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Ugo Pagano

The Crisis of Intellectual Monopoly Capitalism

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**Abstract** - The last three decades have witnessed the emergence of a new species of capitalism. In spite of marked differences among its different national varieties, a common characteristic of this species can be found in the global monopolization of knowledge. This monopolization involves hierarchical relations among firms and between capital and labor because the capital of some firms includes the exclusive ownership of much of the knowledge used in production. Since the 1994 TRIPS agreements, the growing commoditization of knowledge has extended the role of closed science and closed markets at the expense of open science and open markets. The intrinsic long-term dynamics of this species of capitalism are increasingly characterized by inequality and stagnation. In order to exit from the current crisis, we must change many features of Intellectual Monopoly Capitalism and rely on an eclectic approach that draws insights from the Liberal, the Keynesian and the Marxian traditions.

**Jel:** F55, G01, B52, E11, E12

**Keywords:** intellectual monopoly, great depression, eclecticism.

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**Ugo Pagano**, University of Siena and Central European University

## 1. Introduction.

In the Marxian tradition, machines may have a perverse role under capitalism. Since their owners employ labor, living humans become means for their valorization. Embodying past effort, they behave like vampires: their dead labor feeds on the living labor and the skills of the workers. “Machines’ skills” do not develop together with human capabilities; rather, they tend to displace them. Moreover, machines embody not only past labor but also past effort in science and ideas which also become oppressive powers ruling the labor process.

In his work, *Labor and Monopoly Capital*, Harry Braverman (1974) argued that the tendency of capitalism, considered by Marx, also operated in the twentieth century, and that modern scientific management involved an increase in the monopolization of knowledge by capital and management. However, even in Marx’s and Braverman’s analysis, one crucial possible future development of capitalism was overlooked: the inclusion of knowledge itself among the capital assets of the firms. Given the non-rival nature of knowledge, its inclusion among privately owned assets involves the creation of a legal global monopoly. Only in the mid–1990s did these intellectual monopolies become well-defined and enforceable in the global economy, and since then *intellectual monopoly capitalism* has become the dominant form of organization of big business. The new form of organization has not only expanded to an unprecedented level the process of concentration of productive knowledge into a few hands considered by Marx and Braverman. It has also transformed a world mainly based on open science and open markets into a world of closed science and closed markets, and it has restricted the investment opportunities for many firms in different countries. This famine of investment opportunities is the other face of the saving glut which, coupled with poor regulations, has been such an important factor in the recent financial crisis. In this respect, the recent crisis is due to the specific nature of *Intellectual Monopoly Capitalism*. An exit from the crisis must contemplate a radical change of its architecture and a move from a world of closed markets and closed science to a world of open markets and open science.

The paper is structured as follows.

The following section shows how *intellectual monopoly capitalism* is related to the knowledge concentration process analyzed by Marx and Braverman. The third section argues that the booming 1990s and the depressed first decade of the new millennium can be explained in terms of the dynamics of this new species of capitalism. Section 4 focuses on the tension between the production relations of

*intellectual monopoly capitalism* and its knowledge-based productive forces. Finally the concluding section argues that an exit strategy from the crisis requires an eclectic blend of receipts stemming from different intellectual approaches.

## **2. Labor and Intellectual Monopoly Capitalism.**

According to Marx, capital is more than a physical asset. It is a social relation that makes the productive forces, developed by the human intellect, a power standing against the human beings that develop them:

*It is a result of the division of labour in manufactures, that the laborer is brought face to face with the intellectual potencies of the material process of production, as the property of another, and as a ruling power. This separation begins in simple co-operation, where the capitalist represents to the single workman, the oneness and the will of the associated labor. It is developed in manufacture which cuts down the laborer into a detail laborer. It is completed in modern industry, which makes science a productive force distinct from labor and presses it into the service of capital. (Marx 1967, ch. 14, section 5)*

In other words, the dynamics of capitalism are characterized by an excessive upgrading of the non-human intellectual productive forces and a continuous degradation of the creative forces embodied in human beings.

This view of Marx was revived by Harry Braverman (1974) and other radical economists.<sup>1</sup> In his influential book *Labour and Monopoly Capital* Braverman was able to show the power that the

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<sup>1</sup> See for instance Marglin (1974), Rowthorn (1974), Bowles (1985), Pagano (1985). The feature shared by these approaches was that technology could be shaped by the property rights of capitalism.

Marxian analysis in the explanation of some features of the *degradation of work in the twelve-century*, (which is the subtitle of his book). In the Marxian framework, men first conceive ideas and then execute them. Work “as purposive action guided by intelligence, is the special product of humankind” (Braverman, 1974, p. 49). However, this great feature of humankind can be turned into alienation and deprivation of creativity. The autonomy of conception from execution implies that most people may simply execute what other people have conceived. Under capitalism, the employment contract entails that one agent agrees to execute, within certain limits, the actions conceived by another agent. Thus capitalism is one of the possible social arrangements exploiting the separation between ideation and execution, but the profit motive pushes this separation to unprecedented extreme consequences.

According to Braverman, employers seek to pay as little as possible for the skills of the workers and try to make the workers work as hard as possible. For this reason, they tend to re-organize occupations and trades by subdividing them into meaningless and repetitive operations. This organization has little to do with the maximization of "learning by doing" that, according to Smith, characterized market economies; rather, it is related to a set of principles first spelled out by Babbage (1832) and Ure (1835)<sup>2</sup> and later transformed into the coherent theory of scientific management advocated by Taylor and his disciples.

Whereas the Smithian principles of the division of labor rely on the maximization of the "learning acquired by doing", the Babbage principle is based on the idea that the division of labor should be organized to minimize the "learning and the (strength) required for doing": the more detailed the division of labor, the lower is the skill requirement for each operation. Labor-power can be made cheaper by a detailed division of labor involving job de-skilling. According to Braverman, "applied first to handicrafts and then to mechanical crafts, Babbage's principle eventually becomes the underlying force governing all forms of work in capitalist society, no matter in what setting or at what hierarchical level" (Braverman, 1974, pp. 81-2).

As to Taylor, he realized that the traditional system of management was ill-suited to increasing workers' effort. Traditional management relied on the knowledge of the workers in the sense that the managers believed that the workers knew better than they did how to perform their jobs. Under

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<sup>2</sup> Marx (1967) relied on both authors in the first volume of *Capital*. Pagano (2007b) considers the Marxian analysis of technology and property rights and argues that it has become particularly relevant since New Institutionalism. On the relative importance of the relation between property rights and technology relatively to the relation in the reverse direction see Earle Pagano Lesi (2006).

traditional management, the workers could work less than "fairly" by claiming that a certain amount of time was required to perform a certain job. The situation of "asymmetric information" existing under traditional management implied that the managers had no means of challenging this claim. Taylor's solution to this problem was straightforward: the managers and not the workers should know how the jobs could be best performed, plan how they should be executed, and give the workers detailed instructions about their execution. It was only by gaining control over the labor process that the managers could reverse the situation of asymmetric information and control the workers.

Braverman summarizes the content of Taylorism in three different principles:

- 1) *dissociation of the labor process from the skills of the workers.*
- 2) *separation of conception from execution.*
- 3) *use of this monopoly over knowledge to control each step of the labor process and its mode of execution.*

Babbage's and Taylor's principles pertain to a consistent body of organization guidelines. *The dissociation of the labor process from the skills of the workers* does not only allow for greater capitalist control; it also, following Babbage, cheapens labor by decreasing learning time. In the very same way, the *separation of conception and execution* does not only imply greater capitalist control; it also means that fewer people should learn how to conceive and more people should become cheap executors of their decisions – this being, again, also an implication of the Babbage principle. The same detailed division of labor cheapens labor-power and increases capitalist's control over labor and, consequently, workers' effort. For this double reason, Braverman argues, de-skilling jobs is a fundamental tendency of capitalism.

According to Braverman, analysis of Taylorism is essential for understanding the real-life capitalist economy because in Taylor's work there "lies a theory which is nothing else than an explicit verbalization of the capitalist mode of production" ( Braverman 1974, p. 86). This fundamental role of Taylorism is contrasted with the influence of the subsequent management schools of human relations and industrial psychology which, according to Braverman, have offered little more than cosmetic adjustments for the underlying principles of capitalist organization. Braverman observes how "Taylorism dominates the world of production; the practitioners of "human relations" and "industrial psychology are the maintenance crew for human machinery" (Braverman 1974, p. 87).

Braverman contrasts the state of "human machinery", under capitalism, with that of non-human machinery. He points out that capitalism is characterized "by the incessant drive to enlarge and perfect machinery on the one hand, and to diminish the worker on the other" (Braverman, 1974, p. 228) – a point that had been implicitly made by Andrew Ure (1835) and was a key ingredient of the Marxian analysis.

According to Marx, the history of machinery is in striking contrast with the history of workers. Machines first acquire "skills" specific to certain production processes. Then, especially after the electronic revolution, they also acquire "general purpose" abilities. By contrast, workers, deprived of traditional, craft-specific skills, become "general purpose" not because their abilities are enlarged but because the scope of their jobs is narrowed. Or, in other words, workers become "general purpose" because of job de-skilling: the tasks which they are required to perform are so detailed and simple that each worker can be moved from one job to another without substantial training costs. In this sense the worker becomes "a general-purpose machine operated by management" (Braverman, 1974, p. 180). Machinery is also used to control the worker indirectly through the machine. By setting the pace of the machine the manager can control the effort and the tasks performed by the worker. Conception and execution become even physically separated: management makes machines execute tasks which require the execution of other tasks by the workers. De-skilled workers are increasingly controlled by means of "skilled" machines: again, in the words of Marx, the "intellectual powers of machines" make *science a productive force distinct from labor and presses it into the service of capital*.

Whereas, according to Braverman, Babbage and Taylor provide (much better than Adam Smith) a *verbalization* of the capitalist mode of production, in reality we have a dual labor market where both Babbage-type and Smith-type workers co-exist. In the mature sectors of the economy there is certainly a tendency to turn the learning-by-doing *Smithian workers* into unskilled *Babbage workers* who simply execute other agents' ideas. However, in other new production processes, the skill content is higher and may easily compensate for the overall deskilling process. Moreover, different varieties of capitalism involve different mixes of the two types of workers, and there has been a tendency to export Taylorism to the developing countries.

However, independently of the overall long-run (de-)skilling tendency, one can easily agree with the idea that excessive job de-skilling and capital up-skilling are salient characteristics of capitalism insofar as it is associated with well-defined property rights on machines and ill-defined rights over labor.

While the *skills* of machines can be clearly included among the assets of firms, the firm-specific skills of workers cannot be unambiguously included among these assets, nor among those of the workers. For this reason capitalism may have a tendency to over-monopolize intellectual assets and make them a clearly defined part of firms' capital. Indeed one can well argue that, in spite of their considerable foresight, Marx and Braverman could not see the most extreme and most meaningful step in this monopolization process: the privatization of knowledge and its direct transformation into the most valuable proprietary asset of the firm. This process, which has characterized the last two decades, motivates our addition of the word *intellectual* to the term *monopoly capitalism* used by Harry Braverman.

The main characteristic of *intellectual monopoly capitalism* is that monopoly is not simply based on the market power due the concentration of skills in machines and management. It becomes also a *legal global monopoly* on some pieces of knowledge. In this respect, a model of capitalism based on the ownership of knowledge is fundamentally different from the one on which Marx and Braverman focused their analysis.

Machines are well-defined physical objects. In their case, private ownership can be defined and enforced on an object located in a well defined space. As long as an individual does not interfere with the local space occupied by the objects owned by other people, respect for the property rights of others does not limit his/her liberties. Moreover, as long the objects are not visibly taken away or changed by others, an owner can safely assume that his/her ownership rights are respected. The relative legal positions have a local domain geographically limited by the position in space occupied, at a certain moment in time, by the material object over which the rights are defined. The material character of the good and its well-defined location imply a possible overcrowding by potential consumers, and they are a source of rivalry in consumption. When machines embody some intellectual forces, the monopoly power that they confer is limited by the fact that in other locations one could lawfully build similar machines.

Knowledge is not an object defined in a limited physical space. The same piece of knowledge can be encoded in multiple languages, using many different objects existing in a potentially infinite number of places. For this reason, the full-blown private ownership of knowledge means a global monopoly that limits the liberty of many individuals in multiple locations. The ownership of a physical asset, such as a machine, entails some duties for the surrounding individuals, who should not interfere with the



property rights of the owner and are, only in this sense, limited in the exercise of their liberty. By contrast, ownership of a piece of knowledge implies that, independently of their physical location, all individuals have a duty not to interfere with that legal position. They have to comply with the rights that it defines by limiting their actions in their daily lives in multiple ways, irrespective of the place and the country in which they operate. If some individuals happen to produce (or in relevant cases have already produced)<sup>3</sup> the same knowledge on which the right is granted, their liberty to use the results of their efforts is limited by the monopoly on knowledge that has been already acquired by others.

The reinforcement and the extension of intellectual property have been compared to the enclosure of common land that preceded the industrial revolution.<sup>4</sup> Also in this case, commons were turned into exclusive private property. There is, however, a fundamental difference. In the case of land, the object of privatization was a local common that involved the legal positions of few individuals. By contrast, the privatization of intellectual property changes the legal positions of many individuals and has major implications for the international standings of different countries. Privatizing land has only local implications. By contrast, the holders of property rights on knowledge end up with rights equivalent to the imperial powers of the past. They can decide whether a certain production process can be undertaken in particular country, and they end up owning the future opportunities of the firms of other countries.

In the midst of the financial crisis, the *Financial Times* of 6 March 2009 reported that the German Government was considering saving Opel from the possible bankruptcy of GM, only to discover that, although the company had the same workers, machines and management, its future had vanished because some legal papers had changed hands:

*“Our impression is that Opel has not freed itself from GM’s influence and that it is not being serious about becoming more autonomous as a business,” the insider said, confirming that both Mr Guttenberg and Ms Merkel were losing patience with the companies.*

*Berlin has refused to assist Opel without cast-iron guarantees that the money will not flow to GM or be lost in the wake of a GM insolvency. Officials say Opel’s restructuring suggestions so far have failed to provide this guarantee.*

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<sup>3</sup> An account of cases in which traditional knowledge has been stolen by multinationals is given by Shiva (2001).

<sup>4</sup> For instance, see Shiva (2001: pp. 44-48).

*The government suspects GM has provided some of Opel's patents as collateral to the US Treasury in exchange for financial assistance. Berlin therefore doubts Opel would be shielded against an GM insolvency."*

Without its patents, Opel was worth nothing and could not be saved even by substantial funding from the German State. This story exemplifies the nature of *Intellectual Monopoly Capitalism* and, in particular, the importance of IPR for a company's future prospects and value. Even if we disregard the overwhelming importance of trademarks, the absence of other forms of intellectual property is sufficient to jeopardize a company's prospects. In the case of Opel, the deprivation of patents occurred while the skills of the engineers and the other employees who had developed them were still in the company, together with its physical capital. However, other situations can be much worse. With IPR protection lacking, all the other resources, such as the related skills and physical resources, are unlikely to be developed, and investment opportunities may be completely blocked by the absence of a multiple set of factors. These multiple blockages, due to *intellectual monopoly capital*, must be included among the causes of the current 'great depression' considered in the next section. We can conclude this section by observing that the same blockages evidence the extent to which, under modern *intellectual monopoly capitalism*, *the laborer is brought face to face with the intellectual potencies of the material process of production, as the property of another, and as a ruling power.*

Unlike machines, knowledge can become a commodity and an integral part of capital only as a *monopoly* of ideas and future ideation. This monopoly power entails that the worker must face the *intellectual potencies* of the production process *as a property of another* and *as a ruling power* setting legal limits on the development of workers' capabilities and skills.

### **3. Great depression and global intellectual monopolies.**

In much economic theory, knowledge had been treated as a public good. However, knowledge is an impure public good. It shares its non-rival nature with pure public goods, but not the impossibility of exclusion. Depriving others of access to knowledge can be accomplished in various ways, such as secrecy and intellectual property rights. Moreover, the inclusion of others in the use of knowledge (that

is, its transmission and diffusion) may be very costly. Under a regime of strong property rights, each firm is forced to specialize its investments in the narrow field left free by the intellectual monopoly of other firms. In some cases, these specialization opportunities coincide with the shrinking fields, unaffected by IPR, which are the modern equivalent of the common lands unaffected by the enclosures of the industrial revolution. In other cases, besides these shrinking commons, the field includes the firm's exclusive private intellectual property (which contributes to the narrowing of all the other possible fields of specialization).

While the start of *industrial capitalism* was preceded by the enclosure of lands, *intellectual monopoly capitalism* has been made possible by a parallel enclosure of ideas in privately owned fields. Also in the case of this second enclosure movement, the institution of new private rights has affected the legal positions on the public domain.<sup>5</sup> There are, however, some fundamental differences. In the case of land, according to the views of some commentators,<sup>6</sup> enclosures and private property may even have prevented the over-exploitation of a resource being depleted by overcrowding, and they may have provided a solution to the well-known "tragedy" of the local commons. No similar claim can be made for the case of intellectual assets. Rather than preventing a tragedy of commons, their private ownership is instead likely to produce an anti-commons tragedy (Heller and Eisenberg, 1998). The fields of knowledge are not subject to overcrowding. By contrast, they may be greatly damaged if they are enclosed within narrow and rigid boundaries. When the access to knowledge is severely restricted by the fields privatized by others, agents are forced to specialize in narrow fields, and they are likely suffer a dramatic squeeze of investment opportunities. In other words, an anti-commons tragedy due to over-privatization is likely to occur.

Moreover, the legal ownership of knowledge which restricts the freedom of some countries to enter certain specialization fields has consequences more drastic than those of tariffs. Tariffs can at most completely close the market of the country imposing them. IPR are much more restrictive: those imposed by a firm, or by cluster of allied firms of a certain country, can close global markets for all the other firms and for all the other countries. However, although IPRs act like global tariffs, they cannot be reciprocated by other countries. Thus, unlike tariffs, they are associated with forced specialization

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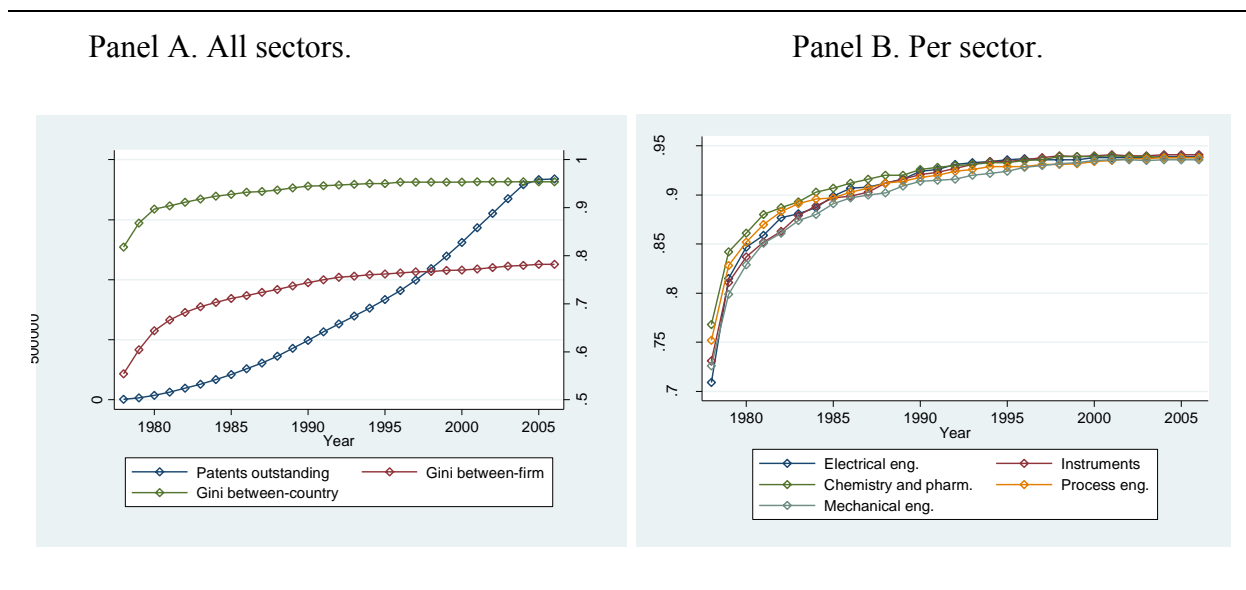
<sup>5</sup> Boyle (2003) clarifies the similarities and differences between the first and the second enclosure movements. His methodology is based on the Hohfeldian legal relations between the private and public domains. On the importance of Hohfeld and Commons for the analysis of property relations see Pagano (2007).

<sup>6</sup> Ostrom (1990) shows that, in many cases, Hardin's (1968) tragedy of the commons did not in fact occur.

and with increases in global trade. Countries which are prevented from specializing in certain fields must import goods or licenses from the holders of the legal rights on the related knowledge. As a consequence, IPR tend to create new sorts of national comparative advantage (Belloc Pagano 2010).<sup>7</sup>

The overall result of the IPR protectionism of *Intellectual Monopoly Capitalism* is a global squeeze of investment opportunities. This restriction of productive opportunities, however, is highly asymmetric and path-dependent on past endowments of intellectual assets. Organizations rich in intellectual assets own larger fields of investment and new patenting opportunities. A polarization arises in the innovativeness of different firms, as well as of countries. A picture of these asymmetric dynamics emerges rather sharply from Figure 1 (panel A and B).

**Figure 1. World distribution of patents.**

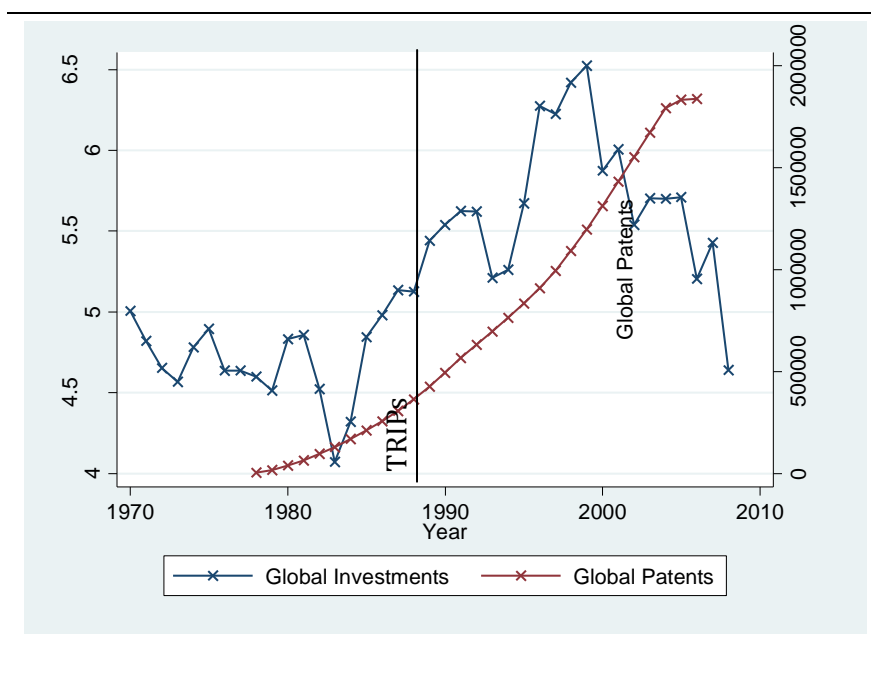


Source: Belloc and Pagano (2010).

<sup>7</sup> This is a particular case of what Hall and Soskice (2001) call ‘institutional comparative advantage’ and which may imply a specialization in the global economy which may even increase the institutional diversity among different countries (Pagano 2007c).

As Figure 1 shows, the degree of inequality in the distribution of patents increases over time both among firms and among countries, but the degree of polarization is constantly higher for the latter. Firms in the same country undertaking joint research activities are more likely to engage in cross-licensing or other types alliances to fight rival patenting activities, and these strategies are likely to augment firms' inequalities.

**Figure 2. Global patents and global investments.**



Source: Belloc and Pagano (2010).

While some countries and firms may gain from intellectual protectionism, the overall restriction of investment opportunities generates the dynamic process shown in Figure 3, where we can observe a total world increase in investments for about five years after the TRIPs but, after that initial phase, a continuous decline starting in 1999 and culminating with the recent global financial crisis. The interactions between productive forces and production relations is likely to have produced two different dynamics of *Intellectual Monopoly Capitalism*, the first characterizing the ‘roaring nineties’ and the second the much less glamorous first decade of the new millennium.

The first phase (1990-1999) marked the expansion of the so-called *knowledge economy* – the new economy which was supposed to open a new age of ever-lasting development. By 1990, the Cold War belonged to the past and the US had become the only superpower, which, together with its multinationals, could heavily influence the new architecture of the world economy. The fruits of the cold war effort and of its victory were not only evident in the political sphere; for in the new world under American dominance, internet and computers – to whose development military and public research had substantially contributed – became cheaply and often freely available, opening up many new technological possibilities for the entire world economy. However, the technological generosity of the US did not last for long. The 1994 Marrakesh agreements marked the beginning of a new era of the world economy in which a few giant firms could own a disproportionate share of global knowledge. The creation of the WTO, with the associated 1994 TRIPs agreements, marked a structural break in the world economy that saw the birth of the institutions of *intellectual monopoly capitalism*. Initially, in second half of the 1990s, the establishment of the institutions reinforced the boom. In that happy period, it was possible to enjoy the fruits of past public investment in knowledge as well as the incentives of knowledge privatization. The cheap availability of revolutionary forms of information and communication technology opened new investment opportunities which were greatly enhanced by the fact that they included the possibility to acquire new secure intellectual property rights. The reinforcement of private intellectual property rights happened on virgin terrain which had just been fertilized by the ICT innovations made publicly available to all. It was therefore hardly surprising that, whilst the incentives associated with the acquisition of intellectual monopoly were strong, its blocking effects were rather weak.

The second phase (2000-?) has been characterized by a shrinking of investment opportunities which, in our view, has been the main cause of the 2008 financial crisis and of the subsequent great depression. Although wars and other “exogenous” events have contributed to this process, an endogenous mechanism due to the nature of *intellectual monopoly capitalism* has also been at work. In this second phase, the new gold-rush to acquire intellectual property rights and the absence of public investment in knowledge have started to exert negative effects on investment opportunities, and the blocking effects of intellectual monopoly have become stronger than its incentive effects. This substantial decrease in investments, in turn, explains the existence of global imbalances better than the hypothesis of a "saving glut" on which much emphasis has been placed to explain the 2008 financial crisis. The “famine” of good productive investment opportunities, coupled with poor financial regulations, produced a flood of

easy money that became both a cause and an effect of the housing bubble and of the ensuing subprime crisis (Pagano Rossi 2009).

Whilst better regulations could make future financial crisis less dramatic, what should be changed are the economic relations of modern *monopoly intellectual capital*. Patent pools and pre-emptive patenting (Gueller, Martinez and Pluvia, 2009) have created a situation in which only some large interconnected firms are able to limit the damage caused by intellectual monopoly and, in particular, by patent trolls.<sup>8</sup> Recently, eleven firms, including Sun Microsystems, Motorola, Hewlet-Packard, Verizon Communications, Cisco Systems, Google and Ericsson, have become members of AST (Allied Security Trust), a joint trust which is a patent holding company that helps protect members against patent infringement lawsuits. Allied Security Trust (2010) claims that:

*AST operates under a “catch and release” model that is unique among defensive patent organizations. AST members purchase patents for defensive purposes, secure the necessary licenses to ensure freedom of operation, and then return the patents to the marketplace for sale. These sale proceeds help to reimburse AST members for their investment in acquiring a license. Under the rules of Trust, AST or its affiliated companies seek to sell all acquired patents within one year of the date of acquisition.*

If companies of the size of those that have joined AST consider it useful to join forces to avoid specialization restrictions and “to ensure freedom of operation”, it is not hard to imagine the difficulties encountered by small companies, especially when they belong to the periphery of the industrial world. Investment opportunities are still increasingly squeezed by the world of closed science and closed markets.

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<sup>8</sup> The term is used to indicate a person or company that enforces patents against alleged infringers in a manner considered unduly aggressive or opportunistic, often with no intention of manufacturing the patented innovation.

#### 4. Property rights and productive forces under *intellectual monopoly capitalism*.

The property rights of *intellectual monopoly capitalism* are presently the dominant form of production relations under the *technology of the knowledge intensive economy*. However, to use Marxian terminology, there should be an evident contradiction between the property rights and the productive forces of intellectual monopoly capitalism. A knowledge-intensive technology should entail the increasing comparative advantage of labor-hiring-capital firms with respect to capital-hiring-labor ones. Knowledge is often *embodied* in human beings, and in a knowledge-intensive economy one should expect labor-hiring-capital organizations to be often advantageous because, in this case, they can decrease agency costs more than alternative organizations. Moreover, the knowledge which is *disembodied* from human beings can be made available to additional members of society without depriving the current users of its availability. Unlike a piece of physical capital, an idea can be used simultaneously by many people without being worn out (indeed, the opposite is true: the use of ideas helps the memorizing and improvement of ideas). Since the marginal cost of using additional *disembodied knowledge* is zero, these firms should not face the renting and borrowing agency problems which usually affect labor-hiring-physical-capital firms. Thus, a technology which makes intensive use of *embodied* and *disembodied* knowledge should contribute to an environment favorable to labor-hiring-capital organizational forms, or at least to organizations with effective safeguards for investments in human capital.

However, the hypothesis that the knowledge-intensive economy should involve a fundamental discontinuity in the capitalist organization of the economy relies on the idea that, unlike physical goods, *disembodied knowledge* is a public good in the sense that there is no cost involved in increasing the number of its users. However, pure public goods are a mix of two ingredients: non-rivalry in consumption, and the impossibility of exclusion from consumption. While the former feature certainly attaches to knowledge, the latter does not necessarily characterize it. *Disembodied knowledge* is a public good in the sense that it is a non-rival good, but exclusion of others from intellectual ownership is possible. Indeed, not only is the excludability of knowledge possible, but it also has broader and more profound consequences than the excludability of physical objects. In the latter case, both the definition and the enforcement of private property rights are specified at the local level and they are unlikely to have any relevant implications in distant locations. By contrast, the legal positions defining



the private ownership of *disembodied knowledge* are often global in nature and involve restrictions for many individuals in various country locations, and potentially for all the individuals in the world. Thus, not only can *disembodied knowledge* become capital, but when it does so, it necessarily becomes intellectual *monopoly* capital.

As to *embodied knowledge*, its fate is strictly related to that of *disembodied knowledge*. When the latter becomes *intellectual monopoly capital*, the "capital-hiring-labor" solution is likely to outcompete the "labor-hiring-capital" solution. If agents can hold exclusive monopoly rights on knowledge, the use of the latter is going to be rather expensive and it is likely to increase the agency costs of labor-hiring-capital firms even in comparison to those which make an intensive use of physical capital. Moreover, when knowledge is privatized, the size of the firm matters: each unit of proprietary knowledge can be used an infinite number of times, generating a dramatic form of (firm-level artificially restricted) increasing returns, and more than proportionally producing opportunities to exploit the complementarities with the other units. In the never-ending production of new knowledge, this makes it even more valuable to produce or acquire additional knowledge from small firms. And size matters also in another crucial respect: the greater is the concentration of knowledge, the lower is the unit cost of defending the exclusive ownership rights on each unit of knowledge which each other competitor could independently discover or imitate. Thus, the so-called knowledge economy produces an evident paradox: the non-rival nature of knowledge, which could in principle favor small, and even self-managed, firms, is used to create artificial economies of size which make the cheap acquisition and the defense of property rights possible only for big business.

If much *disembodied* knowledge is concentrated in a few firms, the intensity of *embodied* knowledge is likely to decrease relatively to *disembodied* knowledge. In other words, to use a Marxian expression, *dead intellectual capital* is likely to increase with respect to *living intellectual capital*. The monopolization of knowledge inhibits investments in human capital. In the absence of knowledge privatization, the need to provide incentives to invest in human capital would be an argument in favor of the labor-hiring-capital solution. However, when markets are characterized by positive transaction costs and individuals are wealth-constrained, the owners of the means of production have greater incentives to develop their capabilities and, for this reason, tend to become the best owners. This incentive effect of ownership is much stronger for intellectual property because the right to exclude entails a restriction of the liberty of all the other individuals to replicate similar means of production (Pagano and Rossi, 2004). The monopoly owners of *disembodied* intellectual capital become better

investors in *embodied* intellectual capital (to a much greater extent than do the owners of physical capital).

In the case of a machine, an individual who has learnt to work and possibly to innovate with skills that are partially specific to the machine is only partially damaged if s/he is deprived of its use. S/he maintains the liberty to work with other machines or to build identical machines. The damage is greater when an individual has acquired skills that are specific to a piece of intellectual property and s/he is denied access to this asset. The nature of intellectual property implies that s/he does not maintain the liberty to work with or to “re-discover” a similar piece of knowledge. IPRs involve a global right to limit the access of all individuals to the use of all the similar pieces of knowledge, including those that are independently developed. Turning a public good like knowledge into a private good transforms a universal unlimited liberty into an asymmetric legal position limiting non-owners’ freedom well beyond the restrictions that stem from property rights defined on traditional rival goods. For some individuals, the monopolistic ownership of intellectual property encourages investment in the skills necessary to improve the knowledge that they own, and the skills that are developed make it even more convenient to acquire and produce more private knowledge. By contrast, other individuals may be trapped in a vicious circle of under-investment in human capital where the lack of intellectual property discourages the acquisition of skills, and the lack of skills discourages the acquisition of intellectual property.<sup>9</sup> The interaction between the accumulation of privatized knowledge has self-reinforcing properties: it generates vicious and virtuous circles of cumulative causation leading to asymmetric, and increasingly divergent, investment patterns in human capital.

For these reasons, the types of firms that tend to prevail in the knowledge economy will crucially depend on the diffusion of the institutions of open science and on the degree of private intellectual property protection. Greater knowledge privatization tilts the balance in favor of the "capital-hiring-labor" solution in spite of the fact that the non-rivalness property of knowledge and its embodied form would suggest the optimality of the "labor-hiring-capital" solution. Unfortunately, in contemporary economies, the role of open science appears much less prominent than it used to be when its very seeds were being developed. This is reflected in the tendency to protect knowledge upstream through private property rights to an extent unimaginable in earlier times and to reduce the extent of publicly-funded

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<sup>9</sup> See Pagano and Rossi (2004). There are complementarities between rights on intellectual assets and the technical assets owned by firms which imply that multiple organizational equilibria are possible. On organizational equilibria and institutional complementarities see Pagano and Rowthorn (1994), Aoki (2000) and Pagano (2007a and 2011).

open science. The absence of an adequate provision of public knowledge and the up-streaming of private intellectual property is a likely result of the absence of adequate global institutions funding public research and the rent-seeking activities of the firms which seek monopoly power on their products and the technology that they use.

Under *intellectual monopoly capital*, there is an evident complementarity between *closed markets and closed science*, and the selection of the organizational form is biased in favor of the capital-hiring-labor solution. The advent of the knowledge intensive economy does not involve a substantial move to the labor-hiring-capital organizational form. The hypothesis that the intense use of non-rival *disembodied knowledge* capital would imply this move holds true only if much knowledge is produced using the institutions of *open science*, and not in the *closed science world of intellectual monopoly capital*. If much knowledge is privatized, the knowledge-intensive economy may turn out to be even more unfriendly to a widespread extension of organizational rights than the physical capital intensive economy. *Intellectual monopoly capitalism* is not a world of *open science* and *open markets*, but instead a world suffering from an unhealthy alliance between *closed science* and *closed markets*. Moreover, the reification of knowledge makes it a tradable asset and increases the financialization of the economy. In turn, the power of finance puts pressure on firms to concentrate knowledge in a few hands and possibly to make it a commodity, very different from human labor, on which secure property rights can be defined and traded. The value of shares increases the intensity of these non-human assets relatively to the value of the skills of the workers (that no firm can really own). Thus, the privatization of knowledge, while restricting the number of participants in product markets, favors the burgeoning of all sorts of trades in the world of financial markets. While investments in useful productive knowledge suffer from institutional restrictions, investments in self-referential and bubble-creating knowledge absorbs an increasing share of human intellectual energies.<sup>10</sup>

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<sup>10</sup> Soros (2010) distinguishes between the knowledge that we gather about society and about nature. In the latter case, our theories have not only a cognitive but also a manipulative function. In some cases, such as the subprime market in the recent crisis, the manipulative function can confirm false theories and produce bubbles that will only burst at a substantial distance from economic fundamentals. Also the concept of intellectual property has a cognitive function (intellectual property is just a form of private property) and a manipulative function (introducing IPR gives us the traditional advantages of private property). The initial rush (and the consequent boom) of the 1990s to get the rents from intellectual monopoly may have reinforced the false expectation that intellectual property is as beneficial as standard private property. It is an open question whether, because of the subsequent blocking effect of intellectual monopoly, the intellectual property bubble is going to burst.

## 5. An eclectic conclusion.

The foregoing analysis has a Marxian flavor: the productive forces of the knowledge economy are fettered by the production relations of *intellectual monopoly capitalism*, and more knowledge should stay or become a global common of humankind. However, the same analysis could have been developed with alternative languages stemming from different intellectual traditions (as I have tried to do in other papers). Moreover, the policy conclusions which can be derived from this analysis are hardly consistent with an orthodox Marxian approach, and they end up by mixing together policies that have been traditionally seen to be in conflict with each other but which could be part of a consistent strategy to exit the present crisis of *Intellectual Monopoly Capitalism*.

We have argued that the crisis of *intellectual monopoly capitalism* requires a radical move from a world mainly organized around *closed science* and *closed markets* to a world centered on *open markets* and *open science*. A move towards open science is certainly consistent with some sort of communism of human knowledge. However, it can be also be seen as a policy complementary to the promotion of open competition among different firms. Private knowledge clashes with open markets and public intervention for public science can be seen as a key ingredient of a pro-market liberal policy.<sup>11</sup>

Moreover, public intervention in the field of knowledge reinforces the argument for anti-crisis Keynesian policies. Since the crisis, Keynesian policies have been criticized on the ground that the existence of a multiplier greater than 1.0 implicitly assumes that “the government is better than the private market at marshaling idle resources to produce useful stuff” (Barro 2008 p. 1) – a sort of general impossibility theorem for some economists. However, the relative merits of markets and governments are unlikely to be the same in each moment of history and for all the possible types of idle resources. During major downturns, especially when the zero lower bound rate on the nominal rate of interest rate binds, increases in government spending may have no crowding-out effects on private investments (Christiano, Eichenbaum, Rebelo 2009). Moreover, the size of the multiplier is influenced by the nature of the investments made by governments.

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<sup>11</sup> For a liberal pro-competition criticism of intellectual monopoly see Boldrin and Levine (2008).

Even in the case of military expenditures, on which Barro focuses his analysis, public investments may be substitutes for or complements of private investments. Keynes (1940a) maintained that, in WWII, in spite of high unemployment, the nature of military and private civil expenditures was such to make them competing substitutes, and he advocated the immediate implementation of a forced saving scheme. The multiplier should have worked in reverse, squeezing, as much as possible, private expenditure. “In the new circumstances”, Keynes argued, “the same argument multiplies the gain to the national resources from almost every form of saving.” (Keynes 1940b, p. 185)<sup>12</sup>. By contrast, the Cold War offers evident examples of complementary military investments with a major expansionary impact on the private sector. Military expenditure had a fundamental role in the development of *Arpanet* (the progenitor of the Internet). Only in 1983, on the eve of the transition to the *IPC/TP protocol* (adopted by the militaries in 1980), was *Arpanet* separated from *Milnet*. The commercialization of the internet required much transmission of knowledge from the public to the private sector, and it had evident multiplying effects.

The present economy offers similar opportunities. Since the 1994 TRIPS agreements, much knowledge has been monopolized (Pagano, Rossi 2009). Knowledge is a non-rival good whose uses are inefficiently restricted by existing monopolies, and public research can have a very beneficial role. Also some public buy-outs of IPRs could be useful, especially when large firms block each other's R&D strategies and, even more so, the innovations of small firms. The additional money and competition arising from public buy-outs could stimulate the investments of the former monopolists, while their competitors could benefit from access to ex-monopolized knowledge. Finally, because of new products and lower prices, consumption could also increase. In the present downturn, to generate multipliers greater than one, we do not need voodoo rituals but rather the human blessing of appropriate public investments.

*Intellectual monopoly capitalism* is inhibiting the democratization of the workplace, fettering the

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<sup>12</sup> “From now onwards a high figure of available of labour unemployed should be the text of success for the Ministry of Labour . . . .” (1940b, p. 184). Those – like Beveridge – who argue that we should postpone private retrenchment “until we have mopped up those (unemployed) we have already” are according to Keynes “relapsing into a mode of thought of a departed world. Those who are at the present employed but could be released are likely to be more valuable and more easily absorbed into work of national importance than the hard core of the chronically unemployed.” (1940b, p.186) In this situation, it is in the national interest that public military expenditure crowds out, as much and as soon as possible, private expenditure.

development of human capabilities, and causing a major economic depression. The exit from the crisis requires a “Marxian” reform of its property rights, a “liberal” anti-monopoly pro-market policy, and a “Keynesian” public investment policy that re-launches open science as a fundamental requisite of genuinely open markets. All this may sound too eclectic. However, even if eclecticism is often seen as a tasteless *minestrone*, the term comes from Greek "ἐκλεκτικός" (*eklektikos*), literally "choosing the best". Sometimes, the *minestrone* can taste better than its ingredients and be a genuine innovation.

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