Chapter III

Economic Analysis of the Public Domain

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1. INTRODUCTION

In the past decade, the field of intellectual property has seen the most significant change since its birth following the invention of the printing press. On the one hand, the digital revolution has brought about a process of commodification and propertization – a vast increase in informational goods and services that are protected by property rules, either by law or by other means such as technology (which itself is protected by law against circumvention). On the other hand, we have seen the emergence of a social movement that seeks to halt or reduce this process of commodification. The preservation of the public domain is a key issue for this movement. It is argued that the legislature and the courts are surrendering to the big media and other powerful interest groups by enhancing the scope of intellectual property and increasing control over creativity, thus effectively shrinking the public domain.[1]

In the course of this debate the exact meaning of the term 'public domain' has also changed. Originally it was defined as including creations for which intellectual property protection had expired. Then it also encompassed statutory limitations to intellectual property rights, such as fair use,[2] and now it may even refer to any information resource for which legal rights to access and use for free are held broadly.[3] The definition of the public domain that I will adopt in this chapter includes creations that were not initially subject to intellectual property, and this definition, in fact, equates the 'commons' with the public domain. This is a good working

1. L. Lessig, 'Coase's First Question', 27 *Regulation* 38-41 (2004).
2. W. Gordon, 'Fair Use as a Market Failure: A Structural and Economical Analysis of the Betamax Case and its Predecessors', 82 *Columbia Law Review*, 1600-1657 (1982).
3. A. Chander and M. Sunder 'The Romance of the Public Domain', 92 *California Law Review*, 1331-1373 (2004), at p. 1338.

L. Guibault and P.B. Hugenholtz (eds), *The Future of the Public Domain*, 27–58

definition from a law and economics perspective, knowing that one of the major rationales of law and economics for propertization is the 'tragedy of the commons', or, according to our working definition, the tragedy of the public domain. I will return to the definition of the public domain in section 6, where I will question the dichotomy between intellectual property and the public domain and propose a more complex view of property rights.

The debate between property supporters and the advocates of the public domain is portrayed by some scholars as a debate between the law and economics movement on the pro-propertization side, and progressive scholars on the pro public domain side. Thus, for example, Chander and Sundler write: 'Since Hardin, law and economics scholars have launched a crusade to expose the evil of the commons – the evil, that is of *not propertizing*. Progressive legal scholars have responded in kind, exposing the perils of *propertization*'.[4] In this chapter, I will try to show that this labeling is inaccurate and that the law and economics analysis is more complex than what is usually presented. For this purpose, I will begin with a few words on my own perception of the law and economics approach, which is somehow different from, and much broader than, the traditional conception of this movement (section 2).

But already from my opening statement, it is clear that law and economics insights can be useful to both sides of this debate. On a positive level of analysis, the ongoing commodification of information can be perceived as an inevitable phenomenon, based on the traditional positive analysis of Harold Demsetz on which I will elaborate in section 3. Moreover, the accusations of the pro public domain camp against the course of legislative and judicial expansion of intellectual property is in itself an insight of law and economics, or, more precisely, of its sub-field of public choice theory, portraying this legal change as the result of pressure by powerful interest groups.

On a normative level of analysis, the opposition of intellectual property rights versus the public domain is confusing within the law and economics paradigm itself. First, economists generally favor free markets over government regulation, but in the context of intellectual property it is not clear whether creating intellectual property rights by law is a manifestation of the free market or a case of government intervention. On the one hand, the main tool to create intangible property is the law; hence intellectual property belongs in the interventionist camp. On the other hand, markets can operate only on the basis of (private) property; in other words, property is a basic pre-condition for the market to operate. Hence intellectual property is an integral part of a free market.

Second, the prime normative goal of law and economics is to maximize the welfare of society. Without intellectual property, incentives to create will be lacking and thus new drugs would not be developed, new ideas would not be published, cultural and scientific progress would cease or significantly slow down, decreasing the welfare of society. However, most new inventions are based on older ones, whether this is scientific innovation or cultural creation. Full propertization of every idea and

4. Id., at 1332-3.

expression would, therefore, slow down scientific and cultural progress. In order to enhance society's welfare, we do need a significant public domain. Granting intellectual property rights, therefore, works in both directions. It stimulates innovation and creation, thus increasing total welfare, while at the same time creating barriers to further innovation and creation, decreasing welfare growth. This requires a more sophisticated framework of analysis to achieve the right balance. This aspect will be discussed in section 4.

In section 5, I will elaborate on the economics of the digital realm, which ought to change the parameters underlying the traditional economic rationale of intellectual property and thus of the public domain. One of the most important features in this context relates to the state of technology and its pace of change, traditionally taken as an exogenous variable within the law and economics analysis. I will argue that the state of technology ought to be endogenized, transforming the equilibrium of traditional analysis and also affecting the analysis of traditional market failures such as high transaction costs, which may no longer play a crucial role in the choice of legal rules.

2. LAW AND ECONOMICS AND INTELLECTUAL PROPERTY

The law and economics movement can be described as an application of economic theory to examine and evaluate the formation, structure, process and impact of law and legal institutions. The science of economics has come a long way since its definition in the mid 19th century by Marshall as 'a study of man's action in the ordinary business of life; it inquires how he gets his income and how he uses it'.[5] This definition focuses on economic markets, whereas economic science today also addresses non-economic markets and indeed human interactions that are not part of any market activity. Already in 1932,[6] Robbins defined economics as a 'science, which studies human behavior as a relationship between ends and scarce means which have alternative uses'. This definition of the science of economics as a science of choice implies that economics today can be perceived as a grand theory.[7] Taking into account game theory and social choice as sub-fields of economics maybe even Robbin's broad definition of economics is no longer broad enough today.

I believe that a more accurate description of the science of economics, and by derivation, of the law and economics movement is not through its objects of analysis or (right-wing) ideology, but through its methodology. The economics methodology is based on (1) simplifying a very complex reality, (2) applying a rigorous model

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5. A. Marshall, *Principles of Economics*, London, Macmillan, 1922.
6. L. Robbins, *An Essay on the Nature and Significance of Economic Science*, London, Macmillan, 1932, p. 16.
7. Q. Skinner, *The Return of Grand Theory in the Human Sciences*, Cambridge, Canto, 1990. In this sense the contemporary scope of economics resembles its perception by its modern founder (Adam Smith) more than its perception by the 19th century economists (primarily Marshall) who developed some of its major methodological tools. Hence Skinner's book title.

to analyze this simplified reality, (3) deriving results from the model as to possible causal connections between its various variables and (4) deducing insights with regard to the real world based on the model's results.

One of the main advantages of this methodology is that it is evolutionary: one can construct a simple model based on far reaching simplifying assumptions, and develop this model gradually by relaxing or complicating some of these assumptions.[8] In this sense the Chicago school, which uses the basic microeconomics market model and applies it to law can be perceived as a first generation, while neo-institutional analysis or behavioral law and economics can be seen as a second or third generation.[9] The other advantage is that such a methodology provides the academic community with a common language, and the debates regarding the subject matter of the analysis can focus on the model, on the conclusions from the model regarding the real world, and indeed on the simplifying assumptions.

In a similar way to the science of economics, the law and economics movement is popularly identified with efficiency or wealth maximization, as a great supporter of free markets and as an opponent to government or central intervention in market activities. This perception is somewhat partial or even distorted. Indeed, in the area of intellectual property the traditional law and economics analysis does not believe in 'natural' markets and advocates central intervention by granting intellectual property rights, on the basis of which market transactions can take place. In this specific field the definition of 'market' is crucial and, as I will try to show later, the public domain can be (and ought to be) perceived as a sort of a market. Hence the law and economics approach should not be viewed as a priori in favor of intellectual property rights and against the public domain. In addition, wealth maximization is not the only possible objective of the law and economics approach, and once other normative principles are taken into consideration in the foundation of this approach the popular view of the stances of Law and Economic can be disputed.

The law and economics movement is engaged in two different projects – the normative analysis and the positive analysis. The normative analysis tries to tell us what the desirable legal or constitutional arrangements are. To perform such an analysis one has to define a normative objective, the source of which is outside the scope of the science of economics. The leading normative goal of most economic analyses literature is indeed efficiency. However, there are several competing definitions of efficiency – maximization of utility, maximization of wealth, Pareto optimality – and competing views regarding the goal of efficiency as the primary

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8. However, this process of simplifying the reality through intended unrealistic assumptions is a source of specific ideology to implicitly enter economic analysis.
9. N. Mercura and S. Medema, *Economics and the Law: From Posner to Post-Modernism*, Princeton, Princeton University Press, 1997; N. Elkin-Koren and E. Salzberger, *Law, Economics and Cyberspace: The Effects of Cyberspace on the Economic Analysis of Law*, Cheltenham, UK, Edward Elgar Publishing, New Horizons in Law and Economic Series, 2004, Ch. 1.3. The main task of neo-institutional law and economics is to take on board the fact that behavior and actions are not only the result of individual decisions, but the result of collective decisions which are affected by the institutional structure and decision-making rules within institutions. The main task of behavioral law and economics is to relax the assumption of full rational behavior.

normative principle[10] or as a second best to utility maximization as viewed by welfare economics. In addition, a major share of constitutional law and economics relates to another normative goal (which is also one specific notion of efficiency) emanating from different historical roots – the social contract theories of the state – consensus or Pareto optimality.

The two major normative paradigms to analyze intellectual property are the natural law paradigm (which is dominant in the Continental European legal world) and the positivist one (which is dominant in the Anglo-American legal tradition). The natural law paradigm is outside the reach of law and economics, as it is deontological rather than teleological; it judges whether a law, decision or action, is right or wrong on the basis of its intrinsic moral value without regard to its consequences. Thus, a Lockean type of natural law justification to property rights, including intellectual property rights, is outside the scope of law and economics, as is the Kant-Hegel self-fulfilling or self-flourishing justification for the protection of intellectual property. In contrast, a republican justification for intellectual property can be analyzed within the law and economic discourse, as, of course, the utilitarian theory of intellectual property.[11] From a law and economics perspective, the difference between the classical utilitarian justification and the republican one lies with the assumptions regarding individual preferences. While the utilitarian approach views preferences as exogenous to the analysis, the republican approach posits that the legal arrangements themselves can affect the basic individual preferences in a way that will make them more cooperative or altruist and less distant and conflictual, allowing the extension of the frontiers of general utility.[12]

These very general and philosophical observations are important in the context of the public domain. This concept exists beyond the specific intellectual property context and is part of a republican vocabulary. The public domain, like the public sphere, is a place in which individuals meet each other, interact, exchange views and information, attempt to influence each other's opinions and preferences and indeed absorb inspiration and ideas for creation. Thus, under an analytical framework which assumes endogenous preferences, the development and preservation of such public spaces are beneficial from a point of view of welfare maximization, because once individuals change their preferences towards more altruist ones, the collective is able to reach utility or wealth frontiers that were not available with the sets of initial preferences. In the context of intellectual property, the public domain is not merely a place of free flow of information and opinions; it is also a place of production or even a means of production, and unlike the traditional production means of land, labor and, to lesser degree, capital, the public domain is not rivalrous or exclusive. In the course of this chapter we will examine how this multi-purpose public domain

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10. R. Posner, 'Utilitarianism, Economics, and Legal Theory', 8 *Journal of Legal Studies* 103-104, (1979).
11. On these four normative sources of theories of intellectual property, *see*: C. Fisher, *Rebating Environmental Policy Revenues: Output-Based Allocations and Tradable Performance Standards*, Discussion Paper 01-22, Resources of the Future, Washington, 2001.
12. Elkin-Koren and Salzberger, *supra* note 9, Ch. 10.

affects the traditional analysis regarding both efficiency in production and efficiency in allocation.

Positive law and economics analysis tries to explain why things are as they are or to describe legal phenomena in economic language. It portrays causal connections between various variables in the legal and economic arenas. The growing contribution of institutional law and economics highlights the central role that the institutional structures play within positive analysis, and rightly so. The public domain in this context can be viewed as a unique institution, which like other institutions affects individuals' choices and social outcomes.

One of the weak points of the economic analysis of law approach is the inner equilibrium between normative and positive analyses. Since both positive and normative analyses are founded upon specific assumptions as to human behavior, it is very possible that the normative prescription of the desirable legal arrangement is different from the positive analysis of what legislatures and courts will actually do. What is the use of constructing a normative theory if the same underlining assumptions lead us to predict that the recommended solution does not stand a chance of being selected.[13]

The most important general premise of the economic theory is that open competition within a perfect market will lead to efficiency, which is the most desirable social outcome. The concept of efficiency in economic theory relates to both the production of goods and their allocation. Efficiency in production means that it is impossible to produce more goods using the available resources. Efficiency in allocation means that it is impossible to transfer goods among individuals in a way that makes one individual better off without improving the lot of others (Pareto efficiency), or that it is impossible to enhance the total welfare of society by further transfers of goods or services (Kaldor-Hicks or welfare maximization efficiency). Yet, the term efficiency can be defined in a broader way. It can encompass both Thomas Hobbes' analysis of the creation of the state as an efficient solution to the problems of the state of nature, and Adam Smith's analysis of the invisible hand as the balancing factor of human markets. Again, the complexity of the intellectual property concept of the public domain is that it encompasses both a place of production and a place of consumption, and it relates both to traditional economic activities and to traditionally non-market activities.

The premise that open competition within a perfect market will lead to efficiency contains a positive component (open competition will lead to efficiency) and a normative component (efficiency is the desirable social outcome). This general premise was advanced by the economic approach to law in several directions, the two most important being the economic theory of the state and the limits of free markets justifying central intervention. The economic theory of the state analyzes

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13. The distinction between normative and positive analyses is not exclusive to the economic approach. Thus the core questions of jurisprudence or the philosophy of law are what law is, and what law ought to be and what are the inter-relations between these two questions. However, this distinction is crucial in law and economics, because of the common assumptions as to human behavior.

the emergence of the state, its central government, and its institutional structure as derived from problems of collective action that are market failures of sorts. Studies of the limits of the free market seek to identify the circumstances in which central government or central governance is justified, or should take place in order to shift the market (imperfect) solution. Only in such circumstances should government intervene. Such circumstances are once again related to market failures. Four traditional market failures are commonly mentioned: monopolies or excessive market powers, lack or a-symmetry of information, public goods and externalities.

This traditional market analysis, however, assumes three important assumptions that precede the operation of a free market: a given community, a given state of technology, and a given allocation of property rights among the players in the market. The former presumption includes both a set composition of a community and a given set of preferences or utility functions of each of its members. The latter relates both to the objects of property, as well as to its original allocation, from which a free and competitive market will enhance the general welfare or the wealth of a specific community. In other words, a free and competitive market will maximize efficiency for a set community, comprising members with given preferences and resources under a set technological state. When we discuss the concept of a public domain we have to relax these presuppositions.

When focusing on the public domain, the problem of distinguishing between normative and positive analysis becomes apparent. Property rights are analyzed in the discourse of law and economics within two broad frameworks: the incentives paradigm and the tragedy of the commons paradigm. In the next two sections, I will try to present these two paradigms in the context of the normative-positive distinction and with some insights into these rationales when applied to intellectual property and the public domain.

3. THE TRAGEDY OF THE COMMONS PARADIGM AND THE POSITIVE ANALYSIS OF THE PUBLIC DOMAIN

The tragedy of the commons is the dominant paradigm in law and economics for the positive analysis of property in general, and land law in particular. However, it can easily be extended to explain intellectual property and its connection with the public domain; it can also be viewed as a normative analysis of property, of intellectual property and, by derivation, of the public domain.

Parallels are drawn between the English enclosure movement, the process of fencing off communal land and turning it into private property, which lasted from the 15th to the 19th century, and the recent trend of commodification of information and the expansion of intellectual property rights.[14] From a law and economics perspective the first enclosure movement is treated mainly in the context of the tragedy of the

14. J. Boyle, 'The Second Enclosure Movement and the Construction of the Public Domain', 66 *Law and Contemporary Problems* 33-74 (2003).

commons paradigm, which is dominated by positive analysis. Although the term tragedy of the commons is attributed to Hardin,[15] it was in fact Harold Demsetz[16] who offered this theoretical framework to analyze the concept of property rights.

Demsetz holds that property rights emerge in response to the desires of economic actors to adjust to new benefit-cost possibilities. Thus, 'the emergence of new private or state-owned property rights will be in response to changes in technology and relative prices'.[17] His analysis begins with an absence of property rights, thus rejecting the natural law concept of property rights. Land, and what is on it, is owned by no one, or rather by everyone. This can be an optimal and static equilibrium if every individual can use and produce from the land all he or she is seeking for. Population growth and density may change this equilibrium. So does an increase in demand that is beyond the consumption needs of the local population. Once such a situation occurs a clash between individuals over the land and what is on it will take place, which will bring about over-consumption and a 'tragedy of the commons', making all individuals worse off than before.

Demsetz compared the creation of property rights by the Native Americans in the Northeast and to the same in the Southwest. When hunting was carried on primarily for purposes of food and the relatively few furs that were required for the hunter's family, Demsetz wrote, 'Hunting could be practiced freely and was carried on without assessing its impact on other hunters … There did not exist anything resembling private ownership in land.'[18] But the fur trade changed that. First, the value of the furs to the Indians increased considerably. Second, and as a result, the scale of hunting activity rose sharply. So the tribes developed territorial hunting and trapping rights to make sure that the resources were cared for prudently and to enhance long-term efficiency.

Why didn't the indigenous peoples of the American Southwest develop similar institutions? Demsetz cites two reasons. First, in their area there were no animals of commercial importance comparable to the fur-bearing animals of the North. Second, those animals that did populate the Southwest were primarily grazing species that tended to wander over large tracts of land, making it difficult to prevent them from moving from one parcel to another. 'Hence both the value and cost of establishing private hunting lands in the Southwest are such that we would expect little development along these lines. The externality was just not worth taking into account,' wrote Demsetz.[19]

It is important to emphasize that Demsetz provides us with a positive analysis of the development of property rights, which is also a dynamic analysis portraying the process of propertization (and de-propertization). This description does not involve a state or central government, which is called upon to intervene in market activities.

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15. G. Hardin, 'The Tragedy of the Commons', 162 *Science* 1243-1248 (1968).
16. H. Demsetz, 'Towards a Theory of Property Rights', 57 *American Economic Review* 347-360 (1967).
17. Demsetz, *supra* note 16, at 349.
18. Ibid, p. 351.
19. Ibid, p. 352.

Implicitly, the description of Demsetz is also his normative analysis. Demsetz endorses the creation of property rights because it fulfils the efficiency criterion, defined probably in terms of both welfare maximization and Pareto optimality. His theory is based on an equilibrium between normative and positive analysis.

The current changes in intellectual property laws – the process of commodification of information or the 'second enclosure movement' – is in line with Demsetz's theory, according to which the emergence of new private or state-owned property rights will be in response to changes in technology. However, three major differences must be pointed out and looked upon more carefully when we apply Demsetz's theory to the contemporary analysis of the expansion of intellectual property and its effects on the public domain. First, in contrast to land, information is non-rivalrous; its use or consumption does not prevent others from parallel consumption. Nonetheless, unlike land, information has to be produced in order to be consumed, and free usage by everyone can affect the incentives to produce it in the first place. In addition, it can be argued that free consumption of informational goods would reduce the value of this information for each user. In other words, the tragedy of the commons in informational goods is different from the tragedy of the commons in land, and we will have to examine whether these differences are such that the dynamic of propertization of information is substantially different from Demsetz's description.

Second, Demsetz's analysis assumes technology to be an exogenous variable in the process of the emergence of property rights. He indeed relates to the effects of technological change on the creation of property rights, but not to the effects of property rights on the course and pace of technological development. Since technological changes today are much more rapid and dynamic it is problematic to ignore them as an essential variable in the analysis of property. I will elaborate on this point in section 5. Third, Demsetz portrays the emergence of property rights as the result of market activities without the intervention of the state or central government. This fact enables him to ignore the public choice side of the story. Collective action problems, interest groups and rent seeking are absent from the analysis. This is not the case with the 'second enclosure movement' and we will have to take on board this difference seriously when applied to the current debate regarding the public domain.

The analysis of Demsetz can be extended to de-propertization as well. According to his rationale, if governments (or courts or other collective decision-making bodies) intervene in the market of property rights, as in the contemporary situation, market activities can bring about de-propertization. The phenomena of open source, creative commons and other forms of enhancing the public domain can be seen as market responses to the inefficient expansion of property rights by central agencies.[20] The same positive and dynamic analysis offered by Demsetz for describing the creation of property rights can serve to analyze the expansion of the public domain in the

20. It is noteworthy that such de-propertization movements avail themselves of the existing legal instruments of contract and property law to perform the shift towards de-propertization. *See* N. Elkin-Koren, 'Exploring Creative Commons: A Skeptical View of a Worthy Pursuit', *see* p. 325 in this volume.

shadow of a strong, or overly strong, property rights regime. Demsetz himself hinted at this direction by asserting that '[t]he greater are diseconomies of scale to land ownership the more will contractual arrangement be used by the interacting neighbors to settle these differences. Negotiating and policing costs will be compared to costs that depend on the scale of ownership, and parcels of land will tend to be owned in sizes which minimize the sum of these costs'.[21]

Demsetz' theoretical framework does not only allow for a dynamic of de-propertization, but it also mentions the variables that can predict such a process, some of which may fit the description of the new mode of production of informational goods.[22] Demsetz referred to the analysis of corporations as an alternative structure of property rights, stating that '[t]he interplay of scale economies, negotiating cost, externalities, and the modification of property rights can be seen in the most notable 'exception' to the assertion that ownership tends to be an individual affair: the publicly-held corporation. I assume that significant economies of scale in the operation of large corporations is a fact and, also, that large requirements for equity capital can be satisfied more cheaply by acquiring the capital from many purchasers of equity shares. While economies of scale in operating these enterprises exist, economies of scale in the provision of capital do not. Hence, it becomes desirable for many 'owners' to form a joint-stock company'.[23]

Benkler emphasizes the peer production mode as an alternative to production within a firm. However, if we focus on the property rights aspects of the new production mode, the analogy between corporations and the market-driven enlargement of the public domain can be of great interest. Demsetz' statement regarding the nature of corporations can actually, with small modifications, describe the property rights aspect of the peer production process emerging today.[24] The decrease of transaction costs and contract formation costs is leading to greater production outside firms and back into the markets. However, the atomization of joint work efforts enabled by the new technologies creates a new type of market activity not seen before the Internet revolution.

To summarize, the tragedy of the commons paradigm offers us a fruitful positive law and economic model of the current state of the public domain: both its initial shrinkage as the result of intellectual property expansion, and more importantly its subsequent expansion in the shadow of intellectual property, due to inefficient legal intervention and rapid changes of technology. Since the tragedy of the commons is also an implicit normative analysis we can conclude that law and economics is not merely biased in favor of propertization, but that it also endorses a viable public domain.

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21. Demsetz, *supra* note 16, at 357.
22. Y. Benkler, 'Coase's Penguin, or, Linux and the Nature of the Firm', 112(3) *Yale Law Journal* 369-447 (2002).
23. Demstez, *supra* note 16, p. 357.
24. Elkin-Koren and Salzberger, *supra* note 9, pp. 62, 130-136.

4. THE INCENTIVES PARADIGM AND THE NORMATIVE ANALYSIS OF THE PUBLIC DOMAIN

The incentive paradigm is the main contemporary law and economics framework for the normative analysis of intellectual property. I will first elaborate on its essence, its differences with the tragedy of the commons paradigm and the implications of these differences for the public domain. Subsequently, I will discuss the alternatives to intellectual property rights within this framework, as well as their effects on the public domain.

4.1. THE INCENTIVE PARADIGM VERSUS THE TRAGEDY OF THE COMMONS

Like the tragedy of the commons framework, the incentive paradigm in the domain of intellectual property is an extension of the original analysis of property rights in physical objects.[25] As a pure normative analysis, the starting point is a normative goal, which, as explained above, is external to law and economics. This goal is efficiency defined in terms of wealth maximization.[26] I have noted before that efficiency is not the only possible normative principle for the economic analysis of law and that there are several competing definitions of efficiency, but once one acknowledges that government intervention is needed to facilitate a desirable structure of intellectual property it is obvious why efficiency in our context is translated into maximization of wealth, rather than Pareto optimality or maximization of utility. In any case, internal debates within law and economics as to the preferred normative goal of intellectual property arrangements are scarce.

The incentives paradigm focuses on the legal instruments needed to maximize society's wealth. It recognizes that while in a world without intellectual property rights there will be no incentives to create (or limited incentives to do so) and property rights should therefore be established, propertization also hinders the creative process, as new creations in most cases rely on previous ones. In this sense, one cannot describe the law and economics model as a priori pro propertization and anti public domain. The question is rather what is the optimal extent of intellectual property and the public domain, or the right mixture of the two that will maximize society's wealth. However, this question leaves out two important factors that are not addressed by the core model: the definition of the society (state, territory) for which we are seeking to maximize wealth and the definition of a time frame for such maximization.

The two factors are less crucial (but not absent) in the analysis of traditional property (tangibles and land), as physical property is connected to a specific territory.

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25. W. Landes and R. Posner, *The Political Economy of Intellectual property Law*, AEI Brookings Joint Center for Regulatory Studies, Washington D.C, 2004, p. 11.
26. Id., Ch. 1.

Save exceptional externalities, it usually already exists and has a relatively long-term value. Intellectual property has no geographical barriers (or minor geographical barriers of language) and its term of value can vary significantly from news items of only momentary value to large scientific breakthroughs or major ideas with almost eternal effect. In addition, intellectual property is mostly hypothetical or pre-creation and thus the impact of current intellectual property and the public domain regulation is crucial for future creation of potential property. For intellectual property, therefore, the two questions – whose wealth we are seeking to maximize and what is the time frame for such maximization – become highly important.

Indeed, the debate between third world countries and the industrialized world regarding patents on medications exemplifies the crucial factors of territory and time span. If the unit for which we seek to maximize wealth is the traditional national state, American intellectual property laws should not take into account their impact on people suffering from illnesses in Africa, save some minor potential wealth effects of the decreasing population in Africa on American's wealth (such as a decrease in exports to Africa). If the unit for which we maximize wealth is global, the picture becomes entirely different. In other words, a crucial factor in setting the desirable extent of intellectual property laws for a specific jurisdiction is the balance of trade of this jurisdiction in creations. A state that exports more products of the mind than it imports, will opt for a broad extent of intellectual property, whereas a state that is mainly an importer will find it more efficient for its citizens to set a low degree of intellectual property protection.

Similarly, if the time unit for wealth maximization is momentary or short, then most intellectual property ought to be in the public domain – the price of medications should be their marginal production cost, because the potential effect on future creation is not taken on board. If the time unit for such maximization is long, then the incentives to create should be taken into consideration. But how long should this time unit be, and how can we possibly predict the impact of today's regulation on future creation, especially in environment in which technological progress (which itself depends on the current intellectual property regulation) is so rapid? The growing pace of technological change decreases even the relevancy of the few empirical studies on the impact of intellectual property laws on cultural and scientific progress. In short, setting the time frame for wealth maximization is problematic from both conceptual or theoretical point of view and an empirical one.

The incentives paradigm has several common features with the tragedy of the commons paradigm, but also several important differences. The main similarity between the two concerns the major rationale for propertization (and de-propertization). Like the argument from the tragedy of the commons discourse – that without property rights we will witness, on the one hand, overuse of the common resources, and, on the other hand, lack of incentives for private investment to optimize the production capabilities from the resource and its potential value – the incentive discourse argues that without intellectual property rights there will be no sufficient incentive to invent and create. Demsetz himself connected the two when he wrote in the last part of his path-breaking article: 'Consider the problems of copyright and patents. If a new idea is freely appropriable by all, if there exist communal rights

to new ideas, incentives for developing such ideas will be lacking. The benefits derivable from these ideas will not be concentrated on their originators. If we extend some degree of private rights to the originators, these ideas will come forth at a more rapid pace'.[27]

However, there are a few important differences between physical property and intellectual property and thus between the tragedy of the common land and the incentive paradigms. First, as I mentioned before, informational goods are non-rivalrous. Consumption by one will not prevent simultaneous consumption by others. In this sense, lack of propertization of ideas will not create a tragedy of the commons in the sense of over-consumption. One can argue that instead of over-consumption of physical objects, in intellectual property we will witness a decrease in value for users with the increase of the number of other users (see below Landes and Posner's recent argument). But the opposite can also be argued: that increasing parallel use creates a positive network effect. In other words, the value for a user will increase when others use the same creation, especially when we are talking about communicative products – software, cultural creations, etc. The non-rivalrous effect of intellectual property, it seems, does matter, but its impact is in two opposing directions, the dominance of which cannot be determined without empirical data.

A Second difference between the two frameworks is that for the new property the same rationale, which points towards the propertization of ideas – incentive to create, is also pointing to the fact that such propertization will leave less ideas to be the source for new creations. In other words, propertization of ideas works in both directions when the goal is to maximize creation, knowledge and progress. It can be argued that this phenomenon has an equivalent in the tragedy of the commons physical world, as the tragedy is not only reflected by over-consumption, but also by lack of investment to enhance the value of the property. But in the context of intellectual property this consideration works in an opposite direction: while propertization in physical objects works mainly as a positive incentive to invest and enhance the value of the property, propertization of ideas will decrease the sources for new creations and thus its future volume. For these two reasons, intellectual property rights, unlike property rights in land and tangibles, are thought to be a good mechanism to maximize incentives only if they are given for a limited time and with various exceptions, such as fair use.

It is interesting to note that Demsetz himself ignored these two differences and pointed to another difference between intellectual property and physical resources. He wrote: 'But the existence of the private rights does not mean that their effects on the property of others will be directly taken into account. A new idea makes an old one obsolete and another old one more valuable. These effects will not be directly taken into account, but they can be called to the attention of the originator of the new idea through market negotiations. All problems of externalities are closely analogous to those, which arise in the land ownership example. The relevant variables are

27. Demsetz, *supra* note 16, p. 359.

identical'.[28] Demsetz's point is a little vague because it is not clear whether this is an argument from a distributive justice perspective or an inner efficiency one (and if so, what is his precise concept of efficiency). Demsetz ignored the two differences I mentioned here probably because his argument is constructed within the category of externalities as a market failure, which requires central intervention and correction, while the contemporary analysis of intellectual property is conducted in context of the public goods category of market failures.[29]

The focal point of the public good analysis is that since the marginal costs of copying a work or a creation are minimal (almost zero) the market price of a non propertied work will be so low that it will not cover the initial investment of its creator and thus new works will not be developed. Only propertization of such works will grant sufficient incentives for their creation in the first place. Landes and Posner set this framework.[30] They portray copyrights (and by extension other types of intellectual property) as a mechanism to enhance incentives to create, but acknowledge that the benefits should be outweighed with the administrative costs of registration and enforcement and, more importantly, with the shrinkage of the public domain, which is the main source for new ideas and creations. Thus, they write: '… beyond some level copyright protection may actually be counterproductive by raising the cost of expression … Creating a new work typically involves borrowing or building on material from a prior body of works … The less extensive copyright protection is, the more an author, composer, or other creator can borrow from previous works without infringing copyright and the lower, therefore, the costs of creating a new work'.[31]

In a later paper, however, Posner and Landes change their analysis and advocate for an indefinitely renewable copyright, instead of intellectual property rights limited in duration.[32] It is puzzling how in this recent article the authors ignore the major reason, mentioned in their earlier piece, for limiting the duration of intellectual property – that propertization, while, on the one hand, provides incentives for creation, on the other hand, limits the sources for new creation and thus is likely to reduce such creation. Instead they specify six other reasons, connected mainly to transaction costs, for limiting the duration of intellectual property and argue that these reasons are not convincing.

The main thrust of their later argument is disputing the first difference I mentioned above between land and informational goods – the public good nature of the latter, which will prevent a tragedy of the commons even if there is no propertization. Posner and Landes argue that this is not correct because overuse of ideas, images,

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28. Ibid.
29. Traditional microeconomic analysis points to four major market failure – monopolies, public goods, a-symmetric information and externalities.
30. Landes W. and Posner R. 'An Economic Analysis of Copyright Law'. 18 *Journal of Legal Studies,* 325-363 (1989).
31. Id., at p. 332.
32. W. Landes and R. Posner, 'Indefinitely Renewable Copyright'. 70 *University of Chicago Law Review* 471-518 (2003).

literary characters etc. will decrease their value and hence their usage is, in fact, rivalrous. Their main example is Disney's Mickey Mouse, on which they write: 'If because copyright had expired anyone were free to incorporate the Mickey Mouse character in a book, movie, song, etc., the value of the character might plummet. Not only the public would rapidly tire of Mickey Mouse, but his image would be blurred, as some authors portray him as Casanova, others as catmeat, others as an animal-rights advocate, still others as the henpecked husband of Minnie'.[33]

Posner's and Landes' point is similar to Demsetz's qualifications regarding the potential effects of new ideas and creations on old ones, and in this sense the differences between land and informational goods might not be so big as Landes and Posner portray. However, they ignore the network effect mentioned above, which is likely to balance the decreasing value. More importantly, in their later paper, Landes and Posner ignore the main point, e.g. the contribution of the ideas and creations in the public domain as incentives and the likelihood of developing new ideas and creations, which is the main characteristics of informational goods, distinguishing them from tangibles and real estate. In this sense, the major difference between the informational public domain and the physical public sphere is that the former is not only a common pool for non-rivalrous consumption, but also a common production mean, which can foster Pareto improvement not only in consumption but also in production.

One of the overlooked differences between the incentives framework and the tragedy of the commons one is related to the normative-positive distinction within the law and economics movement. The incentive framework is a purely normative analysis, while the tragedy of the commons, as I noted before, originates from a positive analysis. In this sense, while the tragedy of the commons framework for property rights can be presented as creating an inner equilibrium between positive and normative analyses, the incentive paradigm as a pure normative analysis that has to be implemented by law-makers in order to materialize, is exposed to manipulation by interests groups, social choice problems and other public choice obstacles. It lacks equilibrium between normative and positive analysis, or, in other words, it cannot forecast whether the desirable (optimal) solutions will be implemented on the basis of the same fundamental assumptions of the law and economics paradigm as a whole, especially the assumption of rational behavior.

This point is especially important in the context of the contemporary debate about the public domain. While the supporters of intellectual property extension comprise a relatively small group of people (or rather corporations) which is likely to get well organized because their costs of collective organization will be lower than the expected benefits from such organization, the supporters of a greater public domain encompass many individuals whose individual gains from organization is likely to be smaller than the immense organization costs; thus their likelihood to influence the decision-makers will be much lower than that of the intellectual property lobbies. The legislative results, therefore, will reflect a bias (in terms of the optimal

33. Landes and Posner, *supra* note 32, p. 488.

point according to the incentive analysis itself) towards the intellectual property camp, and thus a distorted balance between intellectual property and the public domain will ensue. The changing structure of the relevant markets, concentration of market powers in the hands of few publishers and the emergence of interested mega-corporations in recent decades can provide an additional explanation for the increasing propertization and commodification in our times.

If this description is accurate and legal rules result in sub-optimal solutions due to public choice problems we can envisage market corrections to the law, through contractual means. In other words, individuals who favor a greater public domain at the expense of propertization are likely to channel their political activities to the market instead of the political sphere. Indeed, the Creative Commons project is exactly a contractual shift from the legal regime.[34] This setup can characterize also the open source project and other peer production phenomena.

A final difference between the tragedy of the commons framework and the incentive one is connected to the concept of efficiency of the two models. The incentive paradigm, as explained above, is preaching for intellectual property laws that maximize total wealth. The tragedy of the commons can be viewed as directed towards Pareto optimality definition of efficiency. This difference is directly related to the role of central government in the incentive model, which is absent in the tragedy of the commons one.

4.2. Alternatives to Intellectual Property within the Incentive Paradigm and their Effects on the Public Domain

The central government plays an important role in the discussion on the public domain vis-à-vis the incentive rationale. Unlike the deontological rationale for intellectual property, which focuses on the natural right to be granted ownership on self created ideas – rationale, which has thus a first order type of justification in favor of intellectual property rights (and against the public domain) – the starting point of the economic paradigm is a market failure of public goods, which in the case of information and ideas is also a public production mean. The economic rationale for intellectual property rights and against the public domain is, therefore, a second order justification. In other words, the first step is to examine whether such a market failure does exist; a separate issue is the desirable remedy to correct this failure.

With regard to the remedy issue, it ought to be emphasized that establishing intellectual property rights is only one possible remedy for this type of market failure. Central production of information and ideas, direct sponsoring of these activities in the form of research institutions and universities and liability or other sort of legal rights (not necessarily propriety) are alternative solutions. This seems

34. Elkin-Koren, 'Exploring Creative Commons: A Skeptical View of a Worthy Pursuit', *see* p. 325 in this volume.

to be a trivial point, but a closer look at the existing literature shows that it is not so. Each of these remedies has advantages and disadvantages. For example, while direct government funding of creation bears the risk of carrying a hidden or explicit political agenda or, more broadly, the risk of endangering democratic and liberal values, intellectual property rights have the danger of limiting production means and of functioning in a counterproductive way, thereby constraining the frontiers of intellectual production.

Direct subsidies from the government for creation activities, instead of granting intellectual property rights, will generate a greater public domain. Intuitively, it seems that economists ought to prefer intellectual property rights to government owned creation activities or subsidies, because the former will be traded in markets and therefore their value will be determined by market forces. If no free market activity in ideas and creations takes place, how will we be able to determine how much creation to finance, how many subsidies to give and to whom? This is not such a trivial issue. First, as explained above, in order for intellectual property to be traded in markets, these rights must be initially defined through central intervention. This definition itself is not a result of free market activity, and of course it will have a decisive impact on the future market outcome regarding the actual objects of the rights. By contrast, granting subsidies for creation can be done on the basis of competitive variables, and the end product of these activities – the actual physical products and services which are the result of creation activities – will be traded in markets and therefore generate much more competition than the trading of intellectual property protected products and services that are monopolized by their holders. Indeed, most basic research is funded with no direct connection to its market value and patents usually do not cover such value. However, we are witnessing, in recent decades, increasing attempts by research institutions to commodify their research products, which of course leads to the shrinkage of the public domain. As will be explained below, this sort of patent extension cannot be easily justified by economic analysis.

Liability rules are another possible remedy to the public goods market failure in information and ideas. Calabresi and Melamed[35] highlighted the distinction between the question of whether to allocate at all an entitlement to information and ideas and that of the desirable form for their protection. They set the framework for choosing between property and liability rules. The choice, according to their model, should depend on the structure of transaction costs. For example, the entitlement to your own ideas can be protected by property rules that prohibit others from making use of these ideas, or by liability rules that do not ban such use, but entitle the creator to sue for compensation.

Which of the two remedies is more desirable? According to Calabresi and Melamed, property rules should be preferred when negotiation costs are lower than the administrative costs of an enforcement agency or a court determining the value of the entitlement. In such a case, central intervention ought to be minimal, since

35. G. Calabresi and D. Melamed, 'Property Rules, Liability Rules and Inalienability: One View of the Cathedral', 85 *Harvard Law Review*, pp. 1089-1128 (1972).

following the construction of the legal rule, the parties are likely to negotiate for the efficient end result, adhering to or bypassing the rule. Entitlements will change hands through a voluntary exchange in the market, where the government's sole function will be to prevent bypassing of the market through injunctions and criminal law. The persons who hold the entitlement are protected by a property rule, granting them a right of injunction, which prohibits the injurer or user from causing them any harm. Liability rules should be preferred when the cost of establishing the value of an initial entitlement by negotiation is higher than that of determining this value by an enforcement mechanism. In addition, liability rules might be preferred in order to avoid bargaining costs. Lack of information or uncertainty as to the cheapest means to avoid costs is likely to point us, according to Calabresi and Melamed, in the direction of liability rule as well. Liability rules involve additional central intervention by a state organ deciding on the objective value of the entitlement. In this case, if the creator has the entitlement, she has the right to be compensated, but she cannot prohibit others from using it.

One of the features of information and ideas is the uncertainty as to their value and their possible change of value over time. Granting property rights in informational goods means that speculators can make a fortune by purchasing them for a modest price and then enjoying huge profits on their future market value. In addition, in contrast with tangible goods and real estate, it is sometimes very difficult to locate the owners of intellectual property. The costs of trading intellectual property can be very high, as Lessig[36] illustrates, for example, in relation to the process of rights clearance necessary before any artistic creation based on various previous creations, can be launched. Informational goods, as we mentioned, are non-rivalrous, and this means that granting monopolistic property rights on them might be less efficient than enabling everyone to use them, subject to appropriate compensation paid ex post. Liability rules can, therefore, become interesting competitors of traditional intellectual property rights. Using them means an enhancement of the public domain, because those who want to use the entitlements protected by them cannot be prohibited; they just have to pay for the use.

In any case, the crucial point here is that central production, subsidies and liability rules, in the context of economic analysis, should be viewed as substitute remedies to the market failure of public good of information, and thus it is not clear at all that universities and other publicly funded R&D institutions should enjoy the same intellectual property protection. The fact that Universities rank very high in the statistics of patent applications and patent revenues is inconsistent with economic analysis. In other words, government funded research and information production should not enjoy the same intellectual property protection as private enterprises – individuals or firms. Likewise, intellectual property protection ought to be regarded as excluding liability protection. Consequently, the use, for example, of the doctrine

36. L. Lessig, 'Coase's First Question', 27 *Regulation*, No. 3, 38-41, 2004.

of unjust enrichment in cases where intellectual property was available, cannot be justified.[37] Such a law and economics view will enlarge the public domain.

5. SOME HIDDEN ASSUMPTIONS OF THE TRADITIONAL LAW AND ECONOMICS ANALYSIS

The traditional tragedy of the commons and the incentives paradigms are constructed on the basis of several hidden assumptions, indeed presuppositions, in their justification for intellectual property and the right balance between intellectual property and the public domain. The new information environment requires to reveal these assumptions and to put them under a closer scrutiny. This is the purpose of this section. I will focus here on three issues, beginning with the background concept of the evolution of science and progress, continuing with the state of technology and concluding with the basic assumptions as to the individual, community and time.

5.1. THEORIES OF PROGRESS AND THE EVOLUTION OF SCIENCE

The incentives framework, as we have seen above, advocates for limited property rights in intellectual products. The justification for propertization of ideas originates from the need to generate enough individual incentives to create. The justification of limiting these rights (in scope, time and purpose of use) originates from the notion that more creation and more progress will be available if creators have a wider available source of previous creations, ideas, and data. This latter rationale is also one of the major arguments of those who advocate a greater public domain at the expense of intellectual property.

The implicit assumption behind this argument is that scientific progress and cultural progress are the result of cumulative knowledge and ideas. We can place another brick in the wall of progress, only if we have access to the layers that already exist and thus our contribution is placed on the top of the bricks placed by previous creators. This picture matches Francis Bacon's philosophy of progress and the evolution of science. Bacon (1561-1626) disputed the ancient philosophy of scientific and artistic progress, which believed that knowledge and progress are the result of either intuition (Plato) or revealing the concealed by ignoring the palpable or the obvious or the evident (Aristotle). Bacon in the *Treatise on the Proficience and Advancement of Learning*[38] argued that progress is not achieved by intuition but by cumulative study of the reality through experiments.

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37. N. Elkin-Koren and E. Salzberger 'Towards an Economic Theory of Unjust Enrichment Law', 20 *International Review of Law and Economics* 551-573 (2000).
38. F. Bacon, 'The Advancement of Learning', Excerpted in Bizzell and Herzberg (eds.), *The Rhetorical Tradition*, Boston, Bedford, 1605/1990, pp. 625-631.

In 1962, Thomas Kuhn published his influential book on the *Structure of Scientific Revolutions*[39] in which he coined the modern use of the term 'paradigm'. Kuhn disputed the Baconian theory of the evolution of science. He argued that scientific research is conducted within a set of presuppositions and assumptions, which are taken as given (what is in fact admittedly done by the science of economics). This framework, dubbed by Kuhn 'paradigm', sets also the research agenda, directs resources and guides the recruitment of personal to conduct research. But the accumulation of results, which negate the pre-supposed framework, leads, from time to time, to the collapse of the paradigm and its replacement with an alternative one. Thus, scientific knowledge is not in constant state of progress and its advancement is not steady and continuous. Kuhn denied that he is a relativist, but two decades later the Post-Modernist movement took Kuhn's views to the extreme and argued that there is no objective truth or value. Post-Modernist claims began with analysis of the arts, but continued with analysis of history, law, language, and indeed the exact sciences.

While Bacon's perception of progress fits well in the incentives framework and especially in the considerations in favor of limiting intellectual property rights on behalf of the public domain, accepting Kuhn's or Post-Modern premises ought to question whether a reach and wide public domain is indeed a contribution to progress, or that such a domain actually reinforces the strength of current paradigms in both culture and science, delaying the emergence of new innovative ideas which contradict conventional wisdom.

In this context, the possible differences between post-modern insights and Kuhn's insights might be of relevance. If Kuhn is not a relativist (as he himself argued in a later addition to his book), then one must interpret his theory of the evolution of science as pointing in the general direction of progress; each paradigm is an improvement of previous ones. In that case, paradigmatic shift ought to be institutionally encouraged. Social and legal environments, which ease such shift, should be preferred to alternative ones, which make it more difficult to shift paradigms. It can be argued that in the context of the debate between intellectual property and public domain, therefore, Kuhn's analysis should not support equivocally the latter. If research is conducted *tabula rasa*, then the chances of the emergence of new and contradicting theories are greater, and thus the fixing of established views is larger. In this case, it can be argued that limiting access to existing ideas in form of a strong intellectual property regime does not work against progress, as it encourages constant fresh and unconventional thinking.

This is not the case, however, if we interpret Kuhn as a relativist, or if we adopt a post-modern view of progress. Here, the conclusion might be that the choice between a strong intellectual property regime and a strong public domain does not matter to the likelihood of progress, as progress cannot materialize in any case. It can be also argued that if these views (in both variations) of scientific progress are accepted, then the same applies to the cultural and artistic world. A strong public

39. T. Kuhn, *Structure of Scientific Revolutions*, Chicago, University of Chicago Press, 1962.

domain would have delaying effects on new fashions, new artistic schools, etc., if change is not desirable as such.

To sum up, the conventional economic analysis of intellectual property and its desirable scope, and hence of the desirable size of the public domain, presuppose a Baconian description of the evolution of science and by derivation, the same type of evolution of culture. Under different theories of evolution of science, such as Thomas Kuhn's, we might negate the basic rationales of the economic analysis. In this framework, the purpose of my discussion was mainly to raise the issue. A more thorough analysis of these questions is much needed.

5.2. THE STATE OF TECHNOLOGY

The question of the role of technology and its place within the law and economic models is connected to the debate on the evolution of science, but is not exactly identical. In this context, I would like to highlight one aspect of technology vis-à-vis the economic analysis of intellectual property and the public domain – its status as exogenous or endogenous variable. An old controversy among scholars who study the evolution of science and technology relates to the nature of technological change. On the one hand, one can find a rather deterministic view, which perceives technological advances as provoking economic changes, and thereby transforming social institutions. Even if this is not stated explicitly, this view believes in technological determinism, perceiving technological progress as independent, governed by its own internal logic and moving ahead due to scientific breakthroughs and maturity of accumulated data. This view can correspond to Bacon's view of the evolution of knowledge.

On the other hand, one can find scholars who hold that technology does not have any meaning in itself. Its emergence is not merely the outcome of technological plausibility, but rather depends on an interplay between technological ability and other social and economic factors. Thus, mass production, for example, could be viewed as an inevitable outcome of the economy of atoms, but could also be attributed to major demographic changes during the 20th century, which led to population explosion, and created the 'masses'. The notion of the 'masses' affected both political theory, and the concept of the self, which, in turn, created a need for mass-produced goods. Technology addressed that need. In other words, technology does not only affect new paradigms, but assumes, reflects, serves, and indeed results from them.[40]

Traditional law and economics models take the state of technological development as given or as exogenous to their analysis of the law. They do not give adequate consideration to the possibility of technological progress and, moreover, to the way technology changes as the result of the economics and legal environments. Technology is actually absent from the economic analysis in two senses: first, as a dynamic parameter that may affect efficiency, and second, as one of the outcomes of applying

40. Elkin-Koren and Salzberger, *supra* note 9.

certain legal rules. Obviously, technological advancements affect efficiency. That is because the state of technology determines the availability and costs of technological devices that, for example, are employed to reduce harmful consequences, which, in turn, establishes who would be the least cost avoider. Similarly, technology substitute legal measures, including private property, on the one hand, and the structure and dynamics of the public domain, on the other hand.

The state of technology and especially the pace of technological change are relevant, for example, to Demsetz' analysis of the creation of property rights and to Coase's analysis of protection of entitlements.[41] They were not taken on board by these two giants probably because the pace of technological change was very slow (relative to today) when they offered their analyses, and they thought that the evolution of technology is not likely to change significantly as a result of the choice of legal rules. This is not the case with the new digital information environment, where technologies are constantly evolving and the results of Demsetz or Coasian analysis may be different with each technological state of the art. The pace of technological change is disputable and there are many ways to measure it. Some believe that the speed of the chip, which currently doubles every two years, is a good measure of technological change. A common assumption in the high-tech environment is that technology reinvents itself every six to twelve months, and that employees must keep up with this rapid pace. This very brief timeframe and the elasticity of technology, call for special consideration in the analysis.

The crucial shortcoming of the traditional law and economics analysis when applied to the new information environment is that it takes technological development as static. It overlooks the interdependency and reciprocity between technological developments and legal rules. This multi-layered relationship between law and technology is a key factor for understanding technological innovation in the information environment. Thus, an analysis that takes the state of technology as an exogenous component suffers from a serious shortcoming when applied to an environment with rapid technological advances and innovations. The analysis also fails to consider the effect of legal rules on technological progress.

Coase's main insight is that in a world with no transaction costs the legal rules do not matter because if a rule (or its absence) is inefficient, individuals will negotiate and reach an efficient equilibrium.[42] The same conclusion can be attributed to Demsetz who shows how property rights evolve. They will be negotiated only if their absence is inefficient and vice versa – inefficient property regime will be the basis of contractual change. However, this analysis assumes that the costs for a self-help mechanism (like building a fence around a piece of land which can prevent everyone from entering and enjoying the fruits of the land) is fixed and is higher than the cost of creating a legal rule and enforcing it. Likewise, it assumes that each of the parties is in an equal position to advance technology as the result of the legal rule

41. R. Coase, 'The Protection of Social Cost', 3 *Journal of Law and Economics*, 1-44 (1960).
42. Ibid.

The ability of one party to efficiently prevent harm (Coase) or prevent entry (Demsetz) depends on the availability and costs of preventive measures, namely technologies that may reduce or eliminate harm altogether or prevent entry altogether. Yet, the availability of these technological advancements and their costs are treated by Coase and by Demsetz as fixed variables. Coase asserts that in a world of zero transaction cost it does not matter if the polluting factory has the entitlement to pollute, or that the neighbors have the entitlement to clean air. If the entitlement allocation is inefficient it will be contractually changed. However, the harm of pollution depends on the quality of filters, and the chances of technological improvements of the filters are different when the entitlement is allocated to the factory and when it is allocated to the neighbors, as the availability of the factory to invest and upgrade the quality of the filters is not equal to the availability of the neighbors.

Technologies are not the result of nature or the necessary sole outcome of scientific progress. Scientific progress depends on investment in R&D, which in turn is likely to hinge on the legal regime and specific legal rules regarding property and liability. States of technology, therefore, cannot be regarded as independent factors and should not be exogenous to the analysis. Indeed, the availability of certain technologies is contingent upon various socio-economic factors, of which law is a primary one.

If we require that the steam engines of railway companies release less sparks (Coase), we create a demand for more effective devices. Such a demand is likely to attract more investment in research and development of better devices and to stimulate competition among developers and producers. Large investments and high levels of competition are likely to increase innovation in spark-reducing measures and push down the prices of such devices. If legal rules under-protect intellectual property then, technologies are likely to develop which will restrict access or use. In the new information environment some programs may simply prevent the creation of uncompensated copies by using digital rights management systems (DRMs). Using encrypted platforms, owners may technically prevent the creation of digital copies, permit printed copies, or restrict any access or copying whatsoever.

DRMs can constitute a new regulation, applying original norms that depart from the legislated copyright laws, thus substituting existing copyright laws as a normative source. But DRMs may also function merely as enforcement mechanisms for existing rules, making them more efficient. If the hardware and software adopt the legislated rules, they will prevent copying or charge for copying whenever copyright protection is granted by statute, and allow it according to the exemptions specified in the law, e.g. fair use. In this case, the technologies are merely an enforcement mechanism of law enacted by traditional law-making institutions. However, if DRMs limit copying when the legislation permits it, technology both created a new legal regime and at the same time provides means to enforce it. The distinction between the two courses is not always easy to identify and analyze, as the rules codified in the technological platforms are not explicit and not transparent as are legislated rules.

The availability of certain technologies is not determined by the law of nature. It is a parameter affected by various factors. Law is one of them. Whereas rights

assigned by law may not affect efficiency in the absence of transaction costs, legal rules may do so by shaping the types of technologies that become available and their cost. By failing to make technology endogenous to the analysis, traditional economic analysis overlooks the reciprocal relationship between legal rules and technological progress.

This shortcoming in the traditional Coase-Demsetz analysis might not have been significant in the physical world. Indeed, the technologies relevant to Coase's examples about trains and sparks, as with regard to Demsetz' example of hunting among Native Americans, were not likely to change significantly as a result of the choice of legal rules. This oversight could be crucial, however, in the new information world, characterized by a great pace of technological change, or where technology is said to reinvent itself every few months. Information technologies are dynamic and constantly changing, and the results of Coase or Demsetz analysis may be different with each technological state of the art. It is more feasible today, therefore, that the choice of substantive legal rules regarding creation and protection of entitlements would have a crucial effect on those technologies likely to be developed in the short, medium, and long term.

5.3. THE ARENA – THE DEFINITION OF COMMUNITIES, INDIVIDUALS AND TIME

The two traditional law and economics models to analyze intellectual property, as all the traditional models of the economic approach, make important assumptions regarding the individual, the community and territory. The incentives model seeks to find the intellectual property arrangement in which the total welfare of the community is maximized. More propertization is desirable as long as the marginal gains from propertization reflected by more creation is higher than the losses from the fact that these creations are not available for free, i.e. are not in the public domain. The point in which the gains equal the losses is the optimal state of propertization and thus also of the size of the public domain. Notwithstanding the measuring problem, there are two important variables which must be defined in order to be able to calculate gains and losses – the community for which this calculation is made and a time framework for these calculations. We elaborated on them in section 3.

Likewise, the tragedy of the commons explanation for the establishment of property rights assumes that individuals will engage not only in individual actions (within or bypassing markets), but will also benefit from collective actions, like the creation of legal rights and their enforcement. The economic approach, as liberal theories from Hobbes to Rawls, views the state as the most important collective organization or institution, and presupposes that markets correspond to states, which are basically territorial units. A social contract, or another form of collective action, is carried out by citizens of a specific territorial unit, which becomes a state or another form of a national unit.

In Demsetz' original analysis, which focused on natural resources like hunting land, oil or waters, it was sensible to define the community on the basis of territory.

This is not the case with intellectual property and a public domain of ideas. Likewise, the implicit assumption of the incentives model that the unit of maximization ought to be the state (as it advocates intellectual property laws enacted by the state) is far from being self-explanatory. Ideas cross territorial and political boundaries. Intellectual property markets are global. Intellectual community activities are a-territorial.

The implication of the borderless nature of ideas on economic analysis is highly significant. One can no longer take the state as the relevant framework for market activities, for decision-making calculus or for institutional analysis. This change is significant in both the normative and positive domains. Thus, while traditional normative law and economics analysis take the state as the basic maximization unit, which has implications on the definition of externalities and the analysis of other market failures, this cannot be the case in the new information environment. Likewise, positive economic analysis is trickier, again because the identification of markets is less straightforward than in the physical world.

The implicit territorial assumption can be best demonstrated by patents and the pharmaceutical market. When one can distinguish between states in which new medications are developed and states which are only the consumers of medications, maximization of welfare will lead to totally different property protection of patents and, by derivation, different sizes of the public domain in the two types of entities. As a result, a rule that reflects global efficiency will be yet a different one. When collective action is required but only possible within the state's framework while its effects are global, we can expect increased rent seeking and social choice problems, which will distort an efficient rule even in the context of the state's community. Until the economic models establish a defendable definition of communities for which maximization is justified, the models will be analytically defective.

Another variable that ought to be defined in order to conduct maximization of welfare, wealth, or utility is a time framework. The definition of time is less acute when economic models analyze responsibility rules for physical harm or criminal law. It is very significant when dealing with a propriety regime and especially when we analyze intellectual property. The whole incentives concept is constructed upon the idea of seeds that are expected to blossom in the future. A more affluent public domain is meant to benefit the community not (only) in the present, but (mainly) in the future. What is then the right time frame for such a calculation? A decade? A generation? Taking into account the next generation? Again, the economic models do not have a coherent concept of the most justifiable time framework and this fact is a serious flaw in their ability to serve as a normative framework for the analysis of the public domain.

The third important variable, which constructs the basis of law and economic analysis, is the individual. Most models assume that individuals are rational physical entities and each has a fixed set of preferences or a utility function, which is exogenous to the object analyzed by the model. In other words, these preferences are pre-fixed and do not change as the result of deliberation and interactions within and outside the relevant market. Two major points can be highlighted in context of this fundamental presupposition. The first relates to the definition of the individual

in the new information environment; the second is connected to the debate between liberal and republican theories of the state.

The new information environment transforms not only the notion of collective communities, but also that of the individual, who is the basic unit for liberal philosophy of the state and for economic analysis. In the non-virtual world the basic unit of reference – the individual – is one person with a single identity, passport or drivers' license number, a specific address and distinct physical features. In the new information environment, the atomistic unit of analysis is a username with a password and an electronic address. There is no strict correlation between the Cyberian individual and non-virtual individual, as the same physical individual can appear on the Internet as several entities, each with different identification features and a different character, belonging to different communities. While conventional economic thinking, perceives individual preferences in the non-virtual world as exogenous to the political process and to the economic markets, the new information environment requires us to internalize even the analysis of individual preferences.

Conventional economic analysis assumes that our basic identity, which can be framed in terms of various sets of preferences, is the result of distinguished historical, cultural, linguistic, and even climatically different backgrounds.[43] Those background factors are pre-given and predate any formation of markets and collective action organizations, such as states or other national units. The definitions of state boundaries, however, are very much influenced by these ancient groupings of preferences. Even if preferences change as the result of market interactions, such as successful marketing and advertising, they are initially founded upon these ancient differences, some of which are presumably almost permanent.

Intellectual property, especially in the new information environment can be viewed as threatening this perception, because it blurs historical, cultural, national, and even climatic boundaries. The decline of some of the more physical attributes of online users is accompanied by the pervasive effect of information technologies on processes such as individuation and will-formation. The online information environment constitutes the human condition of our time. The comprehensive character of the online environment makes individuals more vulnerable to external effects that shape their preferences. The emergence of media, communications, and software multinational conglomerates and the rise of new monopolies not only affect economic competition in the market for ordinary goods, but also affect individual autonomy. As phrased by Barber,[44] the new monopolies are particularly insidious because while monopolies of the nineteenth century were in durable goods and natural resources, and exercised control over the goods of the body, new information-age monopolies of the twenty-first century are over news, entertainment, and knowledge, and exercise control over the goods of the mind and spirit. Power exercised by private economic agents is relevant for the formation of preferences. Powerful market players that

43. Montesquieu, *The Spirit of Laws*, Berkeley, University of California Press, 1977 [1748].
44. B. Barber 'Globalizing Democracy', 11 (20) *The American Prospect* (2000), online: <www.prospect.org/print/V11/20/barber-b.html>.

control the means of producing informational goods are better positioned to express their own agendas and thereby marginalize diversity.[45]

When power accumulated in the market is used in the public sphere, it tends to distort equal participation and reduce fair access to participation means. Informational goods, such as news and data, but also photo images, music, novels, comics, or computer programs reflect an ideology, and may shape ones identity and preferences.[46] Informational products affect their own demand. Consequently, centralized power in such a marketplace could be very powerful in shaping preferences and agendas and reducing plurality, as well as social and political diversity. Individuals in the online environment are therefore cut off from their historical, cultural, and geographical context, on the one hand, and widely exposed to a relatively homogenous information environment, which affects their preferences, on the other hand. Indeed, a globalized market for goods could benefit from a relatively homogenized body of consumers, consuming goods under fairly standard interoperable settings. We are in an interim stage of Cyber-revolution. In the future, the Internet may cause the disappearance of diversity, which in the non-virtual world fosters the definition of the unique self, leaving us with a brave new homogenous human being.

If this description is true it also blurs the distinction between intellectual property and the public domain. The romantic view of the public domain portrays the individuals there as freer and more independent. But the effect of relaxing the rigid assumption regarding pre-fixed individuals interacting with each other applies not only to intellectual property markets, but also to the public domain. If our identities are shaped by the global information we consume and the global interactions with others, the public domain can be seen as captured by the same forces which capture our markets, affecting, in this manner, our freedom.

The second point concerning the perception of the individual in the traditional law and economics modeling is somehow related, but focuses on the normative vantage point. Liberal thinking, on which most law and economics models are based, views markets and collective decision-making institutions and processes as aiming to aggregate pre-fixed individual preferences. Republican thinking emphasizes the need of the desirable political community to have not only technical mechanisms of preferences aggregation, but also a more substantive content to the public sphere, which enables real deliberation and participation by all individuals. The republican view rejects the notion that the democratic scene is a competitive marketplace of ideas that must be kept free so it can best reflect the aggregated choice of citizens. Political institutions, according to the republican view, shape public discourse, and thereby affect preferences.

Preferences are considered a by-product of a political process that takes place in the public sphere and are shaped by deliberation or sometimes by the inability to deliberate. The way public discourse is structured affects the way individuals

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45. Barber, *supra* note 44; and Netanel N. 'Cyberspace Self-Governance: A Skeptical View from Liberal Democratic Theory', 88(2) *California Law Review*, 395-498, 2000.
46. B. Barber, 'Jihad Vs. McWorld, How Globalism and Tribalism Are Reshaping the World'. New-York, 1995.

develop their ideas, shape their positions, identify their interests, and set their priorities. Preferences do not exist prior to the deliberating process, but are rather the output of political processes. Institutions and processes which are based on individual participation and responsibilities, it is argued, are likely to shift self-centered individual preferences into more public-regarding preferences. This latter republican idea is reflected by Rousseaus' distinction between the general will and the sum of individual wills or preferences (although it is doubtful whether Rousseau would agree to this interpretation of his political theory).

From the republican perspective, the way information markets are structured is of great importance for shaping preferences, since preferences are not prior and exogenous to the political process, but rather an output of that process. Processes in the public sphere should be given a broad understanding to include all discursive will formation processes that take place in our cultural life.[47] The new information environment facilitates more opportunities for individuals to undertake an active part in the public sphere. While public discourse in the pre-Internet age was facilitated exclusively by the mass media, online exchange allows more individuals to directly communicate with each other. The low cost of communication provides individuals with more affordable access to news, large databases, and cultural artifacts. Digital networks further affect the quality of participation in the public sphere, enabling interactivity and facilitating more active involvement.

Participation is no longer limited to passively consuming television shows and editorials of major newspapers. There are increasing opportunities to speak out and actively take part in online debates, by using talkbacks, posting ones own positions and analyses in online forums, and challenging the views of others. The low cost of producing and distributing informational goods and the interactive nature of digital representation, allow individuals to participate in creating their own cultural artifacts, publish on their own Web pages, adopt fictional characters to reflect their own meaning of political agenda, participate in collaborative writing of online stories or report news to a newsgroup. Online discourse, therefore, opens up opportunities of transforming the structure of the public discourse from the mass media scheme of one-to-many, to a more decentralized, and more democratic many-to-many structure.

This republican vision, together with the new information environment has also the same blurring effects between intellectual property and the public domain. However, replacing the conventional law and economic assumption of fixed preferences with the assumption that preferences are endogenous to the economic and political markets, means that any intellectual property-public domain equilibrium under the traditional assumption has to shift towards a greater public domain under the republican law and economic analysis. Such a shift is Pareto superior as preferences are expected to change towards more altruist, more cooperative nature, which means that utility or wealth frontiers can be extended.

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47. N. Elkin-Koren, 'Public/Private and Copyright Reform in Cyberspace'. 2(2) *Journal of Computer Mediated Communication* (1996), available at: <jcmc.indiana.edu/vol2/issue2/>.

To sum up, traditional law and economics models presuppose fixed, varied and exogenous individual utility functions or sets of preferences. Relaxing this presupposition is likely to blur the distinction between intellectual property and the public domain and tilt the equilibrium in favor of a greater optimal public domain.

6. PROPERTY RIGHTS AND THE PUBLIC DOMAIN REVISITED

So far the analysis in this chapter, implicitly assumed that property rights, including intellectual property rights, are the antonym of the public domain and that the distinction between the two is dichotomous – a thing (land, tangible, music, book, idea) can be either propertized or in the public domain. In this section, I will try to show that this is not necessarily the case, and in particular that (1) propertization does not necessarily lead to the shrinkage of the public domain, and (2) that a dichotomous line connects property right and the public domain, rather than create a dichotomy.

Let me begin with some formalistic categorization, which may assist us in the analytic definition of the public domain. The antonym of private property includes all the things that are not privately owned. These can be divided into things that cannot be owned, things that are owned by the government, the state or some other ruling entity, things that are owned in common (*jus publicum*) and things that are owned simultaneously by everyone, or open access regimes (*res nullius*). The difference between the two last categories is that under common ownership any decision regarding the thing has to be reached by the collective through some kind of decision-making process, while with *res nullius* everyone can make use of the thing or reach a decision regarding the thing as they like. Many scholars objecting to the commodification trend and advocating the perseverance of a rich and extensive public domain implicitly assume that the commodification process transfers things from common ownership or from *res nullius* to private ownership. However, the main features of the commodification trend is not the shift from common property or from *res nullius* into private property, but a shift from things that in the past could not be owned to objects of property. In this sense, there is no direct link between commodification and the shrinkage of the public domain.

Moreover, under this broad definition of the objects of property, the public domain can, in fact, expand with the creation or usage of private property. Consider, for example, the most typical example of privately owned property – land. Let us assume that the government changes the designation of particular common land into private property, this piece of land is subsequently purchased by an individual on which she builds an architectural masterpiece. This new building is privately owned in the sense that no one can enter the building, use it, sell it, or eliminate it save its private owner or under her permission. But the pleasure of viewing the building for the rest of the community, the inspiration it creates, its contribution to future architectural plans can be regarded as an enlargement of the public domain. So does the enhanced economic value of properties in the neighboring vicinity. The new

architecture masterpiece can be the source of new ideas in architecture, the source of inspiration for poets and writers and in general a source of utility enhancement for members of the community and even the cause for an increase in the monetary values of the private properties of the neighbors. All these benefits cannot be claimed by the private owner of the new building, thus they are things which belong to the public domain. It is very possible that had this piece of land been kept in common ownership or declared *res nullius*, everyone would have made any physical use of it, but the total welfare or utility of the community would have been lower.

To put this idea differently, from a law and economics perspective (defined broadly on the basis of utility maximization or narrowly on the basis of wealth maximization), property rights are a mechanism to increase the total utility/wealth of the population and in this path we can resort to Demsetz and his externalities analysis of the emergence of property rights or to the incentives model, and portray the public domain as comprising also positive externalities from private property. The public domain, therefore, should not be regarded as the antonym of private property.

A second argument I would like to put forward is that between private property and the public domain, there is a dichotomous line rather than a dichotomy. The favorable reception of the first argument regarding the relations between private property and the public domain implies in itself that the second argument also holds, but I would like to add another angle to what was argued above. Property right, or ownership, is an established legal concept, but, in fact, this right is an abstract concept, which includes a bundle of particular rights related to its object. The five main components of private ownership are access, withdrawal, management, exclusion and alienation.[48] There is no obvious reason to consider automatically the whole bundle of rights in the context of the battle between property and public domain.

Indeed, the American courts' rulings regarding common resources, such as oil, gas, and public waters, developed a more complex allocation of rights. For example, courts ruled that, while individuals have the right to drill on their private property and that the retrieved oil is owned by them (although its source is a common pool below all the private properties around), they are not allowed to alienate the oil and will be liable for damages for doing so.[49] This ruling, in fact, creates a right that includes exclusive access and withdrawal, common management and no right to alienation. This is an exception to the general perception of full private property as a thick and integral concept.

It is possible that transaction costs were the main reason in the past not to break up the concept of property into its different components, or rather to group those rights under a common legal title in the first place. In the new information

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48. E. Ostrom,'Private and Common Property Rights', II *Encyclopedia of Law and Economics*, 2000, online: <encyclo.findlaw.com/2000book.pdf>.
49. R. Epstein, *Takings – Private Property and the Power of Eminent Domain*, Cambridge, Mass., Harvard University Press, 1985, p. 221.

environment transaction costs are significantly lower.[50] More sophisticated and fine tuned enforcement measures are available thanks to innovative technologies. It might be an interesting exercise, which is beyond the scope of this chapter, to examine the justification of each of the component separately and its optimal degree of propertization. For example, the optimal duration of each of these rights might be different. While restrictions on access are the most heavy-handed measure vis-à-vis the implications on the flow of ideas and the sources for new creations, management, exclusion, and alienation are less harmful. On the other hand, from the point of view of the individual incentives to create, allowing greater access (for example by a wide definition of fair use) might pose a minor disincentive to create in comparison to allowing management or alienation.

The breakage of the full property right into different components is not only a normative analysis of the boundaries between intellectual property and the public domain; it can be analyzed in the positive level. Projects, such as Creative Commons, in fact, break the full private property right into sub-components, using contractual tools. Again, the decrease of transaction costs in the new information environment enables these developments. In law and economics' eyes, these developments point to inefficiency of the current legal arrangements, but the good news is that reduced transaction costs brings us closer to Coasian efficiency, in the shadow of the legal rules.

7. CONCLUSION

In this chapter I tried to show why the economic analysis of law is a useful framework to analyze the public domain in the context of the contemporary debate between its supporters and those who believe in greater commodification. On a positive level of analysis, law and economics can explain why we are witnessing changes in intellectual property rights with increased technological change, as is the case with the information revolution of the last decade. In this respect, Demsetz' tragedy of the commons framework can be a helpful model. However, public choice analysis can shed additional light on the contemporary changes and it predicts that the legislative and judicial decision-making will lead to non-optimal arrangements in favor of intellectual property rights and against the public domain. Positive law and economic analysis can also explain the various private contractual enterprises (such as Creative Commons), trying to bypass the legislative and judicial arrangements, especially in the light of public choice predictions that the official arrangements will be inefficient.

On a normative level, we focused on the incentives paradigm. We saw why according to the traditional analysis law and economics scholars should not be in favor of unlimited commodification and why the public domain has an important

50. N. Elkin-Koren and E. Salzberger, 'Law and Economics in Cyberspace', 19 *International Review of Law and Economics* 553-581 (1999).

function in the path to achieve efficiency. Law and economics, therefore, cannot be seen as a pro commodification movement and in comparison to deontological rationales, such as natural law, it advocates for a viable and meaningful public domain. However, we also focused on some of the traditional presuppositions in the traditional law and economic models, the relaxation of which can even shift the optimal solutions vis-à-vis the right balance between intellectual property rights and the public domain even further in the direction of the public domain. Such presuppositions are the definition of the relevant community for which we seek efficient rules, and indeed the assumption regarding individuals and their utility functions or preferences.

Finally, it was argued that the public domain is not the antonym of intellectual property rights. Expansion of intellectual property rights can lead to the expansion of the public domain and vice versa. More importantly, property is a bundle of rights which were traditionally treated in a unified framework due to high transaction costs of separation. However, the new technological revolution enables the separation of traditional property rights into its different components, allowing a more complex, yet more efficient, regulatory regime, which will also lead to a greater public domain. Many of this chapter's insights are only appetizers and require a more sophisticated study and elaboration. But if it prompts empirical research and theoretical discussion, its purpose would be well served.