

Copyright Failure and the Protection for Tables and Compilations

Dennis W. K. Khong
Department of Economics,
University of Strathclyde, United Kingdom

Draft paper prepared for 2004 Annual Meeting of the Society for Economic Research
on Copyright Issues, 8-9 July 2004, Turin, Italy.

Abstract

This paper attempts to show that databases, as a category of informational goods suffer from what I term 'copyright failures'. The efficient remedy to these copyright failures is a liability rule. Property rule is socially inefficient for various reasons, and no protection leads us back to the classical problem of provision of public goods. With this in mind, a hypothesis is formulated based on Richard A. Posner's efficient common law hypothesis. Our hypothesis is that judges will tend to make liability rule decisions as it is socially efficient. This hypothesis is tested against court decisions on tables and compilations disputes from the earliest times to 1997 when a new database regime supersedes thereafter. Initial investigation shows that our hypothesis is rejected, and that in most cases, judges choose property rule over liability rule. The possible reasons for this anomaly is explored.

1. Introduction

Informational goods such as copyrightable works exhibit public goods characteristics, namely nonexcludability and inexhaustibility in consumption (Gordon and Bone 2000), causing them to be susceptible to the free-riding. Unfortunately, the theory of public goods postulates, that when free-riding occurs, there will be insufficient incentive for authors and creators to invest in creating their works. Hence, the provision of goods is a form of market failure requiring the state intervenes, which may come in various forms.

For example, the state may subsidize authors and creators through tax revenue, or that a race with a prize may be held every time a work is required. Alternatively, the state may use law to create a special kind of property in informational goods with the powers to legally exclude non-paying users. Ultimately, it is this special kind of proprietarisation which is presently adopted to resolve the market failure in provision of informational goods such as copyrightable works. In other words, copyright law is a law which creates properties out of nonexcludable and inexhaustible creations.

It is the contention of this paper that although copyright law is an optimal mechanism to resolve the problem of public goods provision in most cases, special circumstances may arise where secondary market failures are prevalent. The genesis of these secondary market failures, termed here as copyright failures, are examined here in detail.

Part 1. Nature of Copyright Protection

2. The Abstraction Process

In an earlier paper, I show that copyrighted works are divisible into levels of abstraction, at both the expression and the ideas dimension of the works (Khong [2004]). The lower levels of abstraction contain common and general elements, while the higher levels of abstraction contain unique and detailed elements. For example, at the expression dimension of a text, the lower levels of abstraction consist of the letters of the alphabets, words, and short phrases; and the higher levels of abstraction consist of sentences, paragraphs, pages and chapters of text. Similarly at the idea dimension, the lowest level of abstraction consists of the genre or a very general idea, and the highest level of abstraction consists of specific sequences of plots, scenes and instances of a story.

Case law shows that copyright doctrines create a protection divide where elements at lower levels of abstraction are not protected by copyright law, while elements at the higher levels of abstraction are protected. Further analysis shows that above the protection divide, there is possibly an inference divide which protects levels of abstraction by a first appropriation, strict-liability like rule. Therefore, if the idea of an inference divide holds, the levels of abstraction above the protection divide and below the inference divide are only protected so far as against appropriation but not against independent re-creation. This means that to prove infringement of a level of abstraction below the inference divide, extraneous evidence of actual copying or probable access has to be adduced.

The implication is that high levels of abstraction get strong copyright protection, and the lowest levels of abstraction get no protection at all. Substantial reuse by other authors of the elements at the lower levels of abstraction is thus made possible. Furthermore, it is observable that the more levels of abstraction are found below the protection divide, the more reusable it is of a copyrighted work by other authors.

3. Valuable Levels of Abstraction

Generally, consumers of copyright goods derive utility from using or enjoying the elements at high levels of abstraction, which are at the expression dimension, the idea dimension, or both. Authors having copyright in these elements may enjoy a stream of income from the sale of works containing thereof. Hence, these levels of abstraction are valuable levels of abstraction. The term ‘valuable levels of abstraction’ used herein refers only to those levels that increase the utility of consumers, but not those lower levels of abstraction which potentially may allow a right-holder to extract rent from second-comers. Hence, ‘valuable’ is only used here from the consumers’ perspective, and not that of the right-holder.

The valuable levels of abstraction may be protected by copyright law, or may be not protected by copyright law, depending on the relative positions of those levels of abstraction vis-à-vis the protection divide. Figure 1 shows a representation of six possible configurations of copyright protection. The black dots denote where the valuable levels of abstraction are relative to the protection and inference divide. The lower black lines are the protection divides and the upper black lines the inference

divides. Although Figure 1 shows all the configurations in a single dimension as opposed to the usual dual ideas and expression dimensions of copyright protection, it is sufficient representation for our purpose, as all the dimensions are collapsible into one in our model.

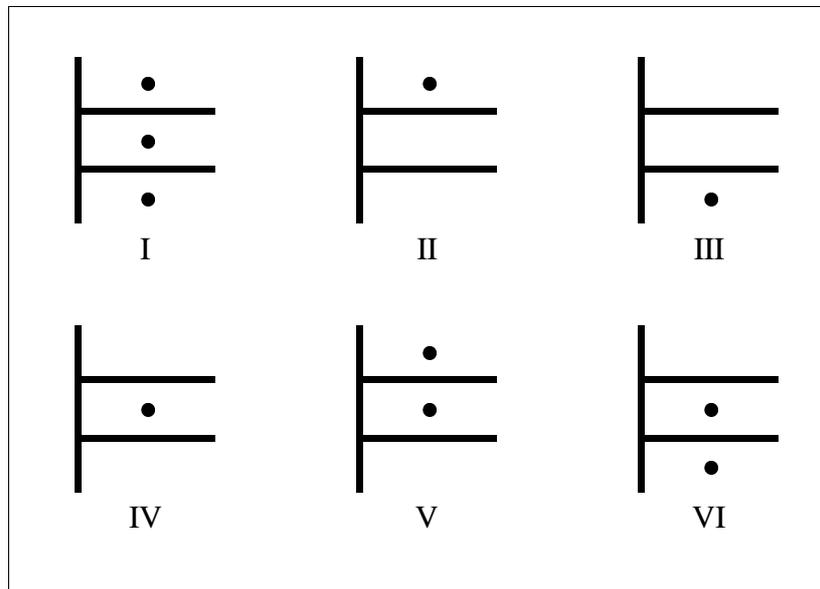


Figure 1 Valuable Levels of Abstraction

Configuration I in Figure 1 shows the case where the valuable levels of abstraction span across both the protection divide and inference divide. The valuable levels of abstraction below the protection divide allows for substitution of those levels, and the valuable levels of abstraction above the inference divide cannot be freely reused by competitors. Therefore, Configuration I represents a copyright market of imperfect substitutes with partial protection.

Configuration II shows a situation where all the valuable levels of abstraction are above the inference divide. In such a case, there is no meaningful substitutes from competitors, and the market can be characterised as a monopoly with complete copyright protection. Configuration III shows the other extreme. All valuable levels of abstraction are below the protection divide. There is no meaningful copyright protection to the works in this market. Thus, here is potentially a market with perfect substitutes from different producers.

When some valuable levels of abstraction fall between the protection divide and inference divide, whether these levels are protected strongly—monopolistically—or weakly—competitively—depends on their likelihood of coincidental similarity, i.e. how likely can the elements be re-constructed independently without having prior access to another work. If the likelihood of coincidental similarity is low, these valuable levels of abstraction will be strongly protected as in the case of a monopoly. On the other hand, if the likelihood of coincidental similarity is high, such as for factual content, they will be weakly protected, as if they are competitively available to all. Such is the case of Configuration IV, and also, the middle regions in Configurations I, V, and VI.

Partial protection as represented in Configuration I may be further illustrated by two examples. In the first, we have the case of an economics textbook. We find that copyright law protects how the author expresses his content in each paragraph, and the sequence of appearance each of the specific idea. What is not protected is the knowledge of economics in the idea dimension. The textbook is only partially protected by copyright, so far as to the wordings of each paragraph, but not to the knowledge in its content. In the second case, we have a play. Similar to the textbook case, the wordings in a large chunk, and specific sequence and details of each scenes may be protected by copyright law. But the general idea of the play is not protected. Even the idea of a specific scene may be not protected. Likewise, a play is only partially protected by copyright law.

Partial protection by copyright law may give rise to substitutes which are dissimilar in appearance, but partially similar in content. Competitors may reuse to some extent those parts of a work which are not protected or falling under the protection divide. As a result of the dissimilarity in appearance, these works are likely to be imperfect substitutes.

If all the valuable levels of abstraction lie above the protection divide, or more particularly above the inference divide as in the case of Configuration II, a complete protection results. In such a case, there is no substitutes by competitors. An related example is technical specifications, especially in the case of computer-related technology. In *Data Access Corporation v. Powerflex Services Pty. Ltd. & Ors.*, the High Court of Australia affirmed the decision of the Full Court of the Federal Court of Australia, that a specially created table of codes known as a Huffman Compression Table, used in an application development system, is protected by copyright, even though its reproduction in a competing system is necessary to achieve interoperability. The court acknowledged thus that “[the finding] may ... have wider ramifications for anyone who seeks to produce a computer program that is compatible with a program produced by others,” but it resisted from interfering with the law as it thinks that “these are ... matters that can be resolved only by the legislature reconsidering and, if it thinks it necessary or desirable, rewriting the whole of the provisions that deal with copyright in computer programs.” Since the compression table is a key component of the appellant system, providing complete protection thereto will render competing software non-substitutes if lock-in effect is taken into account. Even if lock-in effect is disregarded, competing products may only be considered as partial but imperfect substitute.

Complete protection may also happen in the case of compilations of information, when such compilations are sourced from one organisation. In *British Broadcasting Company v. Wireless League Gazette Publishing Company*, Astbury J. held that the defendant publisher was infringing the plaintiff’s copyright in television programme listings by incorporating them in its weekly entertainment magazine. Since the court found that the whole of the listing is protected, the defendant could not create a substitute product without infringing on the plaintiff’s copyright. Hence, copyright protection in such cases is complete.

The flipside of complete protection is no protection. This happens when the valuable levels of abstraction are below the protection divide, as represented by Configuration III. In *Feist Publications, Inc. v. Rural Telephone Service Co., Inc.*, the United States Supreme Court denied copyright protection to a telephone directory on

the ground that the subscribers' details are facts and not capable of copyright protection, that there is no creativity in the selection of entries since selection is wholesale, and that there is no creativity in the arrangement either since the listings are in plain vanilla alphabetical order. The peculiar situation caused by this decision is that some valuable and socially useful works such as directories may be denied copyright protection.

In conclusion, three possible situations may be envisaged by the operation of copyright law: partial protection, complete protection, and no protection, although different countries' copyright law may give rise to slightly different effects, such as in the United Kingdom, there are less occurrences of 'no protection' situations because of lower threshold for copyright protection. The economic implications of the three positions of copyright protection will be subject to further examination below. Furthermore, it is suggested here that a secondary market failure, which I term 'copyright failure', results when when there is complete or no copyright protection.

Part 2. Economic Implications

4. Copyright Market

The three possible situations of copyright protection may lead to three types of market for copyright goods. Partial copyright protection give rise to a market of imperfect substitutes, complete copyright protection to a market with no substitute, and no copyright protection to a market of perfect substitutes. These three market conditions will be analysed in respect of copyright works.

For the purpose of this paper, a stylised characterisation of a work is one with a fixed cost of creation, and zero or constant marginal cost of reproduction (see Arrow 1962). Consequentially, the average total cost is ever decreasing, and thus justifies preventing the duplicative effort to re-create the same work. However, this conclusion says nothing about allowing competitors to free-ride on the initial cost of creation.

A second consideration to the analysis is that society incurs a risk of court error whenever the courts could not differentiate between an author who independently creates an evidentially similar work to an earlier author, and one who free-rides on the latter by copying. Therefore, copyright law is generally developed in such a way as to minimise the occurrences of court error. In a sense, it can be said that copyright law promotes evidentially dissimilar works, and discourages the duplicative creation of evidentially similar works.

5. Imperfect Substitution

When copyright law provides partial protection to the valuable levels of abstraction, a market of imperfect substitutes appear. This happens when copyright law protects high levels of abstractions in the expression, and gives thin protection to the ideas, so that competing works may provide substitution in the ideas, but imperfect substitution or some differentiation in the expression.

The welfare analysis of such a market, absence concrete empirical data on a specific category of works, is at best indeterminate. It is possible that the unregulated market will produce too many variations of the same theme (Abramowicz [2003]). On

the other hand, competition albeit imperfectly may potentially drive down prices and drives up quality, and inducing dynamic efficiency (Yoo 2004). Competition at least has the effect of increasing consumer surplus by reducing the size of deadweight loss.

A copyright market of imperfect substitutes with evidentially dissimilar works have the additional advantage of reducing the risk of court error. Also, duplicative sunk costs of creation is likely to be prevented as each work seeks to be different from the others. It would seem that partial copyright protection leading to a market of imperfect substitutes is a good solution to the public goods problem in informational goods.

6. No Substitution

When copyright law provides complete protection to all the valuable levels of abstraction in a work, it creates a monopoly market with no substitute. The author or copyright owner will then be able to charge a monopoly price and earn super-normal profit with no threat from competition. From a welfare point of view, it is a form of market failure, where potential consumers who are not willing to pay the monopoly price are unable to consumer the good even though their willingness to pay is higher than the marginal cost of provision. This loss of potential consumption is the proverbial deadweight loss associated with monopoly pricing.

7. Perfect Substitution

When copyright law affords no protection over valuable levels of abstraction, free-riders may enter into the market by reproducing what was created without incurring the same fixed cost of creation. By not having the pressure to recoup a fixed cost of creation, these free riders may charge a price as low as their marginal cost. Since, the original creator has to charge at least its average total cost to recover its investment, it will not be able to compete with the free-riders. Hence, there is less incentive *ex-ante* to invest in the creation of work unless there are supplemental ways to out compete the free-riders. This brings us back to to the problem of suboptimal provision of public goods, which is another traditional form of market failure.

It would seem that contrary to the traditional tenets of neo-classical economics, perfect competition in a market of perfect substitutes with no copyright protection is inefficient. Even with copyright protection and allowing independent recreation, a market of perfect substitutes is still inefficient owing to the natural monopoly characteristics of each copyrighted work. In addition, the risk of court error is ever present when protecting evidentially similar works.

Part 3. Copyright Failure

8. Copyright Failure Defined

Although copyright protection generally leads to efficient markets with imperfect substitutes, under certain conditions, it may lead to secondary market failures. The market failure arising from the operation of copyright law, conveniently termed here as ‘copyright failure’, is defined as a market failure stemming from the operation of copyright law. Type 1 copyright failure is related to monopoly power, when copyright

law protects completely all valuable levels of abstraction in a work, causing no non-infringing substitutes to appear in the market for a copyright good. Type 2 copyright failure happens when copyright law under-protects the valuable levels of abstraction in a work, causing free-riding perfect substitutes to appear. This market failure is similar to the provision of public goods problem.

A further Type 3 copyright failure may be described, when copyright law causes independent reconstruction of a similar copyrighted work. This failure has two aspects: the duplicative sunk cost in reconstruction, and the risk of court error in determining whether there was independent reconstruction or merely unlawful appropriation. This type of copyright failure is also a market failure because of the decreasing average cost of a copyrighted work, and thus does not justify the unregulated market supporting duplicative sunk costs.

9. Copyright Failure in Databases

Databases as compilations of information pose peculiar problems in copyright law. Unlike other written works such as novels or textbooks which exhibits the characteristics of a market of imperfect substitutes, copyright protection of databases generally leads to a few types of copyright failures. These failures are caused by the inherent factual nature of databases, and to further understand the causes of copyright failure in databases, all databases need to be differentiated into three types.

The first type of database is the sole-sourced or private-sourced databases. In this type of database, the creator makes his list of content, either randomly, based on some personal preferences, or after research based on his own requirements. The contents of his database are unique to himself, and highly unlikely to be independently reconstructible by others. The contents of the database, may or may not relate to an event or phenomenon post-construction. Nevertheless, in this type of database, the database is most valuable before happening of an associated event, such as a broadcast or a race, and this value diminishes rapidly after the event. Therefore, even if other producers may observe the event independent of the original database, reconstruction of such a database has little value to other producers. Examples of this type of database are the television programming and horse racing schedules. Television programmings and horse racing schedules, as databases, have the most value before the broadcast or the race. Although other producers may reconstruct such databases, if legally allowed, after observing the event of the broadcast or the race, it will be valueless by then. Thus, the creator is the sole or private source of this type of databases.

The second type of database is what is called quasi-public sourced database. Unlike, sole-sourced databases where their values diminish after happening of an event relating to the contents, the value in the database remains at all times. Therefore, if not legally prevented, other producers may have incentive to reconstruct the database either by copying or by independently observing the related events. Examples of this type of database are bank and social security number, telephone directories, professional or accreditation list by the regulatory bodies, and street directory by the planning body of the city council. The normal situation is that the database is a by-product creation of another activity, and creator enjoys economies of scope. Thus, it is common that a creator of a quasi-public sourced database has substantial cost advantage compared to other producers.

The third type of database is the public-sourced database. In this type of databases, the contents are found in publicly observable events or phenomena. Therefore, different producers may independently or concurrently compile the same database. No producer has any cost advantage over the other, although some producers may have some technological or financial endowment which make them more likely to be successful in compiling the database. Examples of this type of database are maps, astronomical, geographical and meteorological data.

These three types of databases may be analysed against the different configurations of copyright protection in Figure 1. Configuration I has to be ruled out because it is not a probable configuration due to the factual nature of databases. This is because the content of a database can only be described as a single level of abstraction. Furthermore, for simplicity sake, Configurations V and VI are not considered here as their implications are potentially indeterminate, depending on the implications of protecting the middle region.

Table 1 tabulates the different types of databases against three configurations of copyright protection and derives the possible economic implications. It can be observed that a no protection strategy—Configuration III—always lead to a suboptimal provision problem—Type 2 copyright failure—as long as the fixed cost of creation is higher than the cost of reproduction.

<i>Configuration Type</i>	<i>Database Type</i>		
	<i>Sole-Sourced</i>	<i>Quasi-Public Sourced</i>	<i>Public Sourced</i>
II	Type 1	Type 1	Type 3
IV	Type 1	Types 1, 3	Types 2, 3
III	Type 2	Type 2	Type 2

Table 1 Copyright Failure in Databases

When copyright protection is complete as in Configuration II in a sole-sourced database, a monopoly is created, leading to a Type 1 copyright failure. Allowing non-infringing independent re-creation is useless in this type of database because the content is highly unique to the copyright owner, and cannot be independently re-created. Thus Configuration IV also leads to a Type 1 copyright failure.

When copyright protection is complete in a quasi-public sourced database, the situation is the same as in a sole-sourced database. Competitors may not reconstruct a database indirectly from public source information. The advantage of this strategy is that a Type 3 copyright failure is avoided. The disadvantage is that potentially a Type 1 copyright failure occurs. On the other hand, when protection is of Configuration IV, a Type 1 copyright failure may still appear because of the absolute cost advantage of the first creator, but when competitors independently re-create the database, a Type 3 copyright failure appears.

In public-sourced databases, the predominant feature is Type 3 copyright failure. This is because it is socially optimal to have one party incur the fixed cost of creation, while the others save on this cost by relying on what the first compiler has incurred. Absence other evidential tools to detect illegal copying, compilers may have

disincentive to compile public-sourced databases for fear of free-riders. Thus Type 2 copyright failure may also appear.

In conclusion, legal protection of databases seem to be shrouded with economic market failures, for whatever the type of database, and for whatever protection strategies. Perhaps, protection of database through a pure property rule strategy is not optimal, and a liability rule remedy may cure some of the failures.

10. Solution for Copyright Failure

The existence of copyright failures should not paint a gloomy picture on the system of copyright law. Indeed there possibly exist remedies to overcome situations of copyright failure. One possible solution is a liability rule remedy.

A liability rule remedy is one where an injunction is not granted, but that a person is permitted to infringe the copyright owner's right provided that compensation is said. A liability rule remedy can be priced at zero or at a value greater than zero. A zero-priced liability rule remedy means that there is no infringement, or that there is no protection for the work or portion of that work in question. A zero-priced liability rule remedy is not uncommon in copyright. The merger doctrine in US copyright law is often evoked to exclude from protection elements which may give rise to technological network effect. The rule not to protect facts and expressions thereof can also be seen as an attempt to solve a copyright failure in compilations and databases.

A zero-priced liability rule has the advantage of dispensing with the cost of determining the quantum of compensation. Also, once a rule has been established that a zero-cost liability rule applies, subsequent producers may rely on earlier works to come up with competing substitutes. The drawback of a zero-priced liability rule is that it may possibly lead to sub-optimal level of incentive to create, i.e. a Type 2 copyright failure.

The alternative to a zero-priced liability rule is a normal liability rule where compensation only is payable. One ex-ante variation of this is a compulsory licensing scheme. Unfortunately compulsory licensing as a judicial remedy is not common. Unless specifically provided by statute, courts normally do not provide compensation in lieu of an injunction and delivery up. A major reason could be that since a copyright is a unique object, and one with a public good characteristic no less, it is often difficult for a judge to determine a 'fair' price for liability rule compensation. This difficulty applies too to tribunals managing compulsory licensing schemes. Fortunately in the spirit of activism, some courts are beginning to temper traditional copyright remedy with competition law liability rule remedies (see the *Magill* case).

[Theoretical proof that normal liability rule is efficient, provided that compensation can be determined.]

As for a copyright failure because of a social network effect, a second best solution is to reduce the term of copyright protection. Where a copyrighted work may grow popular over time and attain the status of a classic, allowing the copyright to lapse into the public domain may be an efficient way to minimise, to a certain extent, the monopoly effects of this copyright failure. Unfortunately, the current long length of copyright term may have little practical effect on popular titles which have a short appeal.

11. Hypothesis

Some years ago, Richard A. Posner (1977) put forward an efficient common law hypothesis. Paraphrased by Michelman (1979, 309), this hypothesis suggests that court decisions, “taken as a whole, tend to look as though they were chosen, with a view to maximizing social wealth (economic output as measured by price) by judges subscribing to a certain set of (‘microeconomic’) theoretical principles”. Judges, as the hypothesis predicts, will tend to unconsciously choose legal positions and make decisions which maximize social wealth.

Henceforth, if the efficient common law hypothesis holds in our copyright failure problem, we shall observe the same effect whereby judges often grant liability rule remedies in tables and compilations cases, because liability rule is the efficient remedy. This hypothesis may be tested by British court decision from the earliest times to 1997 when a new database regime takes over thereafter. For the purpose of this testing, 45 cases, labelled accordingly in Appendix A, are identified and divided into the three types of databases described above. Within the public sourced database, a special category is identified where the selection of content is not wholesale but involves individual creativity in its selection or composition. Also, indicated in the public source databases category is whether the database owner can be characterised as the ‘cheapest cost compiler’ because of his unique position.

12. Results

Of the 45 cases examined, only one of the decisions partially resembles a liability rule remedy. Five sole-sourced databases were examined: one granted an injunction (A2), two interlocutory injunctions (A4, A5), one was held to have no copyright (A1), and another with copyright declared but no injunctive remedy for the potential future injunction was unknown (A3). This last case is to be contrasted with another case with similar circumstances (A45), namely unknown future football lists, where an injunction was granted. In one case where an interlocutory injunction was granted (A4), it was noted that a licensing scheme for the database was available.

Seven quasi-public source database cases were examined. All but one had an injunction granted. In the one where the Appeal Court found no infringement (A12), it was because the defendant claimed to have obtained the information from the physical components sold by the plaintiff instead of copying straight from the plaintiff’s database. This is a case where “reverse-engineering” of information is allowed. In all but one cases, there were substantial network effect in the use of the information, *e.g.* telegraphic codes, shorthand codes, and compatible after-market components for cutter-crush machines.

In the category of public source databases, excluding those with creative or unique selection or composition of data, 29 cases were investigated. The remedies ordered were more varied. Fourteen injunctions were ordered or maintained. Two preliminary or interlocutory injunctions ordered. Nine cases were dismissed or found to be not infringing, partly on the ground that the database is not protected by copyright. Two cases were referred to a jury or an arbitrator with no result reported. In one single case, nominal damages were ordered on the ground that the defendant contributed substantial improvement to the work copied (A18); and another had only damages as there is no more potential future infringement of the said matter (A36).

Nevertheless, case A36 cannot be strictly termed as a liability rule remedy in a copyright sense, because it does not cover future use of the copyright material.

As for public-source database exhibiting creative or unique selection or composition of information, three cases had injunctions granted, while one was held not to be entitled copyright protection (A44).

The cases examined suggest that property rule remedies in the form of injunctions are the predominant results in sole-sourced, quasi-public sourced databases, and public-sourced databases with creative selection. General public-source databases show a mixed result with injunctions granted slightly more often than when infringement of copyright was rejected. A careful examination of public-sourced database cases further shows a general trend of granting of injunction against infringement after (A24) *Kelly v. Morris* (1866) .

In conclusion, the hypothesis that courts will grant efficient solution in the form of a liability rule remedy is rejected. This finding however must be qualified, as it does not wholly reject the Posner's efficient common law hypothesis, but only in regards tables and compilations cases.

13. Discussion

There are a few possible explanations for the results obtained. First, almost all the cases on tables and compilations are heard in the Court of Chancery or the equity court. Traditionally, this court is an alternative to the king's bench or queen's bench which provides the common law remedy of damages. The Chancery on the other hand provides injunctions as remedies, and accounts of profits following an injunction.

The second reason is that of path-dependence. Courts in England are bound by the doctrine of *stare decisis*, which means that courts are obliged to follow the same reasonings in earlier decisions. Since the earliest copyright infringement cases, injunctions have been granted in the Chancery. Hence, the court follows what have been decided.

The third possible explanation is that it is difficult to compute damages in the case of copyright infringement, especially for potential prospective use. In most cases, each copyrighted work is a unique work with no perfect substitute in the market. Hence there is no equivalent price to determine compensation. Also, the copyright owner might not be willing to divulge its own accounts for the court to assess compensation.

14. Conclusion

In this paper, we first define the term valuable levels of abstraction. Taking that copyright protection creates two divides—the protection divide and the inference divide—around the valuable levels of abstraction, we show that there can be a possible six configurations of copyright protection. Within these six configurations, there can be a partial copyright protection, a complete copyright protection, or no copyright protection. Partial copyright protection leads to a market of imperfect substitutes, which some literature shows is dynamically efficient given the public good nature of copyright goods. Complete copyright protection on the other hand leads to monopoly, which we term Type 1 copyright failure. Insufficient or no

copyright protection of the valuable levels of abstraction leads to a market of perfect substitutes, and resurface the problem of provision of public goods, which we term Type 2 copyright failure. Further more, the wasteful nature of duplicative sunk costs to independently re-create an evidentially similar work, and its related evidential conundrum are causes of another form of copyright failure. These three forms of copyright failure can generally be identified as market failures stemming from the operation of copyright law.

In the main, we show that databases as a category of informational goods suffer from the problems of copyright failure of all three types, depending on the type of database and the form of protection. For this purpose, we identify three types of databases: sole-sourced databases, quasi-public sourced databases, and public-sourced databases. These three types of databases are analysed against three different configurations of copyright protection. These copyright failures in databases can be efficiently remedied by a liability rule.

At the end, we test a hypothesis that common law courts will make efficient decisions by granting liability rule remedies, by examining 45 decided British cases on tables and compilations of information. The results reject the hypothesis as most cases ended with an injunction, *i.e.* a property rule remedy. Three possible reasons for this findings are offered.

References

- Abramowicz, Michael. [2003.] Copyright redundancy. George Mason University School of Law, Law and Economics Working Paper Series, paper 03-03.
- Arrow, Kenneth J. 1962. Economic welfare and the allocation of resources for invention. In *The Rate and Direction of Economic Activity*, ed. R.R. Nelson, 609–626. Princeton: Princeton University Press.
- Gordon, Wendy J., and Robert Bone. 2000. Copyright. In *Encyclopedia of Law & Economics, Vol. 2: Civil Law and Economics*, ed. Boudwijn Bouckaert and Gerrit De Geest, 189–215. Cheltenham: Edward Elgar.
- Khong, Dennis W. K. [2004.] Copyright doctrines and court error. Paper presented at Midterm Workshop in Law and Economics, 13 February, University of Bologna, Italy.
- Michelman, Frank I. 1979. A comment on “Some uses and abuses of economics in law”. *University of Chicago Law Review* 46: 307–315.
- Posner, Richard A. 1977. *Economic analysis of law*, 2d ed. Boston: Little, Brown & Co.
- Yoo, Christopher S. 2004. Copyright and product differentiation. *New York University Law Review* 79.

Cases

British Broadcasting Company v. Wireless League Gazette Publishing Company [1926] Ch 433.

Data Access Corporation v. Powerflex Services Pty. Ltd. & Ors. [1999] HCA 49 (High Court of Australia).

Feist Publications, Inc. v. Rural Telephone Service Co., Inc., 499 US 340 (1991).

Lotus Development Corporation v. Borland International, Inc., 49 F.3d 807 (1995).

Radio Telefis Eireann and Anor. v. European Commission (Intellectual Property Owners Inc and another intervening) (Magill case) ECR [1995] I-0743, [1995] All ER 416, [1995] FSR 530 (ECJ, 6 April 1995).

Synercom Technology v. University Computing Co., 462 F.Supp 1003 (ND Tex. 1978).

Appendix A

Sole Source Databases

<i>Case Name</i>	<i>Summary</i>	<i>Remedy</i>
[A1] <i>Greyhound Racing Association, Ltd. v. Shallis</i> [1923-28] MCC 370.	List of starting position of racing greyhounds, created from random balloting.	No copyright.
[A2] <i>British Broadcasting Company v. Wireless League Gazette Publishing Company</i> [1926] 1 Ch 433 (Ch 1926).	Television programming.	Injunction granted.
[A3] <i>Football League Ltd. v. Littlewood Pools Ltd.</i> [1959] 1 Ch 637 (Ch 1959).	Chronological list of football matches.	Copyright declared, though no injunction for past infringement, and no new lists yet for further matches.
[A4] <i>Independent Television Publications Limited v. Time Out Limited and Elliott</i> [1984] FSR 64 (CA 1983).	Television programming. Licensing scheme available.	Interlocutory injunction granted.
[A5] <i>Express Newspapers Plc. v. Liverpool Daily Post & Echo Plc. and Others</i> [1985] 3 All ER 680, [1985] FSR 306.	Newspaper contest results.	Interlocutory injunction granted.

Quasi-Public Source Databases

<i>Case Name</i>	<i>Summary</i>	<i>Remedy</i>
[A6] <i>Pitman v. Hine</i> (1884) 1 TLR 39 (QB 1994).	Shorthand codes.	Injunction granted.
[A7] <i>Ager v. Peninsular and Oriental Steam Navigation Co.</i> (1884) LR 26 Ch D 637.	Telegraphic code. Defendant, using the plaintiff's code, compiled a book for their agents' internal use.	Injunction granted.

<i>Case Name</i>	<i>Summary</i>	<i>Remedy</i>
[A8] <i>Ager v. Collingridge</i> (1886) 2 TLR 291.	Telegraphic code. Defendant, using the plaintiff's code, compiled a book for their agents' internal use.	Injunction granted.
[A9] <i>Exchange Telegraph Company Limited v. Gregory & Co.</i> [1896] 1 QB 147 (CA 1895).	Stock exchange information supplied to plaintiff. Defendant obtained information from plaintiff and publish it before plaintiff's publication.	Injunction granted.
[A10] <i>D. P. Anderson & Co. Ltd. v. Lieber Code Co.</i> [1917] 2 KB 469.	Telegraphic code.	Injunction granted.
[A11] <i>Masson Seeley v. Embosotype</i> (1924) 41 RPC 160.	Catalogue of cuttercrush machines, types, etc. Defendant competitor publish a catalogue with same information and description.	Injunction granted.
[A12] <i>Purefoy Engineering Co. v. Sykes Boxall & Co.</i> (1955) 72 RPC 89-106 (CA 1955).	Code numbers for standard parts. Defendant contended that information was taken from the parts themselves.	No infringement.

Public Source Databases

<i>Case Name</i>	<i>Summary</i>	<i>Remedy</i>
[A13] <i>Taylor v. Bayne</i> (1776) 10 Mor. Dict. (Morison's Dictionary of Decisions (Scot.)) 8308 (Scotland). (1776) 10 Mor. Dict. App. 7.	Road book. Piracy proved.	Interdict granted.
[A14] <i>Sayre and Others v. Moore</i> (1785) 1 East. 361n; 102 ER 139–140.	Sea charts. Defendant copied and made alterations and improvements. Plaintiff's map inferior to defendant's.	No infringement.

<i>Case Name</i>	<i>Summary</i>	<i>Remedy</i>
[A15] <i>Carnan v. Bowles</i> (1786) 2 Bro. C. C. 80; 29 ER 45-48. (1786) 1 Cox 283; 29 ER 1168-1169.	Plaintiff's road book in letter-press. Defendant published great roads in copper-plate and cross-roads in letter-press. Both editions made by the same author.	Injunction subsequently dissolved, thinking that the second work though contained copied matter, is original in itself.
[A16] <i>Trusler v. Murray</i> (1789) 1 East. 363n; 102 ER 140-141.	Book of chronology.	Case referred to arbitrator for comparison. Copying not allowed.
[A17] <i>Cary v. Faden</i> (1799) 5 Ves. Jun. 24; 31 ER 453-454.	Road book. Errors copied, though with improvements. Plaintiff's book copied from defendant's earlier edition, and defendant copied from plaintiff's.	No order made.
[A18] <i>Cary v. Longman & Rees</i> (1801) 1 East 358; 102 ER 138-140. 3 Esp. 273; 170 ER 613-614.	Road book. Plaintiff's book copied from earlier work with improvements.	Nominal damages.
[A19] <i>Cary v. Kearsley</i> (1802) 4 Esp. 168; 170 ER 679-680.	Road book.	Case reverted to jury, on whether copying was to make a new book with new arrangement of matter, or colourably to steal the plaintiff's copyright.
[A20] <i>Matthewson v. Stockdale</i> (1806) 12 Ves. Jun. 270; 33 ER 103-106.	East India Calendar, containing names and appointments on the Indian Establishment. Plaintiffs, being the clerks in the India House, are the cheapest cost compilers.	Injunction maintained.
[A21] <i>Longman v. Winchester</i> (1809) 16 Ves. Jun. 269; 33 ER 987-988.	Court calendar. Copying admitted.	Injunction granted.
[A22] <i>Baily v. Taylor</i> (1829) 1 Russ. & M. 73; 39 ER 28.	Leases and annuities tables, which can be calculated in a few hours' time.	Injunction refused. Plaintiff at liberty to claim suit in court of law.
[A23] <i>Nichols v. Loder</i> (1831) 2 Coop. T. Cott. 217; 47 ER 1135.	Map of canals and railroads. No piracy proved.	Injunction refused.

<i>Case Name</i>	<i>Summary</i>	<i>Remedy</i>
[A24] <i>Kelly v. Morris</i> (1866) LR 1 Eq 697.	London directory. Defendant copied some information from plaintiff's directory.	Injunction granted against those parts copied.
[A25] <i>Scott v. Stanford</i> (1867) LR 3 Eq 718.	Coal import statistics. Plaintiff cheapest cost compiler.	Injunction granted.
[A26] <i>Morris v. Ashbee</i> (1868) LR 7 Eq 34.	Business directory.	Injunction granted against the list of names.
[A27] <i>Cox v. Land and Water Journal Company</i> (1869) LR 9 Eq 324.	List of hounds.	Preliminary injunction refused.
[A28] <i>Morris v. Wright</i> (1870) LR 5 Ch App 279.	Business directory. Defendant used plaintiff's information for verification.	Preliminary injunction maintained.
[A29] <i>Cobbett v. Woodward</i> (1872) LR 14 Eq 407.	Catalogue with description of furniture. Partial copying proven.	Plaintiff entitled to injunction against synopsis, but not description of common articles.
[A30] <i>Grace v. Newman</i> (1872) LR 19 Eq 623.	Catalogue of cemetery headstones. Defendant copied from plaintiff's.	Injunction granted.
[A31] <i>Maple & Co. v. Junior Army and Navy Stores</i> (1882) LR 21 Ch 369 (CA).	Catalogue of furniture, with original engravings. Defendant copied from plaintiff's.	Injunction maintained.
[A32] <i>Trade Auxiliary Company v. Middlesborough and District Tradesmen's Protection Association</i> (1888) 40 Ch 425 (CA 1889).	Lists of registered bills of sales and deed of arrangement. Defendant copied plaintiff's fictitious entries.	Injunction maintained.
[A33] <i>Cate v. Devon and Exeter Constitutional Newspaper Company</i> (1889) 40 Ch 500.	Lists of bankruptcies, bills of sale, etc.	Injunction granted.
[A34] <i>Leslie v. J. Young & Sons</i> [1894] AC 335 (HL 1894).	Republication of railway time table from plaintiff's book. Copying admitted.	No liability.

<i>Case Name</i>	<i>Summary</i>	<i>Remedy</i>
[A35] <i>Weatherby & Sons v. International Horse Agency and Exchange, Limited</i> [1910] 2 Ch 297.	Stud book with list of brood mares.	Plaintiff entitled to succeed in the action. An action to restrain infringement of copyright would lie though no damage was shewn.
[A36] <i>H. Blacklock & Co. v. C. Arthur Pearson</i> [1915] 2 Ch 376 (Ch 1915).	List of railway stations, for use in defendant's competition.	No injunction but only damages, as competition was over.
[A37] <i>G. A. Cramp & Sons, Limited v. Frank Smythson, Limited</i> [1944] AC 329, [1944] 2 All ER 92 (HL 1944).	Tables in pocket diary.	No copyright.
[A38] <i>Elanco Products Limited and Another v. Mandops (Agrochemical Specialists) Limited and Another</i> [1979] FSR 46, [1980] 8 RPC 213 (CA 1978).	Instruction on use of herbicide. Patent on herbicide expired. Defendant's label contains same data but in a different format and language. Most data could be traced to a public source.	Interlocutory injunction granted.
[A39] <i>Waterlow Publishers Ltd. v. Rose</i> (1990) 17 IPR 493, [1995] FSR 207 (CA 1989).	Directory of practising solicitors. Plaintiff has access to cheapest cost compiler, the Law Society.	Infringement upheld, although the data had been checked, verified or updated before insertion in the defendant's directory.
[A40] <i>Waterlow Directories Limited v. Reed Information Services Limited</i> (1990) 20 IPR 69, [1992] FSR 409 (Ch 1990).	Directory of barristers and solicitors. Defendant entered names from plaintiff's directory into a word processor and sent letters to said persons to invite them to be included in defendant's directory. Plaintiff has access to cheapest cost compiler, the Law Society.	Injunction granted.

<i>Case Name</i>	<i>Summary</i>	<i>Remedy</i>
[A41] <i>VNU Business Publications BV v. Ziff Davis (UK) Limited</i> [1992] RPC 269.	Directory of corporate computer users and suppliers, for use as mailing list, with seed entries. Plaintiff refused to disclose identity of seed entries.	Interlocutory order for the defendant.

Public Source Databases With Creative/Unique Selection/Composition

<i>Case Name</i>	<i>Summary</i>	<i>Remedy</i>
[A42] <i>Hotten v. Arthur</i> (1863) 1 H & M 603; 71 ER 264.	Catalogue of books with original anecdotes and descriptions.	Injunction granted.
[A43] <i>Mack v. Petter</i> (1872) LR 14 Eq 431.	Birthday scripture text book. Daily bible quotes in birthday diary.	Injunction granted.
[A44] <i>Chilton v. Progress Printing and Publishing Company</i> [1895] 2 Ch 29 (CA 1895).	Selected predictions of winning horses.	No copyright.
[A45] <i>Ladbroke (Football), Ltd v. William Hill (Football), Ltd.</i> [1964] 1 All ER 465, [1964] 1 WLR 273 (HC 1964).	Football betting coupons. Substantial copying proven.	Injunction maintained.