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Are intellectual property rights working for society?

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ABSTRACT

Intellectual property rights (IPRs) play a key role in increasingly intangible economies. At the same time IPR systems are facing a profound legitimacy crisis, as scholars have unveiled perverse mechanisms and strategic practices that can severely hinder their expected societal returns.

In this introduction to the Special Issue, we provide an overview of the key debates and the recent evidence on the societal role of IPRs. After providing a brief introduction to IPRs and their specific societal function, we integrate insights from different disciplinary discourses into several key emerging themes. We highlight the progress made in recent research, but also flag urgent research gaps and directions to further expand the frontiers of scholarly and policy debates.

1. Introduction

1.1. The societal debate on IPRs

The creation of property-like regimes on intangibles like ideas and other creative endeavours has a long history, with origins in the "ad hoc" provisions enacted in favour of inventors and creators during the late Middle Ages in Europe. Today, economists and legal scholars refer to this array of rights, covering the outcomes of inventive and creative activities in different domains, as Intellectual Property Rights (IPRs). The scope of this institutional arrangement has become progressively larger. In addition to the "traditional" IPRs of patents, trade secrets, copyrights, and trademarks, many governments have introduced new forms such as protections for plant breeds and database rights, among others.

Over the last few decades, policymakers in Europe and the US have increasingly resorted to IPRs as the primary mechanisms to promote the production and diffusion of knowledge, including new ideas, inventions, creative works, and much more. Multilateral and bilateral trade agreements have expanded IPRs to more countries, extended the scope of IPRs to additional subjects (e.g., software, business methods, and databases), increased their duration, and strengthened their enforcement mechanisms. Proponents of these changes argue that these policies will foster creativity and innovation, for the benefit of society. However, while IPRs generally increase expected private returns to their owners, their effects on social returns are less clear. The intellectual monopolies associated with IPRs may restrict access to knowledge and innovations that can change the lives of many (Bessen and Meurer, 2008; Heller, 2010; Lunney Jr, 1999; Pagano, 2014). For instance, IPRs may hamper access to life-saving treatments, prevent farmers from using patent-protected seeds, or hijack the cultural heritage of indigenous communities. Fundamental questions remain as to whether IPRs appropriately balance private and public benefits. In addition, while this balance likely differs across countries, trade agreements governing IPRs limit the scope of signatories to adapt them to local conditions.

IPR systems currently face a severe legitimacy crisis, as scholars have unveiled perverse mechanisms and strategic practices that can severely hinder their societal returns. These detrimental effects can outweigh the original incentives provided by IPRs (Dosi et al., 2006; Boldrin and Levine, 2008; Henry and Stiglitz, 2010; Moser, 2013; Cimoli et al., 2014; Lemley, 2015; van Gompel, 2019). Moreover, alongside concerns about the effectiveness of IPRs in striking a balance between knowledge creation and access, a growing body of literature has identified various settings where inventive and creative activities thrive without relying on IPR regimes. These contexts, often referred to as "negative IP spaces," further challenge the notion of the indispensability of IPRs (Fauchart and von Hippel, 2008; Sprigman, 2017).

At the same time, other scholars stress the key role of IPRs in a time when the strategic importance of intangible assets and innovation for organizations, regions and countries is becoming increasingly evident (Ziedonis, 2008; Haskel and Westlake, 2018). Moreover, whether IPRs can act as coordination devices or instead paralyse responses to societal challenges – including urgent health crises like pandemic outbreaks and other sustainability issues – remains a conundrum. Importantly, emerging evidence suggests that IPRs may not be effective in addressing the threats of the most vulnerable groups and of the poorest countries. The benefits and costs brought by IPRs appear unequally distributed across geographies, firms, and income groups. Even less understood or studied is IPRs' impact on and possible tensions with other societal goals, such as equality, environmental sustainability, and human rights.

These and similar issues present many policy challenges that must be addressed for IPR institutions to deliver the societal goals that they are,

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purportedly, designed for. Such a discussion can be informed by systematic evidence on the use of IPRs (or lack thereof) across industries, markets, and countries, to identify such tensions as well as to understand best practices in responsibly deploying IPRs. We also still lack a systematic assessment of IPR alternatives or alternative governance models for IPRs, including compulsory licensing or patent pools (Kingston, 2001; Contreras et al., 2018) and bottom-up initiatives like open source software or creative commons (Ahn et al., 2019). Research in this domain is scant and scattered across many disciplines, including law scholarship, biology, anthropology, and business ethics. Social scientists who focus on innovation have much to gain from interdisciplinary insights on these issues.

In this introduction to the Special Issue, we summarize the debate on the societal role of IPRs. We start by providing a brief introduction to IPRs and their effects on social welfare. We then integrate knowledge from different disciplinary discourses into several key emerging themes. In this way we identify urgent research gaps and directions to further expand the frontiers of scholarly and policy debates.

1.2. Whither intellectual property rights?

Much of the debate on the societal implications of IPRs has concerned patent and copyright systems (Boldrin and Levine, 2008). While academic study of other forms of IPRs is limited, recent work has examined trademarks (Castaldi, 2023), design rights (Fromer and Sprigman, 2017), and breeders' rights (Campi and Nuvolari, 2021).

It seems useful to briefly discuss what each type of IPR is expected to bring to society, at least according to the basic principles that underlie the functioning of the different IPR systems. While each IPR system follows a specific rationale, they all aim at balancing private returns, often in the forms of temporary monopoly and/or moral rights of some kind, and social returns. The hope is that the social returns exceed the societal costs of allowing private returns. In general terms, the most widely accepted philosophical foundation of IPR is utilitarian. These rights are granted by virtue of their positive effects on social welfare, namely the stimulus they provide to inventors and creators. Note also that the limitation in time of the rights is consistent with the utilitarian argument: the rights are kept "alive" only as long as the prevailing conventional wisdom suggest they are necessary for eliciting the socially desired amount of investment in innovation and creativity.[1] In order to provide a perspective on the possible tensions between the private vs. the public returns of IPR, it is useful to recall briefly the main rationale and scope of the three most important forms: patents, copyrights and trademarks.

For patents, the key rationale behind granting exclusive rights to inventors lies in the dynamic benefits from more inventions that accrue to society over time (Arrow, 1962). Because research and innovative activities often generate spillovers, there is underinvestment by the private sector in the absence of policy interventions. In providing the patentholder with the ability to exclude others from using the invention, patents limit competition and its associated benefits for consumers by increasing the expected private returns to innovation. Thus, in theory, the level of innovation is higher with patents than without them. To the extent that the private returns realized by patentholders are positively correlated with social returns, innovative activity should also be directed where social need is greatest. Furthermore, patent systems offer only a limited period of protection (now 20 years, in general) and require the disclosure of inventions in some detail, so that society should eventually benefit from competition and the diffusion of knowledge.

The rationale underlying copyrights is similar. The outputs of creative activities such as literary works, music and films are liable to copying and imitation. Digitalization and the internet have drastically reduced the costs of copying and further disseminating these types of products. By establishing the exclusive rights of authors, copyright systems attempt to restore the private incentive to engage in creative activities. Copyrights grant exclusive rights, typically for the duration of the author's lifetime plus 70 years, to the creators to reproduce, distribute, display, and perform their creative works; copyrights also provide protection for derivative works. It is important to stress that copyrights are meant to protect the specific *expression* of creative ideas, rather than the ideas themselves. Recent research on copyrights suggests that they have the potential to elicit creative efforts, but that the extension of their duration beyond the life of the original creator is not likely to provide a significant contribution to overall welfare (Giorcelli and Moser, 2020).

Trademark systems have a different rationale, unrelated to invention and creativity. Trademarks are supposed to help the functioning of markets by reducing information asymmetries. Trademarks act as information signals in designated markets, indicating the origin of goods and services (Ramello and Silva, 2006). Their informal use dates back to Greek and Roman history, when distinctive signs were already used to flag the output of specific producers. Modern trademark systems are much more recent (Sáiz and Castro, 2022). For sellers, investing in trademarks results in valuable reputational assets. The economic rationale suggests that this also provides incentives for sellers to invest in product quality (Economides, 1988), hence indirectly affecting innovation and dynamic competition (Greenhalgh and Rogers, 2012).

Table 1 summarizes the scope and rationale of the three main forms of IPR.

The discussion above has summarized the expected social returns of IPRs. Yet, evidence is mounting on the challenges of realizing such expectations. For instance, Lemley (2015) concluded that "it is far from clear that IP is doing the world more good than harm" (p. 1335) based on his assessment of the evidence to date. The ambiguity in empirical findings has prompted attempts to move beyond the traditional utilitarian justification and redefine IPRs as "natural rights": granting IPRs is a moral end itself and does not need to be grounded in any assessment of social costs and benefits. Lemley labels these rationales as "faith-based" justification of IPRs and argues that they are ultimately not compelling. Nevertheless, this discussion suggests that the time is ripe for an in-depth reconsideration of the role and rationale of IPRs in the world economy.

2. Emerging themes around the societal returns of IPRs

2.1. IPRs and dynamic competition

As discussed above, IPR systems come with trade-offs between allowing advantages to some and ensuring benefits to all. The balancing of these inherent tensions is also a temporal one, where short-term private gains should lead to long-term societal gains. Economic analyses have found it useful to look at these tensions in terms of the difference between static and dynamic competition. In the short term, theory and evidence point to strong effects of IPRs on static competition

[1] A compelling rendition of the utilitarian perspective is the so-called IPR clause of the US constitution (art. 1, section 8) which states: "The Congress shall have Power…to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Rights to their respective Writings and Discoveries…". The ultimate goal is the "progress of science and useful rights" and the rights are granted by Congress for "limited times". This can be compared with the discussion of "property rights" in amendment V of the Constitution, where they are mentioned alongside life and liberty and not subordinate to any specific social goal ("No person…shall be deprived of life, liberty, or property, without due process of law, nor shall private property be taken for public use, without just compensation"). A different perspective, which regards IPR as a "natural" human right is represented by Article 27 of the United Nations Declaration of Human Rights (UNDHR), which states that "Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author." In this case the enjoyment of the right is not subordinated to the attainment of other social or economic goals.

Table 1
Key properties of the three most used IPRs.

	Patents	Copyrights	Trademarks
Subject matter	Technological inventions	Creative work	Distinctive symbols
Duration	20 years	70 years after authors' death	Infinite (with 10 years renewal)
Key actors	Inventors	Creators	Buyers and sellers in markets
Private incentives	Monopoly rents	Monopoly rents	Monopoly rents and reputational assets
Expected social returns	Knowledge disclosure; more innovation.	More creativity; establishment of authors' moral rights.	Lower transaction costs; reduced information asymmetry; fewer market failures; higher product quality.

in many industries, including pharmaceuticals and book publishing. In the long term, the question is whether dynamic benefits are realized, allowing innovation and dynamism in markets and industry (Greenhalgh and Rogers, 2012). While competition often increases once the IPR covering an invention or creative work expires, it is more difficult to estimate whether that invention or creative work would have existed in the absence of IPRs. For example, while many studies find that an expansion of patent protection is associated with more innovative effort in drug development, a large body of work also establishes that other innovation policies (such as government grants) can also be effective. Gallini and Scotchmer (2002) summarize the conditions under which economic theory considers IPRs to be the best incentive system. However, very little empirical research directly examines in which specific contexts those conditions hold. Many economists today acknowledge that alternatives to IPRs, such as prizes, may be superior under certain conditions. Two Nobel prize winners in economics – Michael Kremer and Joseph Stiglitz – have been prominent supporters of this view (Kremer, 1998; Stiglitz, 2007). Notwithstanding this influential support, prizes and advance market commitments still remain a relatively minor instrument in the standard innovation policy toolkit, largely due to the challenges of information acquisition and coordination necessary to implement them.

A recurring question for competition policy authorities and scholars alike has been the extent to which short-term barriers erected through IPRs create barriers beyond what is intended, so that entrants can still challenge incumbents and push them to further innovate. Theoretical contributions consider policy design choices such as the length and breadth of patent protection and their effect on innovation incentives, for both incumbents and potential entrants (see Scotchmer, 1991, for a useful summary). Empirical studies find nuanced effects of both patents and copyrights on cumulative innovation and knowledge diffusion. Using a natural experiment from history, Biasi and Moser (2021) show that weaker copyright protection on scientific textbooks encouraged the use of that science. A modern effort to reduce the costs of using copyrighted material is "open access" publication, which is provided for free to consumers. McCabe and Snydor (2014) conclude that open access boosts citations modestly, but the effects vary across the quality rankings of journals. Several studies find that patents hinder follow-on innovation (Galasso and Schankerman, 2014; Williams, 2013; Cockburn and MacGarvie, 2011). However, Sampat and Williams (2019) demonstrate that the negative effects of gene patents on cumulative research are quantitatively small. In the case of pharmaceuticals, Gilchrist (2016) concludes that increasing the duration of a pioneer's market exclusivity pulls in additional (non-infringing) entrants. Büttner et al. (2023) in this Special Issue conduct an original study leveraging the natural experiment of the English translation of Chinese patents in Google patents. They find that better access to the information stored in patent registers comes with positive effects on knowledge diffusion. These results highlight that the specific implementation of IPRs matters and should receive more attention. Reducing the cost of access to information about IPRs themselves is such an example.

Strategic corporate IPR practices can interact with, or exploit loopholes in, IPR policies, with effects on both static and dynamic competition. These practices include using IPRs to build barriers to entry in several astute ways, from patent thickets to submarine trademarks[2] and more (Greenhalgh and Rogers, 2010; Hall et al., 2021; Fink et al., 2022). These practices not only have short-term effects, but can also undermine the long-term opportunities for entrants. For instance, competition authorities in both the US and Europe have identified "pay for delay" or reverse payment agreements between originator drug firms and generic producers as an example of a strategic IPR practice harming competition.[3] Their concern is that these agreements, which usually involve licensing a subset of patents covering a particular drug, may extend the period of the originator's monopoly beyond what was intended by policymakers. Overlapping rights are also used strategically by companies, for instance to extend protection after patent or copyright expiry, but also to leverage multiple legal arguments in IPR-enforcing cases (Calboli, 2014). Governments in some countries, such as India, have responded to corporate efforts to engage in "evergreening" by requiring a higher inventive step for patent eligibility.

Several papers in this Special Issue examine the strategic use of IPRs. Wagner et al. (2022) dissect a specific type of strategic patent practice used in the pharmaceutical industry: the use of Markush structures. Their study finds that such practices do not imply frictions in patent prosecution processes, but they do come with lower rates of follow-on invention. Kaiser et al. (2023) study the US comics industry and find that trademarks are associated with lower reuse of characters. Consistent with the notion that IPRs may impede cumulative innovation is evidence in papers by Scott and Spadavecchia (2023) and de Rassenfosse and Palangkaraya (2023). Scott and Spadavecchia (2023) provide fresh evidence on how patent pools and restrictive licensing agreements were effectively used to stifle innovation and competition in three American industries (glass containers, washing machines, and shoe-making machinery) during the 1920s and 1930s. In contrast, de Rassenfosse and Palangkaraya (2023) find that the corporate practice of removing the threat of IPR enforcement through patent pledges leads to greater use of the technologies covered by those patents. Clearly, this result suggests interesting managerial and policy implications, calling for more research on the potential benefits of patent pledges on knowledge access. A further issue relates to the systemic costs of IPRs. These include the operational costs of IPR offices, screening ever-increasing numbers of IPR filings, and the legal costs involved in monitoring and enforcing IPRs. Ascione et al. (2023) in this Special Issue find evidence that

[2] Submarine trademarks refer to strategies of filing trademarks in a remote location as a way to delay disclosure of information about new products and market strategies to the public, but still be able to claim priority (Fink et al., 2022).

[3] The US Federal Trade Commission states that opposing such agreements is one of its "top priorities" (https://www.ftc.gov/news-events/topics/competition-enforcement/pay-delay). In the EU, DG Competition identified patent settlements between originator and generic firms as a concern in its 2009 sector inquiry into the pharmaceutical industry, and subsequently monitored these settlements (https://competition-policy.ec.europa.eu/sectors/pharmaceuticals-health-services/pharmaceutical-sector-inquiry_en).

university patenting in the US resulted in costly and inefficient involvement of universities in patent litigation cases.

IPRs are assets, and thus can play an important role in the financing of firms. Ayerbe et al. (2023) examine the issue of loans secured by patents. In principle, this could represent an additional instrument used by innovative firms to finance their investments. In fact, the authors point out that this kind of financial instrument may not be neutral in terms of the innovation strategies pursued by the borrowing firm. In particular, Ayerbe et al. (2023) are concerned that the use of this instrument will prompt firms to deviate from long-term innovative activities towards more short-term strategies based on the exploitation of their patents by means of aggressive litigation.

2.2. IPRs and economic development

Many initiatives to strengthen and extend IPR protection worldwide have been pushed with the idea that stronger IPR institutions can create opportunities for economic development for rich and poor countries alike. This narrative is an integral part of initiatives like the TRIPS agreement. However, the relationship between IPRs and development is not an easy one: IPRs may well facilitate appropriation of knowledge *in* developing countries, but it may at the same time limit the transfer and use of relevant knowledge *from* developed to developing countries. Indeed, the impact of IPR appropriation on innovation and development in the latter group of countries is more likely to depend on whether IPR systems are designed to generate social welfare and on the related enforcement of complementary institutions than on IPR strength per se (Dosi and Stiglitz, 2014). Empirical work also points to positive effects of IPRs on the diffusion of technologies from developed to developing countries (Branstetter et al., 2006; Delgado et al., 2013).

Some articles in this Special Issue point to the growing globalization of IPR institutions, standards, and rules, raising concerns about their societal impact. Petit et al. (2023) provide interesting evidence on the process of globalization of patent systems. They study the interdependence among national patent offices. Examining the USPTO, the EPO and the Japanese patent office, they find that when patents are applied for via the Patent Cooperation Treaty (PCT), national patent offices adopt simplified search procedures, relying on the information already gathered by the other national patent offices. Overall, their results suggest that even if patent laws are still, by and large, of national relevance, international treaties such as PCT and the standardization of procedures represent a powerful drive towards the globalization and international harmonization of IPRs.

However, while there might be positive effects stemming from the globalization of IPR appropriation in terms of stimulus to inventive activities, there are doubts about whether this delivers the expected results in terms of equality and shared prosperity. Arza et al. (2023) in this Special Issue assess the extent to which the TRIPS Agreement resulted in a more equal configuration of inventive activities. They find evidence that it did not, revealing that after TRIPS, patenting in Latin America became even more concentrated in foreign applicants. Thus, rather than contributing to higher innovation rates *by* developing country firms, these agreements appear instead to reinforce patent monopolies by leading international firms. This article echoes earlier research pointing at the need for developing countries to access international (frontier) knowledge through other means – including through policies that support open access and other sharing mechanisms (Reichman, 2014).

International benefit-sharing agreements are a modality of international knowledge sourcing that has been applied to the context of IPR appropriation of natural and biological resources, as developing countries have sought protection of their traditional knowledge against appropriation by foreign investors (Orozco and Poonamallee, 2014). Bioprospecting, a practice whereby companies selectively search for biodiversity with the purpose of commercially exploiting its biochemical or genetic elements (Robinson, 2012), has been subject of rising societal objections due to its unfair outcome on local communities, who, despite being the retainers of traditional knowledge, have historically gained very little, if anything, from such commercial exploitation. The specialized literature has identified several undesirable effects on local communities from the IPR appropriation of these materials by international actors (Giuliani et al., 2021).

Wynberg (2023) in this Special Issue assesses the experience of combining patenting of traditional knowledge with benefit-sharing agreements as a tool for indigenous communities. She finds that the promise of those benefit-sharing agreements has hardly been fulfilled, casting doubts on the strategy of extending patent protection as a way to leverage collective community resources. In a more optimistic view, Jimenez et al. (2022) do find innovative ways in which indigenous communities can leverage IPRs and achieve collective gains, via the use of collective trademarks. Meyer and Naicker (2023) in this Special Issue reaffirm the importance of establishing collective intellectual property systems as an alternative to IPR appropriation by foreign firms, but they also stress how power imbalances in such systems may lead to the exclusion of certain social groups from the benefits of the sharing agreements.

In the context of developing countries' agricultural production, IPR protection has been discussed in relation to seed development and appropriation. Genetically engineered seeds and farmers' dependence on that proprietary technology are considered to undermine farmers' livelihoods by hindering their free reuse of seeds from previous harvests, while it grants strong economic power to agri-food companies owning seed patents (Campi and Nuvolari, 2015). Marin et al. (2023) in this Special Issue discuss how, in Argentina, a favourable intellectual property rights regime for genetically engineered crops has disadvantaged firms specialising in plant breeding and undermined plant-breeding research and technological developments, which the authors suggest would have constituted a more socially and environmentally sustainable alternative to genetic seeds covered by IPR.

2.3. IPRs and societal challenges

In principle, IPRs should facilitate the diffusion of technologies and products that tackle societal challenges by signaling new solutions and speeding up adoption through licensing. In reality, the transfer of knowledge through IPRs can be difficult. One complicating factor is institutional differences between countries. Athreye et al. (2023) in this Special Issue find that patents do not work well as a technology transfer mechanism for clean tech inventions because of the differences between de-jure and de-facto quality of national IPR systems. Their result feeds into the broader debate about the role played by IPRs in the transition to more environmentally sustainable economic systems (Castaldi, 2021; Eppinger et al., 2021). IPR protection might also create system inefficiencies that frustrate the diffusion process. A domain where these inefficiencies are apparent is the one of standard setting, as discussed by Bekkers et al. (2023).

Bustamante et al. (2023) in this Special Issue examine innovations that affect common pool resources, such as inventions that allow for carbon sequestration to address the climate crisis or vaccines that are relevant to combat pandemics. They introduce a conceptual taxonomy that studies the effectiveness of patents in a variety of common pool resources contexts and other relevant characteristics, and examine the possible role of patents in each configuration. Their study is still exploratory, but it has the potential to focus future research in directions with relevant policy implications.

The case of Covid-19 is also a striking one: despite urgent global needs and different initiatives of Covid-19 related pledges, companies have engaged and are still engaging in costly IPR litigation. The debate around Covid-19 vaccine patents has also exposed the varying positions of public institutes and private companies. The IPR-centered appropriation strategies of most pharmaceutical companies co-exist with publicly funded research. Despite having different objectives (at least in theory), universities that perform publicly funded research as well as

other public institutions (including the NIH) do seek IPRs, and actively enforce their IP through litigation as well.[4] However, Ascione et al. (2023) in this Special Issue argue that universities are less prone to litigate than other non-practicing entities.

In general, global health challenges lay bare several tensions in the extent to which IPRs are helping society. For the pharmaceutical industry, Kyle and McGahan (2012) found a strong association between patent protection and R&D efforts for diseases that are prevalent in high income countries, while this association is not found for diseases like malaria, tuberculosis, and leprosy that are prevalent in low-income countries. Incentives for innovation based on IPRs are thus unlikely to be well-suited for the needs of all countries. Where these needs are relatively easy to identify and define, the use of advance market commitments, prizes, and public-private partnerships may be more effective at yielding results as well as being better aligned with social goals. A recent example is the malaria vaccine Mosquirix, the output of more than 30 years of collaborative efforts between a large pharmaceutical firm (GlaxoSmithKline) and the public sector (Walter Reed Army Institute of Medicine in the US), with financial support from international organizations and foundations. Mechanisms to facilitate global diffusion even in the presence of IPRs, such as the Medicines Patent Pool, could also be deployed more widely.

2.4. Alternatives to IPRs?

Given the many critiques and pitfalls of IPR systems outlined above, a natural question to ask is whether their costs outweigh the expected societal benefits. Even more fundamentally, some scholars have questioned the very legitimacy of IPR systems. Historical work on how modern IPR systems have emerged and evolved over time seems particularly useful to help understand current tensions and revives a long-standing debate on the need for and legitimacy of IPR systems (Machlup and Penrose, 1950). In their historical analyses of the pharmaceutical industry, Gabriel (2014) and Dutfield (2020) shed light on the complex relationship between industry evolution, corporate practices, and legal discourses. Gabriel (2014) reconstructs how patents and trademarks on drugs were originally considered unethical. His analysis serves as a reflection on how norms and values around what should or should not be protected by IPRs depends on time and context specific conditions. We also have extensive evidence on how innovators resort to informal appropriation strategies instead of formal ones (Hall et al., 2014), especially in the case of young and small firms (Leiponen and Byma, 2009).

An interesting strand of research focuses on recent attempts to develop alternatives to IPRs. In this respect, David (1993) has noted that property rights are not the only institutional set-up supporting inventive and creative activities in modern capitalist economies. In particular, David points to two alternative systems to property rights: patronage and procurement. Patronage includes all the institutional set-ups in which government (or also publicly spirited private actors) funds the undertaking of creative and innovative activities, by employing (or contracting with) innovators and creators directly. Importantly, this institutional set-up has historically evolved in such a way that innovators and creators funded by the government have relative freedom in deciding the goals of their activities. In contemporary economies, the most relevant example of patronage is government support for basic research via the university system and public research centres. Procurement includes all the cases in which a government writes contracts with innovators and creators for a well-specified product, be this a piece of research or scientific discovery (e.g., a vaccine), a technology or technological artefact (e.g., an advanced weapon system) or a work of art (e.g., a commemorative statue). In some cases, procurement can be set up as a prize or competition. Note that the costs of these alternatives may limit their use by developing countries. Furthermore, they are all vulnerable to regulatory capture, especially when some actors have the resources to put pressure on jurors and regulators (Khan, 2020).

These institutional set-ups (property rights, patronage, and procurement) have resulted in a pluralistic system for the generation of knowledge and other creative works. However, recent debates on IPR reform hint that the boundaries between these systems are not fixed: it is possible that the drive for extending and deepening IPR as an incentive tool for innovators and creators will result in a corresponding squeezing of the patronage and procurement domains. The welfare implications of such reconfiguration are far from obvious, as is suggested by the controversies surrounding the ownership and patentability of university research (Geuna and Nesta, 2006; Ascione et al., 2023). Overall, this would suggest a cautious approach to IPR reform rather than a steadfast prioritization of the "property" approach.

Furthermore, as we have mentioned, the intriguing evidence emerging from the negative IP spaces literature suggests that creativity and innovation can flourish even in contexts in which IPRs are completely absent or inapplicable (Darling and Perzanowski, 2017; Bessen and Nuvolari, 2019). Even for the case of trademarks, which do not directly provide incentives for creativity and innovation, there is evidence of markets and industries which effectively function without trademark-protected brands (Raustiala and Sprigman, 2012). For instance, Füller et al. (2013) discuss communities that create informal user-generated brands. Overall, this literature suggests that there might policy options for creating the context conditions capable of letting alternative approaches emerge in domains that today are dominated by IPRs.

3. Conclusions

The aim of this Special Issue was to gather interdisciplinary contributions that could shed further light on the question of whether current IPR regimes are working for society.

In this editorial, we took stock of the contributions from the Special Issue and other relevant studies to discuss four key themes: (i) IPRs and dynamic competition, (ii) IPRs and economic development, (iii) IPRs and societal challenges and (iv) alternatives to IPRs. Our thematic discussions identified critical debates and flagged the most promising directions of research. At the same time, we also see other areas where research is missing and could be further developed.

A first avenue of research would be to engage in conceptual efforts to define and monitor IPRs in term of how 'inclusive' they are. Evidence suggests that access to and benefits of IPRs are skewed towards certain social groups (Cook and Kongcharoen, 2010) and geographies (Arza et al., 2023). Theories of social justice could be used to understand how the current IPR regimes grant disproportionate power to specific actors (Gosseries et al., 2008). A challenge here is to engage in fruitful conversations with scholars working from philosophical, legal, and anthropological perspectives. When envisaging this Special Issue, we were hoping to attract original contributions from such scholarly communities. Unfortunately, we were not able to elicit an adequate response – suggesting that there might still be a significant intellectual divide between the innovation studies community and other fields addressing foundational questions regarding IPR regimes.

A second avenue of research could engage with the idea of 'responsible IPRs'. As companies are increasingly pressured to act responsibly on different fronts, their IPR strategies are also becoming more and more closely scrutinized. At the same time, it remains unclear to what extent societal pressures (from activist organizations, from consumers, etc.) are enough to change corporate behaviours. Griffiths (2019) provides a sceptical view: shaming of trademarked brands in the fashion industry

[4] For example, the NIH and Moderna have ongoing disputes over the patent rights associated with mRNA technology. Caltech was awarded $1.1billion in a patent lawsuit against Apple and Broadcom. Two academic institutions (UC Berkeley and the Broad Institute) have sued each other over ownership of key CRISPR patents.

has hardly changed practices in their value chains. Others are more positive and discuss initiatives like responsible licensing programs or patent pledges (de Rassenfosse and Palangkaraya, 2023). Understanding the effectiveness of these pressures could inform policymakers on the extent to which public policy action is needed. Insights could be drawn from research on business ethics as well as legal studies.

Thirdly, from an empirical and methodological point of view, there is room for more research aiming to identify the societal value or harm of IPRs in a systematic way. New quantitative methods to identify the public value of patents (Ribeiro and Shapira, 2020) and trademarks (Castaldi and Mendonça, 2022) or their potential human and environmental toxicity (Biggi et al., 2022), as well as empirical research documenting predatory practices with regard to the appropriation of indigenous communities' traditional knowledge via patents or trademarks, offer tools to assess the social value or damage of IPRs. A policy question is whether IPR examination should cover these issues, in addition to verifying administrative requirements and technical claims. This stream of research can potentially provide important insights on possible reforms to the screening process of IPRs.

Finally, another neglected research issue concerns the extent to which the current IPR system is suitable for effective reconfiguration in the context of a sudden crisis or emergency. To be sure, the current system incorporates a number of flexibilities; for example, compulsory licences are possible within TRIPS, including in cases of national emergencies. Nevertheless, it is unclear to what extent these provisions will be sufficient and effective in a "polycrisis" (Tooze, 2021). Therefore, an urgent matter would be to consider how to design IPRs that are flexible enough to enable a prompt response to emergencies and ensure equitable access to innovative solutions. More research in this direction could help expand our understanding of how IPRs can meaningfully work for the benefit of society.

References

Ahn, J.M., Roijakkers, N., Fini, R., Mortara, L., 2019. Leveraging open innovation to improve society: past achievements and future trajectories. R&D Manag. 49 (3), 267–278.

Arrow, K., 1962. Economic welfare and the allocation of resources for invention. In: Nelson, R.R. (Ed.), The Rate and Direction of Inventive Activity: Economic and Social Factors. National Bureau of Economic Research, Chicago, pp. 609–626.

Arza, V., López, A., Montes-Rojas, G., Pascuini, P., 2023. In the name of TRIPS: the impact of IPR harmonisation on patent activity in Latin America. Res. Policy 52 (6), 104759. https://doi.org/10.1016/j.respol.2023.104759.

Ascione, G.S., Ciucci, L., Detotto, C., Sterzi, V., 2023. University patent litigation in the United States: do we have a problem? Res. Policy 52 (2).

Athreye, S., Kathuria, V., Martelli, A., Piscitello, L., 2023. Intellectual property rights and the international transfer of climate change mitigating technologies. Res. Policy 52 (9), 104819. https://doi.org/10.1016/j.respol.2023.104819.

Ayerbe, C., Azzam, J., Boussetta, S., Pénin, J., 2023. Revisiting the consequences of loans secured by patents on technological firms' intellectual property and innovation strategies. Res. Policy 52 (8), 104824. https://doi.org/10.1016/j.respol.2023.104824.

Bekkers, R., Tur, E.M., Henkel, J., van der Vorst, T., Driesse, M., Contreras, J.L., 2023. Overcoming inefficiencies in patent licensing: a method to assess patent essentiality for technical standards. Res. Policy 51 (10), 104590. https://doi.org/10.1016/j.respol.2022.104590.

Bessen, J.E., Meurer, M.J., 2008. Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk. Princeton University Press.

Bessen, J., Nuvolari, A., 2019. Diffusing new technology without dissipating rents: some historical case studies of knowledge sharing. Ind. Corp. Chang. 28 (2), 365–388.

Biasi, B., Moser, P., 2021. Effects of copyrights on science: evidence from the wwii book republication program. Am. Econ. J. Microecon. 13 (4), 218–260.

Biggi, G., Giuliani, E., Martinelli, A., Benfenati, E., 2022. Patent toxicity. Res. Policy 51 (1), 104329.

Boldrin, M., Levine, D.K., 2008. Against Intellectual Monopoly. Cambridge University Press, Cambridge.

Branstetter, L.G., Fisman, R., Foley, C.F., 2006. Do stronger intellectual property rights increase international technology transfer? Empirical evidence from US firm-level panel data. Q. J. Econ. 121 (1), 321–349.

Bustamante, J., Oughton, C., Pesque-Cela, V., Tobin, D., 2023. Resolving the patents paradox in the era of COVID-19 and climate change: towards a patents taxonomy. Res. Policy 52 (9), 104850. https://doi.org/10.1016/j.respol.2023.104850.

Büttner, B., Firat, M., Raiteri, E., 2023. Patents and knowledge diffusion: the impact of machine translation. Res. Policy 51 (10), 104584. https://doi.org/10.1016/j.respol.2022.104584.

Calboli, I., 2014. Trademarking creative works: trends and negative effects on the copyright equilibrium. In: Frankel, S., Gervais, D. (Eds.), (2014). The Evolution and Equilibrium of Copyright in the Digital Age, Vol. 26. Cambridge University Press, pp. 52–80.

Campi, M., Nuvolari, A., 2015. Intellectual property protection in plant varieties: a worldwide index (1961–2011). Res. Policy 44 (4), 951–964.

Campi, M., Nuvolari, A., 2021. Intellectual property rights and agricultural development: evidence from a worldwide index of IPRs in agriculture (1961-2018). J. Dev. Stud. 57 (4), 650–668.

Castaldi, C., 2021. Sustainable innovation and intellectual property rights: friends, foes or perfect strangers? In: Voinea, C.L., Roijakkers, N., Ooms, W. (Eds.), Sustainable Innovation: Strategy, Process and Impact. Routledge, pp. 229–238.

Castaldi, C., 2023. Off the mark? What we (should) know about the bright and dark sides of corporate trademark practices. Ind. Corp. Chang. 32 (5), 1046–1062.

Castaldi, C., Mendonça, S., 2022. Regions and trademarks: research opportunities and policy insights from leveraging trademarks in regional innovation studies. Reg. Stud. 56 (2), 177–189.

Cimoli, M., Dosi, G., Maskus, K., Okediji, R., Reichman, J., Stiglitz, J., 2014. Intellectual Property Rights. Legal and Economic Challenges for Development. Oxford University Press, Oxford.

Cockburn, I.M., MacGarvie, M.J., 2011. Entry and patenting in the software industry. Manag. Sci. 57 (5), 915–933.

Contreras, J.L., Hall, B.H., Helmers, C., 2018. Green Technology Diffusion: A Post-Mortem Analysis of the Eco-Patent Commons, Working Paper. w25271. National Bureau of Economic Research.

Cook, L.D., Kongcharoen, C., 2010. The Idea Gap in Pink and Black, Working Paper w16331. National Bureau of Economic Research.

Darling, K., Perzanowski, A. (Eds.), 2017. Creativity Without Law: Challenging the Assumptions of Intellectual Property. New York University Press, New York.

David, P.A., 1993. Intellectual property institutions and the panda's thumb: patents, copyrights, and trade secrets in economic theory and history. In: Wallerstein, M.B., Mogee, M.E., Schoen, R.A. (Eds.), Global Dimensions of Intellectual Property Rights in Science and Technology. National Academy Press, Washington, DC, pp. 19–64.

de Rassenfosse, G., Palangkaraya, A., 2023. Do patent pledges accelerate innovation? Res. Policy 52 (5), 104745. https://doi.org/10.1016/j.respol.2023.104745.

Delgado, M., Kyle, M., McGahan, A.M., 2013. Intellectual property protection and the geography of trade. J. Ind. Econ. 61 (3), 733–762.

Dosi, G., Stiglitz, J.E., 2014. The role of intellectual property rights in the development process, with some lessons from developed countries: an introduction. In: Cimoli, M., et al. (Eds.), Intellectual Property Rights: Legal and Economic Challenges for Development. Oxford University Press, pp. 1–55.

Dosi, G., Marengo, L., Pasquali, C., 2006. How much should society fuel the greed of innovators? On the relations between appropriability, opportunities and rates of innovation. Res. Policy 35 (8), 1110–1121.

Dutfield, G., 2020. That High Design of the Purest Gold: A Critical History of the Pharmaceutical Industry 1880–2020, World Scientific, Hackensack NJ Economides (1988), The Economics of Trademarks, Trademark Reporter, 78, pp. 523–539.

Economides, N.S., 1988. The economics of trademarks. Trademark Rep. 78, 523.

Eppinger, E., Jain, A., Vimalnath, P., Gurtoo, A., Tietze, F., Chea, R.H., 2021. Sustainability transitions in manufacturing: the role of intellectual property. Curr. Opin. Environ. Sustain. 49, 118–126.

Fauchart, E., Von Hippel, E., 2008. Norms-based intellectual property systems: the case of French chefs. Organ. Sci. 19 (2), 187–201.

Fink, C., Fosfuri, A., Helmers, C., Myers, A.F., 2022. Submarine trademarks. J. Econ. Manag. Strateg. 31 (4), 818–840.

Fromer, J.C., Sprigman, C.J., 2017. A Theory of Legal Protection for Industrial Design. NYU Law and Economics Research Paper No.17–37.

Füller, J., Schroll, R., Von Hippel, E., 2013. User generated brands and their contribution to the diffusion of user innovations. Res. Policy 42 (6–7), 1197–1209.

Gabriel, J.M., 2014. Medical Monopoly. University of Chicago Press, Chicago, IL.

Galasso, A., Schankerman, M., 2014. Patents and cumulative innovation: causal evidence from the courts. Q. J. Econ. 130 (1), 317–369.

Gallini, N., Scotchmer, S., 2002. Intellectual property: when is it the best incentive system? Innov. Policy Econ. 2, 51–77.

Geuna, A., Nesta, L., 2006. University patenting and its effects on academic research: the emerging European evidence. Res. Policy 35, 790–807.

Gilchrist, D.S., 2016. Patents as a spur to subsequent innovation? Evidence from pharmaceuticals. Am. Econ. J. Appl. Econ. 8 (4), 189–221.

Giorcelli, M., Moser, P., 2020. Copyrights and creativity: evidence from Italian opera in the Napoleonic age. J. Polit. Econ. 128 (11), 4163–4210.

Giuliani, E., Jaqueminet, A., Nieri, F., 2021. Bringing light to dark spots: The case of cross-border bioprospecting. In: Castellani, D., Perri, A., Scalera, V., Zanfei, A. (Eds.), Cross-Border Innovation in a Changing World. Oxford University Press, pp. 324–345.

Gosseries, A., Marciano, A., Strowel, A., 2008. Intellectual Property and Theories of Justice. Palgrave Macmillan London.

Greenhalgh, C., Rogers, M., 2010. Innovation, intellectual property, and economic growth. In: Innovation, Intellectual Property, and Economic Growth. Princeton University Press, Oxford, UK.

Greenhalgh, C., Rogers, M., 2012. Trade marks and performance in services and manufacturing firms: evidence of Schumpeterian competition through innovation. Aust. Econ. Rev. 45 (1), 50–76.

Griffiths, A., 2019. Brands, 'weightless' firms and global value chains: the organisational impact of trade mark law. Leg. Stud. 39 (2), 284–301.

Hall, B., Helmers, C., Rogers, M., Sena, V., 2014. The choice between formal and informal intellectual property: a review. J. Econ. Lit. 52 (2), 375–423.

Hall, B.H., Graevenitz, G.V., Helmers, C., 2021. Technology entry in the presence of patent thickets. Oxf. Econ. Pap. 73 (2), 903–926.
Haskel, J., Westlake, S., 2018. Capitalism without Capital: The Rise of the Intangible Economy. Princeton University Press, Oxford, UK.
Heller, M., 2010. The Gridlock Economy: How Too Much Ownership Wrecks Markets Stops Innovation, and Costs Lives. Basic Books, New York, NY, US.
Henry, C., Stiglitz, J.E., 2010. Intellectual property, dissemination of innovation and sustainable development. Global Pol. 1 (3), 237–251.
Jimenez, A., Delgado, D., Merino, R., Argumedo, A., 2022. A decolonial approach to innovation? Building paths towards Buen Vivir. J. Dev. Stud. 58 (9), 1633–1650.
Kaiser, F., Cuntz, A., Peukert, C., 2023. Batman forever? The role of trademarks for reuse in the US comics industry. Res. Policy 52 (8), 104820. https://doi.org/10.1016/j.respol.2023.104820.
Khan, Z., 2020. Inventing Ideas. Patents, Prizes and the Knowledge Economy. Oxford University Press, Oxford, UK.
Kingston, W., 2001. Innovation needs patents reform. Res. Policy 30 (3), 403–423.
Kremer, M., 1998. Patent buyouts: a mechanism for encouraging innovation. Q. J. Econ. 113, 1137–1167.
Kyle, M.K., McGahan, A.M., 2012. Investments in pharmaceuticals before and after TRIPS. Rev. Econ. Stat. 94 (4), 1157–1172.
Leiponen, A., Byma, J., 2009. If you cannot block, you better run: small firms, cooperative innovation, and appropriation strategies. Res. Policy 38 (9), 1478–1488.
Lemley, M., 2015. Faith-based intellectual property. UCLA Law Rev. 62, 1328–1346.
Lunney Jr., G.S., 1999. Trademark monopolies. In: Emory LJ, 48, p. 367.
Machlup, F., Penrose, E., 1950. The patent controversy in the nineteenth century. J. Econ. Hist. 10 (1), 1–29.
Marin, A., Stubrin, L., van Zwanenberg, P., 2023. Technological lock-in in action: appraisal and policy commitment in Argentina's seed sector. Res. Policy 52 (2), 104678. https://doi.org/10.1016/j.respol.2022.104678.
McCabe, M., Snydor, C., 2014. Identifying the effect of open access on citations using a panel of science journals. Econ. Inq. 52 (4), 1284–1300.
Meyer, C., Naicker, K., 2023. Collective intellectual property of indigenous peoples and local communities: exploring power asymmetries in the rooibos geographical indication and industry-wide benefit-sharing agreement. Res. Policy 52 (9), 104851. https://doi.org/10.1016/j.respol.2023.104851.
Moser, P., 2013. Patents and innovation: evidence from economic history. J. Econ. Perspect. 27 (1), 23–44.
Orozco, D., Poonamallee, L., 2014. The role of ethics in the commercialization of indigenous knowledge. J. Bus. Ethics 119 (2), 275–286.
Pagano, U., 2014. The crisis of intellectual monopoly capitalism. Camb. J. Econ. 38 (6), 1409–1429.
Petit, E., de la Potterie, B.V.P., Gimeno-Fabra, L., 2023. Are patent offices substitutes? Res. Policy 52 (8), 104823. https://doi.org/10.1016/j.respol.2023.104823.
Ramello, G.B., Silva, F., 2006. Appropriating signs and meaning: the elusive economics of trademark. Ind. Corp. Chang. 15 (6), 937–963.
Raustiala, K., Sprigman, C., 2012. The Knockoff Economy: How Imitation Sparks Innovation. Oxford University Press, New York, NY, US.
Reichman, J.H., 2014. Intellectual property in the twenty-first century: will the developing countries lead or follow? In: Cimoli, M., Dosi, G., Maskus, K., Okediji, R., Reichman, J., Stiglitz, J. (Eds.), Intellectual Property Rights. Legal and Economic Challenges for Development. Oxford University Press, Oxford, pp. 111–179.
Ribeiro, B., Shapira, P., 2020. Private and public values of innovation: a patent analysis of synthetic biology. Res. Policy 49 (1), 103875.
Robinson, D.F., 2012. Biopiracy and the innovations of indigenous peoples and local communities. In: Drahos, P., Frankel, S. (Eds.), Indigenous Peoples' Innovation: Intellectual Property Pathways to Development. ANU E Press, Canberra, Australia, pp. 77–93.
Sáiz, P., Castro, R. (Eds.), 2022. The Brand and Its History: Trademarks, Branding and National Identity. Routledge, New York, NY, US.
Sampat, B., Williams, H.L., 2019. How do patents affect follow-on innovation? Evidence from the human genome. American Economic Review 109 (1), 203–236.
Scotchmer, S., 1991. Standing on the shoulders of giants: cumulative research and the patent law. J. Econ. Perspect. 5 (1), 29–41.
Scott, P., Spadavecchia, A., 2023. Patents, industry control, and the rise of the giant American corporation. Res. Policy 52 (1), 104651. https://doi.org/10.1016/j.respol.2022.104651.
Sprigman, C.J., 2017. Copyright and creative incentives: What we know (and don't). Hous. L. Rev. 55, 451.
Stiglitz, J.E., 2007. Economic foundations of intellectual property rights. Duke LJ 57, 1693.
Tooze, A., 2021. Shutdown: How Covid Shook the World's Economy. Allen Lane, New York, NY, US.
van Gompel, S., 2019. Patent abolition: a real-life case study. Am. Univ. Int. Law Rev. 34, 877–922.
Wagner, S., Sternitzke, C., Walter, S., 2022. Mapping Markush. Res. Policy 51 (10), 104597. https://doi.org/10.1016/j.respol.2022.104597.
Williams, H.L., 2013. Intellectual property rights and innovation: evidence from the human genome. J. Polit. Econ. 121 (1), 1–27.
Wynberg, R., 2023. Biopiracy: crying wolf or a lever for equity and conservation? Res. Policy 52 (2), 104674. https://doi.org/10.1016/j.respol.2022.104674.
Ziedonis, R.H., 2008. On the apparent failure of patents: a response to Bessen and Meurer. Acad. Manag. Perspect. 22 (4), 21–29.

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