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## THE CREDIBILITY OF EXIT THREATS: REFINING THE “RACE TO THE BOTTOM” DEBATE

*Rachel I. Massey*

This essay explores the question of whether industry mobility poses challenges to environmental protection. I review the empirical studies that are frequently invoked in the debate over a possible “race to the bottom” in environmental standards, and argue that these studies fail to focus on the test cases that would be most illuminating for this debate. I suggest that in order to gauge the risk of a “race to the bottom,” it is necessary to consider the bargaining relationships that exist between states and firms. In particular, environmental protection efforts may be impeded if firms are able to make credible exit threats in response to increased environmental regulation. I suggest four factors according to which the credibility of potential exit threats may be estimated: size of required fixed investment; extent of product differentiation; environmental impact abatement costs as a proportion of total costs; and reliance upon a local, exhaustible natural resource.

### INTRODUCTION

The pursuit of economic integration raises questions about the extent to which countries should harmonize environmental standards. According to one common but controversial formulation, as industry mobility increases, states’ autonomy to determine domestic environmental policy diminishes. They find themselves drawn into a “race to the bottom,”

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*Rachel I. Massey is a Master of Public Affairs candidate at the Woodrow Wilson School of Public and International Affairs, Princeton University.*

ratcheting standards downward in the competition to attract footloose industry. While it is widely acknowledged that collective action problems contribute to the difficulty of resolving transboundary environmental problems such as global climate change and acid rain, the “race to the bottom” formulation suggests that international collective action problems can also undermine domestic environmental protection programs within individual states. If correct, this view has significant policy implications, suggesting that states must agree on international standards if they are to protect domestic environmental quality.

Is a “race to the bottom” in environmental standards likely to occur? Is there any proof that it has occurred in the past? I argue that the empirical studies on which the “race to the bottom” debate relies are insufficient to answer these central questions. The majority of these studies have focused on the industry sectors in which, I suggest, a “race to the bottom” is least probable.

To answer properly the question of whether industry mobility poses problems for environmental protection, scholars must turn their attention to the cases where problems are most likely to arise. If it can be shown that industry mobility poses no risk to environmental standards in the situations deemed most likely in principle to produce such a risk, then the “race to the bottom” debate should be laid aside in favor of more pressing topics. On the other hand, if a study of the highest-risk cases reveals that some states *are* constrained to keep environmental standards low in order to attract or retain mobile firms, then the search for policy remedies can be undertaken with a clear vision of where the problems exist.

As a first step toward refocusing the empirical research agenda, I propose an examination of the bargaining relationship between states and firms. This paper focuses on one central factor in this relationship: the credibility of firms’ threats to relocate. All other things being equal, the more credible a firm’s threat to relocate out of a state, the more power it may have to gain concessions, including lax environmental standards, from that state.<sup>1</sup> Once industries have been identified in which firms are most likely to have significant bargaining power, empirical work can be redesigned to answer the “race to the bottom” question more thoroughly than has been done in the past.

### THE “RACE TO THE BOTTOM” DEBATE: A REVIEW OF THE LITERATURE

Richard Revesz is a high-profile proponent of the view that there has been and will be no “race to the bottom” in environmental standards. Revesz’s

argument is centered on the concept that states compete not only for industry location but also for residents. Thus each state will balance the advantages of a clean environment against the advantages of employment and will choose the combination that is most attractive to actual or potential residents of the state. Revesz and other proponents of this view emphasize the differences among states both in "preferences" for environmental goods and in environmental carrying capacity. Just as one state may have lower labor costs than another or may be rich in a resource that another lacks, similarly the citizens of one state may be less concerned about environmental protection than others or their environment may possess an exceptional capacity to absorb pollutants. Industry mobility does not push environmental standards down; rather, it enhances states' access to the benefits of comparative advantage (Revesz 1992, 1997a, 1997b). Revesz and other optimists also note that through trade openness, the invisible hand of the market may promote the upward harmonization of environmental standards (see, for example, Vogel 1995).

On the less sanguine side of the debate, Daniel Esty has argued that industry mobility can undermine states' environmental protection programs (Esty 1994, 1996; Dua and Esty 1997). Although loosely categorized as a believer in the "race to the bottom," Esty does not actually argue that countries will respond to industry mobility by actively dismantling their environmental protection laws. Rather, in Esty's terms, international competition for industry location is likely to produce "political drag," or a "regulatory chill." According to this view, the fear of losing important industry, or of failing to attract new industry, may lead states to be lax in enforcing environmental protection laws or may impede them from strengthening existing regulations. Esty and other proponents of this view refer to anecdotal evidence of experiences in which the development of stringent environmental protection was impeded by the fear of losing essential industries. In general, however, Esty argues that this "drag" or "chill" is next to impossible to measure empirically.

### **Empirical Tests**

The "race to the bottom" debate in international law and policy circles has its roots in two economic hypotheses. The "industrial flight hypothesis" posits that industries will exit a developed country as it increases its environmental standards, fleeing to locations where regulations are lax. The "pollution haven hypothesis" predicts that developing countries will compete among themselves to offer firms the most lenient environmental regulations (Anderson and Blackhurst 1992). These twin hypotheses form

the basis for an expectation that environmental standards in both the developed and the developing world will suffer as a result of industry mobility. It is important to note that these hypotheses imply no normative assumptions about whether environmental standards should be high or low. They imply only that industry will move toward countries with lower standards, and that some countries will keep standards low in order to attract industry.

Most of the empirical studies that have tested the “industrial flight” and “pollution haven” hypotheses have found little evidence supporting these models (Bartik 1988; Dean 1992; Engel 1997; Eskeland and Harrison 1997; Kopp et al. 1990; Lucas et al. 1992; Tobey 1990; Dunning 1993). A series of studies reviewed by Pearson (1985) found that in the U.S. the effects of environmental regulations on operating costs were not significant enough to produce any major change in trade patterns. One study did show, however, that in certain very hazardous industries, such as those producing asbestos and certain pesticides, there was a discernable pattern of migration out of the U.S. In a study of his own included in the review, Pearson estimates the possible advantage for a developing country of maintaining environmental standards lower than those in the developed world. He concludes that a developing country will gain only a small and short-term benefit from relaxing environmental standards in order to attract industry. While this study provides a convincing argument that reducing environmental standards to attract industry is unwise, it is of course easy to imagine a government that would nonetheless choose to lower standards for the sake of a one-time boost in exports.

Jeffrey Leonard (1988) finds little to no evidence of industry behaving in accord with the “industrial flight” hypothesis. Through detailed case studies he does, however, find evidence of government officials keeping environmental standards low in the hopes of attracting industry. He also finds that these efforts were unsuccessful. Thus Leonard supports Pearson’s view that there is little advantage for developing countries in becoming “pollution havens,” but demonstrates that countries may do so nonetheless. He also makes the important point that when an industry is in decline, industrial flight may become a more attractive option to firms than it would be at other times.

In a 1992 study, Patrick Low and Alexander Yeats developed a roster of the world’s “dirtiest” industries, identified by the level of their expenditures on pollution abatement measures. Like their predecessors, they found little evidence of variations in these industries’ location decisions or activities that could be correlated with changes in environmental regulations. In a review conducted in the same year, Judith Dean summarized

studies that tested whether the phenomenon of industry flight to pollution havens had occurred. Again, investment patterns showed no evidence that firms were basing their location decisions on environmental standards.

Adam B. Jaffe et al. (1995) conducted an exhaustive review of empirical studies testing the competitiveness effects of environmental regulations on manufacturing industries in particular. The explicit motivation for their study was to determine whether maintaining or increasing environmental protections in the U.S. would undermine the competitiveness of U.S. industry. These scholars locate themselves within a polarized debate, between arguments that environmental regulations would be disastrous for U.S. industry, on the one hand, and arguments that higher standards would boost innovation and competitiveness, on the other. Jaffe et al. conclude that neither perspective in this debate is supported by the data.

In a more recent review, Pearson (1996) notes that few studies have attempted to measure the potential effects of future environmental regulations that developing countries might undertake. Most focus simply on the effects of past environmental regulations adopted in developed countries. He notes further that nearly all the relevant studies focus on regulations that address pollution, and that regulations intended to control natural resource depletion have been largely overlooked. Pearson suggests that natural resource-intensive industries that produce commodities may be particularly likely to exhibit an "industrial flight" dynamic.

Konrad Von Moltke et al. (1998) address the trade and environment question from the perspective of product analysis, focusing on the neglected area of natural resource-intensive commodities production. Von Moltke et al. note that when there is no way for consumers to distinguish the origin of a commodity, they cannot judge the conditions under which the commodity was produced and therefore have no means to communicate their preference for environmental protection to firms. If one producer were to improve environmental standards in a way that necessitated price increases, there would be no way for consumers to identify that good among the cheaper alternatives provided by competitors. Thus the very structure of commodities markets can impede environmental protection initiatives.

### **TOWARD AN INDUSTRY TYPOLOGY**

While the studies reviewed above are invoked in the discussion of whether industry mobility poses problems for environmental protection, most of them were not conducted with a view to answering that particular question. The majority were intended to determine whether the U.S. should limit the stringency of its environmental regulations in order to

remain competitive internationally. While the studies provide convincing arguments in response to that question, they do not provide us with the means to judge definitively whether industry mobility poses challenges for environmental protection worldwide. In this section, I propose a framework intended to elucidate the factors shaping bargaining relationships between firms and states. By increasing the precision with which we understand a firm's "exit" option, we may be able to identify the cases in which industry mobility has the greatest potential, in principle, to undermine states' regulatory abilities.

Presuming that firms are rational profit maximizers, a firm should relocate whenever the cost of complying with a new regulation is greater than the cost of relocating. However, the situation is seldom this simple. One can expect that a firm's location decisions will be based not only on current costs but also on expectations of future costs. Furthermore, the bargaining process between the firm and the state may be more important than the firm's actual analysis of potential costs. We can assume that bargaining between the state and the firm is based on imperfect information. The firm wishes to retain as much control as possible over rents, and the state wishes to appropriate as much as possible of these rents. It is this bargaining dynamic, not the extreme cases in which an environmental regulation might actually make it uneconomic for a firm to continue operations in a given location, which will drive the "regulatory chill" to which Esty refers, if it occurs at all.<sup>2</sup>

### **The Vocabulary of "Exit" and "Voice"**

In *Exit, Voice, and Loyalty* (1970), Albert Hirschman proposes a simple yet illuminating vocabulary to describe the options available to members of "organizations," ranging from firms to nations. If members of an organization are dissatisfied with some aspect of its operations, they may exercise their "exit" option by ceasing to take part. Alternatively, they may exercise their "voice" option by expressing their concerns and attempting to change the organization from within. Some organizational structures, Hirschman notes, make it easier for individuals to choose "exit." Other structures bind their members, constituents, or consumers in a manner that increases the likelihood that they will use "voice." Thus, in a situation of perfect competition among firms, consumers are likely to exit if one firm's product declines in quality. Under monopoly conditions, consumers are more likely to use their "voice" option to demand the products they desire. Using the terms of Hirschman's framework, then, this paper considers the ways in which the presence of an exit option for firms may affect environmental outcomes.

### **A Model Typology**

In proposing a way to categorize firms according to the credibility of their potential exit threats, I draw most directly on a similar undertaking by Theodore Moran (1985).<sup>3</sup> Moran analyzes the process by which a firm may judge the security of the rents from its foreign direct investments, given the ever-present possibility of state appropriation of the firm’s assets. He identifies five industry characteristics as crucial determinants of how vulnerable a firm is in relation to the state:

1. Size of required fixed investment. The larger the required fixed investment, the more vulnerable the firm is in negotiations with the state. The smaller the required fixed investment, the more credibly the firm can threaten to withdraw from the country if conditions are not favorable.
2. Extent of actual or potential competition among investors. The more foreign investors there are, the greater power the government will have to play them off against one another.
3. Technology associated with the project. The bargaining relationship between the firm and the state may vary according to the nature of the technologies required for production.
4. Importance of product differentiation. Companies with strong label recognition are stronger in relation to the state because the state would lose a major source of consumer loyalty if it were to nationalize the industry.
5. Extent or importance of vertical integration. A firm may enhance its bargaining position by gaining control over the “stage in the vertical chain” characterized by the highest barriers to entry.

Moran points out that certain industries are characterized by high vulnerability in all of the first four aspects he describes. In particular, “many natural resource industries (copper, nickel, petroleum, natural gas, iron ore, coal)” are characterized by “large fixed investments, active competition, stable technology, and low product differentiation” (1985, 110).

### **Factors Shaping the “Exit” Option**

What industry characteristics will determine the credibility of a firm’s threat to exit a country in order to avoid environmental regulation? As a step toward answering this question, I propose a categorization system based on the following characteristics:

1. Size of required fixed investment

2. Extent of product differentiation
3. Environmental impact abatement costs as a proportion of total costs
4. Reliance upon a local, exhaustible natural resource

#### *Size of Required Fixed Investment*

Due to variations in the physical nature of the tasks they perform, industries vary in the ease with which firms can transport or liquidate their capital investments. Some industries require large plants, equipment, or other infrastructure that firms can neither transport abroad nor sell to firms in other industries. Others employ equipment that is relatively easy to transport, or that can be sold for use in other industries. All else being equal, the larger the required fixed investment, the more costly relocation will be, and thus the less credible an exit threat will be.<sup>4</sup>

#### *Extent of Product Differentiation*

If the firm in question is a price taker and its economic profits are near zero, then the firm may credibly cite a small change in costs due to an environmental regulation as creating a competitive disadvantage. Following Moran (1985) and Von Moltke (1997), I suggest that the extent of product differentiation can serve as a proxy for the competitiveness of the market in which a firm operates. If products are easily distinguished according to the firm or country that produced them, consumers can express environmental protection preferences through their choice of products. If one firm's products are indistinguishable from those of another, on the other hand, extra costs incurred for the sake of environmental protection cannot be passed on to consumers in the form of a premium; these costs therefore constitute an unambiguous competitive disadvantage. A firm producing goods characterized by low product differentiation will, all else being equal, make more credible exit threats in response to environmental regulations than a firm that can pass environmental abatement costs on to consumers without a major loss of market share.

#### *Environmental Impact Abatement Costs as a Proportion of Total Costs*

If environmental impact abatement costs are high relative to total production costs, a firm may credibly claim that an environmental regulation puts it at a disadvantage in world markets. The size of environmental impact abatement costs will depend largely on the type of environmental regulation an individual state decides to impose, rather than on the nature of the industry. As a first approximation, however, if abatement costs for a given



industry constitute a high proportion of its expenses in general, then future abatement requirements can be expected to affect that industry disproportionately. For estimates of the magnitude of environmental abatement costs, I draw on Low and Yeats (1992), in which industries are categorized by the level of their environmental impact abatement costs.

### *Reliance Upon a Local, Exhaustible Natural Resource*

I specify here the importance of a *local* resource because some industries are able to import natural resource-based raw materials whereas others rely on the local use or extraction of natural resources. Within the category of *exhaustible* resources, I include both nonrenewables, such as minerals, and potentially renewable resources, such as forests, which may be exhausted if specific steps are not taken to ensure regeneration.<sup>5</sup>

For some industries, the natural resource endowment of the country in which a firm is located has little significance. For others, a local natural resource is central to production. I will argue that as such a resource approaches exhaustion, it may become a crucial determinant of the bargaining relationship between the firm and the state. Paradoxically, the further an industry depletes a resource, the stronger its bargaining position may be and the more effectively it may be able to extract concessions from the state.

### *Exhaustible Resources and Firm/State Bargains*

Some industries, such as mining, will eventually deplete the major resource upon which they depend. Industries that rely on a renewable resource, on the other hand, may never run out of raw materials. In fact, of course, they often do; for example, timber harvesting often depletes forest resources, and intensive plantation agriculture is ordinarily conducted in such a way that it depletes soil fertility.

When a country's mines are exhausted, a mining firm must either cease operations or move on to another country with usable mineral endowments. When the timber available in a forest dwindles, a timber harvesting firm finds itself in a similar situation, except that it may have the option of investing in replenishing the resource. Similarly, as soil fertility declines, an agriculture-based firm may have a choice between abandoning the land for fresher fields, on the one hand, and converting to a sustainable form of cultivation, on the other. In some instances, of course, the firm may find itself without such an option: the soil may be too depleted to be salvageable. In general, it should not be assumed that a "renewable" resource may be replenished at any point. The initial exploitation of a forest

resource, for example, may alter the surrounding ecosystem in such a way that the desired species of tree can no longer germinate there.

If a firm is engaged in the irreversible depletion of a resource upon which its production depends, it will eventually reach a point at which it must relocate in order to continue production. Thus firms in certain industry sectors are likely to relocate eventually, regardless of labor costs, environmental regulations, or other factors specific to the regime of the country in question. If both the firm and the state know that the firm will eventually relocate, then two possible dynamics may arise. One possibility is that the state will impose stringent regulations based on a calculation of its long-term interests, recognizing that the firm will eventually leave regardless of how strong or weak these laws are. If the firm threatens to exit in response, the state can recognize the threat as credible and yet disregard it, knowing that no amount of concessions will induce the firm to remain indefinitely.<sup>6</sup> The other possibility is that the state has a short time horizon—for example, that an elected government cannot see beyond the end of its term in office and the next election. In this case, the primary concern of the government may be the political costs of “driving out” the industry, possibly producing unemployment and economic hardship. Thus we can envision a dynamic in which as the resource nears exhaustion, the firm is increasingly strong in relation to the state, and the state is increasingly disposed to make concessions, whether by overlooking infractions of current regulations or by failing to enact new ones.

If the industry in question depends upon an exhaustible local natural resource for production, then the potential exists for a more credible exit threat than would, *ceteris paribus*, exist otherwise. This potential will come into play at the point when yields begin to fall, or when an expectation of falling yields becomes relevant for the firm’s output projections. If the resource is renewable, the firm will need to decide, based on a calculation of costs and risks, whether it should invest in replenishing the resource or simply move elsewhere. However, it will also bring a new bargaining chip to its interactions with the state: increased credibility of its exit threat.

Figure 1 illustrates two extreme cases in the abstract. A firm’s threat to exit will be most credible if it enjoys low fixed costs, faces high costs of environmental impact abatement and low levels of product differentiation, and relies upon a local, exhaustible natural resource that is nearing depletion. A firm’s exit threat will be least credible if fixed costs and product differentiation are high, environmental impact abatement costs are low, and exhaustible local natural resources are irrelevant for production.

Figure 1: Extreme Cases

	Fixed Investment	Product Differentiation	Abatement Costs	Local Natural Resource
Most credible	Low	Low	High	Nearing depletion
Least credible	High	High	Low	Not required

### THE OBSOLESING BARGAIN: REVERSED AND RENEWED

Raymond Vernon (1971) developed the concept of the “obsolescing bargain” to capture the variable relationship between states and firms. According to this model, when a firm initially enters a foreign country it faces significant uncertainty and risk, so that it will not decide to invest in new production without significant inducement. Thus, initial state/firm agreements are likely to be very favorable toward the firm. Uncertainty and risk decrease over time, however, and the firm’s sunk costs increase. Thus the firm’s bargaining power in relation to the state diminishes, and gradually the firm’s tenure is renegotiated on terms more favorable to the state.

The dynamic I have described above, in which the depletion of a natural resource can enhance the bargaining power of a firm, may be seen as a reversal of the obsolescing bargain. During some period of time after an initial investment, the bargaining power of the firm diminishes and that of the state grows. But at some point this situation changes and the firm can again extract significant concessions from the state. This happens when the natural resource upon which the firm depends nears exhaustion, so that the firm can make a highly credible exit threat. At this point, the firm’s bargaining power returns to the high level at which it began. For industries that deplete a renewable natural resource, a turning point may thus appear at which the original obsolescing bargain is renewed, again on terms initially favorable to the firm.

The timber example discussed above illustrates the ways in which this dynamic may operate. Early on, a firm harvesting timber may not be required to invest in the replenishment of the resource upon which it depends for production. Some firms may forego economies of scale and practice sustainable harvesting instead of clearcutting; some may invest from the start in replanting. Many, however, will deplete the resource steadily until a turning point occurs. At this turning point, they must decide between reinvesting in the resource (presuming that the ecosystem can still support new growth) and moving to a fresh location. Once a

timber harvesting firm replants a new “crop” of trees, its bargaining position in relation to the state will be transformed; it will be constrained by a high fixed investment and a long lag time before substantial profits may be reaped. The credibility of its exit threats will thus be significantly reduced.

At the point when the firm needs to decide between a large new fixed investment and an exit option, it can make a very credible threat to exit. On the other hand, if the firm does not exit at this point, its future exit threats will be far less credible. Thus the initial conditions of the obsolescing bargain are recreated. At this turning point, the firm enjoys the maximum ability to extract concessions from the state. Once again the state, bargaining with a firm that has the option not to invest, will be likely to offer the firm very favorable conditions. If the firm accepts, the bargain will begin to obsolesce again, with the state’s power increasing as the firm’s fixed investment increases. But if after an initial fixed investment the firm once again allows the resource to near depletion, the firm’s bargaining power will again increase. In this way the depletion and renewal of a natural resource may form the basis for a cyclical variation in a firm’s ability to gain concessions from the state.

## CONCLUSIONS

The empirical studies that probe the “race to the bottom” debate answer certain questions quite thoroughly. They show that in recent decades the location decisions of polluting industries have not been highly sensitive to increases in the stringency of developed countries’ environmental regulations. They further suggest that while the governments of developing countries may try to attract industry by maintaining low environmental standards, this approach is unlikely to produce significant results. However, related questions of equal importance have been addressed with less rigor and less success. The “pollution haven” hypothesis has been undermined, but the concept of a “natural resource depletion haven”—admittedly a less elegant term—has not been explored at all. The concept of “industrial flight” out of developed countries has been examined from all angles; but the possibility that industries might flee developing countries as well has received little empirical examination. Most importantly, a gap exists between the questions being posed in the realms of policy debates on the one hand, and the world of empirical research on the other. The framework proposed in this paper may constitute a step toward bridging this gap.

### Directions for Future Research

The studies that underpin the "race to the bottom" debate have focused on industries characterized by high fixed investment requirements and little to no dependence on a local, renewable natural resource. Future studies should consider industries whose profiles, according to the analysis presented above, suggest that their exit threats may be highly credible. Chemical or auto manufacturers may have little ability to bargain environmental standards downward by threatening to relocate, but transnational timber or banana companies may be able to do so quite effectively. It is in these cases, then, that we should test for evidence of "regulatory chill." Can we discern here the behavior postulated by hypotheses of "industrial flight" or "natural resource depletion havens"? Do any of the phenomena loosely known as "race to the bottom" dynamics actually appear?

There is, of course, no easy or automatic way to test for a "regulatory chill." One option would be to examine detailed legislative records, noting debates over the regulation of a selected industry's activity as well as any records of lobbying or exit threats by firms within that industry. At what junctures did exit threats occur? Did the response of the government vary? Can variations in government response be explained by factors other than the credibility of the exit threat, such as administration changes? Such a study could be accompanied by an historical analysis, for the same period, of the level of depletion and efforts at maintenance of any local natural resources upon which the industry in question depended. An alternative, or complementary, approach would be to trace, for a given sector, the history and patterns of actual exit decisions. How much have firms in the selected industry moved around? What reasons appear to drive these moves?

It would also be interesting to consider whether some of the characteristics I have identified are more important than others. What predictions can be made for an industry in which different categories point in different directions—say, if fixed costs are low, implying *high* credibility of exit threats, but abatement costs are low and product differentiation high, implying *low* credibility of the same threats? Do the effects of some factors tend to dominate those of others?

It is worth keeping in mind, of course, that models focused on bargaining relationships may be misleading in some contexts. The boundaries between "state" and "firm" may be very fluid. When a government develops in tandem with an important industry sector, all its institutions may be intertwined with and formed by that industry (see Evans 1979). Government actors with close ties to a firm or set of firms may thus work

from within to ensure that industry preferences regarding environmental standards are heeded. These structures and mechanisms may allow relevant actors to bypass the uncertainties of threats and counter-threats associated with the sort of bargaining I have assumed to exist.

Finally, the industry characteristics that I have analyzed in relation to the “exit” option can also have implications for the development of exit’s counterpart, “voice.” Firms for which the exit option is impractical may devote more resources to the development of their “voice” option than those which see relocation as a strong possibility. The habitual and adept use of voice could potentially be more effective than the occasional, though credible, exit threat. The firms predicted to be weak bargainers might develop channels of communication and influence resulting in greater environmental concessions than those achieved by “stronger” bargainers. A new set of empirical studies, informed by an understanding of the variety of possible state/firm relationships, should allow the “race to the bottom” debate to encompass these possibilities as well.

### Notes

<sup>1</sup>In general, my use of the word “state” is intended to refer to countries. In this as in many cases, the points made using the word “state” in its most general meaning are equally applicable to the States of the U.S. However, my primary focus is on movements of industry internationally.

<sup>2</sup>While my purpose here is to analyze the factors affecting the bargaining position of a firm, outcomes will, of course, also depend on the interests and capacities of the state.

<sup>3</sup>Another helpful template for categorizing industries can be found in Shafer (1994).

<sup>4</sup>The time lag between an initial investment and the attainment of full output capacity may also be an important factor determining the significance of the fixed investment for a firm considering relocation.

<sup>5</sup>I do not attempt to deal here with the more general concept of an ecosystem’s carrying capacity. By some broad definitions this could also be considered a “resource.”

<sup>6</sup>Obviously, this possibility could be developed more thoroughly. If the concession is small, it may make sense for the state to give in, in order to enjoy the benefits of the firm’s presence for an additional few years. If, on the other hand, the concession consists in allowing the firm to extract or consume the remainder of the country’s forests, then it may be preferable to preserve the forests and allow the firm to leave. The point is that given imperfect information on the one hand and a government concerned only with the long-term interests of its citizens

on the other, we might expect a government to be steadfast in refusing to grant a firm additional concessions as the resource in question nears exhaustion.

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