

congestion, and traffic accidents—and summarizes evidence on the dollar value costs of these problems for passenger vehicles in the United States. It then discusses how much fuel taxation might be justified to account for them, as well as how much taxation might be appropriate on fiscal grounds, assuming per mile charges are unavailable. Finally, it discusses to what extent fuel taxation should be replaced with per mile taxes.

Natural Resource-Based Economic Development in History 103

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The role of natural resources in fostering economic development is examined for key historical epochs, from the agricultural revolution in 8,000 BC to the present. Natural resource exploitation has been important to development for most of global history. Depending on which epoch is examined, resource-based development could be viewed as “successful” and sometimes not. Simply because a developing economy or region was endowed with abundant natural resources does not guarantee that its natural wealth is exploited efficiently and generates productive investments. Institutional factors also matter, and environmental conditions may also determine whether or not countries develop “good” institutions.

The Economics of Copyright 153

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The copyright industries—such as music, film, software and publishing—occupy a significant and growing share of economic activity. Current copyright law protects the creator for up to 70 years after their death, significantly longer than patent protection (20 years after invention). Copyright law aims to balance the incentive to create new work against the costs associated with high prices and restricted access to this work. This paper reviews the economic issues behind copyright and how these are challenged by changes in technology and market structure. While economics provides a powerful conceptual framework for understanding the trade-offs involved, the paper argues that our empirical knowledge base is very weak. Much more empirical analysis is needed to understand the impacts of changes to copyright legislation. Without such analysis, policy and legal debates will continue to be based largely on anecdote and rhetoric.

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This paper discusses a number of issues in the context of the debate on intellectual property in less developed countries (LDCs). It starts by discussing the consequences of IP enforcement in LDCs for global innovation and welfare in poorer countries. It then considers the costs and benefits of IP enforcement for a small, open LDC, abstracting from global issues. Finally, it discusses the

The Economics of Copyright

Ray Corrigan & Mark Rogers

Introduction

To many economists the idea of copyright is familiar in a personal sense but distant, and even uninteresting, as an economic concept. In terms of intellectual property, patents have attracted by far the greatest economic analysis, with the economics of copyright lagging well behind. This is unfortunate for a number of reasons. First, the copyright industries—such as publishing, media, entertainment and software—are increasingly important.¹ Second, copyright is concerned with encouraging creativity and sharing its benefits, and many would argue that these activities are critical to both an economy's economic success and the wellbeing of its citizens. Third, it appears that economics offers a useful framework for analysing the effects of copyright. The copyright system is a complex mixture of law, technology and market forces. Despite the pivotal role that economic concepts occupy in this system, relatively few economists have analysed copyright and, in particular, there is a huge lack of quantitative evidence.

If you write a book, compose a song, or 'create' some other 'work', you are entitled to copyright protection. In this paper we use 'creator' to refer to the individual(s) who created the work. Copyright protects against copying the 'expression' of the ideas contained in the work, not the ideas themselves. To an economist, such protection represents a monopoly right—in the same way that patents award a monopoly to the inventor, even though patents (unlike copyrights) go beyond preventing unauthorised copying, and forbid even independent creation. Currently, copyright

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¹ For example, WIPO (2005) estimate that 'core' copyright industries account for around 6% of GDP in the US and that employment in these industries is growing at twice the economy-wide rate.

protection in the EU and US lasts for the life of the creator plus 70 years (a patent lasts for 20 years; trademark protection can be indefinite). Section 2 discusses how we arrived at this level of protection. The basic rationale for copyright is to encourage creative activity by providing monetary incentives for, and clear acknowledgement of, the creator. The downside is that granting monopoly power tends to restrict access by consumers to the creative work. From an economic perspective, the copyright system should find the optimal balance between generating incentives for creators and allowing access to creative work (see Section 3).² Debate over whether the copyright system is optimal has intensified in recent years, as the internet and new technologies have tested and modified existing laws and market structures. Some people argue that the copyright system has been hijacked by big business, with the result that not only is access severely limited but that *new* creative work is being stifled. Others assert that copyright infringement is more widespread than ever, requiring ever tougher laws and enforcement. Sections 4 to 9 summarise the key arguments and issues in this intense debate.

1. A brief history of copyright

Ever since Gutenberg invented the printing press in the fifteenth century, the history of copyright has been a story of the responses of a variety of interested parties to developments in politics and technology. By the mid-sixteenth century, printers and booksellers in Venice had gained monopolies in exchange for acting as agents of censorship (Rose, 1992). In England in the 1500s, copyright began as a crown-granted privilege to ‘print and sell only, not to own a work’, in exchange for the stationers’ companies’ agreement to block the publication of seditious or heretical works. The first intellectual property rights were, therefore, tools of monopoly and censorship and, as such, became the focus of severe criticism amongst advocates for free trade. The first specific copyright law is reputed to be the Statute of Anne, enacted in England in 1710 (Lessig, 2004, p. 86). Its aim was to continue to protect the rights of the publishers to print and sell

² This paper only considers copyright from an economic perspective. This is in line with the UK–US common law system, which emphasises the outcomes—or costs and benefits—of copyright, rather than the ‘continental’ view, which traditionally emphasises the individual, or moral, rights of the creators (although the European Commission may be adjusting the traditional continental viewpoint by emphasising economics rather more than individual rights in the rationale for its copyright directives and regulations).

books; to control their monopoly power by limiting the term of copyright to 14 years (renewable once for a further 14 years by authors only); and to break the connection between copyright and censorship. Despite this, a small group of powerful booksellers called the 'Conger' managed to effect perpetual copyright in practice, if not in law, until the landmark House of Lords decision in the *Donaldson v. Beckett* case of 1774.

The continental tradition of copyright arguably began during the French Revolution, with a declaration on the right of authors, which evolved into a strong recognition of the moral rights (these are the rights to control the later reception of the work). In the US, the first federal copyright act was passed in 1790 and was built on the foundation of the English experience. Internationally, through most of the eighteenth and nineteenth centuries copyright in foreign works was largely ignored and publishers all around the world engaged in mass piracy of popular or important foreign works. These publishers saw themselves as honourable men engaged in a public service of providing cheap books (Briggs, 1906, p. 36–38). Gradually, bilateral agreements between states led to reciprocal recognition of copyrights in those countries.

Eventually, due to trade pressure and prominent advocates for change like the author Victor Hugo, the multilateral Berne Convention for the Protection of Literary and Artistic Works was agreed in 1886. The agreement gave international protection to books, music, art, architecture and the moral rights of creators—protections which had developed in signature countries. A revision to the Convention in 1908 also recommended a minimum term of copyright of the life of the author plus 50 years. By comparison with the original exclusive publishers' printing and selling rights, this represented a significant increase in the scope and term of copyright. The Berne Convention has seen a number of significant revisions since its inception, the most recent being in 1971, and it remains one of the most important international copyright treaties to this day, with 159 nations subscribed.

The US did not sign up to the Berne Convention until 1989, though US publishers had long derived the protections of Berne by simultaneously releasing a book in a Berne signatory country such as, for example, Canada. Developments in copyright in the nineteenth and twentieth centuries were largely a tale of industries' responses to developments in technology. For example, when Eastman invented the Kodak camera there

were serious legal disputes as to whether the photographer required the permission of the person they were photographing (it was eventually decided that no permission would be required unless some breach of confidence or contract was involved). The introduction of sound recording, broadcast radio, television and cable television saw the expansion of copyright law to allow compulsory licensing solutions. With the advent of the video cassette recorder (VCR), Jack Valenti of the Motion Picture Association of America famously compared the machine's relationship with the film industry with that of 'the Boston strangler to a woman home alone'. Ultimately, the US Supreme Court narrowly came down in favour of the legality of the VCR in the *Universal v. Sony* case of 1984. Interestingly, the movie industry subsequently derived much higher revenues from the sale of videos and now DVDs than from cinema releases.

Copyright has therefore evolved with market and technological developments. As a result, current copyright law in all countries contains a complex mix of codes and exemptions, making succinct summaries difficult. What is clear is that in many jurisdictions the length of copyright protection has increased. For example, after the first 1790 act in the US, the term of copyright was extended in 1831 (to 28 years, renewable for 14 years), and again in 1909 (to 28 years, renewable for 28 years). From 1962 the copyright renewal term was extended by Congress for one year each year. In 1976, the renewal term on existing work was set at 47 years, while new work was now protected for the life of author plus 50 years (in line with Berne Convention revision of 1908). In 1993, the EU harmonised the term to life plus 70 years (except for sound recordings and broadcasts), with the US following suit in 1998.³

2. The economic analysis of copyright

This section sets out a conceptual framework for thinking about the economic effects of copyright. Awarding a copyright provides creators and their agents with monopoly power to exploit the work. The extent and duration of the monopoly will depend on the specifics of copyright law and the enforcement of this law. Monopoly power means that the price of the work will be higher, output (sales) will be lower, and profits higher

³ For summaries of the many changes in copyright term and scope, including the different copyright term for individuals as opposed to corporations that we ignore here, see <http://arl.cni.org/info/frn/copy/timeline.html>.

than in a competitive market. From a basic economic viewpoint, it is these higher profits that provide the incentive to undertake creative activity. Thinking of profits as the sole incentive is somewhat crude. In particular, it is important to make the distinction between the creator *per se* (e.g., the writer) and the agents, or companies (e.g., a publisher), that embed the creative work in a product available to consumers. Creators may be less responsive to economic incentives than agents, although they may well be interested in the recognition that copyright fosters.

The downside to awarding monopoly power is well known. The higher price, and lower output (sales), of the copyright-protected work reduces access by consumers. Looked at in a static sense, the high price and low output set by the monopolist leads to a welfare loss to society (i.e., overall welfare, or net benefit, to society is lower than if the price were lower and output higher, as in a competitive market). Of course, the entire point of copyright is not to look at the situation in an isolated, static sense, but rather to balance the increased creative activity (a dynamic gain) against the static loss due to higher prices.

There is, therefore, an unavoidable trade-off at the centre of copyright. If copyright protection is too strong, incentives to creators are likely to be high, but access to the work is low. In such a case, society may be worse off since many people cannot afford to access creative work.⁴ To be more precise, an economist would stress that ‘access’ to the work is suboptimal, since the additional cost of allowing greater access to the (already created) work is very low.⁵ On the other hand, if there were too little copyright protection, it is possible that very little creative work would be available, hence society suffers (even though the limited creative work available is accessible to all). Note that the absence of, or weakness in, copyright protection may have a large impact on the profits available to creators and agents, since, in many cases, the ability of competitors to copy the existing work at low cost will dramatically reduce prices. This trade-off between encouraging creative activity, and accessibility to the work that is created, is the basic problem facing the design of a copyright system.

⁴ Or, more specifically, copyright-protected realisations of that creative work. It is the expression, not the idea, that is protected (though the distinction is not always clear). So someone can get copyright protection for an article about painting walls white but this does not stop anyone from using the idea to paint their own walls white.

⁵ In terms of economic jargon, the optimal level of output should be where price (the implied marginal value to the last consumer to buy the product) equals the marginal cost (the additional cost of production). For many goods covered by copyright the marginal cost is very low—for example, the cost of copying onto a CD—hence the price should also be very low.

While the basic trade-off involved may be relatively easy to state, it turns out that the devil is in the detail, which involves an evaluation of both the logic of the arguments outlined above and also an assessment of the magnitudes of the effects involved. Consider the basic argument that stronger copyright protection will increase the incentives for creative activity. This argument relies on a series of assumptions. The first of these is that stronger copyright raises the price of work, the profits to agents and, thereby, the royalties paid to creators. As we will discuss below, this chain of events is subject to various caveats and uncertainties. In addition, and perhaps most problematically, the argument ignores the fact that creative activity often involves using existing ideas in different ways, hence stronger copyright protection may discourage new creators (for example, they may be worried about being sued for infringing someone else's copyright because the line between ideas and expression can be blurry, and subconscious copying can also infringe). This issue is sometimes termed protecting cumulative creative effort or, using Newton's words, 'standing on the shoulders of giants'.⁶ In fact, copyright law recognises this issue to some extent and often allows what are called 'transformative works'.

The argument that access to copyrighted work is too low also requires further analysis. Copyright law does, in fact, try to offset this access problem by allowing 'fair use' (in the US), or more narrowly 'fair dealing' (in the UK). These allow some forms of copying, typically—though not exclusively—for non-commercial purposes, such as for education, research or news reporting.⁷ These exemptions can be viewed as allowing access at zero or low cost (depending on the cost of copying). Fair use, therefore, lessens the market distortion from copyright restricting access.⁸

Figure 1 shows three graphs that illustrate the various issues discussed above. In each graph the horizontal axis is the 'strength of copyright'—something that depends on copyright term and scope, as well as enforcement practices—which we will assume can be represented by a variable, Z . In the top graph—labelled (a) *Creators*—the vertical axis is creative activity. The graph shows that even if there is no copyright (i.e., $Z=0$),

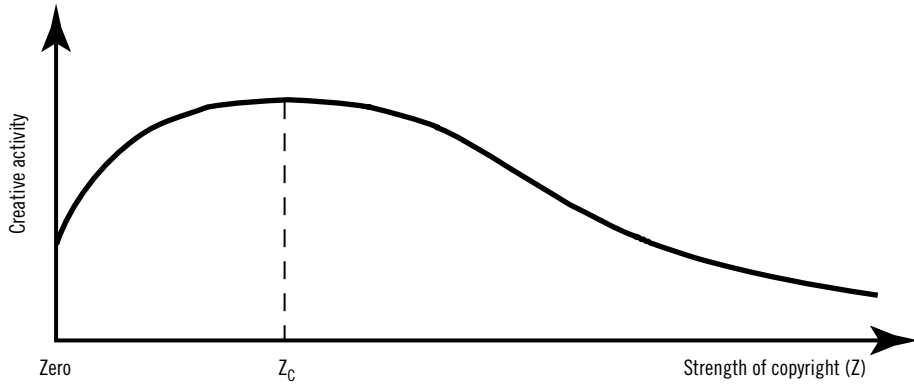
⁶ Newton was by no means the first to use this phrase (Merton, 1993).

⁷ The exact details of 'fair use' and 'fair dealing' exemptions are more complex than suggested here and, of course, the actual legislation is subject to legal disputes (see Einhorn, 2004, Chap. 2 for a discussion).

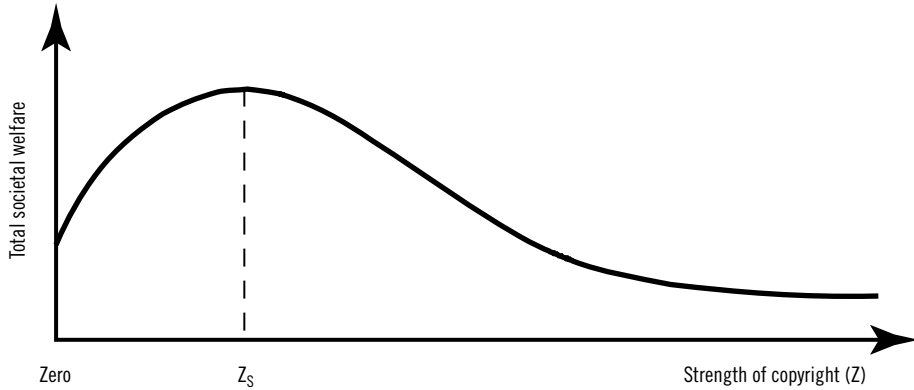
⁸ The existence of fair use can also be justified using a transactions cost framework: it removes the need for copiers to negotiate small, one-off licence agreements with the author (which would often be too costly to negotiate given the small number of copies required).

Figure 1: Optimal copyright

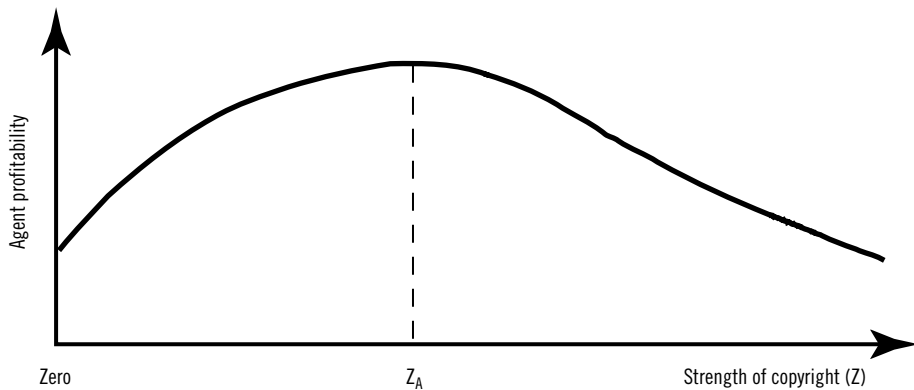
(a) Creators



(b) Society as a whole



(c) Agents



there is some level of creative activity (an assumption that section 6 discusses). As copyright is strengthened, the graph shows that creative activity first increases, then decreases, reaching a maximal value at Z_C . In reality, the exact position of the maximum is unknown, but there are strong arguments for why a maximum would exist (in short, overly strong copyright is likely to hinder new creative activity—see section 8). However, the objective of the copyright system is not to maximise creative activity, but to benefit society as a whole.

The second graph—labelled *(b) Society as a whole*—illustrates the trade-off between societal welfare, or the ‘public interest’, and copyright. In basic terms, societal welfare can be defined as the welfare of consumers plus the profits of firms, but more complex ‘welfare functions’ are possible. Here we have illustrated societal welfare reaching a maximum (at Z_S), which is below Z_C . This is based on the idea that if copyright maximised creative activity, a small reduction in copyright strength will raise welfare (because such a reduction will result in a small loss in creative activity but a large increase in access to, and consumers’ welfare from, creative work).⁹

The final diagram—labelled *(c) Agents*—illustrates perhaps the most controversial issue. The vertical axis shows agents’, or corporate, profitability; once again, our knowledge suggests that this will first increase and then decrease, with strength of copyright. What we do not know is whether such profits are maximised at a level of copyright strength above or below Z_S . The diagram shows a situation where $Z_A > Z_S$, which means companies would prefer stronger copyright protection than society does. This coincides with some people’s view that large companies manipulate the copyright system to raise profits. However, as this paper will discuss, the reality is that there is insufficient empirical evidence to assert the relative positions of Z_A and Z_S .

3. Creators and incentives

A great deal of creative work is initiated by the efforts of individual creators. Hence, in order to understand the impact of copyright, we need to understand the motivations of these creators. In economic terms, we are interested in the supply curve for creative work, which has price (e.g.,

⁹ A formal model of these concepts is in Landes and Posner (2003, Chap. 3).

royalties or other compensation) on the vertical axis. It is probably uncontroversial to assert that many creative individuals often write, compose or design primarily for the inherent satisfaction, rather than monetary gain. Taken to its limit, this line of argument suggests a near vertical (inelastic) supply curve, largely unresponsive to price signals, with its position dependent on intrinsic human characteristics combined with cultural, educational and social conditions. However, the little evidence there is suggests that many creators cross-subsidise their creative work from other jobs and, as a result, their allocation of time to creative activity is, initially, very responsive to increased royalties. This suggests that increasing the basic income of large numbers of creators might have substantial effects. In contrast, the copyright system appears to provide a highly skewed income distribution, with a few ‘superstars’ earning vast incomes and the majority of creators earning virtually nothing. As stated already, the copyright term has been extended over time, and is much longer than patent protection, something that further increases returns to the most valuable copyrights. This said, there are little data and analysis on this issue, with the skewness result being largely based on analysis of musicians’ royalties (Towse, 1999, 2003).

It is difficult to analyse the incentives facing creators without including a discussion of the agents that publish and distribute their work. The next section discusses agents in more detail, focusing on the large corporations that dominate many copyright industries, but some issues need to be dealt with here. Individual creators are often the weakest party in any negotiation, in some cases assigning their copyright directly to agents for a fixed fee, although sometimes there are industry norms for payments to copyright holders (Toynbee, 2004). Another important agent for many creators are collecting societies. Collecting societies—such as the UK’s Performing Rights Society or the US’s American Society of Composers, Authors and Publishers—are membership-based, non-profit organisations that license work. These societies collect and distribute royalties to creators, hence they appear to increase efficiency by pooling transactions costs.¹⁰ Despite this, distributions from collecting societies to creators appear low (for example, the median payment to musicians in the UK for 1989–95 was £75 per year, Towse, 1999).

¹⁰ Collecting societies have, however, drawn criticism from competition authorities (they can be viewed as having monopoly power) and on grounds on efficiency (Rochelandet, 2003).

What about creative activity in non-traditional areas such as computer software? Although software development is dominated by organisations, the open source software movement relies on the activities of thousands of individual, unpaid programmers. Formal analyses of this type of apparently altruistic behaviour make a number of points. First, this type of collective activity is not new: the creation and sharing of knowledge is an important feature of many innovative environments, although the nature of software development appears particularly suitable (von Hippel, 2005). Second, although altruism may account for some of the rationale, it is also likely that programmers are interested in peer recognition and career enhancement (Lerner and Tirole, 2000). In any event, it is clear that creative and commercially valuable activity does occur without using copyright law in the standard way.¹¹

In summary, for traditional types of creative activity, such as music, writing or performance, the evidence that we have suggests that supply could be quite responsive to monetary rewards for many (poorer) creators. However, the current system of copyright appears to generate high payments to a few superstars, leaving most creators to cross-subsidise their creative activities. There is, of course, an issue of 'quality' here: treating all creative work as equal in 'value' is difficult to justify, hence high rewards to a few superstars may be justifiable. The open source software movement also demonstrates that creative activity can occur without using copyright in the standard way. Although, once again, it is probably wrong to assert that monetary incentives are totally absent.

4. Agents, profitability and copyright

Although creative work may have its genesis in individual minds, it is clear that companies play the dominant role in refining, marketing and distributing the final work. For want of a simple term, we refer to publishers, music, movie, software and other companies as 'agents'. Agents are clearly motivated by profits and, as would be expected, are keen to use copyright law to increase profits. These profits are, in turn, paid out as dividends or re-invested in the companies' activities, one of which will be investing in

¹¹ The software may have copyright, but the use is licensed on terms that users who add value will similarly allow their improvements to be used. In fact, there is a theoretical dispute about whether copyright can be legally abandoned at all.

creative activity. Given that the relationship between profitability and copyright are central to this debate, there are surprisingly few academic papers on this issue.¹² There is research into how music sales are affected by unauthorised copying, including internet downloads, but sales are not the same as profits.¹³ For example, IFPI in its *Piracy Report 2005* estimates that there were 1.5 billion unauthorised CD sales in 2004, which at an estimated \$3.05 each, represents US\$4.6bn dollars of lost sales.¹⁴ There is considerable debate over these numbers, but the possibility that unauthorised copying in developing countries reduces current legitimate CD sales is supported by other studies (Peitz and Waelbroeck, 2004). There is also research into how unauthorised downloads from the internet affect music sales. Needless to say, this issue has been central to recent legal cases (see section 7) and, as such, there is no consensus. Academic papers, using various methodologies have found differing impacts, from ‘no effect’ (Oberholzer and Strumpf, 2004) to ‘substantial’ (Blackburn, 2004). One of the issues is that illegal downloads allow consumers to ‘sample’ new types of music, which may in turn increase sales. Some artists can, therefore, benefit and—in terms of stimulating creative activity as a whole—the internet may foster creative work. On the other hand, legitimate sales of superstars’ music are likely to suffer the most, and it is these sales that are central to the large music companies’ profits.

Another way to approach the issue of whether copyright generates market power for creators and their agents is to study the market structure of the industries involved. Economic analysis of changes to market concentration, prices, profits and sales through time—especially in relation to changes in copyright law or technology—would provide some insight into the core issues. Published studies on these issues appear very rare. Hui and Png (2002) analyse whether the production of movies in the US (1990–2000) is related to video and TV ownership, and also the Sonny-Bono Copyright Extension Term Act in 1998 (which extended the term of copyright by 20 years). They find that video ownership boosts production, TV ownership is detrimental and there is little effect from Sonny-Bono.

¹² This is partly due to the fact that copyright is not registered in many countries, unlike trademarks and patents. But there are survey data and other methodologies that could be used (see Mazeh and Rogers, 2005).

¹³ Profits are sales less costs. Hence, for example, although sales may fall due to illegal use of new technology, costs for the companies may also fall, making the overall effect on profits unclear. Further, new technology may generate new sales, such as for mobile phone ringtones.

¹⁴ The ‘pirate’ price is estimated to vary across countries: for example, \$1.12 in China and \$4.81 in Spain.

As is well known, the music industry has been dominated by the ‘Majors’, such as Warner and Universal Music Group, for decades. Estimates of the five firm concentration ratio in the late 1990s were around 70–80%, but there is a large competitive fringe of independent record companies (‘Indies’). An economist might expect such a competitive fringe to generate low prices, but the Indies tend to produce either niche recordings or act as a testing ground (from which the Majors select the winners). The net outcome of these factors, combined with the central role of copyright and changes in technology, is complex, but Silva and Ramello (2000) suggest that the outcome may be contrary to the public interest.

There has been considerable recent debate over whether corporate lobbying has led to changes in copyright-related legislation that will boost profits. A detailed discussion of the role of corporations in copyright changes is contained in Drahos and Braithwaite (2002). Such activity is unsurprising, given the large economic literature on strategic, profit-seeking behaviour by firms, including attempting to create barriers to entry (e.g., Tirole, 1988). This said, there is little empirical evidence to back up these views, hence we are often left with anecdotes and case studies. Perhaps the most famous case is the Sonny-Bono Copyright Extension Act (1998) in the US, mentioned above. Some argue that this represented pure rent-seeking behaviour by firms such as Disney (see, for example, Free Expression Policy Project, 2003). In economic terms, the additional incentive for *new* creative activity from extending the term from 50 to 70 years is very small, since rational agents will heavily discount future cash flows.¹⁵ Given this, one would not expect any substantial increase in creative activity, something that the limited empirical evidence to date tends to confirm (Landes and Posner, 2003, Chap. 8). But such extensions clearly benefit those with copyrights about to expire.

In summary, it seems likely that companies will attempt to use the copyright system to raise profits. What is less clear is how successful, on average, such activity is: there is a real lack of empirical studies that try to disentangle copyright effects from the wide range of other factors that

¹⁵ The relative effect on the present discounted value will depend on the rate of interest. For example, the Sonny-Bono Act extended corporate copyright term from 75 to 95 years; if future royalties are discounted at 10%, this would increase the present value of the copyright at publication by less than a tenth of one per cent. If the discount rate is 3%, the figure is 5%.

influence profitability. At this point, one should note that anti-trust authorities do monitor competitive conditions in the economy, including how intellectual property may interact with other practices to reduce competition. An example was Microsoft's use of a blanket, fixed licence fee for PC manufacturers that installed its software (a practice that they agreed to abandon after pressure from the US Justice Department). It is not clear, however, whether anti-trust authorities can effectively deal with a complex legal environment, as well as a rapidly changing technology and market structures (Landes and Posner, 2003).

5. A world without copyright?

To gain greater insight into some of the issues surrounding the role of copyright it is useful to consider a world in which no such protection exists. As section 2 made clear, copyright did not formally appear until 1700s and there certainly was creative activity, and the commercial exploitation of this, before that (Shakespeare's plays were subject to rapid copying, but equally Shakespeare faced no constraints on drawing on existing work). An interesting historical case concerns the lack of copyright protection for British authors in the US in the 1800s. Despite this, many British authors negotiated substantial royalties from US publishers based on providing advance copy (i.e., there was value in being first to publish; see Plant, 1934, for a detailed discussion). There are also some current exemptions in copyright law; for example, some argue there is no copyright on chess games, and yet books of chess games are published (Frank, 1996). Equally, some publishers and software companies do sell products under open licence. Such decisions are made on a commercial basis, as the firms expect profits to be higher under such a system (either direct profits generated from the main product or from indirect sources, such as after-sales service).

Boldrin and Levine (2002, 2004) put forward a formal argument of why copyright is not required to provide incentives to create. The basic idea at the centre of their model is that the sale price of a copyable good includes the future value of making such copies, hence the creator can charge a high price for initial units sold. This idea of 'indirect appropriability' derives from an earlier literature on copying (Liebowitz, 1985). The extent to which indirect appropriability can generate returns to the creator is

disputed (Klein *et al.*, 2002), especially when copying technology is low cost and rapid.¹⁶

Other factors, in addition to indirect appropriability, can generate monetary incentives. Landes and Posner (2003, p. 40) list eight other reasons why creators may gain some return even without copyright protection, for example creators may gain from spin-off products (e.g., consultancy, endorsements) or they can use technological protection (e.g., encryption). Consumers may choose to buy the original version, either as direct support for the creator or because the original is easier to locate. In summary, it appears that removing copyright could still leave some monetary incentives for creators and agents.

The removal of copyright would also allow new creators to freely access existing work, borrowing not only the ideas without concern (which should happen even under current copyright laws), but also copying parts of existing work. Section 8 expands on this issue. So does our discussion imply that copyright should be abolished? This is hard to justify on a number of grounds. First, there is little solid evidence of how incentives would be affected. Second, activities and behaviour would change in the absence of copyright, as secrecy and first-mover advantages become critical, which would in turn create additional costs. Third, creators might rely more heavily on patrons, including government funding, which historically was seen as detrimental to innovative creative activity. Rather than abolish copyright, the arguments above are often used to argue for a less strict—sometimes called ‘thin’—copyright regime; as opposed to the strong, or ‘thick’, regime that many think we have moved to.

6. Technology, copyright and recent debates

So far we have avoided a detailed discussion of how technological and market innovations are testing the role of copyright, but it is these innovations that are behind much of the current debates. The Napster case is

¹⁶ For readers with a specific interest in models, the returns from indirect appropriability depend on the nature of the copying technology (i.e., how cheaply and how fast copies can be made and distributed), as well as the nature of demand for copies. Boldrin and Levine assume an elastic demand curve for copies, which means that as price falls, quantity rises rapidly, hence revenues increase as the total number of copies grows (which is difficult to justify in the extreme), hence their models indicate that copying is not a problem. There is also the issue of uncertainty surrounding future demand (i.e., you would only pay a high price for the initial unit if you were certain of selling the copies made).

a suitable place to start. The most widely used first generation, free peer-to-peer music sharing software was Napster, conceived by teenager Shawn Fanning in 1999, which had about 70 million users at the height of its popularity, before being shut down by the courts in 2001. The music companies accused Napster of being responsible for copyright infringement on a massive scale. By the way of background, in 1984 the US Supreme Court (*Universal v. Sony*) ruled that the video cassette recorder was legal (because it had potential uses that did not infringe copyright, termed ‘substantial non-infringing uses’). Napster claimed a similar situation applied to their central database.¹⁷ The US 9th Circuit Court of Appeals decided that while the Napster technology was capable of substantial non-infringing uses, Napster was liable for ‘contributory’ (i.e., helping others) and ‘vicarious’ (i.e., responsible for the actions of others) copyright infringement. They stated that Napster controlled access to music and could therefore block access to copyright-infringing files. Napster did develop a process to block access to infringing files, which the company suggested was 98% effective, but the district court judge decided it had to be 100% effective. After this ruling, Napster was closed down and its assets bought up by Bertelsmann, who later relaunched it as a legitimate fee-paying service selling access to properly licensed music.

Napster was quickly followed by other peer-to-peer file-swapping technologies such as KaZaa, Morpheus and Grokster. These companies had ‘decentralised architectures’, meaning that they could not control the actions of their users. Legal cases surrounding these and other companies are still ongoing, but an interesting development was the Dutch Supreme Court’s ruling (*Buma/Stemra v. Kazaa*, December 2003), which decided that the founders of KaZaa could not be held liable for such copyright infringement. The US Supreme Court, however, has taken a different view from both the Dutch Supreme Court and the lower US courts. The US Supreme Court (*MGM v Grokster*, June 2005) stated, ‘We hold that one who distributes a device with the object of promoting its use to infringe copyright, as shown by the clear expression or other affirmative steps taken to foster infringement, is liable for the resulting acts of infringement by third parties.’ Despite this, the court avoided the key question of

¹⁷ They claimed their database allowed ‘fair use’ (for example, to copy songs via Napster that you already own), as well as other wider uses, such as a teacher distributing class notes.

whether Grokster met the ‘substantial non-infringing use’ test and whether that should shield the company from liability. Some have taken the view that the Supreme Court’s finding will stifle the development of innovative technologies due to the fear of getting sued, although the Court did go to some lengths to state that its intention was not to undermine future innovation.

Another important development is ‘digital rights management’ (DRM) technologies, sometimes called ‘technological protection measures’. DRM is a digital fence, constructed around electronic information, which allows the vendor of that information to control access to it. If successful, this effectively removes the need for copyright protection at all. For example, DVDs are sold with DRM that only allows playback on DVD players made by licensed manufacturers approved by the DVD Content Control Association (set up for the purpose by the US film industry). Many DVD players come with region coding that prevents playback of a DVD purchased in another geographical region (i.e., paving the way for price discrimination across regions). Copyright, by contrast, does not allow an author or publisher to insist that a book bought in the UK must not be read in the US. DRM has been strengthened by recent changes to the law. The US Digital Millennium Copyright Act of 1998 and the 2001 EU Copyright Directive make it illegal to bypass DRM technology, even if the person doing so would otherwise have the legal right to access the information behind the digital fence. It is the potential power of DRM, and the recent changes in law to back them up, that prompts some commentators to claim that access to information will become increasingly monopolised.

Exactly how DRM technology will affect the copyright industries is hard to predict. Although it may appear to facilitate a huge increase in market power for companies, it faces a number of obstacles. First, it has become commonplace for new DRM to be cracked (albeit illegally) shortly after its release and the circumvention codes to be widely distributed on the internet. It is likely that some people will continue to engage in the development and communication of circumvention techniques. Second, consumers may become increasingly frustrated with DRM that restricts usage and presents problems (i.e., as hardware and software need changing or updating). This creates an opportunity for firms that sell products based on more open standards.

7. The information commons

There is a body of scholars, including well known people like Lawrence Lessig and James Boyle, who have developed the view that changes in law and technology are leading to a ‘second enclosure movement’.¹⁸ They argue that we are seeing an enclosure of the ‘commons of the mind’, as opposed to the grassy commons of old England. The difference, of course, between intellectual property and land is that the former is non-rival, allowing many people to access and use the ‘property’ at the same time. Their fear is that this non-rival, intangible raw material—which is critical for future creative work—will be fenced off by law and technology. They argue that most creators borrow and improve upon existing work, a process of creative re-mixing. People such as Walt Disney and William Shakespeare borrowed or copied extensively, without needing to clear this borrowing with a private owner or their lawyers. Hence, the ‘fencing off’ of information will undermine the development of new creative work. As Lawrence Lessig often puts it, no one will be able to do to Disney what Disney did to the Brothers Grimm or to Victor Hugo.

These arguments reiterate the need for an optimal mix between publicly available and privately owned intellectual property resources. The optimal mix would allow both (monetary) incentives to create and at the same time sufficient free access so as not to inhibit future creators. The fact that the term of copyright has been extended over time lends weight to those who argue that the mix is moving against future creators; however, there is little aggregate evidence on this issue.

The debate surrounding the Google Print project illustrates these issues. Google has embarked on a project to digitise all the books that have ever been published and to make the entire contents of these books searchable, but not downloadable. Such a project offers potential benefits to consumers, researchers and creators, but may also benefit publishers (as potential customers gain knowledge about published books). However, in scanning and digitising all these books, unless the copyright has expired, Google is engaging, *prima facie*, in massive copyright infringement. At the time of writing, Google have decided to suspend the copying of books until November 2005 to give publishers an opportunity to opt out. In legal

¹⁸ Key references are Boyle (1996) and Lessig (2004). Access to these books and other material can be found at <http://cyberlaw.stanford.edu/lessig> and <http://www.law.duke.edu/boylesite>

terms, a central issue for the Google Print project is whether their actions constitute 'fair use'. From a wider perspective, the basic question is whether such activity is in the public interest or, in terms of Figure 1(b), will such a project increase societal welfare.

8. International issues

Previous sections have already discussed how copyright evolved from a set of national systems into the international system we have today. In the early days, national governments often ignored the rights of foreign creators, focusing instead on the specific needs of domestic industries. Although moves to internationalise copyright go back over a century, decisive changes occurred in the 1990s. In 1994, the Trade-Related Intellectual Property Rights (TRIPS) agreement set out common standards for intellectual property for members of the World Trade Organisation. In 1996, the World Industrial Property Organisation's (WIPO) Copyright Treaty, and Performances and Phonograms Treaty, laid down further common standards; particularly important aspects were the treatment of software and a requirement to act against circumvention technologies. By mid-2005, 54 countries had signed up to the Treaty, including many developing countries, although not India or China.¹⁹ There is a concern that the imposition of common international standards could be detrimental to development in poorer countries (Wade Hunter, 2005). The concern stems from two areas. First, the growth of companies in poorer countries could be reduced by the need to make royalty payments to, or avoid legal disputes with, overseas companies. This is not to say that poorer countries do not have potential from their own copyright industries, only that this may take time to achieve, and that the evolution of copyright should reflect domestic conditions. Second, poorer countries often have an acute need for educational material, such as textbooks or access to journals. Although the WIPO Treaty does have educational and research 'fair use' exemptions, some argue that these do not work effectively and need to be relaxed (Commission on Intellectual Property Rights, 2002).

¹⁹ See <http://www.wipo.int/treaties/en/>

Conclusions

This paper has reviewed the various economic issues surrounding copyright law and recent changes in technology. The underlying framework for our discussions is that the copyright system should operate to the benefit of society. To economists, this framework is one of maximising societal welfare, defined as the sum of benefits accruing to consumers, creators and agents from creative work. In many ways this approach is a complex cost-benefit analysis, including all costs and benefits, both current and in the future.

The paper has described how the copyright system has to balance the incentive to create against the reduction in access to creative work. This balancing act is complex. One reason for this is that access to creative work is both important in its own right and also as an input to future creative effort. Another is that the balance is dependent on the relationship between agents and creators, as well as the interplay of market forces and new technologies. All of these factors are then subject to the exact nature of the legal system and its enforcement. Nevertheless, in our opinion, there is a conceptual framework laid out to deal with these complexities. However, a conceptual framework is not enough. To assess whether the copyright system is optimal we also require quantitative evidence of the impacts involved. To do this we need answers to questions such as ‘by how much does creative activity vary as copyright laws are changed?’ What are the impacts of copyright on corporate profitability? How much did consumers benefit from new technologies such as Napster? While there is some empirical analysis relating to such questions, there is a need for much more.

Without such evidence the debate over copyright will continue to be dominated by anecdote, case studies and statistics on partial aspects of the problem. Is it unrealistic for economists to provide such evidence? In our view, no; economists have and do measure controversial effects in other areas (e.g., the impact of tax reform on work incentives, the welfare loss of agricultural subsidies). There are data that provide proxies for creative activity (e.g., books published, movies made, software created), as well as financial data on industry and firm-level activity. There are also differences in copyright law across countries, and changes within countries through time, which allow the use of statistical techniques to estimate

impacts.²⁰ The copyright landscape has seen increasing turmoil in recent years. Policy making in the area has justifiably been criticised as lacking a sound empirical basis. There is a strong case for producing more empirical evidence to support decision making surrounding the increasingly contentious issue of copyright.

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²⁰ For example, in 1996 the EU adopted the European Database Directive (Directive 96/9/EC), thereby extending copyright protection to cover unoriginal data collected in databases (e.g., phonebooks). Currently, US copyright does not cover databases (see Bernt Hugenholtz's 'The Database Right File' at <http://www.ivir.nl/files/database/index.html>). Hence, one could compare the subsequent performance of the EU and US sectors.

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