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**Financial markets and the real economy:
finance and intellectual property**

1. Introduction.

Complete law and complete markets require that the rights and the duties of the individuals can be defined ex-ante. Finance is about future projects to be carried out under unknown future contingencies. In some cases it is possible to specify satisfactorily ex-ante only the rights of investors or the duties of the individuals managing the investments. In this case it is necessary to evaluate ex-post whether these ex-ante rights or duties have been matched by the corresponding duties or by the corresponding rights. Traditional banking can be considered as an example of the first case. Creditors have well-defined ex-ante rights (guaranteed by some collateral) to which the ex-post duties of the borrowers should be adjusted. Equity finance belongs to the second typology. Corporate managers have well-defined duties, which involve some ex-post rights (dividends etc.) of shareholders. Our paper focuses on the relative advantages of equity and debit financing. We argue that the degree of specificity of the invested real assets plays an important role in the choice between these arrangements and that it co-evolves with the financial structure. The recent growth of intellectual property has increased the degree of asset specificity and it is also correlated to an increased dimension of the financial sector. Unlike machines, intellectual property is made unique by intellectual monopoly and involves risky specific investments on underlying thin markets. Regulations should not only deal with the nature of financial claims on the assets but also with the legal monopolies that create these assets.

2. Incomplete Law and the Nature of financial Transactions

According to Fuller, Law is the activity to subject to rules human behaviour. Since humans are also engaged in other activities (such as producing food) there are trade-off between Law and other activities. These trade-offs make law incomplete. Completing the

Law is sometimes unfeasible and it is often a costly enterprise. Only within certain limits it is worthwhile to complete the law. Moreover, some other trade-offs are internal to law. For instance, if rules have to guide human behaviour, they cannot change too often. At the same time they have to adapt to a changing reality. There is a trade-off between flexibility and rigidity of rules.

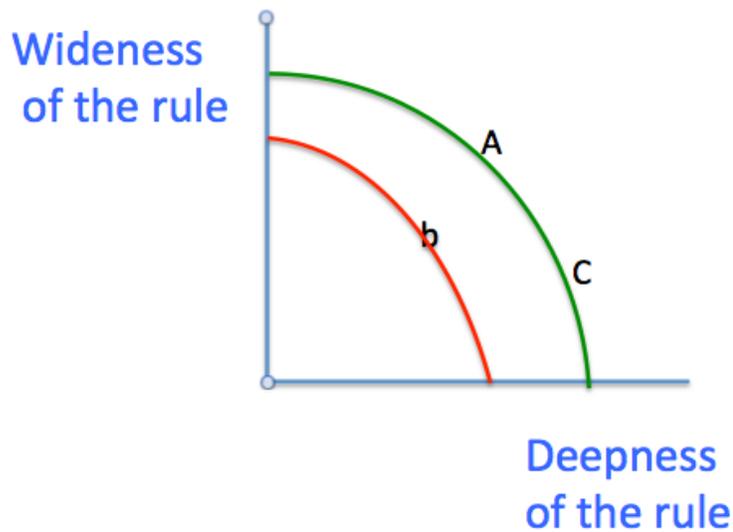
Another important trade-off considered by Fuller (1969) is that between the comprehensibility and the technical precision of a rule. Even more important are the trade-off between the specificity (deepness) and generality (wideness) of rules considered by Pistor and Xu (2003) which we represent in figures 1 and 2. Ex-ante specific rules prescribing in detail what to do in particular situations favour effective enforcement in particular cases but they fail to cover a large number of cases. In this case incompleteness may be due to an insufficient generality of the rule involving *wideness incompleteness*. Ex-ante general rules, covering a large range of possible situations, suffer from the opposite problem. Incompleteness may stem from their lack of precision and their superficial nature may involve a form of *deepness incompleteness*.

Figure 1: Forms of Incompleteness

	Detailed ex-post enforcement	Wide ex-post enforcement	Forms of Incompleteness
Ex-ante specific rules	+	0	Wideness Incompleteness
Ex-ante general rules	0	+	Deepness Incompleteness

Hence we must face a legal trade-off between *Wideness Incompleteness* and *Deepness Incompleteness*. In some cases, rules can be revised without sacrificing one objective for the other. If we can move from b to point A of figure 2 we can improve both the wideness and the deepness of legal rules. By contrast, moving from A to C involves improved deepness at the expenses of reduced wideness of the rules. Until wideness and deepness of rules can be improved at no opportunity cost, no choice of rules is required but, if we reach a point where a trade-off exists and we must balance the costs of one form of legal incompleteness with the other and face the problem finding the less damaging forms of legal incompleteness.

Figure 2. The legal incompleteness trade-off



Observe that in the Kelsen's (1992) main stream legal approach law is treated as a consistent set of rules and no incompleteness is admitted in the rule of law. In terms of the Hohfeldian tradition (Hohfeld, 1919) this involves a consistency among the jural positions of all the persons acting in the same legal system. In the framework of complete law, rules would specify both the extension of the rights (i. e. their boundary with the exposures) and the extension of duties of j (i. e. their boundary with the liberty of j). Thus, the relations between any two persons i and j could be described by Hohfeld's classical relations of Fig 3.

Fig. 3 Jural positions

Right of i	Duty of j
Exposure of i	Liberty of j

By contrast, in a situation of incomplete law only the rights or only the duties (or no one of them!) would be completely defined ex-ante. Some ex-post adjustment is necessary. When some legal positions can be better defined than the others, an obvious strategy of law-making is to define the positions that can be defined ex-ante, leaving to ex-post decisions the definition of the other positions on the basis of additional future information. In this respect, we can define different legal arrangements arising from some stylized forms of legal uncertainty. Complete law with fully defined rights and duties is feasible when it is possible to define both with certainty the rights and the corresponding duties (case 1). We have two intermediate situations. In one, it is possible to spell out precisely some rights but not the corresponding duties (case 2). In the other, it is possible to spell out the duties but not the corresponding rights (case 3). Because of the first type of legal uncertainty we may therefore have situations when ex-ante rights or duties are defined and some ex-post governance of duties or rights is necessary. In this case, while the governance cannot be entirely ruled by the initial agreements, it is however guided by the legal positions that it was possible to define ex-ante. Some legal interpretation and disagreement on the ex-post nature of the rights (duties) matching the ex-ante duties (rights) is likely to arise and the initial constraints may in some cases include a certain number of possible outcomes. Such guidance is obviously absent in case for case 4 where legal uncertainty involves both rights and duties and ex-post definition of rights and duties cannot be guided by some initial definitions of some legal positions.

Figure 4

Incompleteness and legal uncertainty

	Certain Duties	Uncertain Duties
Certain rights	<p>1) Ex-ante defined rights Ex-ante defined duties</p>	<p>2) Ex-ante defined rights Ex-post defined duties</p>
Uncertain rights	<p>3) Ex-ante defined duties Ex-post defined rights</p>	<p>4) Ex-post defined Rights Ex-post defined duties</p>

The possibility of defining ex-ante rights and/or duties characterizes different systems of legal orderings considered in Figure 5. The ex-ante definition of rights and duties allows a complete legislation under which it is possible to write complete contracts. In case 1) contract law can here be a pervasive system of legal ordering and the Arrow-Debreu construction of an economy with complete contracts can even sound as a reasonable description of an economic system. When the rights can be clearly defined ex-ante but the corresponding duties are uncertain the initial contracts fail to offer a satisfactory legal ordering and contract law needs to be integrated with liability law and bankruptcy law. This is case 2). Judicial arbitration is required to define the ex-post duties that are consistent with the ex-ante rights. This is the case of accidents, analysed by Guido Calabresi and it is also the case of individuals unable to fulfil the duties that were agreed under the initial contract. By contrast, negligence law, criminal law, duties of care and regulations fall under case 3) where duties are precisely defined ex-ante and rights adjusted to the existing duties only ex-post. Since the goal of the system is still the satisfaction of the rights, regulatory activity has to verify continuously how in practice the ex-ante duties satisfy the targeted ex-post rights. For this reason regulatory activity bundles together rule making and enforcement powers. Case (4) is a case in which both ex-ante duties and ex-ante rights cannot be defined. In this case pervasive ex-ante legal uncertainty involve that there is wide discretionary power in the ex-post rules. In this

case the only thing that can be done ex-ante is to agree on legitimate authority (private or public), which has the power to establish and balance the ex-post rights and duties.

Figure 5

Legal Orderings		
	Ex-ante defined duties	Ex-post defined duties
Ex-ante defined rights	(1) Complete Legislation Complete Contracts	(2) Liability Law and judicial arbitration Social and Welfare policy Bankruptcy law
Ex-post defined rights	(3) Regulation, Rules of Negligence Rules of duty and care	(4) New Law Making Power Corporate and public executive powers

It is very difficult to find real-life governance systems that fall under one of these pure four cases. However, we can see how traditional banking activity and equity finance are both characterized by legal uncertainty and they differ in the type of legal positions that can be defined ex-ante.

Traditional banking falls mainly under (2). Creditors have well defined ex-ante rights to which the ex-post duties of the borrowers are adjusted. In some particular cases, such as default, some ex-post governance of the relation is necessary. Bankruptcy rules differ in different countries and involve some redefinitions of the duties of the borrowers to which the ex-ante rights of the creditors have to be re-adjusted.

Shareholding finance falls mainly under (3). Corporate managers have well defined ex-ante duties, which involve ex-post rights (dividends and values of the shares) of shareholders. Their duty of diligence and care involves a certain vagueness of the ex-post actions that are best fitting the rights. Because of the discretionary power of managers shareholders have to monitor that managers are fulfilling their ex-post duties.

In a regime of incomplete law, equity and debt finance turn out to be different for different types of investments that we will consider in the following section.

3. Financial Regulations and asset specificity.

The Modigliani-Miller (1958) equivalence of equity and debt financing relies on the idea it is the same to contract a loan and buy a firm or to buy directly a firm that has contracted a loan at the same conditions. Their argument ignores the fact that agents with different reputations and collaterals face different costs when they stipulate debts. Moreover, it ignores bankruptcy costs.

However, we will argue that the main problem with the Modigliani-Miller theorem is that it ignores the relation between technological choice and governance structure. The technical assets, which are the best under one governance system, are not necessarily the ones that are the best under a different system. If we are in a world without bankruptcy and where managers' duties can be completely be specified, then the two systems turn out to be equivalent. However, in world with legal uncertainty the two systems are best with different technical assets and tend, in turn, to bias the choice of the technical assets. In particular the two systems tend to favour the use of assets characterized by a different degrees of specificity¹.

Under traditional banking (2) creditors have well defined ex-ante rights to which the ex-post duties of the borrowers are adjusted. Their rights have priority in case of bankruptcy. Their interests are protected by projects that involve the development of low specificity assets that can be easily redeployed in case of bankruptcy. By contrast they are not interested in high returns of risky projects involving high asset specificity.

Under shareholding financing (3) shareholders have ex-post rights (dividends etc) corresponding to managers' ex-ante duties. Shareholders are the last ones to be compensated in case of bankruptcy and gain little from low specific assets in case of liquidation. By contrast they share the gains of risky projects characterized by high asset specificity².

Higher degrees of asset specificity increase the value of the company for shareholders and decrease its value for creditors. One may argue that for each degree of asset specificity there is an optimal debt-equity mix maximizing the value of the company.

Debt is a cheap system of governance where the financier needs only to monitor the liquidity (non-specificity) of its assets. However when the sacrifice of valuable high-specificity projects becomes greater than a certain threshold some equity finance increases the value of the company.

An optimal debt-equity ratio should correspond to each degree of asset-specificity. Low levels of specificity favour low equity/debt ratios and high levels of specificity favour

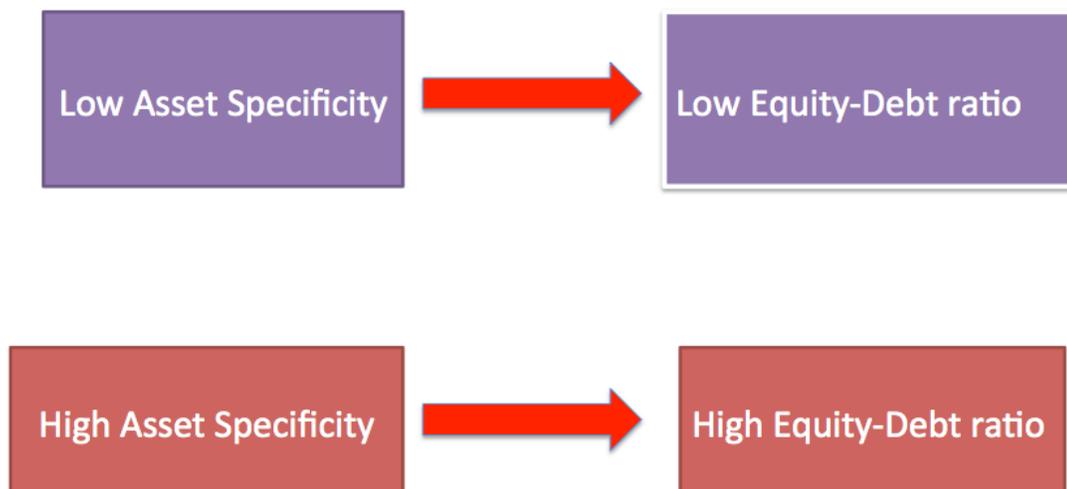
¹ The degree of specificity is the share of its value or productivity of the resource, lost when the resource is moved to its next best use. Williamson (1985) attracted the attention of economists on the importance of specificity to understand the nature of the different governance systems.

² We treat here debt and equity as two forms of financing and assume that each group of financiers when prevalent can exercise some pressure on the management of the organization. We do not consider the important issue concerning the shareholders as "owners" of the corporation – a claim that seems increasingly challenged by the recent legislation (Donald, Kay 2016).

high equity/debt ratios³. Figure (6) represents this influence of technical assets on the governance system.

Figure 6

From specificity to finance



However, specificity characteristics cannot be assumed to be independent of the existing governance mechanism.

If creditors have control on the governance of the firm they will favour low specificity investment projects. Their ex-ante rights of recovering their capital are particularly valuable if managers have (over-)strong duties to adopt low specificity projects. Low specificity investments are easily recoverable in case of liquidation of the assets of the

³ The account of this direction of causation (from degree of specificity to governance structure) is based on Williamson (1988).

firm.

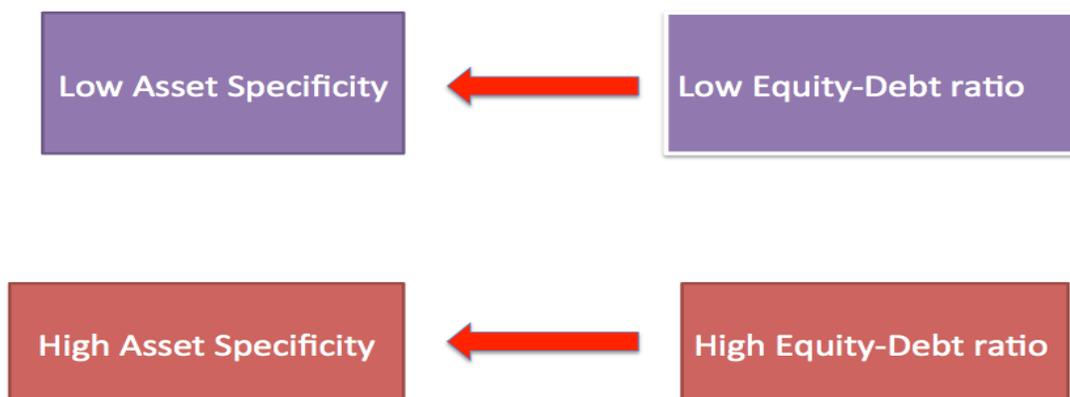
By contrast, if shareholders have control the governance of the firm they will favour high specificity investments. Their ex-post rights to earn profits will be translated in over-strong duties of high specificity projects that increase the value of the shares.

In other words the rights of creditors and shareholders involve that their earnings are protected and truncated in different ways. Creditors have a protected ex-post priority the right to receive back their initial funding and the agreed interests in case of bankruptcy but they are truncated in the appropriation of the profits of the enterprise. Shareholders have no protection (within the limits of limited liability) and priority in case bankruptcy but they are not truncated in the ex-post earnings that they can get in case of successful investment projects. Because of their different interests shareholders and creditors tend to favour different asset structures⁴. As it is summarized in Figure 7, a low equity-debt ratio favours low asset-specificity whereas a high equity-debt ratio involves high asset-specificity.

Figure 7

⁴ The account of this direction of causation (from financial structure to degree of specificity is based on Nicita and Pagano (2016).

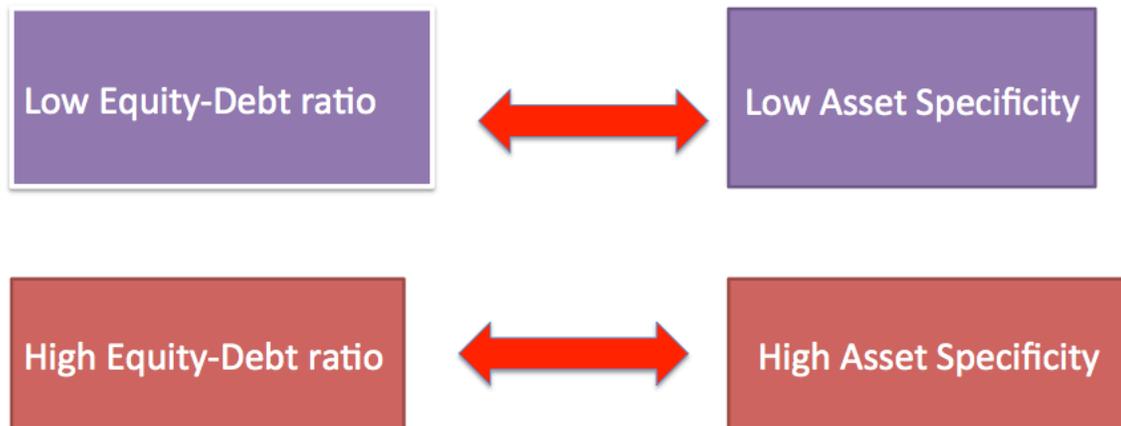
From finance to specificity



Thus, in Figures 6 and 7 causation runs in opposite directions: in Figure 7 it goes from the financial form of governance to the degree of asset-specificity whereas in Figure 6 the other going in the opposite direction. We join the two directions of causation in figure 8. In figure 8, these two directions generate multiple financial equilibria characterized by different finance-technology complementarities (Nicita and Pagano 2016). We have therefore self-reinforcing processes such that a certain form of assets may reinforce its nature by favouring the corresponding form of financial governance and a certain form of financial governance may reinforce its characteristics by favouring the related assets.

Figure 8

Finance-Technology Complementarities and Multiple Financial Equilibria



Because of the self-reinforcing nature of each system of governance, one may expect a certain polarization of the different organizations.

One may argue that appropriate regulations may try to avoid extreme polarizations. However, they may also produce useless standardized hybrids, unable to cover the different nature of the assets characterizing the firms to be financed.

Moreover some regulations may have unintended effects. For instance, by making managers duties more responsive to shareholder ex-post rights, regulations may push firms towards an excessively high level of asset-specificity and damage creditors' interests. Or, in other cases, by making managers more responsive to ex-ante creditors rights on the collateral, regulations may push towards excessively low levels of asset-specificity and damage shareholders interests.

Other regulations problems have to do with the complex nature of asset-specificity.

The degree of specificity of an asset is the share of its value that is lost when it is moved from its current use to the next best employments. Thus, the specificity of an asset is not an intrinsic characteristic of the asset. Its degree of specificity may increase because some alternative employments have vanished or may increase because new opportunities have been open.

In comparison to traditional societies modern societies have decreased the degree of specificity of many assets. However, in many cases, the employment of specific assets is still necessary to increase productivity and for many innovative activities. Unfortunately this does not seem to be the main cause of the recent increase in the intensity of specific assets. As we will see in the next section this increase has rather much to do with the increasing monopolization of modern capitalism and the related privatization of the knowledge commons.

4. Intellectual monopoly and the enclosures of knowledge commons.

According to Schumpeter, capitalism is characterized by a process of "industrial mutation" which "incessantly revolutionises the economic structure *from within*, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism. It is what capitalism consists of and what every capitalist concern has got to live in" (Schumpeter 1952 p. 83). In spite of Schumpeter's influence on the economic profession, his analysis of capitalism may be rather out-dated. Schumpeter almost ignored the role of intellectual property (even the word "intellectual property" was not used when he was writing). He did not see the protection that legal intellectual monopoly could offer against his process of creative destruction. His analysis belongs to a period in which the dramatic reinforcement of what came to be known as intellectual property had not yet taken place. Moreover, his emphasis on entrepreneurial innovation ignores that the appropriation of innovations and of working knowledge has always been a source of fierce conflicts also within the capitalist firm.

In a world of complete law and of complete contracts, the problem of appropriation of the fruits of working knowledge and of other productive factors would not arise. However, in a situation of incomplete law and contracts the division of the production surplus is highly uncertain. Some institutional solutions are available for avoiding opportunistic behaviour for non-human capital but they are not available to reward working knowledge and, in general, human effort.

If machines are specific to each other, different owners can decide to own them jointly and have shares in the same entity. In this way, owners may sell their shares but not single machine whose withdrawal from production might have a dreadful effect on the productivity of the other machines. Moreover, if additional machines are required for production, one can buy them using machines as a collateral to guarantee the lenders. No analogous solution exists for the skills and the working knowledge embodied in the workers. One worker cannot own parts of other workers and, in general, individuals cannot own shares of other individuals. Moreover, absent slavery for debt, individuals make an unreliable collateral.

The problem is made even more complex by the non-rival nature of knowledge (Pagano 2014). The same working knowledge can be used in many other firms even if they have contributed very little to its development. Specificity is not an intrinsic characteristic of resources. If new opportunities open what is now specific working knowledge may become in the future general-purpose knowledge. Vice-versa what is general working knowledge may become specific if new opportunities close.

The conflicts related to the appropriation of the working knowledge were treated in different ways by the legal system in different periods. Fisk (2001) shows how the

capitalist system evolved from regimes of strong workers rights and weak Corporate Intellectual Property to regimes of strong Corporate Intellectual Property and weak workers rights. According to Fisk (2001), three periods marked the transition of American and British Common Law from the emphasis on workers liberty to use their knowledge in all employments to the emphasis on the corporate ownership of intellectual property rights, implying also the enforcement of trade secrets and of restrictive covenants.

From 1800 1860 courts stated repeatedly that skilled workers had no fiduciary responsibilities. They could not be restricted in their liberties to change employment and use somewhere else the working knowledge acquired in preceding employments. Trade secrets were considered to be a limitation of competition and of the fundamental liberties of the workers. Post-employment covenants were usually considered to be illegal or at least unenforceable.

From 1860 to 1890, Courts started to regard Trade Secrets as a possible obligation of Employment, which should however be explicitly included in the initial contract.

The period 1860-1920 witnessed the diffusion of a more radical view considering the respect of trade secrets as an implicit condition of employment. The breach of Trade Secrets started to be seen as a misappropriation of property, automatically forbidden by the employment contract.

“In enforcing contracts first, only if they were express, and later by recognizing such contracts as implied-to maintain secrecy of the employer's methods, courts created a new species of "intellectual" property at the expense of older notions of artisanal independence. This was undoubtedly a case of "creative destruction" of one form of economic privilege to create another - the corporate intellectual property.” (Fisk, 2001 p. 445).

Artisanal independence was also limited and often destroyed for the majority of the workers by the scientific management movement of Frederick Taylor. According to Taylor, artisanal skills had another major drawback for the employers: 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 (1974) 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 and (3) use of this monopoly over knowledge to control each step of the labor process and its mode of execution. These principles had not only the effect of controlling workers' effort. It monopolized working knowledge in few individuals and together with trade secrets law contributed to the protection of the private property of the knowledge of the firm.

Even if trade secrets could be seen as a form corporate intellectual property, they lacked a key-factor distinguishing property from implicit or explicit contracts among the involved parties: the possibility of enforcing the rights “*erga omnes*” and not only the contracting parties. Property requires the involvement a third agent, such as a State, which guarantees the rights against other parties, which are not involved in the contract. This universality of intellectual property makes it tradable and allows its inclusion in the capital of the enterprise. The full-blown institution of intellectual property changes the role and the rights of the parties not involved in the contract⁵. With trade secrets obligations or with restrictive covenants somebody who discovers independently a technology used by others has the right to use it. By contrast, if some persons have acquired the intellectual property of the technology, even persons who have re-discovered independently the technology are not allowed to use it without their permission.

As Radder (2017 pp. 446-7) points out a product patent is a patent on the product as such. “That is to say, it is valid for *any* known or unknown process through which the product has been or might be produced. Thus, with the help of the questionable distinction between the invention itself and the patent claims allegedly based on it, the protection acquired through a product patent goes far beyond what has been made available through the actual invention.” Thus, a product patent effectively amounts to appropriating a concept because the patent claims made through a product patent are, effectively, conceptual or theoretical claims (Radder, 2004). According to Radder (2017) this kind of privatization appropriates full, non-exhaustible potential of knowledge on the basis of a limited scientific achievement and it prevents the (wider and possibly improved) realization of this potential by other researchers (including the present research workers if they leave the firm where they have contributed to the development of the product).

In other words, intellectual property rights are a typical product of incomplete law. They specify the *ex-ante* rights of the holders of intellectual property rights and leave to an *ex-post* adjustment the unknown duties of the other individuals.

If firms are entitled to own the intellectual property developed by the workers and can sell or licence it to third parties, this entitlement tilts definitively the balance against employee’s independence and in favour of corporate intellectual property.

In 1918, Supreme Court Judge Brandeis could confidently claim that “[t]he general rule of law is, that the noblest of human productions—knowledge, truths ascertained, conceptions, and ideas—become, after voluntary communication to others, free as the air to common use.” (Boyle 2003, pp. 38-39)

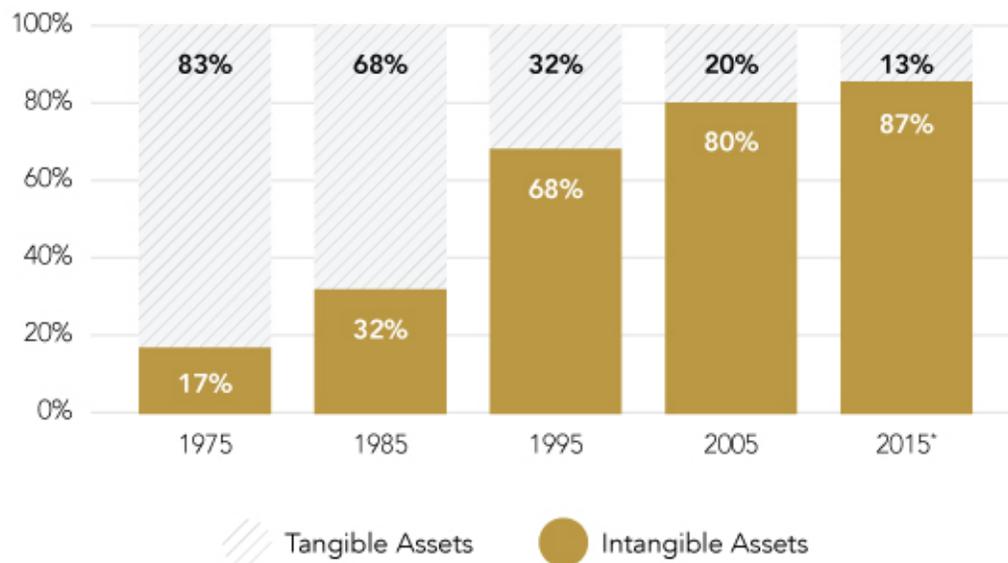
However, since Brandeis’ time the commons of facts and ideas have been enclosed. Patents are increasingly stretched out to cover “ideas” which twenty years ago all scholars would have agreed were un-patentable. Most troubling of all are the attempts to introduce intellectual property rights over mere compilations of facts. Once trade-marks, industrial designs, patents and all sort other intangibles have become property of the corporation much working knowledge becomes specific to the corporation for legal reasons. The *ex-ante* rights on intellectual property of the corporation impose a tight constraint on its employees’ liberties to use their working knowledge in other firms. With the ownership of these intangibles the firm may acquire a monopoly of some

⁵ This point is a particular application of the general framework developed by Pistor (2017).

productive activities and on their future improvements. Thus, it is not too surprising that intangibles have become the lion's share of the assets of big corporations. As Figure 9 shows, in the case of the top 500 corporations, their share has grown from 17 per cent in 1975 to 87 per cent in 2015.

Figure 9

COMPONENTS *of* S&P 500 MARKET VALUE



SOURCE: OCEAN TOMO, LLC

A dramatic mutation of capitalism has occurred. Big corporations have moved from being rich in machines and other physical assets to being rich in intellectual monopoly and other intangible assets, which are a distinctive characteristic of a new form of intellectual monopoly capitalism.

The 1980 Bayth Doyle Act and the 1994 TRIPs agreement (an annex to the institution of the WTO) marked two crucial steps of this dramatic mutation of capitalism. The first allowed the acquisition of private intellectual property rights for innovations developed with the support of public funding. The second introduced a much stronger legislation and enforcement for intellectual property at global level (Pagano 2014).

In this way, corporations have been able to exploit the huge economies of scale and of scope that arise when knowledge becomes a private input. They have also been able to

decentralize production to firms in low labour cost countries without the fear that their competitors could use their know-hows.

According to Boyle (2003) a second enclosure movement has taken place. The first industrial revolution capitalism was preceded by the enclosure of lands. Modern intellectual monopoly capitalism has been made possible by a second great enclosure, fencing ideas in privately owned fields. Even if there is some evidence against this thesis (Ostrom 1990), some theories claimed that land enclosures may have even prevented its over-exploitation by the commons crowding the land with an excessive number of animals. No similar claim can be made for the case of intellectual enclosures. Knowledge is a non-rival good and its fields are not subject to overcrowding. By contrast, the privatization of the field of knowledge sets limits to its access, which decrease productivity and welfare. The agents are forced to specialize in activities based on narrow fields and suffer a dramatic squeeze of investment opportunities which Heller, Eisenberg (1998) have appropriately called the anti-commons tragedy.

The so-called knowledge society emerges from the following paradox.

The non-rival nature of knowledge, which could in principle favour small, and even self-managed, firms, is used to create artificial economies of size which make a cheap acquisition and the defence of property rights possible only for big business.

Absent knowledge privatization, the need to provide incentives to invest in human capital would be an argument favouring the labour-hiring-capital solution.

Because of the monopolization of intellectual capital the knowledge economy can become the un-friendliest environment for small labour-managed firms and an ideal setting for big corporations. Only the latter centralizing the ownership of much intellectual property can give a partial solution to the anti-commons problem.

The increased intensity of intangible assets has increased the degree of specificity of the assets of the firms. Trademarks, patents, reputation, copyrights, design and projects ownership and industrial secrets are often unique assets. Mainly for legal reasons, they cannot be replicated and have an unclear, and often lower, value outside the firm. Unlike, buildings, land, plants, industrial machines, trucks or airplanes, they do not have thick markets and offer a very poor collateral. Thus, the weightless economy makes traditional banking increasingly difficult and the equity-debt ratio increases. Because of the self-reinforcing process considered in the preceding section the increase of the debt-equity ratio in turn favours the increase of asset-specificity.

Since intangibles have no thick markets the values of the companies have become more volatile. At the same time, the enormous growth of intangibles has greatly increased financial wealth and companies with a great percentage of intangibles are greatly valued on stock markets.

Financialization of the economy and privatization of intangibles have reinforced each other. In many ways they make two sides of the same coin.

When embodied in human beings or available as public goods, intangibles as knowledge cannot offer a significant basis for secure financial rights. By contrast, privatized pieces of knowledge become assets on which financial claims can be defined and traded.

In turn, the financialization of the economy induces companies to commodify their intellectual capital. The higher is the intensity of private commodified knowledge, relatively to other types of knowledge, the easier is to attract cheap finance. Thus, financialization of the economy and commodification of knowledge reinforce each other.

Most Corporations are characterized by extensive financial control and by a high share of intangible assets.

The massive increase of financial wealth and intangible assets has not gone together with an increase of productive capital and of social wealth. Indeed the opposite has been true. The increase in financial wealth has often caused a decrease of total productive capital or, in other words, we have often had a form of capital-destructive financial wealth. As Stiglitz (2015 p. 24) has pointed out:

If monopoly power of firms increases, it will show up as an increase in the income of capital, and the present discounted value of that will show up as an increase in wealth (since claims on the rents associated with that market power can be bought and sold.)

By contrast, knowledge that is freely available increases output, but doesn't show up in anybody's balance sheet. Therefore it would not normally be reflected in the national accounts as wealth. While increasing financial wealth, a process of privatization of knowledge could destroy productive intellectual capital, which becomes available only for a much-decreased number of uses. However, soon or later, also the financial wealth of society will be threatened by the monopolization of the economy.

When IPR are reinforced (as it happened with the 1994 TRIPs agreements) the surpluses of the different firms are likely to diverge. Some firms enjoy a virtuous circle where intellectual property induces them to develop new capabilities and, in turn, these capabilities induce them to acquire more intellectual property. Some other firms are trapped in a vicious circle. They do not develop skills because they lack the complementary intellectual property. At the same time, they do not acquire intellectual property because they do not have developed the complementary skills.

Because of IPR protection, many “tangible” production activities can be safely decentralized to low cost countries, increasing even more the inequality among firms. The firms intensive in the types of jobs advocated by Taylor can be separated from the ones where the more skilled activities take place. These jobs are done in firms which competing for the tasks outsourced by the firm holding the intellectual monopoly and they become very precarious and badly paid.

Unsurprisingly, there is a very high level of inequality among firms. As Schwartz (2017 p. 205) points out “Using a standard measure for inequality, the Gini index (where 1 equals perfect inequality and 0 equals perfect equality), to assess the distribution of profit just within the FG2k shows levels of inequality for profits that are significantly higher than any given national economy. The Gini index for the distribution of profits among the FG2k over the ten year period 2005 to 2015 is .809. By comparison, some of the most unequal societies in the world, South Africa and Brazil, typically have Gini indices of roughly .600, and the highly egalitarian Nordic countries have Gini typically around .250.” Workers tend to share part of the benefits of the profits of their firm. Thus, the inequality in the profitability of the different firms causes inequality in the earnings of their employees. Virtually all of the rise in earnings dispersion in the United States from 1978 to 2012 between workers is accounted for by increasing dispersion in average wages paid by the employers of these individuals. (Song and al., 2015).

In spite of all striking outcomes these studies are based only on non-financial firms. We should add to this bleak outlook for (in)equality the fact the new intellectual monopoly capitalism had implied a shift from traditional banking to equity with additional adverse effects on wage dispersion. This has in turn changed the nature of the work in finance

from routine business to hedging and other sophisticated activities. According to Philippon (2002), the new setting of financial industry has contributed to increase the earnings of the individuals in this sector relatively to other sectors. Philippon (2002, p. 1605) observes how workers in finance “earn the same education-adjusted wages as other workers until 1990, but by 2006 the premium is 50 per cent on average” with executives in finance earning “250% more than executives elsewhere”. Thus, the change in the nature of finance, associated to new intellectual capitalism based on intangibles, has contributed to increase even more the overall level of inequality.

High inequality does not only involve an unjust distribution of income, which has devastating social consequences. It has also bad consequences on the level of activity of the economy. It gives more money to individuals who have a low need to consume and may be sometimes simply engaged in a positional competition to overcome the others in their wealth ranking. It is true, as Keynes observed, that it is far better that an individual tyrannises over his bank balance instead of tyrannising over his fellow-citizens. However, savings are no guide for future consumptions and investments. If no investment in productive capacity is taking place, the higher the saving the lower will be the future production that is available, and as a consequence the future savings that will be possible. Keynes’ paradox of thrift is counterintuitive only because many individuals confuse an act of saving with a future demand for goods or an immediate demand of capital goods⁶.

The inequity in the distribution of tangible and intangible assets entails that money is given to the individuals that are less likely to specify an effective demand and more likely to increase their savings. However, the global share of savings has not changed much in the years preceding the great depression. By contrast, as shown in figure 10, its composition has much changed. The share of high-income countries has decreased while the share of low-income countries has increased. This has produced a paradoxical recycling of savings from low-income countries to high-income countries.

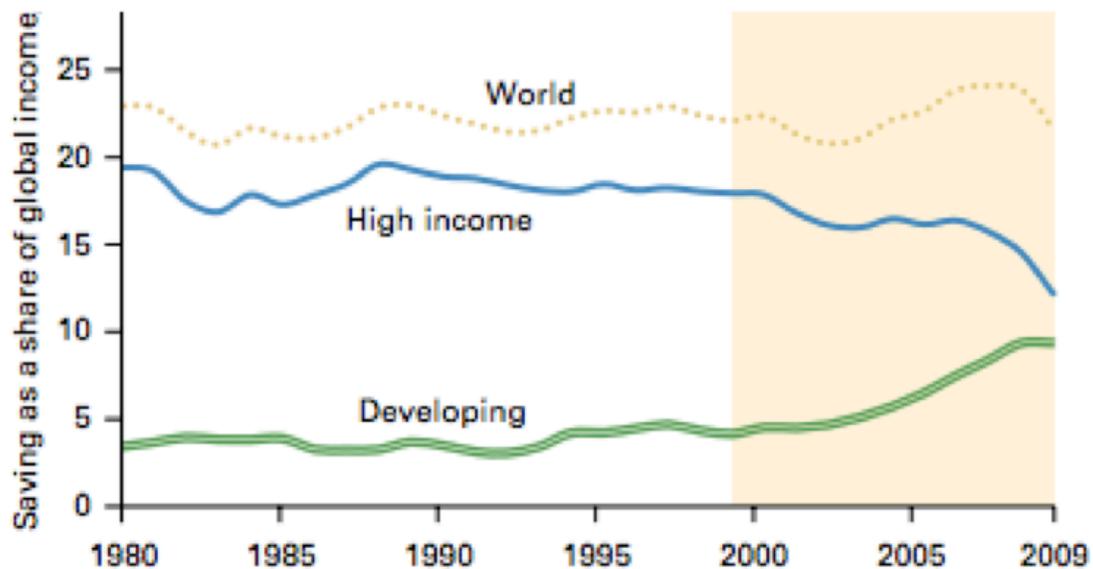
However, it is difficult to maintain that a “saving glut” in the advanced countries, due to an excess of savings in the low-income countries, has been the main cause of the crisis. In the advanced countries, the recycling of the savings of the low-income countries has, at most, compensated the decrease in the savings of the high-income countries. In the high-income countries many people needed to borrow because globalization (and stronger intellectual property rights) allowed a decentralization of productive activities in the low-income countries, increasing income inequality in the core countries. At the same time, because of strong intellectual property rights, the low-income countries could not digest they own savings, which had to be recycled through intellectual-property

⁶ “The absurd, though almost universal, idea that an act of individual saving is just as good for effective demand as an act of individual consumption, has been fostered by the fallacy, much more specious than the conclusion derived from it, that an increased desire to hold wealth, being much the same thing as an increased desire to hold investments, must, by increasing the demand for investments, provide a stimulus to their production; so that current investment is promoted by individual saving to the same extent as present consumption is diminished.

It is of this fallacy that it is most difficult to disabuse men’s mind. It comes from believing the owner of wealth desires a capital-asset as such, whereas what he desires is its *prospective yield*. Now prospective yield wholly depends on the expectation of future effective demand in relation to conditions of supply.” (Keynes 1937 210-2)

rights rich firms of the high-income countries. Until the American Corporations kept on investing China-America (and in general the Global Economy) boomed.

Figure 10⁷



However, Intellectual Monopoly Capitalism was doomed to have an investment crisis also in the intellectual property rich countries. A reinforcement of Intellectual Property rights such as that that occurred with the TRIPS agreements has two effects on Investments. The first is an incentive effect. Firms invest to get the benefits of future monopoly rents. The second is a blocking effect. The monopoly rights of other firms may make each investment risky because it may requires technologies infringing the intellectual property rights of other firms.

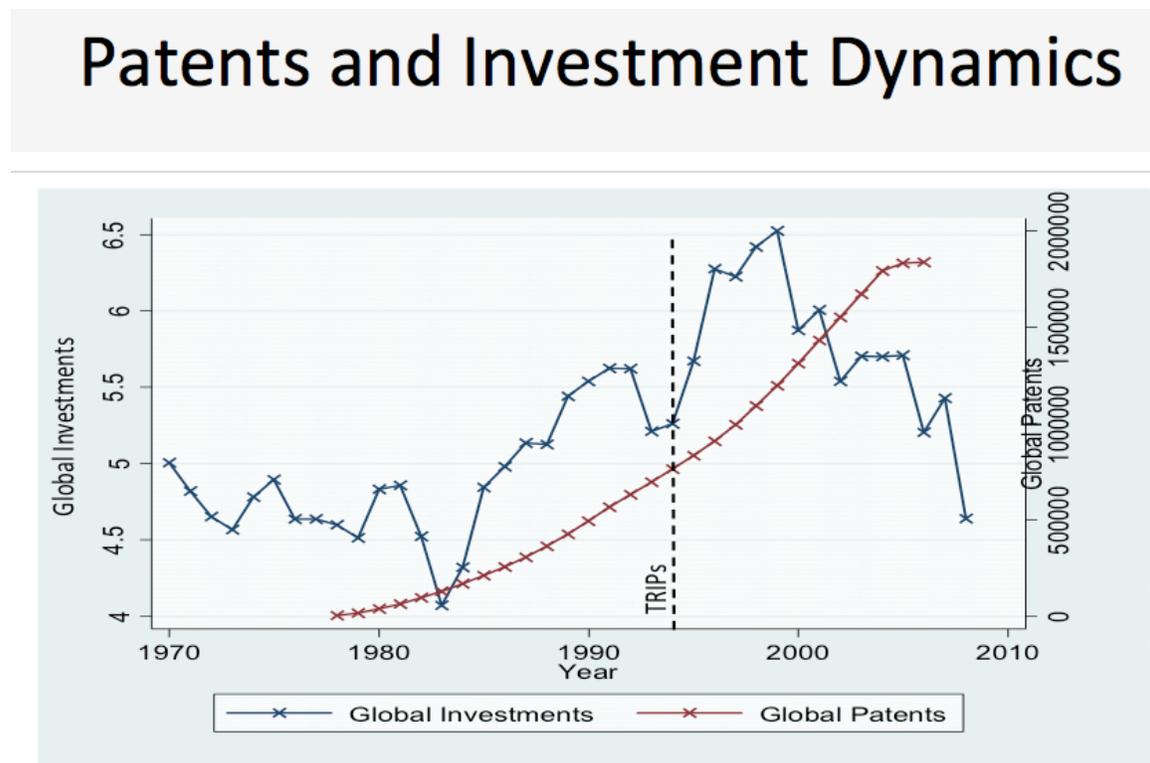
The time profiles of the incentive and of the blocking effects of IPR reinforcement are different. The incentive effect is immediate. As soon as the reinforcement of intellectual property is introduced (and even before, when it is expected to happen) firms are pushed to invest in innovations that can be patented. The blocking effect comes later, when a substantial number of innovations has been patented and many technological paths are

⁷ <https://siteresources.worldbank.org/EXTDECPROSPECTS/Resources/476882-1368197310537/CapitalForTheFuture.pdf> p. 63

forbidden, or too costly, for non-owners.

Even if complex historical process have always multiple causes, it is interesting that the reinforcement of IPR could explain both the investment boom of roaring nineties and the investment famine of the first years of the new millennium leading to the great recession. Figure 11 shows how the introduction of the TRIPs agreement was unsurprisingly followed first be a boom of global investments and later by an investment crisis.

Figure 11



While is a commonly accepted wisdom that the financial crisis was due to a saving glut, Figures 10 and 11 show how the crisis was more due to a famine of good investment opportunities than to an increase in the propensity to save.

The monopolization of the global economy has contributed to this famine of investment opportunities. In the crisis of 30ths, protectionism was considered one of the worst consequences of the financial crisis. However, unlike IPR, even the highest tariff can at most protect the national industry against foreign competitors. In the recent downturn, protectionism (in the new form of global IPR tariffs) has been a cause instead of a consequence of the financial crisis. Because of the lack of good investments opportunities a flood of savings has been employed in the American housing market and other similar speculative business.

Tougher financial regulations have been seen as the main remedy to the financial crisis. With the Dodd-Frank act, the U. S. we have witnessed a return to a diluted version of the 1933 Glass-Steagall act. With some exceptions, commercial banks should not engage in proprietary trading. Basel II and Basel III have increased the capital and liquidity requirement of the banks (Avgouleas 2012).

These regulations are useful to restore some space for some finance in a “banking equilibrium, overtaken by the speculative mood of the pre-crisis economy.

However in an investment crisis these regulations cannot help too much. In some cases they may make banks too cautious in a period in which quantitative easing, even in the form of helicopter money, is advocated to re-launch the economy.

It is now becoming clear that the problem is low effective demand and the nature of assets may have been at least as important in causing the crisis as nature of the financial claims on the assets.

5. Conclusion.

Contemporary capitalism is has seen an exceptional growth of finance and is often defined as financial capitalism. Securitization and equity finance have gained an unprecedented role with respect to traditional banking. We have seen that this kind of financial capitalism could also be seen as the other face of intellectual monopoly capitalism. While financial regulations can improve the stability of contemporary capitalism, some of the characteristics of the financial arrangements are related to the assets on which the financial claims are made. Many underlying assets have become discounted rents of intellectual monopoly, which are poorly suited for traditional banking. In this respect overregulating the traditional banking sector may have simply the effect of switching even further the economy towards an equity-based (or possibly shadow banking-based) financial equilibrium, which would in turn reinforce a security-based equilibrium. In this respect, it may be more attractive to regulate the intangible assets on which the financial claims are exercised taming the negative effects of intellectual monopoly.

Consider that IPRs may generate huge incomes for a monopolist but they depress the average returns of the economy and squeeze future effective demand by making the monopolist a lazy investor and by depriving competitors of valuable investment opportunities. Moreover Intellectual monopoly creates huge inequalities depressing the average propensity to consume.

To overcome these problems we need regulations that change the nature of the assets. In this concluding section we suggest two ways in which this could be done.

In some cases, public buy-outs of IPRs could be useful. They could leave the former monopolies with more money and more competition and stimulate their investments. At

the same time, competitors could now enter new markets and increase their investments. The standard multiplicative properties of public investments would be reinforced by the intrinsic multiplicative properties of a public good such as knowledge. Keynes' multipliers can become super-multipliers in a knowledge economy!

We need also international regulations concerning the levels of public spending on knowledge in the different countries. Public knowledge is a global common and each Nation-State has the incentive to free ride on the public knowledge produced by other States. Free riding on the production of public knowledge of other nations should be seen as a damaging form of unfair competition. 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 that a GNP fraction of each member state to be invested in open science and to be made available to all countries as a global common.

Closed Science and Closed Markets can be perverse institutional complements, organizing and shaping the nature of excessive amounts of assets. New institutional complementarities, based on open science and open markets should shape and organize an increasing numbers of assets, fitting a more equal and dynamic society. Regulations cannot only be about the financial claims on the assets. They should also be about the assets themselves.

Law will always be incomplete. However, in some fields, its enterprise (subjecting to rules human behaviour) has barely started and its incompleteness is particularly painful. In particular Intellectual Property is a field in which the assignments of the rights to few involves huge legal uncertainty and unpredictable limitations of liberties in the future.

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