# 2 Rationale for patents and associated safeguards

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| Key points |
| * Without public intervention, inventors may have inadequate incentives to undertake the level of innovation that is optimal from society’s viewpoint. * This can occur if those producing innovations are unable to capture sufficient benefits from their inventions to cover their costs. * Measures to address this problem include establishing property rights (the issuance of patents), subsidies for research and development, and research prizes. * A patent is a legally-enforceable right to exclude others from commercially exploiting a device, substance, method or process that is new, inventive, and useful at the time the patent was granted. * In the design of a patents system, there is a tradeoff between encouraging innovation on the one hand, and facilitating adoption of inventions on the other. * The right to exclude others from using a patented invention is central to providing innovators with a means to benefit financially from their efforts, but it can also hinder adoption of the invention. * In cases where there are no substitutes for an invention, a patent could also facilitate monopolistic and/or anticompetitive behaviour. Safeguards are typically built into a patents system to limit its potential shortcomings. They can be divided into two broad groups. * Ex ante safeguards are applied before a patent is granted, and include a threshold test (that seeks to restrict patents to truly innovative ideas) and a fixed patent duration (to limit the time that people can be excluded from using inventions). Limited technological exemptions also exist. * Ex post safeguards (which include compulsory licensing) apply after a patent is granted, and are generally invoked in exceptional circumstances where patent exclusivity is inconsistent with upholding the general interest of the community. |
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## 1 Why have a patents system?

In the absence of public intervention, private incentives to undertake innovation can be inadequate, due to the ‘public good’ characteristics of innovative activity (Arrow 1962; PC 2007). The implication for economic policy is that mechanisms such as patents are required to allow innovators to capture a sufficient amount of the benefits to the community from their activity.

Innovative ideas are regarded as having the characteristics of a public good because they are ‘non-rival’, meaning that their use by one entity does not diminish the amount that can be consumed by other potential users (Gans, Williams and Briggs 2004). For instance, one car manufacturer’s use of the internal combustion engine does not impinge on the ability of other car manufacturers to use internal combustion engines in their cars. By contrast, use of a ‘rival’ good or service by one person, such as consuming a can of drink, reduces the amount of that good available for use by others.

An additional consideration is that of ‘non-excludability’. If a firm or other producer of a good is unable to exclude others from using it, then the good may be described as ‘non-excludable’. Innovative ideas that are in the public domain are typically regarded as possessing this characteristic, given the difficulty of preventing others from benefitting from them (in the absence of legal rights to prevent use unauthorised by the originator) (Encaoua, Guellec and Martinez 2006).

The optimal degree of innovation from society’s perspective occurs when the expected social benefits from additional innovation equal the expected social costs. If, however, innovators are unable to appropriate sufficient benefits from their activity, innovation may be less than socially optimal (Besen and Raskind 1991). This might occur, for instance, if new products could be easily replicated by rival producers, or if products (such as books and music) could be readily copied by consumers.

As detailed below, patents are one means of encouraging innovation that would not otherwise occur due to its public good characteristics. Patents systems have existed for a number of centuries in different parts of the world. A patents system existed in Venice in the fifteenth century. In England, the formal development of a patents system culminated in the Statute of Monopolies of 1623, which provided the first patents law of a modern nation. In the sixteenth and seventeenth centuries, the granting of exclusive rights to inventors was widespread in parts of central and western Europe. In the 1790s, patents legislation was introduced in France and the United States. The nineteenth century saw significant international growth in patents systems, with countries such as Austria, Russia, Belgium, Spain and Sweden all introducing patent laws in the first half of the century (Machlup and Penrose 1950).

In Australia, the first patents legislation was introduced in New South Wales, and came into force in 1854. The colony of Victoria followed with its own patents legislation in 1854 (State Library of Victoria 2012). The first national patents legislation was the *Patents Act 1903* (Cwlth), which was subsequently replaced by the *Patents Act 1952* (Cwlth) and then the current *Patents Act 1990* (Cwlth).

## 2 Options to foster innovation

A number of options for public policy to rectify a potential shortfall of innovation have been proposed, including establishing property rights (especially by issuing patents), and policies such as subsidised R&D, prizes for research activity, and research contracts (collectively referred to as rewards). Some researchers have also suggested private means for protecting intellectual property (IP) that may facilitate innovative activity.

### Establishing property rights

The traditional means used to provide individuals with the ability to appropriate at least some of the benefits of creative activity is to establish a system of IP rights. IP relates to creations of the mind, including industrial and other innovations, creative works (literary and visual) and software, as well as symbols, images, names and designs used in business (WIPO nd). It thus differs from other forms of property primarily on the basis of its intangibility, in that it embodies thoughts and knowledge created by people (Aoki and Small 2004; PC 2007). A property right over IP gives its owner the exclusive right to use the property covered by that right.

Gans, Williams and Briggs (2004) identified three key basic elements required for an effective system of property rights: establishment, enforcement, and exchange. Establishment refers to the ability of the legal framework to identify those in possession of property rights, while enforcement relates to the presence of a system able to enforce those rights (for example, through courts). Exchange concerns the ability of individuals to exchange property rights within the system at a non‑prohibitive cost. The presence of such a system enables trade to take place, and provide individuals and firms with the required incentives to create socially valuable assets (Gans, Williams and Briggs 2004).

With a means to permit the exclusion of others from using their creations, producers of IP may be able to capture sufficient benefit from their work to encourage productive activity. However, there is also potential for the creation of exclusive property rights to facilitate monopolistic or anticompetitive behaviour (Boldrin and Levine 2002; Romer 2002). This raises the issue of whether an IP rights system achieves a sufficient balance between facilitating creation on the one hand, and allowing IP to be sufficiently disseminated on the other (Besen and Raskind 1991; PC 2007).

A number of researchers have cautioned against the notion of automatically equating property rights with market power. Kitch (2000) for example, noted that the assumption that IP rights confer monopoly power on their owners is only true if those rights prevent others from providing substitute goods with the same functional characteristics as those protected by the IP rights. For instance, a pharmaceutical patent would only confer a monopoly on the patent holder if there were no alternative treatments available for the medical condition(s) in question. Kitch (2000) thus concluded that ‘whether a right or combination of rights, confers an economic monopoly is an empirical question’ (p. 1731).

Similarly, Gans, Williams and Briggs (2004) concluded that assignment of IP rights by itself, is unlikely to create monopoly power. They argued that monopoly problems may arise where the idea covered by strong IP rights is required as an input for the production of a distinct good. However, this requires the possibility of ‘demand‑side’ substitution to be ruled out (as noted by Kitch (2000) above). Furthermore, Gans, Williams and Briggs (2004) observed that ‘supply-side’ substitution, whereby alternative inputs to the one with exclusive rights are available for production, can help to reduce the extent to which any market power conferred by rights can be exercised.

Where the assignment of exclusive rights over an invention does create market power, the primary concern from the standpoint of public policy is not the existence of such power, but rather whether it is exercised to the detriment of economic efficiency and community benefit. These issues were given significant discussion in the Hilmer report on National Competition Policy (Hilmer, Rayner and Taperell 1993). The *Competition and Consumer Act 2010* (Cwlth) contains provisions relating to the misuse of market power and remedying anticompetitive conduct. Remedying anticompetitive conduct requires anticompetitive purpose in addition to the exercise of market power (chapter 6).

There are three main types of commonly used IP rights — patents, copyright, and trademarks. These are discussed below, in addition to IP rights provided for plant breeders.

#### Patents

A patent is ‘a right that is granted for any device, substance, method or process that is new, inventive, and useful’, that is legally enforceable, and gives the patent holder an exclusive right to ‘commercially exploit’ the innovation for the duration of the patent (IP Australia 2012g, p. 1). By creating an exclusive right over an invention, a patent is intended to overcome the ‘free riding’ problem associated with non‑excludability of innovative activity. In return for excludability, patent holders are required to disclose details of their invention. This benefits the community by reducing the likelihood of duplication of research effort, and facilitating improvements on the patented invention by others. As the Institute of Patent and Trade Mark attorneys observed of the rationale for patents:

… it is generally accepted that the patent system provides public benefits by stimulating investment in innovation and the commercialisation of the results of innovation. It does this by creating a piece of property comprised of specific exclusive rights with a limited life … In short, the grant of a patent stops or can be used to stop others from ‘free riding’ on the investment made for a limited period of time. (sub. 18, pp. 1–2)

The Patents Act establishes the conditions under which an invention may be eligible for a patent in Australia. The Australian patents system is discussed further in chapter 3 and appendix B.

A patent holder has a legal right to exclude innovations identical to its own from being produced and marketed.

Use of a patented innovation usually requires the permission of the patent holder, and such use can involve the payment of royalties to the party holding the patent. There are, however, often safeguards that allow a patented invention to be used without the owner’s permission in limited circumstances, including compulsory licensing (discussed below). When the term of a patent expires, the invention covered by the patent enters the public domain and can be used without the permission of the initial patent holder.

Not all patented inventions are commercially successful. This has implications for the pricing of inventions. A firm may need to set the price of its successful innovations at a level that recoups the cost of both successful and unsuccessful innovations.

#### Copyright

Copyright is another measure used to address IP related market failures. Its basic characteristics are described here, but are not discussed further, given the focus of this inquiry on patent issues.

Copyright focuses on artistic, musical, literary, software and dramatic works, often covering products such as films, books, and music. In Australia, copyright is automatic the moment an idea or creative concept is documented, and is covered by the *Copyright Act 1968* (Cwlth). Copyright protection does not protect an originator against the creation of similar work, but does give the copyright holder the exclusive right to license others in the matters of copying, performing, broadcasting, publishing and making adaptations of the protected work (IP Australia 2011a).

#### Trademarks

A trademark is ‘a right that is granted for a letter, number, word, phrase, sound, smell, shape, logo, picture and/or aspect of packaging’ (IP Australia 2012k, p. 1). It confers an exclusive right to commercially use, license, or sell the goods and services that the trademark is registered under.

The primary function of trademarks is to provide consumers with an ability to identify products and their sources, and thus facilitate an orderly process of marketing (Besen and Raskind 1991). Trademarks have developed as a form of indirect consumer protection by allowing purchasing decisions to be made on the basis of marks that identify products and their source. Trademarks are not discussed in further detail in this report, given its focus on matters related to the patent system.

#### Plant breeder rights

Similar to patents, plant breeder rights provide an incentive to create new plant varieties that may not otherwise occur due to the public good characteristics of innovation. In Australia, this is codified in the *Plant Breeder’s Rights Act 1994* (Cwlth). The patents system was considered unsuitable for plants for several reasons:

* lower levels of newness and inventiveness involved in traditional breeding methods
* difficulty in reliably reproducing plant varieties from standard technical descriptions
* the importance of plants as a basic resource, especially for food (ACIP 2010a).

As a result, the criteria used to grant a plant breeder’s right differ from those used for patents. There is also a separate compulsory licence regime (chapter 5).

### Reward-based systems

A number of reward-based tools exist that may be utilised to stimulate research and other innovative activity, and can act as an alternative to assigning property rights. These include measures such as subsidies for undertaking R&D, and prizes for successful research. A key difference between these instruments, and assigning property rights, is that no exclusive right is established for innovations; once produced they enter the public domain and can be freely utilised.

These instruments may provide incentives for increasing the level of R&D, and hence, innovative activity. Prior to considering the use of these instruments, however, it is necessary to consider whether the targeted activities would generate greater benefits to the community as a whole with public intervention (PC 2007).

A body of literature has compared the functioning of, and incentives provided by, reward-based systems to those offered by patents. For example, Wright (1983) contrasted prizes awarded for successful research, research contracts, and patents. This author regarded the imbalance in information about the costs and benefits of research between those undertaking it and those potentially funding it as one of the key advantages of patents over other tools to encourage research. This was balanced against the costs of limited diffusion of innovations that may result from patents. Wright (1983) concluded that, if the social costs of limited technological diffusion associated with patents was greater than the social costs associated with raising an equivalent amount of taxation, prizes and contracts would be socially preferable to patents.

A later work by Shavell and van Ypersele (2001) contrasted the patents system with a reward system whereby innovators received payment for their innovations directly from government. In their analysis, they assumed that the grant of a patent led to market distortions, thus imposing a social cost, a concept common to much economic analysis of patents. The incentive for an inventor to innovative is thus given by the price they would be able to receive through commercial exploitation, which would exceed the price of a competitive market due to the patent holder’s exercise of market power. By comparison, under a reward-based system, the incentive an inventor has to innovate is determined by the reward they can expect to receive. An innovation, once created, is made available at marginal cost, avoiding the distortions associated with the use of market power to affect pricing. However, in Shavell and van Ypersele’s (2001) framework, it was assumed that an inventor knew what the demand for a particular innovation would be before investing in research, whereas the government did not have this information.

Given this imperfect information, Shavell and van Ypersele (2001) make the point that incentives to invest under a reward system could be either insufficient or excessive, depending on the actual state of demand for an innovation, and the size of the reward offered by the government. In Shavell and van Ypersele’s (2001) analysis, neither system clearly dominates the other in all possible circumstances.

There are several other important differences between patents and other policies, such as subsidies, that aim to encourage innovation. For instance, under a patents system, decision making typically lies with individual innovators who are likely to have greater information on the costs and benefits of their activity than the government. As noted by Encaoua, Guellec and Martinez (2006), this delegation of research activity discourages innovators from taking risks that they know are unlikely to be commercially successful. Hall (2007) stated that policies such as prizes and research contracts were of limited use when the objectives of innovative activity are unknown, or difficult to identify prior to the completion of research. Scotchmer (1991) argued that if a government knew all the costs and benefits associated with research, it could select the research projects that delivered net social benefits and the patent system would be unnecessary. This places large informational requirements on government for all possible research projects however, making the actual realisation of such a system likely to be infeasible. As Thomson and Webster (2009) noted:

Unfortunately, government supply of R&D is subject to enormous information requirements which are, in part, a product of the fundamental uncertainty inherent in technological progress. Efficient allocation requires identifying the most valuable research projects, determining who should tackle them, knowing how much resources are required and how investment should be spread over time. … Good innovation policy should therefore supplement public R&D grant schemes with policies that decentralise decision making and harness market forces to allocate resources to research (p. 57).

This discussion highlights the fact that there are advantages and disadvantages associated with each of the public policy instruments designed to encourage innovation. A single instrument is not necessarily preferable to another in a general sense; rather, which one is utilised depends largely on the specifics of a given situation. Hence, there is a role for patents and subsidies in the suite of government approaches to provide incentives for innovation.

### Other mechanisms for promoting innovation

Government assignment of property rights and subsidies are not necessarily the only way to promote innovation. A number of other potential mechanisms exist, and have been discussed in various contexts over time. For instance, the maintenance of trade secrets is one means by which inventors can try to protect their IP from unauthorised use, and in doing so, retain sufficient incentives to innovate. Trade secrets prevent the disclosure and diffusion of inventions, and thus can allow firms to recoup the costs of innovating. However, trade secrets can be wasteful from the perspective of the whole community as they may lead to duplication of research effort and hinder efforts to improve on things that have already been invented. They also do not exclude others from using the innovation once it enters the public domain (Aoki and Small 2004).

In the context of financial innovations, Herrera and Schroth (2004) examined the possibility that informational advantage provides sufficient incentive for innovation to occur in the absence of property rights mechanisms such as patents. With specific reference to investment banks, Herrera and Schroth (2004) suggested that product innovators that engage in initial transactions with clients obtain more precise information about the characteristics of clients than do rival firms. Although rival firms can freely imitate new financial products, the innovating firm has an informational advantage provided by their initial period of dealing, allowing them to recoup the costs associated with innovating.

Boldrin and Levine (2002) distinguished between two components of property rights: the right of first sale, and downstream licensing. The first relates to the right to own and sell ideas, inherent in all property rights. The second relates to the right to control the use of ideas after sale, which Boldrin and Levine (2002, p. 209) argued was ‘economically dangerous’. In their view, the right of first sale could provide sufficient incentives to innovate, and so make policy instruments such as patents unnecessary[[1]](#footnote-1). However, this result depends on assumptions made by the authors in their analysis, which are open to question (Encaoua, Guellec and Martinez 2006).

## 3 Patent design

Patents, and the economic issues they give rise to, have long been discussed in the economic literature. A number of relatively early contributions in the modern literature, beginning with Nordhaus (1969), began to focus on optimal patent design. In subsequent years, this work has been added to, and more complex elements of the issues raised by patents have been analysed.

This section gives a brief outline of some of the key (theoretical) literature that has informed economic discussion of aspects of patent design. The specific design of the Australian patents system is considered in chapter 3 and appendix B.

### The tradeoff between exclusivity and diffusion

Although patents may address incentives to innovate (discussed above) by assigning property rights, they also come with the risk of facilitating anticompetitive behaviour. As noted earlier, if granting a patent to one producer prevents others from providing similar products to consumers, and prevents possibilities for substitution, a monopoly may be conferred on the producer in possession of the patent. A great deal of the economic literature on patents focuses on market power issues (for example, Denicolo 1996; Nordhaus 1969; 1972; Scherer 1972; Vaughan 1948; Wright 1983).

Thus, a patents system typically involves striking a balance between providing sufficient incentives to encourage innovation on the one hand, and encouraging the diffusion of new technologies and processes on the other. Indeed, a system with a large number of innovations that are not widely used may be less beneficial to society than one with less innovation overall, but greater diffusion of new technology (Besen and Raskind 1991).

### Disclosure and limited duration

While a patent confers exclusive rights to commercial exploitation on its holder, in return, the holder must also disclose information relevant to the invention to the public. This disclosure aspect plays an important role in facilitating the diffusion of knowledge to other potential users of technology (Scotchmer and Green 1990), even though their ability to actively utilise that technology may be limited for the duration of the patent. A patent might be socially beneficial due to this aspect alone, even if it is not required for innovation. If an innovation can easily be kept secret, granting a patent, through its information disclosure provisions, may help to ensure that the innovation is diffused and ultimately provides broader public benefits that would not occur had it remained secret (Encaoua, Guellec and Martinez 2006).

There are also other benefits that arise from the information disclosure aspect of patents. Among them, parallel independent discoveries of identical processes and creation of technologies may be prevented. Resources not utilised in duplicating the efforts of others are then free to be directed to other, more valuable purposes, including other innovative activities.

In addition, the information disclosure requirements inherent in patents can aid in the creation of subsequent innovations in the future. Subsequent innovations might be either complements or substitutes to the initial one: regardless, a great deal of research is cumulative in nature. This raises a dynamic issue, namely, that of providing adequate incentives to encourage first stage innovation, and yet also ensuring that those innovations are eventually available to society more widely to enable second stage innovation.

This issue is addressed by one of the key features of patents, namely, that they have a limited duration, after which the innovation covered by the patent enters the public domain. In Australia, the exclusivity period for a Standard patent is 20 years subject to the payment of annual renewal fees (and is up to 25 years for pharmaceutical products), with fees increasing over the life of the patent (IP Australia nda).

### ‘Optimal’ patent duration and breadth

Over time, a large body of economic literature has developed on the question of how to design patents to yield the greatest possible net benefit to society. Much of this work has analysed the effects of different choices of patent duration. Duration affects the amount of time revenue can be derived based on the presence of a patent. Patent breadth is another concept that has been the subject of discussion in the literature. Unlike patent duration, there is no universal definition of patent breadth. Encaoua, Guellec and Martinez (2006) note that, in principle, breadth is determined by the claims accorded by patent examiners to a patentee, which establishes the elements of IP to be protected by a patent. In the economic literature, the term breadth has been used to refer to diverse concepts, such as the costliness of imitating an innovation, and the degree to which differentiated products possess similarities without infringing each other’s patents (Denicolo 1996).

Another body of literature has developed that considers the ‘strength’ and ‘quality’ of patents systems in various countries. The definition of strength incorporates patent duration and breadth, with strength also typically considered to include patent coverage, enforcement mechanisms available to patent holders, and safeguards. The concept of quality normally relates to the stringency and transparency of patent systems. This literature is discussed in more detail in appendix B.

The balance between providing adequate incentives for innovation and the desire to enable access to inventions to the wider public led to a focus on analysing the perceived tradeoff between patent duration and breadth in the economic literature.

However, there is a difficulty in drawing general conclusions for policy from the literature. For example, although much has been written on patent breadth (Denicolo 1996; Gallini 1992; Gilbert and Shapiro 1990, Klemperer 1990, and Tandon 1982, among others), authors have often used alternative concepts of patent breadth, and chosen different economic frameworks in which to consider them. In some cases, conclusions reached by one author have stood in contrast to those reached by another. The main implications that arise from the economic literature on patent duration and breadth are that the effects of changing patent duration and breadth are dependent on the economic environment in which they occur, including the type of innovations that are patented and the degree to which they may reduce production costs, as well as the structure of the markets in which final products are sold (such as how many competitors an innovating firm faces). Also important is the degree to which innovations are isolated, or instead build on one another. For instance, a wider patent breadth (though perhaps desirable for some reasons) could make it more difficult to improve on an innovation, or invent around it, whereas a longer patent length could provide a greater incentive for other inventors to imitate or build on an initial innovation (although a longer patent life could have adverse effects of its own).

In conclusion, considerations of patent duration and breadth involve a complex interaction between instruments of policy, their effects on innovation, and the market structures that firms face. As a matter of practicality, Australia and many other countries have ultimately settled on a patent life of 20 years for most types of innovations.

## 4 Compulsory licensing and other safeguards

While a patent generally gives its owner an exclusive right over an innovation, safeguard mechanisms also typically exist to limit the extent of the patent holder’s right to exclusive use. These mechanisms are intended to be enacted in exceptional circumstances where the exclusive right associated with a patent is not in the interest of the community as a whole. For instance, in times of a pandemic, a government may find it desirable to have a means to limit the exclusive rights of a patentee in order to ensure that adequate production of pharmaceuticals takes place. Alternatively, non-use of a patented innovation may prompt a government to invoke safeguards to ensure that the benefits of the innovation are realised by the community.

Such ex post safeguards that apply after a patent is granted are distinct from the ex ante patent safeguards applied before a patent is granted. Ex ante safeguards include the threshold required for a patent to be granted (influencing breadth), as well as the fact that the duration of a patent is limited. The threshold requirement for a patent (depending on its strength) ensures that truly innovative products receive patent protection, and that frivolous patents, which may have the effect of restricting competition or sequential innovations, are not issued. The limited duration of a patent constrains the extent to which a patent owner can capture the benefits to the community from an invention. Thus, it is part of the tradeoff between encouraging innovation and ensuring the benefits of innovation reach the public, as discussed above.

Ex ante safeguards have the advantage of being fully known by the patentee at the time the patent is granted, thus exposing the holder to no additional uncertainty regarding these aspects of the design of the patent.

### Adequacy of ex ante safeguards

Some submissions to this inquiry raised questions about the adequacy of ex ante safeguards, and a small number also discussed concerns with the patents system generally. In particular, Dr Hazel Moir (sub. 31) questioned the argument that patents are needed because inventors would otherwise be unable to earn a sufficient return for their efforts. She argued that this was only plausible for large, lumpy investments and where followers can enter a market very quickly. She claimed that many patents systems typically have low requirement for inventiveness, which has led to many patents being granted for trivial variations on existing innovations. The Commission supports Dr Moir’s view that patents should only be granted where they lead to worthwhile innovations that would not otherwise occur.

An assessment of Australia’s threshold test for granting what is a patentable invention is beyond the terms of reference for this inquiry. However, the Commission notes that this was recently subject to review and subsequent amendments as part of the ‘Raising the Bar’ reforms, which are due to come into full effect in April 2013. The result will be to apply a tougher threshold test, reflecting concerns identified in the review process:

Concerns have been raised that the thresholds set for the grant of a patent in Australia are too low, suppressing competition and discouraging follow-on innovation. Particular concerns have been raised that patents are granted for inventions that are not sufficiently inventive … (Australian Government 2011b, p. 8)

The ‘Raising the Bar’ reforms were subject to an extensive public consultation process. This included the release of a draft Bill and associated regulations, accompanied by an invitation for submissions from the public.

### Ex post safeguards

Ex post safeguards include government use or acquisition, remedies under competition law, and compulsory licensing. Government acquisition provides for a patent, or an invention that is the subject of a patent application, to be acquired by a government. Competition law remedies sometimes include a direction by the judiciary to grant licences to work a patented invention (on competition-related grounds, in relation to certain characteristics of competition law) (chapter 6). The validity of a patent itself can also be subject to challenge (for instance, on the grounds of inventiveness) in court in a number of jurisdictions.

Compulsory licensing, the focus of this inquiry, is an ex post safeguard that exists in most countries. It compels a patent owner to license its innovation to another party (usually on a non-exclusive basis) in certain circumstances. The precise grounds for issuing a compulsory licence vary between countries, but usually includes underutilisation of an invention that could benefit the community (appendix C).

Like government acquisition or use, and provisions of competition law, compulsory licensing could, if used to excess, blunt the incentive to innovate. As a form of forced patent use, compulsory licensing permits a patent holder to retain their ownership rights over the innovation. By contrast, government acquisition does not allow a patent holder to retain their ownership rights. Both instruments allow for the payment of compensation to patent holders.

The appropriate conditions or circumstances that warrant the use of compulsory licensing has been examined by a number of researchers over time, in various contexts. In a relatively early discussion in the economic literature, Vaughan (1948) argued that compulsory licences should be provided to allow the ‘conjoint use of important improvements and basic inventions, to prevent the suppression of worthwhile patents, to restore competition and at the same time lessen the conflict in the use of the latest technology’ (p. 226). By way of example, Vaughan (1948) suggested a situation where most of the important patents in an industry are owned by one or a few companies. This, in his view, could be remedied by requiring the patent owner(s) to offer licences to other firms on a royalty basis, with the reasonableness of terms judged by the number of resulting licensees and competitors.

In a similar vein to Vaughan (1948), a much later contribution by Aoki and Small (2004) also raised compulsory licensing as a possible remedy to anticompetitive activity. Indeed, they regarded it as one of the two reasons for the very existence of the provision. The other reason noted by them was the use of compulsory licensing for reasons such as ensuring the adequate provision of pharmaceuticals to those with insufficient income to afford the products in their own right.

The origins of compulsory licensing date to the International Convention for the Protection of Industrial Property 1883 (the Paris Convention). This Convention included a provision that obligated patentees to ‘work’ a patent in accordance with the laws of the country in which patented innovations were introduced. Failure to do so could result in the forfeiture of patent rights by the patentee. Legally, countries could require patent holders to work a patent within a certain period of time, and also require them to do so locally, generating manufacturing and distribution activity in the country in which the patent was granted. In 1925, the Convention was altered to essentially oblige countries to attempt to rectify patent ‘abuses’ via the use of compulsory licensing, prior to using the stricter remedy of patent forfeiture (appendix D; Reichman and Hasenzahl 2003).

While there has been some discussion and debate about the circumstances in which compulsory licensing ought to be used, empirical analysis of its effects is quite limited. A prominent exception was a study undertaken by Scherer (2000).[[2]](#footnote-2) He looked at the impact of compulsory licensing on the privately‑financed R&D expenditures (undertaken in 1975) of more than 40 US companies that had been subject to mandatory patent licensing. One of the primary intentions of such an empirical investigation would be to determine to what extent, if any, the exercise of compulsory licensing provisions affected the incentives of firms to innovate (discussed earlier).

Scherer (2000) concluded that there was no significant statistical evidence that the companies subject to compulsory licensing under anti-trust decrees undertook less intensive R&D than other firms of comparable size and industry origin. Scherer (2000) also reached the conclusion that compulsory licensing had had no discernible effect on industry concentration in a related statistical analysis. It should be borne in mind however, that the conclusions obtained in this empirical study do not necessarily generalise for different companies, time periods, or indeed, different countries.

1. In a later work, Boldrin and Levine (2012) called for the abolition of patents, based on their concerns about lobbying and rent-seeking. [↑](#footnote-ref-1)
2. An analysis of the effects of compulsory licensing on chemical inventions in the US in the years immediately following the First World War was undertaken by Moser and Voena (2009). [↑](#footnote-ref-2)