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The economics of copyright and the internet:
Moving to an empirical assessment relevant in the digital age

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The Economics of Copyright and the Internet: *Moving to an Empirical Assessment Relevant in the Digital Age*

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Abstract

Technology and the Internet have triggered important changes to how creative works are created, accessed and how creators and copyright-based industries generate their revenues.

In this chapter, we re-assess the economics of copyright in the light of these changes. After providing an introduction to the economics of copyright, the article analyses the changes to the baseline copyright model triggered by the new technological landscape. Then, the article assesses the empirical economic work on copyright so far, and suggests future avenues of research and related data needs.

Disclaimer

The views expressed in this article are those of the authors and do not necessarily reflect the views of the World Intellectual Property Organization or its member states.

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Introduction

Technology and the Internet have triggered important changes to how creative works are created, accessed and how creators and copyright-based industries generate their revenues.

Digital content markets have double-digit growth rates across various content sectors and increasing shares of total revenues. In addition, new types of content, novel content producers and innovative ways of manipulating and modifying digital content are emerging.

In this chapter, we re-assess the economics of copyright in the light of these changes. Section I provides an introduction to the economics of copyright. Section II provides an overview of the changes to the baseline copyright economics model. Section III summarises the existing economic literature so far and resulting data needs.

1. The Economics of Copyright – The Baseline Model Before Digitization

At the outset, it makes sense to recast the main economic rationale behind copyright law.

Legally speaking, copyright law grants moral and economic rights to the creator of a work, such as a song or a movie.¹ At the international level the minimum term of protection is 50 years, plus the life of authors, but in many countries this term has been raised, often to 70 years after the death of the author.

This legal set-up is grounded in the economics of copyright which sees this intellectual property right (IPR) as an instrument to stimulate the production and dissemination of creative works.² Economists qualify creative works as non-excludable goods that can be reproduced at low marginal cost and enjoyed in a 'non-rival' way by many consumers. However, if creative works were provided at marginal (and hence low) costs or copied for free, creators and the associated industries would have no direct incentive to undertake the investments to create works. The supply of creative works – in terms of quantity, quality or diversity – could fall below a level that is socially desirable. Indeed, the fixed cost to produce content and the risks associated with financing the production, marketing and distribution of creative works tend to be high in many content sectors.

The establishment of a copyright system is seen as the solution to the above market failure. As with other IP rights, however, a trade-off among costs and benefits is involved which merits careful consideration (see Table 1). This trade-off strikes the balance between the short-term gratification of immediate consumption and the long-term process of providing economic incentives that reward creativity and foster a dynamic culture.³

On the one hand, the creator of a work is rewarded with the grant of an exclusive right for having invested the necessary time and effort in cultural creation.⁴ Besides any moral rights conferred by copyright law, the economic rights grant the creator exclusive control over her work with respect to reproduction, translation, adaptation, public performance and certain ways of making available to the public (e.g. broadcasting) and generating revenues from said works. First, theoretically at least, these rights allow the creator to set the market price at a

¹ It applies to 'every production in the literary, scientific and artistic domain, whatever may be the mode or form of its expression'. This includes books, music, plays, choreography, photography, films, paintings, sculptures, and computer programmes and databases.

² Landes and Posner (1989) and WIPO (2003).

³ Gurry (2011).

⁴ Plant (1934).

'monopoly' rather than at a competitive level, and secondly, it allows the creator to price-discriminate with regard to the other market participants according to different levels of access.⁵ The exclusive rights conferred by copyright are intended to trigger a positive effect on the supply of creative works, both direct as authors are incentivised and indirect as the created work might stimulate follow-on creativity by others.

Table 1. Effects of the Copyright System – A Conceptual Framework

	Potential upside impacts	Potential downside impacts
Effect on creative supply	<ul style="list-style-type: none"> - Positive incentive for creators and right holders to create, supply and finance creative works induced by prospect of remuneration - Positive effect on follow-on creators as more creative works act as inspiration. Copyright also provides for a framework clarifying how to license, and re-use creative works of others 	<ul style="list-style-type: none"> - Reduced follow-on creativity induced by fact that copyright might reduce access, increase price, and outlaw unauthorised adaptations and other re-uses of creative works
Effect on access by the end user	<ul style="list-style-type: none"> - The above positive effect on creative supply will positively influence the availability of creative works 	<ul style="list-style-type: none"> - Increased cost of access for the end user and limitations on if, how and when the content can be accessed
Institutional and administrative effects	<ul style="list-style-type: none"> - The copyright system allows to transact and collaborate with IP as the main coordination vehicle 	<ul style="list-style-type: none"> - Administration and transaction costs created by the copyright system (deadweight-loss)

Importantly, copyrights play a fundamental role in the economic organization of creative activities and the creative industries. Copyrights are a vehicle for transaction and cooperation, as rights can be transferred and bundled.

Rarely do consumers enjoy creative works directly from a 'lone creator' as often implied in economic treatise or studies as they relate to copyright. A musician will often rely on a record company to invest in his recording, to market it, to arrange for broadcasts, etc. She will also rely on a collective management organization (CMO) to generate revenues for her through collective licensing of her music to radio stations and other outlets. Many creative works also require the participation of many creators with potential rights to their performance which need to be negotiated and bundled in one piece of work. A movie for instance has a scriptwriter, a director, actors, cameramen and the like, which all share in the creation and potentially hold separate rights.

Copyright-based industries often are the right holders responsible for financing, supporting, distributing and marketing creative works. They also often shoulder and manage the risk involved in the production of creative works; it is well demonstrated that only a limited number of copyright works generate the bulk of industry revenues, cross-subsidizing other less successful creations.

⁵ WIPO (2003).

On the other hand, the impact on follow-on creation and the access by end users can also be negatively affected.

When it comes to access by end users, the exclusive rights conferred by copyright law allow the rights holder to control the work, its accessibility, its pricing, its modification, and other elements. It is expected that this raises the price of the said work, in particular when works can be shared through copying or rentals.⁶

In reality, of course, creators or artists cannot set prices while ignoring market forces. The price elasticity of demand, the availability of many other competing content products, and many other factors will reign in a power to control prices which is more theoretical than real. In addition, it is not the creator herself who decides on the pricing of her work in most cases, but intermediaries, e.g. the movie studio, the collective management organization (CMO), etc.) and distributors, e.g. record shops, supermarkets do.⁷ It can also be noted here that in many creative posts, such as computer programmers, journalists, and others, the copyright is never attributed to the actual creator of said work but to her employer.

However, the point about potentially higher prices remains valid. Access to the creative work will certainly not be free and ubiquitous.

When it comes to the impact on follow-on creation, the limitations on accessing, re-using and modifying creative works – which all could inspire the creation of new works - can also be reduced due to exclusive copyrights, potentially negatively affecting creative supply. As compared to patents, copyright works fall in the public domain much later and potential follow-on creators - either of original works or adaptations - can be negatively affected.⁸ This holds particularly true when copyright exceptions and limitations to exclusive rights (e.g. fair use provisions, exceptions for educational purposes) are not applicable.

Finally, while the existence of copyright facilitates transactions, and the collaboration of parties, it can also hinder the making available of works and impose costs on intermediaries keen to invent new forms of access and new business models.

- First, copyright by definition means exclusivity and territoriality depending on the country and its legal regime. Right holders might refuse to license and make accessible the work to particular actors or transmission channels, or to particular jurisdictions.⁹ In particular when new entrants would like to make content available in new ways, the refusal to offer or broadcast certain copyright works might disable new forms of accessing content, e.g. securing the rights to broadcast soccer matches over mobile phones by telecom providers was a daunting process. At times, refusal to license can have anticompetitive motives.¹⁰
- Second, the nature of scattered and unregistered rights and their territorial nature can complicate the identification of right holders and the construction of new business models. Indeed the complexity and costs of the legal processes and the fees involved can be as high as to discourage new market entrants. Small players in particular might face insurmountable obstacles. This became apparent in the online context, with new entrants – no matter how large their size - initially having a hard time

⁶ Varian (2000).

⁷ I thank my colleague Paolo Lanteri (WIPO) for this important point.

⁸ Landes (2002).

⁹ This point much depends on the circumstances in question. For instance CMOs often have the obligation of non-discriminatory practice, i.e. nobody can be prevented from using particular content; no direct authorisation from the right holder is indeed required. But even in this case, digital exploitation is often not included in CMO contracts.

¹⁰ Wunsch-Vincent (2010a).

securing rights for many territories in a timely manner. Even today, it is challenging to propose an online video platform where videos can be watched in many legal jurisdictions alike, as rights have not been obtained for cost, process or other reasons.¹¹ The difficulty of securing the rights to orphan works – creative works where the author can no longer be identified – is also a recurrent policy issue.

In addition, maintaining a copyright system is not costless. Similar to other forms of statutory intervention, a copyright system also creates considerable administration, enforcement and transaction costs that lead to a so-called ‘dead-weight loss’.¹² As copyrights are never examined or renewed, no related efforts or fees have to be incurred.¹³ As a result as opposed to the patent system the cost on this end are rather low. Still private parties have to keep records, transact, negotiate, clear, and enforce rights. Policymakers are occupied with finding the right scope and length of protection. Courts are involved in settling disputes and police, border authorities and others – including private firms on their own or others’ behalf - in enforcement.

In light of the above, there is recognition among economists that copyrights alone might not create optimal incentives and economic rewards for creators. Given the multiplicity of right holders, copyright markets and institutions such as CMOs are needed to create more efficient markets, hence to reduce transaction costs related to search, bargaining, and other processes and to intermediate between creators, licensors and licensees. This is ever more topical in the digital era.¹⁴

In order to better understand the impact of copyrights on economic outcomes and social welfare, economists have to disentangle the various above effects on creators and performers, right holders, the industry, the consumers and society at large while taking the parameters of the particular copyright system and possible alternatives into account.¹⁵ Parameters are the definition of protectable subject matter, the scope of exclusive rights, exceptions and limitations, duration of protection, as well as mechanisms to create copyright markets and exchanges, the level of enforcement and finally also on how these parameters are put in practise or modified by law or behaviour in an online context.

Importantly, and to lead over to the topic of copyright in the digital age, the outcome of this analysis is largely an empirical and not a theoretical question. Is the legal and administrative set-up guaranteeing an optimal supply of creative goods, new genres and related innovation and diversity? Is the term of protection long enough to stimulate these policy objectives, and in particular as compared to the access barriers it might create?

¹¹ Many online video platforms make content available in one or two jurisdictions only, and in particular in the United States. This same content is not accessible out of a European or Asian country, for instance.

¹² Watt (2000).

¹³ Art. 5 (2) of the Berne Convention provides for formality free protection of creative works. That said, some countries can oblige or give preference to national creators who register their copyright works. See the discussion in part III.

¹⁴ Wunsch-Vincent (2010a, b).

¹⁵ From an economist’s perspective, there are several alternatives to a copyright: One strand of literature argues that in the absence of a copyright system, markets would simply adapt and resort to alternative business models, such as first mover advantages (Boldrin and Levine, 2002), the joint sale of complements, creating product lines (what Varian, 2005 called ‘versioning’), price discrimination among different groups of customers (Liebowitz, 1985) or network effects (i.e. where the benefits of a good increases when more consumers use it). Another strand of literature prefers alternative statutory interventions such as to charge levies on copying technologies, to award prizes, stipends or direct subsidies to creators. However, all these alternatives have the disadvantage of relying at least partly on central control, whereas in a copyright system, the decision-making is decentralised and based on market mechanism.

2 Transposing Copyrights to the Internet : What Impacts on the Baseline Copyright Economics Model?

How do the above trade-offs and the potential costs and benefits of the copyright system change in an online environment?

At the outset it can be said that the basic trade-offs and associated questions behind the copyright system remain unchanged. The basic tenets of the economics of copyright, and hence the motivation for copyright laws and regulations, remain valid in an Internet age.

Yet, there are a few important factors brought about by digital technologies which fundamentally change the way (i) how content is created, (ii) how it is accessed, (iii) and, potentially how copyrights are administered. The empirical economic evaluation of the associated trade-offs induced by copyright law is affected.

First, the increased availability of digital technologies, and the Internet in particular, have arguably and on first sight significantly lowered the costs to create, copy and distribute creative works on a global scale in a quasi instantaneous fashion.¹⁶ Undoubtedly, this paradigm shift has the potential to stimulate access and creativity. By many accounts, a promise of ubiquitous and more universal access to content and creativity should materialise. Lower content creation and distribution costs could eventually also lead to wider distribution of creative works or higher profit margins of creators and associated industries. Arguably, it has never been easier to create and re-use or adapt content. Amateur content creators are certainly now recognised as a new creative force.¹⁷ All in all, a potentially wider range of authors and creators stands to be incentivised by the copyright system.

These above points need to be put into perspective however when looking at professionally produced content.¹⁸ Many content sectors have actually experienced increased costs of production in a digital context, e.g. online video and computer games and new digitally shot cinema movies are multiple times more expensive than their offline equivalent. Creating a professional news report based on field research in a natural disaster zone still entails significant costs. Essentially, it is the distribution costs of content – and thus a relatively minor share of overall costs¹⁹ - which has plummeted thanks to digitization and the Internet. Also novel digital distribution costs arise as discussed later in this article.

At the same time, the same tools facilitate the piracy of creative works as the variable cost of copying and disseminating unauthorized copies is reduced to close to zero. Authors of creative works and associated content industries might benefit less as their revenues from paid copies could effectively be reduced. Costly policing of copyright infringements will ensue and seeking enforcement of rights via private means and public courts to restore the original trade-off intended by the copyright system. The incentive effect of copyright might thus be reduced by rampant unauthorised copying and the inability to enforce private copyrights.

Second, the rise of the Internet as new distribution channel has introduced a change as to how works are made accessible and as to how revenues are generated and shared. Digital content markets have double-digit growth rates across the industry sectors and increasing shares of total revenues. Offline transactions have moved online.

¹⁶ Varian (2010) and Gurry (2011).

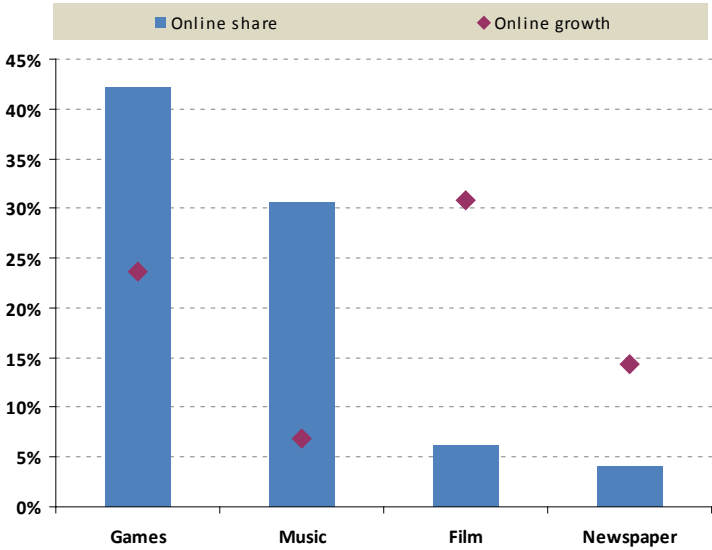
¹⁷ OECD (2007).

¹⁸ C.f. Wager (2008). Section 3 of this article on 'Promotion of Follow-on Creation' discusses the balance between original creators and follow-on creators.

¹⁹ See OECD (2005) for a breakdown of costs in the music sector.

To illustrate, Figure 1 depicts the online share and growth of content sectors such as games, music, film and newspapers to illustrate. In addition, new forms of content, new content producers and new ways of manipulating and modifying ('meshing') digital content are emerging.

Figure 1. Digital Content Share and Growth 2009-2010



Source: Author based on data from PriceWaterHouseCoopers, updated from OECD (2008, 2010, 2012).

Value chains and business models – and associated revenue opportunities and incentives - have changed with uncertain impacts on the supply of and the access to creative works. Initially it was expected that content creators could largely 'disintermediate' intermediaries, potentially generating more profits from themselves. The instant migration from a restricted offline to a more liberated online model with access to content 'everywhere, on every device and at ever time of day' was foreseen. In the process, additional incentives for creators and the content industry to create and finance creativity would see the day of light

Reality has proven experts of these early days wrong. The development of workable online content business models has been slower than expected. Ten years ago nobody imagined the complexity of putting these online distribution and business models together. Roadblocks have been technological issues, the legitimate fear of online piracy and – amongst others - the difficulty of agreement on adequate revenue sharing and business models.

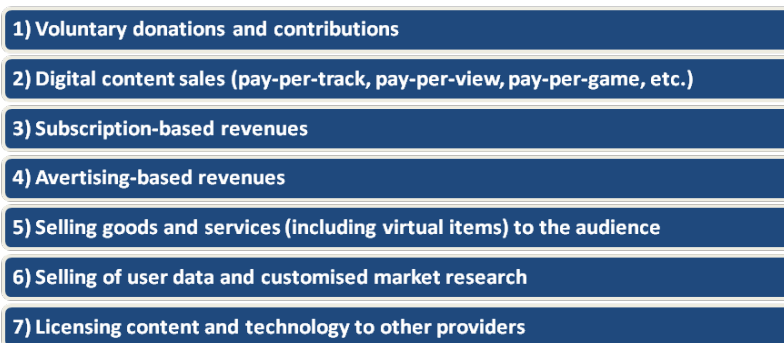
Direct relations between content creators and consumers, and thus full disintermediation, are still rather the exception than the norm, e.g. musicians offering music for free to obtain revenue from donations and/or film writers offering short or feature films on video-sharing platforms for sale. Instead, the role of intermediaries and aggregators for digital content seems to be growing. The notions that the costs of content production will drop to zero, that creators can do away with the content industry or that user-created content will supplant professional content are now also largely discarded. A co-existence of mutually enriching professional and amateur content is the more likely scenario.

The position of creators, rights holders and cultural industries has changed in this new configuration with impacts on their expected revenues and the economic function of copyright. Transformed digital content value and distribution chain exist with new important intermediaries²⁰, online platforms and, potentially, hardware devices required to access content²¹; re-intermediation rather than dis-intermediation is taking place.

Right holders still exercise distribution and price control. Yet this control is diminished by new distribution models and certainly also the interest to lure consumers to legal content offerings. The power to extract revenues from copyright is affected. New intermediaries and device manufacturers start having significant clout in the content value and distribution chain. It is currently unclear who is extracting most value from commercial digital content transactions and where the bargaining power lies: Does it lie with the creators, the content industry, i.e. the content, infrastructure providers, i.e. the 'pipes', online intermediaries and aggregators, e.g. online content store-fronts, search engines, social networks, or device manufacturers which are able to tie content to their particular device?

At the same time we are witnessing the proliferation of new business models (see Figure 2) which potentially also impact the expected economic benefit from copyright; the control of creators in how content revenue is generated and shared is challenged.

Figure 2. Digital Broadband Content Business Models

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- 1) Voluntary donations and contributions
 - 2) Digital content sales (pay-per-track, pay-per-view, pay-per-game, etc.)
 - 3) Subscription-based revenues
 - 4) Advertising-based revenues
 - 5) Selling goods and services (including virtual items) to the audience
 - 6) Selling of user data and customised market research
 - 7) Licensing content and technology to other providers

Source: Author based on OECD (2008)

Often the direct link between a consumer payment and the access to a given work by an artist is put into question, with uncertain outcomes for artists and the content industry's revenue structure. In many advertising-based, donation or subscription-based models consumers do no longer purchase one particular creative work.²² For example, online music subscription services which are available for a few Euros per month deliver unlimited music across a wide range of musicians.

Also an unbundling of what used to be bundled for the last three decades is taking place. The fact that consumers can purchase individual newspaper articles rather than the newspaper, selected scientific articles rather than the full journal subscription, or individual songs rather than the full album has an impact on the expected copyright-based and other revenues.

²⁰ E.g. digitization, digital rights management, hosting of content, content aggregation and distribution.

²¹ Often particular content is now tied to particular platforms or devices (i.e. a new form of vertical integration with games tied to certain consoles, music tied to certain online platforms and/or MP3 players, online news content tied to certain tablets, user-created content tied to certain sharing platforms), and in the face of lacking (commercial) interoperability and 'lock-in' third parties or new entrants cannot compete.

²² As my colleague Hannu Wager points out, with respect to music this is the return to the past where – before the inventions of Long Play vinyl records – songs were purchased individually.

This is not to say that the effect of the revenues of content creators, the content industry or others need be negatively affected. If the overall pie of revenues increases, potentially original creators, both amateurs and professional ones, stand to benefit.

It is again an empirical question whether revenues for creators - and hence, in part, the motivational incentive triggered by copyright - have increased or decreased. On the one hand, incentives for creation might increase as costs are lower. New revenue sources and mechanisms (e.g. micropayment) can be uncovered, and niche artists and genres find a more receptive audience. On the other hand, the redistribution of bargaining power along the value chain and the rise of different business models might also question the sustainability of creative supply in the future. In other words: Is copyright still a guarantee to generating sufficient revenue for artists and the associated content industries in this new context?

At the moment, the scarce information available on online digital business models does not convincingly demonstrate that copyright holders surely benefit from new digital content value chains and business models. In OECD (2005), authors tried to assess the revenue implications for artists from pay-per-track and new subscription schemes showing that the cut to creators might be lower but generally concluding that the data situation is to unsatisfactory to produce a certain finding on this point. Press articles have also surfaced with more anecdotal but revealing insights that streaming services do not generate much income for musicians.²³

Looking at indirect revenue streams via collective management, a clear-cut assessment of what the online future holds for creators' revenues is also difficult to ascertain. The annual reports of the International Confederation of Authors and Composers Societies (CISAC) shows that in 2011 globally only 2.2% of revenues generated by public performance were generated by digital sources and the underlying rights.²⁴ At the same time, digital rights are the second most important driver of public performance revenues, after television and radio. Also, overall the substitution from offline to online channels has not impacted the fact that CISAC's global collections have continually increased throughout the last decade.

Finally, one could have expected that technology will make the administration of copyrights, i.e. the identification of a rights holder, the clearing of rights, the redistribution of revenue, etc., easier, more efficient and transparent. One would assume that digital transactions make it much simpler to gather detailed records on content consumption and to pay out a corresponding, fair remuneration.

So far however the administration of copyrights has not yet been significantly impacted by the digital revolution. As put by Gurry (2011), *'important pressures for the copyright system are trapped in a territorial cage, whereas economic and technological behaviour burst out of that cage some time ago'*. The transaction costs in managing legitimate transactions in copyright material are continuing to pose entry barriers, in particular for the international development of new creators or creative works worldwide or new Internet-based, borderless distribution platforms.²⁵ The scarcity of reliable information on copyright status and licensing conditions remains.²⁶ Finding out whether the direct or indirect – i.e. via collective rights management - remuneration of artists has been made more efficient or precise is a challenge. This holds true despite of the improving data work by CMOs. The latter necessarily cover their collection revenue only, and hence are necessarily biased towards certain sectors and indirect revenue sources.

²³ 'As Music Streaming Grows, Royalties Slow to a Trickle showing that streaming services generate hardly any income for musicians', New York Times (January 28, 2013).

²⁴ CISAC (2012).

²⁵ Varian (2010).

²⁶ Lanteri (2012, 2013)

Also several CMOs often exist per country and not all of their data is equally accessible, making the compilation of a meaningful national or international database impossible.

Changes to the technical and institutional copyright infrastructure might thus be needed to reinstate the function of copyright which is to allow the generation of revenue in return for authorized consumption.²⁷

Finally, the enforcement of copyrights, a necessary condition to ensure the incentive effect of copyright law, has also become significantly more challenging in the online context.²⁸ Years have passed and the legal certainty on digital consumption on the Internet has not improved. Knowing what is legal and what is not remains challenging for consumers and courts alike, e.g. unauthorized streaming versus downloading, uploading of unauthorized material versus the downloading, etc. If one introduces the country-specific and case-specific heterogeneity on the matter, things become more difficult.²⁹ To simplify, in studies economists often lump together what should not be, for example, treating all activity or files on peer-to-peer networks as illegal.

3. What has the Economic Literature produced so far and What Data Issues remain as Obstacles?

For a start, it is fair to argue that the empirical literature on copyright is fairly nascent. Economists have largely focused their empirical work on the economics of the patent system.

Indeed the basic tenets of copyright effects as explained in Section I and without consideration to the new technologies evoked in Section II remain largely untested. It has been hard for economists to assess the actual incentive effect of copyright in an offline context, and its impacts on access and creative supply to have a useful benchmark to assess the changed incentives and access costs in a digital environment.

As outlined in Towse (2011) and Handke (2011), two excellent reviews of the empirical work on copyright, the literature is not particularly rich when it comes to copyright as economic incentive and hence as motivator for creators.³⁰ Little empirical evidence is available on the effect on economic incentives with the current or proposed duration of term, with some quarters believing it is too long and some too short.³¹ While economists criticize the 'one-size-fits-all' aspect of copyright and the fact that sectors differ, no concrete recommendation on more appropriate copyright length or sector-specific variations of copyright terms have been proposed. A few economists have made some headway in estimating the earnings of artists from copyright, which is significant for the question of the importance of the incentive it offers to creators.³² Yet, more work on the creators' remuneration is needed. Likewise, little attempts have been made to estimate the costs of copyright to users or final consumers in terms of higher prices or reduced accessibility. Studies on the transaction costs of searching and clearing copyright material and related entry barriers are scarcely available, as discussed in more detail later.

²⁷ Gurry (2011).

²⁸ Idem.

²⁹ C.f. the discussion on the Global INET 2012 'Digital Content, Intellectual Property and Innovation expert panel session', April, 24 2012 at http://www.elon.edu/e-web/predictions/isoc_20th_2012/intellectual_property_innovation.xhtml.

³⁰ Further excellent reviews are Png (2006), Watt (2000, 2004), Waldfoegel (2011) and Kretschmer and Towse (2013). The *Review of Economic Research on Copyright Issues* and the Society for Economic Research on Copyright Issues (SERCI) and the International Association of Cultural Economics have devoted much effort in recent years to improving the economic literature in the field.

³¹ Akerlof et al (2002).

³² Kretschmer, WATT

How then has the economic literature reacted to the role of copyright in an era of digitization and electronic networks?

In a somewhat unfortunate turn of events, the majority of the empirical economic literature since the advent of the Internet has focused on the effect of unauthorized downloading of creative works on the sale of the creative industries, with a particular focus on music and more recently films.³³ In this strand of the literature the focus is almost exclusively on the impact of unauthorized downloading on the revenues of the creative industries alone, and not on the individual creator, his or her ability to make a living, or the actual production of creative works, the nurturing of new talent, or innovation in the process of creativity.

This new 'Peer-to-peer download and copyright'-economics literature has produced some tentative but ambiguous results and two camps of economists, those that assert that unauthorized file-sharing has substantially decreased music industry revenues and those that argue the opposite.³⁴

In terms of quantity, the largest body of work confirms the negative effect of unauthorized downloads or streaming on sales, i.e. displacement is taking place.

At the same time, the literature also shows that the effect is not a one-to-one replacement of unauthorised downloads against purchased tunes; some downloads do not harm music industry revenues, and some indeed have a 'sampling and tasting effect'. In other words, free access to music via unauthorized downloading creates follow-on music purchases or offsetting increases in demand for complementary income streams such as concerts.³⁵

A significant number of methodological issues are also at stake, e.g. that it is hard to causally link falling industry revenues to increased peer-to-peer network activity, that is hard to see whether falling music industry revenues based on falling CD sales are not made up by increased concert revenues, or, more philosophically, whether decreased overall music industry revenues have negatively impacted the creative supply of music through composers, musicians, and other creators. Also, the overall effects of copyright piracy on the producer of the creative work, and on creative employment, the consumer or welfare are ambiguous.

Transposing what happens in the field of music to the other creative sectors is also a stretch; the lessons learnt could be sector-specific.³⁶ Definitely with technology changing swiftly the question is whether throwing darts at this *moving target* is a worthwhile pursuit.

More fundamentally, and stepping outside of the peer-to-peer literature, the effects of the new digital set-up on creative supply and thus the long-term sustainability of this new digital ecosystem have hardly been assessed from a solid empirical point of view.³⁷ However it must be assumed that this knowledge gap ought to be addressed for the sake of policy-making.

Based on these observations, a large research task lies ahead of economists when it comes to assessing copyright law in the context of digitization and the Internet.

³³ OECD (2005), Png (2006) and Handke (2010).

³⁴ See for reviews OECD (2005), Fink et al (2010), Handke (2011), and Towse (2011).

³⁵ Oberholzer-Gee and Strumpf (2009).

³⁶ There has been uneven industry coverage, with a great deal of attention to music, moderate attention to scientific publishing and film, much less attention to news and book publishing and software. Variations across industries, countries, and time are poorly understood. See the OECD studies on the digital content sectors at www.oecd.org/sti/digitalcontent. See for similar calls on the need for sector-specific studies Merrill and Raduchel (2013).

³⁷ Wunsch-Vincent (2010a, b).

What are the obstacles which need to be overcome to further this research agenda on copyright in the digital age? This article concludes by pointing out the main five data challenges on our way to assessing the motivational/incentive function of copyright and the main other costs and benefits as they relate to copyright in the digital age.³⁸

- 1) First, statistics are missing on the number of copyright works and hence the quantity of creative works supplied which are meant to be positively stimulated, in part, through copyright law. As suggested earlier, no formalities are implied when obtaining copyright; the recognition of copyright ownership is automatic.³⁹ It is true that some countries can oblige or give procedural advantages to national creators which register their work.⁴⁰ Yet, at the moment, the underlying data available in a few jurisdictions is mostly not used for economic analysis since it is often not accessible in the right format or since the data itself might not be representative.

An alternative route to estimating the number of original works could be to obtain unit counts of the number of creative works produced in a country or in a given sub-sector.

In reality, data on units of creative works produced (be they sold or not) are also hard to obtain. Internationally, it is for instance close to impossible to identify the number of books or number of songs written in a given country in a valid and internationally comparable fashion.⁴¹

This problem is compounded in the Internet age where no central entity exists which would monitor and report the production of creative works. Indeed, statisticians and economists have been struggling with trying to assess the true extent of user-created content online.⁴² Using simple count data (e.g. the number of online videos uploaded on popular video platforms) is misleading. Amateur videos or uploads to online video platforms are not always original creative works; some videos are unauthorized copies of television series or other protected works. Also amateurs create or remix content over various decentralised and sometimes overlapping online platforms, causing problems of double-counting. New genres of content emerge which are unaccounted for.⁴³ Finally, data on the uptake and intensity of use of streaming services, the number of works accessed and revenues generated are unavailable.

- 2) Secondly, the quality and 'value' of copyright works are hard to objectively assess, in particular when one moves beyond economic value for the content industry alone, and if one is required to assess the economic value for the creator, or, more complex, the artistic value for society at large. A Hollywood movie for several million USD, a Czech movie shot on a shoestring or a home-made video put on an online platform might generate similar copyright entitlements. Yet, the quality of these different films and the overall economic and societal value is hard to account for in regular unit counts. While professionally produced content might have more value on average, some online videos or amateur productions are dramatically more popular than most

³⁸ A similar exercise has recently been conducted in the US context, in Merrill and Raduchel (2013).

³⁹ Art. 5 (2) of the Berne Convention provides for formality free protection of creative works.

⁴⁰ See WIPO Second Survey on Voluntary Registration and Deposit Systems. Recording transfer of rights, at http://www.wipo.int/copyright/en/registration/registration_and_deposit_system_03_10.html and WIPO (2011).

⁴¹ The UNESCO Institute for Statistics has, in recent years, aimed at improving cultural and related statistics, notably by developing a 'Framework for Cultural Statistics' in 2009. The different sectors treated are: Cultural and Natural Heritage; Performance and Celebration; Visual Arts and Crafts; Books and Press; Audio-visual and Interactive Media; and Design and Creative Services. Clearly, these statistics relate to cultural outputs such as films. While coverage is improving, these data are hardly available for recent years for a broad set of countries. This situation will surely improve through new surveys and activities of the UNESCO Institute for Statistics (on cinemas, library statistics, and broadcasts); see Deloumeaux (2013) and Wunsch-Vincent (2011).

⁴² OECD (2007).

⁴³ Bruegge (2011) and INSEAD and WIPO (2012).

cinema movies and can attract millions of views within weeks. A simple association of production costs to the value of the creative work in question, is often misplaced, i.e. in the world of art and creativity more expensive works are not naturally better.

- 3) Thirdly, data is missing on the revenues generated on the basis of copyright and the respective distribution of these revenues between creators, the creative industries, and other intermediaries.

Admittedly private sector associations have made tremendous progress in accounting for sales revenues generated by particular content sectors. The International Federation for Phonograms Industry (IFPI), for instance, has been making available detailed data on sales – and more recently online sales and subscription revenues.⁴⁴

On the international level, international organizations are measuring the economic contribution of the copyright-based industries, their value-added or contribution to international trade. WIPO's Creative Industries Division undertakes activities to better conceptualize and measure the creative industries and measures their contribution to economic growth, trade and development based on the methodology outlined in the 2003 WIPO Guide on Surveying the Economic Contribution of the Copyright-based Industries.⁴⁵

Yet, obtaining a clear picture on who earns what from these figures, i.e. the creator or performer, the creative industries, other intermediaries such as online music stores, online video platforms, and hence deducing something on the incentive effect of copyright, is hard. Indeed determining the revenue of artists is challenging as some is based on contractual income negotiated with the content industry, some earnings are based on collectively negotiated contracts from CMOs, and some income is based on the exploitation of copyright such as concerts, readings, and to use legal terms, performing, mechanical and other rights. Artists today may prefer to give away their music for free on their social media page, i.e. in this case the official music revenue statistics would show zero income, while subsequently generating concert-based revenues, a new phenomenon revealed by press articles but for which no official data or studies are available.

Similarly, in the online context revenues are not generated from the sale of songs over music platforms alone. Watching a video or listening a song on a streaming service, like YouTube or Spotify (be it based on a subscription payment or supported by advertising) will technically generate a stream of revenue which is hard to elucidate in the current data context.⁴⁶ Online videos often do not generate direct revenues for their creator, and if they do, the money generated does not show in traditional content industry revenue statistics but rather in revenues reported by CMOs, for instance. Certain music subscription services pay the right holders in advance (advance payment) before any music is streamed and consumed, part of which – in principle - reaches the artist.

Conducting research on the artist and industry split has been complex in the past and has resembled true detective work to determine the revenue splits between creators, various industries and distributors.⁴⁷ Each artist's or creator's contract is different,

⁴⁴ See, for instance, the IFPI IFPI's Recording Industry in Numbers 2013 and its Digital Music Reports, and other statistics at http://www.ifpi.com/content/section_statistics/index.html .

⁴⁵ WIPO Project on Measuring the Economic Contribution of the Copyright-Based Industries and relevant national projects WIPO Guide on Surveying the Economic Contribution of the Copyright-based Industries was published in 2003. Reference UNESCO and UNCTAD, and WIPO. See http://www.wipo.int/ip-development/en/creative_industry/economic_contribution.html.

⁴⁶ Lanteri (2013).

⁴⁷ See again OECD (2005) which was based on painstakingly trying to get access to various artists' contracts to

and individual cases gleaned from private contracts – be it for exploitation of the work online or offline or on all media - cannot be generalized. In the case of films or online multiplayer games, rights are owned across the board and payments are not associated with rewards for owning the copyright: imagine the salary of an actor in an Indian movie, the salary of a freelance journalist when writing or of a level designer in an online computer game.

Importantly, more detailed information about the cost structure of different content industries and creators to assess the motivational and incentive effect of copyright against the revenue generated is required.⁴⁸ As outlined earlier, the costs of the creative sector can be high at times. The artists rely on the financial and organizational capacity of the content industry to leverage risk of the sector. This question is particularly timely with respect to the online distribution of content. While assumptions were of a costless, immediate and free global distribution in the digital age, reality has shown that new costs have emerged, e.g. costs related to digital rights management, online payments, the revenue share paid to online platform.

Interestingly, artists and the creative sector as such also have non-monetary incentives which have to be factored in. While one could see this as a competing incentive to copyright, it is indeed often linked; even when a creator foregoes remuneration for the viewing of their works or the particular creative contribution, but she might rely on attribution and thus moral rights, for instance, to build reputation, to generate other revenue streams or to achieve non-monetary rewards.

- 4) Fourth, and related to the point on costs, little convincing data is available on the administrative and transactions costs related to copyright, and in which way the system facilitates or creates barriers. Arguably the transaction costs have to be set against the potential incentive effect of copyright across the economy which is difficult. One would want to assess the relative costs and benefits of various arrangements for managing transaction costs.⁴⁹ And, surely one should assess the existing and potential effect of new technologies on existing licensing procedures and collective rights management institutions.

At the moment the data situation does not allow this easily. A few studies and policy reports have stressed the difficulty of securing rights across the board, and one study in the European context even has put a figure on it, namely that services available in several countries and which offer more than one million titles can face transaction costs of several hundred thousand Euros, require significant human resources and time.⁵⁰ Any assessment of the administrative effect also has to factor in the economic and other implications of the exceptions and limitation that copyright law foresees. Technically, the latter decreases the costs of copyright as an access barrier. It is precisely the function of exceptions and limitations to make works accessible for various purposes such as parody, educational, and other functions.

- 5) Finally, data on the pricing and the consumption of creative works would be needed to assess the access constraints potentially imposed by copyrights. This data does not exist beyond broad industry revenue aggregates or has not been used in solid economic studies.⁵¹

conduct a meaningful quantitative analysis.

⁴⁸ Merrill and Raduchel (2013).

⁴⁹ See Merrill and Raduchel (2013).

⁵⁰ KEA and Vrije Universiteit Brussel (2012), study financed by Google.

⁵¹ Encouragingly a few credible papers are emerging which assess the linkage between copyright and the price of creative works. Yet the one which comes to mind relates rather to the 18th century and is hard to transpose to the contemporary context. See Moser *et al* (2012).

Conclusion and Call for further Research

Copyright law establishes an important trade-off between the incentive for creators and creative industries, on the one hand, and the potential new access restrictions on the other hand.

This article has assessed the baseline model of copyright economics against realities in the online context. In a first step, it has described the basic copyright economics as encountered in standard textbook analysis, while trying to overcome simplifications or short-cuts which are often taken by the economic community. In a second step, the article asks how this baseline model can be transposed to an online setting. In other words, the author describes how above trade-offs change in an online environment. In doing so it identifies the three major areas where change has taken place, potentially affecting the economics of copyright, namely i) how content is created, (ii) how it is accessed, (iii) and, potentially how copyrights are administered. Finally, in a third step the article identifies what the economic literature on copyright, with and without digitization, has delivered so far. The statistical obstacles to better empirical research on the matter are identified.

The result in terms of additional economic work required and the statistical challenges to overcome is indeed impressive, not to say overwhelming. Economists and policymakers have a long journey ahead of them. The absence of data, the complex financial and legal linkages between composers, creators, performers, editors, and other parts of the creative industries, new online intermediaries, and the way revenues are generated and split complicate the matter.

The fact that the various content sectors function indeed differently, also calling into question the validity of results from one sector to another, does not simplify the situation.

To conclude on a positive note, however, economist and policy-makers are now more focussed on these shortcomings and actively working on overcoming them. On the national level, a number of Parliamentary Hearings, Reviews or Committees have been set up to study the effect of digitization and the role of copyright in the digital age.⁵² Many of these activities orient the work of economists in the right direction. On the level of academic and other economic research, positive developments are also on the way with the creation of new research centres or continued work by international organizations on the topic.⁵³ An important determinant of success will still be how successful we are in overcoming said data-related obstacles. But while *target* will continue to move fast for the foreseeable future, progress will now happen more swiftly.

⁵² Beyond some of the initiatives mentioned in footnote 1 and in the bibliography see, for instance, the Hargreaves Review, (Hargreaves, 2011). See also the last chapter in Merrill and Raduchel (2013) which sets out research priorities and data needs.

⁵³ See, for example, the recent inauguration of RCUK centre for copyright and new business models in the creative economy (CREATE) at the University of Edinburgh, <http://www.create.ac.uk/>. See also the continued empirical work of the OECD on the matter at www.oecd.org/sti/digitalcontent and the commissioned studies by the European Commission and the work of its Joint Research Centre's on the matter, see, for instance <http://is.jrc.ec.europa.eu/pages/ISG/MCI/conference.html>. The WIPO studies on copyright in the context of the Committee for IP and Development also make important contributions.

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