

# From the gene to the globe: Extracting rents based on intellectual property monopolies

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## ABSTRACT

The increasing power of concentrated financial capital is accompanied by an extension of processes of commodification and procedures of dispossession similar to forms of original accumulation. This continuing and reinforced accumulation by dispossession in its different guises is capital's answer to the problem of over-accumulation. As a form of dispossessing accumulation, the implementation and extension of intellectual property monopolies is of particular importance. In the context of an increasing socialization of labor, in particular of innovative activities, the private appropriation of knowledge in the form of intellectual property monopolies and its commercial valorization has become a central characteristic of the current configuration of capitalism. Income based on such property titles has become an important form of the appropriation of resources in the finance-dominated accumulation regime. The article applies Marxian rent theory to intellectual property monopolies. Findings from the pharmaceutical and biotechnology industries illustrate how, based on specific power relations, the owners of property titles can appropriate resources and values. Rent extraction processes take place on different scales, from the enforcement of property monopolies over gene sequences to the role of the USA as a *rentier* state on a global scale.

## KEYWORDS

Accumulation by dispossession; biotechnology industry; pharmaceutical industry; commodification of knowledge; intellectual property, rents.

The far-reaching economic changes and the generalization of neo-liberal policies accompanied by privatization and the intensified enforcement of private property rights as well as 'new wars' for natural resources have encouraged discussions of the characterization of the current configuration of capitalism. One increasingly discussed thesis is that current capitalism in addition to the 'normal' accumulation process and appropriation of

non-waged surplus work is again characterized by procedures of dispossession in the style of original accumulation (Harvey, 2003). This debate raises old questions. Karl Marx and Rosa Luxemburg had already extensively dealt with this problem. But during the long upswing phase after World War II up to the 1970s, the discussion fell silent. Today, the problems of over-accumulation, lower growth rates and different capital strategies to tackle these challenges have stimulated new debates.

The aim of this article is to theoretically explain that in addition to 'normal' accumulation, different forms of dispossession processes and value transfers are central characteristics of the current configuration of capitalism. As a form of dispossessing accumulation, the implementation of intellectual property monopolies takes on special significance. This will be illustrated by the growing importance of intellectual property rights and its effects in the pharmaceutical and biotechnology industries.

The starting-point of this contribution is based on three processes. First, the emergence of a finance-dominated accumulation regime, thus the ascent of concentrated financial capital and its accompanying social and institutional changes, entails a stronger exploitation of wage labor and a division of total profit in favor of rent- and interest-based revenues. Second, forms of dispossession processes as well as the forced separation of producers from their means of production persist. Such processes made the original accumulation<sup>1</sup> possible. They are permanent characteristics of capitalism. Third, the extraction of rents, thus income on the basis of property titles, has become a central form of the appropriation of resources in the finance-dominated accumulation regime. Rent-based revenues can only be obtained if property titles are monopolized, and patents cause exactly that. The creation of a monopoly is a patent's core purpose. In order to emphasize this right to a monopoly, I prefer the term intellectual property monopolies instead of the masking notion of intellectual property rights, which suggests rights to property.

The thesis of this paper is that the enforcement and expansion of intellectual property monopolies express and unify these three elements into a triple process: (a) the implementation of intellectual property monopolies corresponds to a process which, similar to the original accumulation, separates the direct knowledge producers from their products and monopolizes this knowledge in the hands of capital; (b) the valorization of the monopolistic intellectual property and of the monopolized natural resources takes place through the extraction of rents; (c) (intellectual) property titles can thus enable the accumulation of money capital outside of the value-added process. These three processes take place on different scales, from the enforcement of property monopolies over gene sequences to the role of the USA as a *rentier* state on a global scale. In view of the increasing socialization of labor, in particular of innovative activities, capital seeks to attain

direct control of humans and of social relations which have knowledge or creative potential.

This article is arranged as follows. The next section explains how the rise of financial capital, thus the emergence of a finance-dominated accumulation regime of property owners, leads to an increasing importance of interests and rents. This regime again resorts to forms of original accumulation permanently inherent in capitalism anyway. The enforcement of intellectual property monopolies corresponds to an expropriation procedure and is a condition of valorizing natural resources and intellectual acquisitions in the form of rent-based revenues. The second section applies Marxian rent theory to intellectual property monopolies. This approach aims to contribute to the theoretical understanding of the emergence, function, and impact of rent through the monopoly of intellectual property, be it in form of patents, trademarks or copyrights. The third section focuses on patents in the pharmaceutical and biotechnology industries. It details the consequences of the expansion of intellectual property monopolies accompanying institutional changes. But the expansion of property monopolies into all human activity is a central aim of the neo-liberal program. The fourth section describes the global dimension of the regime of property monopolies. The global configuration is characterized by a hierarchy dominated by the US. Based on its power, the US can enforce its status as a global *rentier* economy. In closing, I describe how dispossession of intellectual creativity and biological resources are a component of the finance-dominated accumulation regime. This refers to the political and theoretical consequences of the appropriation of rents.

## **1. CONCENTRATED FINANCIAL CAPITAL AND ACCUMULATION BY DISPOSSESSION**

### **1.1. Division of profits and accumulation by dispossession**

The liberalization politics enforced over the course of substantial labor movement defeats and the conservative counter-reform since 1979/80 facilitated the increased importance of a highly concentrated financial capital. This financial capital can be defined as concentrated capital in the form of money whose owners expect a revenue (interests, dividends) based on ownership and/or a yield from selling the property or creditor title. Institutional investors, such as mutual and pension funds, profited the most from the deregulation of the financial markets (Chesnais, 2004; Sauviat, 2004).

The economic, societal and political power of the finance sector rests on two complementary institutional fundamentals. The first consists of societal processes and institutional mechanisms which enable a centralization and concentration of money capital into the hands of finance

companies and institutional investors – insurances; mutual and pension funds; and, to a lesser extent, banks. Private, capital-fed retirement systems have immensely intensified the attractiveness of financial investments and led to a centralization of individual savings and wealth (Blackburn, 2002; Sauviat, 2004). The second fundamental consists of secondary capital markets which enable the liquidity of financial investors in the scientific sense, namely, the privilege to withdraw instantly from the market. The combination of these two fundamentals gives investors their enormous influence and the ability to control corporations (Chesnais, 2004). These changes are accompanied by new macroeconomic and societal configurations, especially the increased economic role of the forced savings of future pension recipients. Therefore, looking for a new stable capitalist configuration, Aglietta called this configuration a patrimonial growth regime (Aglietta, 2000).

In view of the development of the last decade, it is more likely that this configuration remains unstable. The power relations are better expressed by the notion of a finance-dominated accumulation regime (Chesnais, 1997). This regime originated in the US but unleashes global effects. Thus, a new phase of capitalism was initiated which, due to general wage pressure, the bursting of 'rigid labor markets' and new forms of labor organization, enabled an increase in profit rates compared to the situation in the 1970s. But higher profits caused a substantial increase in investments only in a few sectors, due to limited markets. Financial capital institutions transfer a part of surplus value into the financial sphere, where it yields a particularly high profit (Chesnais, 1997; 2004; Duménil and Lévy, 2004; Husson, 2004).

Due to this achieved position and power, the financial capital in the form of investment and pension funds can acquire an increasing portion of profits as revenue from placements on stock markets, rents and ground rents as well as from public debt service. These interest- and rent-based incomes are only legitimized by possessing fortunes, even if the owner stands outside the reproduction process (Marx, 1981 [1894]: 500). Thus, this financial capital valorizes and grows as interest- and rent-bearing capital by absorbing a part of the profit (Marx, 1863: 462). This, however, requires an increase of surplus-value rate and a sufficient accumulation of productive capital (Chesnais, 2004: 31).

The surplus value is divided into profit and rent respectively into interest and enterprise profit (Marx, 1981 [1894]: 498ff, 567f). The increased share of rents and interests induces a stronger exploitation of labor through an increase of the surplus-value rate and reinforcement of original accumulation forms (see Figure 1). Through its claims of increasing profitability, financial capital strives to extract more value from society. This manifests itself in reduction of real wages, work intensification, deregulation of labor, attacks on social achievements, privatization and appropriation of public services by transnational corporations, dispossession mechanisms in the

so-called emerging markets (interest payments, flight of capital) and, finally, in imperialistic and martial appropriation of territories and their resources (Chesnais, 2004: 43). The submission of additional social spheres to the capitalist valorization process plays a crucial role. Among these rank the enclosure of socially produced knowledge in the form of legal property monopolies (May, 2000), as well as the appropriation and valorization of natural resources, e.g. through emission certificates or the exploitation of drinking water resources by concentrated financial capital.

These processes refer to the actuality and permanence of 'original accumulation' processes. In accordance with Marx's analysis of the original accumulation of capital numerous processes of dispossession determined the emergence of capitalism (Marx, 1976 [1867]: Chapter 24). Discussion of the permanence of accumulation forms related to an expansion of capitalistic property and production relations to countries (or sectors) and social activities not yet or only partly subjected to these conditions is not new. Luxemburg (1913: 397) impressively pointed out the violent accumulation of capital at the expense of non-capitalist production forms.

In this sense, accumulation designates the spatial and social expansion of commodity relations and capitalist property relations. Thus, the original accumulation is not to be understood as a historical phase, but as a permanent characteristic of capital. 'Primitive accumulation of capital and capital accumulation through the production of surplus-value are, in other words, not merely *successive* phases of economic history but also *concurrent* economic processes. Throughout the entire history of capitalism up to the present, processes of primitive accumulation of capital have constantly coexisted with the predominant form of capital accumulation through the creation of value in the process of production' (Mandel, 1975: 46).

With the establishment of the capitalist mode of production, the temporal sequence is not only a historical but a permanent one. Capital continuously separates the producers from their means of production and expands this procedure. This separation of the producers from their means of production is a common characteristic of the 'normal' and the original accumulation. However, conditions for the enforcing this separation differ. The accumulation processes reproduces this separation continuously. Therefore, capitalism cannot be understood as a closed system. Capital rather always colonizes new areas. The expropriation of rural producers bears witness this, as does the enclosure of socially produced knowledge (*knowledge commons*) (De Angelis, 2004). So, the original accumulation corresponds to a structural relationship between capitalist and non-capitalist modes of production and life which, driven by the valorization process of capital, configures itself consistently in new forms (Alnasser, 2003). The mechanisms of the original accumulation analyzed by Marx are a substantial trait of the 'new imperialism' (Harvey, 2003).

## 1.2. Appropriation and valorization

Following Chesnais (2003: 174) and Harvey (2003: 145ff), I differentiate three forms of accumulation by dispossession: first, the separation of producers from their means of production, enclosures and the enforcement of new property rights in the sense of the original accumulation; second, the expansion of capitalist property into new areas (e.g. colonial appropriation, privatizations); and third, dispossessions by stronger accumulation centers (e.g. large companies). The first and second form can appear closely inter-related. The valorization based on these processes can take place through wage labor or through the extraction of interests and rents, which for their part are based again on the redistribution of acquired surplus labor.

The commodification, control, and appropriation of intellectual creativity as well as of natural resources such as water and air (e.g. through tradable emission certificates) are current key processes of capital expansion into new fields. These new fields are sources of regular revenues in the form of rents. The capitalization of nature and of scientific knowledge has become a central characteristic of current capitalism under the dominance of financial capital (Chesnais and Serfati, 2004).

The analysis of current developments in the pharmaceutical and biotechnology industries in the third section shows that various dispossession processes are often interlocked such as the enclosure of knowledge; the privatization of publicly funded research results; the extraction and centralization of parts of value and surplus value produced in other social forms of organization by financially, organizationally or institutionally stronger accumulation centers. Therefore, those processes cannot be sharply distinguished. The challenge is to grasp how the different processes of dispossession and valorization interlock temporally and spatially, how they mutually perpetuate themselves, and understand to what extent they have become central forms of exploitation and resource transference in the current accumulation regime.

Enclosures are not only a permanent characteristic of capital logic; they also have a central role in current political confrontations. While capital seeks to incorporate new areas, resistance arises from population segments who want to maintain their influence over these areas. The social space for the accumulation created by enclosures is contested permanently (De Angelis, 2004: 60, 72).

The concept of original accumulation helps to analyze the enclosure of socially produced knowledge by property monopolies in two ways. Original accumulation consists in the separation of producers from their means of production and the transfer of production conditions into private property. The private appropriation of land permits landlords to pocket a part of surplus value and to enforce a further process of dispossession. In the same way, the enclosure of socially produced knowledge corresponds

to a dispossessing accumulation process, which subsequently clears the way for valorization through the extraction of licensing royalties by the owners of the intellectual property monopolies. These licensing revenues are nothing else but rents.

## 2. INTELLECTUAL PROPERTY MONOPOLIES AS INSTRUMENTS OF ACCUMULATION

Knowledge and technology have become central axes of an accumulation strategy which relies on the massive expansion of intellectual property monopolies. In principle, the valorization of knowledge is not new in capitalism. Distinctive for the finance-dominated accumulation regime, however, is the highly increased importance of monopolized knowledge and information for the extraction of rents. Before I apply the rent concept to intellectual property monopolies, I explain here the important particularities of knowledge production and the institutional changes which made the race for rents possible on a large scale.

### 2.1. Private appropriation of socialized knowledge production

Knowledge, information, inventions and innovations are the result of social processes, more exactly of an increasing socialization of labor. Marx grasped this phenomenon with the notion of *universal labor* (Marx, 1981 [1894]: 199). Universal labor encompasses science, discovery and invention as expressions of the social intellect which transforms the process of social life. *Communal labor* decisively contributes to activate and use universal labor. Both are embodied in technologies and texts. This socialization makes it difficult to assign the elements of an intellectual achievement to specific actors and firms.

With the increasing socialization of knowledge production also the knowledge produced by the enterprises themselves increases. For this reason they depend more on 'intellectual common goods' in the form of generally available qualifications, information and knowledge (Jessop, 2000). Therefore companies strive for acquiring knowledge generated by researchers, workers and community members.

The contradiction between increasing socialization of production and private appropriation inherent to capitalism appears even more obvious with knowledge production. The production of knowledge and new technologies is a process based on division of labor in complex systems and networks. Often innumerable people take part in this process. The classic contradiction between economic and business rationality, thus between privatization of the benefits and externalization of the expenses, becomes a particular guise. The enterprises aspire to free access to knowledge and

information, and at the same time they want to reserve as much private property thereof as possible. Because of the increased profit claims in the finance-dominated accumulation regime capital strives to acquire new fields of accumulation. The enclosure and monopolizing of socially produced knowledge is a key element.

Additionally, a further contradiction in the finance-dominated accumulation regime has arisen. The interests of financial capital are contradictory to long-term and hard to calculate research and technology strategy. On the one hand, the financial investors want to receive their portion of the profits (*shareholder value*), and in doing so limit the means for long-term investments (Lazonick and O'Sullivan, 2000: 18). Alternatively, their wish to realize the profits of their financial investments in the short or medium term contradicts the long-term innovation cycles of knowledge-based industries, particularly in *life sciences*.

The private appropriation of knowledge raises even more far-reaching questions than the private appropriation of the production of material goods. Knowledge production and its valorization exhibit some characteristics which are crucial for the transformation of the regime of property rights (Jessop, 2000; May, 2000; Husson, 2001: 128; Serfati, 2004: 56). First, intellectual activity enables considerable cumulative effects with much larger consequences than the productivity gains realized in material production. The benefit of science and information increases according to the number of people who use it. Knowledge develops and increases with broad and free diffusion. These cumulative effects arise because codified information and knowledge can circulate extremely easily. They result from the collective and open character of the intellectual activity. Second, the production of scientific knowledge and of numerous new technologies requires very extensive, concentrated investments, similar to investments in fixed capital. The valorization however can often be organized with only marginal additional costs. Knowledge-relevant information can be multiplied and used without large costs.

For these reasons, using intellectual property titles (patents, copyrights) and technical safety devices (e.g. copy protection of computer programs) firms seek to limit the uncontrolled diffusion of their products and to artificially create scarcity. Intellectual property titles are designed to render this artificial scarcity legitimate in the area of knowledge (May, 1998: 69–70; Sell and May, 2001: 472) and to exclude others from its use or force them to pay royalties.

## 2.2. Key role of institutional changes

The last two decades saw a vast increase in patents. The United States Patent and Trademark Office (USPTO) granted 76,748 patents in 1985, 107,124 in 1991 and 221,437 in 2002. A similar development happened

in Europe. There were 42,957 applications for patents in 1985, 60,148 in 1991 and 110,640 in 2002 at the European Patent Office (EPO) (Khan and Dernis, 2006: 51ff). From 1990 to 2000, the number of patents granted in biotechnology rose 15 percent a year at the USPTO and 10.5 percent at the EPO, compared to a 5 percent a year increase in overall patents (OECD, 2002: 8). This explosive expansion of intellectual property monopolies is less a result of technological breakthroughs than of far-reaching economic and institutional changes linked to the emergence of a finance-dominated accumulation regime.

Intellectual property is a power instrument and contributes to a further accumulation of power. The enforcement of intellectual property monopolies is only possible on the basis of specific social power relations, organizational and financial potential and state guarantee of respective property titles in particular. The appropriation process and the enforcement of the intellectual property monopoly are substantially bound to material resources and capital property (Brand and Görg, 2003: 27).

The changes in accumulation processes have been accompanied by an extensive modification in the regime of intellectual property monopolies in the US over the last two decades (Orsi, 2002; Perelman, 2002). In 1980, the US Supreme Court for the first time granted a patent for a genetically engineered micro-organism to General Electric (*Diamond vs. Chakrabarty*). This decision marked a decisive turning point in US patent policy. Henceforth, firms and institutes could also enforce a monopoly claim on life-forms and gene sequences. Such patents unleash a considerably larger monopoly effect than one which monopolizes only a production process (Cassier, 2003; Coriat and Orsi, 2002; Orsi, 2002). A comprehensive change in the property rights regime then occurred: as of then, discoveries and not only inventions could be patented. Patents which could be a basis for further developments, even if their use could not be proven at the time of the patent application, were provided (Orsi, 2002: 71f). Thus scientific insights became objects of systematic privatization.

Of particular importance was the extension of the intellectual property monopolies by a new legal practice since the early 1980s. The highly important *Patent and Trademark Amendments Act*, known as the Bayh–Dole Act, induced a change in the universities' role in 1980. It facilitated the privatization of intellectual property generated through federal financing and permitted universities to grant exclusive licenses with possible preferential treatment of US companies. These institutional changes were conducted in light of a change in the universities' role. In the 1970s and 1980s, universities were increasingly assigned the task of helping to re-establish the US economy's international competitive position, as well as its technological leadership in certain areas (Argyres and Liebeskind, 1998: 435f; Coriat, 2002: 182; Coriat and Orsi, 2002; Nelson, 2004: 462; Orsi, 2002). Hence, the effects of different institutional changes have been mutually complemented

and reinforced. These institutional complementarities (Coriat *et al.*, 2003: 240) together with the ascent of concentrated financial capital (investment, mutual and venture capital funds) have led to a finance-dominated biotechnology innovation system and the corresponding regime of intellectual property monopolies (cf. Zeller, 2003a).

Although delayed, Europe is experiencing the same development towards stronger intellectual property monopolies (Cassier, 2003; Gröndahl, 2002). The agreement on *Trade Related Aspects of Intellectual Property* (TRIPs) contributes decisively to the establishment of a new international regime of property rights. The TRIPs creates a minimum standard for the protection of intellectual property monopolies which is binding for all World Trade Organization (WTO) members. With integration into WTO set of rules, the dominant capitalist countries also obtained an arbitration mechanism with sanction possibilities (May, 2000; UNDP, 1999).

### 2.3. Property titles to enforce rents in the form of royalties

Due to neo-liberal politics, financial capital has been able to extend its operating range beyond production. It transforms social reproduction into instruments of valorization. The property monopolies on intellectual activities and biological forms of life substantially extend rent-like appropriation of values and wealth (Serfati, 2004: 15). Generally, a rent can be defined as an income which is enforced by the owner of a property title, even if he/she stands outside production.

The concept of rent is closely linked to the concept of surplus profit. The achievement of surplus profits, thus above-average profits, is a central motivation for firms in capitalist competition. However, such surplus profits usually exist only temporarily and become settled by inflow of new capital (Mandel, 1991: 257ff). But it is not appropriate to consider rents only as a special form of surplus profits, because rents emerge under very specific institutional conditions, namely, property rights. These ensure that rent yields do not erode like surplus profits. They can instead be stabilized over years or even decades. Thus, it is property rights as well as political and economic power that permit a long-persisting appropriation of rents to the monopolistic owners. Consequently, these rents are not additional values, but arise from the division of the surplus value produced by the workers and appropriated by the firms (see Figure 1). In the following paragraphs, I'll try to point out the emergence, mode of function and impact of rents by the monopoly of intellectual property rights and to illustrate the specific impact of different forms of rents. This outline intends to render rent theory suitable for understanding intellectual property monopolies.

Marx differentiated four different forms of rents: monopoly, absolute rent and two forms of differential rents. Indeed, in his elaborations Marx was

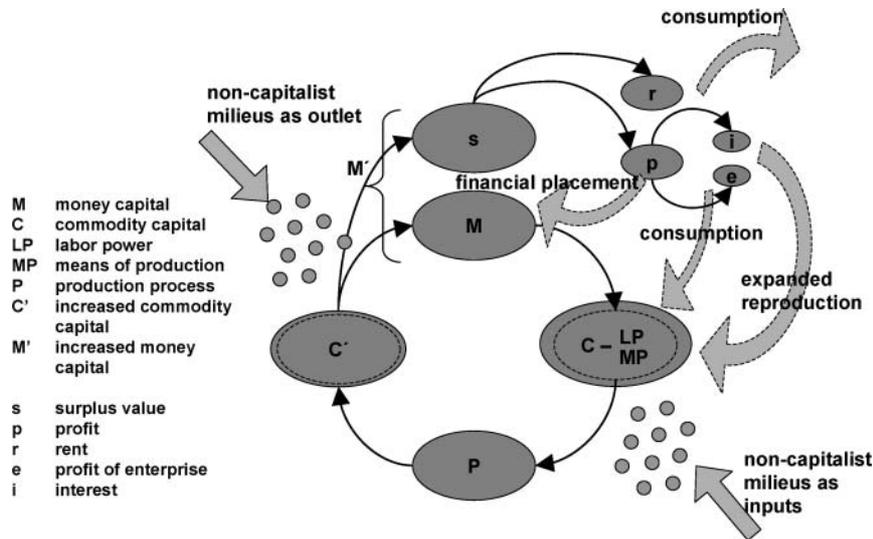


Figure 1 Capital circulation, surplus value, rents and non-capitalist milieu.

more concerned with a critique of classic economics than with a comprehensive, independent rent theory. Therefore, the theoretical understanding of rents is still a building site (Harvey, 1982: 349). Marx developed his rent theory on the basis of monopolistic land property. The dynamics of capitalism reveal that rent-like revenues do not only arise from the monopoly of land property but also from other monopolistic property forms. The new enclosures of intellectual property rights generate specific forms of rents; much like the enclosures of original accumulation led to the emergence of capitalistic land rent and still do today. Additionally, interests and rents have large similarities. Following Robinson we can designate the position of the financial investors as those of *rentiers*. Rentiers are 'capitalists in their aspect as owners of wealth, as opposed to their aspect as entrepreneurs. We include in the incomes of rentiers dividends as well as payments of interest ...' (Robinson, 1956: 247). Whereas interest is a contractual payment for the loan of finance rent is a contractual payment for the hire of land and buildings (Robinson, 1956: 13) and intellectual property. Just as rent is a payment to the land owner for the right to use land with all its resources and buildings, so royalty payments to the owner of the property title convey the right to use the technology and information enclosed, therefore monopolized by the patent, to the licensee.

Marx generalizes: 'Landed property presupposes that certain persons enjoy the monopoly of disposing of particular portions of the globe as exclusive spheres of their private will to the exclusion of all others' (Marx,

1981 [1894]: 752). But use of land depends on concrete economic conditions. In the same way, intellectual property titles convey a monopoly over immaterial 'particular portions of the globe'. Indeed, in the new regime of intellectual property, property titles guaranteed by patents have evolved into a rent-providing financial asset.

Knowledge is a product of labor. But the problem lies in the fact that information and technology once produced are usually quite simple to reproduce, and therefore the realization of the exchange value is questioned. Only the artificial creation of a monopoly in the form of intellectual property titles allows information to be traded and the desired exchange value to be obtained. Just as in the purchase of land, the purchase of property titles or the enforcement of property titles respectively 'procures a title for the purchaser to receive annual rent' (Marx, 1981 [1894]: 944).

'The price of land is nothing but capitalized and thus anticipated rent' (Marx, 1981 [1894]: 944). Equally, the price of monopolized information corresponds to the expected licensing revenues in the case of an out-licensing of the patent right. Here, a similarity to the interest-bearing capital shows up. Any revenue (like an annual rent) can be regarded as the interest on imaginary, fictitious capital. To the buyer, rent figures as interest on the money laid out for the purchase of land or the monopolized intellectual property. In principle, it does not differ from similar investments in government debts, shares, consumer debts, etc. In each case, the money laid out is interest-bearing capital. The land, or the monopolized intellectual property, takes the form of fictitious capital, and the real estate market, as well as the markets of intellectual property titles, and derived of that, also the dealing with share of high-technology firms, function simply as a special department of the circulation of the interest-bearing capital.

The attractiveness of intellectual property for investments makes it vulnerable to surplus capital. The more surplus capital resulting in over-accumulation is available, the more likely the monopolized intellectual property will be absorbed into the framework of capital circulation in general (Harvey, 1982: 348). The rapid extension and enforcement of intellectual property titles into new areas are prerequisites for the valorization of this property in the form of stock exchange quotes from high-technology firms and expanding markets of intellectual property, through out- and in-licensing of patented information. Similar to land rent theory which can be applied even though much land in the world is still not enclosed (e.g. in a desert), the fact that most patents are commercially not used does not contradict the application of rent theory to intellectual property monopolies.

#### **2.4. Monopoly rent and absolute information rent**

Normally, users compete for different information enclosed by patents and the patent owners also compete for the rent revenues from products of

similar use. However, there are situations where these competition conditions do not exist (Marx, 1981 [1894]: 910; cf. Harvey, 1982: 349–50; 2001: 395). Owners of intellectual property monopolies which allow particularly high profit expectations are able to obtain monopoly rents from those who want to acquire or in-license them; due to the exceptional quality, they are willing to pay a premium. However, owners can also obtain a monopoly rent selling products which are based on these property titles. On the other hand, owners of intellectual property titles can refuse to out-license or sell patents or speculate on future price increases. These constellations are often not clearly distinguishable in practice. In the end, the monopoly rent depends on the using firm's ability to realize the monopoly price for the product, i.e. a medication. It has also become generally accepted in the industry that this monopoly price will be realizable in future. The monopoly rent represents a retention of the surplus value produced by society as a whole, so it is based on a redistribution of aggregated surplus value (Marx, 1981 [1894]: 965, 968).

Thus the rent is a result of a systematic shortage of supply created by the property monopoly of the supplier of a key product, which encounters no direct competition from substitution goods. The amount of the monopoly rent depends on the concrete demand and supply conditions. The more inelastic the demand reacts to price increases, the larger the rent. If substitution goods exist, the demand is more elastic and thus the monopoly rent smaller. The more strategically a patent is localized in a technological development path, or the broader the field covered by the patent, the more numerous and the higher the licensing revenues the owner can call in from all those who want to use the patent for the development of technologies and products. In contrast to the differential rent, which arises due to differently favorably located or fertile pieces of land, no information differential rent can emerge, because every enclosed information is unique and is normally used in each case for the production of specific products.

Now the question arises whether revenues based on the intellectual property monopolies only result from obtaining monopoly rents, or whether further types of rents can be identified. Monopoly rent only depends on competition conditions. Marx sought a further explanation beyond the business cycles of the market. Thus, a rent can also exist on the least fertile cultivated land if supply and demand correspond, and therefore no market power exists to sell the grain above its value (Murray, 1977: 110). Thus we reach the problem of the organic composition of capital and the equalization of the profit rate.

The mobility of capital causes an equalization of the profit rate in the course of capitalist competition in a society. Thus it causes the surplus profits to melt away again after some time. However, scarcities due to natural conditions, such as land or mineral resources which are not renewable

or replaceable or the erection of institutional barriers like private property on land and mineral resources, preventing access to further capital, can limit this mobility. Under such conditions, surplus profits can be stabilized for decades and thus be converted into rents. Ground rents and mine rents were the most important kinds of rents during Marx's times (Marx, 1981 [1894]: 896ff). Marx's theory of ground rent and mineral rent can be extended to a general theory of rent, applicable to all areas where considerable and long-persisting obstacles to the mobility of capital have been established.

In what respect now does the concept of absolute ground rent help to understand the mode of action of patent-based property monopolies? Similar to a land estate, a patent-based property monopoly inhibits any additional capital from flowing into the sector enclosed by the property title. For this reason, the surplus value produced within this 'protected' area cannot flow into general equalization. The equalization of the profit rate is thus prevented. It can be argued that the (expected) profit rate is higher in these areas than the social average, thus allowing for a surplus profit.

Because knowledge and technology production is labor-intensive, the organic composition of capital is rather below average. Moreover, all factors (among others technological leads, monopolistic or oligopolistic advantages) come into play which favor surplus profits even without property titles over information. In addition, the organic composition of capital differs in the various phases of the innovation process, which becomes relevant with long development times. The phase of producing knowledge and information whose acquisition will be secured based on a patent is normally characterized by a high share of variable capital. Therefore, a potentially high surplus value arises here. But it is not yet realized because the product still in research and development will be sold much later. Due to the property monopoly, this surplus value does not enter into the equalization of the profit rate, analogous to the absolute ground rent, independently of the concrete competitive conditions.

The valorization of the monopolized intellectual property can take place directly, indirectly or independently as a financial investment. At the direct valorization level, the enterprise develops a commercializable product based on the intellectual property. The firm which produces and commercializes a successful, patented product receives the rent itself, much like the firm which finances itself without bank loans also pockets the interest it would otherwise be paying. The out-licensing or even the sale of the property title represents an indirect valorization. In this case, the enterprise wants to rake in the rent within a certain period of time or even immediately. The sale of the patent can lead to its independent valorization as a financial investment in the end. In this case, the new owner is not involved in the industrial valorization, but is only interested in a strategically well placed

out-licensing of the intellectual property title in order to pocket a rent income. The property titles are freely tradable and can become independent. They become either an investment object of the liquid placement capital or an object of the strategic accumulation of rents by industrial firms and (public and private) research institutes. What is to be traded is a claim to future incomes, as in any form of fictitious capital. This means a claim to future profits from the use of intellectual property monopolies or, more directly, from future unpaid surplus time (cf. Harvey, 1982: 347).

In analogy with Marxian absolute ground rent, we can identify an absolute information rent which can be acquired by the owners of the legally protected, monopolized intellectual property in research-intensive high-technology sectors – even if their products are competed against similar products. The absolute rent appears in the pharmaceutical and biotech industry, even if enterprises compete with substitution goods. The monopoly is thus limited to the property title on a medicine, not to the market of a specific therapeutic area. Therefore, even if a medicine is exposed to competition with a medication for the same therapeutic indication, and the real monopoly rent goes down as a consequence, pharmaceutical companies can still obtain an absolute rent.

### **3. THE GROWING IMPORTANCE OF RENTS IN INNOVATION SYSTEMS IN THE BIOTECH AND PHARMACEUTICAL INDUSTRIES**

After having presented the general tendency of financial capital to capture values and resources created in companies and social communities, this section reveals that the appropriation of knowledge and its valorization through rent extraction has become a key characteristic in the pharmaceutical and biotechnology industries. Pharmaceutical industry faces an innovation deficit expressed in new active substances yearly introduced to the market (Angell, 2004; Drews and Ryser, 1996, 1997). The new biotechnology did not fully substitute the declining number of new chemical entities. Pharmaceutical companies answered with mergers and acquisitions, amplifying the acquisition and the appropriation of knowledge, technologies and active substances through collaborations with specialized biotech companies and with publicly funded research institutes. Aggressive strategies acquiring and securing intellectual property play a key role. Basically, two steps must be considered: first, the direct appropriation of knowledge by formal collaborations and/or by the appropriation through social contacts. Subsequently, this knowledge, based on property monopolies, can be valorized by extracting rents. Financial firms can directly appropriate such rents or indirectly by profiting from a higher valuation of the companies on the stock markets.

### 3.1. Appropriating and absorbing knowledge

In addition to the still important internal knowledge generation, there are further crucial processes of knowledge and value transfer such as appropriation of publicly funded research, the acquisition and absorption of knowledge and technologies through collaborations with other firms as well as the use of social capital and human creativity. Pharmaceutical companies systematically observe the technological development on a global scale and acquire promising substances and technologies (Zeller, 2003b). They appropriate knowledge, technologies and drug candidates from smaller biotech companies or from academic research institutes. Due to the enormous differentiation of drug discovery technologies they minimize their own risk by absorbing externally produced knowledge. The monetized transfer of knowledge and technologies is to a large extent based on intellectual property titles. Power over technologies and markets are relevant parameters to shape the contracts.

The private appropriation of publicly funded research results is essentially carried out via two mechanisms. The first one happens via collaboration agreements between university institutes and private companies. The second takes place with spin-offs out of university institutes. The out-licensing of drug candidates and technologies often discovered thanks to public financial research assistance is a central source of income for biotech companies and universities. Biotechnology companies often take a mediating role. They transform and develop the basic knowledge generated in publicly financed research institutes. They then can further develop promising projects together with pharmaceutical companies or out-license corresponding rights to them. The appropriation of knowledge previously created in public research institutes also takes place by start-up companies founded by researchers from the public sector. With patents, these start-ups and spin-offs acquire the inventions generated earlier by their research teams and thanks to public financing. Publicly funded research is an essential prerequisite for the generation of application-oriented knowledge. Similar to other science-based industries, the invention and innovation activities of the biotech and pharmaceutical companies would be impossible without the appropriation of the results from publicly financed research institutes (Angell, 2004; Zeller, 2003a). The innovation system is thus based on the fact that important fundamental knowledge is created by publicly funded research. Companies can afterwards acquire this knowledge using different channels and make profits by monopolizing the property rights.

Companies that make products based on new technologies depend on long-term investments, on knowledge acquisition through training, and on long-term learning processes among their employees. This specific knowledge is produced by and embodied in the employees through their social relations. Central to an innovation system is the public R&D expenditure

effectuated by governments and their educational systems, particularly higher education as well as long-term basic research that is not directly profitable.

The large pharmaceutical companies also hold their oligopolistic rivalry for technological leads by trying to weave themselves into the social contexts of spatially concentrated innovation systems. They establish intensive relationships with key protagonists and anchor themselves into the regional arenas and social contexts of technologic potential. In doing so they hope to tap and codify the knowledge bound to social contexts and, whenever possible, to extend their intellectual property monopolies. Almost all large pharmaceutical companies therefore localize their research centers in only approximately one dozen high-technology regions in the world. With these strategies the large corporations acquire freely accessible knowledge, which otherwise slumbers in the social contexts of these regions (Zeller, 2004: 105). The codification and enclosure of this knowledge by intellectual property monopolies, hence commodification, is a prerequisite to its direct valorization and commercialization.

### 3.2. Valorization of knowledge by extracting rents

The economic and institutional changes in the pharmaceutical and biotechnology industries in the course of the last three decades show the growing importance of rents in the accumulation strategies of the firms, accompanied by the emergence of a finance-dominated accumulation regime and a regime of monopolized intellectual property rights. The markets created by the extension of the intellectual property monopolies connect the academic research institutes, the biotech companies often set up by university researchers, and the large pharmaceutical companies. The firms pursue different strategies to extract rents. In principle, monopolistic property rights can be established along the whole value-added chain.

The pharmaceutical industry normally justifies patents with high research and development expenses of over 800 million USD (DiMasi *et al.*, 2003) per new drug brought to market. This sum is contested intensely by Public Citizen, a consumer organization in the US, and by Marcia Angell, the former editor of the *New England Journal of Medicine*. These two studies only calculate costs at an average of 150 million USD (Public Citizen, 2001) and of 175 million USD (Angell, 2004: 40), respectively, per medication. Marketing, on the other hand, swallows even higher shares of the sales (around 30–35 percent) than R&D expenditures. The profits of the most profitable large pharmaceutical companies are higher than their R&D expenditures (Angell, 2004: 54, 119; Zeller, 2004).

The extension of patentability has led to bilateral monopolies controlling much knowledge from basic research in biotechnology. Thus the infamous

'Harvard mouse', covered by a patent as a research tool in cancer research, was assigned to Dupont Corporation through an exclusive license agreement. The breast and ovarian cancer gene (*BRCA1 gene*) was jointly granted to the University of Utah, to the National Institutes of Health (NIH) and to Myriad Genetics, a Salt Lake City-based biotech firm. However, Myriad Genetics enjoys exclusive rights to the profits that arise from diagnosing this gene. The agreement with the University of Utah and the NIH grants Myriad Genetics the right to sell exclusive licenses for the use of the gene (Coriat and Orsi, 2002: 1499; Orsi, 2002: 84).

With the regime of intellectual property, genetic conditions become a commodity. Whole sections of the population, in particular those who lived in isolated areas over a long period, become recording targets in order to generate genetic databases. So, against the protest of numerous scientists, the firm deCode Genetics entered into an agreement with the Icelandic government awarding it exclusive rights to investigate the genetic composition of the Icelandic population. In a collaborative agreement with deCode from 1998 to 2002, Hoffmann-La Roche secured itself the rights to the genes for 12 specific diseases, for 200 million USD. The alliance was prolonged by two years and expanded on the investigation of therapeutic active agents for four diseases in January 2002 (Cassier, 2003: 74; Perelman, 2002: 152; *Roche MI*, 2002).

The area of monoclonal antibodies is particularly interesting. In 1975, Cesar Milstein and Georges Köhler published a landmark paper in *Nature* describing how to make monoclonal antibodies via hybridoma technology (Kohler and Milstein, 1975). They were not aware of the consequences of not patenting their breakthrough invention. The basic technology was accessible to subsequent scientists. That enabled a wave of progress in immunology laboratories and helped to launch young companies which tried to turn this breakthrough into commercial drugs. However, soon every single aspect of monoclonal antibody production was enclosed by patents. Subsequent users must now buy licenses and pay royalties (Eichmann, 2005: 99ff). There were 20 monoclonal antibodies on the market by the end of 2006. Over a long period there were two landmark patents broadly covering methods for making monoclonal antibodies, both issued in 1989: the 'Boss' patent (US patent no. 4,816,397) owned by the British biotech company Celltech (acquired by Belgian-based UCB in 2004), and the 'Cabilly' patent (US patent no. 4,816,567) of South San Francisco-based Genentech. After a long patent dispute and before expiration in March 2006, Genentech succeeded in receiving a 'new Cabilly' patent (US patent no. 6,331,415), also covering the 'Boss' patent field. Over a long period, a great many producers of monoclonal antibodies had to pay royalties either to Genentech or to Celltech. If the new patent resists legal challenges, Genentech will hold a monopoly until 2018 and therefore profit from an IP monopoly for 29 years (Lorenzo, 2007; Teskin, 2003). Any company wishing to use corresponding

cell culture to make recombinant antibodies for use as human therapies needs to enter into a royalty agreement with Genentech (Van Brunt, 2005). Genentech's annual reports of the last years show that this company, which is about 60 percent owned by Hoffmann-La Roche, does not only successfully launch new therapeutics, but it is also a successful royalty recipient, particularly in the field of monoclonal antibodies.

The attainment of monopolized property rights over technologies and active substances is a decisive weapon on the battlefield of oligopolistic rivalry. These patents permit the companies to convert surplus profits into durable rents, even if the technological lead has already melted. Monopoly rights open up the possibility of boosting drug prices. In the examples of the BFCA1 gene, deCode Genetics and monoclonal antibodies, the amount of the technological monopoly rent depends on the extent to which the monopolized technology can be substituted by other technologies. In many fields complex royalty cascades can be observed. Companies which want to use a patent pay royalties/rents to the owner. However, they also receive royalties/rents from other firms using their knowledge or from consumers buying their drugs. As long as patent owners can sell their monopolized knowledge, technology or drug, they can even cashier an absolute rent, independently of possibilities to substitute their commodity.

While the enclosure of DNA sequences is an important trait of the new intellectual property monopolies regime, this new regime is not an outcome of the technological revolution in biotechnology. It's important to keep in mind that it is the new configuration of capitalism that promotes the enclosure of new fields. Patents for DNA sequences or specific upstream knowledge portions in the field of monoclonal antibodies are only one outcome of this new regime.

### **3.3. Transferring rents to venture capital, investment funds and license companies**

Despite the remarkable advancement in the biotech sector, only a few biotech firms managed to become profitable. Until the end of the stock exchange boom, market capitalization increased far more than revenues from product sales. In view of the slow increase of product sales and missing profitability, the valuation of biotech firms depends to a large extent on the assessment of their intangible resources (like intellectual property titles) and expected future prospects in addition to their product pipeline. Thus, the transformation of knowledge into commodities is at the core of the financial world's valuation of the biotech sector. The public announcement of awarded patents increases the valuation of firms at the stock exchanges (Abate, 2003; Coriat and Orsi, 2002; Robbins-Roth, 2000). Under pressure by financial investors, biotech companies strive to multiply their intellectual property titles. Property monopolies can contribute to boosting the

price at an *initial public offering* (IPO) or a trade sale of the entire company. Venture capital companies selling their shares to the next investors then cash in the bonus.

However, patents are not only indicators for the valuation of biotech firms by financial capital, they can also become the direct and immediate subject of investment strategies. Just as the interest-bearing capital can become independent, so the rent-bearing capital can also appear separated into 'an autonomous kind of capital' (cf. Marx, 1981 [1894]: 500). The Berkeley-based biotech company Xoma, for example, encountered acute financial troubles in 1997. Because of this, it sold patent rights and the connected rights to royalties on a drug for a special kind of cancer approved in November 1997 to Pharmaceutical Partners, a firm specialized in patent business. This genetically recombinant drug is commercialized under the name *Rituxan* by Genentech and IDEC in the US, and by Roche under the name *MabThera* throughout the rest of the world (apart from Japan). Xoma sold the rights to future royalties for 17 million USD cash. Pharmaceutical Partners, a subsidiary firm of Switzerland-based Royalty Pharma, now rakes in the royalties stemming from *Rituxan/MabThera* sales. This deal was extremely profitable for Pharmaceutical Partners because *Rituxan/MabThera* became a blockbuster drug, with sales of 3,154 billion USD in 2005 (InfoService Biotechnology, 2006). The stocks of IDEC Pharmaceuticals, the company in charge, increased based on the market success of *Rituxan/MabThera*. The share price multiplied 36-fold within four and a half years, between the beginning of 1995 and the end of June 1999. After the approval of *Rituxan/MabThera* in November 1997, the stock price increased from about USD 30 to about USD 100 more than two years later. Xoma, which had sold the property rights on royalties, was left empty-handed, apart from the above-mentioned 17 million USD (Robbins-Roth, 2000: 159, 216; Xoma, 1998). This example is not an isolated case. Royalty Pharma arranged several similar and recently even much bigger deals (Royalty Pharma, 2005).

The increasing influence of financial capital over the corporate governance is expressed in the importance of increasing shareholder value (Lazonick and O'Sullivan, 2000). Immaterial assets such as patents became a key indicator for the valuation of pharmaceutical and biotech companies on the stock markets. Intellectual property titles even attain the character of a security in such cases. For instance, Royalty Pharmaceutical does not pursue the least industrial interest. The interest is purely financial: making more money from money. Thus the interest-bearing and the rent-bearing capital merge.

### 3.4. The contradictions of intellectual property monopolies

It is human labor and creativity that creates knowledge. Enforced property monopolies serve to acquire a part of the surplus value produced by this

labor in the form of rents. The idea of rent is inseparably connected to that of property rights. Property rights, respectively property titles, can even enable certain individuals to prevent the reproduction processes of life or to conduct them for their purposes and therefore to transform genetic and cultural inheritance into a commodity.

Since the possession of property monopolies (patents, brands, author-rights) builds the source of incomes, its multiplication becomes a high priority. Intellectual activity is inherent to humans, so the possibilities for privatization are practically unlimited. Defenders of extending intellectual property monopolies use the stimulation of invention activities as an argument. However, private appropriation, which governments encourage, contradicts the fact that knowledge production is now more than ever the result of collective activities, and therefore requires as much freedom of exchange and communication among scientists as possible. The regime of intellectual property monopolies in the context of a finance-dominated accumulation regime impedes potential for innovation and favors an enormous squandering of human and material resources. The privatization of universal labor is an answer to problems of accumulation. But it causes new contradictions as other attempts to counteract capitalist crises have done. Among these contradictions are also phenomena increasingly cited by authors who do not reject intellectual property monopolies per se, but discuss the dangers and disadvantages connected to the new regime.

*Patents to block.* Racing for the acquisition of additional patent rights, companies practice strategies which impede innovation processes. Meanwhile, numerous studies show that an extensive granting of patents hinders the use and accumulation of knowledge and therefore the process of innovation (Coriat and Orsi, 2002; Nelson, 2004). First, this can happen if patents are too broad and therefore block the ensuing research in the same area. Second, there is the anti-commons-regime frequent in biotechnology. Companies attain private rights to DNA sequences, including fragments of a gene, and therefore prevent a protagonist from unifying the rights and respectively acquiring all licenses. In this case, different owners of fragments of a good have the right to exclude all others from its use so that, in the end, the product is not developed (Heller and Eisenberg, 1998: 699). Third, innovation can be blocked if research tools, preliminary products for broad research areas or key approaches are patented and the patent holder aggressively pursues unlicensed users or allocates only an exclusive right of use (Nelson, 2004: 464). Those who are willing to pay large sums, normally large corporations, are most able to skip these hurdles and create monopolistic situations based on exclusive rights. Primarily in the genome research area, different firms practice a systematic accumulation of patents. This permits them to enclose entire fields of drug targets, substances or technologies. Requiring an 'immaterial toll', they can block other

interested parties who do not pay the license fees. Patent holders can also block future, at the time of the patent release still unknown utilizations (Cassier, 2003: 71; Coriat and Orsi, 2002: 1498; Orsi, 2002: 74).

*Secretiveness.* The economy is increasingly characterized by secretiveness and patent disputes in the regime of monopolized intellectual property rights. Thus, technological progress will take a quite specific face (Perelman, 2002: 43). Intellectual property undermines the open nature of scientific research. Scientific breakthroughs and discoveries are made by scientists who pursue their interests and are not limited by the narrow, short-term, profit-oriented priorities of large corporations.

*Weakening and commercializing basic research.* The privatization of basic scientific knowledge, particularly in the area of biotechnology, can impair innovation in the long run. Basic research is decisive for long-term growth and should remain a public good which is financed publicly. Different authors emphasize that basic research, due to its cumulative character, should be organized as independently as possible from entrepreneurial interventions and the influencing control of financial investors (Argyres and Liebeskind, 1998; Chesnais and Sauviat, 2003; Foray, 2002). Nelson (2004) argues that the republic of science should be preserved. However, a too idealistic picture of the previous period should be avoided. For instance, science in context of the precedent techno-structure, often related to the military sector, was far from an open democratic republic.

*Price increases.* Monopoly rights connected with intellectual property increase prices, and transfer immense incomes and prosperity to the few large corporations which control the mass of intellectual property titles. A study in the US concludes that the abolition of the patent system on medicines accompanied by a rise of public financing for R&D would make substantial savings possible. The gross savings that the US government and consumers would have experienced in 2000, if drugs had not been subject to patent protection, would have been between 72 und 90 billion USD (Baker and Chatani, 2002).

*Orientation on a well funded demand.* The concentration of drug research meeting a well funded demand corresponds with the basic principles of a profit-oriented economy. This prioritization is also reinforced by the macroeconomic context, characterized by a strong uncertainty and a requirement of fast returns on investments for financial markets and shareholders. The lack of interest by the pharmaceutical companies to investigate medicines against fatal diseases in the southern hemisphere is well known. The problem is intensified by fading public financing in this field in the developing world. Out of the 1,556 approved new chemical entities

between 1975 and 2004, only 18 were against tropical diseases and three against tuberculosis (Chirac and Torreele, 2006: 1560).

*Commercialization of basic research and higher education.* Patents did not only become a central valuation criterion of firms, but even of academic research institutes. Basic research and higher education have increasingly been shaped by financial constraints (Krimsky, 2003). The companies which finance academic research require reliable and confidential results. This impairs open interaction between researchers. But exactly this distinguishes academic from corporate research in life sciences (Cooke, 2004: 167). Soon, researchers also in the public sector could find themselves in situations where they need approval from the patent holders to use the sequences once considered part of the public domain (Eisenberg and Nelson, 2002: 1397).

These contradictions all together lead to two fundamental societal problems. First, by intensifying the process of rent extraction and centralization the reinforced regime of intellectual property monopolies has contributed to a process of a maldistribution of income and wealth (Perelman, 2002: 204). Second, by hindering the dissemination and the application of knowledge and technologies and thereby encouraging the development of less efficient technologies (as a substitute of more efficient, but monopolized technologies) the new regime of intellectual property monopolies has also promoted a waste of resources and human creativity.

#### 4. RENTS, STATE AND IMPERIALISM

The state was and is decisive for the enforcement of property rights and markets. This ranges from original accumulation to present forms of accumulation by dispossession. The state subsidizes the educational system and research activities. Moreover, the state counts on its means of coercion to enforce property monopolies. Since the forbidden appropriation of an intellectual property is less obvious than the theft of physical goods, the protection of intellectual property reveals far stronger effects than comparable endeavors for the protection of physical goods. Owners of intellectual property titles can force suppliers of commodities to modify their products and thus to reduce their usefulness.

State action is a prerequisite for enforcing conditions which make the extraction of rents possible, just as the state is indispensable for enforcement of the accumulation conditions and the reproduction of capital-labor relations (Murray, 1978: 28). This applies to the negotiations on agricultural policy in the context of the WTO, where the US, the EU and some farming exporters in the south want to realize rents exporting agricultural surpluses. This also applies to urban planning, where the state enables real estate owners to extract rents (Jäger, 2003). And the erection and enforcement

of intellectual property monopolies is finally unthinkable without a deliberate state policy. The share of the rent on the yearly produced value in a society which is distributed in the form of salaries, rents, interest, corporate profits, and taxes is also a result of class struggles, and therefore of social power relations (Harvey, 1982: 362). At the same time, the disposal of scientific and technological potential has become a defining factor of international dominance and dependence relations (Sachs, 2000).

The payment of licensing fees flows primarily between rich countries. Yet the flows are even more concentrated than those of world trade and foreign direct investment. The rich capitalist countries held 97 percent of all patents worldwide in the mid 1990s. In 1995, more than half of all license fees were paid to firms and institutions in the US, most of them from Japan, Great Britain, France, Germany and the Netherlands. In 1993, only ten countries accounted for 84 percent of worldwide research and development expenditure and collected more than 90 percent of cross-border license fees. Moreover, 80 percent of the patents granted in developing countries were awarded to citizens of the capitalist core countries (UNDP, 1999: 68). Companies in the capitalist metropolises received 97 percent of the license payments in 2001. This corresponds to 71 billion USD every year (Maskus, 2003: 17; UNDP, 2005: 135). The payment of license fees for patents amounts to a net transfer to the large corporations in the capitalist metropolises. With the TRIPs established by the WTO, the technology producer, above all the US, reinforces its role as receiver of license fees, therefore of rent payments. The peripheral countries are pushed into the role of cheap resource suppliers without sovereignty. The worldwide technological gap widens.

The accumulation of intellectual property rights is part of the capitalist core countries' strategies to strengthen national competitiveness. The large transnational corporations in the capitalist metropolises profit most from the finance-dominated regime of intellectual property titles, institutionally secured by agreements such as the TRIPs. Because millions of people are still kept in poverty, the societies cannot use their creative potential for the development of *universal labor* (Marx, 1981 [1894]: 199).

Although the finance-dominated accumulation regime does not provide a sustained growth on a global scale, the US was able to impose a remarkable growth of its domestic economy during the last one and a half decades. But this growth is to a considerable degree based on capital imports and the import of cheap products. The growth of the US economy during the new economy in 1990s and also afterwards is unique. This unusual feature is explained by the kind of political and military relations the US maintains with the rest of the world in the context of the geopolitical transformations of the 1990s. The US holds the monopoly to sustain a regime of production and consumption growth which depends increasingly on the ability of the rest of the world to finance the triple deficit of the US (trade, budget

and private households), voluntarily or forced (Serfati, 2004: 19, Chapter 6). This regime and the rapacious relations the US maintains with the rest of the world are linked to its foreign and military policy (Chesnais, 2004: 44). The strategic agenda of the US takes these economic conditions into account. The document on the national security strategy is explicit in this regard and emphasizes the protection of property rights (The White House, 2002).

The far-reaching institutional changes complementing each other (*institutional complementarities*) in the areas of intellectual property rights, the exclusive licensing of publicly funded research results to preferably national companies according to the Bayh–Dole Act, and a coordinated foreign trade policy are an expression of the US's professed will to regain or respectively to defend their technological hegemony (Coriat, 2002). At the same time the intellectual property monopolies which are internationally recognized and enforced are an important instrument for extracting resources from other parts of the world based on rent revenues. An ensemble of economic, political, and military factors forms the basis for exerting a form of rivalistic cooperation between the US and their most important allies in the North Atlantic zone, and a hardly contested dominance opposite to the rest of the world. The finance-dominated accumulation regime therefore must be interpreted in the context of the globalization of capital, both as an expression as well as a specific phase of imperialism.

The emphasis on the US in this article is not intended to suggest that the mechanisms of the finance-dominated accumulation regime and the new regime of intellectual property monopolies attained acceptance only in the US. Similar developments have taken place in Europe. But the economic and institutional changes in the US have global effects, due to their economic, political and military importance. In summary, the current phase of imperialism corresponds to an era of political power of finance and rent-bearing capital.

## 5. CONCLUSIONS

The extension of property monopolies in the course of the last two centuries has contributed to the concentration and centralization of capital, and therefore also of labor, including specialized intellectual labor. More recently, the establishment of a finance-dominated accumulation regime is accompanied by the enforcement of an intellectual property regime which extends property monopolies into new areas. Searching for new fields of valorization, capital dispossesses different protagonists, such as researchers, skilled workers, and also rural communities. It takes from them the goods produced by them, their means of production, and finally the knowledge and the information which they generate in collective work.

In order to understand the current processes, one must avoid a simple dichotomy between surplus-value production by labor and forms of accumulation by dispossession as in original accumulation. With imperialist

globalization, the forms of appropriating produced value and existing wealth differentiate more strongly. The production of value in the context of waged labor as it existed predominantly in rich capitalist countries during the post-war decades forms one pole. It only concerns a minority of workers worldwide who mainly live in the capitalist core countries. Their qualification protects them from dangerous competition. At the other pole we see the economy of plunder (Serfati, 2004: 103). The dispossession of knowledge producers through the extension of intellectual property monopolies is a form of a particularly developed accumulation by dispossession corresponding to the knowledge-based economy. Between the two poles, value production is based on an industrial reserve army of producers offering great diversity in exploiting forms of labor. So 'normal' accumulation is strongly interwoven with forms of original accumulation and accompanying state and non-state violence (Harvey, 2003).

This continuing and reinforced accumulation by dispossession in all its varied forms and appearances is capital's answer to the problem of over-accumulation. Like other strategies where capital tries to resolve capitalist contradictions, the monopolization of knowledge and information by an extension of property rights creates both new possibilities of valorization and new contradictions and problems. Thus, the monopolization of intellectual property and its increasing concentration in transnational corporations cause a glaring under-utilization and often even a squandering of creative potential in society. The innovation processes in the pharmaceutical and biotechnology industries offer numerous examples of this.

The rise of new technologies, such as information and communication technologies and biotechnologies, is the expression of a very long social accumulation of scientific and technical knowledge. The patented product results from a long accumulation of knowledge produced independently from the patenting enterprise, and it is based on the labor of publicly funded researchers in research institutes or researchers in small companies. The patent legalizes a process of dispossessing researchers and the public institutions which finance them. Through this privatization, the patent transforms social knowledge into a mechanism for extracting rents and a powerful instrument of social and political power. Control of knowledge is crucial in the current phase of capitalism, which is marked by the power of rent-extracting financial capital. This stresses the theoretical challenge to synthesize a critical theory of knowledge-based capital and a critical theory of the capitalism of property holders (Chesnais, 2003: 179).

This article intends to contribute to the theoretical understanding of knowledge-based capitalism with its forms of dispossession and valorization through rents: understanding this extraction of rents legitimized only by the possession of property titles facilitates a better grasp of the burning questions surrounding current forms of resource dispossession and appropriation, be it between different classes or between factions of ruling

classes, such as in the transfer of resources and surplus value between and within enterprises.

In an emancipatory perspective, the challenge consists in developing suggestions to promote the democratic design of technological development on different scale configurations. Broad social debates about desired technological developments, priorities for the public financing of and private investment in technologies as well as about the organization of the division of labor are a prerequisite for this. The extension of intellectual property monopolies carries the central contradiction of capitalism to extremes, namely, the one between social production and the private appropriation of commodities. Therefore, challenging intellectual property monopolies can also be a gateway to initiate discussion about the large transnational corporations' exclusive right of disposal of strategic means of production.

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### NOTE

- 1 Marx's notion '*ursprüngliche Akkumulation*' has been translated into 'primitive accumulation' as well as 'original accumulation'. I use 'original accumulation', because it better expresses the causal and temporal aspects of creating capitalist production relations.

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REVIEW OF INTERNATIONAL POLITICAL ECONOMY

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