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REGULATION AND DEREGULATION: PROPERTY RIGHTS ALLOCATION ISSUES IN THE DE REGULATION OF COMMON POOL RESOURCES

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Regulation and Deregulation: Property Rights Allocation Issues in De Regulation of Common Pool Resources

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Abstract

Rights-based institutions have been adopted for certain natural resources in order to more effectively mitigate the losses of the common pool. Past central government (command and control) regulation has not proved satisfactory. In deregulation, a major issue has been the assignment of those rights and controversy over it has slowed the process. In this paper, I examine three different allocation rules: first-possession, lottery or uniform allocation, and auction and draw predictions as to when they might be adopted and why they are controversial. I analyze the assignment and nature of the rights granted for common-pool resources where deregulation has occurred: oil and gas unit shares, emission permits, and selected fishery ITQ's in six countries (Australia, Canada, Chile, Iceland, New Zealand, and the U.S). I find that first-possession rules dominate where there are incumbent users. Lotteries and auctions are rarely used. I discuss criticisms of first-possession rules and argue that first-possession is likely more efficient than previously recognized. Accordingly, restrictions on such allocations as part of deregulation (rights set-asides for particular groups and exchange limitations) may be costly in the long run for addressing the problems of the common pool.

I. Introduction.

Command and control regulation typically has been the first formal government response to mitigate the losses of the common pool. [1] Dissatisfaction with the subsequent performance of regulation, however, has resulted in a search for alternative institutional responses, including deregulation and the corresponding assignment of property rights of some type as part of market-based reforms. [2] For instance, Tietenberg (2003, 1) reported that tradable use permits were now used in 9 applications in air pollution control, 75 in fisheries, 3 in water, and 5 in land use control that previously had been regulated. Property rights approaches offer more flexibility, cost savings, information generation, migration to high-valued uses, and better alignment of incentives for conservation or investment in the resource. The more complete are property rights,

[1] See Hannesson (2004) for example for discussion of the process of regulation and subsequent shift to privatization in some previously open access fisheries.
[2] See Stavins (2003, 1998b) for discussion of the movement toward market-based instruments. This paper draws directly from discussion in Libecap (2007a, 2007b, 2007c).

the more the private and social net benefits of resource use are meshed, eliminating externalities and the losses of the common pool.[3] By contrast, centralized regulation relies more upon uniform standards, arbitrary controls on access, constraints on timing of use, and/or limits on technology or production capital, and hence, suffers from high cost, inflexibility, ineffectiveness, and industry capture. Further, regulatory decisions take place in the absence of information about alternative uses that market trades generate. Finally, centralized state regulatory rules may or may not align with the incentives of actual users of the resource. Generally, no party involved--actual users, regulators, politicians—is a residual claimant to the social gains from investment or trade.[4]

Deregulation through the use of property rights, however, requires adoption of an allocation mechanism. Because of distributional implications, allocation can be very controversial and conflict over distribution limits the adoption of property rights and their effectiveness in mitigating the losses of the common pool. At least some constituencies, including regulators, who benefited from the previous regulatory arrangement, will be disadvantaged under a new rights system and have incentive to resist the new arrangement. Other parties that previously used the resource will be denied access. Production under a property rights regime has a different composition of inputs and timing than what occurs under open-access or regulation, with negative impacts on certain groups of labor, input sellers, service organizations, and processors. These production changes are inherent in the efficiency gains of privatization. Further, as the resource rebounds and becomes more valuable, new owners have wealth, status, and political influence not available to those without access privileges. These distributional factors, along with the costs of bounding, measurement, and enforcement constrain

[3] Libecap (1989), Dahlman (1972).
[4] Johnson and Libecap (1994, 156-71)

the extent and timing of the assignment of property rights to address the potential losses of the common pool as part of a process of deregulation.

II. Open-Access, Regulation, and the Allocation of Property Rights.

The Losses of the Commons

The losses of the commons are well known. Garrett Hardin's, "The Tragedy of the Commons" (Science, 1968) made clear in the popular scientific press what resource users had always understood, that open-access can result in important economic and social costs.[5] Hardin was not the first to call attention to the tragedy of the commons, however. More than a decade before his article, H. Scott Gordon (1954) clearly outlined similar logic in another classic: "The Economic Theory of a Common-Property Resource: The Fishery. Gordon=s analysis was extended by Scott (1955), Cheung (1970), among others.

Central State (Command and Control) Regulation

The first formal response to the commons generally has been central, command and control regulation of entry and production to include: a). restrictions on access or time of use, such as limits placed on non-citizens or non-residents in fisheries; b). equipment controls, such as on vessel size or technology used in fisheries and uniform requirements for scrubbers on power plants; and c). extraction regulations, such as prorationing in oil production and air pollution emission controls. The aim of these regulations is to constrain output to more optimal levels and thereby avoid some rent dissipation.

State regulation is the initial resort for a number of reasons. One is that it avoids the complex, costly, and controversial allocation of more definite property rights, which could directly address the problem of externalities. Second, state regulation may involve lower costs of

[5] Discussion drawn from Libecap (1998).

measurement, bounding, and enforcement, and if the resource is of relatively low value, more definite property rights may be too costly to be an option. [6] Another reason is that state regulation is consistent with the notion that many natural resources are rightly "public" with ownership reserved in the state rather than in private parties. Similarly, if there are important public goods associated with the resource, then state ownership and regulation of access may be optimal. Finally, state regulation can advantage certain influential political constituencies who mold regulatory policy in their behalf. While market processes are relatively transparent, political and bureaucratic processes are less so, facilitating preferential treatment to certain parties.[7]

Allocation of Property Rights

Often, state regulation involves high cost and inflexibility and is ineffective in stemming open-access losses. If the resource is of high enough value to warrant adoption of more definite property rights and resort to more flexible market processes, then deregulation can occur. But property rights arrangements are costly and how they are implemented affects their timing and efficacy in addressing the bsses of the commons. There are several allocation mechanisms:

First-Possession Rules.

As we will see, first-possession is the dominant method of establishing property rights.[8] It assigns ownership on a first-come, first-served basis or first-in-time, first-in-right. First-possession rules are attractive because they recognize incumbent parties, who have experience in exploiting the resource and hence, may be the low-cost, high-valued users. Incumbents also have a direct stake in access to the resource and will be important constituents in any property rights distribution. They are concerned about past investment in specific assets, which otherwise would

[6] See Alston, Libecap and Schneider (1996) for discussion of the emergence of property rights as resource values change.
[7] For discussion of the problem of oversight when information is limited, see Johnson and Libecap (2001).
[8] See discussion of first possession in Epstein (1979), Rose (1985), and Lueck (1995, 1998).

not be deployable to other uses. Since first-possession rules recognize these investments, this security should encourage future outlays. Allocations that do not consider the position of incumbents will face opposition, raising the costs of rights assignment and enforcement.[9]

First-possession rules also recognize valuable risk taking by innovators and entrepreneurs, who first experiment with and use a resource. Further, under first-possession the market determines optimal claim size, whereas under other allocation arrangements bureaucratic or political objectives define the assignments. If these are not consistent with optimal production size then further trade is required. Hence, first-possession can economize on transaction costs.[10] Examples of first-possession rules include allocating property rights based on historical catch in fisheries, on past fuel use in emission permits, prior appropriation in water rights, and on novelty in patent and copyright assignment.

A criticism of first-possession is that it can encourage competing parties to race for ownership and to dissipate rents. If the parties are homogeneous, then full dissipation is possible. If, on the other hand, the parties are heterogeneous and the property rights are long-term and secure, then allocation losses will be more limited.[11] There are costs with any rights allocation rule, and the "winners" of such a race may be the most efficient producers. Accordingly, first-possession may not be more costly than other assignments. Generally, if the transaction costs of subsequent exchange are high, then it makes sense to assign rights to low-cost users with histories of past involvement in the resource.

Despite their ubiquity, first-possession rules can conflict with fairness considerations, and this situation raises political opposition to them in the assignment of property rights. First-

[9] See also, Tietenberg (2003, 10).
[10] See Epstein (1979).
[11] Johnson and Libecap (1982) show that heterogeneity among fishers limits rent dissipation even under open-access and the rule of capture.

possession discriminates against new entrants. If first-possession ownership is viewed as rewarding those who by luck and connections were allocated the right, then they may be opposed or their returns taxed.[12]

Uniform Allocation Rules.

Equal sharing rules avoid the distributional concerns associated with first-possession and better reflect egalitarian goals. If there are no restrictions on subsequent exchange of property rights and transaction costs are low, there are few efficiency implications. The resource still migrates to high-valued users. Uniform allocations also avoid the measurement costs of verifying claims of past production or use or of documenting precedence claims that are part of first-possession assignments. They can also avoid the costly pursuit of property rights when first-possession is known to be the allocation rule. Lotteries are examples of uniform allocations because each claimant is given an equal, random draw in the assignment of rights to the resource. Uniform allocations are most effective when applied to new resources where there no incumbent claims and all parties are relatively homogeneous.

Auction Allocation.

A third allocation mechanism is auction. It can directly place asset into the hands of those who have the highest value for the asset. It thereby avoids the transaction costs of re-allocation. Auctions also generate resources for the state and avoid the windfalls that might be considered unearned and divisive. Auction returns can be used to cover the costs of defining and enforcing property rights and other costs of resource management. As with lotteries, auctions work best for new, unallocated resources where there are no incumbent claimants and where resource values are very high. By granting more of the rents to the state, auctions reduce the distributional implications of first-possession or uniform-allocation. As with other allocation arrangements,

[12] Alesina and Angeletos (2005, 960-80).

there are costs to auctions. The state must be able to measure and enforce resource boundaries and individual allocations secured by auction. The terms of the auction may also be influenced by competing claimants who lobby for rules that provide them with specific advantages. Because of their design costs and opposition by incumbent users, auctions are not used as often as economists have predicted.[13] With these concepts in mind, we now turn to environmental and natural resources where rights institutions have been adopted to augment or replace central regulation: oil and natural gas, air pollution emission permits, and fisheries.

III. Allocation of Rights to Subsurface Oil and Gas Reservoirs in North America.

In the United States and Canada rights to access oil, natural gas, and other minerals generally are assigned to surface land owners. Actual ownership of subterranean oil and natural gas comes through the common law rule of capture, which creates conditions for competitive open-access extraction if there are multiple surface owners above the deposit. The first response to open-access was state regulation of production, with most regulations adopted in the U.S. between the early 1930s and 1960. Libecap and Smith (2002) describe the pattern of state regulation of oil and gas production. Overall production "allowables" were determined each year in each state based on geologic conditions and more importantly, on estimated oil demand and supply. These allowables were then prorated among the regulated firms as annual production quotas. Quotas were based on past production and investment, such as the number and depth of existing wells on a lease. The latter variables encouraged denser drilling of deep, costly wells in order to increase quota size, and thereby shifted regulated production from low to high-cost producers. Further to gain their political support for regulation, the owners of numerous small,

[13] Tietenberg (2003, 10) notes that auctions were used extensively in just one ITQ in Chile. Historical catch was the dominant allocation mechanism. Lueck (1998, 136), McMillan (1994) points to the costs of auctions.

high-cost firms in Texas were able to obtain exemption from prorationing rules for their so-called "stripper" wells (very high-cost, low-production wells). These and other preferences to high-cost small firms reduced the overall benefits of regulation by over $2 billion annually by the early 1960s. As a result, state regulation (prorationing) was criticized as being very costly.[14] There were calls for less reliance upon regulation and more on private production controls through unitization through deregulation.

Under unitization, production is delegated through negotiation to a single firm, the unit operator, with net revenues apportioned among all parties on the field (including those that would otherwise be producing). As the only producer on the field and a residual profit claimant, the unit operator has incentive to maximize field rents. Accordingly, unitization results in important economic gains: a time stream of output that more closely approximates the rent-maximizing pattern, increased oil recovery, and reduced wells and other capital costs.

Despite these attractions and advantages over central state regulation, conflicts over the allocation of unit shares or property rights have slowed unitization.[15] Wiggins and Libecap (1985) examine the bargaining problem underlying unit formation and Libecap and Smith (1999) describe the nature of a complete unit contract. As a result of conflicts over allocation, unit agreements can take a very long time to negotiate or breakdown and result in incomplete units that cover only part of a field. In their detailed analysis of 7 units in Texas and New Mexico, Wiggins and Libecap found that they required from 4 to 9 years from the time negotiations began until agreements could be reached. Moreover, in 5 of the 7 cases the acreage in the final unit was less than that involved in the early negotiations. With incomplete units, part of the reservoir remains open-access or is organized into competitive subunits with significant losses. In the case

[14] Libecap and Smith (2002, S595).
[15] Libecap (1989, 93-114).

of Prudhoe Bay, North America's largest producing field, Libecap and Smith describe a lengthy and contentious bargaining process. The field was discovered in 1968 and unit negotiations began in 1969. The first unit agreement was not reached until 1977 and was revised at least seven times due to disputes among the key producers over natural gas and oil valuation, investment, and production. In 1999 British Petroleum, one of the largest producers on the field, purchased ARCO, the other major operator, to effectively complete unitization of the field.

To speed the process of unitization and deregulation, states have intervened with so-called compulsory or forced unitization statutes as the costs of reliance solely on prorationing became apparent. These statutes relaxed unanimity voting requirements for share allocations. Between the late 1940s and the 1960s, all oil-producing states, except Texas adopted some form of forced unitization law to facilitate unit formation. Only in Texas was the power of small firms sufficiently great to block the legislation. Not surprisingly, Texas has a lower share of production from fully-unitized fields than does other states. It also has had more high-cost producers than other states.

IV. Allocation of Air Pollution Emission Permits.

Early regulatory efforts to reduce air pollution in the U.S. generally were costly and not effective. They relied on relatively inflexible, uniform air quality standards and required that polluting firms meet them. Regulation included rules on emissio ns, equipment to be used, such as types of scrubbers and performance standards. The uniform rules did not recognize that the costs of controlling emissions varied across and within firms. Traditional regulation gave advantages to old plants and technology. There were few incentives to develop new technologies, and central regulation was often used politically to disadvantage certain firms and

regions at the behest of entrenched interests with little environmental benefit.[16] Beginning in the mid 1970s dissatisfaction with the costs and performance of centralized air pollution regulation led to deregulation and adoption of emission trading programs, despite some resistance from regulatory agencies.[17] .

Under deregulation, an annual targeted level of emissions is set and then prorated across permit holders, who are allowed to discharge a specified amount of pollution. The permits have been allocated through first-possession, based on past electricity production, heat generation, fuel use or emissions, free of charge. In some cases, a small portion, about 2 percent, have been auctioned to provide flexibility and to allow new entry by firms that did not have production histories. These emission permits are a right to use the air to discharge waste products in production. They can be traded and an active market has developed in most emission systems where tradable permits have been used.[18] Rather than equating pollution levels across firms, these instruments equalize incremental abatement costs. Those firms with pollution below their allowable allotments can sell the residual emission rights, apply them to offset excess emissions in other parts of their operations, or bank them. As an example, consider SO_2 deregulation and trading under the 1990 Clean Air Act Amendments. There are various estimates of the cost savings of the program, but they range from $5 to $12 billion over the command and control regulation alternative.

The objective was to reduce SO_2 and NO_x emissions by 10 million and 2 million tons respectively from their 1980 levels. These are the principle gases associated with acid rain and they largely were emitted by electrical utilities. Two phases were used. Phase I, which ran through 1995, assigned emission permits to over 400 electrical generating plants and Phase II,

[16] Pashigian (1985).
[17] Dewees (1998).
[18] Tietenberg (2003, 12), Stavins (2003, 4).

which extended regulation to almost all generating units.[19] Total emissions were gradually reduced each year to achieve the targeted level.

Emission permits were granted on first-possession so that existing polluters were grandfathered and newer units were disadvantaged. There is no available information on how negotiations over pollution rights may have slowed the process of deregulation. Nevertheless, politics clearly played a role. Utilities that began operating in 1996 and thereafter had to purchase their allowances on the open market. Phase I allowances were allocated free of charge based on past power generation as indicated by heat input. The allocation formula granted emission rates of 2.5 pounds of SO_2/mmBtu (million British thermal units) of heat input, multiplied by the unit's baseline, mm Btu (the average fossil fuel consumed from 1985 through 1987). Utilities in key states such as Illinois, Indiana, and Ohio were allocated an additional 200,000 allowances annually during Phase I. In these states there were important coal interests and all had ranking members or chairs of key Congressional subcommittees.[20] Additional allowances were granted to plants where scrubbers had been installed that reduced SO_2 emissions by 90 percent and to plants where emissions were reduced through use of renewable energy. A small portion of the allowances, 2.8% of the total allowances for a year, were auctioned by the EPA.[21]

Phase II allowances are part of a tighter overall annual emissions cap. The formula used in determining the initial allocation took an emission rate of 1.2 lbs of SO_2/mmBtu of heat input, times the unit's baseline. As with phase I, exceptions and additional allowances were made for political and technical reasons. Additional allowances were allocated to units that did not perform at their capacity during the base year due to equipment malfunctions. Greater allowance

[19] Stavins (1998b, 6-13).
[20] Ellerman (2000, 40-43).
[21] Ellerman (2000, 8-9)

allocations were granted to smaller units.[22] An opt-in program also was used to encourage very low-polluting utilities to enter by granting them allowances which could be traded to others.

V. Allocation of ITQ's in Fisheries.

Wild ocean fisheries are classic open-access resources. Over entry, over fishing, over capitalization, falling catch per unit of effort, and depleted stocks follow from the fugitive nature of most species, distances involved, overlapping political jurisdictions, and large numbers of heterogeneous, competing fishers.[23] The implications of open access have been understood for a very long time (Gordon, 1954), yet Grafton, Squires, and Fox (2000) described the dramatic wastes of over fishing and regulation in the Pacific Northwest halibut fishery, and a 2003 *Nature* article by Myers and Worm (2003) reported that the world's major predatory fish populations were in a state of serious depletion.[24]

Historically, the initial response has been command and control regulation with denial of access to certain groups—non-citizens with expansion of the Exclusive Economic Zones (EEZs), sports versus commercial fishers, inshore versus offshore fishers, large-vessel versus small-vessel fishers, or vise-versa, and so on. This action temporarily reduced fishing pressure, but it did not solve the fundamental problem which is that rents exist for those who can find ways around the regulations.

As these failed, new command and control regulations such as fixed seasons, area closures, and gear restrictions were put into place. These arrangements are politically attractive to regulators because they do not upset *status quo* rankings, minimize existing transaction costs,

[22] Ellerman (2000, 43-48).
[23] Libecap and Johnson (1982), Leal, (2005), Tietenberg (2003, 5-12), and Hannesson (2004) for discussion of the emergence of various regulatory/property regimes.
[24] A similar conclusion for deep-sea fisheries was reported by Devine, Baker and Haedrich (2006), also in *Nature*.

and call for major regulatory mandates, which are attractive to regulators and politicians. But they have not been successful. They do not align the incentives of fishers with protection of the stock. Further, given heterogeneous fishers and limited and asymmetric information about the stock and the contribution of fishing relative to natural factors, there are disputes about the design and efficacy of these regulations. Finally, there is no basis for fishers to contract among themselves to reduce fishing pressure and thereby to capture the returns from an improved stock. There are no property rights to exchange.

With deregulation, there has been a turn to individual transferable quotas (ITQ's) in some fisheries, after continued declines in the stock under centralized regulation. ITQ's require restrictions on entry, the setting of an annual total allowable catch, TAC, the allocation of rights or quotas to a share of the TAC, and enforcement.

The more secure, definite, durable, divisible, and permanent the ITQ, the stronger is the property right. And stronger property rights better link the incentives of fishers with the goal of maximizing the economic value of the fishery. The value of each quota as a share of the TAC depends on the state of fish stocks and the sustainability of the fishery.[25] Enforcement costs may decline relative to those under other forms of regulation because fishers have a stake in the preservation of the stock as shareholders in the right to fish and self-monitor.

There are efficiency advantages to first possession. Assigning quotas to those with knowledge and past experience in the fishery is consistent with granting rights to the low-cost users. This practice reduces the need for subsequent re-allocation and therefore, economizes on transaction costs. Reserving the fishery rents to fishers, rather than granting them to the state via auctions, also, enhances long-term incentives of fishers for protection of the stock and provides incentives for investment. Collaboration between fishers and regulators in setting the TAC not

[25] Arnason (2002, 1).

only reduces resistance to the catch limit, but incorporates stock and habitat information collected by the industry.[26]

Other parties, such as processors and other input suppliers (crews, dock owners, boat and equipment sellers and support providers) and their communities, however, may be adversely affected by changes in harvest patterns made possible by ITQ regimes. There are additional concerns that transferability of quotas and associated consolidation of the industry, which also bring efficiency gains, will gradually squeeze out small vessel owners. Regulators also may resist ITQ's because of a potentially reduced regulatory mandate or diminished ties to specific constituents that become less active in the fishery under the ITQ. The following summarizes selected ITQ allocation issues in fisheries in five countries, Australia, Canada, Chile, Iceland, New Zealand, and the United States.

Australia

There are at least 20 ITQ-managed fisheries in Australia, covering about 34 percent of the volume and 22 percent of the value of the country's fisheries.[27] The dominant allocation method is first-possession based on historical catch. Prior investment plays a smaller role. There are equity considerations in certain fisheries leading to equal or uniform quota distributions and/or restrictions on the maximum and minimum amounts of quotas that can be held as well as requirements that quotas be exchanged only among license holders. ITQ's in Australia are comparatively strong property rights, being permanent, divisible, and transferable, and apparently can serve as collateral for long-term loans.

Canada

[26] See criticism of grandfathering in Fullerton and Metcalf (2001).
[27] Arnason (2002, 3-11).

There are ITQ's in about 40 fisheries in Canada, accounting for over 50 percent of the value and volume of landings.[28] In established fisheries, allocations are based on historical catch, modified by vessel size, capacity, and recent investment. The quotas are granted without charge. Most quotas, such as those for Pacific halibut (1991) and sablefish (1990), were adopted between 1982 and 1998. In one newer fishery, the North Atlantic shrimp fishery, a uniform quota allocation of the TAC was used. In that fishery there were only a small number of licenses and limited historical catch records. In Canada, ITQ's as property are weaker than in Australia. They do not have the legal status of property, but rather held as a use privilege, subject to renewal and regulation. In most fisheries there are no limits on number of quotas that can be held, but there are no guarantees of permanence. Their term is the same as the fishing license, which generally is more or less automatically renewed.

Chile

In 2002, there were four ITQ fisheries in Chile, the squat lobster, yellow prawn, black hack, and orange roughy.[29] Unlike the Australian and Canadian systems, initial allocation was by auction, followed by annual auctions of 10 percent of the outstanding quota shares. There are few participants (less than 10) in each of these fisheries so that allocation issues may have been less contentious. The ITQ's are transferable, divisible, and are not linked to a vessel. There are no maximum limits on the number of quotas that can be held by a firm, but during the annual auctions no firm can bid for more than 50 percent of the TAC. Based on the success of these ITQ's, they are being extended to other established fisheries, and are to be allocated through first-possession, based roughly on 50 percent weight on historical catch for the past four years

[28] Arnason (2002, 12-17).
[29] Arnason (2002, 18-23).

for purse seiners and past two years for trawlers, and 50 percent vessel hold capacity. There are restrictions on transferability to existing fishers.

Iceland

Iceland is one of the first countries to adopt ITQ's.[30] Herring quotas were implemented in 1975 and 1979; quotas in the capelin fishery in 1980 and 1986; quotas in the demersal fisheries in 1984; and ITQ's to all fisheries in 1991. 16 species are covered for 95 percent of the volume of the total catch. The quotas were granted without charge and include a right to catch a given proportion of the TAC every year. TAC shares are divisible and transferable. In the demersal, lobster, scallop, and deep-sea shrimp fisheries, ITQ's were allocated on the basis of vessel historical catch, 3 years prior to quota system adoption. In the herring and inshore shrimp fisheries, where smaller vessels may have predominated, there were initially equal shares for eligible vessels. There have been some restrictions on the transfer of annual quotas between geographical regions to protect local employment, and recent requirements that vessels holding quotas must be involved in harvest.

New Zealand

New Zealand is also one of the first countries to adopt ITQ systems.[31] After declines in deep water stocks within the 200-mile EEZ, New Zealand adopted ITQ's in 1983 based on 1982 catch volume and vessel capacity. In 1986 an inshore ITQ system was adopted for vessels active in 1985 based on 1982-4 catch histories. In both the offshore and inshore fisheries ITQ's initially were fixed quantities, but these were changed to shares in 1990. Equity concerns led to assignment of 40 percent of the quota to the Maori. The ITQ's are permanent, divisible, and

[30] Arnason (2002, 24-33).
[31] Arnason (2002, 45-51).

transferable, with no restrictions on trade among participants. The rights apparently are as secure as those that exist for land. The rights security is similar to that found in Australia.

United States

ITQ's are more limited and are a weaker property right in the U.S. than in many other major fishing countries.[32] Only four U.S. marine fisheries operate under such regimes: the Mid-Atlantic surf clam and ocean quahog fishery, the Alaskan halibut and sablefish fishery, and the South Atlantic wreckfish fishery, all adopted in the early 1900s. Two extensions were under consideration in 1995 for the Gulf of Mexico red snapper and Pacific sablefish fisheries, but tabled with the 1996 Congressional 4-year moratorium on further ITQ's.[33] The ITQ's are a permanent share of the TAC, divisible and tradable. They are allocated on the basis of historical catch at no charge.

In the Alaska halibut and sable fish fisheries, allocations went only to vessel owners who had landings during 1988-90 (historical catch) and were based on the best five of seven harvest years between 1984 and 1990 for halibut and best five of six harvest years between 1985 and 1990. Quotas go the vessels and owners must be on the vessels (a type of beneficial use requirement). Part of the halibut TAC is reserved for community development quotas. ITQ's in these two fisheries are weaker than in the others. There are restrictions of transferability to those in same management area and vessel class involving fishers with 150 days commercial fishing and there are minimum and maximum quota limits. Moreover, only transfers from larger to smaller vessel classes are permitted, and no individual is allowed to own more than 0.5 percent

[32] Arnason (2002, 52-7).
[33] The Sustainable Fisheries Act (PL 104-297).

of the total quota. There are other controls on share consolidation to limit holdings and to maintain a targeted number of vessels in the halibut fleet.[34]

VI. Concluding Remarks.

Deregulation of many common pool resources has taken place through the adoption of property rights arrangements of some type. This institutional change has occurred as central regulation has failed to stem the losses of the commons. Allocation of property rights, however, has been a major issue in determining the timing and extent of deregulation. Table 1 summarizes the distribution of property rights for oil and gas unit shares, air pollution emission permits, and individual transferable fishing quotas in six countries. As shown, first-possession allocation rules dominate where incumbent users existed at the time of establishing the rights regime under deregulation. Auctions are adopted very infrequently. Although first-possession is criticized by many economists as being inefficient, its empirical regularity suggests that there are efficiency advantages beyond political expediency. Equity issues, however, often have constrained the type of property right assigned. The more limited the property right, the less effective it will be in addressing the losses of the commons.

There is the potential for waste due to a race to establish credentials for the subsequent assignment of use rights if first-possession is known to be the allocation rule and the parties are homogeneous. Just how important this problem is depends on the empirical case at hand. In general, for most of the resources examined here, there was a long history of prior use before the introduction of rights-based institutions and the claimants were heterogeneous. Hence, the real costs of race may have been comparatively low.

[34] Doyle, Singh, and Weninger (2005).

In every case except for oil and gas unit shares, the rights granted are use rights only. They are not a right to the resource itself. In general, ownership of the stock is much more difficult to define and enforce than to the flow of use. Political factors also have influenced the nature of the rights system. In fisheries, for example, preferential assignments to certain groups of fishers (small, community) and accompanying restrictions on exchange lower the value of the rights and the value of the fishery.

Table I

Summary of Allocation Mechanisms in Deregulation of Natural Resources

Resource	Nature of the Property Right	Allocation	Allocation Constraints
Oil and Gas Unit Shares.	Full, legal property right.	First Possession (Rule of Capture).	No restrictions on trade. Small producers granted preferences in regulation and restrictions on mandatory unitization laws in Texas.
Air Emission Permits.	Use rights. Explicitly, not a property right.	First Possession Limited (2.8%) Auction in Phase I.	Some preferences to coal using states in SO_2 permits. More restrictions on banking in RECLAIM.
Certain Fishery ITQs			
Australia.	Use rights. Legal property right.	First Possession (historical catch, some past investment).	Some quota trade restrictions.
Canada.	Use rights. Not property.	First Possession (historical catch and past investment and vessel size). Uniform allocation	Some quota trade restrictions.
Chile.	Use rights.	Auction. First Possession (historical catch and vessel size)	Some quota trade restrictions.
Iceland.	Use rights. Fairly strong property right	First possession (historical catch, vessel size).	Some quota trade restrictions.
New Zealand.	Use rights. Legal property right.	First Possession (historical catch and past investment).	Some quota trade restrictions. Reservation of quota share for Maori.
U.S.	Use rights. Uncertain.	First Possession (historical catch).	Some quota trade restrictions. Community quota reservations. Actual fishers.

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