowing him collect R&D costs plus the profits that the innovative activity required. In other words to explain why a patent “... confers the right to secure the enforcement power of the state in excluding unauthorized persons, for a specified number of years, from making commercial use of a clearly, novel and useful identified invention.” (17b)

The manner in which a legal monopoly functions is to generate scarcity on the patented product and through it, allows a patent owner to appropriate a quasi rent. Consequently, it gives them incentives to promote inventions in the amount, it is presumed, the society will need (18).

The above reason for supporting a legal monopoly in patent law is indeed persuasive but at the same time, besides the general and well-known objections arising from a monopoly (19), deserves important and more specific reasons to reject granting it under patent law.

Let me mention some of them. The first is that the reasons supporting special legal and political measures to encourage innovation are not reasons in favor of granting a legal monopoly but, notwithstanding the way some people use them, in favor of any system able to do that. This implies, in turn, the necessity to find specific justifications for legal monopolies, other than the general ones, in relation to other alternatives. Work not being doing yet in the measure it deserves, and, in my opinion, hardly difficult to do as it becomes evident taking into account the development of monopoly studies in economics.

The second, doubts arising with the extension of standard patent legislation all over the world due to the conclusion of GATT’s Uruguay Round, taking into account that there is not a consensus about the benefits this system generates in developing countries (20).

Finally, an increase concern about the cost, efficiency and fairness of the exclusivity system, not only because of its administrative and court problems, but also because of the higher prices society has to pay for certain patented products (21).

All of these objections, in my opinion, are fair and strong enough to justify a rethinking of the traditional foundation of legal monopolies in patent law. Moreover, it is possible, and necessary, to analyze the relative merits of a legal monopoly in comparison with other legal alternatives to try to find the one that assures the best balance between benefits and costs under patent law. Only in this way, we can be sure if we are focusing all our efforts in order to solve the problems related to the accessibility of patented products.

### **3. DESCRIBING THE PROBLEM. LEGAL MONOPOLY JUST AS ONE PROMOCIONAL SYSTEM TO PROMOTE INNOVATION.**

Suppose we have to accept that special legal and political measures are needed to promote inventions in order to maximize social welfare. Is exclusivity or a legal monopoly the only way to do that or are there other alternatives? In addition, if there are other alternatives, which is better in reaching the goals of the system at a minimum cost? Alternatively, if we want to look at the same matter from another point of view: which way works best to get more inventions while spending the same amount of resources?

A legal monopoly is just a promotional method to encourage inventions, but it is not the only way to achieve that goal. Consequently, it is necessary to demonstrate the virtues of a monopoly in comparison with other alternatives before adopting it as the best legal way of promoting inventions. This means we must determine the effectiveness of a legal monopoly in developing inventions measured in terms of the costs the society has to pay, comparing these results with the ones obtained by the adoption of other alternatives. I will analyze this comparative issue next.

### **4. LEGAL MONOPOLY OR PAYMENTS OF ROYALTIES: TWO POTENTIAL RIVALRY SYSTEMS.**

The first of the questions is simple to answer because there are several alternative systems other than a monopoly that could create an incentive to generate and put inventions in the market. Some of these alternatives have been extensively described in the current bibliography (24) but they include: invention certificates, direct subsidies, purchase of the invention by governments, license etc.

Among these alternatives, the automatic license system can preserve market competitiveness to a substantial degree. When this alternative is adopted a legal monopoly is avoided all together and so are its particular and general objections. Automatic licenses should be studied to make comparisons with the adoption of a

legal monopoly in patent law. I will describe and analyze payment of royalties as a rival promotional system of legal monopoly later in this chapter.

The second question is not so easy to answer and there are only a few studies on its theoretical and political importance. Furthermore, in my opinion, conclusions currently reached are not well founded, and not well developed. There are several reasons explaining this situation and we will describe and study them in point 8.

## **5. PAYMENTS OF ROYALTIES OR THE “AUTOMATIC LICENSE SYSTEM”.**

### **1) DEFINITION.**

When a system based on payments of royalties is in force any enterprise willing to produce or trade the product under a patent, can do so, by paying a royalty to the patent owner. Therefore, market competitiveness is assured and, at the same time, serves as a reward for the patent owner. Let me call this system “automatic license system” or, briefly, “royalty system.” An automatic license system provides, as does a legal monopoly, an additional incentive in the free market to innovative companies. In fact, it gives market value for inventions and establishes that competitors or imitators can produce or use the product under patent by paying a price - the royalty - to the patent owner. Therefore, this system permits a patent owner to collect R&D costs and profits, necessary, according to the suppositions previously accepted, to develop and put inventions in market. Edith Penrose called this system an “unconditional obligatory license”. Penrose defined this as a system where any patents are available by means of the payment of royalties, which is the same definition adopted in this article (25).

### **2) AUTOMATIC LICENSE SYSTEM VERSUS OBLIGATORY OR COMPULSORY LICENSES.**

#### **a) GENERAL BACKGROUND**

Only the United Kingdom and Canada had adopted the automatic license system, as described above, but only for pharmaceuticals. In Canada, a system of payment through royalties was in effect until 1987 in order to maintain the lowest possible price for medication. Since 1923, Section 41 of the Canadian patent law projected a compulsory licensing system for nutritive and medication products by means of a royalty set at 4% by the patent commission in order to assure its availability to the public at the lowest possible price. (27). Therefore, there is a lack of empirical cases lending support to this concept. However, the concept of a regiment like this is a very old one and has been discussed and proposed on many occasions. Edith Penrose has cited several examples and mentioned

briefly some of the problems as to why many countries refuse to put it in force (28).

Nevertheless, other license systems are well known and have been adopted in most countries and situations. In fact, obligatory or compulsory licenses have been created to solve particular competitive problems, to assure goals in the fields of public health or public interest, or to promote national production on the product under patent. As Carlos Correa pointed out, compulsory licenses are a very old institution in patent regime and serve as an important instrument to avoid certain monopoly practices (29) or to reach different public goals.

**b) IS COMPULSORY OR OBLIGATORY LICENSE A CORRECT NAME?**

Obligatory license was established in GATT Uruguay Round but under the name of “other uses without the authorization of the patent owner” (30). In my opinion, this name is better than compulsory or obligatory license, because it points out in a more accurate and objective way the real nature of the different rights created by patent law.

In fact, the name obligatory or compulsory suggests that the rights of the patent owner be being violated. However, it ignores the fact that the only one who can produce or trade the patented product is the patent owner, which is a departure from the concept of legal monopoly as the only way to encourage innovation or as a natural right of the patent owner. Furthermore, as some authors stressed, this kind of license has to have a narrow and exceptional use, a conclusion which is not demonstrated as it is strictly based in what the name compulsory license suggests.

On the contrary, in a more appropriate way, the name “other uses” shows that exclusivity and licenses are rights created by law and have to be considered as a whole or on their proper merits. For a more extensive discussion about this topic, see chapter II point 2.

Let me call compulsory or obligatory licenses, as we understand it in its traditional version, “conditional license” (31).

**c) LICENSE AND COMPETITION.**

“Automatic license system” is a more radical regime than the conditional license system. In fact, automatic licenses avoid exclusivity or a legal monopoly entirely since a legal monopoly is not granted in patent law, so its goal is not to avoid particular problems generated by legal monopoly, as the conditional system tries to do. Consequently, we can define “automatic license system” as a system designed to pay innovative companies introducing a minimum disturbance into the competitiveness of the markets.

An automatic license system and the conditional system, despite their differences, have some essential points in common. In fact: no matter which of the systems is in force, when

in force, anyone willing to produce or trade the product under patent, can do so, as long as they pay the royalty. A “conditional system” is granted under the so-called non-exclusivity clause, which states that when a compulsory license is granted any person, or company can ask for another (32). When a license is granted in the conditional system, competition is introduced in this particular market, and, therefore, its effects are the same caused by the automatic license system as this last system, by definition, introduces competition in all the markets and then, specifically, in this particular one. This is the reason why the “conditional system”, when applied to many products, could become an “automatic system”, as Casimir Akerman said (33). Then let me not differentiate between both systems except when reasons exist to do so.

## **6. CURRENT STUDIES IN THE COMPARATIVE ISSUE. COMMON OPINION ON MONOPOLY AND COMPULSORY LICENSE.**

In general, when a comparative issue is at stake, it is accepted that compulsory license can diminish the costs associated with monopolies but, at the same time, it is also accepted that it can negatively affect the net income of innovative companies and therefore, the drive for innovation. This appears as a contradiction between social benefit and innovation in patent law because it is commonly accepted that if we want to have innovations, then, we also have to accept the costs of monopolies. This result is used for rejecting compulsory license as a system and supporting a legal monopoly in patent law. However, studies to solve this contradiction have been done in general terms.

Among the issues studied extensively in relation to this problem, we should mention the effects legal monopolies have on promoting R&D or protecting the rights of inventors or innovative companies. On the other hand, problems this legal measure causes on the drug accessibility for people or, in various aspects, over poor or undeveloped countries and how compulsory licenses act in this background. For a survey on this literature, see Carlos Correa (34) and Primo Braga (35)

Some authors have developed more specific and accurate comparative analysis among different payment systems, but their studies have been done with a different aim than what I propose in this work. For example, MORTON KAMIEN: “PATENT LICENSING” (36); MORTON KAMIEN; S. OREN AND Y. TAUMAN: “OPTIMAL LICENSING OF COST-REDUCING INNOVATION” (37); MC GEE (38), among others.

Those articles focus on the comparative issue, but from the viewpoint of the optimal options facing patent holders for exploiting their inventions; among them: exercising monopolistic rights, establishing fixed commission collection, or finally, taking bids on commissions. In all these cases these authors analyze which of these alternatives is better for the patent owner, in terms of their own profits, but they do not investigate the relative merits of these systems in order to maximize social benefit.

TANDOM in “PATENT EXPLOITATION: SOME ECONOMIC AND LEGAL PROBLEMS” (39) concluded that the royalty system is better than a monopoly system when the question is analyzed through an explicit benefit equation. Tandom concludes that the royalty system could maximize social benefit, but recognizes it can also generate a shortfall in the innovative companies’ revenues, so his analysis

did not solve the contradiction between innovation and benefit goals.

The difference between Tandom's analysis and the traditional point of view, arises because in Tandom's analysis the shortfall of the innovative companies' revenues is due to the process by which society reaches the amount that it is willing to pay for this kind of activity. That is to say, in Tandom's analysis, the shortfall produced by the application of the royalty system comes from the amount of money expended in innovation compared to the amount the society wants to spend in innovation.

This analysis is really attractive since nobody says why, from the point of view of society, it is necessary to grant the innovators the monetary incentives of a monopoly and no one says why we have to accept this quantity as the quantity of money the society wants to spend for this objective. Of course, this amount could be excessive or not from this point of view. But, on the other hand, it is not explained why we have to accept that the amount society wants to expend in innovation is necessary to generate the quantity of inventions it needs, which is a matter of opinion. Therefore, we return to our first problem: an automatic license system could indeed improve the benefit situation but, at the same time, could negatively affect the drive for innovation.

## 7. CURRENT CONCLUSIONS IN THE COMPARATIVE ISSUE.

Taking into account Nordhaus (40), Mc Gee (41), and Scherer (42), among others (43), it is possible to consider what the current conclusions are in the comparative issue:

1. a system based on payments of royalties can never improve legal monopoly results, because it can only assure, as a maximum, that innovative companies receive the same income in both cases;
2. even in this extreme case, it can not produce a real gain in the benefit situation;
3. it is possible to obtain an apparent gain in the benefit situation if we fix the value of the royalty down the point that assures the same innovative company income as legal monopoly does but causing, necessarily, a decrease of the innovative companies' revenues and so, at the cost of possible decreases of the monetary incentives for the innovation.

In my opinion, these conclusions are true only under very particular conditions, as we shall see in chapter III. Therefore, there are not general conclusions. Additionally, on occasion, they find support in some misleading common opinions that generate an important misunderstanding in the comparative issue. These common opinions, from my point of view, lead to important, yet erroneous, support for granting legal monopolies in patent law.

## 8. PROBLEMS IN COMPARATIVE CURRENT ANALYSIS: FOUR CURRENT MISLEADING OPINIONS ON AUTOMATIC LICENSE SYSTEMS.

As I have mentioned it is commonly accepted that a compulsory license, when

**adopted, reduces costs associated with monopolies, but it is also commonly accepted that it reduces the innovative companies' revenues, and thus, negatively affects the drive for innovation. Therefore, it is concluded neither that the automatic license system can not be considered as a general nor as a real solution to problems generated by a legal monopoly. Consequently, this last system is commonly considered the most appropriate way to encourage innovation and compulsory license is considered a useful instrument only under very special circumstances.**

**The argument described is common in academic circle (44) and has great political and practical influence. As an example we mention a study conducted for the United States Senate (45), which compared the current system for pharmaceuticals in the U.S., a country where a legal monopoly favors the patent owner versus the Canadian system, which, at that time, provided an automatic or compulsory license for pharmaceuticals. The "automatic license" applies to a specific market (44a).**

In my opinion, this common conception about the relative merits between monopoly and compulsory license, are not well developed nor well founded in part due to the reasons we will see in Chapter III, but also because of four common, but misleading opinions. The first of them appears when a compulsory license is considered as a punishment of the patent owner. The second when welfare market costs of a legal monopoly are considered as a necessary condition for innovation. The third when a legal monopoly is considered as a patent owner's moral right, and the fourth, when patent law exclusivity is not considered the same as granting a legal monopoly. Let me explain and clarify briefly these common viewpoints because, in my opinion, they help to explain why automatic license systems have not been studied enough as a rival system of legal monopoly.

#### **1) FIRST COMMON OPINION: COMPULSORY LICENSE AS A PATENT OWNER'S PUNISHMENT.**

**A compulsory license is currently considered an instrument to punish patent owners. The term compulsory indicates this circumstance because if patent owners do what the policy makers want them to do, why should policy makers need to impose a license against their will?**

**As we have seen in previous points, obligatory license is conceived as a remedy to solve certain competitive problems generated by legal monopolies or as a means to reach particular public objectives -- this is the common practice in most countries. The way a compulsory license functions is to prevent patent owners from exercising monopoly power over the patented product. Therefore, the owner can not collect the monopoly price, taking the maximum price he could collect and the price, which permits him to reach the maximum income, possible.**

**In that way, policy makers obtain less price and more supply on the patented product. Then, in practice, when a compulsory license is applied and competition is introduced in the market place, and a low royalty determined, patent owners collect a lesser amount of money than they could collect left on their own. This circumstance defines the punishment role. Therefore, assuming this is the exclusive goal of the compulsory license system, it is logical to conclude that this system decreases the innovative company's income and, therefore, negatively affects the discovery and appearance of new products in the market**

place.

As a consequence, we have to conclude that an obligatory license, when applied as an “automatic license system,” does not have a real social benefit because while it produces a drop in the cost of new products, it also produces a decrease in the appearance of new products in the market place. Therefore, it will produce a lesser cost for a non-existent product, which means no gain at all.

Of course, as soon as we abandon punishment as a goal of obligatory licenses, it is possible to analyze under what circumstances the license system will decrease a patent owner’s net income and where it will not. We will demonstrate in Chapter III, that, in most cases, there is a level of the royalty payment by licensees that makes a legal monopoly and automatic license system equal in terms of the innovative company’s income. Therefore, at this level of royalty, innovative companies will obtain the same income no matter which system is in force. Then it is possible to make a social benefit analysis comparing the two systems in order to judge which is better from this point of view (see chapter III).

## **2) ANOTHER CURRENT MISLEADING COMMON OPINION IN THE COMPARATIVE ISSUE: LEGAL MONOPOLY MARKET COSTS AS A NECESSARY CONDITION FOR INVENTION.**

As we have seen, it is possible to argue that in patent issues, there can be a contradiction between two main political objectives: incentives for the innovator versus the social necessity that the invention will be free for all who will want access to the invention. When considering legal monopoly, this means, the contradiction between (cuasirents) generated by this promotional system, against welfare market costs involved in monopolies.

However, some authors have denied the existence of such contradictions because they argue that welfare market costs of a legal monopoly are the necessary condition for inventions. Therefore, they have concluded that the monopoly system has no real welfare costs. Of course, in this conception, compulsory license affects negatively legal monopoly incentive and, thus, the appearance of new products in market; so they have concluded the uselessness of this instrument; for example Turner D. “the patent system and competitive policy.” (46)

As we have seen, the argument can be refuted just by taking into account that there are other incentive mechanisms to promote inventions than a legal monopoly. However, it is interesting to describe it briefly, for a better comprehension of the issues developed in the present article.

First it is important to note that considering welfare market costs inherent to a legal monopoly as a necessary condition for innovation is not without controversy even under the suppositions commonly accepted about obligatory license effects. In fact, it is easy to see that there is not an unavoidable relationship between a “monopoly system” and inventions, because some inventions appear without this kind of incentive. Furthermore, there are many

variables affecting inventions. It is fair to conclude that the relationship between a legal monopoly and inventions is not necessarily true as it implicitly or explicitly appears in some studies. There may be very good reasons to maintain a monopoly as a condition for invention, but there may also be very good reasons to deny this relationship (47). It is possible to find one example of the difficulties of the monopoly system in Scherer (48). Of course, there are several other arguments in favor or against the issue. Therefore, if we really want to know what is the true relationship between both variables, we have to look to empirical research to determine the real cause of innovation (49).

It is important to note that if it was not possible to find a direct relationship between a monopoly system and invention, then, it would also not be possible to find that monopoly systems have only costs, because inventions could appear independently of the incentives created by it (50).

In a previous article (51) I did not find a positive relation between legal monopoly and inventions in pharmaceutical in the period... furthermore, figures suggested an inverse relation between both variables (52).

In conclusion, it is not possible to sustain neither in theoretical terms nor in empirical ones that a legal monopoly is a necessary condition of inventions.

### 3) THE THIRD MISLEADING OPINION IN COMPARATIVE ISSUE: LEGAL MONOPOLY AS PROPRIETARY RIGHT. IS IT POSSIBLE A NATURAL MONOPOLY RIGHT?

We have pointed out the necessity to analyze comparatively legal monopolies granted in patent law with other remuneration methods to determine which is better in terms of social benefit. We have accepted that the main goal of granting a legal monopoly in patent law is to promote inventions. It is also possible to argue that there is a moral right to legal monopolies and that the right of patent owners to their products supersedes all other rights. (53).

The argument used as in support of the “ethical position” is that the innovative companies have a right of exclusive ownership on their inventions. Therefore, it can be inferred that if a legal monopoly were not granted, an elemental right would be ignored: the right of ownership – one of the fundamental elements of a capitalist system. (54)

This issue has been analyzed by various authors and from various points of view. Let me briefly describe some of them.

We can group these criticisms into three categories. The first group accepts that a proprietary right exists but it is not absolute, especially, but not exclusively, when goods promoting health are involved. From this, one can infer that it is lawful to limit this right (55). Spota has argued that a proprietary right is not absolute and that other representative rights – values that are part of Occidental society and Democratic systems - limit it. The need to reconcile these rights with

values justifies limiting exclusive rights. (56)

A second group of critics contends that such proprietary rights do not exist because patent rights are limited by time and one cannot concede a temporary right of ownership. Two reasons have been suggested to explain this time limitation for the rights that the patent awards. First, it would be extraordinary to award a legal monopoly in a permanent manner. Second, innovative companies do not have full or total rights over the innovation, but rather a limited right, since what they have done is to use public goods (accumulated knowledge) to establish a development applicable to industry or to the economy. In other words, these companies may not, must not, control all of the revenue which the innovation generates. (57)

Another type of criticism is based on the notion that such proprietary rights do not exist since the proprietary rights are always given on singular goods and not on categories of goods. In other words, innovative companies, by invoking proprietary rights, can not exclude third parties from possessing equal or similar goods to those that he possesses, as Rothbard stated in “Monopoly and Competition.” (58). Rothbard carries it even further and suggests that granting a monopoly is to affect the proprietary right because....”Patents constitute privileges of exclusive monopoly granted by the state, which invades proprietary rights within the market place. The fundamental distinction between patent and author’s rights does not apply, as one is mechanical and the other literary. The fact that they have been applied in this manner is an historical accident and does not reveal the basic difference between both institutions. Such fundamental differences lie in the fact that the author’s copyright is a logical attribute of the proprietary right within the free market. Whereas the patent is an invasion of said right.” In other words, Rothbard argues that a monopoly goes against proprietary rights and including exclusivity or a legal monopoly in patent laws should not be done by invoking a presumptive proprietary right.

Furthermore, proprietary rights, in general, do not prevent copies when dealing with goods which can be produced independently, as in this case. (59). In “DEFENSE OF OWNERSHIP OR MONOPOLY” (60), I have analyzed these issues.

In conclusion, whether or not innovative companies have proprietary rights on their inventions, is a highly debatable issue. Furthermore, it seems evident that, whether or not companies have this right, companies do not have an ethical right to monopolize the market. And this is the real point, even when it can be alleged that innovative companies effectively have rights over their inventions, it can not be inferred that they have the right to monopolize their exploitation or to impede third persons from producing or commercializing the product. Actually, since no one can invoke an innate or natural right to monopolize something then we are not ethically obliged to grant the exclusivity and the clauses we have cited as elements constituting a legal monopoly. Therefore, it is necessary to find a justification for them, in particular in respect to their relative social benefits and costs in relation to other systems conceived to satisfy the multiple rights involved in patent questions.

**4) THE FOURTH MISLEADING CURRENT OPINION: “CURRENT PATENT LAW DOES NOT GRANT A LEGAL MONOPOLY.” UNDERSTANDING ECONOMICS.**

Some authors have argued (61) that patent law does not grant a legal monopoly because it is always possible to produce, commercialize or patent a product similar to the first patented product. It is easy to understand the confusion over the issue because no one (no one here means a professional economist or economics) has defined monopoly as a situation in which an enterprise is able to satisfy per se, as the only supplier, the demand. On the contrary, in economics, a monopoly is defined first, as a situation in which an enterprise is the only supplier of a product, and there are no proximate substitutes of the product.

Therefore, economists and economics, have defined monopoly by looking on the supply side of the market and, only partially - through the second condition of proximate substitutes - on the demand. Economics has not defined monopoly as the exclusivity of one enterprise in satisfying the demand; that is to say as an enterprise “monopolizing” the demand. Of course, if a company is the only one that could satisfy the demand and nobody else could do it, this company has a monopoly. But in economics it is not necessary to go to such an extreme to define a monopoly, as one company would be a monopolist even when it could exist with other companies producing products for the same necessity but under the condition that the products they produced were not proximate substitutes to the first one.

What is important in this discussion and in the context of the present article, is not which of the two definitions is better, but under which conditions the conclusions reached by economics are applied. In this sense, we are speaking about the dominance of the supply and not the dominance of the demand, as the authors we are commenting on have postulated.

Of course, supply, demand, competition and monopoly, and many other concepts in economics, are relative concepts, not absolute ones and we can understand different things when using them. However, it is clear that when we use the term monopoly we are speaking of supply and partially of demand. Besides, it is not necessary in the extreme condition to define a monopoly as a situation in which an enterprise has a full control of the demand to apply economical monopoly theory. Some examples will help us to clarify this situation.

If we adopt the fourth misunderstanding, we have to accept that a company which has the exclusivity to operate airplanes, and therefore the ability to prevent anyone from transporting passengers or merchandise by airplane or, for example by helicopters, would not be a monopoly because it is always possible to transport passenger or merchandises by water or land. Of course for us and for economics this company has a monopoly but people could still transport themselves or merchandises by car, boat or, simply, walking.

In the same way, suppose a company has the exclusivity over telephone service and that no other company can operate in this area. According to the fourth

**misunderstanding, this company would not be considered a monopolist due to the fact that people could communicate through smoke signals or by carrier pigeons!**

**As noted, concepts in economics are relative and so is the term monopoly. In fact, what is the degree of proximity of a product that can define the second condition of a monopoly? In addition, what is the value of the elasticity of demand that could help us to define a monopoly? These are very controversial issues and have several answers, depending on the different situations in which companies would have different market power or a different degree of monopoly depending on each scenario. In some cases, it is fair to ask if there is or there is not a monopoly. However, under current patent law there is no doubt because the law itself defines the monopoly by giving exclusivity in favor of the patent owner and prevents other companies from patenting, producing and commercializing proximate substitutes of the product. This last consideration is in the logic of the actual patent system as, to the contrary patent law would have no effects on innovations and, if it were so, why we need such a legal regime or such a clauses in law?**

**Monopolizing the demand is an extreme case of monopoly and I can not cite any examples of such a condition. If such a condition does exist, I would think there would be a very few of them. Indeed, it is very hard to think of one. Then, unless we use these definitions as a parameter to judge other situations, and this is not the way it is used in economics, this definition is so narrow as to be impractical in every day usage. Therefore, it is better to leave it as an example of an extreme monopoly.**

**So, patent law grants a legal monopoly and this is the basis of the current system to encourage innovations.**

## **NOTES**

### **CHAPTER ONE**

(1) Bibliography is extensive, see for example:

(1a)

(2) Patent law references are in accordance with GATT Agreement provisions

(3) This clause establishes that “ (copy):

5) In a process patent case, patent law does not grant necessarily a monopoly on the product, due to the possibility anyone can develop and patent

an alternative technology. In this case, competition is possible and, if economic conditions justify more innovation, it would be competition on the products obtained with this technology. Then, text will be referred to product patent.

- (6) Some authors have argued that legal monopoly is not granted in patent law, due to the possibility other products can be developed to satisfy the demand, for example: .... See cap 1 point 8 for a comment on this argument.
- (7) There are others than economic justification of the patent monopoly; one of them will be analyzed later. For a survey in this matter, see (Harvard)

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**(1a): Joseph C. O'Mahoney "The patent has, from its inception, involved a basic economic inconsistency. In a free enterprise economy dedicated to competition, we have chosen, ... " foreword of Fritz Machlup; JOHN S. Mcgee: "It is a commonplace observation that patents and competition are to some extent incompatible" Patent Exploitation ... . Sometimes this contradiction is tried to solve differentiating short run from long run. In that sense the argument admits in short run welfare lost run due to exclusivity, but it postulates welfare gain in long run due to dynamic efficiency, that includes the invention and commercial introduction of new products and processes. Competition Policy page 11. The argument explains the problem but do not solve the contradiction, as we will see later.)**

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**(8a) At this point, let me differentiate production costs, which are costs necessary to manufacture products, from R&D costs, which are costs necessary to obtain inventions and to bring them into commercial use**

- (9) Edwin Mansfield: "Intellectual Property, Technology and Economic Growth", in Intellectual Property Rights in science, Technology, and Economic Performance", page 23).

**(10): L Von Mises speaking of technological knowledge required for production as a recipes, stated: " ... " (Cit in Fritz Machlup, op cit, page 26. See also Competition Policy... page 11: Innovation is basically information and information can be used without used up, .... ).**

- (11) Competition Policy:

"New technological knowledge differs from other goods in an important way: It cannot use up. A person or firm can use an idea repeatedly without wearing it out, and the same idea can serve many users at the same time. This property of knowledge creates an important problem for any firm that would like to make a business of producing knowledge. For an investment in research and development to be worth considering, a firm must be able to sell its results, directly or indirectly, for a price. But, who would be willing to pay for a commodity that, once produced, become available to all in unlimited quantity?" Mansfield op cit p 24.)

- (17a) Nevertheless, it is argued that an innovative company or an inventor can have,

without any special protective measure, a special market advantage due to the fact they can be the first in the market.

(14) As Scherer pointed out: “The funds supporting invention and the commercial development of inventions are front- end “sunk” investments; once they have been spent, they are irretrievable bygone. Ind market, etc ...”.

**(16): “... se puede aducir que la competencia reducirá tan rápidamente las ganancias de los innovadores, que nada va a quedar para evitar el “naufragio” de los costos del tiempo, esfuerzo y dinero dedicados al invento y a su desarrollo, costos que los competidores no tienen, ya que solo imitan el resultado final” Edith Penrose, “ La economía ... pág 36).**

(17b) Fritz Machlup “An Economic Review of the patent system”, pg 1.)

(18) As Scherer said: “To reward who invest their time and money in technological invention and innovation, and thus to encourage such investment, has been the classic function of invention patents since the first patents were granted in fifteenth century Italy” Industrial Market Structure and economic performance”, pps 621, and Mansfield: Patents law “... make it possible for firms to produce new knowledge and to sell or use it profitably” op ct pág 24.)

(19) Some of the objections are illustrated in Scherer op ct pg 624, Fritz Machlup, ..., Dale A Nance, and others, Harvard Journal of Law & Public Policy, Volume 13 Number 3, Summer 1990, Symposium on Law and Philosophy,... . From other point of view see OCDE s Publication “Competition Policy and Intellectual Property Rights” paris 1989, and Primo Braga, non paper)

(19) (F Machlup (la frase famosa; también ; Edith Penrose) (see also Carlos A. Primo Braga World Bank Discussion Papers, “Strengthening ..., pg 80) and Lester Thurow: “needed: A New System of Intellectual Property Rights”, Harvard Business review, September October 1997;

(20) Love, Nader, el francés, thurow

(21) As Jamie Love pointed out: ...), C Correa.

(24) (see for example Edith Penrose op ct and in Fritz Machlup op ct; it is interesting the W Lesser observations about inventor’s certificates: “Another variant, often but not exclusively used in centrally planned economies, are inventors’s certificates, a form of nonexclusive patent”. William Lesse Strengthening Protection of Intellectual Property in Developing Countries” World Bank Discussion Papers.).

- (25) op ct pág 166).
- (27) referencias bibliográficas sobre caso licencias compulsivas en Canadá, for some information about the system in United kingdom, see Scherer ... ).
- (28) Edith Penrose when mentioned problems with automatic license system)
- (29) Carlos Correa: Propiedad Intelectual y Competencia: el papel de las licencias obligatorias).
- (30) Gatt Other uses: Cap ...
- (31) Edith Penrose op cit...).
- (32) note refering to art of GATT about non exclusivity clause).
- (33) Edith Penrose Pag 171.

**(34): C Correa general bibliography)**

**(35): referencia bibliografica de Primo Braga y otros).**

**(36) “HANDBOOK OF GAME THEORY”, AUMANN AND HART (ED), ELSEVIER SCIENCE PUBLISHER, 1992)**

**(37): JOURNAL OF MATHEMATICAL ECONOMICS, 21, 1992)**

**(38): articulo de Mc gee)**

**(39): JOURNAL OF LAW AND ECONOMICS, OCTOBER 9, 1966)**

**(40): Nordhaus)**

**(41): Mc Gee op ct.**

**(42): Scherer: el tema de licencias obligatorias**

**(43): this conclusion was properly obtained for the case of process patenting: ...),**

**(44): see note with other bibliographical references about predominant view in monopoly vs licenses).**

**(45): mencionar el estudio del Senado de los EE UU sobre farmaceuticos y Canada)**

**(46): referencia bibliográfica de TURNER).**

**(47): citar bibliografía de uno y otro lado acerca de ventajas o desventajas del monopolio aplicado a patentes, p ej Nougues: ...)**

**(48): Chapter 17 pág 624 “Complications)**

**(49): ver notas originales en recuo)**

- (50): mencionar el artículo de Davis en script y la publicación de la UN)
- (51): “consecuencias” en inglés)
- (52): op ct pags: ...)
- (53): mencionar el estudio de Harvard)
- (54): R. RAPP AND R. ROZEK; OP. CIT.; FIEL: “PROTECTION OF INTELLECTUAL PROPERTY RIGHTS”, MANANTIAL EDITION, 1991).
- (55): FELIX Loñ: “OPINION ON ISSUES OF PATENTING MEDICATIONS”, IN “MORE ON PATENTING PHARMACEUTICAL PRODUCTS. THREE LEGAL ANALYSES”, REVISTA MERCADO, DECEMBER 1991)
- (56): ALBERTO SPOTA: “NATURE OF THE RIGHT OF THE INVENTOR. PROPRIETARY OR MONOPOLY”, IN “MORE ON THE PATENTING OF PHARMACEUTICAL PRODUCTS”, OP. CIT.).
- (57): EDITH PENROSE: “ECONOMY OF THE INTERNATIONAL PATENT SYSTEM”, XXI CENTURY, MEXICO, 1974).
- (58): RESEARCH CENTER ON FREEDOM) (See also Machlup)
- (59): FRITZ MACHLUP: “AN ECONOMIC REVIEW OF THE PATENT SYSTEM”, STUDY NO. 15, SUBCOMMITTEE FOR PATENTS, BRANDS AND AUTHOR’S COPYRIGHTS, U.S. SENATE, 1958)
- (60): “LEGISLATIVE POWER AND ITS PEOPLE” MAGAZINE, JUNE 1992) AND “OWNERSHIP VS. MONOPOLY” (“FREE SOCIETY” MAGAZINE, JUNE-JULY 1992)
- (61): puedo mencionar el último trabajo de Rozek)

## **CHAPTER II**

### **SOCIAL WELFARE ANALYSIS**

**In chapter 2, I am going to apply social welfare analysis to judge, which of the two systems, legal monopoly or automatic license is better from this point of view. Previously, I will make some considerations about social welfare analysis applies to patents.**

#### **1. BASIS OF SOCIAL WELFARE ANALYSIS APPLIED TO PATENTS.**

##### **1) PATENT SOCIAL WELFARE GAINS: INCOME SIDE.**

**I will assume, as is common, that there is a direct relationship between actual or expected net income generated by a legal monopoly or the total of royalties they would receive in case the automatic license system is in force, in favor of the innovative companies', and the investments in R&D that these companies make and, between these investments and inventions. We can define net income as the difference between income or expected income of each quantity produced of the product under patent, and Total Company Cost (TCC) of the same quantity. TCC is equal to Cost Production (CP) plus R&D costs. (See a short discussion about this matter in point 2) of this chapter).**

**I have to make two observations on these assumptions -- first, as we have previously said, the final social goal of an incentive system is to get valuable inventions, not to assure a level of net income for innovative companies nor their level of investment. This observation is made because in some of the current literature there is confusion on this matter, due in part to some extreme suppositions formulated in it, as we will see latter (1).**

**Second, the relationships previously mentioned are empirical in nature and, consequently, we are not obliged to accept them as true relationships without a proper empirical analysis. In particular we are not obliged to accept that investment goes necessarily to inventions due to the simple fact that inventions depend on many variables other than investment (2), (3). However, for the sake of the specific goal of the present study, let me assume that all the relationships previously mentioned are true relationships (4).**

**Therefore, we can take the net income innovative companies collect or expect to collect for their inventions an indicator to be of inventions that society needs. Finally, let me define the social benefits of the Incentive system as the number of inventions caused by it.**

**Next, I will make a very simple description of the principal functions involved in the text. In signs:**

(1)  $Inv = f_1(Inv_t)$ ;

(2)  $Inv_t = f_2(NInc(q))$ ;

**Where  $Inv$  represents inventions;  $Inv_t$ : Investments;  $NInc$ : Net Income and  $q$ , level of production. Furthermore,  $f_1' > 0$  y  $f_2' > 0$ ,  
Therefore, an increase in net income collected or expected to be collected by the innovative companies' goes to an increase in the number of inventions that society obtains.**

*Additionally:*

(3)  $W = f_3(Inv)$ ; where  $W$  is social welfare and  $W_1' > 0$ ,

**Thus, an increase in net income collected or expected to collect by the innovative companies goes to an increase in social benefit.**

(4)  $W = f_4(NInc(q))$ , and  $f_4' > 0$

**This simple formula illustrates a traditional point of view: if a legal monopoly assures the maximum net income for the innovative companies, then, it has to be considered, from the social benefit point of view, the best instrument to promote inventions (5).**

**Nevertheless, this is only one side of the social benefit equation. We also have to consider the simple fact that people and society have to pay a price to get inventions. Then, there are two sides in the social benefit equation: the first postulates that the more invention society gets or, more net income innovative companies have, the greater the benefit to society. This side was previously illustrated and we can call it the income side. The second side says that the more resources society needs and uses to get more inventions, the less the benefit to society. We can call this side of the equation the cost side.**

*Looking on the Cost side:*

(5)  $W = f_5(Cq)$ , where  $Cq$  is total Cost and  $f_5' < 0$

## **2) PATENT SOCIAL WELFARE LOST. COST SIDE.**

**We can differentiate three kinds of losses in social benefit function:**

- Companies have to spend money in order to get inventions and put them in the market. These expenditures are costs and we have considered them in net income as TCC; let me return shortly to this point. First, we assume production costs

function as always (6), but we have to take into account that it is possible to find variations in Production Cost, depending on what incentive systems will be in force. Second, I suppose that innovators have the same R&D costs regardless of the incentive system we choose to analyze. At this point, we have to make another observation – a monopolistic company can be subject to fewer pressures in seeking efficiency than a company working in open markets. Then, it is possible that R&D costs for a monopolistic company will be higher than those operating in competitive markets. However, let me assume that these costs are the same for both alternatives we will study. Third, it is assumed that these costs are fixed costs.

- Governments spend money on several activities to generate and facilitate inventions. Therefore, we have to consider the cost side of government expenditures (Government Cost: GC) on the social benefit equation. We can do so by considering the opportunity costs of these funds invested by government. Let me assume that these kinds of costs are the same in both alternatives.

**As TCC is considered in Net Income, social welfare lost function until now is:**

(6)  $W = f_6(GC)$ , where  $f_6' < 0$ .

**It is important to note that, if losses in social benefit function were only generated by Total Company Costs and Government Costs, as defined, and it was supposed that production costs, R&D costs and opportunity cost of government expenditures were the same for all the alternatives, then, it has to be concluded that an incentive system will be the best if it can assure the highest income possible in favor of the innovators; a conclusion we have previously reached. Other authors have reached this same conclusion (7). In my opinion, this is one of the reasons for the confusion between the social goal to promote inventions and the goal to increase the income collected by the innovative companies.**

**Nevertheless, if we abandon the assumption of same production costs in all the alternatives, or consider the existence of other kind of losses in social benefit function, then, it is not possible to sustain this conclusion. Alternatively, at the very least, it is necessary to have a more complete and detailed analysis on the matter.**

**In fact, each incentive system generates different market structures for the product under patent and, therefore, there will be different welfare situations associated with them. In our example, while a “legal monopoly” generates monopoly markets; “automatic license” generates competitive markets; and, as it is well known, monopoly and competitive markets differ not only in production costs but in prices and quantities traded in the market. Of course, it is necessary to take into account these differences if a whole analysis is to be done. One way to do that is to measure different situations in terms of different prices people must pay for each specific quantity of the product under patent that is generated by each different payment system. This explanation goes directly to our next point.**

- Consumers judge the opportunity cost of inventions, taking into account, among other well-known variables, the price of products. All other things being equal the higher the price of new products, the lower the consumer benefit will be. Let me call these “market costs”, represented in the equation by  $pq$ .

*Then we have:*

- (7)  $W = f_7(pq)$ , where  $pq$  is the price of the product for each quantity produced, and  $f_7 < 0$

**Then Total Social Welfare Lost (TWL) of each different payment system is: R&D costs which, by definition, are the same in all the alternatives, plus the production costs of the products obtained with the inventions, which are not necessarily the same in all the alternatives, plus opportunity cost of government expenditure, which, by definition, is the same in all the alternatives, plus differential welfare lost generated in the market depending the alternative payment system we choose.**

- (8)  $W = f_8(GC, pq)$ ; where  $f_8 < 0$ .

### **3) SOME CONCLUSIONS ON SOCIAL WELFARE ANALYSIS APPLYING TO PATENTS.**

**Given the last point, it is not plausible to argue that the best way to promote inventions is by the one which assures innovative companies a higher net income because this alternative could have a higher production cost or a higher market cost and, then, a higher Welfare Lost in relation with others. Therefore, it is necessary to strike a balance between costs and benefits of the alternatives studied in order to determine which of them is better in social benefit terms.**

**Taking into account our definitions, in order to determine the best alternative we have to compare the innovators' net income, first, by granting a legal monopoly and, after, by payments of royalties, with Total Welfare Lost under each of these systems. In this sense: the higher net income the alternative generates (higher amount of inventions obtained) at a given Total Welfare Lost, the best. Or, looking from the other side: the lesser Total Welfare Lost at the same net income, better the alternative. For the methodology I will employ to analyze the comparative issue, the terms to be used are: The lower the market price that is generated by the system, which can assure innovators they will generate the same net income, the better alternative.**

**Obviously,  $W_{a1} > W_{a2}$ , when  $N_{Inca1} = N_{Inca2}$ , and  $TC_{a1} < TC_2$ , or  $N_{Inca1} > N_{Inca2}$  and  $TC_{a1} = TC_{a2}$ . Where  $a_1$  and  $a_2$ , are alternatives 1 and 2.**

## **NOTES**

### **CHAPTER II**

- 1) Prop and Economic Development, where he judges protecting Intellectual Property by its impact in R and D investment; also Mansfield with the same method; Pharma, evaluating the patent system by the increasing investment in R&D; this last work is interesting because it is possible to take the same figures used by Pharma to justify the patent system in order to conclude the inefficiency of the amount spending in R&D by these companies; Baley, in US Congress).
- (2) Indeed figures Pharma employs (see note 1) to support patent exclusivity demonstrates the existence of an inverse relationship between both variables in pharmaceutical case, furthermore this circumstance is even admitted by Rozek, one of the major supporters of a “strong patent regime”.
- (3) We have to mention, also, a certain lack of evidence supporting this issue in particular for pharmaceuticals, as ...
- (4) With respect to the multifunction relating inventions with other variables, we can suppose, as common, that the other variables are equal during the analysis. However, we have to take into account that the discussion is about what is the main variable explaining invention; and the objections are in this respect.
- (5) nota sobre bibliografía respecto a que cuanto más ingreso se transfiera a traves del monopolio, mejor.
- (6) (referencia bibliográfica sobre costos de produccion) Scherer and others.
- (7) some authors arrived to the conclusión that whebn higher the innovators income, the better

## CHAPTER III

### THE COMPARATIVE ISSUE

Having clarified what we have called “current misleading opinions” in comparative issues, and determining principles of welfare analysis as applied to patents, we are now in a position to make comparisons between a legal monopoly and an automatic license system.

#### 1. LEGAL MONOPOLY IN OPERATION.

There are two reasons justifying the creation of legal monopolies in patent law. The first is to reward innovative companies for their R&D efforts. The second is to provide incentives to companies so they will make an effort in R&D investments. In practice, both justifications are the same, but the first one is originated after the fact (ex post) and the second before the fact (ex ante).

A legal monopoly works in a simple and well-known manner. While trying to compensate the investment effort made by innovative companies, a monopoly creates an artificial shortage in the market place which allows monopolists to raise prices and obtain profits over those obtained, on average, under a competitive environment or in the economy (let us call them “extraordinary profits”).

Looking at the situation ex ante, extraordinary profits can be considered a reward for companies that take the risk by making these investments. In this case, legal monopolies can be considered a promotional system.

As a counterpart, consumers lose part of their potential benefit because they have access to lesser quantities and have to pay higher prices for the patented product compared with those corresponding to a competitive situation. Additionally, potential competitors and other production factors are transferring to the monopoly (and loosing) part of their potential revenue.

Under the logic of the monopolistic patent system, as we have seen, these costs are considered the price society must pay so that the new products are made available. However, these costs are not the only ones studied in economics. In fact, monopolies negatively affect the search for efficiency, which is the pattern of conduct for competitive markets (1). Furthermore, there is pressure exercised on political institutions for generating or maintaining privileges of this type and the costs they imply (2) (3). These facts are also recognized as costs imputable to monopolistic conduct, but we do not include them in this work, although including them would reinforce our hypothesis (4).

## 2. EXTRAORDINARY PROFITS FROM MONOPOLY, REVENUE TRANSFER AND NET LOSS TO SOCIETY

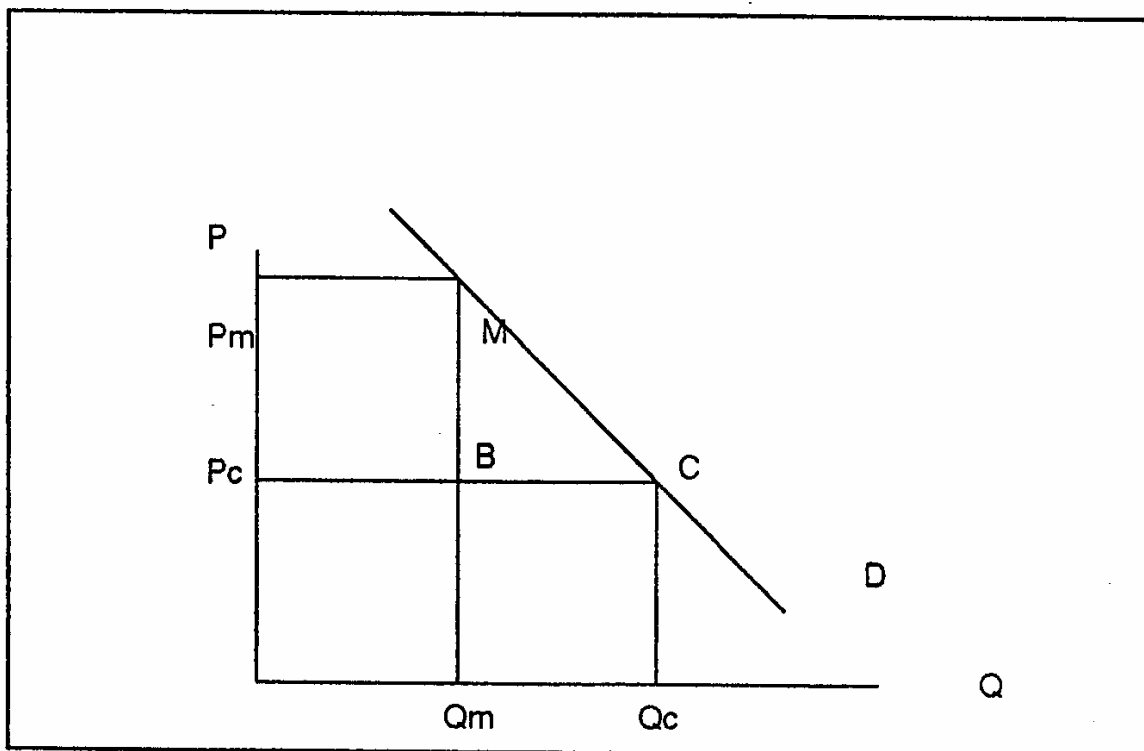
When an innovative company has exclusivity for the production and marketing of a product and has the legal ability to prevent the appearance on the market of similar goods to those which it manufactures and markets, it is in a position to manage the supply of that product in such a way that it can achieve extraordinary profits. In other words, it can obtain greater profits than those it could achieve in the same market if it had to face other competitors and greater than those it could achieve under a competitive environment (6).

The geometry of this situation is easily comprehended and is displayed in the following graph where  $p_m$  is the price of a monopoly,  $p_c$  is that of the competition (6) and  $q_m$  and  $q_c$  are the quantities marketed at both prices. Let us suppose, for simplicity's sake, that  $p_c$  is a good indicator of the minimum average cost,  $c_m$ . In other words, let's allow that, during a certain period, the marginal producers in a market are producing at an average revenue for the economy (7) and that they have encompassed the most efficient technology available. Graph 1 shows the position for monopoly and competency.

$PMQM$  is the total revenue of the monopolist, while  $pcqm$  is his total cost. Therefore, the difference between both concepts is the total profit achieved by the company through its state of exclusivity in the market.

For simplicity's sake, in the graph we are assuming that the marginal income curve cuts the monopolist's marginal cost curve at a point near its minimum average cost. This being the hypothesis, which is most unfavorable to the thesis we are assuming since, in general, the average cost at which the monopolist operates, will be superior to the minimum average cost. (See appendix 1, where three alternative situations are outlined according to the cost curve location.) In the graph, this condition can be seen in area  $pmmmbpc$ . This area has its counterpart in the loss of production and income from production factors seen as impeded in producing the product given the legal monopoly. This area is indicated in the graph as  $bqmqqc$ . Nonetheless, according to Harberger (8), there is another type of loss that can not be compensated (deadweight), the loss by the consumers represented by the  $mbc$  area. This is a net loss.

**GRAPH I: Market's Equilibrium Position: monopoly and competency**



### **3. AN ALTERNATIVE METHOD FOR COMPENSATION OF INNOVATIVE COMPANIES THAT MINIMIZES COSTS RELATES TO PRODUCT PATENT EXCLUSIVITY.**

Now we are in a position to prove that there is an alternative method of transferring revenues that avoids the creation of monopolies while complying with the objectives for which they were created - compensation for expenditures made by the innovative companies or generating incentives which allows these investments to be made in the future -. This method minimizes the social and economic costs associated with the creation of legal monopolies and preserves revenues for the innovative companies. Therefore, it is an optimal method from the viewpoint of global efficiency.

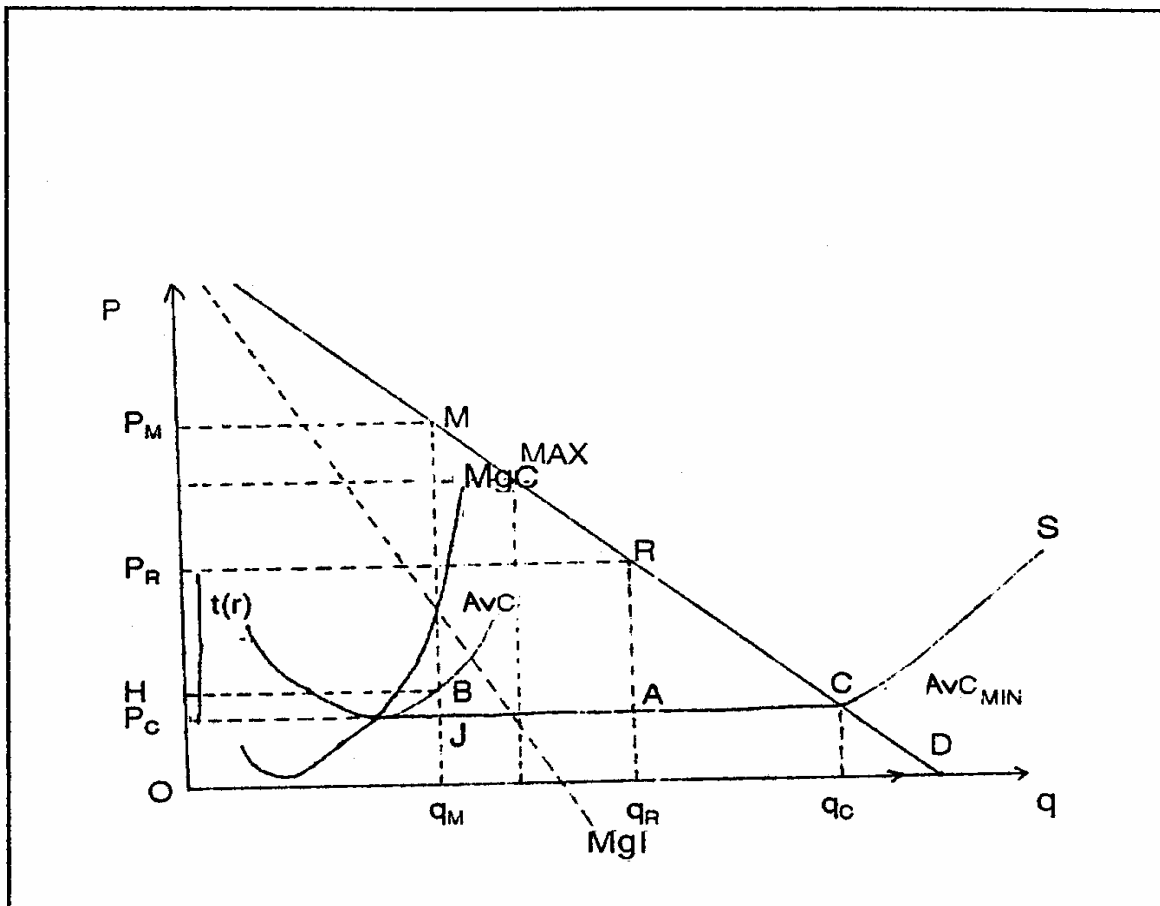
Additionally, it will prove that the creation of legal monopolies does not imply merely a revenue transfer justified by the pursued goal of promotion, but rather causes a net loss in terms of production. In other words, it causes a loss of revenue and welfare that does not have a counterpart and therefore must be avoided. In addition, we propose a method to calculate this loss. Moreover, in the following points we will discuss what amount of benefit is justifiable as a basis for revenue transfer and what amount is not. Finally, we will briefly discuss the role of the trademark under patent monopoly.

### 3. a. INDIFFERENCE TAX OR ROYALTY.

Let us assume for a moment that a new product is permitted to be produced and marketed by any company that is prepared to do so by paying a tax or royalty. Then, let us suppose that an automatic license system, as we have defined it, is in operation. In other words, let us suppose for a moment that a patented product is marketed under free economy conditions in a competitive market. Now then, given certain conditions of elasticity of the patented product demand curve, and from the location of the monopolist's cost curves, there will always be a tax rate per unit produced or a royalty rate to be paid by the producers to innovative companies, such that the total amount of the tax thus collected or the total amount of the commissions exactly compensates the extraordinary profits that the innovative companies would have received were they awarded a legal monopoly. In this case, both systems, legal monopoly and automatic license, are equivalent in order to fulfill goals of promotion or reward innovation.

To solidify these concepts, let us analyze the following graph:

**GRAPH II COMPARISON OF MONOPOLY, COMPETITION, AND APPLYING COMMISSION OR TAX**



As before,  $p_m$  and  $p_c$  are the prices of monopoly and of competition, while  $q_m$  and  $q_c$  are the quantities marketed at those prices. In the graph,  $r$  has been calculated (tax or royalty rate) which when applied to  $p_c$  (as before a good indicator of  $avc$ ), so

as to determine a  $p_r$ ;  $q_r$  being the quantities marketed at that price. We have calculated this rate of tax or royalty in such a manner that the total amount collected by tax or the total amount of a royalty, will be exactly equal to the extraordinary profits which the companies would have received if they had been awarded a legal monopoly.

Extraordinary earnings obtained by the innovative companies due to the exclusivity clause is indicated by the area  $p_m m b h$ ; which is the same in graph i. Even now, this area is exactly equal by construction to that marked as  $p_r r a p c$ . In other words, it is equal to the total amount of the tax or the total amount of commission that is transferred to innovative companies by a method of affixing a tax or royalty rate to  $p_c$ . Therefore, point  $p_r$  fulfills exactly the same conditions of compensating for expenditure by innovative companies or the same motivational function that legal monopoly gives and leads the market to  $m$  ( $p_m$ ;  $q_m$ ).

From this viewpoint, a legal monopoly and affixing compensatory royalty are equivalent. Both exactly fulfill the role of compensating an innovative company's effort or promoting them. Therefore, to the innovative company, both situations are equal because exactly the same amounts of resources are transferred. Nevertheless, both situations are clearly different from a social point of view, as well as economic, and the dynamism of exchange processes. Let us look at this in detail.

When one passes from a competitive state to that of monopoly, the consumers would suffer a loss equivalent to area  $m b c$ ; and the producers and production factors equivalent to area  $j c q m q c$ . This last loss was a reflection of the revenue transfer produced by the monopolist company (area  $p_m h m b$ ), but the first losses, in patent logic, must be taken as the cost which society must incur in order that the companies develop the product. Now, given  $p_r$  and the transference  $p_r p c r a$ , that loss is reduced to the consumers in the  $a j m r$  area, and in the area  $j a q m q r$  to the production factors. In other words, opting for the method of affixing a compensatory commission generates a social and economic profit equivalent to  $q m q r r m$  area.

These conclusions may also be seen by directly analyzing the monopoly position with that of compensatory royalty payment. Bear in mind that both are equal from the viewpoint of the compensation objective as well as that of promotion and of equality for innovative companies that receive the same quantity of resources in both. Comparing the monopoly position with that of the compensatory commission shows that the net losses to be assigned to the legal monopoly is that represented by area  $q m q r r m$ , which is in general superior to that calculated by the Harberger method ( $b m c$ ) and includes a deadweight (loss without compensation) in the area of production and revenue factors: the area  $q m q r a j$ .

Therefore, the method of affixing a compensatory tax for transferring the total amount collected to the innovative companies to compensate them with exactly the same earnings that they would have obtained in exercising a legal monopoly is clearly superior to creating a legal monopoly. By generating greater profits for the production factors, reducing prices, and increasing production with substantial augmentation in the benefit to the consumers and maintaining incentives which economic freedom and competition offers for investments and search for efficiency.

#### 4. CONDITIONS FOR THE EXISTENCE OF $P_R$ (Royalty Price)

The existence of  $p_r$  depends on the shape of the cost curves, its location and the shape of the demand curve, but the fundamental impact aspect is the elasticity of demand. The elasticity of demand must be greater than one. This can be quickly understood if one considers that the condition we imposed is that the surplus income (profit) of  $p_r$  be equal to the surplus income of  $p_m$  – and this can only appear if the elasticity of demand between both points is equal to one, taking the straight line that ties the competition's price point with that of the average cost as a reference. This means that the demand curve must have elasticity greater than one when it is taken on its original axis.

Statistical appendix no. 1 shows rigorous development of the following formulas. It is enough to state that elasticity between  $m$  and  $r$  follows the next formula.

$\sum dr = (p_m) : (p_r - p_c)$  ; as  $p_m > p_r$  y  $p_m > p_c$ ; then  $p_m > (p_r - p_c)$ , which demonstrates that the elasticity required must be greater than one. At the same time,

$$p_r = (p_m + \sum dr \cdot p_c) : \sum dr; \quad \text{and} \quad p_r - p_c = p_m : \sum dr ; \quad \text{as} \quad r = p_r - p_c ;$$

$$\text{gives:} \quad r = p_m : \sum dr$$

This last equation demonstrates that the lower the monopoly price or the higher the elasticity of demand, the lower will be the rate of tax or commission needed to achieve an indifferent state with the legal monopoly, the rate which we have named “compensatory” or “equal”.

## 6. EMPIRICAL STUDIES

We have made a series of empirical studies with the purpose of putting the proposed method to the test, analyzing its main consequences and emphasizing the principal differences which may be produced in carrying out this system in practice or opting for the imposition of a legal monopoly.

First, we took the Argentine market as a base partly because of available data but, more fundamentally, because it is a market where generic branded competition has been allowed almost from patented product launching which is important for correct market evaluation, as we will see in the next point.

The study is developed in detail in Appendix 3, but here we will give its main characteristics and conclusions. The largest selling medications corresponding to the main marketed drugs in the Argentine market were analyzed. The sampling represents 26.9% of the corresponding market.

The procedure used was the following: the market for each indicator corresponding to each drug was taken according to the most sold dosage. The elasticity of demand was calculated between the point corresponding to the launching of the drug, generally by a single laboratory (patent holder), and that corresponding to the most recent year from which data is available. In this last case, the general situation was

that the medications (branded generics) were being produced by a certain number of laboratories (mostly domestic). We calculated the average price and the quantities sold at those prices, and we compared them with the initial one to obtain the elasticity of the demand curve.

We took the initial state as representative of monopolistic condition, and the final measurement as competition condition. Of course, as we have indicated in point 1, this state is not, nor does it have to be, a state of perfect competition. From this data we will calculate  $r$ ,  $p_r$  and  $q_r$ . Finally, we establish the comparisons between this condition of compensatory royalty and that of a monopoly.

The study shows that, on average, affixing compensatory or equalized royalties meant a 37.85% reduction below monopoly prices, and a 707.11% increase in the total quantity of units produced and marketed of the same drug. In other words, imposing compensatory royalties would allow patients to access at a more than 30 % discount over the monopoly price, while increasing consumption almost seven times without affecting the income of the companies that had developed the product. This indicates, without any doubt, a clear economic and social advantage of the proposed method and shows, also clearly, the major costs and elevated inefficiency of the method of transferring resources by means of the creation of legal monopolies.

It may not be necessary to transfer all of the resources that the companies gain from extraordinary earnings achieved through a legal monopoly and which they may retain. This occurs when it is known that these extraordinary earnings are substantially superiors to those required for the purposes for which they were instituted. Various reports, in particular that from the United States Senate Special Committee on Aging, indicate that this may be the case in the United States, where the level of the royalty or tax rate shall be less than that which we have calculated and, therefore, the greater the price reduction and the increase in quantities consumed which can be achieved.

Actually, the most recent report from the United States Senate Special Committee on Aging indicates that only a third of that which is cited as expenditure for research and development should be taken as such, while the rest is dedicated to development of “me too” drugs (which are already on the market) or to publicity and promotion (8).

Therefore, in applying the patent system it may be the decision of the authorities not to transfer resources above those really required for research and development. In this case, the tax or royalty rate must be recalculated to compensate a third of the total amount of extraordinary earnings that the companies obtain by being granted legal monopoly. Under this system, the reduction in monopoly price is 50.29% (instead of the 37.85% above mentioned), on average, without affecting the funds that are really earmarked for research and development (9).

## **7. BRIEF COMMENTARY ON THE CREATION OF LEGAL MONOPOLIES AND THE USE OF TRADE NAMES DURING THEIR PERIOD IN FORCE**

When a legal monopoly is granted on a product and during the period for which it is awarded, if the beneficiary company does not have restrictions then it can impose a trade

name, identifying it strongly with the product. This is something that a monopolistic company can do because it is the only one that can produce and market this product. This implies that, at the end of the legal monopoly condition, a continuation-in-fact situation of market domination is generated which we could call a quasi-economic monopoly. Such situation is determined by the preponderance acquired by the brand name during the period of legal restriction on competition (during that period, all marketing efforts were done to impose a certain brand, avoiding reference to the generic name of the drug). This allows the legal monopolistic company to maintain certain restrictions in offering the product, which it can make everlasting beyond the period of its monopolistic benefits. At the same time, the demand cannot achieve all its potential. This is the reason why a measurement of these situations would not correspond fully with the true potential demand and it is not possible to measure the elasticity of the demand curve.

The quasi-monopoly state which we have described has given rise on various occasions to an attack on the use of the trademarks that, in my opinion, turns out to be totally unjustified, since the problem is not actually created by the use of brand names but rather by the period of restricted competition.

Recent studies (\*) confirm this preponderance of “original” trademarks and the protection barrier they generate to any consumer when trying to find equivalent products (branded generics) which could lead to increase the total market. The end result, in the majority of cases, is that competition does not achieve the required levels (\*\*).

This is the reason why we prefer to take the Argentine pharmaceutical industry figures, an industry where branded generic competition is allowed practically from the initial launching of new drugs, enabling instantaneous competition and a rapid decline in patented product price with the corresponding increase in the total quantities produced and marketed of each drug. Additionally, it should be pointed out that the subsistence of extraordinary earnings after the patent period is an undesirable but real effect, when granting a legal monopoly. This indicates that no one may allege that it is affecting something inherent to the patent system when taking measures to eliminate these at this stage.

## APPENDIX 1

Inclusion of this appendix has been motivated by some comments made by researchers from the Instituto Di Tella, Sebastian Galiani and Federico Weinschelbaum, on a preliminary version of this article. Thanks to those comments I was able to explain this point. The thesis by Galiani and Weinschelbaum demonstrates that with constant and equal costs for the monopolists and the competitor companies, there is no pr that is different from pm. This can be shown in the following manner: if we assume a constant cost, maximizing total profits equals a tax collection at a fixed percentage on a competitive price. Let's look at a demonstration: assuming demand curves and lineal costs; then  $p = a - bq$  would be the demand curve, and  $c/2 = k$  is the average cost. The total revenue is  $pq$ ; and the total cost is  $c/2 q$ , replacing and reordering:  $tb = q(a - bq) - kq$ . Now, the tax rate is  $t = p - c/2$ , and the total to be collected:  $t = tq$ ; replacing and reordering:  $t = q(a - bq) - kq$ ; with  $bt$  and  $t$  having the same maximum. Therefore, with constant costs pm coincides with pr, or, said otherwise, there is no alternative to pm.

Nevertheless, in my work, I have not assumed that there are constant costs. In exchange, I

have assumed that the competitor price approaches the minimum average cost, that is a usual assumption in open markets. In this context, Galiani and Weinschelbaum's observation is only valid for special cases. Proceeding with the illustration and relaxing the constant average cost assumption gives: for the monopolist  $c1/2 = f(q)$  and  $tc = q f(q)$ ; but maximizing tax remains the same, with it is not the same to maximize  $tb = q(a - bq) - q f(q)$ , as  $t = q(a - bq) - kq$ ; except in very special cases in which monopolist's maximization is given at the point where  $mgc$  cuts the average cost curve at its minimum, since in this case  $f(q) = k$  and both =  $c1/2$  minimum. One can observe that, except in this case,  $t > bt$ , which explains the possibility of  $pr = pm$ .

Therefore, the existence of a same maximum for the benefit of the monopolist as for  $pr$  or  $t$ , depends upon our accepting the existence of constant costs, or we assume that the marginal income curve cuts the margin cost at the minimum point of the average cost curve. Now, if we accept that the monopolist has the usual cost curves, this solution then is not obligatory and only occurs in a special case. Economically, there are two reasons which justify this divergence permitting the existence of a  $pr$  different from  $pm$ . The first, that the intersection of  $mgi$  and  $mgc$  does not have to be given at the maximum point of the area above the straight line of the minimum average costs and, second, for the same reason, the average cost at which the monopolist operates corresponding to that production cannot now be the minimum average cost, but rather will be a larger amount. In other words, even when there are no constant costs, it may still be that  $pm = pr$ , but this would only be a case between an undetermined quantity and equally probable cases.

Therefore, in every other case there exists the possibility of two different points of maximization. First, while the maximum point of the monopolist is less than the absolute maximum point of the curve and, second, because its costs of operation are greater than those of the competition. In the following graphs, these comments are illustrated.

Graph A is the special case where  $mgi = mgc$  at the minimum point of the  $c1/2$ .

In the other two graphs (B and C), the two groups of cases in which there is a possibility for a  $pr$  different from  $pm$ .

**CASE NO. 1**

**PR = PM**

**PM = PRICE OF MONOPOLY**

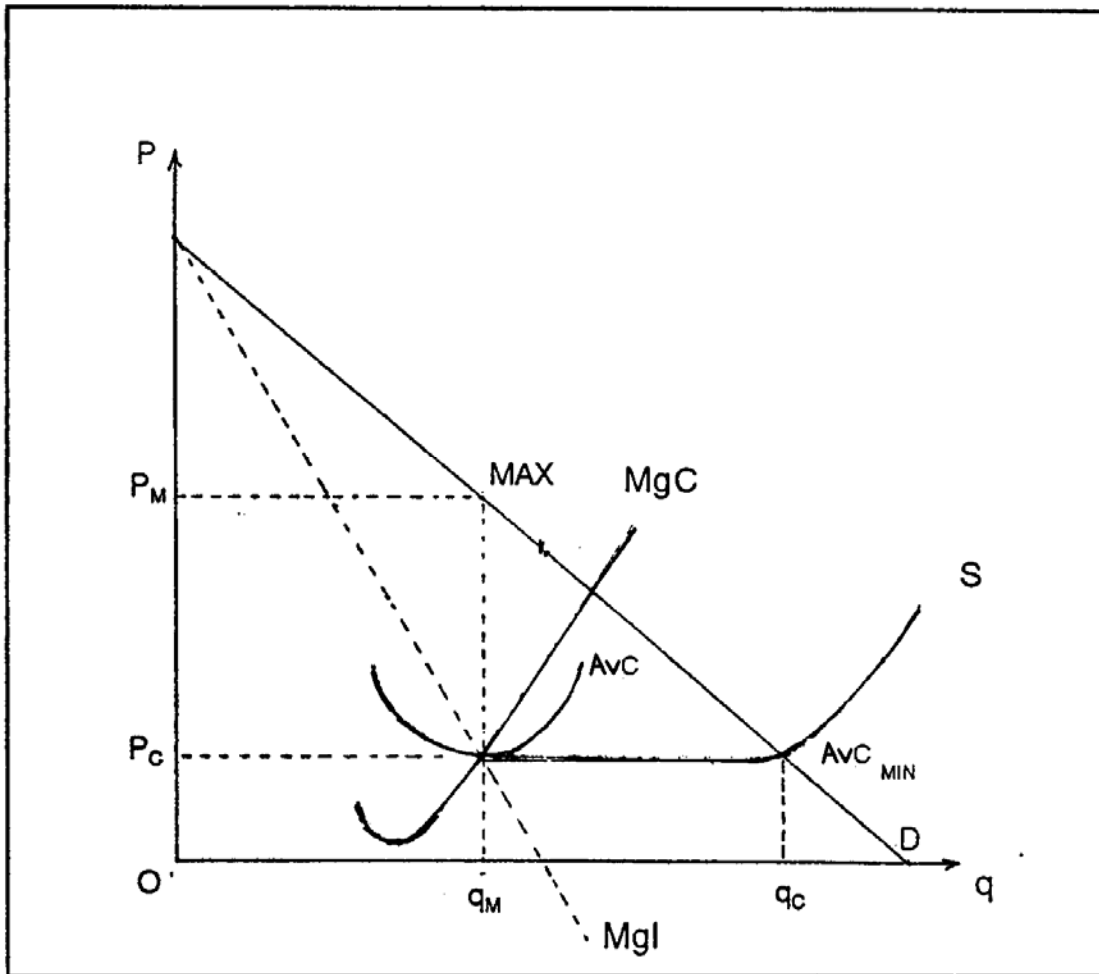
**PC = PRICE OF COMPETITOR**

**QM = QUANTITY BY MONOPOLY**

**QC = QUANTITY BY COMPETITOR**

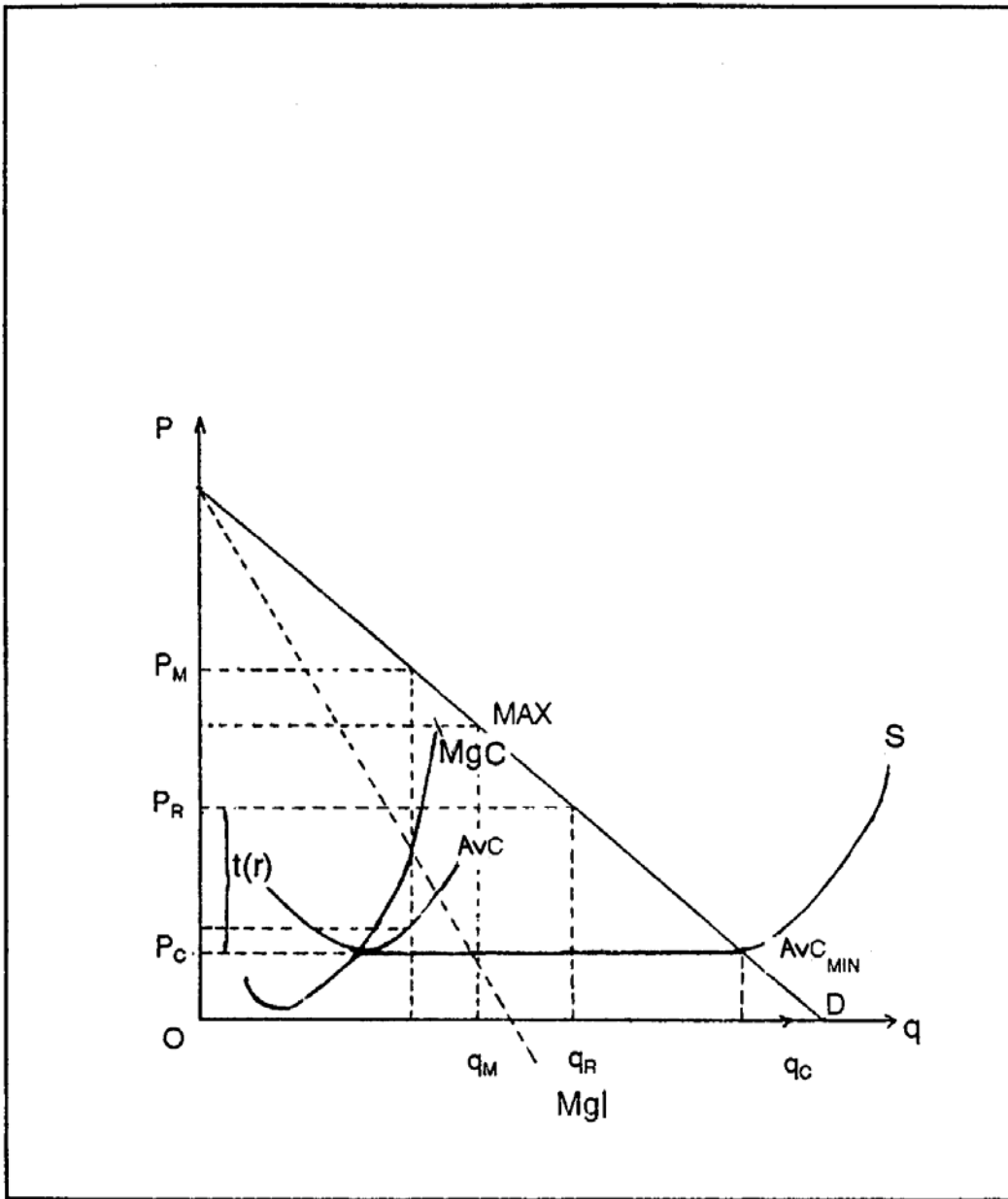
**MAX = MAXIMUM BENEFIT POINT FOR MONOPOLY WITH  
CONSTANT COSTS**

**GRAPH A – CASE 1**



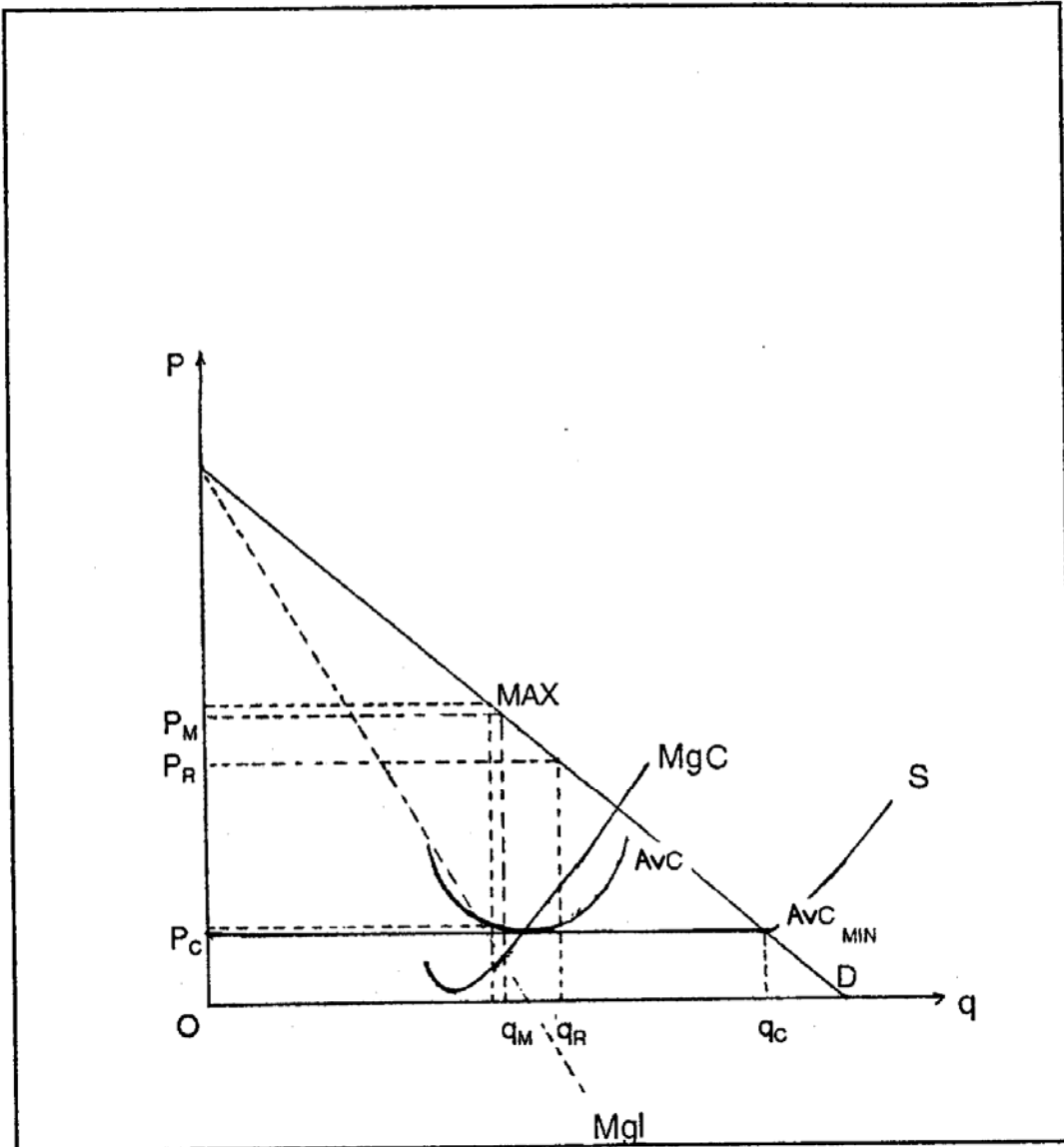
**CASE GROUP N2**  
**IMG CUTS CMG**  
**PR ≠ PM EXIST**

**GRAPH B – CASE GROUP N 2**



**CASE GROUP N3**  
**PR  $\neq$  PM EXIST**

**GRAPH C – CASE GROUP N 3**



## APPENDIX 2

### 1. DEFINITION OF TERMS:

**BTM:** BENEFIT TOTAL FROM MONOPOLY GENERATED BY THE PATENT.

**RT:** ROYALTY TOTAL OR TOTAL TAX COLLECTION WHICH ACCRUES IN APPLYING RATE R TO THE COMPETITION'S PRICE.

**PM, PC, PR:** PRICE OF MONOPOLY, COMPETITION AND PRICE INCLUDED IN ROYALTY OR TAX.

**QM, QC, QR:** QUANTITIES PRODUCED WHICH CORRESPOND TO THOSE PRICES.

**ΔR:** INCREASE CALCULATED TOWARDS R, FOR EXAMPLE ΔR QM IS THE INCREASE FROM QM TO QR.

### 2. DEVELOPMENT:

BY DEFINITION:

1)  $BT = (PM - PC) \cdot QM$  ; ALSO:

2)  $RT = (PR - PC) \cdot QR$  ; AS  $QR = QM + \Delta R QM$  :

3)  $RT = (PR - PC) (QM + \Delta R QM)$

4)  $RT = PR \cdot QM - PC \cdot QM + PR \cdot \Delta R QM - PC \cdot \Delta R QM$  ;  
GROUPING:

5)  $RT = (PR - PC) \cdot QM + (PR - PC) \cdot \Delta R QM$  ; THE CONDITION IS:

6)  $BT = RT$ ; REPLACING WITH 1) AND 5);

7)  $(PM - PC) \cdot QM = (PR - PC) \cdot QM + (PR - PC) \cdot \Delta R QM$  ;  
DIVIDED BY  $(PR - PC) \cdot QM$ , GIVES:

8)  $\frac{PM - PC}{PR - PC} = 1 + \frac{\Delta R QM}{QM}$  ; REORDERING

9)  $\frac{PM - PC}{PR - PC} - 1 = \frac{\Delta R QM}{QM}$  ; MULTIPLYING BY  $\frac{PM}{\Delta PM}$

AND CONSIDERING THAT  $\Sigma D = \frac{\Delta QM \cdot PM}{\Delta PM \cdot QM}$  ; GIVES:

10)  $\frac{PM}{\Delta PM} \cdot \frac{PM - PC - 1}{PR - PC} = \Sigma D$  AND, FINALLY,

11)  $\Sigma D = \frac{PM - PC - 1}{PR - PC} \cdot \frac{PM}{PM - PR}$

OR IT MAY BE THAT THE REQUIRED  $\Sigma D R$  DEPENDS ON THREE PRICE RATIOS: THE DIFFERENCES BETWEEN PM AND PC; BETWEEN PR AND PC AND BETWEEN PM AND PR. SUCH THAT  $PM > PC$  AND  $PR > PC$ , THE FIRST QUOTIENT BETWEEN THE DIFFERENCES IS POSITIVE; IN ITS TURN, AS  $PM > PR$ , THIS QUOTIENT IS GREATER THAN 1 AND, THEREFORE, THE FIRST FACTOR IS POSITIVE. ALSO, THE SECOND FACTOR FROM THE MULTIPLICATION IS POSITIVE AND GREATER THAN 1, WITH THAT WHICH IS DEMONSTRATED THAT  $\Sigma D R$  CANNOT CHANGE SIGN. ALSO, IT CAN BE SEEN THAT GIVEN PM AND PC, THE ELASTICITY REQUIRED WILL BE HIGHER THE LOWER THE DIFFERENCE IS BETWEEN PR AND PC. WE CAN GIVE GREATER PRECISION TO THESE RESULTS. IN EFFECT, CONTINUING WITH THE TRANSFORMATION ONE HAS:

$$12) \Sigma D = \frac{(PM - PC) - (PR - PC)}{(PR - PC)} \cdot \frac{PM}{PM - PR} \quad ; \text{MAKING THE}$$

REMAINDER

$$13) \Sigma D = \frac{PM - PR}{PR - PC} \cdot \frac{PM}{PM - PR} \quad ; \text{SIMPLIFYING:}$$

$$14) \Sigma D = \frac{PM}{PR - PC} \quad ;$$

THIS EQUATION DEMONSTRATES THAT THE ELASTICITY REQUIRED MUST BE GREATER THAN 1, SINCE  $PM > (PR - PC)$ . NOW, WE CAN VERIFY ON WHAT PR DEPENDS: WE KNOW THAT:

$$15) \Sigma D = \frac{PM}{PR - PC} \quad ;$$

$$16) \Sigma D (PR - PC) = PM$$

$$17) \Sigma D PR - \Sigma D PC = PM$$

$$18) \Sigma D PR = PM + \Sigma D PC$$

$$19) PR = \frac{PM + \Sigma D PC}{\Sigma D}$$

LASTLY, FROM 16:

$$20) PR - PC = \frac{PM}{\Sigma D} \quad ; \text{OR BE:}$$

$$21) R = \frac{PM}{\Sigma D}$$

## $\Sigma D$

Which shows that the lower the price of monopoly or the higher the elasticity of demand the lower will be the royalty rate necessary to achieve the situation of equality on which we are commenting.

### APPENDIX 3

This appendix consists of an empirical study in which we have evaluated the behavior of the 23 drugs most frequently sold in the Argentine market. Specifically, the objective proposed was to estimate, approximately, the values of the compensatory royalties.

The procedure used consisted of examining the market behavior at two instances in time: first, when the drugs were taxed on the market, generally beginning from the third year after launching (the existing price at that moment was taken as representative of the monopoly price), and second, in December 1990 when in general the drugs were already produced by a number of laboratories. In both cases the quantities consumed and the prices paid by the consumers were considered for the most sold items of each one of the drugs.

In figure 1, the drugs analyzed are detailed, the elasticities, the decrease  $p_m$  to  $p_r$  and the increase  $q_m$  to  $q_r$ .

As may be observed, with the exception of the theophylline and medroxyprogesterone drugs, the rest of the drugs have values of elasticity which comply with the condition of being greater than 1 in absolute value. For this reason, it was not possible to calculate the drop of  $p_m$  and the rise of  $q_m$  for those drugs. Nor could the changes in  $p_r$  or  $q_r$  for furosemide, digoxin, gemfibrozil and lovastatin be calculated, due to the fact that even if the drugs have values of elasticity greater than 1,  $p_m$  is less than  $p_c$ , and  $q_m$  is greater than  $q_c$  with which  $p_r$  as well as  $q_r$  lack economic significance.

**FIGURE I: DETERMINING THE VALUES OF ELASTICITY**

DRUG	FALL PM TO PR (%)	FALL QM TO QR (%)	ELASTICITY
RANITIDINE	48,31	1.000,00	(20,86)
FUROSEMIDE	-	-	(3,56)
SALBUTAMOL	16,98	58,24	(3,44)
AMOXICILLIN	58,91	548,65	(9,39)
TRIAZOLAM	35,74	336,36	(9,44)
CEPHALEXIN	42,28	373,83	(6,49)
DIGOXIN	-	-	(2,39)
ALPRAZOLAM	49,98	291,60	(5,84)
DILTIAZEM	28,00	139,79	(5,00)
THEOPHYLLINE	-	-	6,45
INDOMETHACIN	70,63	2.118,18	(29,89)
MEDROXYPROGESTERONE	-	-	(0,96)
CEFRADOXIL	12,00	35,42	(3,01)
GEMFIBROZIL	-	-	(14,68)
LOVASTATIN	-	-	(2,94)
LORAZEPAM	34,03	935,71	(27,12)
METRONIDAZOLE	23,88	333,33	(13,96)
NIFEDIPINE	47,50	271,43	(5,68)
NORFLOXACIN	33,00	3.211,11	(97,71)
PIROXICAM	79,39	1.566,67	(39,30)
ATENOLOL	8,65	7,14	(38,18)
BROMAZEPAM	32,57	695,52	(89,17)
ENALAPRIL	21,56	97,91	(76,13)
<b>TOTAL AVERAGE</b>	<b>37,85</b>	<b>707,11</b>	<b>(22,24)</b>

**NOTES ON THE WORK “PRODUCT PATENT EXCLUSIVITY AND COMPENSATORY ROYALTIES”**

- (1) “It does not appear improbable that the monopolists are people with rapidly growing subjective costs, and in such a case it is probable that they obtain much more from their advantageous situation if they do not bother to reach the maximum earnings position than if they make efforts to reach it...the best of the benefits from monopoly is a tranquil life.” J.R. HICKS, *ECONOMTRICA*, VOL III (1935).
- (2) This issue has been analyzed in economic literature on “SEARCH FOR REVENUES.” The initial analysis corresponds to the works of ANNE KRUEGER, “THE ECONOMICS THEORY OF RENT-SEEKING SOCIETY” (*AMERICAN ECONOMIC REVIEW*, 64, 1974) AND GORDON TULLOCK, “THE WELFARE COSTS OF TARIFFS, MONOPOLIES AND THEFT” (*WESTERN ECONOMIC JOURNAL*, 5, 1967). A more exhaustive study is found in the TULLOCK WORK, “THE COSTS OF SPECIAL PRIVILEGE” (J. ALTA AND K. SHEPSLE : “PERSPECTIVES ON POSITIVE POLITICAL ECONOMY” (CAMBRIDGE UNIVERSITY PRESS).

- (3) “Economists were wrong in a very simple and straightforward way. In dealing with the social costs of monopolies, they considered the monopolists themselves members of society so that those people’s gains to some extent counterbalanced the losses of others. Economists thus counted total monopoly profit as a mere transfer from some members of society to others. Socially, it was neither a gain nor a loss...economists erred in failing to notice that the creation of monopolies would require resources... monopolies were a much more important problem than had been previously realized.” (“PERSPECTIVES ON POSITIVE POLITICAL ECONOMY”, CAMBRIDGE UNIVERSITY PRESS. PAGES 195/196).
- (4) Economic science has studied these processes in detail, the repercussions which, from the viewpoint of the societal welfare theory, encourage a monopoly with respect to other more competitive forms, typically with perfect competition markets. At the same time, when dynamic forces are studied, which bring economic and social development to society, traditionally the fundamental role which includes economic freedom and competition in this process has been emphasized. In this sense, it is not proved neither in theory nor in practice that a positive relationship exists between the monopoly taken as a promotional system and positive results in research and development. Sometimes the promotional system instituted by the legal monopoly was evaluated with its direct consequence, expenditure for research and development, which is an error. Instead, it is enough to judge the system in terms of accomplishment of the objective for which it was created: the degree of innovation (new products) obtained through the system. A legal monopoly produces a transfer of revenue and, therefore, of expenditure, thus judging the results of the system because of increased expenditure has no significance. The true evaluation is one of cost-earnings, in other words, as many new innovations (new products) as have been achieved given the necessary investment made as a result of the revenue transfer implicit in a monopoly. Therefore, the pertinent relationship is if this manner of spending public funds is the most efficient in terms of stimulating the appearance of new products and their cost. In particular, in the case of the pharmaceutical industry, the studies undertaken are concordant with this general axiom since they show that this link does not exist. Especially, in our work “THE CONSEQUENCES OF PHARMACEUTICAL PRODUCT PATENTING” (WORLD COMPETITION, VOL. 15, NO. 2, DECEMBER 1991, FROM PAGE. 65 .)
- (5) Empirical evidence confirms that this is the state in which the United States pharmaceutical industry currently finds itself. A recent study by the U.S. Congressional Office of Technology Assessment demonstrated that the profitability of the pharmaceutical industry in the United States for the period 1976-1987 surpassed 2 to 3%, the average profitability of the rest of North American industries (O.T.A.), after adjustment for differences for risk, (“PHARMACEUTICAL R&D: COSTS, RISKS AND REWARDS”, FEBRUARY 1993, CHAPTER 4). Fortune magazine arrived at a similar conclusion, showing that the returns on share capital in the pharmaceutical industry have surpassed the growth pattern for 1980-1991 average returns for the 500 most important industries in the United States. In the same manner, the profits/sales ratio from the manufacturers laboratories of the most sold drug was significantly greater between 1985 and 1991 than the average profit/sales ratios in the 500 most important industries (Fortune magazine 1981-1992, cited in the “REPORT CARD ON 1992 DRUG MANUFACTURER PRICE INFLATION”, REPORT FROM THE UNITED STATES SENATE SPECIAL COMMITTEE ON AGING, FEBRUARY 1993, PAGES 7 AND 8).
- (6) PC is not necessarily the price of perfect competition. This type of assumption is not

required for our analysis. PC is simply the price of an open market, in other words, a market where all of the companies that are capable of producing the product may do so, and where there is brand competition from product launching.

- (7) In an open market as described, the profits tend to near those considered normal for the activity and near the average for the economy. Under this condition, pc tends to approach cm plus the rate of normal profit. Of course, a higher profit rate would attract new investments to the activity and a lower one would discourage investments, thus creating the dynamic tendencies which lead to this convergence.
- (8) In "REPORT CARD ON 1992 DRUG MANUFACTURER PRICE INFLATION", (NOTE 16), it is mentioned that the North American pharmaceutical industry spends 18 million dollars annually in research and development. Of this amount, \$4.5 billion are for "me-too" drug development, which are simply new versions of that which already exists on the market. Only \$3.5 billion was for research and development of new drug molecules - only 19% of the total R&D expenditure.
- (9) Other factors reduce the amount of money that is disbursed for R&D by the pharmaceutical industry. The most significant is that the U.S. Government is the most important participant in biomedical research and undertakes a great number of studies in this field. In summary, the government directly subsidizes R&D. Finally, the National Institute of Health and other federal laboratories carry out research in certain specialized areas.

(\*) OFFICE OF TECHNOLOGY ASSESSMENT, OP.CIT.

(\*\*) this fact is confirmed in the OTA study which shows that, six years after the expiration of a patent, the original brands retain 50% of the market in physical units on the average and, also, that they have an amount of sales representing 70% of the amount of sales at the time of patent expiration, and represent 40% of the sales volume on that date (OFFICE OF TECHNOLOGY ASSESSMENT, OP. CIT. PAGES 88 AND 89).

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THAT THE MONOPOLISTS ARE PEOPLE WITH RAPIDLY GROWING SUBJECTIVE COSTS, AND IN SUCH A CASE IT IS PROBABLE THAT THEY OBTAIN MUCH MORE FROM THEIR ADVANTAGEOUS SITUATION IF THEY DO NOT BOTHER TO REACH THE MAXIMUM EARNINGS POSITION THAN IF THEY MAKE EFFORTS TO REACH IT....THE BEST OF THE BENEFITS FROM MONOPOLY IS A TRANQUIL LIFE." J.R. HICKS, *ECONOMTRICA*, VOL III (1935). THIS ISSUE HAS BEEN ANALYZED IN ECONOMIC LITERATURE ON "SEARCH FOR REVENUES." THE INITIAL ANALYSIS CORRESPONDS TO THE WORKS OF ANNE KRUEGER, "THE ECONOMICS THEORY OF RENT-SEEKING SOCIETY" (*AMERICAN ECONOMIC REVIEW*, 64, 1974) AND GORDON TULLOCK, "THE WELFARE COSTS OF TARIFFS, MONOPOLIES AND THEFT" (*WESTERN ECONOMIC JOURNAL*, 5, 1967). A MORE EXHAUSTIVE STUDY IS FOUND IN THE TULLOCK WORK, "THE COSTS OF SPECIAL PRIVILEGE" (J. ALTA AND K. SHEPSLE : "PERSPECTIVES ON POSITIVE POLITICAL ECONOMY" (CAMBRIDGE UNIVERSITY PRESS).

- (3) "ECONOMISTS WERE WRONG IN A VERY SIMPLE AND

STRAIGHTFORWARD WAY. IN DEALING WITH THE SOCIAL COSTS OF MONOPOLIES, THEY CONSIDERED THE MONOPOLISTS THEMSELVES MEMBERS OF SOCIETY SO THAT THOSE PEOPLE'S GAINS TO SOME EXTENT COUNTERBALANCED THE LOSSES OF OTHERS. ECONOMISTS THUS COUNTED TOTAL MONOPOLY PROFIT AS A MERE TRANSFER FROM SOME MEMBERS OF SOCIETY TO OTHERS. SOCIALLY, IT WAS NEITHER A GAIN NOR A LOSS...ECONOMISTS ERRED IN FAILING TO NOTICE THAT THE CREATION OF MONOPOLIES WOULD REQUIRE RESOURCES... MONOPOLIES WERE A MUCH MORE IMPORTANT PROBLEM THAN HAD BEEN PREVIOUSLY REALIZED." ("PERSPECTIVES ON POSITIVE POLITICAL ECONOMY", CAMBRIDGE UNIVERSITY PRESS. PAGES 195/196).

(4) ECONOMIC SCIENCE HAS STUDIED THESE PROCESSES IN DETAIL, THE REPERCUSSIONS WHICH, FROM THE VIEWPOINT OF THE SOCIETAL WELFARE THEORY, ENCOURAGE MONOPOLY WITH RESPECT TO OTHER MORE COMPETITIVE FORMS, TYPICALLY WITH PERFECT COMPETITION MARKETS. AT THE SAME TIME, WHEN DYNAMIC FORCES ARE STUDIED WHICH BRING ECONOMIC AND SOCIAL DEVELOPMENT TO SOCIETY, TRADITIONALLY THE FUNDAMENTAL ROLE WHICH INCLUDES ECONOMIC FREEDOM AND COMPETITION IN THIS PROCESS HAS BEEN EMPHASIZED. IN THIS SENSE, IT IS NOT PROVED EITHER IN THEORY OR IN PRACTICE THAT A POSITIVE RELATIONSHIP EXISTS BETWEEN THE MONOPOLY TAKEN AS A PROMOTIONAL SYSTEM AND POSITIVE RESULTS IN RESEARCH AND DEVELOPMENT. SOMETIMES THE PROMOTIONAL SYSTEM INSTITUTED BY THE LEGAL MONOPOLY WAS EVALUATED WITH ITS DIRECT CONSEQUENCE, EXPENDITURE FOR RESEARCH AND DEVELOPMENT, WHICH IS AN ERROR. INSTEAD, IT IS ENOUGH TO JUDGE THE SYSTEM IN TERMS OF ACCOMPLISHMENT OF THE OBJECTIVE FOR WHICH IT WAS CREATED: THE DEGREE OF INNOVATION (NEW PRODUCTS) OBTAINED THROUGH THE SYSTEM. LEGAL MONOPOLY PRODUCES A TRANSFER OF REVENUE AND, THEREFORE, OF EXPENDITURE, THUS JUDGING THE RESULTS OF THE SYSTEM BECAUSE OF INCREASED EXPENDITURE HAS NO SIGNIFICANCE. THE TRUE EVALUATION IS ONE OF COST-EARNINGS, IN OTHER WORDS, AS MANY NEW INNOVATIONS (NEW PRODUCTS) AS HAVE BEEN ACHIEVED GIVEN THE NECESSARY INVESTMENT MADE AS A RESULT OF THE REVENUE TRANSFER IMPLICIT IN A MONOPOLY. THEREFORE, THE PERTINENT RELATIONSHIP IS IF THIS MANNER OF SPENDING PUBLIC FUNDS IS THE MOST EFFICIENT IN TERMS

OF NEW PRODUCTS AND THEIR COST. IN PARTICULAR, IN THE CASE OF THE PHARMACEUTICAL INDUSTRY, THE STUDIES UNDERTAKEN ARE CONCORDANT WITH THIS GENERAL AXIOM SINCE THEY SHOW THAT THIS VINCULUM DOES NOT EXIST. IN OUR WORK "THE CONSEQUENCES OF PHARMACEUTICAL PRODUCT PATENTING" (WORLD COMPETITION, VOL. 15, NO. 2, DECEMBER 1991, FROM PAGE. 65 ), ESPECIALLY. (5) EMPIRICAL EVIDENCE CONFIRMS THAT THIS IS THE STATE IN WHICH THE UNITED STATES PHARMACEUTICAL INDUSTRY FINDS ITSELF AT THE CURRENT TIME. A RECENT STUDY THE U.S. CONGRESSIONAL OFFICE OF TECHNOLOGY ASSESSMENT DEMONSTRATED THAT THE PROFITABILITY OF THE PHARMACEUTICAL INDUSTRY IN THE UNITED STATES FOR THE PERIOD

1976-1987 SURPASSED 2 TO 3%, THE AVERAGE PROFITABILITY OF THE REST OF NORTH AMERICAN INDUSTRY (O.T.A.), AFTER ADJUSTMENT FOR DIFFERENCES FOR RISK, ("PHARMACEUTICAL R&D: COSTS, RISKS AND REWARDS", FEBRUARY 1993, CHAPTER 4). FORTUNE MAGAZINE ARRIVED AT A SIMILAR CONCLUSION, SHOWING THAT THE RETURNS ON SHARE CAPITAL IN THE PHARMACEUTICAL INDUSTRY HAVE SURPASSED THE GROWTH PATTERN FOR 1980-1991 AVERAGE RETURNS FOR THE 500 MOST IMPORTANT INDUSTRIES IN THE UNITED STATES. IN THE SAME MANNER, THE PROFITS/SALES RATIO FROM THE MANUFACTURERS LABORATORIES OF THE MOST SOLD DRUG WAS SIGNIFICANTLY GREATER BETWEEN 1985 AND 1991 THAN THE AVERAGE PROFIT/SALES RATIOS IN THE 500 MOST IMPORTANT INDUSTRIES (FORTUNE MAGAZINE 1981-1992, CITED IN THE "REPORT CARD ON 1992 DRUG MANUFACTURER PRICE INFLATION", REPORT FROM THE UNITED STATES SENATE SPECIAL COMMITTEE ON AGING, FEBRUARY 1993, PAGES 7 AND 8).

(6)PC IS NOT NECESSARILY THE PRICE OF PERFECT COMPETITION. THIS TYPE OF ASSUMPTION IS NOT REQUIRED FOR OUR ANALYSIS. PC IS SIMPLY THE PRICE OF AN OPEN MARKET, IN OTHER WORDS, A MARKET IN WHICH ALL OF THE COMPANIES THAT ARE CAPABLE OF PRODUCING THE PRODUCT MAY DO SO, AND WHERE THERE IS BRAND COMPETITION FROM PRODUCT LAUNCHING.

(7)IN AN OPEN MARKET AS DESCRIBED, THE PROFITS TEND TO NEAR THOSE CONSIDERED NORMAL FOR THE ACTIVITY AND NEAR THE AVERAGE FOR THE ECONOMY. UNDER THIS CONDITION, PC TENDS TO APPROACH CM PLUS THE RATE OF NORMAL PROFIT. OF COURSE, A HIGHER PROFIT RATE WOULD ATTRACT NEW INVESTMENTS TO THE ACTIVITY AND A LOWER ONE WOULD DISCOURAGE, THUS CREATING THE DYNAMIC TENDENCIES WHICH LEAD TO THIS CONVERGENCE.

(8)N "REPORT CARD ON 1992 DRUG MANUFACTURER PRICE INFLATION", (NOTE 16), IT IS MENTIONED THAT THE NORTH AMERICAN PHARMACEUTICAL INDUSTRY SPENDS 18 MILLION DOLLARS ANNUALLY IN RESEARCH AND DEVELOPMENT. OF THIS AMOUNT, 4.5 BILLION ARE FOR "ME-TOO" DRUG DEVELOPMENT, THOSE WHICH ARE SIMPLY NEW VERSIONS OF THOSE WHICH ALREADY EXIST ON THE MARKET. ONLY 3.5 BILLION WERE FOR RESEARCH AND DEVELOPMENT OF NEW DRUG MOLECULES - ONLY 19% OF THE TOTAL R&D EXPENDITURE.

(9)OTHER FACTORS REDUCE THE AMOUNT OF MONEY WHICH IS DISBURSED FOR R&D BY THE PHARMACEUTICAL INDUSTRY. THE MOST SIGNIFICANT IS THAT THE U.S. GOVERNMENT IS THE MOST IMPORTANT PARTICIPANT IN BIOMEDICAL RESEARCH AND UNDERTAKES A GREAT NUMBER OF STUDIES IN THIS FIELD. IN SUMMARY, THE GOVERNMENT DIRECTLY SUBSIDIZES R&D. FINALLY, THE NATIONAL INSTITUTE OF HEALTH AND OTHER FEDERAL LABORATORIES CARRY OUT RESEARCH IN CERTAIN SPECIALIZED AREAS.

(\*) OFFICE OF TECHNOLOGY ASSESSMENT, OP.CIT.

(\*\*) THIS FACT IS CONFIRMED IN THE OTA STUDY WHICH SHOWS THAT, SIX YEARS AFTER THE EXPIRATION OF A PATENT, THE ORIGINAL BRANDS RETAIN 50% OF THE MARKET IN PHYSICAL UNITS ON THE AVERAGE AND, ALSO THAT THEY HAVE AN AMOUNT OF SALES REPRESENTING 70% OF THE AMOUNT OF SALES AT THE TIME OF PATENT EXPIRATION, AND REPRESENT 40% OF THE SALES VOLUME ON THAT DATE (OFFICE OF TECHNOLOGY ASSESSMENT, OP. CIT. PAGES 88 AND 89).