

# AN EMPIRICAL ANALYSIS OF THE ECONOMICS OF COPYRIGHT: HOW VALID ARE THE RESULTS OF STUDIES IN DEVELOPED COUNTRIES FOR DEVELOPING COUNTRIES?

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## 1. INTRODUCTION

By most accounts, the exploitation of copyright forms a relatively large part of most developed and developing economies. A small but growing body of literature suggests that 5 per cent of GDP or more can be attributed to industries that are dependent (to a greater or lesser degree) upon copyright, and that this figure is increasing over time. (For an overview of this literature, and a discussion of the methodological issues involved, see the symposium papers in volume 1(1) of the Review of Economic Research on Copyright Issues, available at <http://www.serci.org>.) Clearly, if copyright can be properly managed and protected, the recent advances in digital technologies that allow for greater distribution opportunities for cultural products point to even more impressive figures in the future.<sup>1</sup>

The basic economic theory of copyright has been well understood for quite some time (see, for example, Landes and Posner (1989)). Generally, copyright is seen by economists as an attempt to achieve, simultaneously, a socially optimal production of, and a socially optimal consumption of, copyright material.<sup>2</sup> The idea is that copyright should balance at the margin the (assumed positive) effects on the incentives given to creators of copyright material against the (assumed negative) effects on the consumers of this material. It is normally hypothesized that the supply of copyright material should be increasing in copyright protection, while the demand for copyright material should be decreasing in copyright protection.<sup>3</sup> Thus, too much protection leads to an excess supply of copyright products (over-production and under-consumption), while too little leads to an excess demand for copyright products (under-production and over-consumption).

There has been a considerable amount of theoretical hypothesizing and general hand-waving regarding the exact amount of copyright protection that would be appropriate to equate supply and demand of copyright products. The outcome of this theoretical debate is rather confusing, mainly due to the fact that conflicting theories have been expounded, and defended, on apparently equally solid theoretical grounds. However, in general, it would be fair to conclude that it appears unlikely that either extreme (no protection at all, or total and absolute protection) is an optimal solution.

The heart of the problem can easily be seen to reside in the fact that, by its very nature, an optimal copyright law requires information that law-makers typically do not have, and may not even be able to approximate to any reasonable degree of accuracy. On the one hand, we require knowledge on the market demand curve for copyright products, and on the other, we require information on the private costs (both financial costs and opportunity costs) of creators of copyright products. Coming to grips with either of these concepts is an inherently empirical issue that has yet to be properly and fully addressed in the literature.<sup>4</sup>

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In lieu of the data necessary to directly calculate an optimal copyright law, it appears that the amount and nature of protection has largely been shaped by lobby group pressure. Since most of this pressure has come from the supply side,<sup>5</sup> often represented by lobby groups located in developed countries, the upshot has been constant increases in copyright duration, the most easily defined and understood dimension of protection.<sup>6</sup> This scenario leads directly to at least two interesting questions; how socially optimal are the current protection standards given by copyright law, and how robust is a given level of copyright protection as a socially acceptable standard to different countries? (Above all, is the protection standard that is appropriate in a developed country also appropriate for a developing one?)

In this paper I attempt to provide a synopsis of the empirical literature, in the field of economics, concerning copyright. The paper is not intended to be a full literature survey, but rather attempts to identify the main areas that have been studied, and to offer an overview of what the literature says by means of an analysis of representative publications. The principal objective is to attempt to provide guidance to economists interested in undertaking empirical research on the economics of copyright, particularly in developing countries and countries with economies in transition. I shall attempt to provide an identification of areas for further research and suitable methodological approaches that could be followed by economists, especially in developing countries and countries with economies in transition, to study the economics of copyright empirically.

To that end, the paper will address the following general topics: (1) papers dealing specifically with supply side effects (earnings from copyright royalties, the effect of copyright law on creativity, collective management of copyright); (2) papers dealing specifically with demand side effects (willingness to pay by consumers of copyright products, copyright infringement or piracy); (3) papers concerning emerging mechanisms for exercising rights over protected works. The paper concludes with a section that addresses directly the issue of copyright for developing countries.

### **1.1 The Scope and Nature of Copyright Products**

Before beginning the paper proper, it is worthwhile to clearly set out the limits to the type of literature that it will consider. Here we are only interested in the realm of copyright, and not other types of intellectual property. This is an important restriction, as a huge amount of scholarly work bundles together issues related to copyright with those related to other IP regimes (patents, trademarks, trade secrets, etc.), under the general title of “intellectual property”. The task at hand refers only to copyright, and so we shall not consider literature that is clearly more heavily slanted towards analysis of the other types of intellectual property, most importantly patents.

To be clear, “copyright products” are those that embody works of authorship generally defined. Such works will include things like the written word (novels, prose, poetry, etc.), musical compositions, artwork (including architectural design), audiovisual works, and certain aspects of computer software. As can be readily seen, copyright has much to do with the cultural sector of an economy, where certain outputs related to cultural richness, entertainment, and artistic appreciation are produced and consumed. However, although there is a clear spillover, “the economics of copyright” is not synonymous with “cultural economics” by any means. Copyright products are only a part of cultural output (and vice-versa) – specifically, copyright products can be thought of as that part of cultural output that persists over time in an unchanged state, as fixed to some physical support that functions as a specific means of delivery, with the ability to be consumed time and time again, and (normally) to be easily reproduced. A CD containing a

recording of a concert performance is certainly a copyright product, but a concert *per se* is typically not.<sup>7</sup> Similarly, a book containing a story is a copyright product, but a public recital of that story is typically not.<sup>8</sup> This distinction is important for the present publication, since there has been a significant amount of empirical work on cultural markets (artists' labor markets, supply and demand functions for cultural outputs etc.), some (but not all) of which is pertinent to a study of copyright products.

However, aside from very few exceptions, the demarcation between those aspects of cultural markets that should be earmarked as copyright-relevant and those that are not, is very rarely provided. Thus, we will be forced to include several studies within the present document, sourced from the field of cultural economics more generally defined, that may have only a cursory link to copyright as such. The alternative, which would be to only review the literature that locates entirely within the narrow bounds of the economics of copyright, would cut the number of relevant papers included significantly, but would also be guilty of ignoring a large body of work that is without doubt at least partially relevant (and where the degree of partiality is almost impossible to estimate with any reliability in general). Thus, here I have elected to include many studies from the realm of cultural economics, and I hope that my choice corresponds to those for which the relevance to copyright is the strongest. To ensure that I am not misunderstood on this issue, I will remind the reader from time to time when a particular paper that is being discussed might be classified as only partially relevant to copyright, for the reasons that I have just set out.

Copyright goods provide for a large amount of consumer utility, and as such are an important part of an economy, but they should (in almost all cases) not be confused with technological inputs to productive processes.<sup>9</sup> This is important, especially when we consider the case of economies in different stages of development. Economic growth and development is clearly associated with patented innovation, under which production processes are improved and modernized, but the link between growth and copyrighted expression is less clear.<sup>10</sup> However, the copyright industry is booming worldwide – huge media conglomerates provide employment for a great many individuals, and provide significant welfare improvements to the consuming public in general.<sup>11</sup> Again, going back to the data presented in the studies on the impact of the copyright industries alluded to above makes it clear that economic wellbeing and development are also linked to copyright products.

## 2. SUPPLY SIDE

As stated in the introduction, copyright law attempts to balance the welfare of the consuming public against the incentives provided for creators. Although copyright law does set out some provisions that are not financially motivated (for example, moral rights), there is a clear assumption that proper incentives are synonymous with proper financial remuneration,<sup>12</sup> and this is the assumption that we will retain in the current paper.

The standard economic theory on the supply side of copyright can be summed up briefly as follows. First, we assume that creative individuals (those who create copyright products and who are *de facto* the copyright holders) have a profit motive,<sup>13</sup> and thus are motivated to some degree by financial gain, in the sense that if they are offered higher pay for creating they will respond by exerting more effort in creating. Second, we assume that along with a greater level of copyright protection the copyright holder achieves a greater level of monopoly power in the market in which access to the copyright is traded. Along with that greater monopoly power comes a greater ability to extract willingness to pay from consumers, that is, the copyright holder achieves a higher level of profits. Thus, increased copyright protection leads to higher finan-

cial gain, and so under the first assumption, creative individuals respond by creating more (and better) copyright products. In short, following the argument through, we see that it purports to show that an increase in copyright protection will, in the end, lead to a greater supply of copyright products. Note that this is a dynamic argument – greater protection now leads to more creation into the future (in, of course, the expectation that the greater protection will still be present in the future).

In keeping with economists' general love of pointing out counter-intuitive results, the theoretical literature has identified several ways in which a strengthening of copyright law may have perverse effects upon the remuneration of authors. This literature was initiated in earnest during the 1980s,<sup>14</sup> with perhaps one of the best-known papers in the field of the economics of copyright, Liebowitz (1985). In this famous paper, Liebowitz pointed out that, if the sellers of copyright goods can distinguish users prone to copying from others, then a simple theory of price discrimination can allow them to "indirectly appropriate" the willingness to pay from consumers of copied units of the good without actually selling to them, thus turning copying in their favor. In such a scenario, a stronger copyright law could be damaging to the financial payoff to copyright holders. Liebowitz provided a small empirical study of library journal subscriptions to support his theoretical result.

Following on from the Liebowitz paper, a series of other papers followed that point out other ways in which copying can be favorable to copyright holders. For example, Takeyama (1994) used the possible existence of network effects to achieve this result. In an unpublished paper, Harbargh and Khemka (2001) showed that if a stronger copyright law does indeed imply more original creation, then there will also be more to copy, and so more copying may actually result. In this case it is unclear if stronger copyright protection does indeed favor the ability to price monopolistically.

There are even reasonable theoretical grounds for doubting the generally accepted idea that stronger copyright protection<sup>15</sup> implies a greater level of creativity. For example, Watt and Towse (2006) argued that if an increase in copyright protection implied a greater level of earnings on previously created works, then a standard income effect will imply that more leisure is sought, leading to less time spent in creative activity. This effect would have to be weighed against the substitution effect that occurs when a higher per-unit-time payoff for current creative activities is considered. The upshot of such a tradeoff would likely be that younger (less published) artists would likely spend more time creating while older (more published) artists would spend less time creating, when copyright law is strengthened.

While these types of argument are compelling theoretically, they should not be taken as being more than theoretical curiosities until they can be backed-up by some stringent and serious empirical evidence. I know of no papers that provide such evidence, but of course I would certainly welcome any efforts to advance on such an endeavor. Notwithstanding a lack of convincing empirical evidence in support of such theses as indirect appropriability and network effects, what economists have certainly looked at empirically is the effect of changes in copyright law upon the earnings ability of authors from copyright royalties, and on the production (actually, the publication or registration) of copyright products. It is to these two topics that we now turn our attention.

## 2.1 Earnings From Copyright Royalties

Certainly the particular area of study, under the general topic of the empirics of the supply side of copyright markets, that has received most attention by economists is the ability of authors to earn money from copyright royalties. This aspect of copyright can be thought of in terms of both the demand side and the supply side. It is a demand issue since earnings are exactly equivalent to the revenue that is generated from the demand curve. However, most of the literature has looked at this from the slant of authorship and the decision to supply copyright and other cultural products. The overriding emphasis is to see how much of an author's total income is generated from copyright products, in an effort to then look into the purely supply issue of how creativity itself is affected. In a nutshell, the idea is to look first at how much income is earned from copyright royalties, and then to see if this income does actually provide sufficient incentives for creation and authorship to take place. The literature in general concludes that only a minority of authors actually receive a significant proportion of their total income from copyright royalties, thereby placing a shadow of doubt over the existence of a strong relationship between earnings and creative activity.

Of course, if we were not to restrict our attention to authors, but rather to look at income generated from copyright royalties more generally, we would quite possibly have a very different story. Indeed, as is clearly documented in the very informative writing of Bettig (1996), copyright law has provided the foundation for many of the great business fortunes, and has been used rather effectively to promote economic power and wealth. The benefactors of copyright are not, however, normally the creators of the copyright products, but rather they are the corporations (and principal executive officers of the corporations) that produce and distribute copyright products, most notably the entertainment industry. In any case, in the present study, we will abstract from corporate use (and misuse) of copyright to generate wealth, and instead look at the earnings abilities of individual authors and creators.

It is also worthwhile mentioning that copyright as an incentive mechanism has almost surely had a major impact upon the development of creative and cultural industrial sectors in most countries. This impact is certainly alluded to (but is not actually measured) by the studies that have estimated the macro-economic importance of the copyright industries, which were mentioned in the opening sentences of this paper. Outside of these "impact" studies, to the best of my knowledge there has been no real empirical work done on analyzing the links between copyright as a legal mechanism and the parameters of copyright more particularly, and the development of the industries that disseminate copyright products. This is not, however, an oversight by economists, but rather more likely an indication that any such study is at the very least daunting, and possibly even impossible to carry out in any reasonably convincing fashion.

As we have already mentioned in the introduction, earnings by artists in general do not do true justice to the idea of earnings from copyright royalties, as artists typically get their incomes from a variety of sources. Even if an artist does not earn money in non-artistic activities, royalties from copyright-protected products might not be a particularly important source of income. For example, in a major study of the music industry, Connolly and Krueger (2005) found that concerts provide a larger source of income for performers than record sales or publishing royalties. Of the top 35 income earners, only four made more money from recordings than from concerts, and some of that money was in the form of advances on new albums rather than royalties from past recordings. Overall, for the top 35 earners, income from touring exceeded income from record sales by a ratio of 7.5 to 1.<sup>16</sup> Of course, some of the income that is generated by activities other than recording royalties may still be attributable to the existence of an exclusive right over the work that is performed. In that way, copyright is still something that could be considered important for touring and concert income by singers. However it is likely impossible to sep-

arate the part of concert income that is due to copyright from the part that is not. We are, then, reduced to hypothesizing that copyright *per se* is more important for recording royalty income and less important for concert income, although its relative importance to each activity is unknown.

In a very early paper dealing with the earnings of creative individuals, Filer (1986) tested the often assumed idea that artists are, generally, underpaid relative to non-artistic income earners.<sup>17</sup> Here, the reader is forewarned of what was discussed above in section 1.1 – the Filer paper is concerned with artists' earnings, from all sources, only one of which might be copyright royalties.<sup>18</sup> Filer used data from the 1980 census in the US, and finds that in fact artists do not appear to earn less than other workers of similar training and personal characteristics. Thus, the conventional wisdom on the earnings of artists is found not to be true, although a caveat is in order – the data used by Filer does not distinguish between earnings from arts and non-arts sources. Artists are also found to be on average younger than workers in other professions, and (again, contrary to common perceptions) their employment patterns are more stable (i.e. in any given period, fewer workers leave artistic professions than non-artistic jobs). The variance of artists' earnings is found to be greater than in other professions (again, on average), although no strong evidence was found to support the hypothesis that artists earn less than they might expect to receive in other jobs.<sup>19</sup> Following on from Filer's work, McNertney and Waits (1988) reviewed the literature to date and considered that at best the data is ambiguous and researchers are divided over the issue of whether or not artists earn less than comparative non-artists.

Contrary to the findings of Filer (1986) and McNertney and Waits (1988), in a more complete review of the literature up to the early 1990s, and using data that does separate earnings from arts and non-arts sources, Wassall and Alper (1992) concluded that: "The popular conception of the struggling artist working at other jobs to make ends meet has some basis in fact". Indeed, close scrutiny of the studies on earnings of artists led Wassal and Alper to assert that "... artists' mean income is less than those of workers with comparable educational attainment". These results appear to be confirmed by studies on artistic labor markets in Australia carried out by Throsby (1997) and in Wales by Towse (1992), who estimated earnings functions of artists. In particular, the Welsh study revealed that artists' earnings increase in the amount of time spent on artistic work, with an elasticity of around 0.5.

In an important work on the general topic of artists' labor markets and their earnings from copyright, Towse (1999) has proven to be a cornerstone piece in the literature. The book covers a great many particular topics that are of direct interest to the supply side of the copyright products market, and offers many valuable insights for cultural and copyright policy in the informational age. Towse (p. 58) argues that artists' labor markets are characterized by several aspects, including (1) multiple employment, some of which is outside the arts to earn a living; (2) a reservation wage below which artists would not supply labor to the arts; (3) a willingness to take considerable risks in relation to their income (perhaps due to artists over-estimating their probabilities of success prior to entering the artistic labor market).

The empirical work presented in Towse (1999) on the earnings of artists relates to the UK, and is largely the result of surveys of artists during the latter part of the 1980s and the early part of the 1990s. The data shows that artists earn, on average, less than other workers of comparable characteristics in the UK, although of course there are cases of individuals doing significantly better than non-artistic counterparts. The data suggests that artists' earnings are very skewed, implying that averages may not be representative.<sup>20</sup> Income from artistic sources is also revealed to be particularly risky, suffering fluctuations from year to year.

More recently, a very large study of the earnings of authors from both copyright and non-copyright sources in Germany and the UK, Kretschmer and Hardwick (2007) looked at the particular case of writers. They concluded, after a monumental data analysis, that copyright royalties have not managed to produce an appropriate reward for writers. Specifically, they state that: “The rewards to best-selling writers are indeed high but as a profession, writing has remained resolutely unprosperous”. Among the most salient findings of the survey information gathered by Kretschmer and Hardwick, it turns out that:

- Writing is the main source of income for less than half of the 25,000 authors<sup>21</sup> surveyed.
- Typical earnings of professional writers are less than half of the national median wage in Germany, and one-third below the national median wage in the UK.
- 60 per cent of professional writers hold a second job of some kind.

The analysis by Kretschmer and Hardwick also confirms the skewedness and riskiness, of earnings from copyright royalties. Specifically, Kretschmer and Hardwick calculated Gini coefficients for the distribution of earnings over authors, allowing them to compare the shape of these distributions to those of the national income distributions. In the UK, the Gini coefficient for authors is 0.63, compared with the national Gini coefficient of 0.33, while in Germany the authors’ Gini coefficient is 0.52 compared with the national coefficient of 0.31. The significantly higher values of the coefficients for copyright earnings imply a far greater distortion of the distributions.<sup>22</sup>

It is also interesting to note that the Kretschmer and Hardwick data reveal that payment to authors from collecting societies is more skewed even than the general distributions of earnings of authors. Specifically, in the UK the Gini coefficient for payments from ALCS (the UK collecting society) is 0.78, while in Germany the coefficient for payments from VG Wort (the German collecting society) is 0.67. This, of course, reflects the fact that collecting society payments represent actual use, and suggests that copyright collecting societies exacerbate the income risk of their members.

Other results from the Kretschmer and Hardwick study that are worthy of mention are the following:

- Writers who bargain with publishers earn significantly more than those who do not.
- Female writers earn considerably less than male writers.
- The increased exploitation and use of copyright works via the Internet has not resulted in higher earnings for authors.

The findings that artists rely mainly upon non-artistic sources of income, and that the earnings of artists are very skewed seem to be quite robust across countries and across the different types of artists (writers, singers, performers, entertainers, etc.). For example, Matsumoto (2002) reported data from Japan that further confirms these characteristics in that country. However, interestingly, Matsumoto also provided certain details of earnings that are generated specifically from rental and secondary use of pre-recorded music formats (mainly CDs). Again, skewedness arises, but it is less marked than for the general income distribution, implying that those artists who do record and distribute their work on fixed supports are generally able to earn a more stable income stream from those recordings. Matsumoto also provided details of the use of CD music according to the year of publication, which is a direct test of how copyright is or is not providing remuneration for authors and performers over time. For rental purposes, almost all the CDs are used within a year of publication, but for radio broadcasting on AM only about a third of the use is music that is less than a year old, while the largest percentage share of AM radio use is for music recorded more than nine years ago. FM radio broad-

casting is different, with the most use being made of recent music, although the decline in use as the music gets older is very gradual. Finally, the use made by television broadcasting is also interesting, with music recorded between one and two years earlier being about five times as important as more recent output. Television also makes significant use of older music, again with a gradual decline as the music ages.

Similarly, Hansen *et al* (2003) presented the results of a thorough investigation of the situation of composers, lyric writers and arrangers of music in Finland. Again, the study showed that most Finnish music creators do not manage to earn their living from only creating music, but they rely heavily on other income sources (often related to music creation, like teaching music, writing about music and grants). Copyright remunerations are an important source of income only for a minority of music creators, with the exception of performance remunerations. Perhaps the most interesting feature of the Finnish study is that the source for the data was the National Board of Taxation, and so we can be sure that the data is reliable.

Finally, it is worthwhile to conclude this section with a mention of at least one study relating to a developing country economy. Domon and Nakamura (2007) looked at the particular case of Vietnam. The main focus of the paper was on the effects of copyright piracy and enforcement, but along the way they also provided a snippet of information on the earnings of singers in Vietnam. It turns out that pirated CDs play a major role in promoting singers, and so they are not eager to support copyright enforcement. Earnings from copyright royalties are insignificant compared to earnings from concerts and other live performances. Specifically, Domon and Nakamura found survey evidence that indicated that there are three tiers of singers in Vietnam; the top tier (containing about 20 singers) can earn about 2,000 US dollars per hour of live performing, the second tier (about 100 individuals) can earn about 1,200 US dollars per hour of live performing, and the third tier (containing "a considerable number of singers") can earn about 800 US dollars per hour. However, not only do the hourly equivalent rates drop over the tiers, but also the ability of the artists to command air-time also drops, so that while the top-tier singers can expect half-hour performances, the third-tier singers can only expect to get 15 minutes per performance. Clearly, it is also the case that the top-tier performers are also the most pirated, and so this analysis points to the (somewhat perverse) result that greater levels of piracy of a given artist lead to greater levels of earnings in live performances. Thus, copyright protection in this scenario did not provide a reward, but rather quite the opposite. Of course, no attention at all is given to the calculation of the royalty income losses of the artists due to piracy, and thus we still cannot conclude that artists in Vietnam are better off than if the copyright in their recordings could be appropriately protected.

In short, by almost all accounts, artists earn very little from the direct exercise of copyright through royalty income. There are several reasons for this, among which we could certainly list piracy of different types, but also surely we should consider the possibility that the majority of artists earn very little from copyright simply because there is very little demand for their work. After all, copyright provides a reward that is based on the social value of the creation, which is reflected in the demand for that creation. When there is little or no demand, there can also be little or no reward.

## 2.2 Effect of Copyright Law on Creativity

In the previous sub-section, we have considered the earnings of authors from copyright. However, higher earnings do not necessarily translate into more creativity. It is also necessary to look at the elasticity of supply of copyright products if we are to properly analyze the empirics of copyright. In a nutshell, if copyright law is indeed to work properly as a mechanism under

which the interests of the consuming public and the interests of creators are balanced, then it is important that a strengthening of the protection standard given under copyright law does indeed yield more creative activity (not just more earnings for creators). This is quite simply because when the protection standard is strengthened, it is usual to assume that consumers of copyright products are made worse off, normally through the higher prices and correspondingly lower consumption that would accompany the greater monopoly power afforded to copyright holders, but also (in the case of longer copyright duration) through a longer wait until copyrighted work falls into the public domain. Thus, a strengthening of the protection standard only makes sense if indeed it stimulates more creative activity, hopefully because it provides creators with a stronger financial motive for creating.<sup>23</sup>

The empirical relationship between changes in copyright law and the level of creativity is difficult to test, because “creativity” has no simple and obvious way of being measured. However, using certain proxies for creativity, economists have analyzed the relationship. Also, some authors have attempted to justify alterations in a copyright’s duration by considering the current economic value of works whose copyright is about to expire. This is often done by looking at the percentage of such titles that are still in demand, as measured perhaps by being in print (books), by being demanded for current public broadcast (e.g. movie screenings on television), or for the purposes of publishing new versions (perhaps of old films or of old songs). The idea is that if it is true that there is no commercial value in a given work long before its copyright expires, then clearly there is no value in increasing the copyright duration on those works.

A good example of a paper that considered the current value of old works is Rappaport (1998), who looked at the current commercial value of copyright products that were first published over the period 1922 to 1941 (works whose copyright was soon to expire). Rappaport studied books, music and movies. As far as books were concerned, the annual royalty value of books originally published in 1922 to 1926 was still an astounding 46 million US dollars in 1998, while the figure was 74 million US dollars for books published between 1937 and 1941. For music (the focus here is on songs – lyrics and musical scores rather than performance rights, since the early recordings are of such low quality that they have little current value), the finding is that just over 11 per cent of the sample was still available in 1995. The 1998 annual royalties for music originally written in 1922-26 was 3.4 million US dollars, and for music from 1938-41, the 1998 annual royalties totaled 15.2 million US dollars. Finally, Rappaport also studied movies. He found, unsurprisingly, that the survival rates of movies diminished with time, so that the more recent ones were also the most likely to still be shown commercially. Only 11 per cent of movies that were first screened in 1926 to 1928 still had current commercial use in 1998, while that figure increased to 40 per cent for movies first released from 1929 to 1932, and to 65 per cent for movies first released between 1933 and 1941. Similarly, more recent movies have greater commercial value; those of the period 1926-28 had an average commercial value of 175,000 US dollars, those of 1929-32 had an average value of 250,000 US dollars and those of 1933-41 were valued commercially on average at 400,000 US dollars. At first glance, these results look surprising in that both the percentage and value of old films remains generally high,<sup>24</sup> clearly indicating that long copyright protection duration is justified.

Contrary to the findings of Rappaport that would tend to favor a long copyright duration, Landes and Posner (2003) looked at the time series of renewals of registrations with the US Copyright Office over the period 1910-91.<sup>25</sup> They found that while renewals were generally increasing (a low of only 3 per cent in 1914 to a high of 22 per cent in 1991) along with some lengthening of copyright duration,<sup>26</sup> about 80 per cent of titles (including books, music and graphic arts) had very little or no economic value after the initial term of copyright. Another figure calculated by Landes and Posner is that the elasticity of renewals with respect to the fee was about -0.2, implying that renewals are reasonably price sensitive. Considering that the fee is

low, this indicates that the authors saw very low future earnings from their copyright. It is interesting to compare the results of Landes and Posner with those of Liebowitz and Margolis (2005), who found that of a sample of 236 book titles from the 1920s, 41 per cent were still in print some 58 years later. Disaggregating the data, the survival probability of best sellers from the 1920s is, logically, significantly greater than that of non-best sellers.

Notwithstanding these studies, the main methodology of economists regarding the optimal structure of copyright law is to look for a moment of significant change in the law, and around that date to consider what happened in the copyright market. Above all, entirely due to data availability, it has generally been the case that economists have considered how changes in copyright law have affected the supply of copyright products, and from there they have argued whether or not the change was beneficial. The basic idea is quite simple – it is assumed that an increase in copyright protection is not beneficial to the demand side, and so it can only be socially beneficial if it transpires that with stronger copyright protection, the supply of copyright products increases. If the supply of copyright products were not to increase, or were to increase by a very small amount, then we have significant evidence that the particular change in protection that had occurred was not socially beneficial.<sup>27</sup>

Probably one of the most important alterations in copyright law in the last 50 years or so was the Copyright Term Extension Act (CTEA) in the US,<sup>28</sup> which (retroactively) extended copyright duration from life plus 50 years to life plus 70 years. This legislation led to a renewed interest by economists in arguing whether or not the new copyright term was justified. Specifically, at the 2002 US Supreme Court case of *Eldred et al vs. John D. Ashcroft* (normally known as the “Eldred” case), an *amici curiae* brief was submitted by a group of 17 very distinguished economists (including five Nobel laureates) that argued strongly against the copyright term extension (see Akerlof *et al* (2002)). Using simple but illustrative calculations of present expected value, the brief concludes that: “The CTEA’s longer copyright for new works provides at most a very small additional incentive”. However, in their reply to this work, Liebowitz and Margolis (2005) noted that while the financial incentive may be small, the effect on the creation of copyright products would depend not on this alone, but also on the elasticity of supply with respect to financial reward. Thus, possibly, a small financial reward is sufficient to provide an incentive for a reasonable scale of new creation.<sup>29</sup>

For the case of the production of movies, Png and Wang (2006) looked at how extensions of copyright duration affected the output of new movies in a sample of 18 different countries. Again, the principle change in duration that was considered by Png and Wang was the extension of protection to life<sup>30</sup> plus 70 years (applied retroactively).<sup>31</sup> The results of the study indicated that the term extension generally led to an increase in production of movies (an increase of between about 2 per cent and about 13 per cent, but with a significant variation).

In earlier work on the same topic, Hui and Png (2002) looked again at the impact of economic incentives upon the international supply of big-screen movies in the US using the 1998 increase in the term of copyright protection as the change in the copyright standard.

The analysis of Hui and Png suggests that the CTEA did not stimulate the production of movies, and thus was “a giveaway to owners of existing creative work”. On the other hand, Hui and Png also provide us with one of the only (as far as I know) estimations of the supply curve of a copyright product, albeit using a very rudimentary model (a linear model of supply, where the only explanatory variable is the price). They found that the supply of movies is elastic in price, that is, more is supplied at a higher price. This is interpreted as being support for the hypothesis that the supply of creative work does respond to economic incentives. Nevertheless, what would, of course, be of at least as much interest is how the supply of copyright products responds to the wealth or income of creators.

In a (currently) unpublished work, Baker and Cunningham (2007) used quarterly data on aggregate copyright applications from the US and Canada to estimate the effects of both changes in copyright law and the outcomes of major court cases. The paper finds that applications for copyright are affected positively by court decisions that broaden copyright protection. This effect is described as “small but significant”. Specifically, for each court case that broadens copyright protection, we can expect the flow of copyright applications to increase by 0.4 per cent. Copyright applications are also decreased by increases in the application fee; they move counter-cyclically; they have a strong seasonal component; they may increase with the diffusion of computing technology. All of these are very reasonable and expected results, confirming to a certain extent the logical nature of the supply side of the market for copyright goods.<sup>32</sup> The Baker and Cunningham paper is interesting because it specifically concentrates on changes that involve the scope rather than the duration of copyright law.

Very recently, Pollock (2007) estimated that a socially optimal copyright duration is about 15 years, when any increases are applied retroactively (as has always been the case). To arrive at this figure, Pollock trades off the social value of new works that a term extension would generate against the negative value of existing works that will fall into the public domain later. However, Pollock’s estimate is based on “plausible” estimates and assumptions of several variables and functions (the discount rate of creators of copyright products, the rate of cultural decay, the social deadweight loss function). Some of these estimates are calculated from past empirical work, but others are simply based on personal judgment. Nevertheless, Pollock’s analysis is simple, and provides a methodology that could be quite valuable, if the true empirical values of the required data can be found.

In a related paper, Liebowitz (2007a) looked at the pricing of books that were still in print but had, due to passage of time, lost their copyright protection, and the prices of books that remained copyright protected. Controlling for the page size of books, as well as for other physical aspects (type of paper, type of binding, etc.) and eliminating some clearly outlying book sellers, Liebowitz found that the only clear difference between the two prices could be attributed to royalty payments to authors. Thus there appears to be very little deadweight loss involved in copyright protection, and whatever such losses that do exist are justified as rewards to authors. Liebowitz’s paper points to copyright deserving a lengthy duration, since it does not involve excessive and unnecessary social distortions.

### 2.3 Collective Management

Certainly one of the most important aspects of the empirics of the supply side of copyright is the fact that for many types of use of copyright products, it is beneficial for copyright holders to join together into collective management societies. It is most often argued that collective management of copyright is an efficiency response to transaction costs, although it has also been suggested that copyright societies can provide significant risk-bearing benefits to members.<sup>33</sup> Perhaps the first empirical analysis of the functioning of copyright societies was Besen and Kirby (1989), who provided an in-depth description of how these organisms work in the US, also touching on aspects relating to treaties between societies in different countries.<sup>34</sup> However, unfortunately there appears to be a general lack of empirical work relating to the economics of copyright collectives.

The most important exception to the lack of empirical work on collectives is certainly Rochelandet (2003), who uses data envelopment analysis to compare the efficiency of collectives over different European countries. Rochelandet considers three aspects of the collective management of copyrights: (1) which organizations are characterized by the best performance?

(2) What relationship can be found between ownership structure, legal control and performance of collectives? (3) What legal system would be most conducive to better results for collecting societies? Since there are different ownership and control structures in place for different collectives throughout Europe, Rochelandet is able to compare the performance of each collective (in efficiency terms) to conclude which structure appears to be the most suitable. The analysis is based on data corresponding to the period 1991 to 1998.

The data envelopment analysis of copyright collectives reported by Rochelandet points to several interesting results. First and foremost of the European collectives and in general the most efficient appears to be GEMA in Germany. GEMA is also a society that functions under quite restrictive legal control. However, the data also shows that other collectives functioning with less restrictive environments (e.g. PRS in the UK) are more efficient than other more restricted ones (e.g. SACEM in France), and so it is hypothesized that no general correlation can be drawn between the intensity of legal supervision and the results of a copyright collecting society. Notwithstanding that, it does appear that “intermediary levels of supervision are imperfect and a source of inefficiencies”. Nevertheless, while the results of Rochelandet’s work are interesting and certainly a first step in a most promising line of research, it is difficult to ascertain any clear causality from legal control to efficiency results for such a small data set. Furthermore, the analysis is based upon a model that excludes many reasonable factors that could influence the behavior of copyright collectives, and thus a mis-specification bias could also be present.

Before ending this discussion on the empirics of copyright collecting societies, it is worthwhile reiterating that Towse (1999) and Kretschmer and Hardwick (2007), both mentioned above, do present some data referring primarily to earnings and distribution of earnings of authors from such societies. Towse (1999), for example, provided data on the state of performers rights earnings from collectives in the UK. The major share of the income of Phonographics Performance Limited (PPL, the collective that deals with licensing the performing and broadcasting right of record companies who own the copyright in sound recordings) goes back to the record companies, and the rest (just under half) of their income is dedicated to administration, combating piracy, paying session players and paying named performers. However, the limitation of this data for the purpose of understanding author remuneration from copyright lies in the fact that it only includes the amounts distributed by the collecting societies, and not income from all sources.

Finally, it is worthwhile recalling that the survey data of Kretschmer and Hardwick (2007) mentioned above, as referred to copyright collectives, indicated that collectives may be responsible for an increase in the riskiness of earnings of authors, since it corresponds to an even more distorted distribution of income than the overall distribution of income of authors, at least for the case of professional writers.<sup>35</sup> This result, while interesting, should not be surprising, and has in fact been alluded to theoretically. For example, Snow and Watt (2003) showed that because collectives base payments to their members on actual use rather than sharing among all members the risk that each individual member’s uncertain income stream implies, the income stream that members receive from copyright collectives is more uncertain than need be.

### 3. DEMAND SIDE

Copyright law, being a social instrument, should not weigh the interests of either the supply side or the demand side above each other. Thus, not only should the amount of protection afforded under copyright be sufficiently strong so as to provide an incentive for authors, it should also be sufficiently lenient so as to ensure that consumers of copyright goods are not severely disadvantaged by excessively high prices.

While it has by no means been ignored, the demand side of the copyright equation appears to have been the subject of surprisingly few empirical studies. This is quite remarkable, given the interest that economists have for the demand conditions in countless other markets.<sup>36</sup> However, it would appear that, in the absence of strong empirical evidence on such things as the elasticities of demand<sup>37</sup> for copyright products, and of course in the absence of strong lobby organizations that represent the interests of the demand side, recent duration extensions to copyright protection have been largely the result of pressure from the supply side alone. Above all, most of the empirical work that we have concerning the demand for copyright products is, unfortunately, rather dated, and often refers to formats that are no longer in use (e.g. vinyl LPs and analog tapes).

We now go on to briefly mention these older studies, before we then consider two other areas of concern for the demand side of the market for copyright products, for which we do have more recent data and perhaps a better overall understanding. First, there is the issue of the willingness of consumers of copyright products to pay, and second there is the issue of the effect of piracy on legitimate demand.

### 3.1 Estimates of the Demand Function for Copyright Products

Perhaps the very first serious attempt to model the demand for pre-recorded music was Belinfante and Davis (1979). In their paper, they estimated the sales of record albums using Billboard's Top LP charts during 1977 in the US. They used a variety of independent variables, including proxies for music taste, artist status and exposure. They also, of course, included the price of the albums as an independent variable. Somewhat surprisingly, it was found that the sales of record albums are largely independent of price. The regression estimate coefficient on price revealed an elasticity of -0.52, but it turns out that the coefficient is, statistically, not significantly different from 0, implying that, as a number, it is unreliable. Indeed, as a rough comparison, Belinfante and Davis reported that when there was an across-the-board price increase of one dollar (from 5.98 US dollars to 6.98 US dollars) per album representing a 16.7 per cent price increase, the estimated loss in sales was 14 per cent. This corresponds to an implied elasticity of about -0.84, rather higher than that which was obtained in the demand estimation. In any case, perhaps the most significant aspects from the Belinfante and Davis paper are: (1) since records appear to be price insensitive, it would be optimal for record companies to increase (perhaps markedly) the retail price of records; (2) the effect of income upon record sales was totally ignored in the estimation. This is unfortunate, as logic would tell us that income is likely to be a significant determinant for what is after all a type of luxury consumption item, and it also implies that the demand equation estimated by Belinfante and Davis is likely to be mis-specified, leading to erroneous conclusions with regard to the other elasticities.

Following on from Belinfante and Davis, the paper by Burke (1994) also estimated the demand for pre-recorded music from a data set corresponding to 1975-88 in the UK. In this study, Burke found that indeed, as hypothesized above, the demand for pre-recorded music (on the vinyl format) is income elastic (i.e. vinyl recordings are a normal good, both for permanent and current income), and in contrast to the finding of Belinfante and Davis, Burke's results pointed to LPs having a price elasticity of around -1. However, also not surprisingly, one of the most salient features of the demand function estimated by Burke is the seasonal aspect – the demand for pre-recorded music spikes around Christmas time. Burke was also able to trace the effects on the demand for vinyl LPs of two close substitutes, cassette tapes and (for the latter part of the sample) CDs.

The introduction of CDs, although at a price about 40 per cent higher than the other two formats, eroded the demand for both vinyl LPs and cassettes to the point of their almost total demise. While CDs were in their infancy or non-existent, the price elasticity of demand for vinyl records was almost exactly -1, but over the period of the late 1980s during which CDs became the major pre-recorded music format, the own-price elasticity of demand for vinyl records dropped by 20 per cent to about -0.8.

Aside from these two now rather dated papers, I know of no other that attempts to model the demand for music on pre-recorded formats, outside of indirect results from the literature concerning copyright infringement (see below). However, there is a small quantity of literature dedicated to the study of the demand for printed books. Very recently Ringstad and Loyland (2006) modeled the demand for books in Norway. They found that the survey data that they gathered strongly supported the accepted hypothesis that books are both income and price elastic. These results confirm earlier published work by Hjorth-Anderson (2000) who found a price elasticity of -1.4 and an income elasticity of 1.8 for the Danish book market, and Bittlingmayer (1992) who found a price elasticity of between -2 and -3 in the German book market.

Aside from work directly related to the demand for copyright products, there have been considerable efforts to model the demand for other types of arts products. For example Cameron (1990) estimated the demand for cinema in the UK (pointing to a large negative price elasticity of about -1.5, and a large positive income elasticity of about +1.5), while Fernández-Blanco and Baños Pinto (1997) did the same for the case of Spain, also finding that cinema is a luxury good whose demand is elastic with respect to its price. Other papers also exist that study the demand for other art forms, e.g. orchestras (Lange and Luksetich (1984), who found an income elasticity of about 0.6), theater (Moore (1968), with an income elasticity of about 1, Bille Hansen with a price elasticity of -0.33), and performing arts as a whole (Throsby and Withers (1969), who found an income elasticity of 1.55 from 1949 to 1973, and 0.64 from 1929 to 1949). Finally, Schimmelpennig (1997) found that demand for tickets to the Royal Ballet is strongly elastic (price elasticity of between about -1.5 and -5.5, depending on the particular seating location. Indeed, Schimmelpennig calculated that "substantial margins for price cuts existed which would have increased both attendance and revenue", suggesting that the pricing of ballet performances is not optimal.

### 3.2 Willingness of Consumers to Pay for Copyright Products

Probably one of the most difficult problems for appropriate estimation of the willingness of consumers to pay is that almost all studies are based on survey data and contingent valuation methodologies. While certainly relevant, it is well known that answers to survey-type questions are not salient, and are almost certain to involve biases, the seriousness of which we can never know. A good example of such an effort is the paper by Papandrea (1999), which attempted to value the willingness of Australians to pay for the mandatory transmission of Australian programs by television stations. The results showed a mixed bag of responses, indicating that just over half (55 per cent) of the subjects had a positive willingness to pay to increase Australian television programming by 10 per cent. Of those who were willing to pay something, the value of their willingness to pay is distributed around 12 Australian dollars according to a normal bell-shaped distribution.<sup>38</sup>

However, there is at least one enlightening study that does overcome the saliency problem by attempting to measure willingness to pay by experimental methods, where subjects' decisions do impact upon their finances directly. The paper in question is Maffioletti and Ramello (2004), who ran auction markets for both legitimate and copied CDs.<sup>39</sup> Their experimental results clear-

ly indicate that there is a gap, in some instances a large gap, between the willingness of music consumers to pay and the retail price of a pre-recorded music CD. Indeed, the mean willingness to pay is only marginally greater than about half the retail price. It is reported that only “a small number of participants” actually had a willingness to pay that was close to the retail price, and so almost no participant would have purchased a legitimate CD. Naturally, however, the willingness to pay of almost every participant exceeds the marginal cost of production of a CD of pre-recorded music, and so the analysis of Maffioletti and Ramello points in the direction of a conclusion to the effect that perhaps the retail price-setting policies of companies selling musical CDs should be reviewed. In my opinion, the use of experimental methods to attempt to come to grips with proper estimations of both supply and demand of copyright products is extremely promising, although largely ignored thus far.

In very recent work, Audley and Boyer (2007) managed to calculate a kind of willingness-to-pay figure for the use of music by radio stations in Canada. Using a type of revealed preference argument, based on airtime given to different types of content (talk, music, advertising, etc.) Audley and Boyer estimated that the copyright royalty payments that are made in reality are significantly lower than what radio stations would, judging by their own behavior in content choice, be willing to pay. The authors argue that this methodology reveals a “competitive” price for music, since the revealed preference model is based on competitive assumptions. Specifically, Audley and Boyer found that radio stations would have been willing to pay about 265 million Canadian dollars for their music content, whereas in reality they were only charged about 44.6 million Canadian dollars, thereby arguing that creators of copyright products are underpaid relative to the true demand for their creations.

The methodology proposed by Audley and Boyer is novel in the extreme, and along the way a good deal of educated assumptions are required, but overall this is just the type of empirical analysis that is required if the pressing problem of properly tracking down the demand curve for copyright products is ever to be satisfactorily answered.

### **3.3 The Effect of Copyright Infringement on the Demand for Legitimate Copyright Products**

It can frequently be observed that copyright holders argue that piracy is damaging to them, and often estimates of the economic value of the costs that piracy imposes upon them, and upon society in general, are presented. For example, concerning the industry for pre-recorded music, it is interesting to look at the data in the IFPI report on piracy (2003) with claims that infringement represents lost sales almost as great as the total legitimate trade itself.<sup>40</sup> However, the majority of these types of estimates are unrealistic, since they are based on incorrect assumptions of consumer behavior, as we shall see below. In spite of this, such estimates are widely believed and are openly presented as evidence in liability suits, and can even form the foundation for important changes in legal and political systems. It is of course not surprising that copyright holders will always lobby for legal and political change that favors them, and this often involves publicly citing inflated figures for the costs that piracy imposes upon them. This, in turn, implies that economists have had to take much of the publicly available data concerning the effects of infringement upon markets for copyright products with the proverbial grain of salt.

It is also interesting to note that econometric techniques, which are very frequently used to estimate the costs of piracy, allow for a significant degree of manipulation so that almost any required result can be found in a given data set. For example, in the US when the FCC cable television agreement was brought before the courts in 1972, the operators presented a report prepared by professional economists using econometric techniques that showed that the royal-

ty payments to copyright holders could not be any greater than 5 per cent of their annual income if bankruptcy was to be avoided. On the other hand, the copyright holders presented a second study, based on similar techniques (and presumably the same basic data) that showed that a royalty payment of 16 per cent of operating income would be fair and would not imply any serious probability of bankruptcy (see Bettig (1996), pp. 135-6).

Perhaps the greatest single misconception that is so frequently observed throughout the literature on the costs of copyright piracy is the idea that a pirated unit of a delivery good implies the loss of the sale of an original unit of the delivery good, and so the cost of copyright piracy can be reliably calculated by an estimate of the number of pirated copies that are circulated (see, for example, Hoffman (1990)). This basic assumption is incorrect for several reasons. It is true that copies are not always perfect substitutes for originals, and in fact in some cases they may not even be close substitutes. Hence the demand, and final sales, of both copies and originals may not be as interdependent as the literature makes out, resulting in the sales of one not affecting the sales of the other as directly as one might think.

However, even more obviously, there is the relationship between willingness to pay and the price at which pirate copies and originals are actually sold. Since pirated copies are produced without the additional royalty costs that originals must face, they are cheaper to produce and market, they may be of inferior quality and they are invariably sold more cheaply. The fact that a consumer purchases a pirate copy at a reduced price does not imply that he would have purchased an original at a higher price had the pirate copy not been available. It is perfectly feasible that the consumer would have simply gone without the good in question rather than purchasing an original.

There is a large and growing body of literature that attempts to estimate the effect of piracy on legitimate sales. This literature begins with an analysis of data from the 1980s, when the issue of online sharing and illegal downloading was non-existent. Of course the literature on the effects of copying on legitimate sales of copyright products was turned on its head with the development of the Internet, and online piracy in the form of downloading and file sharing appeared. The basic theory is still the same, but the parameters governing optimal consumption choices have been altered significantly – now copying takes virtually no time at all, a copy is practically identical to an original, and the probability of detection and prosecution is very low. Given the wide differences, it is probably useful to consider the two bodies of literature (pre- and post-Internet) separately.

### 3.3.1. *Pre-Internet Studies of the Impact of Piracy on Sales*

Very early on, Mannering (1994) estimated that, for the case of pre-recorded music, only 38 per cent of all pirated copies are in fact lost sales of originals. This estimate is very close to the 40 per cent that Warner Communications, Inc. (1982) presented for the same figure more than a decade earlier. Along the same lines, Besen (1987) cited research done by Alan Greenspan for the Recording Industry Association of America in which it is estimated that home taping of pre-recorded music represents losses to the industry of 32 per cent of total sales volume, and research done by G. Davis for the International Federation of Phonogram and Videogram Producers that estimated that 25 per cent of home taping of LP records represented lost sales of originals.

Note that there are actually two types of calculation here. Denote the total amount of pirate sales by  $P$ , and total legitimate sales by  $S(P)$ . That way, the (hypothetical) legitimate sales that would ensue had piracy not been feasible would be given by  $S(0)$ . It is assumed that  $S(0) > S(P)$

for  $P > 0$ , that is, piracy does indeed reduce legitimate sales. The percentage of pirate copies that represent lost sales of originals (Mannering, Warner Communications, Davis) is calculated as:

$$\frac{S(0) - S(P)}{P}$$

On the other hand, the percentage of legitimate sales lost to piracy (Greenspan) is:

$$\frac{S(0) - S(P)}{S(P)}$$

Assuming, as appears to be the case, that  $P < S(P)$ , the former calculation should work out greater than the latter (if both are done with the same data).<sup>41</sup>

The case of piracy in the pre-recorded music industry was also considered by Widdows and McHugh (1984). The results of this paper indicated that it is not true that piracy has affected sales and profits in the industry nearly as much as had been claimed by the industry officials, and that other factors such as demographic change and the general state of the economy were much more likely to have been the cause of any recessions in sales than was piracy. In fact, contrary to the claims of the copyright holders, Widdows and McHugh estimated that up to 85 per cent of a downturn in sales in the late 1970s was due to factors other than piracy.

The economics profession of late has turned its attention more to the case of downloading and file sharing as new forms of piracy (see below), but there has been at least one recent influential study on the effect of piracy of pre-recorded music on legitimate trade – Hui and Png (2003). In their paper, Hui and Png looked at sales of music CDs and piracy thereof in 28 different countries during the period 1994-98. It was found that piracy did indeed reduce legitimate sales, and for the year 1998, it is estimated that unit losses amounted to 6.6 per cent of legitimate sales (a figure that should be compared with the 32 per cent estimated by Greenspan about 10 years previously).

Going back to the experimental paper of Maffioletti and Ramello (2004) mentioned above (section 3.2), we have already noted that almost all of the experimental subjects revealed willingness-to-pay figures that were significantly below the retail price of a pre-recorded music CD, and so would not have purchased at the retail price. However, almost all of the participants also revealed a willingness to pay for a pirated version of the same musical CD that was significantly greater than the marginal costs of supplying it. Thus, almost all of the subjects would have purchased a pirate copy, but very few (if any) of these sales would actually have displaced legitimate sales.<sup>42</sup>

Also, recently Bounie *et al* (2005) made an attempt to provide the separation of the substitution and complementary effects implied by piracy of music, using survey data from French university students. They found much interesting evidence relating to stated CD purchases, MP3 files, and the size of CD collections. Their statistical analysis shows that overall, the effect of using file sharing networks and MP3 files leads to an effect on sales of CDs of between -5.2 per cent and +9.7 per cent. The positive influence is due to the presence of “samplers”, which is generally a smaller sub-group than the pure “pirates”.

A second principal area of interest for economists with respect to the economic effects of copyright piracy has been the case of home taping of rented videos and movies from television emissions. The paper by Cronin and Wusterbarth (1986) made some estimates for the lost royalties of copyright holders due to this type of piracy, based on a survey of 1,620 North American

households. From their survey data, Cronin and Wusterbarth estimated that, in 1982 in the US 39 million home tapes of movies from commercial television broadcasts, 29 million copies of movies from pay television broadcasts, and about 7 million copies of rented or borrowed videos were made. Using these figures, the final estimates for the actual monetary amounts of lost royalties during 1982 are 2.7 million US dollars from tapes made from commercial TV, 1.9 million US dollars from tapes made from pay TV, and 1.1 million US dollars from tapes made from rented or borrowed videos.

Although they do not present such statistics, it is interesting to note that from the Cronin and Wusterbarth paper it is in fact possible to conclude that a massive 93.5 per cent of home taping of television broadcasts, and 74.3 per cent of home taping of rented or borrowed videos represent lost sales for the industry. On top of this, certainly home taping of movies also implies lower income at public movie theater box offices, and hence a second opportunity cost for copyright holders that is not taken into account in sales of home videos. When the Cronin and Wusterbarth figures for the effect of piracy on lost sales are compared with the 38 to 40 per cent reported previously for pre-recorded music, one must conclude that the home video and music industries show significant differences as to the substitutability between copies and originals. Of course, as is now extremely well documented, in spite of the adverse effects of movie copying using VHS and DVD technologies, the home movie industry has proven to be extremely profitable for the major producers and distributors of movies (see, for example, Liebowitz (2003)).

### 3.3.2. *Post-Internet Studies of the Impact of Piracy on Sales*

The literature on the effect of downloading on legitimate music sales was motivated, initially, by the Napster trial, in which the plaintiff commissioned a study (see Fine (2000)) to work out the effect of online file sharing on the sales of pre-recorded music on CDs. In the study, Fine looked at sales in record shops close to US universities, the assumption being that university students were responsible for most of the downloading. Sales of CDs both before and after the emergence of Napster were compared, and it was found that while nationwide sales grew by 6.6 per cent between the first quarter of 1999 (pre-Napster) and the first quarter of 2000 (post-Napster), the sub-sample of stores located near universities suffered a decrease in sales of 2.6 per cent. Although this might seem to be compelling evidence that file sharing causes a negative effect on physical CD sales, it transpired that very similar results were also found for the previous year, when Napster did not exist. Clearly, there is more to the file-sharing phenomenon than a cursory look at record sales can reveal.<sup>43</sup>

Using somewhat more sophisticated econometrics methodologies, most of the empirical work on the topic of file sharing on physical sales finds a negative impact. The exception to this rule appears to be, Oberholzer and Strumpf (2007) who used data obtained from a process of matching US record sales data to file-sharing data from a peer-to-peer network over a 17-week period during 2002 to estimate that the impact of downloads on album sales is indeed not distinguishable from 0. However, of all the studies to date, Oberholzer and Strumpf are the only authors to claim that there is no negative impact of file sharing on sales of sound recordings.<sup>44</sup>

A first set of papers uses countries or cities as the unit of analysis, comparing sales of sound recordings in different places over time, using a relevant proxy measure of file sharing over these regions. Liebowitz (2006) studied the change in the sales of CDs in 99 US cities, and looked at how these sales were impacted by file sharing as proxied by Internet access (among other variables). The data suggests that file sharing can explain the entire decrease in sales as well as a potential growth in sales that never occurred. Using data from 16 different countries over the period 1998-2002, Peitz and Waelbroeck (2004) found a 20 per cent decline in the sales of

music attributable to file sharing. Zentner (2005) used cross-country aggregate data from a large number of countries to show that without file sharing, overall sales in 2002 would have been about 8 per cent higher.

Another common method of evaluating the effects of file sharing on CD sales is by surveys. All of the papers that use survey data find that file sharing does harm record sales. Michel (2005) used data from the consumer expenditure survey in the US from 1998 to 2003, and found a negative impact to the order of 15 per cent. Zentner (2006) estimated that file sharing provoked a worldwide decline in sales of 15 per cent, and a decline in the US of closer to 30 per cent. Rob and Waldfogel (2006) based their analysis on data from a survey of college students. They found that each downloaded album reduced legitimate sales by at least 0.2 albums.

Aside from looking at the effect of Internet downloading on the demand for pre-recorded music sales, economists have also considered the related issue of Internet downloading on pre-recorded movie formats, above all, the DVD format. However, to date the studies involved have relied entirely on survey data, which as we have already noted, may lead to unmeasurable biases in the results. For example, Bounie *et al* (2006) used data gathered from a French university community (students and professors). It was found that approximately one-third of the subjects who declared having downloaded films from the Internet also stated that this activity actually increased their demand for legitimate movie products,<sup>45</sup> above all, for rented and purchased movies. Indeed, the data indicated that internet downloading had no impact on movie theater attendance, but a strong impact on video rentals and purchases.<sup>46</sup>

### 3.3.3. *Other Effects*

As the literature surveyed in the previous sub-sections points out, a numerical estimate of the final effect of piracy upon legitimate sales is difficult to arrive at because piracy has both positive and negative effects on sales. The negative effect is obviously the most visible, and is normally the only effect alluded to by lobby groups. However, a positive effect, recently termed "creative destruction" (see Liebowitz (2006)) also exists. For example, Handke (2006) looked at the data on record companies during a period of severe recession (driven, most likely, by Internet file sharing) in the market for phonograms in Germany. In spite of the downturn in total sales, the data clearly showed that over the period in question (1982-2004, with greater emphasis on the last seven years of that period), there was a consistent and increasing growth rate of market entries by new record companies. Thus, one can conclude that while Internet piracy may well be detrimental to the interests of the "major" record labels, it provides a window of opportunity for new entrants, and so the scenario in the record industry may be described as one of re-organization rather than total recession.

## 4. EMERGING MECHANISMS FOR EXERCISING RIGHTS OVER PROTECTED WORKS

There are different mechanisms on which authors may rely in order to make their creations available to the public and/or obtain revenues from their protected works. Here we look briefly at four emerging mechanisms: digital rights management, open-source software, voluntary contributions and levies on blank supports and copy technologies. Not all of these topical areas have been rigorously analyzed in the setting of empirical economics, but all have received some attention from economists. They are worthwhile mentioning, even if only in the hope of generating interest in working on them empirically.

Aside from the protection and/or remuneration systems that we will look at here, the theoretical literature has also suggested a variety of other ways in which authors can appropriate earnings indirectly; for example from network effects and bundling, but (as far as I know) there have been no serious attempts to look at the empirical significance of these options. The interested reader could consult Liebowitz and Watt (2006) for a survey of these mechanisms, at least as far as compensating music creators is concerned.

#### 4.1 Digital Rights Management

At the forefront of the emerging mechanisms is digital rights management (DRM), which basically takes advantage of the digital format in which many copyrighted products are stored, distributed and consumed, to introduce code that prohibits unauthorized usage, or at least makes unauthorized usage very costly. DRM is controversial,<sup>47</sup> since it may impinge upon certain legal rights of consumers, for example the right of private copy (in many countries, it is legal to copy music or software CD if the copy is for the copier's own use; for example to play in his/her car radio, or as a back-up copy, but never for sale or loan to others to copy).

DRM mechanisms are very popular as an added and parallel protection mechanism within the copyright system. In principle, DRM looks like some sort of substitute, that perhaps becomes more and more important when copyright law becomes less and less enforceable and manageable through standard means (for whatever reason). However, DRM relies on copyright law in as much as the underlying property rights need to be in place if they are to be protected via DRM, and so DRM really is only a (partial) remedy for enforcement issues. Thus, it is also easy to envisage DRM as a complement to copyright law, rather than a substitute. Although there are a great many papers on the general issue of DRM, most of which are of a legal rather than a strictly economics orientation, I know of none at all that address the issue of the relationship between DRM and copyright law empirically. I would, of course, welcome any steps taken in this direction in economists' research agendas.

It is not surprising that DRM is used significantly in the software industry. There is at least one study, Blind (2007), that looks at the relative importance of DRM and other options for protection of software. In his paper, Blind was principally interested in the recent push towards the use of patents for protecting software, but the data from a survey of German software firms in his paper points out that other mechanisms, including secrecy, lead-time advantages, trademarks, and a variety of DRM systems are all more popular than are patents and copyright. Indeed, for most of the data gathered, the strategy relating to DRM protection is about equal to copyright in popularity.

#### 4.2 Open-Source Software

Notwithstanding the large body of DRM literature, there is an even greater body of literature on the issue of open source (OS) software, but again the great majority of this literature is framed within legal (or general interest) papers, rather than economics papers, and so is not really of interest to the present survey.<sup>48</sup> There have, however, been a series of publications that document the current use of open-source as a licensing mechanism for software. For a recent example, Koski (2007) looked at the usage of open source as a mechanism under which software firms located in five European countries license their products. She found that the General Public License (GPL) version of open-source licensing works as an efficient coordination mechanism for the leading developers of the OS community. However, software companies that supply the open source software tend not to use the GPL to coordinate the further development

of their own software, preferring instead to work with business strategies that involve more restrictive licensing models.

In a related paper, Koski (2005) used data from software companies in Finland to discover that the usage of different licensing strategies tends to depend on the ownership structure of the firms. Specifically, family-owned firms tend to rely heavily on traditional proprietary licensing models, while diffusely held companies are more likely to release products under OS licenses. The analysis also suggests that the more restrictive open source license, known as the copyleft license, is used more often by companies that have participated in open-source software development projects.

Marshall (2007) surveyed piracy in the computer software market, and, among other issues, she considered the open-source literature, and presented some empirical evidence on the open-source movement. For example, Marshall pointed out that some OS software projects have garnered a good reputation for innovation and reliability that has seen them capture a significant market share. It is estimated that Linux has 21 million users (Linux Counter 2006), and the Apache Web Server was used on 58 million sites, 63 per cent of reachable web servers (Netcraft 2006).

However, the economics of open source have not yet produced a significant empirical output. Most of the relevant work on this topic can be found in unpublished working papers. For example, using project records and a survey on employment, Hann *et al* (2004) studied contributions to the Apache OS project, and found that they have little effect on future salary. In spite of this, Haruby *et al* (2003) found that the promise of higher future earnings as an objective for participation in open source projects is an important driver of contributions to OS projects. In published work, Lakhani and von Hippel (2003) found that the principle driver of OS contributions is the need for individuals to solve their own specific programming needs.

Two of the most important contributors to the economic literature on open source are Josh Lerner and Jean Tirole (for a good overview of their work, see Lerner and Tirole (2005a)). In Lerner and Tirole (2005b), they presented a good deal of empirical information regarding the prevalence of the different types of OS licenses using data from about 40,000 OS projects registered with the SourceForge database. They found that applications geared towards end-users and system administrators (e.g. desktop tools and games) use more restrictive licenses. However, restrictive licenses are less common for applications aimed at software developers and for projects that either function in commercial environments or run on proprietary operating systems. Non-English-language based projects tend to employ restrictive licenses. Finally, less restrictive licensed projects attract more contributors.

### 4.3 Voluntary Contributions

As surprising as it may seem on the face of it, there has been a recent movement toward attempting to generate compensation and remuneration for copyright holders by simply asking consumers for voluntary contributions. Often, the contributions are also anonymous. In spite of the logical outcome of no payment at all being realized, this type of system has been used recently by the popular music group Radiohead to distribute their latest album.<sup>49</sup>

Borck *et al* (2005) analyzed voluntary payments for an electronic newsletter for authors that is supplied on the Internet. In contrast to the standard free-rider prediction that individuals would contribute less the greater the contributions of others, the paper found that readers of the newsletter were more likely to pay more when they expected others to pay. Individuals also con-

tribute more with age, and women contribute more than men. Surprisingly, income is an insignificant predictor of the level of voluntary contributions. It is, however, of note that the data used in the study was gathered from a survey of readers, and thus may be contaminated by the typical survey data bias problems.

#### 4.4 Levies on Blank Supports and Copy Technologies

Perhaps of more interest to the economics of copyright *per se* is the use of levies on blank supports and copy technologies to generate funds from which copyright holders are compensated. Under such a system, copyright holders are compensated for certain private uses of their works onto blank material supports such as CDs and USB sticks: the consumer pays a levy on the purchase of the blank support, in exchange for which a specific exception in the copyright law allows him or her to engage in acts of private use. As such, levy systems are analogous to compulsory licensing arrangements. This type of remuneration system has been put into effect in several countries. However, we should note that such payments are simple transfers from consumers to copyright holders, and they imply that consumers will be charged copyright royalties, whether they use the copyright material or not, since the levies are paid when the blank support is purchased; but on the other hand imposes additional costs upon other members of society. There are no obvious reasons upon which one can base an argument as to why it is better to impose costs on consumers in order to avoid costs for copyright holders. This dilemma has resulted in not all countries adopting the levy "solution".<sup>50</sup>

Nevertheless, the amount of revenue that is generated in different countries from the levies is really quite impressive. The Copyright Levies Reform Alliance has tracked the amount of money that is received as revenue from levies on blank supports and copy technologies for a set of nine European countries (see Damuth (2006)). They calculated that the current levy collection total is between 1.5 and 2 billion euros annually over the nine countries surveyed. If one includes levies that are currently claimed but are disputed, then the figures climb to closer to 4 billion euros annually.

What is really of importance to economists is the final impact of the levies in the market-place. This was calculated for many countries, and totals for both Europe and worldwide are given, by Damuth (2006). In his study, Damuth took elasticity estimates from a variety of sources to calculate the overall welfare effects of levies on consumers and suppliers of copyright products. Both direct effects (in the markets for the goods that are subject to the levies) and indirect effects (other complementary markets) were calculated. The estimates are indeed frightening – for example, it is estimated that in 2005, in Europe, consumers and producers lost 2.1 billion euros because of the levies as applied. The figure balloons to 8.8 billion euros if one includes currently claimed but disputed levies and proposed extensions to the set of levied goods.

However, the raw numbers produced by Damuth should be analyzed a little more closely. Let us take only the case of levies actually imposed and not disputed. Damuth's data showed that for Europe, the total amount collected in 2005 was to the order of 1.2 billion euros. The loss in consumer surplus is calculated at about 131 million euros, and the loss in producer surplus is calculated at 753 million euros. The total loss in surplus in the market from the use of the levies is therefore about 884 million euros, or somewhat less than a billion euros. What Damuth does is to directly add in the total levy collection as a further loss to consumers<sup>51</sup> (for a total negative effect of just over 2 billion euros). However, the money collected in levies is not really lost to the economy in the same way as welfare losses in consumer and producer surplus are, but rather is redistributed to other people (copyright holders). For example, if we assume that consumers, producers and copyright holders all value money equally, and each is given an equal weighting

socially, then an aggregate calculation would reveal that the net effect of the levy system is in fact very slightly positive (about 0.2 billion euros). Of course, in reality, this impact should be compared to the negative impact of the alternative; say, that of not using levies and suffering the effects of private copying.<sup>52</sup>

The documents produced by the Copyright Levies Reform Alliance are interesting, but much of their content is either overly simplistic or purely statistical. True economic analyses<sup>53</sup> of taxes and levies on blank supports goes back to the well-cited paper by Widdows and McHugh (1984), although that paper is best known for the fact that it shows that the downturn in legitimate sales at the end of the 1970s could not be ascribed mainly to piracy, and simply proposes the use of taxes on blank supports as a possible remedy.

More recent literature on taxes on blank supports has been rather scarce. Perhaps this is a reflection on the controversial nature of this “solution” to the appropriability problem for copyright holders. However, Oksanen and Valimäki (2005) argued that it may be the only valid solution in the new digital environment. Indeed, while currently most levies are based on blank supports (CDs, DVDs, MP3 players, etc.) and on some copy technologies (CD burners, photocopy machines), Oksanen and Valimäki suggested that taxing broadband connections and mobile storage devices would also be appropriate (actually, this is already in practice in some countries). They provided some simulations of how such a proposal would, or would not, work in the Finnish market, and concluded that, on balance, any other system based on enforcement and punishment is totally unfeasible.

Of course, the main issue that needs to be addressed when considering the option of taxes on blank supports and copy technologies is the amount of revenue to be collected (i.e. the size of the tax to impose). This problem was discussed theoretically by Liebowitz (2005), but as far as I know, unfortunately there are no existing studies that provide any insights as to an appropriate answer.

## **5. DEVELOPING COUNTRIES: WHAT IS THE DIFFERENCE?**

Finally, we now turn to the intriguing problem of copyright in developing countries. As can be seen by the previous literature analysis, there has been no significant work published in international peer-reviewed journals with the objective of specifically looking at the supply and/or demand for copyright products in developing countries. Given that, in this final section, we will not be concentrating on surveying the literature, but rather we will consider the question of what data and methodologies would be of use to determine the optimal copyright standard for developing countries, and above all, if the literature discussed above which refers largely to developed countries, is useful for the task of determining optimal copyright protection standards in the developing world.

### **5.1. The “Innovations and New Technology” Methodology**

To begin with, it is perhaps worthwhile to say something about the theoretical framework that governs the problem for developing countries. Economists have largely taken a particular type of model, originally designed for looking at international diffusion of innovation and technology (i.e. largely patent subject matter), and have directly applied the conclusions to the case of copyright products. The type of model in question, perhaps expounded in its clearest form by Grossman and Helpman (1991), basically analyzes how technology and innovation that is transferred between countries through international trade, will affect the growth of the trading part-

ners' economies. If one of the trading partners is an innovation leader (often thought of as a developed country), while the other is not (typically a developing country), then the problem of protecting the IPRs that are inherent in the innovations traded becomes an issue.

The model works by assuming that growth is (at least partially) driven by adoption of innovations and technologies. By copying, the developing country can have access to innovations at a very low cost, which is perhaps all they can afford. If no copying is permitted, then there is the fear that new technologies will not be made available at all in developing countries, and this implies that these countries will be stuck in a sort of poverty trap, from which they may not escape since growth relies on technology, which it cannot afford. Of course, there may well be innovators in those developing countries who can make their own new technologies available for their countrymen, but there are several reasons to doubt that this would happen, unless firstly some imported technologies were available. The main reason is that the innovation process is cumulative, and thus requires a starting point. That starting point would be found in imported innovations, and so without these, there is no starting point and thus no dynamic innovation process. In a nutshell then, allowing some copying initially (i.e. a weak IPR regime) could be the only way in which an innovation track can be initiated within a developing country, paving the way to further (local) innovations and the implied growth benefits.

On the other hand, this argument fails once the innovation trajectory has begun, since local innovators will demand strong IP protection if they are to have the relevant incentive to create. If the IP protection standard is not strengthened, then all that will occur is copying and not autonomous innovation. So, the solution appears to be to start out with a weak IP protection regime and to strengthen it over time. This is an even more difficult problem to solve than that which is required for a developed country: not only must we determine an appropriate protection standard, but also an appropriate trajectory over time of the standard.

In any case, perhaps we should stand back and reconsider the applicability of the innovation and new technology argument to the case of copyright products. At this point, it is perhaps again relevant to separate out the particular case of software, which is an outlier from the general set of copyright-protected creations, since it does have an undeniable (and close) relationship with innovation and technology.<sup>54</sup> For other types of copyright product, however, the case is quite different. We mean here products related to entertainment and culture, which are not, *per se*, so directly related to the rate of growth of an economy as are technological improvements to industrial production processes.<sup>55</sup>

Thus, I feel that the argument of the innovation and new technology literature, implying an upward trend in the protection standard over time, is somewhat less relevant to the particular case of copyright products than what appears to have been assumed. Only if we are willing to accept that local authors take their initial inspirations from imported copyright-protected works (i.e. that creation of copyright-protected property is an equally cumulative process as is the creation of patent-protected property), which I personally doubt, then the spillover of the innovation and new technology literature to the case of copyright is not strong. That is not to say that allowing a certain degree of copying early on would not have a positive effect on economic growth. Clearly, if an industry based on copied copyright-protected products were allowed to function, then there would be creation of employment and correspondingly a certain generation of income locally, so long as the copied products were not depriving local authors of remuneration. However, I find this to be an unappealing reason for establishing weaker copyright protection in developing countries, as the same type of effect (probably on an even greater scale) could certainly be achieved by allowing any other "illegal" activity to flourish openly.

## 5.2. How Applicable are the Developed World Empirical Studies to the Developing World?<sup>56</sup>

First and foremost, we should recall that the underlying theory of copyright is one of balancing incentives. I firmly believe that people all over the world, regardless of the type of economy in which they live, respond to incentives in the same (or at least a very similar) way. Thus, independently of whether we are trying to establish an optimal copyright law in a developed country or in a developing one, the same basic theoretical tradeoffs need to be considered.

So just what is the difference between the developed and the developing world? One important difference is that individuals living in developing countries have a lower *per capita* income,<sup>57</sup> and thus have different budget constraints, and different opportunity costs to consider. This different parameter set should, in principle, imply that a different copyright standard would be socially optimal, and so it could be a mistake to simply take the standard that is used in developed countries (assuming that it is socially optimal for that country), and to apply it to a developing country. Nevertheless, certainly some of what we do know from the study of developed countries is bound to be relevant in the case of developing countries.

If only we could have a magic formula that determines the optimal copyright standard as a general mathematical function of a set of parameters that serve to define the state of development of different countries (such as, for example, the general *per capita* income level of a country, its current rate of economic growth, the level of unemployment, etc.), then we would only need to insert the parameters of any given country to find out its optimal copyright standard.<sup>58</sup> Right now, it appears that there is some evidence on the relationship between the demand and supply of copyright products as a function of some of these variables, but we are still lacking the final piece in the puzzle; the concrete relationship between the demand and supply curves and the level of copyright protection. Note that the causality here is a relevant issue to determine – we are generally aware of some of the effects of increased copyright protection on the supply and demand curves,<sup>59</sup> but really we need to know the opposite, that is, how do the supply and demand curves determine the copyright-protection standard?

On the supply side of the copyright equation, creators in the developing world would most likely be poorer, in absolute terms, than their developed world counterparts. Thus the opportunity cost of being an author is lower in the developing world, and this would tentatively suggest that a lower copyright protection standard is in order. However, by the same token, perhaps the case is more likely to be that creative individuals cannot dedicate their time to creating copyright works, since subsistence and a low hourly wage rate in non-copyright employment requires them to spend most of their time working outside of creative endeavors (i.e. they are in a corner solution, dictated by subsistence). This would tentatively suggest that a stronger copyright protection standard is in order. So what should it be? The answer lies in simply looking at exactly how much of their time creative individuals are spending in creative activities. If they are spending most time creating, then the opportunity cost that is relevant is that of the non-creative sector wage, and we could probably consider a weakening of the copyright standard. On the other hand, if they are spending most of their time in non-creative employment, then the relevant opportunity cost is the creative sector payoff, and we could consider that a strengthening of the copyright standard is required.

Thus, the first data point that would be of use for determining an optimal copyright standard in any country (above all, in developing countries), and that should be gathered, is the fraction of time that creative individuals spend creating copyright works. If that fraction is low (high), consider strengthening (weakening) the copyright standard.

Secondly, we need to consider the demand side of the copyright equation. Again, if the only fundamental difference between consumers of copyright products in a developing country and their developed country counterparts is wealth or income, then what needs to be determined is the elasticity of the demand for copyright products with respect to income. Of course, it is also likely that the own-price elasticity of demand is also affected by changes in income, and so this could be another issue to tackle. If we are willing to assume that income differentials are all that is fundamentally different between the developed and the developing world, then a good deal of robust and transferable information could feasibly be found in the demand studies in developed countries.

As an example, say the income elasticity of demand for a given copyright product in the developed world was found to be equal to 1 (i.e. a 1 per cent increase in income yields a 1 per cent increase in demand), and if the average level of income in a given developing country was, say, 20 per cent of the average income level in the developed country, then the demand for the copyright product in the developing country could be assumed to be only 20 per cent of the demand for the same product in the developed country at each given price. Of course, this is a rough estimate, but perhaps a reasonable initial guideline. It assumes, among other things, that the income elasticity of demand is constant in both price and income, which may or may not be true, but if we knew the approximate location of the demand curve for copyright products, then the problem of determining the appropriate protection standard could at least be addressed in an appropriate manner.

Thus, the second recommendation for required data is a greater emphasis on the income elasticity of demand for copyright products. Possibly a great deal of highly relevant information for the demand for copyright products in a developing country could be gained by studying the demand of the low income population in developed countries, who presumably face similar budget constraints and opportunity costs as the average individual in a developing country.

As we have seen above, economists have looked at the relationship between the supply of creative products and the strength of copyright law, but not the same relationship with the demand curve. Perhaps this is a more difficult curve to model, but it is also possible that the reason is that the effect is ambiguous. When copyright protection is strengthened, on the one hand consumers have less ability to use copyright products in so many different ways, which would likely reduce their demand. However, on the other hand, a certain proportion of current pirate copy users would likely switch to legitimate demand, as tighter copyright controls crack down on pirate markets. This would imply a positive demand effect. Which of these two effects dominates is an empirical question that has yet to be addressed. This point has not, I believe, been addressed even for developed countries, and so this appears to be quite virgin territory for economists to tackle.

Thus, the third data point that I believe is required, if we are to arrive at a reasonable analysis of an appropriate copyright law for a given country, is a treatment of the demand for copyright products in that country, along the same lines as the type of analysis that is commonly performed for the supply side.

As far as methodologies are concerned for the purpose of attempting to design an appropriate copyright protection standard, I am not an advocate for statistical analysis of macro-economic variables at the industrial level to attempt to judge the importance of copyright. Neither am I an advocate for the use of survey data, due to the usual bias that we should expect in data gathered in that way. Naturally, the very best source of data is from real-world markets, from which it is possible that some sort of revealed preference argument can lead to reasonable estimates of demand and supply side variables. Barring that, I believe that the second-best option, large-

ly ignored by economists studying copyright but very important to applied micro-economists in other areas, is to perhaps look at setting up experimental scenarios, with real subjects and with real money at stake, to simulate as closely as possible markets for copyright products, and to use the data thus generated to estimate supply and demand variables.

Well-designed and executed experiments could also be of enormous aid in clarifying the applicability of other empirical studies from the developed world to developing countries. All that would need to be done would be to repeat a given experiment in developed and developing countries and to compare the results. I believe that the use of experiments is perhaps the most promising methodology for throwing light on the problem of optimal copyright protection.

## 6. SUMMARY AND CONCLUSIONS

This paper has attempted to set out the results of the empirical research in the economics of copyright. Empirical studies of both the demand and supply sides of the markets for copyright-protected products have been discussed. The clearest message that emerges from the analysis is that not enough empirical research has been carried out. This is especially true compared with the amount of theoretical research that exists.

In terms of copyright industries, really the only empirical research we have are the macro-economic impact studies that point to the copyright industries being in rather good health relative to the economy in general, at least in most of the countries surveyed. This points to (but does not provide conclusive proof for) copyright being an important ingredient to economic wellbeing and development. On a more negative note, we are certainly lacking studies that consider the role that copyright, and perhaps more significantly the parameters of copyright law, may play for the development of copyright industries. The best we can do is perhaps to observe that these industries are often relatively under-developed (compared to the developed world) in the set of countries that we would group under the category of "developing countries".

On the supply side, the most active area of research has been on the issue of earnings, although much of that has not been directed to earnings from copyright royalties as such, but rather to earnings of creative individuals. The very few papers that do attempt to separate out copyright earnings from copyright royalties, from other income sources, generally conclude that copyright does not fare well as a source of financial prosperity. Copyright royalty income is generally lower, and more risky, than other sources of income.

The effect of copyright law changes upon the efforts of creative individuals to create new copyright-protected products is also rather inconclusive. However, those few papers that have looked at this have generally concluded that there is indeed a positive effect – the stronger the protection, the greater the creative effort – but by most accounts the effect is not great.

The demand side of markets for copyright-protected products has been studied less intensively than the supply side. Economists have concentrated their attention on the effects of the existence and operation of markets for pirate products upon legitimate trade. The introduction of digitalization, the Internet and file sharing have revolutionized the way illegitimate trade competes with legitimate trade, and have even challenged the very definitions of what constitutes illegitimate trade. However, almost all studies coincide in that the operation of pirate markets causes harm to the sellers of legitimate copyright-protected products. It remains an open question exactly how much harm is actually caused, with figures that range from about 6 per cent up to about 30 per cent of copies representing lost sales of originals.

Some of the emerging mechanisms for exercising rights over protected works that are available to sellers of copyright-protected products do not appear to have been the object of an excessive amount of empirical study by economists. Here we have briefly mentioned digital rights management systems; open-source software; voluntary contributions; taxes and levies on blank supports and copy technologies. Only open source and taxes and levies on blank supports and copy technologies have been studied to any reasonable degree.

While the general theoretical tradeoffs that copyright law is supposed to address are exactly the same in developed or developing countries, the studies that we have from developed countries are unlikely to be very relevant for the developing world, since the parameter set between countries at different stages of development. However, as data constraints are likely to be even more of an issue in many developing countries, one option could be to look at data gathered from the low income segments of the population in developed countries.

However, at least in my opinion, the most promising research methodology for the near future is to analyze behavior, both of demanders for and suppliers of copyright products, in experimentally simulated environments. In principle, since data from experiments is salient (i.e. involves real financial consequences to participants), experiments might provide a convenient solution to the current empirical data-generating problems; often the required information is not available from real-world sources, and data from survey sources is unreliable due to not being salient. The use of experiments in the economics of copyright would involve a good deal of thinking about appropriate experimental design, but fortunately the general field of experimental economics is now well developed, and there are many excellent economists who are experienced in the problems of experimental design.

## Notes

- 1 Indeed, there is a perception that copyright industries are growing in importance relative to other sectors of the economy. Although it clearly refers to both copyright and patents, take, for example, the following excerpt from Alan Greenspan's speech inaugurating the 2003 Financial Markets Conference of the Federal Reserve Bank of Atlanta; "In recent decades, for example, the fraction of the total output of our economy that is essentially conceptual rather than physical has been rising. Over the past half century, the increase in the value of raw materials has accounted for only a fraction of the overall growth of US gross domestic product. The rest of that growth reflects the embodiment of ideas in products and services that consumers value. This shift of emphasis from physical materials to ideas as the core of value creation appears to have accelerated in recent decades." The full text of the speech is available at <http://www.federalreserve.gov/BoardDocs/speeches/2003/20030404/default.htm>.
- 2 Liebowitz (2003) p. 2) states "The issue at the heart of copyright, indeed all of intellectual property law, is the degree to which the copyright holder can appropriate the value produced by the consumption, or appreciation, of his work by others and the degree to which this appropriation hinders consumption." Thus copyright looks at "the trade-off between consumption efficiency (maximising the net value consumers get of any produced intellectual product) and production efficiency (preserving incentives to create these products efficiently)" (Liebowitz (2003) pp. 2-3).
- 3 The first relationship is supposed to come about as copyright protection increases, as would the creator's income, leading to a greater willingness to supply. On the other hand, the second relationship is supposed to come about as increases in copyright protection lead to a greater monopoly on copyright products, and hence a higher price. The relationship then follows so long as demand is decreasing in price. Both of these relationships, however, are debatable for reasons that will be explained.
- 4 As we shall see in this paper, there is no shortage of empirical studies concerning copyright, but none to date (at least of which I am aware) that succinctly address the issue of estimating the true demand and supply side conditions.
- 5 A clear exception is the recent "open source" movement for software (see, for example, the writings of Professor Lawrence Lessig).
- 6 It is not clear how, or indeed if, the scope of protection has been significantly altered over time.
- 7 Of course, if the concert artists want to perform music that is protected under copyright, then indeed copyright is an issue, but the concert performance itself should not be thought of as a copyright product unless it is recorded onto some tangible media. Also, in most jurisdictions a public recital of a story or a musical concert might be considered a copyright product as far as performers' rights, and other related (or neighboring) rights are concerned, although again, these rights are only really interesting when the performance is recorded for future consumption. It is also fair to say that original expression that is recited once and not recorded for future consumption has never been an important issue for the economics of copyright.

- 8 Legal scholars might well disagree, as in principle there is no need for fixation to a physical support for copyright to be recognized in many jurisdictions. Thus a recital of a story that is not read from a tangible source (e.g. a book) might be considered a copyright product in some jurisdictions. Again, though, such fringe items have never been important to the economics of copyright, where the emphasis has always been on recorded expression, and will not be considered in the present survey.
- 9 Probably the most important exception to that rule is the case of software, which has historically been copyright subject matter, but more recently (in some jurisdictions) has been extended to patent protection as well.
- 10 Again, outside of the obvious case of software. A case could also feasibly be made for the use of copyright products as educational aids to promote literacy generally.
- 11 Bettig (1996) provided a wealth of information on the sheer size of the business operations of many large copyright-dependent firms.
- 12 There are many papers, going right back to the very origins of the economic discussion of copyright (see, for example, Plant (1934), that argue that, while financial motivation cannot be ruled out as a reason for creating, the creators of copyright products are also motivated by many other factors (personal satisfaction, peer esteem, etc.), and that indeed such factors may turn out to be more important than financial remuneration.
- 13 That is not to say that their only motive is for profit.
- 14 Earlier papers also exist, for example Plant (1934), Hurt and Schuchman (1966), and Breyer (1970), all of which found several reasons why a strengthening of copyright law may not lead to greater levels of authorship.
- 15 As opposed to “longer copyright protection”.
- 16 It is interesting to note that in 2003 the total value of recording sales in the US was 11.8 billion US dollars, while the total value of concert tickets sold was 2.1 billion US dollars. Thus, the recordings market is mostly significant for consumers and record companies.
- 17 There is some very early literature to support such a claim (see, for example, Santos (1976), who found that singers and dancers earned between 10 and 31 per cent less than others with similar qualifications in the labor market. See also Waits and McNertney (1980) and Panasuk (1974)).
- 18 A similar comment is valid for many of the papers that follow in this section.
- 19 There may also be reporting biases (related to tax reporting and evasion) that make artists’ earnings appear different from what they actually are.
- 20 Although, of course, if the income distribution in the non-artistic sector is equally distorted, the two averages are comparable.
- 21 For the purposes of the study, an “author” is defined as someone who allocates more than 50 per cent of his/her time to writing.
- 22 Interestingly, the earnings data for German writers points to lower and less skewed distribution than for UK writers. Kretschmer and Hardwick consider that this could be a result of a more regulated environment for copyright contracts in Germany, and/or the more global nature of English-language markets.
- 23 There are many theoretical reasons to suppose that this does not work. First, higher prices with lower consumption do not necessarily imply greater revenue for creators. Second, even if creators’ income did increase, there would be an income effect (assuming leisure is a normal good) that would lead them to spend less time in creative activities (see Watt and Towse (2006)). Third, of course, creators may not be as financially motivated as is assumed (see, for example, Throsby (1992), (1994)). Finally, a strengthening of copyright protection hinders creativity when creative endeavors are sequential, with later authors building upon the efforts of earlier ones (see, for example, Landes and Posner (1989)).
- 24 It would be interesting to compare Rappaport’s figures with movies created more recently, say in the last 20 years or so. The modern movie industry is much more active than the industry of 60 to 80 years ago, with a huge number of titles released each year compared to the first half of the 20th century. I would imagine that the variance of commercial value now is greater than before (some huge smash hits, some huge commercial failures).
- 25 Registration with the Copyright Office is not a necessary condition for copyright to be granted or legally conferred. However, it is of course a readily available data set, and also one would assume that those authors who were most interested in the commercial exploitation of their work would be the ones who register, since registering certainly improves the chances of a positive outcome in any future lawsuit.
- 26 In the US a major lengthening of copyright duration occurred in 1962, when duration was increased by 19 years.
- 27 Indeed, if the change led to a decrease in the supply of copyright products, then we would have evidence suggesting that the optimal change would be the opposite of what was done, but the author knows of no serious studies that have taken their conclusions that far.
- 28 Often referred to as the “Sonny Bono Act”, because of the person who strongly lobbied for it. It is also sometimes referred to as the “Mickey Mouse Act”, in reference to the fact that the well known Disney character was a particular copyright-protected work that benefited from an extension in copyright protection through this Act.
- 29 This was already noted earlier by Towse (2001) in the realm of the arts in general, who argued that estimates of the elasticity of supply of the arts indicate that small financial rewards can have greater than proportionate impacts on creativity.
- 30 For movies, copyright duration is linked to the life of the principal director, the screenplay and dialogue authors, or the music composer. When the last of these dies, the movie is protected for a further 70 years.

- 31 The law was passed in 1995 in Europe, and in 1998 in the US.
- 32 In related work, Baker and Cunningham (2006) found that changes in copyright law do have a significant impact on the stock market valuation of copyright intensive firms.
- 33 See Snow and Watt (2003), and Pérez (2007).
- 34 Towse and Handke (2007) provided a most informative survey of the economics of copyright collectives.
- 35 This is interesting since collective management may imply some degree of cross-subsidising from high-income members to low-income members. What the result points to, then, is that the revenue generated by collective management organizations is significantly more tilted towards high-income earners than towards low-income earners, since even after any cross-subsidization that may take place, the earnings distribution is still more skewed than the overall distribution of author income.
- 36 A proper understanding of the true demand function for copyright goods is, of course, also paramount for the task of pricing them under the monopoly conditions that are often ascribed to copyright-protected markets.
- 37 Of course, both price elasticities and income elasticities are important here.
- 38 As an example of the strange results that sometimes occur in survey data-based willingness-to-pay studies, Bille-Hansen (1997) reported that even non-users of the theater in Copenhagen have a substantial willingness to pay for it. Due to the way in which the willingness-to-pay numbers were generated, we cannot tell if non-users had a willingness to pay for any given function that exceeded the ticket price.
- 39 Interestingly, Maffioletti and Ramello also reported some results taken directly from survey questions (non-salient) of the same experimental subjects. The auction results show generally lower willingness-to-pay figures, emphasizing the possible bias that can be found in pure survey data.
- 40 Equally impressive figures can be found for the case of software copyright infringement (see, for example, the 8th Annual BSA Global Software Piracy Study, 2003, in which the piracy rate – the percentage of installed software without a valid user license – in the US was 24 per cent, and in Vietnam 95 per cent).
- 41 Thus, the outlier appears to be the figure calculated by Davis.
- 42 The results of Maffioletti and Ramello concerning the willingness to pay for pirated CDs could be contaminated by a perception among the experimental subjects that the copied CD in question was not as illegal as one purchased, say, on the back streets of their city, since it was being offered by reputable university professors in an open and public environment.
- 43 Indeed, economists have cited at least four possible impacts of file sharing on legitimate trade: (1) a pure substitution effect under which consumers use shared MP3 files instead of purchasing; (2) a sampling effect under which consumers use shared MP3 files to learn what music they would then like to purchase; (3) a network effect, under which shared files can increase the value of music on all formats to consumers; (4) an indirect appropriability effect. It is most likely true that the indirect appropriability option is non-existent for the case of online sharing (see Liebowitz (2003)).
- 44 Indeed, recently in a working paper, Liebowitz (2007b) has provided a lengthy critique of the Oberholzer and Strumpf paper, pointing out numerous factual errors, poorly-performed empirical tests and errors in logic.
- 45 A similar result can be found in recent work by Smith and Telang (2006) who estimated that a unit increase in *per capita* broadband penetration increases *per capita* sales of DVDs by 0.42.
- 46 In an unpublished work, Rob and Waldfoegel (2005) found the same general result, also based on survey data of college students.
- 47 For example, see the discussion on Wikipedia, available at [http://en.wikipedia.org/wiki/Digital\\_rights\\_management](http://en.wikipedia.org/wiki/Digital_rights_management).
- 48 The reader should be warned that the apparently liberal usage of terms that we would associate with economics (for example, “efficient”, “economics”, “costs”, “benefits”, etc.) in the titles of many papers on open source, does not in any way imply that their actual content is heavily dependent upon any significant use of economic theory.
- 49 Only time will tell if the strategy is successful. However, the reader may recall a well-publicised effort by author Stephen King to do the same, writing chapters of a novel and supplying them online for voluntary donations. King never finished the work (at least using that channel of distribution), due to lack of financial support from readers.
- 50 For theoretical discussions on the issue of taxes and levies on blank supports and copy technologies, the interested reader can consult Gayer and Shy (2003) and Kinokuni (2005).
- 51 It is money spent that would otherwise have been available for other purposes; savings or alternative consumption.
- 52 The possibility that this type of compulsory licensing system would not work appropriately was brought up by Liebowitz (2004); “...it is unlikely that a compulsory license would meet even the modest goals of a net positive impact, to say nothing of the claims of virtual perfection that have been attributed to it”.
- 53 There are also, of course, a good number of legal-type studies. See, for example, Netanel (2003) for a widely cited paper.
- 54 Something that has, of course, been gradually recognised more and more openly with the extension of patents to software alongside copyright in the US. In Europe, although software has been declared non-patentable subject matter, patents have nevertheless been used to protect certain aspects of software. See Blind (2007) for more details. Thus the “innovation and new technology” argument may fit quite well for the case of software.
- 55 Here, I must insist, that I am only looking at a direct type of relationship. Indirectly, of course copyright industries do provide substantial opportunities for economic growth, through the well-known effects upon employment and additions to GDP that they imply.

- 56 We recognize here that the “developing world”, and “developing countries” are very heterogeneous and perhaps subjectively defined categories, that include countries with very different income levels, legal systems, and market structures.
- 57 There are, of course, other differences, such as, political, cultural, health, social, etc.
- 58 Indeed, it would be an interesting theoretical challenge to determine if such a function could exist, or if the function itself would be different for different sets of defining parameters.
- 59 As noted above, most (but not all) of the literature suggests that there is a positive (although possibly loose) relationship between the strength of copyright protection and creativity, i.e. the supply curve of copyright products would move outwards with increased copyright protection. Much less is known about how the level of copyright protection affects the location of the demand curve.

## References

- Akerlof, G. *et al*, *The Copyright Term Extension Act of 1998: An Economic Analysis*, AEI-Brookings Joint Center for Regulatory Studies, Washington, D.C., 2002.
- Audley, P. and M. Boyer, ‘The ‘Competitive’ Value of Music to Commercial Radio Stations’, to be published in the *Review of Economic Research on Copyright Issues*, 2007.
- Baker, M. and B. Cunningham, ‘Law and Innovation in Copyright Industries’, Paper presented to the 2006 Annual Congress of SERCI, available at <http://www.serci.org/documents.html>, Singapore, 2005.
- Baker, M. and B. Cunningham, ‘Court Decisions and Equity Markets: Estimating the Value of Copyright Protection’, *Journal of Law and Economics*, XLIX(2); 567-96, 2006.
- Belinfante, A. and R. Davis, ‘Estimating the Demand for Record Albums’, *Review of Business and Economic Research*, 14; 47-53, 1979.
- Besen, S., ‘New Technologies and Intellectual Property: An Economic Analysis’, *RAND Report N. N-2207-NSF*, 1987.
- Besen, S. and S. Kirby, ‘Compensating Creators of Intellectual Property: Collectives that Collect’, *RAND Report N. R-3751-MF*, 1989.
- Bettig, R., *Copyrighting Culture: The Political Economy of Intellectual Property*, Westview Press, Boulder, US, 1996.
- Bille-Hansen, T., ‘Willingness-to-Pay for the Royal Theatre in Copenhagen as a Public Good’, *Journal of Cultural Economics*, 21; 1-28, 1997.
- Bittlingmayer, G., ‘The Elasticity of Demand for Books, Resale Price Maintenance and the Lerner Index’, *Journal of Institutional and Theoretical Economics*, 48; 588-606, 1992.
- Blind, K, ‘Intellectual Property in Software Development: Trends, Strategies and Problems’, *Review of Economic Research on Copyright Issues*, 4(1); 15-25, 2007.
- Borck, R., F. Bjorn and J.R. Robledo, ‘An Empirical Analysis of Voluntary Payments for Information Goods on the Internet’, *Information Economics and Policy*, 18; 229-39, 2005.
- Bounie, D., M. Bourreau and P. Waelbroeck, ‘Pirates or Explorers? Analysis of Music Consumption in French Graduate Schools’, Paper presented to the Annual Congress of the Society for Economic Research on Copyright Issues, available at <http://www.serci.org/documents.html>, Montreal, 2005.
- Bounie, D., M. Bourreau and P. Waelbroeck, ‘Piracy and the Demand for Films: Analysis of Piracy Behavior in French Universities’, *Review of Economic Research on Copyright Issues*, 3(2); 15-27, 2006.
- Breyer, S., ‘The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs’, *Harvard Law Review*, 84; 281-351, 1970.
- Cameron, S., ‘The Demand for Cinema in the United Kingdom’, *Journal of Cultural Economics*, 14(1); 35-47, 1990.

- Connely, M. and A. Krueger, 'Rockonomics: The Economics of Popular Music', *NBER Working Paper N. 11282*, National Bureau of Economic Research, available at <http://www.irs.princeton.edu/pubs/pdfs/499.pdf>, 2005.
- Cronin, F. and A. Wusterbarth, 'Economic Harm Ignored: Betamax Revisited', *Contemporary Policy Issues*, 4; 54-68, 1986.
- Damuth, R.J., *Economic Impact Study. Private Copying Levies on Digital Equipment and Media. Direct Effects on Consumers and Producers, and Indirect Effects on Sales of Online Music and Ringtones*, document prepared by Nathan Associates Inc. for the Copyright Levies Reform Alliance, 2006.
- Domon, K. and K. Nakamura, 'Unauthorised Copying and Copyright Enforcement in Developing Countries: A Vietnam Case Study', *Review of Economic Research on Copyright Issues*, 4(1); 87-96, 2007.
- Filer, R.K., 'The 'Starving Artist' – Myth or Reality? Earnings of Artists in the United States', *Journal of Political Economy*, 94(1); 56-75, 1986.
- Fine, M., 'Soundscan Study on Napster Use and Loss of Sales', available at <http://www.riaa.com>, 2000.
- Gayer, A. and O. Shy, 'Copyright Protection and Hardware Taxation', *Information Economics and Policy*, 15; 467-83, 2003.
- Grossman, G. and E. Helpman, *Innovation and Growth in the Global Economy*, MIT Press, Cambridge, US and London, UK, 1991.
- Handke, C., '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, 2006.
- Hann, I.H., J. Roberts, S. Slaughter and R. Fielding, 'An Empirical Analysis of Economic Returns to Open Source Participation', unpublished working paper, Carnegie-Mellon University, 2004.
- Hansen, A.M., V. Ponni and R.G. Picard, 'Economics of Composition in a Small Nation: The Situation of Composers, Lyric Writers and Arrangers in Finland', *Working Paper*, Business Research and Development Centre, Turku School of Economics and Business Administration, 2003.
- Harbaugh R. and R. Khemka, 'Does Copyright Enforcement Encourage Piracy?', *Working Paper 2001-14*, Claremont College, available at <http://ssrn.com/abstract=244949>, 2001.
- Haruvy, E.E., F. Wu and S. Chakravarty, 'Incentives for Developers' Contributions and Product Performance Metrics in Open Source Development: An Empirical Investigation', unpublished working paper, University of Texas at Dallas, 2003.
- Hjorth-Anderson, C., 'A Model of the Danish Book Market', *Journal of Cultural Economics*, 24; 27-43, 2000.
- Hoffman, G., 'Piracy of Intellectual Property', *Bulletin for the American Society for Information Science*, 16(3); 9-11, 1990.
- Hui, K. and I. Png, 'On The Supply of Creative Works: Evidence From the Movies', *American Economic Review*, 92(2); 217-20, 2002.
- Hui, K. and I. Png, 'Piracy and the Legitimate Demand for Recorded Music', *Contributions to Economic Analysis and Policy*, 2(1): Article 11, 2003.
- Hurt, R. and R. Schuchman, 'The Economic Rationale of Copyright', *American Economic Review*, 421-32, May 1966.
- Kinokuni, H., 'Compensation for Copying and Bargaining', *Information Economics and Policy*, 17; 349-64, 2005.
- Koski, H., 'OSS Production and Licensing Strategies of Software Firms', *Review of Economic Research on Copyright Issues*, 2(2); 111-25, 2005.
- Koski, H., 'Private-Collective Software Business Models: Coordination and Commercialization Via Licensing', *Review of Economic Research on Copyright Issues*, 4(1); 47-61, 2007.
- Kretschmer, M. and P. Hardwick, *Authors' Earnings From Copyright and Non-copyright Sources: A Survey of 25,000 British and German Writers*, CIPPM and ALCS, available at <http://www.cippm.org.uk>, Dorset, 2007.

- Lakhani, K. and E. Von Hippel, 'How Open Source Software Works: 'Free' User-to-User Assistance', *Research Policy*, 32(6); 923-43, 2003.
- Landes, W. and R. Posner, 'An Economic Analysis of Copyright Law', *Journal of Legal Studies*, XVIII; 325-63, 1989.
- Landes, W. and R. Posner, *The Economic Structure of Intellectual Property Law*, Belknap Press, Cambridge, US, 2003.
- Lange, M.D. and W.A. Luksetich, 'Demand Elasticities for Symphony Orchestras', *Journal of Cultural Economics*, 8(1); 29-47, 1984.
- Lerner, J. and J. Tirole, 'The Economics of Technology Sharing: Open Source and Beyond', *Journal of Economic Perspectives*, 19(2); 99-120, 2005a.
- Lerner, J. and J. Tirole, 'The Scope of Open Source Licensing', *Journal of Law, Economics and Organization*, 21(1); 20-56, 2005b.
- Liebowitz, S., 'Copying and Indirect Appropriability: Photocopying of Journals', *Journal of Political Economy*, 93; 945-57, 1985.
- Liebowitz, S., 'Back to the Future: Can Copyright Owners appropriate Revenues in the Face of New Copying Technologies?' in *The Economics of Copyright: Developments in Research and Analysis*, W. Gordon and R. Watt (eds.), Edward Elgar; pp. 1-25, Cheltenham, UK and Northampton, US, 2003.
- Liebowitz, S., 'Alternative Copyright Systems: The Problems with a Compulsory License', *IP Central Review*, 1(2), 2-19, available at <http://www.ipcentral.info/review/v1n2liebowtiz.html#11>, 2004.
- Liebowitz, S., 'MP3s and Copyright Collectives: A Cure Worse than the Disease?' in *Developments in the Economics of Copyright: Research and Analysis*, W. Gordon, L. Takeyama and R. Towse (eds.), Edward Elgar, Cheltenham, UK and Northampton, US, 2005.
- Liebowitz, S.J., 'Testing File-Sharing's Impact by Examining Record Sales in Cities', *Working Paper*, University of Texas at Dallas, 2006.
- Liebowitz, S.J., 'File Sharing: Creative Destruction or Just Plain Destruction', *Journal of Law and Economics*, 49(1); 1-28, 2006.
- Liebowitz, S., 'Copyright: How Large are the Deadweight Losses?', *Working Paper*, University of Texas at Dallas (also presented to SERCI Annual Congress, Berlin, 2007), 2007a.
- Liebowitz, S., 'How Reliable is the Oberholzer-Gee and Strumpf Paper on File Sharing?' available at <http://ssrn.com/abstract=1014399>, 2007b.
- Liebowitz, S. and S. Margolis, 'Seventeen Famous Economists Weigh in on Copyright: The Role of Theory, Empirics, and Network Effects', *Harvard Journal of Law and Technology*, 18(2); 435-57, 2005.
- Liebowitz, S. and R. Watt, 'How Best to Ensure Remuneration for Creators in the Market for Music? Copyright and its Alternatives', *Journal of Economic Surveys*, 20(4); 513-45, 2006.
- Maffioletti, A. and G. Ramello, 'Should We Put Them in Jail? Copyright Infringement, Penalties and Consumer Behaviour: Insights From Experimental Data', *Review of Economic Research on Copyright Issues*, 1(2); 81-95, 2004.
- Marshall, A., 'Causes, Effects and Solutions of Piracy in the Computer Software Market', *Review of Economic Research on Copyright Issues*, 4(1); 63-86, 2007.
- Manning, F., 'Assessing the Impacts of Audio Home Copying Restrictions', *Quarterly Journal of Business and Economics*, 33; 945-57, 1994.
- Matsumoto, S., 'Performers in the Digital Era: Empirical Evidence from Japan', in *Copyright in the Cultural Industries*, R. Towse (ed.), Edward Elgar; pp. 196-209, Cheltenham, UK, and Northampton, US, 2002.
- McNertney, E.M. and C.R. Waits, 'The Incomes of Cultural Providers: A Review of Current Research', in *Cultural Economics 88: An American Perspective*, D. Shaw, W. Hendon and V. Owen (eds.), Association for Cultural Economics, Akron, 1988.

- Michel, N., 'Digital File Sharing and the Music Industry: Was There a Substitution Effect?', *Review of Economic Research on Copyright Issues*, 2(2); 41-52, 2005.
- Moore, T.G., *The Economics of the American Theatre*, Duke University Press, Durham, 1968.
- Netanel, N., 'Impose a Noncommercial Use Levy to Allow Free Peer-to-Peer File Sharing', *Harvard Journal of Law and Technology*, 17; 1-84, 2003.
- Oberholzer, F. and K. Stumpf, 'The Effect of File Sharing on Record Sales: An Empirical Analysis', *Journal of Political Economy*, 115(1); 1-42, 2007.
- Oksanen, V. and M. Valimäki, 'Copyright Levies as an Alternative Compensation Method for Recording Artists, and Technological Development', *Review of Economic Research on Copyright Issues*, 2(2); 25-39, 2005.
- Panasuk, C., *An Analysis of Selected Performing Arts Occupations*, Canada Council for the Select Committee on Manpower and Immigration, Ottawa, 1974.
- Papandrea, F., 'Willingness to Pay for Domestic Television Programming', *Journal of Cultural Economics*, 23; 149-66, 1999.
- Peitz, M. and P. Waelbroeck, 'The Effect of Internet Piracy on Music Sales: Cross-Section Evidence', *Review of Economic Research on Copyright Issues*, 1(2); 71-79, 2004.
- Plant, A., 'The Economic Aspects of Copyright in Books', *Economica*, 1; 167-95, 1934.
- Png, I. and Q.H. Wang, 'Copyright Duration and the Supply of Creative Work', Department of Information Systems, National University of Singapore, 2006.
- Pollock, R., 'Forever Minus a Day? Some Theory and Empirics of Optimal Copyright', Paper presented to the Annual Congress of SERCI, Berlin, 2007.
- Rappaport, E., 'Copyright Term Extension: Estimating the Economic Values', Congressional Research Service, available at <http://countingcalifornia.cdlib.org/crs/pdf/98-144.pdf>, Washington, D.C., 1998.
- Ringstad, V. and K. Loyland, 'The Demand for Books Estimated by Means of Consumer Survey Data', *Journal of Cultural Economics*, 30; 141-55, 2006.
- Rob, R. and J. Waldfoegel, 'Piracy on the Silver Screen', mimeo, 2005.
- Rob, R. and J. Waldfoegel, 'Piracy on the High C's: Music Downloading, Sales Displacement, and Social Welfare in a Sample of College Students', *Journal of Law and Economics*, 49(1); 29-62, 2006.
- Rochelandet, F., 'Are Copyright Collecting Societies Efficient Organizations? An Evaluation of Collective Administration of Copyright in Europe', in *The Economics of Copyright: Developments in Research and Analysis*, W. Gordon and R. Watt (eds.), Edward Elgar; pp. 176-97, Cheltenham, UK and Northampton, US, 2003.
- Santos, F.P., 'Risk, Uncertainty and the Performing Artist', in *The Economics of the Arts*, Blaug, M. (ed.), Westview Press, Boulder, US, 1976.
- Schimmelpennig, J., 'Demand for Ballet: A Non-Parametric Analysis of the 1995 Royal Ballet Summer Season', *Journal of Cultural Economics*, 21; 119-27, 1997.
- Smith, M.D. and R. Telang, 'Piracy or Promotion? The Impact of Broadband Internet Penetration on DVD Sales', *Working Paper*, available at <http://ssrn.com/abstract=918240>, 2006.
- Takeyama, L., 'The Welfare Implications of Unauthorised Reproduction of Intellectual Property in the Presence of Demand Network Externalities', *Journal of Industrial Economics*, 17; 155-66, 1994.
- Throsby, C.D. and G. Withers, *The Economics of the Performing Arts*, Edward Arnold, London, 1969.
- Throsby, D., 'Artists as Workers', in *Cultural Economics*, R. Towse and A. Khakee (eds.), Springer-Verlag, Berlin/Heidelberg, 1992.
- Throsby, D., 'A Work-Preference Model of Artist Labor Supply', in *Cultural Economics and Cultural Policies*, A. Peacock and I. Rizzo (eds.), Kluwer, Boston, US and Dordrecht, Netherlands, 1994.

- Towse, R., *The Economic and Social Characteristics of Artists in Wales*, mimeo, Welsh Arts Council, Cardiff, UK, 1992.
- Towse, R., *Creativity, Incentive and Reward: An Economic Analysis of Copyright and Culture in the Information Age*, Edward Elgar, Cheltenham, UK and Northampton, US, 1999.
- Towse, R., 'Partly for the Money: Rewards and Incentives to Artists', *Kyklos*, 54(2-3); 473-90, 2001.
- Towse, R. and C. Handke, *Economics of Collective Management of Copyright*, Ediciones y Publicaciones Autor S.R.L., Madrid, 2007.
- Waits, C.R. and E.M. McNertney, 'Uncertainty and Investment in Human Capital in the Arts', in W.S. Hendon et al (eds.), *Economic Policy for the Arts*, Abt Associates, Cambridge, UK, 1980.
- Warner Communications, Inc., 'Estimate of Loss Due to Home Taping: Tapers' Reports of Replacement', internal document, 1982.
- Wassall, G.H. and N.O. Alper, 'Toward a Unified Theory of the Determinants of the Earnings of Artists', in *Cultural Economics*, R. Towse and A. Khakee (eds.), Springer-Verlag, Berlin/Heidelberg, 1992.
- Watt, R. and R. Towse, 'Copyright Protection Standards and Authors' Time Allocation', *Industrial and Corporate Change*, 15(6); 995-1011, 2006.
- Widdows, R. and R. McHugh, 'Taxing Purchases of Home Tape Recorders and Supplies to Compensate for Copyright Infringements: An Econometric Analysis of the Role of Economic and Demographic Factors', *Journal of Consumer Affairs*, 18; 317-25, 1984.
- Zentner, A., 'File Sharing and International Sales of Copyrighted Music: An Empirical Analysis with a Panel of Countries', *Topics in Economic Analysis and Policy*, 5(1); Article 21, 2005.
- Zentner, A., 'Measuring the Effect of Music Downloads on Music Purchases', *Journal of Law and Economics*, 49(1); 63-90, 2006.

## COMMENTS ON AN EMPIRICAL ANALYSIS OF THE ECONOMICS OF COPYRIGHT: HOW VALID ARE THE RESULTS OF STUDIES IN DEVELOPED COUNTRIES FOR DEVELOPING COUNTRIES?

RUTH TOWSE\*

In my opinion, this paper is comprehensive and meets the terms of reference very well indeed. I have to say that I would not have liked to write it – it is quite a challenge to put all this together. It is particularly interesting to see cultural economics viewed in this light but it makes me realize all the more how little work has been done on copyright in that particular field. I have some additional suggestions to make but I have no disagreement with the paper whatsoever.

### General Points

As is well known, there has been a tremendous amount of hype surrounding the creative industries in the last decade and nowhere more so than in the UK. They account for 5 per cent of GDP or more in those countries where that has been measured, and outgrow manufacturing, with growth rates of 5 per cent plus. It is, therefore, worthwhile pointing out that the now widely held belief in the creative industries as drivers of growth might be somewhat dented by some recent work in the UK on trends. The UK seems to be the country that has consistently measured cultural (creative/copyright-based) industries over a five-year period and the recent evidence shows two trends: first, that their growth is slowing down and second, that they appear to be more sensitive to the trade cycle than other industries (DCMS (2007)).

A second general point is that of course, copyright is not one thing – it is a bundle of rights with very different values in different markets. For example, the film rights of a book could exceed the value of the publication rights and also the film rights of a book made into a film by Hollywood have far greater value than if the film studio were in the UK or Denmark. In a similar vein, it is also the case that copyright(s) have different impacts on large and small firms in the cultural industries and on well-established and new entrant creators and performers. Moreover, an economic good embodies several rights of many persons who contributed to its production; for example, a CD has author's rights for the composer, lyricist and the artist of any artwork, related rights for the performers and sound recording maker (and a DVD has even more). The value of these individual rights is not easy to disentangle.

I think it is very important to distinguish, as Richard Watt does, the earnings of authors and performers and the revenues or profits of the industries they supply with content (of which more later).

One question I have often considered is what might be called the indirect effects of copyright in artists' labor markets; specifically, what is the influence of copyright on artists' non-royalty earnings (wages or fees, prices, etc.). If performers did not have related rights, would they get paid more or less? It seems to me it can be argued either way: on the one hand, I have heard it argued that they are paid more because they are 'protected'; on the other hand, employers and others who are paying them a fee or wage (spot payment) may offer less because they know the performer is receiving remuneration or a royalty (future payment). Another question

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is whether the introduction of a new right, say for performers, is paid at the expense of another group, say composers (on both points, see Towse (2001)).

Moral rights may be an important incentive for artists who are not motivated by financial gain. Copyright also confers status on artists in their opinion, and protects their reputation.

### Suggestions for Research Topics

1. The most important piece of research to be done is on what and how creators are paid and this may be very different in developing countries from the customs and institutions in developed countries. For example, performers may be rewarded by a king or chief as patron or given money and other valuables by the audience directly; they may be supported by the community, etc. One would expect to find big differences between the major cities and the countryside. There has been no study I know of artists' labor markets in developing countries that investigates all sources of earnings and it should be noted that there are only two such studies in the developed world that specifically identify copyright and other earnings (studies of artists' earnings usually look for earned and unearned income, the latter from grants, family, etc.).<sup>1</sup>
2. There has been no work on the valuation of copyright assets held by companies or corporations (record labels, film studios, publishers) or, indeed, of those owned by individual creators (David Bowie is an exception). I believe this work is important as it could give an insight into the degree to which creators are "exploited" by cultural industries. We know the industries in the developed world are typically oligopolies and bargaining power is unequal between an individual artist and the industry. I contend that copyright has exacerbated this, because it has unequal effects as between creator and company or corporation (Towse, op. cit.).
3. We do not know how much the copyright system costs to operate – its overall "dead-weight loss".
  - (a) How much do authors and performers "lose" in transaction costs collecting and protecting their copyrights?
  - (b) How much do new creators have to pay to use the works of others?
4. Finally, probably the single most important piece of information a country (especially a developing one) would like to have before signing up to a full-on copyright regime is what the balance of payments (or of trade) is in copyright material, industry by industry.

### Note

- 1 The 2007 US writer's strike was about residual payments not royalties. In the UK, royalties would be payable –different ways of payment in very similar settings.

### References

Department of Culture, Media and Sport (DCMS), *The Creative Economy Program: A Summary of Projects Commissioned in 2007*, London, 2007.

Towse, R., *Creativity, Incentive and Reward. An Economic Analysis of Copyright and Culture in the Information Age*, Edward Elgar Publishing, Cheltenham, UK and Northampton, US, 2001.

## COMMENTS ON AN EMPIRICAL ANALYSIS OF THE ECONOMICS OF COPYRIGHT: HOW VALID ARE THE RESULTS OF STUDIES IN DEVELOPED COUNTRIES FOR DEVELOPING COUNTRIES?

ROGER MELKI\*

The paper has an ambitious objective which is to determine “an optimal copyright standard in any country (above all, in developing countries)”.

The paper argues that the effect of copyright protection standards on the supply and demand for copyright materials is generally understood. What is less understood and needs more analysis is the opposite, that is, “how do the supply and demand curves determine the copyright protection standard?”

On the supply side, the author argues that it is important to consider “the fraction of time that creative individuals spend creating copyright works. If that fraction is low (high), consider strengthening (weakening) the copyright standard.”

Thus in a developing country, if an author spends a small percentage of time writing books, then strengthening copyright-protection standards would be an incentive for the author to spend more time on writing activities, since that would increase the revenue generated from selling books. What the author did not include is non-monetary factors which drive people to be creative, such as the satisfaction in expressing one’s creativity and the pride that a creative person feels after accomplishing and finishing a piece of creative work, which are not positively correlated with or dependent upon IPR laws. On the other hand, there is a lot of writing that goes on in the academic world not necessarily for financial gain, but rather for survival and for getting tenure.

On the demand side, Watt argues that “possibly a great deal of very relevant information for the demand for copyright products in a developing country could be gained by studying the demand of the low income population in developed countries, who presumably face similar budget constraints and opportunity costs as the average individual in a developing country”. This is a controversial argument, because it assumes that the local culture does not affect a consumer’s behavior. We believe that the income factor is not isolated and is strongly interrelated with other factors such as government enforcement of protection standards, as well as a consumer’s feelings towards the country of origin of the pirated product.

Strengthening IPR protection standards is a double-edged sword. On the one hand it would reduce the illegitimate copying/demand for a protected product, but on the other hand it might lead to increased legitimate demand levels because people who were using pirated products and who needed such products to function would have no choice but to buy the original product. An example would be a professor who receives documents to review in Windows 2007: he/she needs to buy the original product to do his/her job. Thus, one would need to know the optimal level of protection standards that would result in a net positive increase in demand levels.

Watt argues against the use of statistical analysis of macro-economic variables or the use of survey data when designing an appropriate copyright-protection standard. Instead, he recom-

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mends studying real-world markets and spending real money to study various scenarios, presumably of the variation of supply and demand with different levels of protection.

An example of such an experimental study could be conducted on the cable sector in Lebanon, where the piracy of the airwaves has become big business, with an estimated 80 per cent of the population accessing pirated programming that is supplied by 600 to 700 cable workers, which results in about 7 million US dollars per month lost to legal broadcasters. The Lebanese government has been trying to regulate the cable industry by drafting new legislation that aims to bolster the fight against piracy. The law, however, has not been approved due to the ongoing political turmoil in the country. Even when/if it does pass, the law might not be fully enforced due to the slowness of the Lebanese court system.

Watt's recommendation of an experimental study might be possible and may have been tried when legitimate cable distributors launched a promotion offer for a period and lowered the cost of the monthly subscription fee to match, if not undercut, fees charged by pirate cable operators. However, there were not many people who went through the trouble of switching; part of it could be loyalty to the local distributor, and the awareness that this is a promotion which will be followed by a price increase, as well as the resistance to change. Another factor is the feeling that the small-scale distributor who usually lives in the same neighborhood is more worthy of receiving the financial gain than the actual cable company, particularly if it is foreign-owned or a franchise of a foreign company.

Thus it might be worth studying the impact of the national origin of a product on its illegitimate distribution in developing countries. This might suggest setting up different protection standards for local vs. international copyright products, a concept that we doubt many would welcome.

Watt recommends repeating the same experiment in developed and developing countries and comparing the results with the objective of identifying the optimal standard of copyright protection. However, we believe that any experiment should be tailored to the local country's economic, cultural, and regulatory conditions, which means that comparing the results of non-identical experiments would not be of much value.

## COMMENTS ON AN EMPIRICAL ANALYSIS OF THE ECONOMICS OF COPYRIGHT: HOW VALID ARE THE RESULTS OF STUDIES IN DEVELOPED COUNTRIES FOR DEVELOPING COUNTRIES?

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The contribution by Dr. Watt provides guidelines to researchers in developing countries and countries with economies in transition (hereafter denoted as DCs) on how to properly study and assess the copyright system and is of great importance to all stakeholders interested in understanding how to develop an optimal copyright standard. The profound and broad review of the empirical literature that he presents provides readers with an updated view on this and related issues. Of particular interest to me are his remarks on supply and demand of copyrighted works: on the demand side, willingness by consumers to pay and the demand for legal and illegal products and, on the supply side, the earnings of artists from royalties and their effect on creativity. My comments on these critical questions focus the attention of readers on what I believe is the most robust evidence that can be obtained from the surveyed empirical evidence.

It is well known that the purpose of copyright law is to encourage creativity among authors by awarding them, and/or the firms that represent them, the necessary monopoly power to exploit their work. The existence of such power provides higher profits than those that would be obtained in a competitive framework and, therefore, give both sets of agents extra revenue that would allow them to continue with their activities and spark copyright industries, which are critical for economic development as several recent studies have shown.<sup>1</sup> On the other hand, by raising prices and lowering the production of goods, copyright reduces the accessibility of consumers to these works. In this static scheme, the key issue is to find the right level of copyright protection that balances the tradeoff between encouraging creative activity by artists (supply) and market accessibility to creative work by consumers (demand) so as to maximize social welfare. As a result, the basic problem facing the design of an optimal copyright system is finding the optimal level of copyright protection that balances these opposing forces, i.e. the term and scope of copyright.

However, finding the right level of copyright protection that would strike the right balance is not an easy task. Dr. Watt remarks that there are several theoretical models on how to approach this issue from an industrial organization perspective, e.g. Landes and Posner (2003). However, there is not enough empirical evidence on critical issues that would help us to determine the optimal level of copyright protection, i.e. the “magic formula” to provide the right level. Nevertheless, the fact that we do not know what the optimal level is, not even in developed countries and much less in developing countries, does not preclude the analysis on how a change in the level of copyright protection would affect supply and demand of copyrighted products and its effect on social welfare, and what the empirical evidence tells us about the theoretical assumptions that we make when addressing this problem from a formal perspective.

Dr. Watt has surveyed the existing and inconclusive evidence on many of these issues, but if we were to guess whether current copyright protection in DCs is below, equal to or above the optimal level, many of us would agree that the available information points to the first possibility. Copyright protection has to do with term and scope, but, more important than the formal accession to treaties and agreements on copyright and related rights, is the actual level of

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enforcement of copyright law. In what follows I start from the hypothesis that the copyright level in DCs is below the optimal level. In this case, social welfare would suffer as market access to consumers (by way of illegal products) is higher than it should be and, therefore, the level of creativity is lower than it should be, as artists would lack incentives to undertake their activity.

There are plenty of country reports and some empirical evidence that indicate that no matter what the optimal level of copyright protection should be (probably below that of developed countries), copyright infringement (unlawful sales) is pervasive across industries, and its scale is too large. It is well known that these reports are commissioned by the industries whose legal sales suffer most from piracy,<sup>2</sup> and that their estimated trade losses are inflated as they equate the sale of an unlawful copy with lost revenue from the legal retail price.<sup>3</sup> This reasoning implies that illegal copies are perfect substitutes for the legal ones – which may be valid for many copyrighted products such as sound recordings and business software – but also that demand is completely inelastic – an assumption that is plainly incorrect. Nevertheless, even if the assessment that industries make of their losses is biased as a result of the price at which they choose to value the volume of unlawful sales, this last variable might not be far from reality, supporting the idea that market access is too high because the size of the illegal market is too large. From a theoretical perspective this calls for industrial organization models where two markets for legal and illegal products are interdependently connected by way of supply and demand. As we shall see below, a key aspect to study is how discriminatory pricing policies may influence each other.

Clearly, excessive market access in developing countries is possible because prices of pirated copyright products are much lower than those of their legally marketed counterparts. Correspondingly, the quantity of legally sold products, upon which revenues for firms and royalties for creators can be collected, is too low, bringing scarce compensation to creators and firms. This means that industries supporting either local or international productions struggle to survive and that lawful productions face important difficulties in poor legitimate markets. In this context, where excessive market access is signaled by widespread unlawful trading, increasing copyright protection would bring larger social welfare by balancing the playing field in favor of creativity. Of course, copyright protection refers to copyright scope and term, as well as to enforcement, which would have an immediate effect in the short run by avoiding unlawful transactions and educational practices, which aim to change consumers' preferences toward lawful products in the long run. In developing countries, legal and actual copyright levels diverge by a gap that is sensitive to enforcement and educational practices.

Then, should governments interested in raising social welfare in the short term enforce copyright law to a greater extent? Increasing copyright protection will certainly not benefit the demand side, but if it encourages creativity so as to offset this negative effect, then society will be better off. However, we should not take for granted that increasing copyright protection will indeed result in greater creativity by individuals, as a result of increasing earnings for copyright holders. The figure below shows the chain of events that should take place for the above reasoning to hold true.

**Figure 1. Does Increased Copyright Protection Lead to Greater Creativity?**



The first event deals with the assumption that increased copyright protection results in higher revenues and earnings for copyright holders, a question related to how consumers react to price changes, i.e. a demand issue. In DCs, where income distribution is so unequal, it seems quite likely that the majority of consumers are unwilling or unable to pay the legal price charged by the industry and, therefore, the owner of the copyright is not deprived of any revenue. However, this does not mean that demand is completely elastic at the illegal price, and consequently some of the industries' revenue is lost. Therefore, we assume that the elasticity of demand is positive, greater than zero a value corresponding to the industries' assumption when calculating their losses and smaller than infinite a value consistent with the assumption made by those who disregard copyright theft on the above grounds suggesting that piracy is harmless or, even, beneficial.

In this scheme, a critical question to examine empirically is the switching price from unlawful to lawful sales, i.e. the elasticity of legal products with respect to illegal pricing an issue that has not been addressed in the empirical literature. If the cross-price elasticity of demand for legal products is positive, then an increase in copyright protection that raises (illegal) prices will bring presumably higher (legal) revenues for companies and earnings to creators. The switching price depends critically on the difference between the legal and illegal prices. Increasing copyright protection raising illegal prices could then be accompanied, from the industries' perspective, by retail price reductions, as this would reduce the difference between willingness to pay and legal prices.

From the willingness to pay perspective, empirical evidence like that presented by Maffioletti and Ramallo (2004) is necessary, but substituting people in DCs for college students in developed countries. From the perspective of the inability to pay legal prices, studies that determine income elasticity in DCs are pertinent. These studies would allow us to determine if the above-mentioned cross-price elasticity is positive and to what extent, as well as the optimal price levels. I believe these research questions complement those given by Dr. Watt. In particular, as long as copyright infringement is high and illegal prices low people in developing countries will not have to make a choice between legal and illegal products, as the price difference will compel them to choose the latter given their willingness to pay and/or their low income. In short, we need to undertake studies that would allow us to know the demand characteristics for copyright products of the middle and low income segments of the population in developing countries.

The second circumstance that should take place in the stylized chain of events presented in the above figure is related to the supply of creative work. Specifically, it is related to the conditions that should be verified for an increase in copyright protection to result in higher earnings for creators through royalties and related compensation and *ceteris paribus* the particular skewedness of their distribution (Towse (1999)). So far, we have talked rather loosely of copyright holders, embracing both creators and large firms that publish and distribute their work, and which play the leading role in marketing and distributing the final work. On these grounds, it is clear that these groups may have conflicting interests when splitting their joint revenues and profits. From an analytical perspective, we need models that discriminate between these groups because putting them together would result in misrepresentation of the supply curve for original products, as stronger copyright protection may result in higher revenues for corporations but meager earnings for authors, who would then be unwilling to create original products (Bettig (1996)).

It is well known that corporate profitability does not always align with authors' earnings by way of royalties, particularly when their distribution tends to be biased against the latter, whose individual bargaining power is extremely low. This means that increasing copyright protection will raise firms' profitability but nothing ensures that the additional revenues are passed on to the

creators, and this is something that developing country authorities ought to keep in mind. It is a matter of the organization of each particular copyright industry and how creators and firms relate to each other. Additional empirical evidence on whether higher copyright protection increases creativity is necessary, but always related to how increasing revenues are shared between authors and their representatives, since it is assumed that copyright holders will see their revenues increased.<sup>4</sup>

Assuming that increased copyright protection results in higher earnings for creators, a subsequent question from the supply side is if this encourages them to allocate more time to the creative activity. More studies are needed in DCs to establish how artists allocate their time, and if current and increased royalties (after strengthening copyright protection) are a meaningful source of income that would drive them toward these activities. If current royalty levels do not motivate artists to spend more time creating original products (Wassal and Alper (1992)), the question is to what extent they should be increased so as to motivate them to behave as predicted by economic theory. That is, besides autonomous creation coming from inherent satisfaction rather than royalty payments, can copyright law reward creativity so as to encourage existing and new authors to commit themselves to these activities professionally? Kretschmer and Hardwick (2007) answered with an emphatic “no” for the case of developed countries. In light of this evidence, collective management may improve the situation for creators by increasing their bargaining power. However, recent studies do not support the fact that collective management increases earnings for creators, as they suffer from some of the same drawbacks as payments through royalties, e.g. a high degree of skewedness, plus additional disadvantages like increased risk among their affiliates. In our current analytical framework the question to be answered is what additional income for the average creator will bring increased copyright protection, and how it relates to their incentive to create. Assuming that creators in DCs present the same characteristics as in developed countries, albeit exacerbated (Towse (1999)): (1) multiple sources of income; (2) willingness to take risks as a result of their inherent satisfaction and hopes in succeeding; (3) a low reserve wage, all of them converging in discontinuous and limited time devoted to these activities, then the relevant opportunity cost of time corresponds to earnings in the creative sector, and an increase in copyright protection to raise their earnings will result in greater creativity.

My conclusion is that if copyright protection in DCs is below an optimal level and the chain of events presented in the figure occurs, then (1) it would be possible to nurture copyright-based industries (creators and firms), while (2) increasing social welfare, as the loss in consumers' access to copyrighted work (priced too low) is offset by the increase in creativity (result of increased earnings). The empirical evidence tends to support all the assumptions that we have made, particularly with regard to the current level of copyright protection being lower than optimal, and the effect that its strengthening would have on reduced and increased demand for unlawful and lawful products respectively, which in turn would bring higher earnings for copyright holders and for creators an increase in creativity. The weakest point in the chain of events we have described lies within the group of “copyright holders”, and whether firms transfer enough earnings to creators to motivate them to carry out creative activities to a larger extent. The empirical evidence in developed countries suggests that it is not enough, let alone in DCs, and, therefore, the final goal of raising social welfare by strengthening copyright protection would be compromised.

I would like to conclude with some recommendations with regard to future research that may cast further light on how to foster creativity and innovation in DCs. Micro-economic research needs to be undertaken to determine to what extent current copyright protection is sub-optimal in DCs. For this purpose: (1) on-site data collection and analysis by way of econometric techniques is necessary to test hypotheses with regard to whether increasing copyright strength raises earnings and creativity (i.e. price, income and cross-elasticities of demand and supply); (2)

experimental evidence may also allow us to test whether individual preferences are as assumed in the above discussion, particularly willingness by consumers to pay and by creators to accept. Finally, even if macro-economic evidence does not help us to design the right optimal protection standard, it may show whether current levels are below or above what should be expected given a country's average level of income. In particular: (1) should we expect the contribution of copyright-based industries to GDP and employment in DCs to be smaller than in developed countries? If copyright products are a type of luxury commodity in DCs, it could be expected to be smaller, where this is aggravated by (2) the fact that high levels of copyright infringement imply that large amounts of (illegal) economic transactions remain unobserved (i.e. overlooked in official macro statistics (OECD (2002)). As a result, and with the usual caveats about data quality and availability, methodological shortcomings, and particular industrial structures, in countries where the contribution of copyright-based industries to GDP and employment is well below expected levels given their average income, copyright protection might be too low and therefore copyright infringement might be too high, signaling the need for further protection.

### Notes

- 1 The role played by these industries in developing countries with regard to GDP and employment is currently being studied by WIPO in Brazil, Colombia, Jamaica, Mexico, Pakistan, Peru, Philippines and others. There are also two published reports on countries in transition, Hungary and Latvia, WIPO (2006).
- 2 See, for example, <http://www.iipa.com/countryreports.html>.
- 3 Here we dismissed the fact that "copiability" may enhance the value of the original so that the copyright owner indirectly appropriates some of the value of the copies, e.g. by accelerating the spread of the work, piracy may help the copyright holder to obtain network monopoly — an idea that permeates the fair use doctrine. In passing, we note that Internet-based piracy might be less of an issue in developing countries as Internet access measured by the percentage of users is rather low — i.e. the penetration rate in LDCs relates to 19 per cent of the overall population, a figure that is much lower when we consider subscribers to an ISP, e.g. <http://www.internetworldstats.com>.
- 4 We presume here that since copyright protection is too low in DCs, increasing it will not harm authors' remuneration by way of indirect appropriation, network effects, backward sloping supply curves, and other possible arguments — see footnote 3.

### References

- Bettig, R., *Copyrighting Culture: The Political Economy of Intellectual Property*, Westview Press, Boulder, US, 1996.
- Kretschmer, M. and P. Hardwick, *Authors' Earnings From Copyright and Non-copyright Sources: A Survey of 25,000 British and German Writers*, CIPPM and ALCS, available at <http://www.cippm.org.uk>, Dorset, 2007.
- Landes, W. and R. Posner, *The Economic Structure of Intellectual Property Law*, Belknap Press, Cambridge, US, 2003.
- Maffioletti, A. and G. Ramello, 'Should We Put Them in Jail? Copyright Infringement, Penalties and Consumer Behaviour: Insights From Experimental Data', *Review of Economic Research on Copyright Issues*, 1(2); 81-95, 2004.
- OECD, *Handbook for Measurement of the Non-Observed Economy: Underground, Informal and Illegal*. Organization for Economic Co-Operation and Development, Paris, 2002.
- Towse, R., *Creativity, Incentive and Reward: An Economic Analysis of Copyright and Culture in the Information Age*, Edward Elgar, Cheltenham, UK and Northampton, US, 1999.
- Wassall, G.H. and N.O. Alper, 'Toward a Unified Theory of the Determinants of the Earnings of Artists', in *Cultural Economics*, R. Towse and A. Khakee (eds.), Springer-Verlag, Berlin/Heidelberg, 1992.
- WIPO, *National Studies on Assessing the Economic Contribution of the Copyright-Based Industries*, Creative Industries Series No. 1, World Intellectual Property Organization, Geneva, 2006.