

THE REGULATION OF PUBLIC GOODS

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ABSTRACT

The paper examines the complex ways in which public goods are regulated. The provision and distribution of public goods is deeply affected by the degree of excludability of those goods and the regulatory context of that excludability. Using a decentered conception of regulation, the paper shows through various examples how state and non-state actors regulate each other's capacities to provide, access, and distribute public goods. The paper includes a discussion of the regulation of knowledge by the rules of intellectual property.

INTRODUCTION

Public goods range from those that are constituted by norms (peace, order, and good government) to those physical goods that provide a collective benefit independently of any norms (forests and algae that consume carbon are two examples). Such goods are typically defined in terms of two qualities: non-rivalry in consumption and non-excludability.¹ Knowledge is perhaps the quintessential public good and there has long been a fundamental debate about how best to ensure its development and distribution.

Adam Smith observed that goods of general benefit to a society would have to be funded by means of a general contribution.² This potentially left a large range of goods to be provided through the public budgetary process. But after the recognition that most of the real economy operated in the messy world of impure public goods, attention began to focus on ways in which public goods could be provided through some form of exclusion, thereby allowing the market to play a much greater role in the provision of such goods.³ By

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¹ Robert Cooter and Thomas Ulen, *Law and Economics*, 3rd edn (Reading, MA: Addison-Wesley Longman, 2000) 42, and Richard Cornes and Todd Sandler, *The Theory of Externalities: Public Goods, and Club Goods* (Cambridge: Cambridge University Press, 1986), 3. Non-rivalry in consumption is used by Cornes and Sandler interchangeably with indivisibility of benefits.

² Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, Book IV, ix. 52, in R. H. Campbell and A. S. Skinner (eds) (Oxford: Clarendon Press, 1976).

³ See P. A. Samuelson, 'Pure Theory of Public Expenditure and Taxation', in J. Margolis and H. Guitton (eds), *Public Economics* (London: Macmillan, 1969) 98–123, 108.

focusing on the excludability of a good, economic theory began to develop the idea that groups or clubs could capture the benefits of public goods that they had funded.⁴ Intellectual property rights are essentially means of permitting exclusive use to knowledge in order to encourage its further development.

The focus in economics continues to be on the basic issue of the role of government in allocating resources to the production of public goods. The discussion has expanded to include issues relating to the provision of international or global public goods (for example, protection of the ozone layer, the control of epidemics, increasing agricultural yields).⁵ International public goods can be distinguished by the extent to which individual contributions affect the level at which the good is supplied.⁶

Theorizing about the provision of public goods has become a long story in economics. In contrast, this paper in short fashion draws attention to some of the ways in which public goods are regulated. Public goods have specific regulatory contexts that affect their provision as well as their distribution and uptake. The benefits of some public goods (for example, cleaner air) flow automatically while the benefits of others (for example, technical knowledge) do not. One consequence of this is that even if the problem of provision is solved for a given public good, the problem of distribution may not be. Restricting access to a public good is sometimes a deliberate choice. Moreover, such restriction can be done by regulating the movement of private goods. The regulation of defense, we will see, provides examples of this. So do restrictions on use of goods embodying intellectual property. In short, the message of this paper is that we gain a better understanding of public-good problems by locating them in their regulatory contexts.

A better understanding of those regulatory contexts rests on the adoption of a decentralized conception of regulation. This is not a claim that can be pursued here. The classical command and control conception of regulation pays insufficient attention to the complex causality of regulatory effects. Essentially, the decentralized approach sees regulation as involving a plurality of types of actors, a variety of legal and non-legal norms and the use of techniques beyond that of sovereign command by the state.⁷ This

⁴ Cornes and Sandler, above n 1, at 3.

⁵ See, for example, Todd Sandler, *Global Challenges: An Approach to Environmental, Political, and Economic Problems* (Cambridge: Cambridge University Press, 1997); Inge Kaul, Isabelle Grunberg, and Marc A. Stern (eds), *Global Public Goods* (NY/Oxford: Oxford University Press, 1999); Marco Ferroni, *Reforming Foreign Aid: The Role of International Public Goods*, OED Working Paper Series, No. 4 (The World Bank, Washington, DC, 2000); *World Development Report 2000/2001: Attacking Poverty* (World Bank, Oxford University Press, 2001).

⁶ Todd Sandler, 'Global and Regional Public Goods: A Prognosis for Collective Action', 19 *Fiscal Studies* (1998), 221, 224.

⁷ For an excellent overview of the decentralized understanding of regulation see Julia Black, 'Critical Reflections on Regulation', 27 *Australian Journal of Legal Philosophy* (2002) 1.

decentralized understanding of regulation has become the dominant paradigm in regulatory scholarship, including the study of global regulation.⁸

Increasingly the regulation of public goods takes place by means of global standards. When, for example, the Basel Committee on Banking Supervision issues guidelines on capital adequacy standards that are adopted by the world's banks, the stability that these and other guidelines bring to the world's financial system is a global public good. Similarly, it may be argued, albeit in a more controversial context, that a global system of intellectual property regulation encourages the international distribution of knowledge goods.

The regulatory processes that lead to the creation of international public goods may only minimally involve states. Private actors have been and remain profoundly important in the generation of standards that lead to public goods. The Plimsoll line, the line painted on the hulls of ships to show overloading, was an innovation that was globally spread by the private classification societies and underwriters of Lloyd's of London who were naturally interested in the safety of the ships they insured.⁹ The rules developed by Lloyd's surveyors eventually became the foundation for the International Load Line Convention of 1930.

Generally in the context of business regulation states are both regulators and regulatees.¹⁰ In the past, states have been regulated by non-state actors such as the British East India Company and financiers like the Rothschilds. Today business organizations like the major accounting firms and international organizations like the IMF and the WTO in various ways regulate states. States are also the objects and subjects of regulation when it comes to public goods. In various ways they regulate for the production of those goods, but also find that their capacity to regulate is affected by international organizations and that the capacity of their citizens to gain access to some public goods is regulated by other states or business organizations.

One advantage of discussing public goods from the perspective of regulation is that it enables the public goods issue to be more clearly linked to theories within the regulatory literature that move the problem of regulation beyond a simple market versus state contest. A public good is not a single good, but an effect with complex antecedents made up of a set of complementary goods (private and public) and different types of social actors. Theories recognizing that regulation is more than a two-actor play and making a virtue of regulatory innovation are more likely to be able to provide strategies for dealing with

⁸ For discussion of this approach in the context of global regulation see William E. Scheuerman, 'Reflexive Law and the Challenges of Globalization', 9 *The Journal of Political Philosophy* (2001) 81.

⁹ John Braithwaite and Peter Drahos, *Global Business Regulation* (Cambridge: Cambridge University Press, 2001), 421–22.

¹⁰ *Ibid.*, at 27.

problems relating to the supply and maintenance of public goods.¹¹ In relation to global public goods where there is no sovereign provider, but simply a lot of imperfect multilateral institutions, considerable innovation is needed.

The remainder of the paper is structured in the following way. Section I contains a brief description of the standard definition of public goods and the problems that preferences pose for the production of public goods. Section II proposes some distinctions amongst public goods that influence their regulation. Using these distinctions, Section III provides some examples of the different ways in which public goods are regulated. Section IV outlines some ways in which the unequal distribution of power affects the regulation of public goods. A short conclusion then follows.

I. PUBLIC GOODS AND PREFERENCES

The non-excludability of a good is a contingent matter. It is easier to exclude individuals from the use of a bike than it is from national defense. A combination of locks and the law do a tolerable job in the case of bikes. It is not logically impossible to exclude people from the benefits of national defense, but it is costly, both in economic and non-economic ways, to do so. Non-rivalry is an attribute that is true of some goods and not of others. It is not true of an apple, for example. Circumstances can affect whether a good is non-rivalrous in consumption. The breath of air that I take on my country walk does not for practical purposes diminish the supply available to you. It is a different matter, however, if we are trapped in a small dark space, as were the crew of the submarine Kursk, where the air supply cannot be renewed.

With one class of goods, knowledge goods, non-rivalry in consumption would appear to be a necessary feature. My use of the multiplication table leaves it free for others to use. Its use by me does not consume it, any more than my drawing of a rectangle on a piece of paper consumes the property of rectangularity.

In the case of purely private goods, efficiency is generally best met by market arrangements in which suppliers compete to meet consumer demands. Consumers have nothing to gain by hiding their preferences for goods. If they do so, they fail to obtain the benefit of the goods as well as failing to contribute to the possibility of further price competition. The matter is different for public goods. The costs of exclusion combined with its non-rivalrous nature make it possible for a potential consumer of the good to get its benefit without paying for it. A rational strategy for consumers is to hide their preference for the good because they will be able to free ride on its provision.

¹¹ See, for example, Ian Ayres and John Braithwaite, *Responsive Regulation* (New York/Oxford: Oxford University Press, 1992).

Problems of appropriation act to deter private suppliers of public goods. Public goods may also be supplied through individual voluntary acts or group cooperation. Self-interest is not the only motive that operates in individuals, but the fact that it is an important one sets limits on the extent to which voluntary arrangements can be relied upon to correct for market failure.

Another response to undersupply of public goods by the market is to look to their provision by government. Government, itself a public good, allows for the creation of binding arrangements for the provision of other public goods. But here preferences also present problems. Mancur Olson's analysis of the logic of collective action provides one example.¹² Concentrated interests are more likely to organize to gain a legislative outcome than diffuse interests because concentrated interests face lower costs of organization and greater individual gains. Diffuse interests face the reverse problem.

The demand of concentrated interest groups for legislation will be affected by the relevant electoral structure. If money is important to re-election, the demands of those concentrated interests making generous donations to election campaigns are likely to be met. This logic explains why, for example, logging or mining interests can trump the preferences of citizens for higher levels of environmental public goods. The adverse impact of interest groups upon legislative output has, in the United States, led some to argue that courts ought to engage in robust judicial review of economic legislation in particular in order to lessen the effects of rent-seeking legislation.¹³

Self-interested preferences lie at the root of social dilemmas in which individuals have to choose between social cooperation and following their self-interest.¹⁴ By following the latter they prevent the possibility of cooperation bringing about better gains for all. In the case of the public-goods dilemma, individuals gain by not contributing to the production of a good from which, they reason, they will in any case get the benefits. The commons dilemma has a similar sort of incentive structure, except that the individual now gains through taking from a common resource in an unrestrained way rather than contributing to its costs of production. The

¹² Mancur Olson, *The Logic of Collective Action* (Cambridge, MA: Harvard University Press, 1965).

¹³ See Cass R. Sunstein, 'Interest Groups in American Public Law', 38 *Stanford Law Review* (1985) 29.

¹⁴ The formal modelling of social dilemmas has become dominated by game theory. Different game forms such as Prisoner's Dilemma, Chicken game, Trust game and Leader game are used to explain the level of public goods to be found within a given context. For examples, see Sandler, above n 6, at 221; Daniel G. Arce and Todd Sandler, 'Transnational Public Goods: Strategies and Institutions', 17 *European Journal of Political Economy* (2001) 493; Scott Barrett, 'International Cooperation for Sale', 45 *European Economic Review* (2001) 1835. Where game theory identifies an equilibrium that is sub-optimal in terms of the supply of a public good, new rules and institutions have to be designed. Scholars of regulation aim at an understanding of the effectiveness of norms, compliance issues, the relationship of legal norms to social practices, complementarities between different kinds of regulation and the techniques of regulation that are most likely to bring success.

outcome is the destruction of a resource (fisheries, forest, water-supply) that all individuals would have been better off saving through cooperation.

The intellectual commons also has difficult incentive problems. In contrast to the resource commons, where the gains come from taking, the gains to individuals using the intellectual commons come from acts of exclusion.¹⁵ As the range and frequency of these acts increase, the intellectual commons ends up being underutilized. It is evident that intellectual property protection fundamentally affects incentives to excluding others from using knowledge, perhaps generating an anticommons problem.

Thus, although the incentive structure of these dilemmas is similar, they pose different regulatory challenges in terms of effectiveness and responsiveness. A standard solution to the problems of the physical commons is to grant private property rights. The intellectual commons requires a different solution since the problem lies in the exercise of property rights. In the case of the physical commons, when property rights are used as the regulatory strategy individuals gain something, whereas in the case of the intellectual commons a strategy based on restricting the right of exclusion involves individuals losing something.

Regulation based on taking something away from individuals is bound to run into considerable levels of resistance. In the case of intellectual property rights, for example, probably the first-best strategy is not to grant extensive rights in the first place. Regulation based on acts of taking (for example, compulsory licensing) is probably the second-best option in terms of effectiveness since individuals face the risk and uncertainty of losing gains.

II. DISTINGUISHING PUBLIC GOODS

Public goods are pervasive and diverse phenomena. This is for the reason that Samuelson observes. Once one moves from the case of a pure private good, most processes and activities have some kind of consumption externality and therefore end up located in the public-good domain.¹⁶ Everything from the humble algae floating in large numbers in the high seas to government has been identified as providing or being a public good. Aside from their pervasiveness, the 'publicness' of public goods comes in degrees and is contingent on circumstances and characteristics. The degree to which the quality of non-excludability applies to a good is affected by social norms and technologies and this in turn affects where the good is at any point in time on

¹⁵ The tragedy of the intellectual commons is under-exploitation. See Peter Drahos, *A Philosophy of Intellectual Property* (Aldershot: Dartmouth, 1996) 63. The problems of the intellectual commons have been developed in the theory of the anticommons. See Michael A. Heller, 'The Tragedy of the Anticommons: Property in the Transition from Marx to Markets', 111 *Harvard Law Review* (1998) 621; James M. Buchanan and Yong J. Yoon, 'Symmetric Tragedies: Commons and Anticommons', 43 *Journal of Law and Economics* (2000) 1.

¹⁶ See P. A. Samuelson, above n 3, 98–123, 108.

the public goods continuum. Camera technology has raised the costs of excluding others from the use of personal image. Encryption technology has probably lowered the costs of making information excludable.

The contingent nature of public goods makes it hard to generalize about the most efficient mode of supply. Within the context of global and regional public goods, Todd Sandler has argued for a more differentiated treatment of public good problems, suggesting that the factors of differentiation are 'the aggregation of the individual contributions to the public good, the number of essential participants, the range of spillovers, the pattern of benefits and costs among agents, the intertemporal character of the public good, the extent of uncertainty and the presence of a leader nation'.¹⁷

Public goods can be classified in various ways. We have already seen that there is a distinction between pure and impure public goods and that they can be classified according to scope of effects – local, national, regional, global. It is also clear that some public goods exist independently of norms, others exist as norms and yet others are dependent for their existence on other public goods. The benefits that the humble algae provide in the form of the absorption of carbon or the benefits of the earth's atmosphere are not, in the first instance, dependent upon norms.

Constitutions are an example of public goods that are constituted by norms. They also illustrate that the production of some public goods is dependent upon the prior existence of other public goods. Constitutions enable the authoritative production of legal norms and they help bring legitimacy and stability to governments. The example of constitutions also shows that some public goods can be thought of as primary public goods, where primary means that it is rational for individuals to want more of that good rather than less. It is rational because the primary good is foundational to other goods (private and public) that individuals need in order to fulfill their specific goals and desires.¹⁸

Another distinction that matters for present purposes is between capability-independent public goods and capability-dependent public goods. The benefits that are provided by biological assets, such as algae, forests, and the ozone layer, flow automatically and are not dependent upon individuals possessing some further capability. This is not true of other classes of public goods. For example, the benefits of chemical formulae and engineering specifications do not flow automatically. Free riders wishing to make use of them have to have certain capabilities.

In the case of information there is an important distinction between codified information and uncoded information or knowledge (the two are used

¹⁷ Sandler, above n 6, at 223.

¹⁸ This sense of primary is taken from John Rawls' discussion of primary social goods. These goods overlap considerably with public goods. See John Rawls, *A Theory of Justice* (London: Oxford University Press, 1973) 92.

interchangeably in this paper).¹⁹ Codified information will be used here to mean information that has been externalized by means of some formal, symbolic system (for example in technical drawings, mathematical notation, in journals, paintings, patent specifications and so on). At the other end of the continuum there is uncoded information that may simply exist as information known by a single individual or as a social practice among a community.

Much traditional knowledge, for example, exists only as social practice. The example of traditional knowledge also illustrates that the distinction between codified and uncoded knowledge does not align with the distinction between secret and public information. The healing properties of turmeric, for example, have been widely known in India for centuries, but this knowledge exists largely in uncoded form.²⁰

Related to the distinction between codified and uncoded information is the notion of embodiment.²¹ In order to avoid a confusing overlap between codification and embodiment, we shall confine embodiment of information to two types of cases. Information can be embodied in a product or process (artifact-embodiment) or in the skill of a person (skill-embodiment).

Codified or uncoded knowledge links to artifact-embodiment or skill-embodiment in various ways. Codified knowledge in the form of a technical drawing or a chemical formula may be embodied in a product such as a piece of furniture or a medicine. Uncoded knowledge may also be the subject of artifact-embodiment. Eccentric Englishmen who rebuild Roman weapons, such as the trebuchet, rediscover a lot of uncoded knowledge. Information that is embodied as a skill may be codified. For example, the skills of a worker may be studied and codified in software that is in turn used to drive a robotic product that models those skills.

The degree of codification of information and its type of embodiment affect the public-good qualities of information in important ways. Information that has been codified and is artifact-embodied may involve lower acquisition cost for potential users than other information. It is cheaper to copy a CD put out by a rock band than to go to their concert and record their performance. Not all codified and artifact-embodied information exhibits public-good qualities. For example, the small Australian firm CEA Technologies supplies radar equipment to the US Navy. Despite the high level of sophistication of its

¹⁹ For a comprehensive discussion of this distinction, see Thomas A. Mandeville, *Understanding Novelty: Information, Technological Change and the Patent System* (Norwood, NJ: Ablex Publishing Corporation, 1996) 49–57.

²⁰ Knowledge about the use of turmeric to heal is an example of a typical grandmother's remedy. See Graham Dutfield, *Intellectual Property Rights, Trade and Biodiversity* (London: Earthscan, 2000) 65.

²¹ Mansfield, for example, observes that knowledge is embodied in methods of production, designs, products, and services. Edwin Mansfield, *The Economics of Technological Change* (New York: W. W. Norton & Company, 1968) 3–4.

technology, CEA does not own a single patent.²² The schematics that underpin its various radar and communications technologies are highly codified but kept secret. Competitors can reverse engineer the products to obtain the schematics, but this is costly and time-consuming. By the time competitors have achieved it, CEA has innovated, and competitors are left with yesterday's technology.

The degree of codification of information can also affect its quality of non-rivalry. Information is sometimes uncoded and embodied within an individual in a way that it is not separable from that individual (such as a special skill or talent). Potential users of information in this form are faced with a zero sum game. A good example is the scramble for German scientific talent after World War II. Once it had dawned on the United States and the United Kingdom that the acquisition of German hardware was not enough to enable them to appropriate the technology, there followed a rush to grab key German scientists.²³ This was a zero-sum game, for once the United States acquired Werner von Braun and his team of rocket scientists, others lost them.

In summary, we have the following set of distinctions. Public goods may be norm-independent or norm-dependent and they may be capability-independent or capability-dependent. Some public goods are primary goods in that they are essential gateways to other kinds of public goods. In the case of information, its public-good qualities will be strongly affected by the degree of the codification of the information and its type of embodiment. Figure 1 schematically summarizes these distinctions as they relate to information. The arrows indicate that, in some cases, by gaining access to information in one form it is possible to gain access to it or related information in other forms.²⁴

III. THE REGULATION OF PUBLIC GOODS

In this section I discuss aspects of regulating public goods in their various forms, accounting for the interrelationships among them.

A. The regulation of artifacts

Defense used to be presented as the paradigmatic instance of the pure public good, but it has come to be seen as an impure public good.²⁵ Defense is an

²² Stated by the CEO of CEA Technologies in his presentation at the 2002 Defence Intellectual Property Conference, Canberra, Australia, 9 May 2002.

²³ For an account, see Tom Bower, *The Paperclip Conspiracy: The Battle for the Spoils and Secrets of Nazi Germany* (London: Michael Joseph, 1987).

²⁴ The extent to which one form of information can act as a gateway to others is set by regulation. Whether a manufacturer, for example, can use the artifact to gain access to the other three forms depends on the law of reverse engineering. See Pamela Samuelson and Suzanne Scotchmer, 'The Law and Economics of Reverse Engineering', 111 *Yale Law Journal* (2002) 1575.

²⁵ Richard Comes and Todd Sandler, above n 1, at 4.

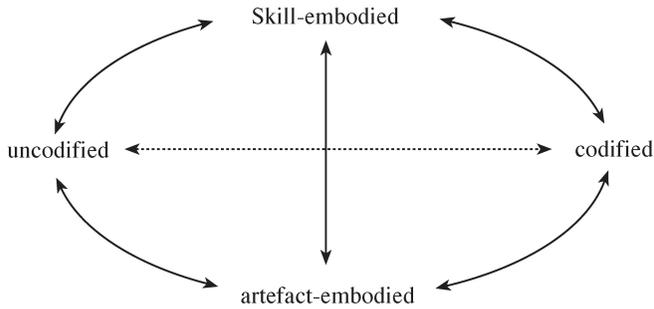


Figure 1. Forms of Information

interesting example of a public good because it shows how states are not just regulators of public goods but in turn have their capacities to provide such goods regulated. Defense is an example of a knowledge-intensive industry. In the case of the United States, investment in defense-related research is a dominant strategy – the country will continue to invest regardless of what other states do.²⁶ Knowledge, depending on what has been done about its excludability, can fall into the category of an impure or a pure public good. It follows that a state such as the United States, which invests heavily in knowledge generation in the defense sector, faces potential free-riding problems. As it happens, this is a case where free riding does not deter investment, but it does make it rational for the United States to look at ways in which to regulate the acquisition of that knowledge by other nations.

Over the years, one regulatory strategy that has been used targets the actual movement of the relevant technological product. A piece of defense technology is an example of artifact-embodiment. The artifact potentially presents a path to the coded information that is embodied in the technology, some of the uncoded knowledge (this may be deduced or learned through the process of reverse engineering) as well as the skills relevant to the making of the artifact. One way in which states with leading-edge technologies seek to restrict access to information about defense-sensitive technologies is to impose controls on the movement of the technologies.

In the United States, for example, the Bureau of Export Administration regulates the export of encryption technologies that have military uses.²⁷ An elaborate structure for controlling the movement of defense technologies was set up in 1949. Known as the Coordinating Committee (CoCom), its aim was to prevent US, Japanese, and Western European companies from selling

²⁶ Ethan Barnaby Kapstein, *The Political Economy of National Security: A Global Perspective* (McGraw-Hill, 1992) 171.

²⁷ Matthew Crane, 'U.S. Export Controls on Technology Transfers', *Duke L. & Tech. Rev.* (2001) 30.

militarily useful technology to Soviet bloc countries.²⁸ Under the Atoms for Peace Initiative, announced in 1953, the United States released large amounts of technical data and supplied materials related to the production of nuclear energy to states that agreed to controls to ensure that the materials would be used for peaceful purposes.²⁹

Defense is an example of restrictions on the movement of products aimed at preventing others from gaining the benefit of a public good. But there are cases where restrictions on the movement of goods might form part of a regulatory strategy that aims at increasing the range of those who benefit from a public good. One illustration of this occurs in the pharmaceutical sector. The benefits of R&D that takes place in large multinational companies on diseases that affect developing country populations can be extended to those populations (or part of them) by preventing the cheap drugs that are supplied to those countries from being re-exported to high-priced markets that are also supplied by those companies.³⁰

There are also examples where restrictions on access to a physical good defeat a broader policy goal of providing a public good. For example, the deposit of microorganisms under the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure has given rise to a system of International Depository Authorities and detailed procedures that make gaining access to deposited microorganisms (and therefore information about them) difficult.

B. The regulation of skill-embodied information

The skills that are embodied in individuals are regulated in various ways. Firms do so by means of private law, such as contract. They do so because, as Arrow observed, it is the firm's workers that 'carry the firm's information base'.³¹ The skill that a person has can be bought and sold in a market and is in this way a private good. But skills relate to public goods in various ways.

Obviously the exercise of skill may lead to creation of new public goods. Some public goods, as we saw earlier, are capability-dependent, meaning they require skills for effective use. The rules of the road rely on citizens being able to read traffic signs. The concentration of scientists in least-developed countries tends to be very low, setting limits on the technical capability of these countries to make use of knowledge, even if it is delivered as a pure

²⁸ One of the best studies of CoCom is Stuart Macdonald, *Technology and the Tyranny of Export Controls: Whisper Who Dares* (London: Macmillan, 1990).

²⁹ John Braithwaite and Peter Drahos, above n 9, at 297.

³⁰ Keith E. Maskus, 'Ensuring Access to Essential Medicines: Some Economic Considerations', 20 *Wisconsin International Law Journal* (2002) 563, 569.

³¹ Kenneth J. Arrow in Michael Perelman, *Class Warfare in the Information Age* (NY: St Martin's Press, 1998) 59.

public good. Of more immediate value to these countries are subsidized private goods (such as medicines).

The regulation by states of skilled labor through immigration policies, education policies, employment law, and intellectual property law all play a key role in the acquisition by states of capabilities that allow them to generate new public goods or to access public goods provided by other states. Immigration policies, for example, can encourage flows of skilled workers around the globe. One feature of these flows is the brain drain from developing countries to developed countries, something that has been of concern to developing country governments for many decades.³²

The brain drain problem raises some important issues from the point of view of public goods. Clearly, developing country governments that invest in education will lose the social payoff of this investment if large numbers of skilled workers leave for better conditions in developed countries. The loss of skilled workers also impacts negatively on a country's capacity to absorb technology transfer since the presence of scientific and technical knowledge embodied in professional networks is key to successful technology transfer and further development.³³

Trade secret law and employment law also have important effects on the diffusion of knowledge within an economy. The transfer of knowledge and technology within liberal market economies is heavily dependent upon the movement of skilled labor.³⁴ The fluidity of this market is itself affected by rules that determine what information employees may use when they switch to another employer and under what conditions.

Public goods, as these examples show, cluster in important ways. Furthermore, they may or may not function as complementary goods. If, for example, the efficiency of or returns from one public good is improved by the presence of another, they can be said to be complementary.³⁵ The economic and social returns from intellectual property systems, for instance, are affected by other public goods, such as education. Strong intellectual property regimes that deliver the public good of knowledge through the market have their efficiency improved if they are complemented by labor markets that allow skilled workers to move among firms. Here, restrictions on

³² See the various UN resolutions cited by Bhagwati in Jagdish Bhagwati, 'The International Brain Drain and Taxation', in Jagdish N. Bhagwati (ed), *The Brain Drain and Taxation: Theory and Empirical Analysis, II* (Amsterdam/NY/Oxford: North-Holland Publishing Company, 1976) 3–27, at 3.

³³ Barry Bozeman, 'Technology Transfer and Public Policy: A Review of Research and Theory', 29 *Research Policy* (2000) 627–55, at 649.

³⁴ Peter A. Hall and David Soskice, 'An Introduction to Varieties of Capitalism', in Peter A. Hall and David Soskice (ed), *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage* (Oxford: Oxford University Press, 2001) 1, 31.

³⁵ Peter Hall and David Soskice define institutional complementarities in this way. See *ibid*, 1, 17.

the use of codified information are counterbalanced by regulation that allows for the movement of skill-embodied information.

Institutions can also be mismatched thereby leading to inefficiencies. Imposing higher standards of intellectual property protection on developing countries that suffer from severe shortages of skilled labor means that intellectual property rights are less likely to achieve their incentive effects and may simply worsen a developing country's terms of trade.

Markets are dependent upon a range of primary public goods that come in the form of rules and institutions (the rule of law, contract, property, banking, corporations, securities and stock exchanges). A flourishing capitalism equipped with such institutions allows entrepreneurs the freedom to act and to create the spontaneous ordering that is said to characterize markets. The regulation of public goods that serve as inputs into the exercise of skill by individuals also has important effects on these processes of spontaneous ordering. For example, over time societies have evolved different regulatory models for the intellectual commons (an information commons). An intellectual commons can be negative (open to individual appropriation) or positive (in the co-ownership or co-use of all and not open to appropriation) and inclusive (open to all) or exclusive (open to a select group).³⁶

The relationship between the different types of commons and market processes of ordering are not especially well understood, but there is little doubt that there are important connections. Take, for example, computer gaming culture. When individuals purchase games, such as Blizzard Entertainment's *Warcraft* or *Diablo*, they are also given the use of a set of tools with which to construct new game scenarios. When the *Warcraft* game addict creates a hot new scenario it can be sent to other players, taken to gaming centers or uploaded onto battle.net, the company's free online game service.

Battle.net is an intellectual commons in which players try out the many different scenarios provided by other players or by Blizzard itself. Players are given the option of downloading the scenarios they use. Games of this kind have led to the formation of loyal user communities that become important resources for the firms that design the games in the first place. Sequels to Blizzard's games sell fast and in the millions of copies.

The strategy of using a commons to help build a community of users has been around for a while. Before it became the biggest patenter of software algorithms, IBM in the 1950s made its source code available to all programmers and encouraged them to share and modify the software that ran on its mainframes.³⁷

Although a commons can be structured in different ways, typically it is linked to a narrative of joint enterprise. Individuals that share similar values

³⁶ See Peter Drahos, above n 15, 57–60.

³⁷ Peter Drahos and John Braithwaite, *Information Feudalism* (London: Earthscan, 2002), 170.

and sensibilities are drawn in by the narrative and so begin a process of community formation. The commons and its accompanying narrative trigger a sequence that leads to the formation of social norms, a group and group identity. As gaming culture and the free software movement have shown, a commons and its narrative can initiate processes of ordering that see the skills and knowledge of individuals harnessed in exciting and economically significant new ways.

One of the interesting features of information economies is that, just as the role of intellectual commons in processes of production are being recognized, those commons are the subject of increasing formal regulation. The regulation is predominantly private in nature through facilitative forms of law, such as contract and intellectual property.³⁸ The effects of this are not easy to predict.³⁹ Some forms of commons and intellectual property rights can coexist and are in fact complementary. Blizzard Entertainment, for example, creates its common within a framework of intellectual property rights. In other cases intellectual property rights allow for command and control style interventions that disrupt commons-initiated processes of production that are based on an absence of intellectual property.⁴⁰

C. The regulation of norm-dependent public goods – the private shaping of public goods

Some public goods, we noted earlier, exist as norms and yet others are dependent upon norms. Norms also matter to pre-existing public goods, such as biological assets in the form of forests, wildlife, and microorganisms. Here society faces the classical commons dilemma in which individuals continue to deplete these biological assets because to date various cost-internalization techniques based on taxes and property rights have not been found or implemented sufficiently well, and governments have not acted to subsidize the preservation of these public good assets at the levels that are needed.⁴¹

The use of norms, especially legal norms, to erect exclusionary barriers to public goods can in certain cases, such as environmental assets, lead to efficiency gains. In other cases making a public good excludable leads to efficiency losses. The recent extension of the copyright term in the US is a

³⁸ Facilitative forms of law on the classical view are seen as non-coercive, but thinkers associated with the American Realist movement developed a different view of facilitative regulation. For a discussion see Robert B. Seidman, 'Contract Law, the Free Market, and State Intervention: A Jurisprudential Perspective', in Marc R. Tool and Warren J. Samuels (eds), *State, Society and Corporate Power*, 2nd edn (New Brunswick/Oxford: Transaction Publishers, 1989) 17–39.

³⁹ On the causal and moral complexity of the relationship between intellectual property and the public domain, see William Van Caenegem, 'The Public Domain: Scienta Nullius?', 6 *European Intellectual Property Review* (2002) 324.

⁴⁰ See Lawrence Lessig, *The Future of Ideas* (New York: Random House, 2001) 212–13.

⁴¹ For a discussion, see Christopher D. Stone, 'What to Do about Biodiversity: Property Rights, Public Goods, and the Earth's Biological Riches', 68 *Southern California Law Review* (1995) 577.

case in point.⁴² Social norms, efficiency, and public goods line up in complex contingent ways.

The use of norms by government to change the character of existing public goods or to create new ones also faces a powerful critique in the economic analysis of group behavior that started with Olson's analysis (described in Section I) of the logic of collective action. Olson applied this logic to account for the different economic performances of nations.⁴³ There Olson spells out a number of implications of his theory, including the fact that countries by and large will not have enough organized groups to allow optimal bargaining to take place, that small groups retain disproportionate organizational power and that such groups 'reduce efficiency and aggregate income' within societies.⁴⁴

Olson's analysis leads to the conclusion that many of the public goods that are supplied by government line up with private rather than public interest. The economic growth problems of societies, especially stable societies, stem not from an underproduction of public goods, but an overproduction. The solution lies in eliminating much of the law and regulation that relates to economic production.⁴⁵

Whether or not Olson's theory is generalizable to explain differing economic growth rates of nations is not a question for this paper to answer.⁴⁶ However, it does describe quite well some processes of private organizational power that lead to the capture of rents. The business lobbying in the 1980s that eventually produced the signing of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) in 1994, as part of the package of agreements of the Uruguay Round of Multilateral Trade Negotiations is a good example of where Olson's theory has application.⁴⁷

In the early 1980s the CEOs of Pfizer, IBM, and Du Pont, sitting on the President's Advisory Committee on Trade Negotiations, began a campaign that led to the formation of a lobbying organization (the Intellectual Property Committee) and the enrolment of European business in an international business coalition that ultimately persuaded the US government and the European Community to make an international agreement on intellectual property their top priority.⁴⁸ By contrast, the users and consumers of

⁴² For a discussion, see Wendy J. Gordon, 'Authors, Publishers, and Public Goods: Trading Gold for Dross', 36 *Loyola of Los Angeles Law Review* (2002) 159.

⁴³ Olson, above n 12.

⁴⁴ *Ibid.*, at 47. See also *ibid.* at 74 for a list of implications.

⁴⁵ Olson would, however, keep antitrust law. See Olson above n 12, at 236.

⁴⁶ For a critical analysis, see Hugh Stretton and Lionel Orchard, *Public Goods, Public Enterprise, Public Choice* (NY: St Martin's Press, 1994), 68–71.

⁴⁷ Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, Agreement on Trade-Related Aspects of Intellectual Property Rights, 15 April 1994, 33 I.L.M. (1994) 81 [hereinafter TRIPS Agreement].

⁴⁸ For a detailed account, see Peter Drahos and John Braithwaite, above n 37.

intellectual property rights, which represented a broad and diffuse constituency, were not organizationally represented at these negotiations.

IV. PREFERENCES, POWER, AND THE REGULATION OF PUBLIC GOODS

For those who believe that public goods are generally undersupplied there is, as we saw in Section I, a simple explanation in the form of the operation of self-interested preferences. In a world where self-interest is the dominant motive of citizens, game theory says that the dominant strategy of individual citizens will be not to contribute to public goods.

Self-interest is only one motive in the complex circle of motives that underpin the choices of individuals.⁴⁹ Theories that make it their sole focus tend to be weak on predictive power and look to their verification for the occasional matching case study. And as we suggested in the previous section, Olson's theory captures the TRIPS story. But Olson's theory does little to explain the rise of the hundreds of thousands of groups that make up international civil society because individuals acting voluntarily and rationally would, on his view of human motivation, never come together to create public goods for themselves, much less others.⁵⁰

In order to explain such groups Olson's theory requires that there be some mechanism of coercion or some positive incentive for individuals to participate in the relevant group. So, if we cannot find, in the large civil society movements that fight for farmers' rights in the South, evidence of a mechanism of coercion or promises of say, a Club Med holiday, we must conclude that the individuals in these movements are acting irrationally. By definition this makes their actions hard to understand or predict.

Another reason why public goods may be underprovided, which the focus on self-interested behavior tends to mask, lies in the role that power plays in shaping the provision and distribution of public goods. The encounters that took place between developed and developing countries over the setting of international intellectual property standards in the 1960s and 1980s illustrates this role. After World War II, many developing countries were faced with the demand for mass education and moved to provide this as a public good. One of the things they sought was a better deal from developed countries on access to textbooks in the form of a revision to the copyright standards contained in the Berne Convention. Ultimately, developing countries failed because Western publishers were able to persuade governments to block the deal that developing countries wanted.⁵¹

⁴⁹ For a discussion of this claim in the context of economic theory, see Hugh Stretton and Lionel Orchard, above n 46, chs 1 and 2.

⁵⁰ Olson, above n 12, at 19–20.

⁵¹ See Peter Drahos and John Braithwaite, above n 37, 74–79.

During the 1980s, the multilateral negotiations in the GATT over TRIPS were profoundly affected by the use of trade enforcement tools by the US and to a lesser extent the EC.⁵² Developing countries that led the opposition to the US agenda on intellectual property in the GATT were at the bilateral level systematically threatened with trade sanctions. The result of the multilateral negotiations was an agreement on intellectual property standards that required developing countries to apply the standard of excludability to knowledge goods much more extensively than they had in the past.⁵³

The effects of this regime shift on developing country economies will emerge over time. More immediately, the globalization of standards of excludability will require developing countries to rethink the ways in which they regulate for provision of public goods in their respective countries. In India, for example, the regulation of pharmaceutical markets was based on an integrated strategy consisting of encouraging local production of bulk drugs by foreign firms, prohibiting the patenting of pharmaceutical products, limited patenting of pharmaceutical processes, price controls and encouraging cooperation between Indian firms and publicly funded laboratories.⁵⁴ The pharmaceutical product that arrived in the hands of Indian consumers thus was the product of a complex mix of pure and impure public goods and processes of private production and market competition.

In the post-TRIPS environment, India's capacity to regulate for the provision of public goods has been circumscribed by patent standards that require the recognition of patents on pharmaceutical products. Under these conditions, all developing countries face a more restricted set of choices when it comes to public goods in the context of health care. They can hope that under tighter and more global standards of excludability markets will provide the public goods they need at a price they can afford. Alternatively, they will have to fund the research into pharmaceutical products as a pure public good.

Mechanisms of power and coercion are also relevant to understanding why it is that the regulation of public goods fails to respond to the demands of citizens for higher levels of some public goods. There is evidence that citizens want more public goods in the form of higher standards in areas such as food safety regulation, consumer protection, environmental protection, and nuclear safety.⁵⁵ There is also evidence that preferences for public goods

⁵² S. K. Sell, 'Intellectual Property Protection and Antitrust in the Developing World: Crisis, Coercion, and Choice', 49 *International Organization* (1995) 315.

⁵³ As Reichman points out, TRIPS standards will set 'the level of competition for knowledge goods' in the global economy. See J.H. Reichman, 'The TRIPS Agreement Comes of Age: Conflict or Cooperation with the Developing Countries', 32 *Case Western Reserve Journal of International Law* (2000) 441, 442.

⁵⁴ Assad Omer, 'Access to Medicines: Transfer of Technology and Capacity Building', 20 *Wisconsin International Law Journal* (2002), 551, 559–60.

⁵⁵ See the references cited in John Braithwaite and Peter Drahos, above n 9, at 609.

are less price elastic and more other-regarding than preferences for private goods.⁵⁶

One reason those preferences do not, at the global level, get translated into international public goods has to do with the nature of global regulatory standard-setting processes. Those processes are not based on the collection of individual preferences and global social choice. Instead they involve contests of principles between complex alliances of state and non-state actors with different mechanisms at their disposal.⁵⁷

In environmental regulation, NGOs pursuing principles of regulation and sustainable development line up against business organizations interested in economic growth and deregulation. Moreover, some states, business organizations and multinational companies are able to draw on money and deploy mechanisms of economic coercion, such as trade sanctions, that are not available to other actors. One reason why big business is such an influential actor in areas ranging from food standards regulation to telecommunications is that it has the resources to send technical people to the thousands of standard-setting committees that end up defining the level of public goods in these areas.

Processes of regulatory globalization do sometimes result in the creation of public goods that many citizens would most probably support, but their emergence has little to do directly with those preferences.⁵⁸ The Montreal Protocol of 1987, which requires members to reduce their emission of ozone-depleting chemicals, is a global public good. Its creation was the product of a complex and fragile alliance of key US multinational producers, such as Du Pont, environmental NGOs, the Reagan Administration, the Nordic countries, Switzerland, Canada, and the United Nations Environment Program.⁵⁹ It is a good example of how an entrepreneurship of global public goods is possible under conditions of globalization.

CONCLUSION

One way to understand the obstacles to the provision of public goods is by analyzing the way in which preferences and incentive structures operate. A lot can also be gained by looking at the factors that differentiate them as well as their regulatory context. Once we attend to this context we can see that there is a range of issues that relates to both the provision and distribution of public goods. In the global regulatory context, states sometimes, in effect, have their sovereignty over the provision of public goods eroded. TRIPS and its effect on

⁵⁶ Daphana Lewinsohn-Zamir, 'Consumer Preferences, Citizen Preferences, and the Provision of Public Goods', 108 *Yale Law Journal* (1998), 377, 401.

⁵⁷ John Braithwaite and Peter Drahos, above n 9 at 7.

⁵⁸ Indirectly, the existence of such preferences helps to support and legitimate the work of public interest groups.

⁵⁹ John Braithwaite and Peter Drahos, above n 9, 264–65.

the provision of knowledge goods is a case in point. The provision of public goods may also fail if states do not have sufficient levels or kinds of primary goods that act as gateways to others. States may do much better in the provision of public goods if they match them in ways that produce complementarities. Mismatches produce a drop in efficiency.

Markets may deliver spontaneously some public goods (the free software movement), but this apparent spontaneity is itself an outcome of the regulation, both private and public, of other public goods, such as the commons. The regulation of public goods is full of surprises. Regulating the movement of private goods can inhibit, promote, or defeat the provision of a public good. Public goods are the subject of trades. In the case of nuclear regulation, one public good (technical data) was traded by the United States in order to set limits on the creation of national public goods (the use of nuclear technology for defense purposes by other states) in an attempt to achieve a global public good (non-proliferation). Mechanisms of power and coercion are fundamental to understanding the public goods that are and are not provided. Even where citizens reveal their preferences for public goods, the imperfect institutions on which they pin their hopes may fail to deliver them.