

THE ECONOMICS OF COPYRIGHT LAW: A STOCKTAKE OF THE LITERATURE

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ABSTRACT. This article is a survey of publications by economists writing on copyright law. It begins with a general overview of how economists analyse these questions; the distinction is made between the economics of copying and the economic aspects of copyright law as analysed in law and economics. It then continues with sections on research on the effects of copying and downloading and the effects of unauthorised use ('piracy') and ends with an overall evaluation of the economics of copyright in the light of recent technological changes. Economists have always been, and still are, somewhat sceptical about copyright and question what alternatives there are to it. On balance, most accept the role of copyright law in the creative industries while urging caution about its becoming too strong. And although European authors' rights are different in legal terms from the Anglo-American copyright, the economic analysis of these laws is essentially the same.

1. INTRODUCTION - THE EARLY LITERATURE

For both lawyers and economists, copyright took second place in the analysis of intellectual property until at least the middle of the 20th century. Economists as early as Adam Smith commented here and there on copyright but it was not until Arnold Plant's 1934 article that there was a systematic analysis of copyright that could be called 'economics of copyright'. There followed a small literature on what we would now call the economics of copying – articles by Hurt and Schuchman (1966), Breyer (1970), Novos and Waldman (1984) and Johnson (1985). In this period, Liebowitz (1985) introduced the discussion on 'indirect appropriability', appropriating rewards through market means using price discrimination, which sparked a considerable subsequent literature, a theme that was revisited in a symposium in the *Review of Economic Research on Copyright Issues* (2005, 2(1)). Law and economics, meanwhile began to analyse copyright in earnest with the seminal paper by Landes and Posner (1989) that comprehensively dealt with the economics of the various doctrines of copyright law - its scope, term and exceptions, such as fair use and works-for hire. In this article, we survey the development of the economics of copyright, adopting what we see as the main strands of economic thinking on the subject; we do not attempt to deal with the wider literature in law and economics on the subject.¹

¹This article is based on a report on the economic aspects of copyright law commissioned in 2006 by the SGAE (the Spanish collecting society for authors' rights) and Fundación Autor. A specific feature of this report was that it included a survey of European literature on authors' rights. Interestingly, research (by economists from France, Germany, Italy and Spain) revealed that almost all the academic writing on the subject by economists in these countries was published in English language publications.

2. ANALYTICAL APPROACHES TO THE ECONOMICS OF COPYRIGHT

The economics of copyright is difficult to survey for several reasons: a range of economic approaches has been used, changes have taken place in the technology of copying over the period surveyed, the literature includes a wide range of topics and the term ‘economic’ is sometimes used in a non-analytical way with reference to the financial aspects of copyright. In addition, many writers on the subject do not adopt one approach consistently; this is understandable as the main goal is to explain the ‘real world’ of copyright’s presence but it makes the task of disentangling the underlying arguments of the various strands more difficult. Also, there has been some duplication of ideas under different headings, something that is normal during the development of a discipline before standardisation is established. There have been previous surveys of the economics of copyright, for example by Raskind (1998), and Gordon and Bone (2000) surveys the law and economics literature, both offering their own categorisation of approaches.

First, however, it should be observed that the term ‘copyright’ itself is used generically by many economists (though not by law and economists). Copyright law consists of a bundle of different rights dealing with a range of circumstances in which works embodying them may be made available; the same work may be used in several markets in different ways – as derivative works or in the original form in secondary markets – and different rights have different values in these markets, and different values to different rights holders. These aspects to copyright are often ignored, especially in formal models. To some economists, copyright law is just a device to control copying; this contrasts with the approach of law and economics, which analyses the doctrines and provisions of copyright law using economics.

We have identified various analytical approaches taken to the economics of copyright: the political economy approach, a public goods and property rights approach, the law and economics approach and what we call alternatives to copyright and its rejection by economists.

2.1. Political economy approach to monopoly. We call this the political economy approach because the questions are posed in terms of political choices posed by economic dilemmas. The oldest and most standard of these is that copyright is a grant of monopoly and therefore is anti-competitive but that is necessary to enable the author to be compensated. Adam Smith, writing on the ‘exclusive privilege’ as he called it in his *Lectures on Jurisprudence* in 1762, which had been on the statute book in England (but not in Scotland) since 1710. Though normally a scourge of such monopolies, he regarded copyright (which at the time lasted for 14 years) as doing no harm and maybe even doing some good and so was not “altogether to be condemned” (Hadfield, 1992: 23). Later economists had stronger views. During the great Patent Debates of the 19th century in Britain, copyright was described by Macaulay as “a tax on readers for the purposes of a bounty for writers”, thus very succinctly summing up its political economic aspect. He also said in a famous quotation:

“Copyright is a monopoly and produces all the effects which the general voice of mankind attributes to monopoly. . . .the effect of a monopoly is to make articles scarce, to make them dear, and to make them bad. . . .It is good that authors be remunerated; and the least exceptional way of remunerating them is by a monopoly.

Yet monopoly is an evil; for the sake of good, we must submit to evil; but the evil ought not to last a day longer than is necessary for the purpose of securing the good.” (Quoted in Hadfield, 1992, 29-30).

The aversion to monopoly runs through economic thinking about copyright, even though it is acknowledged that copyright monopolies are weak and conform more to Chamberlinian monopolistic competition (Yoo, 2005). Even in 1934, Plant was essentially following the same line by emphasising the monopoly aspects to copyright, though he made several other important analytical points. Indeed, it can be argued that Plant (1934) anticipated a great deal of present day analysis on the economics of copyright (moral hazard, rent-seeking, ‘business models’), something acknowledged by Landes and Posner (2003). Thus, the earliest analysis of copyright hinged on the statutory monopoly and the opportunity it affords copyright-holders (authors and others) to raise prices. That is the basis of the incentive to create copyrightable works, financed through the market: the statutory monopoly enables the right holder to charge a price above the marginal cost in order to cover the fixed cost until such time as the work enters the public domain. It then becomes a public good in the economic sense of being non-rival and non-excludable. Liebowitz and Watt (2006) remind us of Demsetz’s insight that copyright is a system for the private finance of public goods. However, what is insufficiently emphasised is that this incentive takes place dynamically: the later social benefit comes at a private cost borne by earlier generations of consumers, the time lag depending upon the duration of the copyright term. There are therefore public finance aspects to copyright (Towse, 2006a).

The effect of the copyright monopoly on a market is frequently modelled as a deadweight loss, particularly in the law and economics literature. That is misleading, however, as it confuses static and dynamic effects (Towse and Holzhauser, 2002, Introduction). In fact, many writers slip all too easily from static to dynamic reasoning, as noted by Landes and Posner (2003). Many economists writing on copyright refer to the need for the dynamic incentive and justify it by using static welfare economics and market failure arguments. A consistent dynamic approach is that taken by Schumpeter (1942), whose theories of innovation and market structure have been taken up by a number of recent writers on the economics of copyright.² The insight from Schumpeter is that perfectly competitive firms in the static sense have neither the means nor the incentive to innovate and therefore a growing economy must be propelled by monopolistic firms; they compete in an evolutionary way by technological innovation, enjoying the fruits of their monopoly power until such time as they are pushed out by a superior innovator – the process of creative destruction. Unfortunately, dynamic effects are very difficult to model and economists who have a preference for technical analysis do not easily give up (see Liebowitz 2005a, 2006a). As greater understanding of this evolutionary approach to economics takes hold, we can expect less condemnation of some aspects of monopoly, particularly natural monopoly. David (1993, 2004) adopts a historical analysis for evaluating the dynamic impact of copyright in various industries and in changing technological conditions. Another dynamic problem is that technical progress necessitates the upgrading of copyright law so as to afford the same protection before and after some technological change; technical changes are rarely

²Schumpeter himself did not refer to copyright (Blaug, 2005).

smooth, however, and can have disturbing effects on markets and the strength of the copyright monopoly may be altered by such changes. We return later to the effect on copyright of digitalisation and new copying technologies.

Monopoly is one aspect of the political economy of copyright. Another is the balance of social costs and benefits and many writers on the economics of copyright, and particularly those from law and economics, explicitly or implicitly use the framework of Paretian welfare economics. Thus, welfare gains and losses are discussed and comparisons made to a static world of perfect competition in which there are constant returns to scale, marginal cost pricing, no public goods or externalities, no transaction costs and of course, no technological progress. In this world, Pareto efficiency could be achieved and, by contrast, anything that violates the underlying conditions (the so-called First and Second Fundamental Theorems of Welfare Economics) is viewed as market failure. Copyright is a second best solution to overcome market failure but, despite claims or the implication that it can do so, copyright law cannot restore the economy to a first best Pareto efficient condition (see Lipsey, 2007, and Towse and Holzhauser, 2002, Introduction). It is also questionable whether claims that copyright law should be framed so as to minimise the deadweight loss caused by the higher price copyright monopolists charge (higher than the unobtainable perfectly competitive price) are meaningful without the prop of Paretian welfare economics. Moreover, the cost benefit approach of balancing welfare gains and losses has little credibility unless they can be measured empirically, since, as with so many other things in economics, the outcome depends upon quantitative not qualitative results.

However, what can be said is that this ideal-type Paretian approach serves to highlight some of the theoretical stumbling blocks for the economic analysis of copyright. The presence of increasing returns (natural monopoly) and/or public goods characteristics, both frequently recognised as attributes of the ‘information’ economy, as well as transaction costs have all been regarded as causes of market failure in the markets for creative goods and services over and above the statutory grant of monopoly itself. Each of these elements maybe changed by technological developments; for example, totally secure digital technological protection measures could eliminate the non-excludability features of some goods/services currently viewed as public goods and could also reduce transaction costs. The conclusions of economists writing before digitalisation, when the only means for unauthorised copying was resetting type or photocopying, are therefore at a considerable disadvantage when viewed in retrospect, however valid the analysis was at the time. This topic is discussed in more detail in the section on the economics of copying.

Increasing returns present a particular stumbling block to economists modelling copyright as they are frequently found in the production of knowledge or information goods and call for some form of mark-up pricing over and above marginal cost, as is usual for utilities. ‘Natural monopoly’, where a monopoly supplier is able to supply the market more efficiently than if there were competition, is thus prevalent in copyright industries. The typically high sunk cost of producing copyrightable works, for which the variable costs are often low, makes marginal cost pricing impossible for the profit-maximising producer and gives rise to the specific features of the creative industries in which these works are utilised (Caves, 2000). It is an interesting question to what extent digitalisation of content creation is reducing

fixed costs and thus altering the ratio of fixed to marginal costs, which is what underlies the problem.

The analysis of natural monopolies is particularly relevant to collective rights management and to copyright collecting societies, which are natural monopolies (Handke and Towse, 2007). In order to achieve an efficient outcome, government regulation usually requires the monopoly producer to adopt marginal cost pricing combined with some other charge covering the fixed cost - a two part tariff; that, however, has not happened in the cultural industries dependent on copyright (except, perhaps, in the special case of broadcasting). However, copyright law could be viewed in this light as enabling the fixed cost to be covered by a price above marginal cost. Price discrimination could likely achieve the same result through the market - the higher price for the hard copy of a book or the institutional subscription for an academic journal that allows the publisher to recoup fixed costs then to charge the marginal cost for a paperback version or personal subscription could be seen in this light (Liebowitz, 1985). Network economies are a specific form of increasing returns: by contrast to the supply side character of technologically determined increasing returns, network economies refer to the benefits to consumers from having access to a larger number of contacts in a system of users, such as email or telephone - see section 3 below.

2.2. Public goods and property rights. Information goods are considered to have the characteristics of public goods because they are non-rival and may be non-excludable. Excludability depends upon the availability and cost of means of exclusion and digitalisation has increased the public goods aspect of copyright works because once works have been released digitally on the Internet, they are non-excludable. Thus commodities like music files and software on the Internet, in the absence of effective technological means of exclusion, are public goods. The absence of excludability gives free riders a free hand and thus the rationale for copyright law is that it closes off this possibility by making it illegal.

The 'Tragedy of the Commons' has come to exemplify the case for well-established property rights to prevent free-riding and to encourage efficient use. Where property, for example land, is held in common, no one participant has the incentive to invest in improvements so each 'free-rides' on the expectation of investment by the others, with the result that no improvement is undertaken. Economic efficiency therefore requires property rights that enable the exclusion of users who do not contribute to the creation of value. This line of thinking is also used to make the case for copyright law; it creates property rights and makes illegal their violation. Non-excludability is very much tied up with the technologies of delivering the non-rival content of copyrightable works, even if the carrier of that content (the book or CD) is itself excludable. As with common property in general, the economic argument hinges on the cost of exclusion, which in the case of copyright includes not only prevention of access but also the cost of protection via legal redress, which the copyright-holder does not pay for if the state prosecutes. Copyright law therefore 'privatises' what would otherwise be a public good.

Many economists and especially those involved in law and economics have been strongly influenced by the work of Coase (Merges, 1994). Coase's insight was that if property rights are fully established, private negotiation rather than state intervention can iron out conflicts between interested parties. The only barrier to that would be if transaction costs were too high. This has set the agenda for

economists to discuss copyright in terms of a property rights approach that sets the establishment of property rights as the ideal and, as its flip side, the minimisation of transaction costs. This approach is thus an alternative to the market failure case for state intervention for the achievement of welfare maximisation. Although copyright is a form of state intervention, its merit is that having established property rights where they otherwise would not exist, the market can be left to work.

However, the essence of the Tragedy of the Commons is that scarcity creates rivalry in use and with a free market property rights will go to the highest bidder, the entrepreneur who can put the commodity to its best use. But this logic does not apply to information goods, which use is non-rival: the more I listen to music in no way reduces the amount you can listen to. The goods we buy, such as CDs may be rival but the creative content in them is not and it is that and not the carrier that is protected by copyright. The insight of Arrow (1962) is that as information goods have the characteristics of public goods, non-rivalry implies that free access is needed for economic efficiency. He consequently made the case for rewarding innovation through a combination of public and private funds. Shavell and van Ypersele (2001) have subsequently put the argument forward that an optional reward scheme is more efficient than having intellectual property rights. Thus, non-rivalry of information goods in general and copyrightable content in particular implies that the frequently argued ‘Tragedy of the Commons’ case for copyright law as a means of privatising (or ‘commodifying’) intellectual property does not apply because there is no case for rationing it. That, however, leaves open the question of incentives to create.

The term ‘Tragedy of the Commons’ has given rise to the term ‘creative commons’, indicating that knowledge cannot by its nature be owned by one person (Lessig, 2004; Ramello, 2005) and also to the term ‘anti commons’, a situation in which property rights are so de-bundled and ownership or control so scattered, that no one can co-ordinate them in order to make use of the property.

2.3. Law and Economics. Law and economics applies economic analysis to the doctrines of copyright law. These include the protection of expression not ideas, the author’s rights in derivative works (such as translations, musical arrangements, film scripts based on a book), work for hire doctrine, the duration of the copyright term and the exceptions and limitations to copyright for private study and research, parody, criticism, etc. Law and economics uses several types of economic analysis – price theory, welfare economics, public choice theory. However, Coasean economics has had a fundamental influence and property rights and transaction cost economics are consequently widely used. This is also true of its application to copyright law, though Landes and Posner (1989; 2003), whose work has dominated this area, have tended to put the accent on the welfare approach with emphasis on the costs and benefits of the legal doctrines of copyright. Unlike other writers, Landes and Posner neither emphasise the monopoly aspect of copyright, nor other types of market failure, but instead place the focus on the positive and negative incentives to creativity: the author’s exclusive right removes works from the public domain for the duration of the copyright, thereby increasing the cost to subsequent authors of creating new works. Therefore, in order to maximise creative output, the law must strike a balance between the protection of the author and the costs that imposes on other authors, such as search costs for novel means of expression and of obtaining permission to use the copyrighted works of others; that balance is to be found when

the cost of extra protection by copyright, which inhibits creativity by restricting access to the public domain, equals the incentive it provides to authors.

Landes and Posner's (1989) model yields specific policy implications: a greater (optimal) copyright protection is required for works that have greater social value; this implies that copyright should be discriminatory and not applied across the board. However, they argue that a discriminatory regime is too costly to administer and therefore copyright is uniform. Moreover, since the value of copyright works increases with demand and markets expand with technical change, copyright protection should expand over time. The optimal level of copyright protection must take account of the higher transaction costs that it causes: the costs of tracing copyright owners increase with the duration of copyright, providing a brake on the desirable length of the copyright term. The lower the costs of administering copyright and the more authors respond to it, the greater will be the optimal extent of protection.

However, Landes and Posner (2002; 2003) have changed their view on the duration of copyright. They now argue not only in favour of strong protection but also for an indefinite duration; more precisely, they favour an indefinitely renewable copyright. They argue that the vast majority of copyright would not be worth renewing and that tracing and transaction costs therefore would not be excessive. They regard the claim that there is no rivalry in intellectual property as incorrect, stating instead that rivalry is present and it could damage the quality of copyrightable works, therefore making the content less valuable. Copyright therefore can play an analogous role to trademarks, which can last indefinitely when renewed. Indefinite renewability would also reduce rent-seeking behaviour as witnessed in the so-called Sonny Bono extension to the US copyright term for works for hire. At the time of writing, the European Union too, despite considerable opposition, seemed set to go down the same route. One encouraging sign is that the debate is not taking place in an empirical vacuum, as has previously been the case; evidence on the longevity of copyrighted work in terms of their survival on the market has been brought to bear on the discussion (Landes and Posner, 2003), echoing research first done by Breyer (1970); Png (2006) makes a strong case for empirical work on copyright.

Another important topic in law and economics that has attracted a lot of attention is 'fair use' doctrine. 'Fair use' doctrine in US law has become well known through American literature on the economics of copyright and it has counterparts elsewhere but the law differs somewhat; 'fair dealing' in the UK, for example, does not at present permit private copying, though this is set to change.³ In European countries, exceptions and limitations to the author's exclusive rights are typically specified in the statutes.

It is, of course, particularly important in the context of downloading work from the Internet and in relation to other kinds of copying. According to this doctrine, the exclusive right of authorisation is limited in copyright statutes and exceptions made for certain types the use of copyrighted material without the author's consent and without payment.

³This change was recommended in a major review of UK copyright law that for the first time included specially commissioned economic research in addition to the usual stakeholder submissions (see Gowers, 2006).

Gordon (1982) pioneered the application of transaction cost economics to US fair use doctrine. According to Gordon, the underlying economic rationale is that a market can fail to develop (what economists call a missing market) when transaction costs exceed the value of copies to individual users: then fair use is a defence against copyright infringement as long as the incentives to the copyright owner are not substantially altered. These circumstances may call for the creation or regulation of copyright collection agencies, such as the US Copyright Clearance Center for photocopying. As Landes and Posner (1989) have argued, a too strong copyright regime that tolerated little fair use would raise transaction costs and copyright-based earnings, transferring rents to artists from users but it would raise the costs of creation to later authors. A too weak regime, on the other hand, would not provide sufficient incentives to look for means of charging and therefore would reduce transaction costs and earnings but it would also ease what Landes and Posner called ‘productive’ (as compared to ‘reproductive’) fair use of copyright material for creating new and derivative works and benefit consumers. Copyright law must therefore balance these opposite tendencies.

2.4. Alternatives to copyright and rejection of copyright law. All the above arguments have been used, often in conjunction (or even contradiction) with each other to make the economic case for copyright. It is questionable whether they are all compatible. Whatever the economic rationale supporting copyright, however, there have always been some authors who have rejected the case for copyright law.

The alternatives that have been suggested are either market solutions of the ‘business model’ variety – being first to market and lead time advantages, price discrimination, joint sale of complements (Varian, 2005), indirect appropriability (Liebowitz, 1985) – or ones that involve the government, ranging from ‘second best’ solutions, such as taxes on blank CDs, computers etc, (Farchy and Rochelandet, 2002) to grants and prizes (which may also, and often are, provided privately as well) (Shavell and van Ypersele, 2001) or direct finance through state subsidies (Plant, 1934; Hurt and Schuchman, 1966).

Boldrin and Levine (2002 and 2008) also argue that freedom of contract and first mover advantage is a sufficient basis for a competitive market of ideas. Though describing themselves as conservative economists, they find that well-defined property rights are less important than unhindered competition. They argue that intellectual property has come to mean not only the right to own and sell ideas but also the right to regulate their use. This creates a social inefficient monopoly, and they argue that what is commonly called intellectual property might be called ‘intellectual monopoly’. The inefficiency comes with regulatory measures that are built into the current copyright regime – no-one selling potatoes could limit their use and consequently sue the inventor or producer of chips for using potatoes without license. Indeed, this is the view being pursued by regulators in several European countries in connection with limitations to the use of iTunes.

Finally, there are objections that copyright does not act as an incentive to creators anyway but just protects business interests that exploit copyrights. A less strong version of this is held by Towse (2001a, 2001b), who argues two points: one, that the greater economic power of corporations in comparison to that of individual artists (creators and performers) means that the artists are not likely to get a good deal; secondly, that artists are motivated not only (or even) by monetary reward but peer recognition, which is usually involved in prizes, and moral rights

that protect the artist's reputation and the integrity of their work may also be a significant factor in the support artists gain from copyright and, more especially, authors' rights. Her evidence suggests that copyright does not yield much in the way of earnings for any other than superstar artists; this is backed up by later research (Kretschmer and Hardwick, 2007)

3. ECONOMICS OF COPYING

Landes and Posner (1989) made a distinction between the economics of copyright and the economics of copying. We find this distinction useful and adopt it here. The economics of copying deals with impacts on the economy that derive from technical means of reproduction, while the economics of copyright focuses on impacts of the legal framework. The two are related because if it is demonstrated that there is a loss of welfare (for either consumer or producer), that would make the case for some intervention in the market, such as copyright law. However, if the producer can obtain his profit without copyright protection, then copyright law would just distort the market. As discussed above, many economists have a predisposition for avoiding the introduction of a monopoly.

The economics of copying analyses the effect of a new technology that makes the process of copying easier or cheaper. It focuses on the relation between the fixed costs of creating the work in the first place and the marginal cost of making copies. These features are closely linked to the state of technology. For a long time the main issue was copying of books and printed material but until the advent of photocopying, that had to be done by type-setting. In the late 1970s and early 1980s the subject matter changed to video and VCR home copying technology; the Sony-Betamax case provided a basis for a number of articles, especially Gordon (1982). For some reason, the copying of audiocassettes did not attract the same level of interest, though it led to the introduction in some countries of the blank tape levy as a second best form of remuneration for right holders. The next big step was generated by digitalisation. The loss of quality due to copying, that had featured in the earlier literature on the economics of copying, was considerably reduced and hence a copy, illegitimate or not, became a close substitute for the original. With the diffusion of CD-burners on personal computers and home computers, the copying of digitalised content for private use became very easy. The last step was the introduction of peer to peer (P2P) and MP3 technologies enabling speedy downloading of copyright works from the Internet. Thus, by the end of the 20th century, there had been a dramatic shift in the possibilities of private copying, causing the marginal costs of making private digital copies to be virtually zero. However, this point should not be exaggerated as copying uses up space on the hard drive, there are the costs of a blank CD or DVD and there are costs in terms of time and knowledge for the user. These changes have given rise to an explosion of literature on the effect of P2P and illegal copying, to which we devote a whole section (see below).

It is useful to trace the development of the economic analysis of copying because it set the terms in which later discussion took place and much of it is relevant today even under different technological conditions. Novos and Waldman (1984) considered the effect of copying as causing underproduction and underutilisation in terms of a loss of social welfare. According to their model, consumers are indifferent between a legitimate and an illegitimate copy and hence are only interested in the

costs of obtaining a reproduction; the authors find analytical support for the underproduction hypothesis but very little support for the underutilisation argument. Johnson (1985) noted that through technological changes, copying by consumers without compensating the creators had become easier and he discussed whether or not copying should be restricted. He found that the case for restrictions could be made both in the short run as in the long run: in the short run, the determinant is the impact on demand and total consumption and in the long run, it depends on the value of variety and the elasticity of supply.

Liebowitz (1985) introduced the idea indirect appropriability. He analysed the impact of photocopying on the market for academic journals and pointed out that copying did not harm journal publishing because publishers were able to practise price discrimination. When that is possible, copyright holders are compensated for unauthorized copying by an increase in demand for copiable originals and also by the increase in the total value of the copyrighted material. He showed empirical evidence that, in the case of journal publishing, these effects were strong enough to protect the publishers' revenues from those of unauthorized copying. Besen (1986) also utilised the idea of indirect appropriability, identifying several cases in which where copying an original could lead to different results: if the costs of private copying are less than the price of an original but higher than the costs of copying for the producer, the consumer would choose to copy, thereby causing inefficiency on a social welfare level. Furthermore, producers might react differently to the existence of private copying: under some conditions they might raise the price of the original in order to profit from indirect appropriability as described above. If the price were only a little higher than the private costs of copying, publishers might bring it down to the level of the private cost of copying and hence compete with the copier. With a price increase, only consumers who make copies from their legitimately purchased copies would be willing to pay the higher prices. Consumers who do not copy their original would be worse off. By contrast, if the price is reduced, consumers are generally better off and producers worse off.

Varian (2000) revived the discussion on indirect appropriability but now with file-sharing in mind. He identified three circumstances in which sharing would lead to an increase in the producer's profit: first, when the transaction costs of sharing are less than the marginal costs of production; second, in the case of a limited number of uses, the firm would sell the product for a higher price as already described by Liebowitz and Besen as above; thirdly, when preferences are heterogeneous. Depending on the individual taste and budget, people can share or buy. Varian gives an example from the eighteenth century when libraries were first established; until then, only richer people had the chance to read books, since only they could afford to buy them. Sharing enables the producer to cater for a segment that otherwise would be neglected. In a later paper, Varian (2005) models the effects on price settings for a (temporary) monopolist supplier in the presence of copying. Here copying takes the place of a competitor who wants to enter the market. The monopolist reacts by changing his price setting strategy. Using this model, Varian models the different cases described by Besen (as above).

A related application of indirect appropriability is by Takeyama (1994). She focused on network externalities of unauthorised reproduction of intellectual property and their impact on social welfare. Because consumers benefit from network externalities, they are willing to pay a higher price for these benefits and producers

may appropriate higher revenues. Thus, so the argument goes, they may well be willing to tolerate unauthorised use that increases the network of users. Takeyama found that in the presence of network externalities, unauthorised copying could not only raise a firm's profit but also might cause an unambiguous Pareto improvement to social welfare. She went even further, suggesting that due to network effects, there might be an increase in the social welfare even in the absence of indirect appropriability as described in Liebowitz (1985) and Besen (1986). Liebowitz and Margolis (1995) responded to this, finding the argument highly exaggerated. They argue that the effects deriving from network externalities are not very well understood. They claim that most of the effects that are summarised under the term network externalities are not externalities in an economic sense – they are simply technological network effects and can be resolved by ownership and contracts or the effects are pecuniary and therefore have no welfare implications.

In the June 2005 *Review of Economic Research in Copyright Issues (RERCI 2(1), 2005)* symposium on indirect appropriability, Liebowitz and his contemporary writers were invited to comment on the progress of this concept and to restate their ideas, particularly since in the interim, the advent of digitalisation had changed the nature of copying. Liebowitz (2005) responded by saying that the concept seemed in retrospect to have been important in its time for showing that all copying was not necessarily damaging to producers but that the concept had limited application and had been taken too far by some economists. Johnson and Waldman (2005) concur that the idea is limited and show that where the market is flooded by copies, it became possible with file sharing and with massive scale copying, the price will be driven down to the cost of making copies (thus failing to compensate creators and cover other fixed costs). Johnson (2005) shows that novel pricing strategies have developed that overcome some of the problems of copying and so enable producers to appropriate revenues. As we discuss later, Liebowitz himself has come to believe that file-sharing and downloading music has damaged sales of recorded music (see below).

4. EMPIRICAL STUDIES ON COPYING, PEER-TO-PEER FILE SHARING AND “PIRACY”

The emergence of file-sharing networks that came to prominence with Napster has motivated an increasing number of empirical studies. For economists, the sudden surge in unauthorised copying provided an extraordinary opportunity to study the effects of so-called “piracy”. In several major markets – in particular the U.S. and Germany – the growth of file-sharing networks since 1999 coincided with considerable reduction in the sales of original ‘authorised’ copies.

The economic argument for controlling unauthorised copying rests on the argument that the incentive to supply copyrighted works will be undermined. Some argue that these adverse effects for suppliers might be offset by the benefits of sampling, by network effects or indirect appropriability, as discussed above. For consumers, the availability of cheap unauthorised copies should be beneficial in the short-run. Over time, consumers will be adversely affected, however, if or when supply dries up. Thus, economic theory makes no clear-cut prediction as to the net effects of increases in unauthorised copying either for producers or for society at large. It is an empirical question whether so-called piracy is harmful in practice.

4.1. The impact of file-sharing on the market for authorised copies. So far, economic studies have mainly focused on the question whether file-sharing harms right holders of musical works by reducing sales (but see Hui and Png, 2003, for a study of offline piracy). The specification of such harm has been a significant aspect of court cases against Napster and its successors in the US (for example, Fine, 2000). It continues to be of practical importance in the courts, for ongoing reforms of copyright legislation and for the businesses concerned.

One standard approach is to correlate measures of file sharing with sales of recordings while controlling for simultaneous changes to a range of other factors that might have influenced sales. Ultimately, the observation of alternative variables attempts to develop a counter-factual idea of what sales would have been otherwise. Considering the volatility of record sales in the past, this appears to be a challenging endeavour at best. In the interpretation of findings, individual authors still usually refer to actual peak levels of sales preceding the emergence of file sharing. Liebowitz (2005b) provides an overview of some of the literature on this issue. He distinguishes between studies according to the unit of analysis: some authors investigate differences between geographic entities such as countries or cities, while others compare the impact of file sharing on the sales of genres or individual records. In addition to studies of accumulated data on file-sharing and record sales, some researchers study consumers' purchasing behaviour in the context of file sharing on the basis of consumer surveys. Each of these approaches has its strengths and weaknesses so that they might be seen to complement each other. Several studies combine the analysis of two units of analysis in their investigation of the impacts of file sharing.

Liebowitz (2004) investigates alternative explanations for falling full-length CD sales in the U.S., including income and demographics, album prices and prices of related goods and services. He concludes that alternative factors cannot explain all of the reported falls in sales and that file sharing is likely to be behind some of the reductions in sales. Zentner (2005) correlates data by the International Federation of the Phonographic Industry (IFPI) on music sales with various data sets on the number of Internet users and peer-to-peer usage in 65 countries between 1997-2002. He finds that sales fell more in countries with wide Internet usage. Peitz and Walbroek (2004) analyse IFPI data on CD sales with data on MP3 downloads from IPSOS-Reid. For the 16 major world markets, they find a significant correlation between downloading and falling CD sales. They also attempt to gauge the substitution effect of MP3 downloads and CD purchases on the basis of U.S. survey data. MP3 downloads appear to explain falling record sales in 2001 well. Based on the calculated measures of elasticity and substitutability, they appear to explain only a fraction of the fall in sales in 2002, however.

Liebowitz (2005c) uses U.S. census data on Internet use, record sales and other demographic variables to compare the impact of file-sharing in 99 American cities. He finds that "file-sharing has caused the entire decline in record sales that has occurred and also appears to have vitiated what otherwise would have been fairly robust growth in the industry." Liebowitz (2005b; 2006a) attempts to support this result by comparing effects on various musical genres that are subject to file sharing to various extents. For further investigation of divergent effects on different music genres, see also Liebowitz (2005c) and Zentner (2005). Both claim that heavily downloaded genres exhibit disproportionately large falls in sales.

Oberholzer-Gee and Strumpf (2007) investigate the effect of downloading on sales of individual recordings. They directly accessed data on the weekly number of downloads via one server that hosted parts of a file-sharing network and weekly album sales from Nielsen Soundscan. They compare various recordings as well as effects of changes in downloading for individual recordings. Oberholzer-Gee and Strumpf (2007) famously conclude that “downloads have an effect which is statistically indistinguishable from zero”. Their methods have been criticised by Liebowitz (2007).

Zentner (2006) used music sales data by IFPI and data from a European consumer mail survey by Forrester to establish the impact of downloading on purchasing behaviour. He suggests that for individual users “peer-to-peer usage reduces the probability of buying music by an average of 30%”. Hong (2004) makes use of the U.S. Consumer Expenditure Survey. Using internet access as a proxy for downloading, he accounts around a third of the total reduction of sales (which was 7.6 percent in 2000) to Napster and concludes that other factors play a significant role.

Rob and Waldfogel (2006) surveyed downloading and purchasing behaviour of 500 U.S. college students. They find that downloads substitute for purchases of authorised copies at a rate of 0.2 or more. They also observed that within their sample downloads were valued less than purchased copies. Further consumer valuation studies have been conducted by Holm (2001), Ghosh et al (2005) and Rochelandet and Guel (2005) in Sweden, Italy and France respectively.

At present, results diverge considerably even for the relatively narrow question of whether file-sharing harms right holders to musical works. Extreme results are virtually no effect on the one hand (Oberholzer-Gee and Strumpf, 2007), and the reversal of what could have been “robust growth” into a severe recession (Liebowitz, 2005c) on the other. Most studies’ results fall into a middle ground between these extremes and suggest that file sharing displaced some demand but that other factors play a role in explaining falling sales. What such alternative factors might be has not been determined with any certainty.

Problems in many of the existing studies include the quality of data. Data on file sharing appears to be particularly problematic. Several studies contend themselves with proxies such as Internet access or computer ownership (e.g. Zentner, 2006; Hong, 2004). Many used data assembled by private firms. Where secondary data is used and the underlying methods are not fully transparent to the researcher or where studies were commissioned by interested parties, such data might be viewed with some scepticism. Liebowitz (2005c) demonstrates how various such measures of downloading can produce conflicting results. Oberholzer and Strumpf (2007) used data on actual file-sharing activity but had to contend with a miniscule fraction of total interactions. Measuring so-called piracy in consumer surveys (e.g. Rob and Waldfogel, 2006; Zentner, 2006; Hong, 2004) could introduce a downward bias because respondents might be reluctant to report illegal activities (Oberholzer-Gee and Strumpf, 2007). In short, there are obvious difficulties with the use of any of these measures for the purpose of detailed quantitative analysis. On the other hand, measures of sales frequently come from industry lead-bodies such as the RIAA or the IFPI. These are interested parties and some researchers have voiced objections as to the validity of their data (Liebowitz, 2003). The specialised surveys of file sharing, valuation of authorised copies and purchasing behaviour (for example, Rob

and Waldfogel, 2006; Holm, 2001; Gosh et al, 2005) are of relatively modest size and might not allow reliable generalisations. In short, the quality of data seems to justify caution in the use of any of the results by themselves even before venturing into the discussion of assumptions and abstractions underlying econometric methods (see, for example, the criticism of Oberholzer-Gee and Strumpf (2004) in Liebowitz (2005b)).

A challenge to any of these studies might be that it is by no means clear that the record industry was in state that resembled a competitive equilibrium when file sharing struck. On the one hand, it is organised in a few major multinational firms that wield considerable market power according to most accounts (see e.g. Burnett, 1996; Silva and Ramello, 2000; Zentner, 2006). On the other, the record industry appears to go through structural changes with continued merger activity among the major companies, increasing importance of media tie-ins as a source of income and authorised online services growing rapidly to name but a few volatile aspects (see Alexander, 2002; Tschmuck, 2003; Bockstedt et al, 2005). Under such circumstances it seems particularly difficult to isolate the effect of file sharing (Liebowitz, 2005c).

4.2. The wider issues. The contentious issue of the extent to which file-sharing harms right holders/producers is not the end of the story. First, file-sharing is not the only new copying technology. CD-burners are either excluded or addressed as a complementary to file-sharing networks. For example in the German market, for which IFPI reported the most severe falls in sales in any of the major markets, mass-diffusion of CD-burners and falling sales preceded file-sharing (Handke, 2006). CD-burners might sometimes merit attention in their own right. Furthermore, the effects of file sharing might not be homogenous as between rights holders. Blackburn (2004) finds that sales of publications by previously well-known artists are diminished as file-sharers substitute purchased copies for downloads. On the other hand, file sharing appears to boost record sales for previously unknown artists. They seem to gain more from the additional exposure of their works than they lose due to the substitution effect.

Last but not least, in the context of public copyright policy consumers' interests need to be accounted for. Obviously, consumers might benefit considerably from the availability of vast catalogues of works online at very low costs (Silva and Ramello, 2000). Rob and Waldfogel (2006) estimate that consumers' welfare gains from file sharing are considerably higher than producers' losses. They do not take account of the long-term effects of diminished incentives to supply copyrightable works, however. Studies on the supply of works in the context of diminished copyright protection (Handke, 2006) might shed some light on this important issue.

To inform copyright policy, it is thus not sufficient to establish that so-called piracy harms producers. Reasonably accurate estimates of the extent of such harm would have to be set in relation to potential welfare gains to consumers – with the important caveat that reduced appropriability could over time adversely affect supply – as well as the administration and enforcement costs of copyright protection. Whereas the majority of empirical studies suggest that file sharing is harmful for producers, the authors of such studies are more evenly divided over the issue whether their results justify increased efforts to protect copyrights. Where Liebowitz (2005b) and perhaps Zentner (2006) cautiously endorse the RIAA's enforcement strategy, for example, Peitz and Walbroek (2004) and Oberholzer-Gee

and Strumpf (2007) express doubts as to whether enforcement makes either good business sense or should be promoted by public policy.

Despite the considerable progress made, the existing empirical literature does not yet appear to provide a solid grounding for determining whether, and to what extent, it is worth fighting private, unauthorised copying in its newest guise of CD-burning and file-sharing. Judging by the considerable interest the issue has received during the last few years, further studies on the effect of file sharing on demand for authorised copies are likely to be produced. It remains to be seen whether better data and complete coverage of recent years – so far many studies have captured only the first two or three years after Napster established file-sharing as a mass phenomenon – will resolve the issue. Perhaps even more focused efforts such as Michel (2005) on the substitution effects between musical recordings and pre-recorded films will provide a clearer picture in this context.

It might also be useful to go beyond the question whether file sharing harmed producers at large. The significance of file sharing for consumers and the consequences of current developments in the legal supply of copyrighted works seem to merit some attention. So do heterogeneous effects on various types of producers and their implications for competition. There are a range of unexplored empirical and theoretical questions that appear relevant with a view to copyright reforms. Finally, systematic comparisons with previous surges in unauthorised copying (Liebowitz, 2004) of recordings or with other digital information goods (Bhattacharjee et al, 2003) and extending links to peer-to-peer related research in computer science (Krishnan et al, 2003) could be a way forward.

5. CONCLUSION AND EVALUATION

This article began life as a survey of the economic literature on the economics of copyright in Europe; that survey found that the literature is almost all written in English and is ‘international’ in flavour. The focus on English and on US scholarship has resulted in several notable features: most of the literature deals with economic rights and there is very little literature on moral rights or on performers’ rights (see Towse, 2006b); also, there is overwhelmingly more attention by economists on efficiency rather than equity aspects of copyright. Efficiency covers a wide range of topics concerning the economic justification of copyright, either through a law and economics approach or a political economy one, the effect of copyright and its doctrines on markets and the administration of copyright and it also includes questions about alternatives to copyright. Equity matters, which would include the distribution of royalties and of the costs of what we can call the copyright system – who pays for the costs of administration and of monitoring and protection (including court proceedings, tribunals and suchlike) – also the sharing of royalties and other revenues, such as remuneration schemes between authors, publishers performers and other claimants have been largely ignored. Even now that there is increasing interest in empirical studies, they tend to be about the effect of unauthorised use on businesses rather than on incentive to creators.

The view held by those who strongly favour copyright protection is that without copyright, there would be much less production of creative content, a reduction in diversity and hardship for artists and other creators. Those who are totally opposed to copyright believe it leads to the exploitation of consumers and of creators, holds back artistic development and cultural diversity because it encourages the growth

of large corporations, and inhibits freedom of expression. Most economists do not subscribe to either extreme position but there is nothing in all the literature we surveyed here to guide us towards the ‘optimal’ copyright standard. There is certainly scepticism about copyright on the part of quite a few economists: the reasons range from the view that it is simply a means of rent-seeking (that is, of using the apparatus of the law to obtain unwarranted monopoly profits) to the view that it was useful once but it cannot work any more with digitalisation. In between are theories about its asymmetric effects on copyright ‘partners’, that is, creator and distributor (author and publisher), that it really only helps commercial enterprises and not the primary creator, that over-reliance on copyright has inhibited publishers from developing new business models for charging for the use of copyright material (especially in the music business). With regard to collecting societies, the view has been expressed that they are inefficient because they have a state grant of monopoly on top of the fact that they are also dealing with statutorily protected works and that they wield too much power as natural monopolies and combine with other societies to control markets, thus inhibiting economic developments, such as online licensing. However, most economists regard collecting societies as essential to the administration of copyright works and the most efficient way of minimising transaction costs for both rights holders and users (Handke and Towse, 2007).

The most common view of copyright law held by economists is that it requires a balance of opposing economic forces: incentive and access (meaning both in terms of pricing and of granting permissions) and costs and benefits in general. Unfortunately, this can often only be decisive when actual numbers can be attached to the many short and long term effects. When it comes to specific problems, such as the effect of digitalisation, abstract models do not prove very helpful and analytical techniques give way to case studies of management behaviour or economic historical experience. However, there is a general consensus that property rights are important for trade to take place in creative work and although copyright is not the only way to establish such rights, it is one that has stayed the course.

Anyway, the real question is what are the alternatives? It has been suggested repeatedly over three centuries that state patronage (subsidy) or a system of prizes and awards could provide the necessary incentive to primary creators and that publishers’ ‘lead time’ or ‘first mover’ advantage would be sufficient protection for them to stay in business. Experience from cultural economics raises questions about the advantages of state subsidy for individual artists and anyway, obviously not all potential artists can be attached to cultural organisations. Moreover, many artists do not like this type of arrangement (Towse, 2001a). Surveys of artists find that artists would like to be able to rely on the market (with sufficient legal protection) and have subsidies and grants only to assist with specific problems, not as a permanent way of life. Of these alternatives, copyright law is preferred but with reservations about its term and doubts about how it is manipulated by business interests.

Copyright law has weathered several technological storms in its 300 year existence and adapted to sound recording, radio and television, home recording and photocopying while maintaining much the same principles: the creator has the exclusive right to authorise use of the work until it enters the public domain. Exceptions and limitations to that rule (‘fair use’ in the USA) enables the public to reasonable non-commercial uses of copyright material. That said, who the creators are, what

works they produce and how they gain access to them has obviously changed a great deal over the years: copyright is certainly not confined to authors writing books, though for a long time that was what economists writing on copyright had in mind. Many of what are now called the creative industries developed with copyright protection from the very start. What we do not know is what historians call the counter-factual: what would they look like without copyright? Nevertheless, this is the situation that is very often evoked – the world ‘with’ and the world ‘without’ copyright. Any attempt to measure the economic impact of the copyright industries has this scenario in mind.

Whether business models suited to Internet commerce can yield sufficient revenues to maintain a desirable (though not necessarily optimal) supply of cultural products without copyright protection is a hard question to answer. On the one hand, the whole economic organisation of the creative industries has depended for so long on copyright that we have copyright ‘lock-in’ and there would be high switching costs of abandoning it. This applies not only to the production and distribution by the industries but also to the system for collecting and distributing royalty revenues to individual creators. On the other hand, recent history has shown that adaptation to new business models can and does take place. – witness the growth of legal online services for downloading music. As Schumpeter believed, technological change triggers a process of ‘creative destruction’, whereby firms that do not adapt to change go to the wall in a Darwinian selection process of the fittest by survival. That is what we have recently witnessed at work in the music industry. Should ‘lame ducks’ be propped up by statutory copyright protection (Plant’s concern 70 years ago – Plant, 1934)?

Technological change is rarely smooth and before the effects of one change have played themselves out, another is on the way. We also know from studies of innovation that previous waves of innovation were initially resisted by industries slow to appreciate their potential uses and they attempted to halt their progress by recourse to law and lobbying; the most significant example is the resistance of the film industry to video recorders (which eventually enabled it to earn a great deal from derivative and secondary use). The implication of these observations is that governments should not act hastily in response to demands for more copyright protection because we really do not know what the effects will be in possibly inhibiting technical progress and the development of new ways of doing business. On the other hand, governments should not take action that promotes one type of technology until it is fully adopted. The emphasis in the WIPO Internet Treaties and in the EU ‘Information Society Directive’ on DRM and TPM seems to have been premature as there is no standard system and no knowledge about their costs and who will pay them. Protection can easily slip into Protectionism.

Turning to the implications of these points for the economic analysis of copyright, it is evident that there is a need for far more detailed empirical work on the effects of copyright in the relevant industries (and why nor also in those industries with similar problems but little legal protection, like fashion?). Curiously, there has been little work by economists dealing with the public choice aspects of copyright law, though it is wide-open to lobbying and rent-seeking, with the co-called ‘copyright’ industries spending huge amounts of money lobbying national governments and international bodies, such as the World Trade Organisation and the World Intellectual Property Organisation. There have been macroeconomic studies of the

contribution of ‘copyright’ industries to GDP and to the balance of payments, not all of which have been purely objective as they have been undertaken by interested parties: however, there are now better data on the cultural sector in general than say, 10 years ago, and the situation is improving as the EU and also UNESCO work to get internationally comparable cultural statistics. Economists should worry more about how such data are used to ‘make the case’ for the creative industries and they have a real contribution to make here. But what are most needed are microeconomic studies of individual industries, firms and creators, which could well be done by management experts as well as by economists. We need studies in the economics of copyright comparable to those on patents on the adoption of technologies by firms and the role played by IP.

Economic historians will eventually judge whether or not the speed of the adoption of digitalisation and its impact on production and consumption patterns is unprecedented, as sometimes claimed. Their insights are certainly important in understanding technological revolutions. Some economists, notably Varian, take the view that however revolutionary the technology, we do not need new economic thinking to analyse its effects. We think this is difficult to judge because economics itself has evolved as a discipline: it may be the case that in retrospect, network effects are just another version of externalities but would the concept have been invented without the insights of information economics? That apart, it seems to us to be the case that the earlier analysis of the economics of copying is outmoded by digital technologies, though, of course, the analytical approach may not be.

Progress in economics can be judged by two yardsticks: theoretical progress and empirical progress. There has been notable progress in theoretical understanding of the economic aspects of copyright law within the different approaches outlined at the beginning of this report. The property rights approach and contract theory have been very fruitful in providing insights into the economic organisation of the creative industries in which rely heavily upon copyright as well as into the kind of royalty contracts creators make with the industries and with collecting societies that administer the rights. Even though a lot of this theorising appears abstract and mathematical to the outsider (and also to some insiders), that it has contributed to progress in understanding the difficulties. There is undoubtedly a big gap between academic economists, who have to submit to their professional peers to further their careers, and those who make use of economic ideas either as consultants or policy-makers. No doubt they do not get listened to because their work seems too theoretical as has been suggested but that is a short sighted view as eventually, ideas trickle down to the level of practical people.

There has been empirical progress, for example in testing the claims for the music industry that illegal downloading is what is responsible for its reduced sales revenues. The fact that Landes and Posner (2003) make their case for indefinitely renewable copyright by using empirical analysis is a very encouraging sign. There is much more to be done, however. We know very little still about what motivates creativity, how much artists and other creators earn from copyright and other sources, how much they would need to earn to continue to be creative, how they respond to and use the copyright incentive, whether a shorter or a longer term of copyright protection would be in their interests, how important moral rights are to creators and many other points connected with the creative process as contrasted to the role of copyright in industry. ‘Content is king’ was once a slogan and it must

still hold true for the future of the creative industries but without more research into the role of copyright and authors' rights in content creation, we cannot be sure how to secure future creativity. Simply repeating as a mantra that copyright assists creators is not enough.

REFERENCES

- Alexander, Peter J.** (2002), "Peer-to-Peer File Sharing: The Case of the Music Recording Industry", *Review of Industrial Organization*, 20; 151-61.
- Arrow, Kenneth J.** (1962), "Economic Welfare and the Allocation of Resources for Invention", in Nelson, R. (ed.), *The Rate and Direction of Inventive Activity*, Princeton: Princeton University Press; pp. 609-25.
- Besen, Stanley** (1986), "Private Copying, Reproduction Costs, And The Supply of Intellectual Property", *Information Economics and Policy*, 2; 5-22.
- Bhattacharjee, Sudip, Ram D. Gopal and G. Lawrence Sanders** (2003), "Digital Music and Online Sharing: Software Piracy", *Communications of the ACM*, 46; 107-11.
- Blaug, Mark** (2005), "Why did Schumpeter Neglect Intellectual Property Rights?", *Review of Economic Research on Copyright Issues*, 2(1); 69-74.
- Bockstedt, Jesse, Robert J. Kauffman and Frederick J. Riggins** (2005), "The Move to Artist-Led Online Music Distribution: Explaining Structural Changes in the Digital Music Market", Proceedings of the 38th Annual Hawaii International Conference on System Sciences (HICSS'05) - Track 7, 180a.
- Boldrin, Michele and David Levine** (2002), "The Case Against Intellectual Property", *The American Economic Review* (Papers and Proceedings), 92; 209-12.
- Boldrin, Michele and David Levine** (2008), *Against Intellectual Monopoly*, Cambridge, UK: Cambridge University Press.
- Breyer, Stephen** (1970), "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs", *Harvard Law Review*, 84; 281-351.
- Caves, Richard** (2000), *Creative Industries; Contracts Between Art and Commerce*, Cambridge, Mass. and London: Harvard University Press.
- David, Paul** (1993), "Intellectual Property Institutions and the Panda's Thumb: Patents, Copyrights, and Trade Secrets in Economic Theory and History", in Mitchell B. Wallerstein, Mary Ellen Mogue and Roberta A. Schoen (eds), *Global Dimensions of Intellectual Property Rights in Science and Technology*, Washington DC: National Academy Press; pp. 19-61.
- David, Paul** (2000), "A Tragedy of the Public Knowledge 'Commons'? Global Science, Intellectual Property and the Digital Technology Boomerang", Working Paper. <http://www.researchineurope.org/documents/paul3.pdf>
- David, Paul** (2004), "The End of Copyright History?", *Review of Economic Research on Copyright Issues*, 1(2); 5-10.
- Farchy, Joelle and Rochelandet, Fabrice** (2002), "Copyright Protection, Appropriability and New Cultural Behaviour", in Ruth Towse (ed.), *Copyright in the Cultural Industries*, Cheltenham: Edward Elgar.
- Fine, Michael** (2000), "Soundscan Study On Napster Use And Loss of Sales", Available at www.riaa.com.
- Ghosh, Shubha, Anna Maffioletti and Giovanni B. Ramello**, (2005), "Intellectual Property Rights or Liability Rules: How Do We Tackle Copyright Infringement in the Music Market? Insights from Experimental Data", paper presented at the Workshop on the Law and Economics of Intellectual Property and Information Technology, July 22-23, 2005, Università Carlo Cattaneo Castellanza, LIUC http://www.liuc.it/ricerca/istitutoeconomia/LawEconomicsJuly2005/papers/Ghosh_et_al_LIUCpaper.pdf

- Gordon, Wendy J.** (1982), "Fair Use As Market Failure: A Structural and Economic Analysis of the Betamax Case and its Predecessors", *Columbia Law Review*, 82; 1600-57.
- Gordon, Wendy J. and Robert Bone** (2000), "Copyright", in Bouckaert, Boudwijn and Gerrit De Geest (eds.), *Encyclopedia of Law & Economics, Vol. 2: Civil Law and Economics*, Cheltenham: Edward Elgar; pp. 189-215.
- Gowers, A.** (2006), *Review of Intellectual Property*, (The 'Gowers Review'), London HMSO, UK Treasury.
- Hadfield, Gillian K.** (1992), "The Economics of Copyright: A Historical Perspective", *Copyright Law Symposium (ASCAP)*, 38; 1-46.
- Handke, Christian** (2006), "Plain Destruction or Creative Destruction? Copyright Erosion and the Evolution of the Record Industry", *Review of Economic Research on Copyright Issues*, 3(2); 29-51.
- Handke, Christian and Ruth Towse** (2007), "Economics of Copyright Collecting Societies", *International Review of Intellectual Property and Competition Law*, 8(38); 937-57.
- Holm, Hakan J.** (2001), "The Computer Generation's Willingness to Pay for Originals when Pirates are Present – A CV Study", Working Paper 2000(9), Department of Economics, Lund University.
- Hong, Seung-Hyun** (2004), "The Effect of Napster on Recorded Music Sales: Evidence from the Consumer Expenditure Survey", SIEPR Discussion Paper No. 03-18.
- Hui, Kai-Lung and Ivan Png** (2003), "Piracy and the Legitimate Demand for Recorded Music", *Contributions to Economic Analysis & Policy*, 2: Article 11.
- Hurt, Robert M. and Robert M. Schuchman** (1966), "The Economic Rationale of Copyright", *American Economic Review* (Papers and Proceedings), 56; 421-32.
- Johnson, William R.** (1985), "The Economics of Copying", *Journal of Political Economy*, 93; 158-74.
- Johnson, Justin P. and Michael Waldman** (2005), "The Limits of Indirect Appropriability in Markets for Copiable Goods", *Review of Economic Research on Copyright Issues*, 2(1); 19-37.
- Kretschmer, M. and P. Hardwick** (2007), *Authors' Earnings From Copyright and Noncopyright Sources: A Survey of 25,000 British and German Writers*, Dorset: CIPPM and ALCS (available online at www.cippm.org.uk).
- Krishnan, Ramayya, Michael D. Smith and Rahul Telang** (2003), "The Economics of Peer-to-Peer Networks", *Journal of Information Technology Theory and Applications*, 5; 38-44.
- Landes, William M. and Richard A. Posner** (1989), "An Economic Analysis of Copyright Law", *Journal of Legal Studies*, 18; 325-63.
- Landes, William M. and Richard A. Posner** (2002), "Indefinitely Renewable Copyright", Working Paper No. 154, University of Chicago John M. Olin School of Law and Economics.
- Landes, William M. and Richard A. Posner** (2003), *The Economic Structure of Intellectual Property Law*, Cambridge, Mass and London, England: The Belknap Press of Harvard University.
- Lessig, Lawrence** (2004), *Free Culture. How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity*, New York: Penguin.
- Liebowitz, Stan J.** (1985), "Copying and Indirect Appropriability: Photocopying of Journals", *Journal of Political Economy*, 93; 945-57.
- Liebowitz, Stan J.** (2004), "Will MP3 Downloads Annihilate The Record Industry? The Evidence So Far", in Boorstin, E. (ed), *Advances in the Study of Entrepreneurship, Innovation, and Economic Growth*, Volume 15, Amsterdam: Elsevier; pp. 229-60.
- Liebowitz, Stan J.** (2005a), "Economists' Topsy-Turvy View of Piracy", *Review of Economic Research on Copyright Issues*, 2(1); 5-17.
- Liebowitz, Stan J.** (2005b), "Pitfalls in Measuring the Impact of File-sharing", *CESifo Economic Studies*, 51; 435-73.

- Liebowitz, Stan J.** (2005c), "Testing File-Sharing's Impact by Examining Record Sales in Cities", Working paper, Center for the Analysis of Property Rights and Innovation, University of Texas at Dallas. http://som.utdallas.edu/capri/Impact_file_sharing.pdf
- Liebowitz, Stan J.** (2006a), "File-Sharing: Creative Destruction or just Plain Destruction?", *Journal of Law and Economics*, 49; 1-28.
- Liebowitz, Stan J.** (2007), "How Reliable is the Oberholzer-Gee and Strumpf Paper on File-Sharing?". Available online at <http://ssrn.com/abstract=1014399>.
- Liebowitz, Stan J and Steven E. Margolis** (1995), "Are Network Externalities a New Source of Market Failure?", *Research in Law and Economics*, 17; 1-22.
- Liebowitz, Stan J. and Richard Watt** (2007), "How to Best Ensure Remuneration for Creators in the Market for Music? Copyright and its Alternatives", *Journal of Economic Surveys*, 20(4); 513-45.
- Lipsev, Richard G.** (2007), "Technological Transformation, Intellectual Property Rights and Second Best Theory", *Review of Economic Research on Copyright Issues*, 4(2); 5-28.
- Merges, Robert** (1994), "Of Property Rules, Coase, and Intellectual Property", *Columbia Law Review*, 94; 2655.
- Michel, Norbert J.** (2005), "Digital File Sharing and the Music Industry: Was There a Substitution Effect?", *Review of Economic Research on Copyright Issues*, 2(2); 41-52.
- Novos, Ian E. and Michael Waldman** (1984), "The Effects of Increased Copyright Protection: An Analytic Approach", *Journal of Political Economy*, 92; 236-46.
- Oberholzer, Felix and Koleman Strumpf** (2004), "The Effect of File Sharing on Record Sales. An Empirical Analysis", *Journal of Political Economy*, 115(1); 1-42.
- Peitz, Martin and Patrick Waelbroeck** (2004), "The Effect of Internet Piracy on Music Sales: Cross-Section Evidence", *Review of Economic Research on Copyright Issues*, 1(2); 71-9.
- Plant, Arnold** (1934), "The Economic Aspects of Copyright in Books", *Economica*, 1; 167-95.
- Ramello, Giovanni.B.** (2005), "Private Appropriability and Sharing of Knowledge: Convergence or Contradiction? The Opposite Tragedy of the Creative Commons", in Takeyama L., Gordon W. and Towse R. (eds), *Developments in the Economics of Copyright: Research and Analysis*, Cheltenham: Edward Elgar.
- Raskind, Leo** (1998), "Copyright", in *New Palgrave Dictionary of Law and Economics*, London: Macmillan.
- Rob, Rafael and Joel Waldfogel** (2006), "Piracy on the High C's: Music Downloading, Sales Displacement, and Social Welfare in a Sample of College Students", *The Journal of Law and Economics*, 49; 29-62.
- Rochelandet, Fabrice and Fabrice le Guel** (2005), "P2P Music Sharing Networks: Why the Legal Fight Against Copies May Be Inefficient", *Review of Economic Research on Copyright Issues*, 2(2); 69-82.
- Schumpeter, Joseph** (1942), "Capitalism, Socialism and Democracy", New York and London: Harper & Bros.
- Shavell, Steven and van Ypersele, Tanguy** (2001), "Rewards Versus Intellectual Property Rights", *Journal of Law and Economics*, 44; 525-48.
- Silva, Francesco and Giovanni B. Ramello** (2000), "Sound Recording Market: The Ambiguous Case of Copyright and Piracy", *Industrial and Corporate Change*, 9; 415-42.
- Takeyama, L.** (1994), "The Welfare Implications of Unauthorized Reproduction of Intellectual Property in the Presence of Demand Network Externalities", *Journal of Industrial Economics*, 42; 155-66.
- Towse, Ruth** (2001a), *Creativity, Incentive and Reward: An Economic Analysis of Copyright and Culture in the Information Age*, Cheltenham, UK: Edward Elgar Publishing.
- Towse, Ruth** (2001b), "Partly for the Money: Rewards and Incentives to Artists", *KYKLOS*, 54(2/3); 473-90.

- Towse, Ruth** (2006a), "Copyright and Creativity: Cultural Economics for the 21st Century", *Review of Economic Research on Copyright Issues*, 3(2); 83-91.
- Towse, Ruth** (2006b), "Copyright and Artists: A View From Cultural Economics", *Journal of Economic Surveys*, 20(4); 567-85.
- Towse, Ruth and Holzhauser, Rudi** (2002), *The Economics of Intellectual Property*, Cheltenham, UK and Northampton, MA, USA. Edward Elgar.
- Tschmuck, Peter** (2003), *Kreativität und Innovation in der Musikindustrie*, Innsbruck: Studienverlag.
- Varian, Hal** (2000), "Buying, Sharing and Renting Information Goods", *Journal of Industrial Economics*, 48; 473-88.
- Varian, Hal** (2005), "Copying and Copyright", *Journal of Economic Perspectives*, 19; 121-38.
- Yoo, Christopher S.** (2005), "Towards a Differentiated Products Theory of Copyright", in Takeyama, Lisa N., Wendy J. Gordon and Ruth Towse (eds.), *Developments in Economics of Copyright: Research and Analysis*, Cheltenham, UK and Northampton MA: Edward Elgar Publishing.
- Zentner, Alejandro** (2005), "File Sharing and International Sales of Copyrighted Music: An Empirical Analysis with a Panel of Countries", *Topics in Economic Analysis & Policy*, Vol. 5(1), Article 21.
- Zentner, Alejandro** (2006), "Measuring the Effect of Music Downloads on Music Purchases", *The Journal of Law and Economics*, 49; 63-90.

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