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Inequality as a cause of environmental degradation

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Abstract

This paper advances two hypotheses. First, the extent of an environmentally degrading economic activity is a function of the balance of power between the winners, who derive net benefits from the activity, and the losers, who bear net costs. Second, greater inequalities of power and wealth lead, all else equal, to more environmental degradation.

Keywords: Environmental degradation; Inequality

"We can't see how the authorities can say they defend the ecological system, while at the same time deploying police to protect those who are destroying the forest."

Brazilian rubber tappers union leader Chico Mendes (1989, p. 60), shortly before his assassination.

1. Introduction

Economic activities that degrade the environment generally yield winners and losers. Without winners – people who derive net benefit from the activity, or at least think that they do – the environmentally degrading activities would not occur. Without losers – people who bear net costs – they would not matter in terms of human well-being. [1]

In analyzing an environmentally degrading economic activity, therefore, we can pose three basic questions:

- Who are the winners?
- Who are the losers?
- Why are the winners able to impose costs on the losers?

The last question has three possible answers. One is that the losers do not yet exist. They belong to future generations, and so are not here to defend themselves. The second possibility is

[1] I do not consider here the relative merits of the biocentric position which accords independent ethical value to the well-being of animals, plants, or ecosystems.

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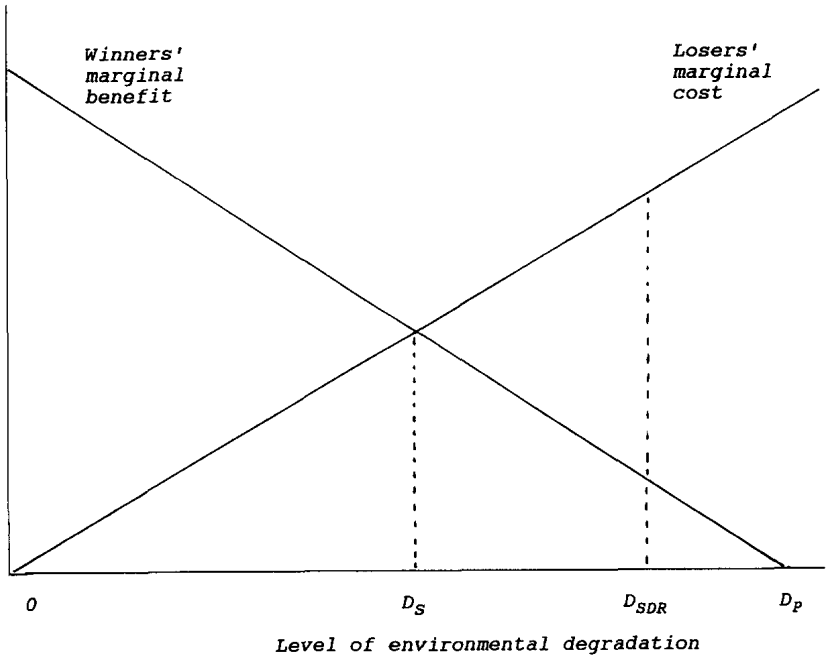

Fig. 1. Determination of the level of environmental degradation. D_S = Level prescribed by cost–benefit analysis (socially "efficient"). D_{SDR} = Level under power-weighted social decision rule. D_P = Level under free market (privately "efficient").

that the losers already exist, but they do not know it. They lack information about the costs of environmental degradation. The third possibility is that the losers exist and know it, but they lack the power to prevent the winners from imposing costs on them. This essay addresses mainly, though not exclusively, the last case. [2]

Traditional microeconomic analysis treats the external costs of environmental degradation as an impersonal by-product of economic activity. The identities of those who produce negative externalities, and of those on the receiving end, are irrelevant to both the diagnosis of the problem and the prescription of a solution. One need not ask *who* wins and loses, but only whether the marginal social cost of the activity exceeds its marginal social benefit. If so, the usual remedies – taxes, regulation, or market creation – are proffered. Whether these remedies are in fact implemented is the province of political science, or perhaps sociology.

[2] For interesting treatments of the first, see Martinez-Alier (1987, pp. 156–171) and Norgaard and Howarth (1991).

In this essay I propose a political–economy framework for the analysis of environmental degradation in which the identities of winners and losers matter. I hypothesize that if the winners are relatively powerful, and the losers relatively powerless, more environmental degradation will occur than in the reverse situation. These outcomes are guided by what I term a *power-weighted social decision rule*. Furthermore, I hypothesize that, all else equal, greater inequalities of power and wealth lead to more environmental degradation, for three reasons: first, via asymmetries in the power-weighted social decision rule; second, via impacts on valuations of the costs and benefits of environmentally degrading activities; and third, via impacts on the rate of time preference applied to the environment.

2. The power-weighted social decision rule

Cost–benefit analysis prescribes a precise rule to govern social decisions: an environmentally degrading activity should be pursued as long as its marginal net impact on society is positive. The

latter is calculated, in theory, as the sum of marginal benefits and costs to everyone affected, including the external costs of pollution and resource depletion. In practice this calculation is often quite difficult, but my concern here is not practical difficulties, but the theory itself. It is possible, indeed likely, that not everyone affected by the activity will derive a net benefit. Some will bear net costs. But as long as the winners could in theory compensate the losers, and still win, the activity is deemed socially "efficient" and passes the cost–benefit test.

Contrast this prescription to what happens in a theoretical laissez-faire world. The costs to the losers are simply ignored by the winners, who pursue the activity as long as it remains privately beneficial for them to do so. Hence the activity is pursued even when its net social impact is negative.

Fig. 1 depicts these two theoretical cases. The downward-sloping line represents the marginal benefit to the winners, the upward-sloping line the marginal cost to the losers. The benefit curve slopes downward due to diminishing welfare gains (the sum of producers' surplus and consumers' surplus) from additional units of the environmentally degrading activity. The cost curve slopes upward due to the rising marginal impact of additional units of environmental degradation. For example, the environmental cost of clearing the last 1000 acres of a 10 000-hectare rainforest exceeds that of clearing the first 1000. The socially "efficient" level of environmental degradation prescribed by cost–benefit analysis is D_S.[3] The laissez-faire level privately chosen by the winners is D_P.

Real-world outcomes often do not conform to these ideal types. Winners are constrained by reactions of the losers in the form of informal sanctions, private bargaining, or pressure for government intervention. These can limit environmental degradation to a level below D_P. There is, however, no guarantee that the result will be D_S. The reason advanced by Coase (1960) is that transaction costs often prevent the attainment of the social optimum. It is not costless, for example, for the losers to bargain with the winners or to lobby the government.

Here I wish to suggest a further reason for failures to achieve the cost–benefit optimum: Real-world outcomes are shaped by the relative power of the winners and losers. Consider two individuals, A and B, who work in the same office. A enjoys cigars, while B abhors smoke. How much, if at all, will A smoke cigars in the office? If A happens to be the boss, and B a secretary, the answer is likely to differ from the reverse situation. More generally, I hypothesize that A's ability to impose external costs on B depends on A's *power* relative to B.

In Coasian terms, we could define power as the ability to bear transaction costs. In the above example, the boss could be said to be better able to bear the "transaction costs" of setting office smoking policy. Similarly, we can predict that waste-disposal facilities will be sited in the least powerful communities, or in Coasian terms, communities whose residents are least able to bear the transaction cost of rejecting such facilities. The fact that hazardous-waste sites in the United States are disproportionately located where racial minorities live (Commission for Racial Justice, 1987) thus tells us something about the relationship between race and power in that country.

Relative power is a function of three factors: (a) a vector of power-relevant individual characteristics such as wealth, gender, ethnicity, and class; (b) the numbers of individuals involved; and (c) the political framework in which these variables are mapped to power.

In any given political framework, for example, richer individuals are likely to wield more power than poorer individuals. Money speaks not only in the conventional markets for goods and services, but also in the "markets" for political influence (Ferguson, 1983). Similarly, environment-related problems that exclusively afflict women, such as breast cancer, may receive less remedial attention than problems that afflict men. The

[3] I place "efficient" in inverted commas because the valuations of benefits and costs by which this term is defined vary with the distribution of endowments, preferences, and technology, as discussed below.

relevance of class and ethnicity has already been suggested.

The extent to which differences in wealth and other individual characteristics translate into differences in power depends on the political framework. For example, power and wealth are likely to be positively correlated, but the strength of that correlation may vary considerably. Power may be more highly concentrated than wealth, or less so, depending on the political framework. The importance of this framework was vividly illustrated in the former Soviet Union, where a highly inequitable distribution of power prevailed despite a relatively egalitarian distribution of wealth. The result, as one would predict under the power-weighted social decision rule, was large environmental costs imposed above all on people with little power. [4]

If, as is frequently the case, the winners and losers are groups rather than single individuals, their relative power also depends on the numbers involved. Group power may be simply the sum of the individual power of its members, but this depends on the institutional framework for collective action. Departures from scale-neutrality are conceivable in either direction. If, as Olson (1965) and others have argued, small groups organize more readily than big ones, large numbers are a liability. On the other hand, some institutional frameworks – including simple majority rule – yield strength through numbers.

Returning to Fig. 1, we can describe real-world outcomes as the result of a *power-weighted social decision rule*. When the losers are less powerful than the winners, environmental degradation exceeds D_S; when the losers are more powerful than the winners, it is less than D_S. In this framework, the theoretical outcomes under cost–benefit analysis and laissez-faire represent special cases: the first corresponds to an equal distribution of power between winners and losers; the second to a situation in which the losers exercise no power whatsoever.

[4] For an indictment of the environmental degradation under the Soviet power structure, see Komarov (1978). See also Pryde (1991) and Peterson (1993).

In the same way that the choice-theoretic model of microeconomic theory infers utility from the revealed preferences of the individual, we can infer power from the revealed preferences of society. If, for example, the actual level of environmental degradation is D_{SDR} in Fig. 1, where the marginal cost to the losers is four times the marginal benefit to the winners, we can conclude that the winners are four times more powerful than the losers.

This definition, like that of utility, is circular: power both explains and is revealed by choice. But circularity need not mean emptiness. Like the utility-maximization model of individual choice, the power-weighted model of social choice yields testable predictions. It predicts that social choices governing environmental degradation will consistently favor some people over others, and that this pattern will correlate with other power-related variables. This hypothesis as to the identities of winners and losers – that is, the direction of negative externalities – forms one element in a research agenda in the political economy of environmental degradation.

3. Inequality and power-weighted social decisions

At first glance, the aggregate effect of power inequality on the level of environmental degradation may seem ambiguous. On the one hand, when the winners are more powerful than the losers the power-weighted social decision rule predicts that greater inequality will lead to more environmental degradation, pushing the outcome further to the right of D_S in Fig. 1 – in the most extreme case, to D_P.

On the other hand, when the losers are more powerful than the winners, greater power inequality reduces the level of environmental degradation, pushing it further to the left of D_S, and in the most extreme case preventing it altogether. In social cost–benefit terms, the result is a sub-optimal level of environmental degradation. As an example, consider the forcible eviction of slum dwellers which I witnessed in Dhaka, the capital of Bangladesh, in 1975. At that time shantytowns were bulldozed and their residents liter-

ally thrown into military trucks and deposited at bleak camps far from urban employment and services. The government called this "beautification". The benefits to the poor of living in the shantytowns probably outweighed the cost to the rich of glimpsing the squalor from their passing automobiles. But in this instance, power inequality generated what might be termed excessive environmental protection.

The question, then, is whether these two effects can be expected to offset each other, such that power inequality has no predictable net aggregate impact on the level of environmental degradation. I think not, for four reasons.

First, insofar as power correlates positively with wealth, situations in which the winners are powerful can be expected to occur more frequently than situations in which the losers are powerful. The richest 20% of the world's people receive 83% of global income, while the poorest 60% receive 6% (United Nations Development Programme, 1992, p. 36). Similar though less extreme disparities exist within most countries. Hence economic activities driven by the consumption demand of the rich – from which they derive benefit in the form of consumers' surplus – are more widespread than those driven by the consumption demand of the poor. [5] And as owners of a disproportionate share of productive assets, the rich capture much of the other benefit component, producers' surplus.

Second, too little environmental degradation can be more readily corrected than too much, due to physical irreversibilities. When a species is extinguished, a non-renewable resource depleted, the soil washed away, or a long-lived pollutant discharged into the environment, the damage cannot be undone. Shifts over time in the balance of power can increase sub-optimal levels of environmentally degrading activities, but cannot reduce such long-term costs of excessive levels.

Third, the rising marginal cost curve implies that the excess environmental degradation driven by powerful winners is more damaging than the lower levels prevented by powerful losers. Finally, if we take account of the benefits derived from the environmentally degrading activity as well as its costs, *both* situations – too much environmental degradation and too little – create welfare losses. These losses are additive, not mutually offsetting.

For these reasons, the ability of the powerful to limit environmental degradation by the less powerful cannot be expected to offset the failure of the less powerful to limit environmental degradation by the powerful. The power-weighted social decision rule yields an unambiguous prediction: the greater the inequality of power, the greater the extent and social cost of environmental degradation. This prediction as to magnitudes is a second element for a research agenda in the political economy of environmental degradation.

4. Inequality and environmental valuation

The foregoing positive analysis departs from the normative framework of conventional cost–benefit analysis in one important respect: the distribution of power affects the weights accorded to costs and benefits to different people in social decisions. So far, however, I have not inquired into the monetary valuations of these costs and benefits themselves, nor into how these are affected by inequality. To these questions I now turn.

Monetary valuations in cost–benefit analysis are in theory based on market prices, or more precisely, on the market prices that would prevail in the hypothetical world of a perfectly competitive general equilibrium. These prices have three fundamental determinants, usually taken as exogenous: the initial distribution of endowments, consumer preferences, and technology.

[5] Environmental degradation per unit consumption is not necessarily constant across income classes. If degradation per unit were sufficiently greater for items with greater weight in the consumption basket of the poor, their demand could in theory account for more environmental degradation than that of the rich, notwithstanding their lower share of aggregate consumption. Empirically, it seems improbable that variations in degradation per unit consumption would yield this dramatic a result. Indeed, it is conceivable that degradation per unit consumption is *greater* for the rich; compare, for example, bicycles and automobiles.

In practice, problems arise from market failure, incomplete information, price distortions, and so on. These have generated a voluminous literature, the guiding principle of which remains valuation in terms of willingness to pay. The costs of air pollution, for example, are measured in terms of how much the affected parties would be willing to pay for cleaner air.

Willingness to pay is constrained, of course, by ability to pay. The latter in turn depends on the initial distribution of endowments. In real-world markets and in the shadow markets of cost–benefit analysis, different distributions generate different prices. For example, if wealth is highly concentrated, demand for basic necessities like rice and beans will be less than if wealth is more equitably distributed, and their "efficient" level of output will consequently be lower. Similarly, the "efficient" level of air pollution is higher when those who breathe the dirty air are poor than when they are rich, for the simple reason that the poor's ability and willingness to pay to avoid it is lower. [6]

The effect of regressive income redistribution – in the case argued above to be most important, when those who bear the costs of the environmentally degrading activity are poor relative to those who reap its benefits – is depicted in Fig. 2. The solid lines are the original marginal valuation curves. The broken lines depict the same curves after a redistribution of income from the poorer losers to the richer winners. The "efficient" level of environmental degradation increases from D_S to D'_S. The level predicted by the power-weighted social decision rule, while holding the power weights constant, increases from D_{SDR} to D'_{SDR}. If income redistribution is accompanied by similar redistribution of power, then the predicted level of environmental degradation increases still further to D''_{SDR}.

Consider, for example, how an increase in income inequality might affect the conversion of tropical forests to cattle ranches. If the increased purchasing power of relatively rich consumers raises market demand for beef, the "benefit" from deforestation increases. Meanwhile, as incomes decline for poorer people hurt by conversion – for example, hunter-gatherers living in the forest or small farmers living downstream – so does their ability (and hence willingness) to pay to prevent it. The "cost" of deforestation falls accordingly. The result – prescribed by cost–benefit analysis and predicted by the power-weighted social decision rule – is more deforestation.

Nor is that all. Inequalities of power and wealth also affect the two other fundamental determinants of market and quasi-market prices in the neoclassical model: preferences and technology. Again, greater inequality can be expected to increase environmental degradation.

First consider preferences. As Becker (1983, p. 392) observes, "'preferences' can be manipulated and created through the information and misinformation provided by interested pressure groups." A person's preference for clean air depends, among other things, on access to information about air quality and about the health effects of air pollution (see, for example, Bergstrom et al., 1990). It also depends on how that person values air quality relative to other wants. Access to information and values both may be affected by the degree of inequality. With greater inequality, the relatively poor and powerless tend to have less access to information about environmental costs and, at the same time, to be more exposed to propaganda designed "to make pollution seem palatable or worth the cost" (Galbraith, 1973, p. 9). In terms of Fig. 2, these preference effects cause a further downward shift in the marginal cost curve, and hence a further increase in the level of environmental degradation.

Similarly, if we shed the exogenous-technology assumption, and recognize that the pattern of technological change is subject to economic and political influences, this opens another route by which inequality may affect environmental valuations. The benefit that consumers derive from an environmentally degrading economic activity depends in part on the availability of less environ-

[6] The alternative method for valuation of health impacts of pollution, via the present value of foregone earnings, produces a similar result. See, for example, the memorandum of World Bank Chief Economist Lawrence Summers published in *The Economist* (1992).

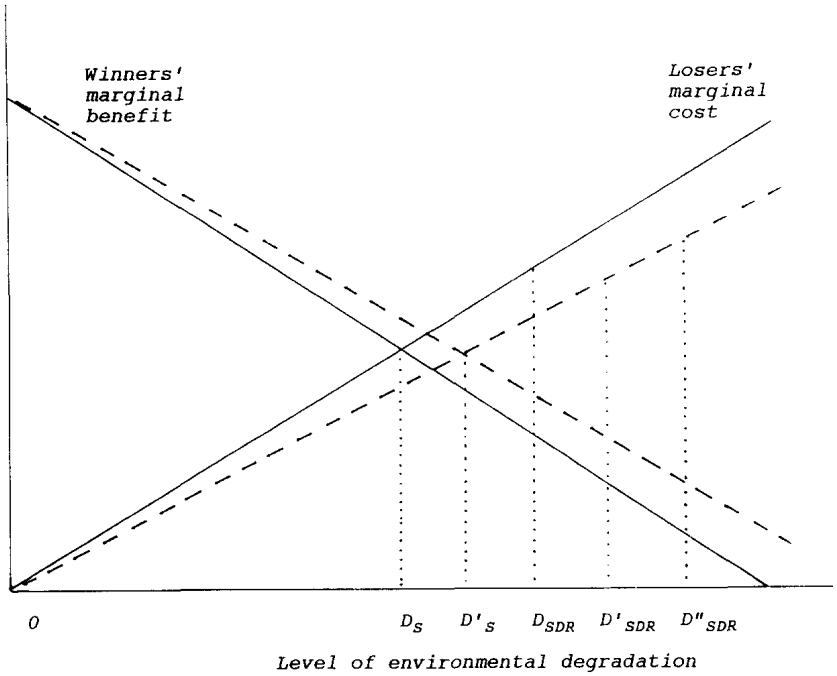

Fig. 2. The effect of regressive income redistribution on the level of environmental degradation. ———: before redistribution. - - - - - -: after redistribution.

mentally degrading alternatives. The latter may be limited by the power of vested interests to shape the path of technological change.

Let me illustrate by means of an example. A momentous technological choice in ground transportation is that between the internal combustion engine and the electric railway. Early in the twentieth century, the United States had an extensive electric rail system both within cities ("trolley cars") and between them. Today that network has been largely supplanted by motor vehicles plying concrete highways. The environmental costs of this historic social decision include vast air pollution and accelerated depletion of fossil fuels. In many cities – including Los Angeles, which today has the most unhealthful air quality in the nation – a consortium formed by General Motors, Standard Oil of California, and Firestone Tire Company played an important role in this transition: it purchased local rail lines, physically demolished them, sold the railroad rights-of-way, and converted mass transportation to buses. In 1949, the parties involved were convicted of conspiracy by a U.S. Federal Court, and a symbolic fine of one dollar was levied against the General Motors treasurer who masterminded the scheme. By this time, however, the nation's ground-transportation industry had been firmly reoriented to the new technological path. [7]

The marginal benefit of driving an automobile and spewing exhaust into the air is much enhanced if one lacks the option of travel by train. In terms of Fig. 2, the effect is to raise the marginal benefit curve associated with this environmentally degrading activity, thereby increasing the level of environmental degradation. Of course, the triumph of the internal combustion engine in U.S. ground transportation was not simply the result of conspiratorial machinations. But neither was it the result of perfect competition in the face of an exogenously demarcated production possibility frontier.

[7] For a brief account of this remarkable chapter of U.S. history, see Commoner (1976, pp. 177–179). For details and debate, see Snell (1974), Whitt and Yago (1985), and Adler (1991).

In sum, inequalities of wealth and power affect valuations of the costs and benefits of environmental degradation via the distribution of purchasing power, the shaping of preferences, and influences on the path of technological change. By each route, greater inequality tends to raise the valuation of benefits reaped by rich and powerful winners, relative to costs imposed on poor and less powerful losers. [8] These valuation effects reinforce the linkage between inequality and environmental degradation under the power-weighted social decision rule.

5. Inequality and environmental time preference

One further dimension – time – can now be added to the analysis. Environmentally degrading activities often generate short-run benefits and long-run costs. The benefits from the indiscriminate logging of a forest, for example, accrue quickly with the sale of the timber, while costs in the form of soil erosion, disruption of hydrological cycles, and biodiversity loss can persist far into the future.

The rate of time preference refers to the willingness to trade present benefits (or costs) for future benefits (or costs). People with a higher rate of time preference place greater weight on the present. They are more willing to accept long-run costs for short-run benefits, and less willing to accept short-run costs for long-run gains. This notion can refer to financial savings as well as to environmental resources. It is possible, however, that the same people will apply different rates of time preference to different types of resources. My concern here is the rate applied to environmental resources, including clean air, clean water, soils, and other "natural capital". I refer to this as the *rate of environmental time preference*.

How do inequalities of power and wealth affect concern for the long-term consequences of resource depletion or environmental pollution? I hypothesize that greater inequality leads to a higher rate of environmental time preference, that is, to less concern for the future, and that this is true for both rich and poor, though for different reasons.

First consider the impact of greater inequality, with average per capita income held constant, on the time preference of the poor. As poverty deepens, the imperatives of day-to-day survival compel the poor to degrade the environment. In Central America, for example, it drives poor peasants to cultivate steep hillsides causing rapid soil erosion. The linkage here runs from inequality to poverty to environmental degradation. If the poor are themselves the principal victims of this environmental degradation, the result is a "vicious circle" in which, by trading short-run gains for long-run costs, the poor grow steadily poorer (Durning, 1989; World Bank, 1992).

In many instances, this undoubtedly is an important link between inequality and environmental degradation. But it is not the only link, nor necessarily the most important. In particular, it completely fails to account for environmental degradation by the rich. Yet, as I have suggested above, the latter may be more pervasive than environmental degradation by the poor.

How does greater inequality affect the rate of environmental time preference of the rich? The conventional assumption is that wealth and the rate of time preference are inversely related, not only among the poor, but throughout the entire range of wealth. Thus the richest individuals ostensibly have the highest savings rates – a key element in the proffered rationale for "trickle-down" economic policies. If the same were true for the rate of environmental time preference, then greater inequality (and the resulting higher incomes for the rich, holding average income constant) would make the rich less myopic in their assessment of long-term environmental costs. Their lower rate of time preference would tend to offset the higher rate of the poor. Indeed, the net result of greater inequality conceivably could be a "virtuous circle" in which the increased farsightedness of the rich raises long-run

[8] By the same token, greater inequality would enhance the ability of rich and powerful losers to constrain environmentally degrading activities by poor and less powerful winners. As argued above, however, this offers only meager solace.

incomes not only for the themselves, but for society as a whole. This is simply an extension of the trickle-down logic to the environment.

In my view, this would be too sanguine a conclusion. Indeed, it is plausible that increased inequality could have the opposite effect, *raising* the rate of environmental time preference of the rich.

Consider two hypothetical countries, both with large reserves of natural resources. In country A, a wealthy dictator monopolizes power and there is a high degree of economic inequality. Country B is identical in every respect except that it has much higher degrees of political democracy (here defined as equity in the distribution of power) and economic equity. Which country will have the higher rate of environmental degradation?

The dictator of country A effectively controls its rate of resource extraction and the associated degree of environmental degradation. As a wealthy man, he may have a high financial savings rate and, in this respect, a low rate of time preference. But he may choose to hold the bulk of these savings outside his own country – in Swiss banks, Manhattan real estate, Mediterranean villas. Within his own country, meanwhile, the dictator's rate of *environmental* time preference may be quite high: he may choose to extract natural resources as quickly as possible, while shunning more costly methods which would mitigate the associated environmental impact. Is the disjuncture between the dictator's financial saving and his environmental dissaving a symptom of schizophrenia? Not if we recognize that the dictator's hold on political power – and with it, his de facto property rights over the country's natural resources – is inherently insecure. Eventually his oppressed fellow citizens may succeed in overthrowing him. The prudent dictator hedges against that possibility by feathering a foreign nest.

I submit that the dictator's degree of insecurity – and hence his rate of time preference with respect to the country's natural resources – is a function of the degree of political and economic inequality. The reason is simple: these inequalities undermine the ruler's legitimacy. For the moment, the dictator wields great power, but with time comes the possibility that power and wealth – perennial objects of contestation among individuals, groups, and classes – may be reallocated.

More generally, I advance the following hypothesis: The greater the degree of political and economic inequality, the higher the rate of environmental time preference of the rich. It is not only dictators who fear the reallocation of power and wealth. Inequalities may fatten foreign bank accounts, but they do not protect the environment at home. [9]

As a real-world example, consider the Philippines under President Ferdinand Marcos. During the two decades of Marcos' rule, the Philippines' rich tropical hardwood forests were rapidly felled for timber, with little effort to minimize the environmental impacts of deforestation. Exports of logs and lumber ranked among the country's top foreign-exchange earners until the early 1980s when revenues collapsed due to the virtual depletion of economically accessible forests (for details, see Boyce, 1993, pp. 225–241). The cut-and-run philosophy of Marcos and his political associates was perfectly consistent with the foregoing analysis.

6. Conclusion

This essay has advanced two central hypotheses. First, the extent of an environmentally degrading activity depends on the balance of power between the winners, who derive net benefits from the activity, and the losers, who bear net costs. When the winners are powerful relative to the losers, more environmental degradation occurs than in the reverse situation. This reflects

[9] Alternatively, we could say that inequality shifts the portfolio selection of the rich in favor of external as opposed to domestic assets. Since many domestic environmental resources are not fully private, they can be exchanged for external assets only if first harvested or mined. Resource depletion can here be interpreted as in part a social cost of privatization.

the operation of what I term a power-weighted social decision rule.

Second, greater inequalities of power and wealth lead to more environmental degradation for three reasons: (a) The excess environmental degradation driven by powerful winners is not offset by the environmental degradation prevented by powerful losers; (b) inequality raises the valuation of benefits reaped by rich and powerful winners relative to costs imposed on poor and less powerful losers; and (c) inequality raises the rate of time preference applied to environmental resources by both the poor and the rich, by increasing their poverty and political insecurity, respectively.

Both hypotheses can be tested in empirical research. If accepted, they imply that democracy and equity are important not only as ends in themselves, but also as means to environmental protection.

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