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## **The Crisis of *Intellectual Monopoly Capitalism*\***

*The last three decades have witnessed the emergence of a new species of capitalism. In spite of marked differences among its 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 financialization, 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, financialization, eclecticism.

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\* This paper is dedicated to Geoff Harcourt who kept alive an eclectic tradition in Cambridge in years in which too many economists closed their minds to the understanding of the other approaches. Harcourt himself (1985) used appropriately this term to describe the work of Richard Goodwin who was my first supervisor in that University and, later, my colleague at the University of Siena. An early version of this paper was presented at the 2011 workshop on *Economic Crisis and Innovation in Economics* of the Korean Association of Political Economy, where I received very valuable comments by Jung-Kyoo Choi and Sam Bowles. At the final stage, the paper was also presented at the Center for Development Studies (Thiruvananthapuram, Kerala). Finally, I have received very valuable comments from two anonymous referees of the Cambridge Journal of Economics.

## 1. Introduction.

In the Marxian tradition, machines may have a perverse role under capitalism. Since their owners employ labor, living humans become means for the valorization of machines. 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 efforts 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 firms. Given the non-rival nature of knowledge, its inclusion among privately owned assets involves the creation of a legal monopoly which can be potentially extended to the entire global economy. 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. The financialization of the economy, and its related instability, have also been driven by the same massive incorporation into firms’ capital of fictitious commodities like monopolized knowledge and other assets whose value cannot be determined by competitive forces and tends to be mainly influenced by the volatile expectations of the agents. In this respect, the recent crisis must be seen in the context of the specific nature of *Intellectual Monopoly Capitalism*. An exit from the crisis must contemplate a radical change of its economic architecture and involve 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 recipes 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 into 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 intellectual productive forces disembodied from human beings, and by a continuous degradation of the creative forces embodied in them.

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 of the Marxian analysis in explaining certain features of the *degradation of work in the twentieth 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 outstanding 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).

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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.

<sup>2</sup> Marx (1967) drew 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. Earle, Pagano Lesi (2006) test the relations between property rights and technology. Both directions of causation are significant but the relation from ownership to technology proves to be stronger than the one in reverse.

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 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 capitalists' 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 to 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 which had been implicitly made by Andrew Ure (1835) and which was a key ingredient of the Marxian analysis.

According to Marx, the history of machinery stands in striking contrast to 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 tend to over-invest in *disembodied* intellectual assets, such as machines which embody past knowledge and skills, thereby helping management to gain monopoly over knowledge of the production process. However, 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 capital* used by Harry Braverman.

The main characteristic of *intellectual monopoly capitalism* is that monopoly is not simply based on the market power due to the concentration of skills in machines and management. It becomes also a *legal monopoly* over some items of knowledge which extends well beyond national boundaries. 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.

Since machines are well-defined physical objects, 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 similar machines can be lawfully built in other locations.

Knowledge is not an object defined in a limited physical space. The same item 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 an item of knowledge implies that, independently of their physical location, all individuals have a duty not to interfere with that legal position. They must 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 a particular country, and they thus come to own the future opportunities of firms in 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.*

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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).

*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.*

*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 a 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 machines, workers and state support are still in place, a company may have no future when it is deprived of its intellectual property. The situation is likely to be even worse if the company has had no ownership of intellectual assets since the outset. 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. 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.

The overall blocking effect of patents<sup>5</sup> appears to be even stronger if one considers that they include not only technological blueprints but also basic design patents. In the famous Apple-Samsung lawsuit, Apple even claimed ownership of geometric shapes such as rectangles with rounded corners:

*The following elements of Apple product designs comprise the "Apple i-phone Trade Dress at issue in this case:*

- *a rectangular product with four evenly rounded corners;*
- *a flat clear surface covering the front of the product;*
- *a display screen under the clear surface;*
- *under the clear surface, substantial neutral (black or white) borders above and below the display screen;*

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<sup>5</sup> The blocking effect of patents was first considered in Heller M. and Heisemberg's classic study (1998) on anti-commons. Chang (2002) considered the constraints set by patents on development opportunities. For a more recent assessment of the problem see also Jaffe and Lerner (2006).

- when the device is on, a matrix of colorful icons with evenly rounded corners within the display screen;

- when the device is switched on, a bottom dock of colorful square icons with evenly rounded corners set off from the other icons on the display, which does not change as other pages of the user interface are viewed. (United States District Court, 2011, pp. 18-19)

However, in spite of Apple's claims, rectangles are the only reasonable shapes for these devices, and corners must be rounded for safety reasons. The intellectual ownership of such elementary geometric shapes would block the entire development of the mobile communication devices industry.

While Apple tries to remove rounded rectangles from the public sphere, much of the technology generating the astronomic profit-making iPhone (from internet, semiconductors and microchips to GPS, SIRI and touch-screen technologies) comes from huge investments made by public agencies which get little or no return for their very risky investments (Mazzucato 2013, pp. 87-110).

The picture is even worse when we consider that some agents – the so-called *patent trolls*<sup>6</sup> – do not use their patents to protect their own technological advances but only to extract profits from companies that they can ‘hold up’ with their patents. While pure patent trolls may still be a minority phenomenon, *the growth industry of the new millennium* (Lemley 2008 p. 613) may be patent hold-up:

*Hundred of companies are engaging in efforts to capture not just the value of what they contributed to an invention, but also a disproportionate share of somebody else's product.* (Lemley 2008 pp. 613-4).

It will be argued in the next section that these multiple blockages, due to *intellectual monopoly capital*, must be included among the causes of the current ‘great depression’. 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.*

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<sup>6</sup> Strictly speaking, we can define patent trolls as entities that "license" only the right not be sued and are not engaged in any technological transfer. However, most firms carry out both activities and are characterized by different mixes of them. Since the 1980 Bayh-Dole act, universities are not only permitted but also encouraged to patent federally-funded inventions, and in the past three decades they have contributed to the massive surge of patenting. Universities have also made an unfortunate contribution to the growth of the hold-up industry. Indeed, since they are not directly interested in production and are engaged in more basic research, cross-licensing cannot help solve the hold-up problem, which in their case is particularly damaging because it concerns usually essential upstream knowledge (Lemley 2008 pp. 615-619).

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 the property of another* and *as a ruling power* setting legal limits on the development of workers' capabilities and skills. In this respect, what was in Marx' time the "future of capitalism" has gone well beyond Marx's most dramatic expectations.

### 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 with various devices, 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 demesne.<sup>7</sup> There are, however, some fundamental differences. In the case of land, according to the views of some commentators,<sup>8</sup> enclosures and private property may even have prevented the over-exploitation of a resource being depleted by overcrowding, and they may have

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<sup>7</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>8</sup> Ostrom (1990) shows that, in many cases, Hardin's (1968) tragedy of the commons did not in fact occur.

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 to 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 clusters 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 and with increases in global trade.<sup>9</sup> Countries which are prevented from specializing in certain fields must import goods or licenses from the holders of the legal rights on the relative knowledge. As a consequence, IPR tend to create new sorts of national comparative advantage.<sup>10</sup> Paradoxically a form of protection stronger than the strongest tariff forces new flows of trade. Thus, IPR *forced trade* ((Belloc Pagano 2012) joins the spontaneous causes favoring international trade considered by the classical theories of comparative advantage, as well as by the theory of intra-industry trade developed by Krugman (1980) by drawing on Dixit and Stiglitz (1977)<sup>11</sup>.

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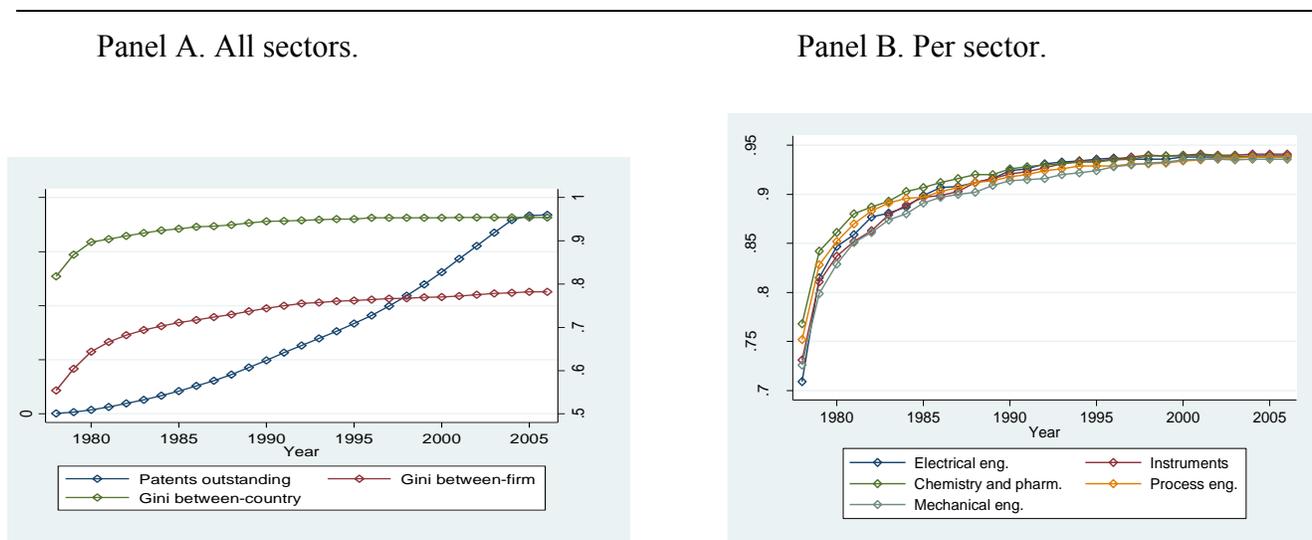
<sup>9</sup> One effect of a strong IPR regime is that companies are not afraid to decentralize production to low cost countries. This decentralization involves some form of subordinate development for these countries and wage pressure in the industrialized ones. However, developing countries can employ appropriate industrial policies to decrease their private knowledge dependency. For instance, since the 1980s China has been able to couple the advantages of being a low cost countries with appropriate industrial policies (Nolan 2001).

<sup>10</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).

<sup>11</sup> Under increasing returns to scale, there is a trade-off between product variety and the abatement of costs. Dixit and Stiglitz (1977) show that, under some conditions, market can approximate the optimal variety of products. Building on their findings, Krugman (1980) argues that, for the selfsame reasons, countries specialize in different products, and that gains from trade arise from the fact that the *opening* of markets allows for a greater variety of products. By contrast, Belloc and Pagano (2012) find that the monopolist *closing* of some markets stimulates international specialization and trade.

Besides effects on forced specialization and forced trade, 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 of new patenting opportunities. In the innovativeness of different firms (and even more of different countries) a polarization arises. A picture of this asymmetric dynamics emerges rather sharply from Figure 1 (panel A and B).

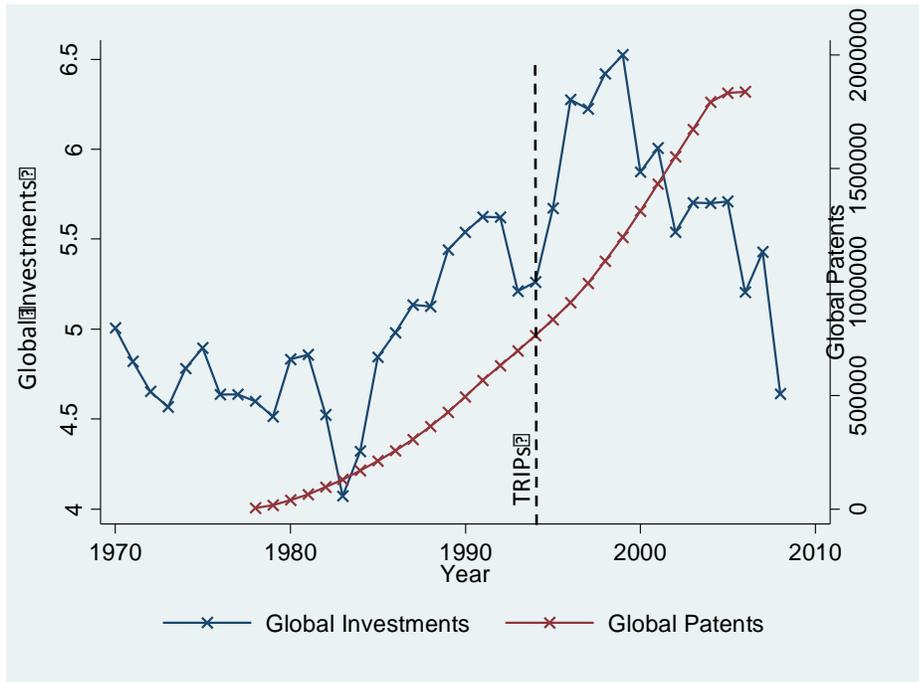
**Figure 1. World distribution of patents.**



Source: Belloc and Pagano (2012).

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 (2012).

While some countries and firms may gain from intellectual protectionism, the overall restriction of investment opportunities is likely to generate the dynamic process shown in Figure 2, 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, computers and other innovations – to whose development military and public research had substantially contributed (Mazzucato, 2013) – became cheaply

available, opening up many new technological possibilities for the entire world economy. However, this technological generosity 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 these 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, pure financial regulations other “exogenous” events have greatly 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.<sup>12</sup> 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).

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<sup>12</sup> Blanchard and Milesi-Ferretti (2009) show that global unbalances have been of a different nature in different periods. According to them, after 2000 and before the beginning of the 2005-8 housing bubble, foreign capital inflows were due to the fact that, in spite of a marked decline of industrial investments, US savings had declined even more than investments. In the same period the excess of savings outside the US was due to a dramatic fall in investments while average savings were more or less unchanged (Möec and Frey 2005, Pagano and Rossi 2009). In other words, there was no increase in the propensity to save but rather a decline in investments. What has to be explained, therefore, is not a *saving glut* but rather an *investment strike*.

Whilst better regulations could make future financial crisis less dramatic, what should be changed are the economic relations of modern *monopoly intellectual capitalism*. 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. Recently, eleven firms, including Sun Microsystems, Motorola, Hewlett-Packard, Verizon Communications, Cisco Systems, Google and Ericsson, 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 increasingly and unevenly squeezed by the new world regime of closed science and closed markets.

#### **4. Knowledge Privatization, Biased Technologies and Financialization.**

The property rights of *intellectual monopoly capitalism* have emerged as the dominant form of production relations under the *technology of the knowledge intensive economy*, and they are likely to

shape its immediate future. However, to use Marxian terminology, one could argue that there is an evident contradiction between the property rights of intellectual monopoly capitalism and its productive forces. 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 *disembodied* from human beings can be made available to additional members of society without depriving the current users of its availability. An idea is not like a piece of physical capital. Many people can use an idea simultaneously without crowding out its use. Indeed, the opposite is true: the use of ideas helps their improvement. Since the marginal cost of using additional *disembodied knowledge* is zero, these firms should not face the renting and borrowing agency problems that are usually difficult to solve for labor owned firms that have to hire great amounts of physical capital. Thus, a technology that makes intensive use of *embodied* and *disembodied* knowledge should favor an environment more favorable to labor-hiring-capital organizational forms than to traditional capitalist firms. It should at least make a very friendly environment for organizations with effective safeguards for investments in human capital.

In other words, there seems to be an evident paradox in the institutional tendencies of modern capitalism: the knowledge-intensive characteristics of its technologies should favor a democratic economy made up of small firms employing non-rival knowledge; by contrast, however, thanks to knowledge private ownership, big global firms, whose shares are traded on global financial markets, are increasingly predominant in the world economy.

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. Thus, not only can *disembodied knowledge* (i. e. the knowledge that can be separated from the intelligence and the skills of the workers) become part of a firm's private capital, but, when it does so, it necessarily becomes intellectual *monopoly* capital. Even if additional uses of a piece of *disembodied knowledge* do not decrease the total

amount of knowledge available to society, other firms have no liberty to use it.

As to *embodied knowledge* (*i. e.* the knowledge that cannot be separated from workers' capabilities), its fate is strictly related to that of *disembodied knowledge*: the skills of the workers are likely to be properly developed only when a secure legal access to property rights on knowledge is available. When *disembodied knowledge* becomes *intellectual monopoly capital*, the "capital-hiring-labor" solution is likely to outcompete the "labor-hiring-capital" solution. Or, in other words, when knowledge becomes a private commodity, standard capitalist firms increase their efficiency relatively to organizations where workers have stronger rights. 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 allow the exploitation of economies of scope arising from the complementarities with a greater number of other units of knowledge.

Firms' size matters in another crucial respect: the greater is the concentration of knowledge, the lower the unit cost of defending the exclusive ownership rights on each unit of knowledge which each other competitor could independently discover or imitate. The skills necessary to deal with courts and lawyers involve a high initial set-up cost. If legal fighting skills are costly, deterrence requires even more time and more resources to become effective: a tough reputation (to be endowed with the skills and the financial resources necessary to challenge competitors' IPR claims) entails an even higher set-up cost. Thus, the so-called knowledge economy produces an evident *paradox*: the non-rival nature of knowledge, which could in principle favor small (even workers-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.

Deprivation of knowledge ownership inhibits investments in human capital much more than the lack of physical capital does. 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 the owners of physical capital can outperform the have-nots<sup>13</sup>.

In the case of a machine, an individual who has learnt to work and possibly to innovate with skills that are partially specific to that 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. 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>14</sup>. The interaction between the accumulation of privatized knowledge and human skills has self-reinforcing properties: it generates vicious and virtuous circles of cumulative causation leading to asymmetric, and increasingly divergent, investment patterns in human capital.

The growing inequality in opportunities between firms rich in commodified knowledge and of those that lack them is accompanied by a growing asymmetry between the power of capital and labor in the economy taken as a whole, and by the increasing financialization of the economy. Even in firms where the workers' skills are important, the power of capital is greatly reinforced by the fact that it includes not only machines and buildings but also a large share of monopoly intellectual capital. The commodification of knowledge favors the financialization of the economy, characteristic of contemporary capitalism. The firm can be traded as a *thing* on financial markets because most of its value consists of tradable non-human assets. When the large majority of firms' assets coincide with the skills of their employees, which can only be temporally rented to the organization, few firms' resources can be securely owned and exchanged. By contrast, commodified knowledge, disembodied from the

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<sup>13</sup> This can be another factor contributing to the world-wide increase in inequality in the last decades, carefully analyzed by Piketty (2013).

<sup>14</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).

workers, constitutes a securely owned and tradable asset allowing the financialization of the economy.

In turn, the financialization of the economy induces each firm willing to raise cheap finance to concentrate knowledge assets in a few persons and in tradable intellectual property disembodied from workers' skills. Firms with a large amount of knowledge embodied in numerous workers and little disembodied capital raise equity capital at a cost higher than that of firms concentrating the same intellectual property in a few workers and disembodied intellectual assets.<sup>15</sup> Hence the financialization of the economy and the commodification of knowledge are two complementary processes, which reinforce each other.

While restricting the number of participants in product markets, the privatization of knowledge favors the burgeoning of trades of all kinds in financial markets. Whilst investments in useful productive knowledge suffer from institutional restrictions, investments in knowledge about financial markets absorb an increasing amount of human intellectual energy. The reason why knowledge about financial markets, as well as other fields characterized by human interactions, is relatively unproductive has been convincingly shown by George Soros (1987, 2010, 2013), who, building on the Keynesian beauty contest view of the workings of financial markets, has attributed the relative unproductiveness of such knowledge to its self-referential nature. In the understanding of human interactions, theories have not only a cognitive but also a manipulative function. While Newton's apple falls without caring about our theories, real-life human interactions are not independent of our (mis-)conceptions. In some very relevant cases, human misconceptions can alter social and economic reality, reinforcing the misconceptions themselves<sup>16</sup>.

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<sup>15</sup> A similar disadvantage holds for borrowing capital. Knowledge embodied in human beings is an insecure collateral for debt. Thus, also loans prove to be very expensive for firms that do not reify much knowledge in non-human assets.

<sup>16</sup> According to Soros (2013), the reflexive feature of human behavior involves that an independent reality cannot be used to test and to falsify theories (as it is possible to do in the case of natural sciences). However, the complexity of human behavior can be seen as an extreme case in a spectrum of various degrees of reflexivity characterizing different phenomena (Beinhocker, 2013). According to Beinhocker, reflexive systems have a degree of complexity higher than complex adaptive systems (on complex adaptive systems see Markose 2005) and are, indeed, characterized by the highest complexity. Farmer (2013) argues that, besides the ignorance of reflexive behavior, standard economics is impaired by its Cartesian approach. According to Farmer, economics stood on the "Cartesian side", accepting the existence of universal laws deduced from unproven first principles. By contrast, according to Farmer, other sciences (for example physics, with Galileo and Newton) abandoned this approach very early.

Financial markets provide an interesting example of the role of misconceptions. These are particularly evident in the formation of price bubbles, which burst only when the distance from the fundamentals of the economy becomes evident to the majority of the players.

Misconceptions in financial markets can, for a long time, defy fundamentals and, for some time, modify them in such a way that they become self-reinforcing. These misconceptions have become more likely since the increased financialization due to the massive privatization of intellectual property. Unlike machines, intellectual assets have no values defined in competitive markets, and they are more subject to the vagaries of speculative expectations. The more people believe that an intellectual asset is valuable, the more its value increases, attracting the demand of other people in a self-reinforcing circle. This also applies to other similar assets like houses and machines – except for one important characteristic: that a thick market for these assets gives benchmarks for their values. The commodification of knowledge does not only increase the financialization of capitalism, shifting its employment to less productive activities; it also increases its financial instability.

A similar self-reinforcing misconception is likely to characterize the merits of intellectual property itself. The fact that the incentive effects of intellectual property come first, and the blocking effects later, reinforces the idea that intellectual monopoly yields the same incentive effects as private property. The policy misconception is also reinforced by the fact that firms with larger shares of these assets have higher profits and better valuations on the stock market, so that agents disregard the corresponding blocking effects. While the intellectual property bubble may increase its size, the (at least partially independent) fundamentals may find it difficult to break the veil of this self-reinforcing misconception. Firms rich in intellectual endowments will continue to do (possibly increasingly) better than those lacking this monopoly power and most people will continue to mistake this fact as proof of the benefits of knowledge privatization for the entire economy. The intellectual property bubble may generate and feed different bubbles on the economic surface, such as increasing investment strikes and consequent saving gluts. It may easily become a hidden massive “under-ground bubble” contributing to financial instability. Also in nature, under-ground bubbles can often be only indirectly guessed by the existence of minor surface bubbles. Only some times they become the evident cause of devastating volcano eruptions.

Paradoxically, in the knowledge intensive economy, a non-rival good – in regard to which it is so costly and wasteful to define private property rights – becomes an important driver of capital

concentration, financialization, and employers' power. *Closed science entails closed markets*. The selection of the organizational form is biased in favor not only of the capital-hiring-labor solution but also of big firms holding substantial monopoly power. The advent of the knowledge intensive economy does not involve a substantial shift to an economy of small self-managed firms using non-rival knowledge inputs. This shift comes about only if a great deal of knowledge is produced using the institutions of *open science, and not in the closed science world of intellectual monopoly capital*. If a great deal of knowledge is privatized, the knowledge-intensive economy may prove even more unfriendly than the physical capital-intensive economy to a widespread extension of organizational rights. *Intellectual monopoly capitalism* suffers from an unhealthy alliance between *closed science* and *closed markets, and it favors an unhealthy financialization and monopolization of the economy*. Its future is increasingly shaped by the contradiction between the public good aspects of knowledge and its private appropriation.

In the words of Kenneth Arrow (1996, p. 651) ‘Information overlaps from one firm to another, yet the firm has so far seemed sharply defined in terms of legal ownership. I would forecast an increasing tension between legal relations and fundamental economic determinants. Information is the basis of production, production is carried on in discrete legal entities, and yet *information is a fugitive resource, with limited property rights*’. This tension, so well-described by one of the most important mainstream economists, seems a contradiction between productive forces and relations of production, typical of the Marxist tradition. It suggests that the world of closed science and closed markets of *intellectual monopoly capitalism* may one day be replaced by different production organizations.

## **5. An eclectic conclusion.**

The foregoing analysis has a Marxian flavor: the production relations of intellectual monopoly capitalism fetter the productive forces of the knowledge economy. 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 viewed as 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 shift 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 also be seen as a policy complementary to the promotion of open competition among different firms. Only when basic knowledge and technologies are not monopolized by particular firms, open markets and genuine competition are possible. Private knowledge clashes with open competitive markets, and public intervention for public science can be seen as a key ingredient of a pro-market liberal policy.<sup>17</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 orthodox 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 economy is close to the zero lower bound rate on the nominal rate of interest, 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.

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, during World War II, 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

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<sup>17</sup> For a liberal pro-competition criticism of intellectual monopoly see Boldrin and Levine (2008).

national resources from almost every form of saving.” (Keynes 1940b, p. 185)<sup>18</sup>. By contrast, the Cold War offered evident examples of complementary military investments which had a major expansionary impact on the private sector (Mazzucato 2013). For instance, 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 military information net). 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, in order to generate multipliers greater than one, we do not need voodoo rituals but rather the human blessing of appropriate public investments.

One may object that most Nation States are running budget deficits that they are trying to cut and are unlikely to provide the funding for these types of investments. A “classic” answer to this objection is that Keynesian policies, appropriately tailored for the knowledge economy, can generate sufficient income to pay for the related expenses. Moreover, the poverty of the Nation States is also due to the fact that private companies get all the profits indirectly generated by risky public research and public infrastructure investments. The American State would be in a much better financial shape if it had a share of the profits generated by products, like the iPhone, corresponding to the risky public

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<sup>18</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.

investments embodied in these devices (Mazzucato 2013). A sharing of these profits with the State could contribute to the funding of new risky investment in basic research, correcting what is in the long run a self-defeating strategy also for private business. Joint ventures between Nation States and private enterprises can offer a partial solution to this problem<sup>19</sup>. However, these types of arrangements are likely to transform intellectual property rights in some sorts of national protective tariffs. National sharing of IPR could determine severe trade unbalances among different States and could even generate trade-wars. Moreover, this solution would only limit the under-investment problem. Citizens of IPR-deprived nations would still be discouraged to make investments requiring the related proprietary knowledge.

The present crisis requires that more basic knowledge is generated in the global public domain. Lacking World Government, this requires each Nation State to invest in public knowledge. However there is an evident free-rider problem. For each Nation State, it is convenient that other Nations sustain the costs of these investments in public knowledge. The widespread underfunding of Universities and of other public research institutions is an evident expression of these free riding policies, involving a global under-investments in most important global common produced by humankind.

To overcome this global underinvestment in the production of new public knowledge, some international institutions must change. The global enforcement of IPRs, introduced with the institution of the WTO, has been coupled with the national fragmentation of public investments and has induced each nation to free ride on the production of new public knowledge. Ironically, these policies are often defended by (mis)using the holy name of unfettered competitive markets. By contrast, free riding on the production of public knowledge should be seen as a damaging form of unfair competition where one reaps the benefits of others' costly investments. The WTO should be reformed in such a way that this unfair competition is tamed. The charter of the WTO should include rules stating that a fair participation to international trade requires a GNP fraction (increasing more than proportionally with national wealth) of each member state to be invested in open science and to be made available to all countries as a global common.

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<sup>19</sup> See Mazzucato (2013). A similar policy is implemented by the Fraunhofer-Gesellschaft in Germany. Besides a “rapid implementation of technological innovation through contract research”, Fraunhofer is also engaged “in pre-competitive research in selected promising fields of technology, backed by long-term funding.” (Fraunhofer 2010, p. 35). In the US the importance of military expenditure makes this type of institutions relatively less important than in Europe. In the European Union the active industrial policy of Germany and the absence of similar policies by other countries, such as Italy (Vasta 2010 ), have contributed to generate very serious trade unbalances. However, also the American administration is now considering the funding similar institutions (Cormack 2012).

We need some courageous policies of asset redistribution. Inverting a trend (that was supposed to last for ever since the last World War) of decreasing polarization in the distribution of assets (Piketty T. 2013), the inequality of contemporary capitalism is reaching levels that may threaten the social conditions required for the existence of democratic societies. Even for the case of tangible assets, some policies of asset redistribution can decrease agency costs and enhance the efficiency of the economy (Bowles, Gintis, Olin Wright 1999). Some redistribution and collective sharing of intellectual assets would not only involve these standard advantages of efficiency-enhancing redistributions. It could also generate additional benefits due to the non-rival nature of knowledge. Many people could simultaneously enjoy the use of an asset moved from the private to the public sphere of the economy. What is redistributed as public knowledge can be a multiple of the amount taken away from the present private owners.

*Intellectual monopoly capitalism* is inhibiting the democratization of the workplace, fettering the development of human capabilities, and causing a major economic depression<sup>20</sup>. The exit from the crisis requires a “Marxian” policy of asset redistribution, 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<sup>21</sup> is often seen as tasteless *minestrone*<sup>22</sup>, the term comes from Greek "ἐκλεκτικός" (*eklektikos*), literally "choosing the best". Sometimes, the *minestrone* can taste better than its ingredients and become a pleasant new entry of our menu.

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<sup>20</sup> An alternative view of the great depression stems from the work of Carlota Perez (2003) who argues that technological revolutions are followed by financial crashes and, later by golden ages. In the perspective offered in this article, the present crisis does not only stand as a repetition of the recurrent dynamics of capitalism. It represents also a novel historical situation due to the massive privatization of knowledge. The dynamics of capitalism is also characterized by a commoditization process that may alter its nature. New fictitious commodities (Polanyi 2001) have been introduced during its complex history, biasing its technologies (Grandori 2013, Pagano 2013b). Also for this reason, each crisis is different from the other. The massive commoditization of knowledge, which characterizes contemporary capitalism, involves that the current depression should be seen in a long-run historical perspective. Since the dawn of humankind, knowledge has been the most important asset of our species (Pagano 2013a) and its massive privatization is bound to make a huge difference.

<sup>21</sup> On eclecticism (referred to Goodwin's creative eclecticism) see Harcourt (1985).

<sup>22</sup> And indeed this is what happens when one mixes the wrong ingredients in the wrong proportions! For instance, liberal views defending intellectual property as standard private property, Marxian approaches ignoring the features of modern intellectual capitalism and Keynesian policy proposals overlooking the novel infrastructures of modern economies can only be mixed together in sterile debates and produce inappropriate remedies for the global depression.

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