

# Issues in Regulation Theory

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## EDITORIAL

Changes in property rights have always marked the transformations of capitalism. In this article, Fabienne Orsi and Benjamin Coriat analyse the decisive influence of the reforms of intellectual property law in the United States, the role of these reforms in the emergence of finance capitalism and the way the latter can affect the production of fundamental research by privatising and commodifying what was previously a form of public property. The risks contained in the spread of such a system are multiform, in both economic and human terms.

Also featured this issue: the programme of the Forum on Regulation, which took place in Paris on 9-10 October 2003, texts can be found on the Regulation website.

\* <http://www.upmf-grenoble.fr/irepd/regulation>

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## THEORETICAL NOTE

### Intellectual Property Rights, Financial Markets and Innovation A Sustainable Configuration?

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During the 1990s, the American economy was often lauded for its dynamism and many commentaries were devoted to its ability to promote innovative firms, especially in the 'new' fields of information technologies (IT) and biotechnologies. But the bursting of the Nasdaq bubble and the long line of companies forced out of existence with the fall of stock-market prices have since tempered this enthusiasm. At the same time, however, it does not seem to us that the real significance of what occurred in this reversal has been brought out.

This article attempts to shed further light on the subject. We maintain that the new 'complementarities' constructed between a largely overhauled intellectual property rights (IPR) regime and a group of financial market regulations without precedent have permitted the introduction of a specific mechanism for the promotion of 'innovative firms' in the United States. After indicating the content of the institutional changes which have occurred, we shall outline the kind of *modus operandi* which has given rise to a very particular form of finance-driven innovation. Finally, we shall consider the 'tenability' of the new configuration which has been introduced.

#### **A new regime for intellectual property rights**

The first key series of transformations occurring over the past two decades emerged in the area of IPR on the basis of two new, interrelated directions promoted by the US administration and courts.

1. A series of changes of a legal nature were

introduced to open up the area of patents (and more generally IPR) to new players. In practice, these were the universities and research laboratories, authorised by the new legislation to file patents on the products of their research, even—and this is the noteworthy point—when the research in question is publicly funded.

This step was taken in 1980 with the passage of the Bayh-Dole Act, which introduced a series of complementary arrangements. On the one hand, it authorised the filing of patents on the results of publicly funded research. On the other, it opened the possibility of transferring these patents to private firms in the form of exclusive licenses or creating joint ventures with such firms in order to take advantage of the knowledge thus transferred, either to trade on it or to make use of it to arrive at marketable products. A massive increase in the number of patents registered by university labs followed (cf. Jaffé 2000).

Even more profoundly, the Bayh-Dole Act was to bring about a fundamental transformation in the practice of academic research with the creation of technology transfer offices in all the major American universities. These bodies soon came to play a decisive role in the very orientation of research insofar as their activity is aimed at promoting ongoing research likely to permit the rapid filing of patents. In many cases, they were also to push for delaying the publication of scientific results by requiring prior filing of patents on the subjects covered by the publication.

The transformation introduced by the Bayh-Dole Act was decisive. In fact, until this law was

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passed, the prevailing doctrine in the area of patents had a considerably different orientation which, consistent with the economics of research as analysed by Arrow (1962) and Nelson (1959), attempted to compensate for the market shortcomings resulting from the 'public interest' nature of scientific information. Public policies thus distinguished between two forms of research incentives:

- i) *The grant*: mainly oriented towards basic research, it primarily concerned academic institutions and other publicly-funded laboratories.<sup>1</sup> In return, the research results were to be made available in *free and unrestricted form*.
- ii) *The patent*: this was conceived as a partial, conditional monopoly granted to an inventor on the condition that the invention is 'useful' (i.e., clearly relevant to applied disciplines) and that the patent 'describes' and 'discloses' the invention in a sufficiently precise way to be re-used by the community of inventors.

In both cases, legislators were motivated by the concern for the pursuit of collective well-being (promoting the production and dissemination of inventive ideas).

The Bayh-Dole Act broke with this practice and the doctrine underlying it. With the introduction of the possibility of attributing the results of publicly-funded research in the form of *exclusive licenses to private firms*, the very foundations of the incentive to innovate through public grants lost both its meaning and its bases in the theory of well-being.

2. During the same period, as a result of court decisions, intellectual property law itself was modified, following a 'jurisprudential' path in the American tradition of common law. These modifications covered numerous issues, but the essential change consisted of enlarging the scope of patentability to cover objects which had not previously been included or were explicitly excluded from it.<sup>2</sup>

Two main areas are concerned here: computer software and living organisms. In the first, this development was reflected by the authorisation to patent *algorithms corresponding to the simultaneous use of mathematical equations*. In other words, elements of 'generic' knowledge currently used by the community of software programmers and designers were now patentable. The 1990s were thus to see the patentability of the famous business models for sales methods or financial

services. And many Internet companies were promoted on the basis of the financial markets' evaluations of their intangible assets, which took the form of patents and other IPR on computer methods.

But the change was most radical and heavy with implications in the life-sciences field. Here, the breach was first opened by the well-known Chakrabarty ruling allowing General Electric to patent a micro-organism and this decision was the first in a long series which ultimately led to the patentability of genes and partial gene sequences. In the United States today, more than fifty thousand patents on gene sequences or partial gene sequences have been granted or filed, thus *opening up the way to a veritable commodification of scientific knowledge* (Orsi 2002, Orsi and Moatti 2002). In numerous cases, moreover, the patents granted cover and protect not inventions of recognised utility but a wide range of future applications. By granting patents on basic knowledge itself (the input of future inventions), the American courts have also protected not only the inventions described and disclosed but all the potential and virtual ones which might be derived from the use of patented knowledge.<sup>3</sup>

The changes in the IP regime on living organisms offer an exemplary demonstration of the process leading to the elimination of the distinction between 'discoveries' and 'inventions'. In the past, this border clearly separated two worlds: that of the production of knowledge, constituted as the world of "open science" (Dasgupta and David 1994) and that of the commercial exploitation of these discoveries (the world of innovation) where industrial firms confront each other.

We have now witnessed a total "displacement of borders" (Orsi 2000) inaugurating the era of the privatisation of the scientific commons, which firms can now break up and appropriate for their own use. These firms sign agreements with research laboratories (most often public) which result in the creation of bilateral monopolies, whereas free access had been the rule in return for public funding. Today, this unprecedented situation is denounced by highly important and influential sectors of the scientific community but also by private-sector innovators.

The fact remains, however—and this point should be noted—that the transformations of IP have occurred with particular force *in the two major areas where powerful waves of innovation are developing today*. It is as if, after American industry's extremely pronounced losses of competitiveness in the 1980s, a reaction were organised in the new technology fields in order to allow firms to gain privileged access to the basic knowledge provided by the American science

<sup>1</sup> Following Arrow (1962) and Nelson (1959), we may define basic research as that which provides a base and in-puts for other research which will exploit this information 'upstream' for inventions of demonstrable practical utility. In the same spirit, Nelson (2003) defines basic research as that which deals with "scientific commons" in the sense of public scientific property which provide a base for other research.

<sup>2</sup> For a detailed presentation of the modifications, see Jaffé (2000) and Coriat and Orsi (2002).

<sup>3</sup> In this respect, American jurisprudence broke with prior doctrine, for the precise description of the invention concerned in order to demonstrate its practical utility had been an essential criterion of patentability.

system through a new IP law.<sup>4</sup>

### **The constitution of new kinds of financial markets specialised in the commodification of IPR**

The other transformation is the one resulting from the entry of finance capital in the world of the production of knowledge. The conversion of knowledge into merchandise (in the form of marketable IPR guaranteeing future rents) created the necessary conditions for the entry of finance capital into the space of the production of knowledge. The key step occurred in 1984 with the NASD regulation authorising the market entry and listing of firms operating at a deficit on the condition that they had considerable 'intangible' capital, which was composed precisely of IPR.<sup>5</sup> Known as 'Alternative 2', this regulation permitted the promotion of such firms (in deficit but holding a stock of IPR), no longer on the OTC market, which, with its limited liquidity, is not attractive, but on the First Market of the Nasdaq National Market.<sup>6</sup>

Other legislative and regulatory changes in the financial domain followed; the 'prudent man' law on pension funds was modified so as to authorise them to invest part of their holdings in risky securities and stocks, which had previously been prohibited. In this way, part of the enormous liquidities concentrated in the pension funds expanding rapidly during this period allowed the financial markets to promote hundreds of new firms which were in deficit but deemed 'high potential' in view of their intangible assets.

### **The complementarity between financial markets and IPR at the heart of the 'New Economy'**

This is how a particular 'institutional complementarity' between intellectual property law and financial market regulations was set up within the context of the American national innovation system. The notion of institutional complementarity, which is now used in numerous studies dealing with the economics of institutions (Amable 2000, Hall and Soskice 2001, Coriat and Weinstein 2002) was first introduced and defined by Aoki (2001). Drawing on North's definition of the role of institutions as 'rules of the game', Aoki emphasises that these rules are never absolute, that they always open up a space of interpretation and discretion for the actors' game. In this approach, the key idea is that it is necessary to consider not the influence which each institution taken in isolation exerts on the agents but the interactions which may be established between them and the opportunities which give rise to

complementarity between *institutional arrangements belonging to seemingly distinct domains*.

In the case which concerns us here, the parallel, complementary changes in intellectual property law and financial regulations offered unprecedented possibilities to the actors involved in innovation processes. What is important is the aspect of the *institution conceived as a 'resource'* to be mobilised by the agents in the service of their strategies (Coriat and Weinstein 2001). The coexistence of the formation of a new intellectual property law regime and the creation of an Alternative 2 within Nasdaq regulations to allow the introduction on the market of non-profitable firms whose assets were composed of IPR has permitted the launching of a very special kind of companies following unprecedented business models.

It must be recognised that these new types of business models initially produced remarkable effects. A number of firms which have now become world leaders in biotechnology (Genentech, Myriad Genetics), computer software (Oracle) or Internet (Yahoo, Google) greatly benefited from the new institutional framework to ensure their rapid development. Indeed, a large share of the supposed 'New Economy' owes its origins and its strength to this phenomenon.

### **A sustainable configuration?**

The contradictions generated by the new configuration were also quick to produce their effects, however, for the promotion of firms whose main assets are 'intangible' created considerable problems of evaluation.<sup>7</sup> How do we determine the 'value' of a firm whose assets are composed of a patent on a gene? Or in the case of firms on the Internet, one which has a 'virtual' number of customers? Added to the players' mimetic behaviour on the financial markets (Orléan 1999) and the many deficiencies of financial regulations as revealed by the Enron affair, these difficulties led to considerable financial over-evaluations and ultimately to the formation and subsequent explosion of one of the most remarkable speculative bubbles in the history of capitalism.

The tenability of the model is thus clearly called into question. Beyond the problems related to the practice of entrusting scientific evaluation to financial players (since they are the ones who ultimately decide which of the discoveries will be marketed on the basis of the new firms listed on Nasdaq), the features of the new IP regime reveal the process by which innovation is generated, with its unprecedented risks.

Indeed, by displacing the border between 'invention' and 'discovery', the new IP regime has undermined the delicate equilibrium which prevailed until now and destroyed the logic underlying the production of innovations. Once access (upstream) to knowledge becomes costly and

<sup>4</sup> For a discussion of this point, see Coriat and Orsi (2002) as well as Coriat (2002b). For the specific case of living organisms, see Orsi (2001) and (2002).

<sup>5</sup> NASD = National Association of Security Dealers, the body responsible for overseeing the regulation and security of Nasdaq transactions under SEC supervision.

<sup>6</sup> For a detailed account, see Orsi (2001) and Coriat, Orsi and Weinstein (2003).

<sup>7</sup> Concerning the thorny problems raised by the evaluation of start-ups whose assets are mainly intangible, cf. Dubocage and Rivaud-Danset (2003).

subject to market strategies of pricing, the firms ready to involve themselves in innovation are strongly discouraged from doing so. The dangers which this situation brings to bear on the progress of scientific knowledge have been denounced with clarity by numerous analysts and observers. Thus, in the case where the innovation depends on a large number of cumulative advances (typical of sectors such as computer software and programmes), Shapiro (2001) exposes the risk of 'hold-ups' where innovative new entrants are taken hostage by the large firms which have stocks of patents on the commonly used algorithms. In the area of living organisms, the risk lies in the development of a veritable "anticommons tragedy" (Heller and Eisenberg 1998): when the scientific commons are fragmented and appropriated by private firms for their exclusive use, there is great risk that research will be obstructed (Nelson 2003).

The American model of promoting innovating firms, which has been showered with praise and cited everywhere as a model, is now subject to profound re-evaluation. In our view, after singing the praises of the 'New Economy', it is not enough to declare that it is dead and buried. Rather, it is necessary to draw the relevant lessons from its crisis by reconstituting the 'model' which permitted its rapid growth. If this article can contribute to that effort, it will have fulfilled its objective.

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(Translated from the French by Miriam Rosen)

## RECENT PUBLICATIONS

The following publications are signalled by the editors of *Issues in Regulation Theory* because of their relevance to the research program of the Regulation School.

Bellon B., Ben Youssef A., Rallet A. (eds), *La Nouvelle économie en perspective*, ADIS, Université Paris-Sud, Economica, 2003.

Boyer R., "The embedded innovation systems of Germany and Japan: Distinctive features and futures", in Yamamura Kozo, Streeck Wolfgang (eds) *The End of Diversity? Prospects for German and Japanese Capitalism*, Cornell University Press, Ithaca, p. 147-182, 2003.

Boyer R., "La crisis argentina: Un análisis desde la teoría de la regulación" *Realidad económica*, n° 192, Instituto Argentino para el Desarrollo Económico (IADE), p.6-23, 2003.

Boyer R., "European and Asian Integration

process compared ", couverture orange CEPREMAP n° 2003-02.

Boyer R., " La répartition des compétences en Europe. Le double éclairage du droit et de l'économie " (avec Mario Dehove), couverture orange CEPREMAP n° 2003-03.

Boyer R., " Les institutions dans la théorie de la régulation ", couverture orange CEPREMAP n° 2003-08.

Boyer R., " L'économie au début du XXIe siècle ", dans Combemale Pascal, Piriou Jean-Paul (Dir.), *Sciences économiques et sociales: Nouveau manuel*, 3<sup>e</sup> édition, La Découverte, Paris, p. 207-216, 2003.

Boyer R., " L'avenir du capitalisme ", dans Combemale Pascal, Piriou Jean-Paul (Dir.), *Sciences économiques et sociales : Nouveau manuel*, 3<sup>e</sup> édition, La Découverte, Paris, p. 607-615, 2003.

Chesnais F., Neffa J.C. (eds), *Ciencia, tecnologia y crecimiento economico*, Ceil-Piette Conicet, Trabajo y Sociedad, Buenos Aires, 2003.

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Petit P., " Les temps de la nouvelle économie ", chap. 2, in B. Bellon , A. B. Youssef, A. Rallet (coord.), *La nouvelle économie en perspective*, Economica, 2003.

Pottier C., *Les multinationales et la mise en concurrence des salariés*, collection Travail et Mondialisation, L'Harmattan, 2003.

## Forum on Regulation

2003

9 –10 October

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For complete programme in French  
(all sessions are held IN FRENCH)

<http://www.upmf-grenoble.fr/irepd/regulation/forum/index.html>

### Thursday 9 October

9:30 am–12:30 pm

#### "The political economy of inequalities"

Chairs:

**Isabelle Laudier**, Institut Caisse des Dépôts pour la Recherche Economique et Sociale

**Robert Boyer** (EHESS, CEPREMAP), president of Recherche & Régulation

Participants :

**Christian Baudelot** (ENS)

**Jacques Freyssinet** (Univ. Paris-1, CEE)

**Eric Maurin** (INSEE)

**Thomas Piketty** (EHESS, CEPREMAP)

#### Workshops

2:30 – 4:00 pm

1. Wage nexus #1
2. Analyses of post-Fordism
3. Spaces of regulation #1 (dynamics of territories)
4. Social State #1 (systems of public intervention)
5. Theory of the firm #1

4:30 – 6:00 pm

6. Wage nexus #2
7. Forms of competition (market institutions)
8. Economics of development #1
9. Spaces of regulation #2 (regulation of public and collective property)
10. Social State #2 (institutional form of the State)
11. Institution theory

### Friday 10 October

#### Workshops

9 am – 10:30 am

12. Systems of demand and lifestyles
13. Analysis of the transition
14. Spaces of regulation #3 (international dynamics)
15. Modelling #1
16. Economics of development #2 (economics and politics)

11 am – 12:30 pm

17. Theory of the firm #2
18. Theory of money
19. Spaces of regulation #4 (sectoral dynamics)
20. Theory of action
21. Modelling #2

#### Closing plenary

2 pm – 5 pm

#### "The Regulationists in Politics: Theory Put to the Test of Reality"

Chairs:

**Frédéric Lordon** (CEPREMAP),

**Patrick Le Galès** (CEVIPOF)

Participants:

**André Gauron** (France)

Chief advisor, French Accounting Office.  
Advisor to the Ministry of the Economy and Finance (1984-86, 1988-91).

**Ricardo Hausmann** (*Venezuela*)

Professor of economics, Harvard University.  
Minister of Planning (1992-93), administrator  
of the Central Bank.

**Alain Lipietz** (*France*)

European deputy.

National spokesperson for the Verts (1996-98).

**Carlos Ominami** (*Chile*)

Senator.

Minister of the Economy (1990-92), member of  
the central committee of the Socialist Party  
(1987- ).

**Michele Salvati** (*Italy*)

Professor of political economy, Milan.

Deputy DS-Ulivo (1996-2001).

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