

WORKING PAPERS



ENFORCING GOVERNMENT POLICY: THE EVOLUTION OF EFFICIENT REGULATIONS

Mark A. Cohen

and

Paul H. Rubin

WORKING PAPER NO. 131

November 1985

FTC Bureau of Economics working papers are preliminary materials circulated to stimulate discussion and critical comment. All data contained in them are in the public domain. This includes information obtained by the Commission which has become part of public record. The analyses and conclusions set forth are those of the authors and do not necessarily reflect the views of other members of the Bureau of Economics, other Commission staff, or the Commission itself. Upon request, single copies of the paper will be provided. References in publications to FTC Bureau of Economics working papers by FTC economists (other than acknowledgement by a writer that he has access to such unpublished materials) should be cleared with the author to protect the tentative character of these papers.

BUREAU OF ECONOMICS
FEDERAL TRADE COMMISSION
WASHINGTON, DC 20580

Enforcing Government Policy: The Evolution of Efficient Regulations

Mark A. Cohen

and

Paul H. Rubin

Federal Trade Commission

September 1985

The views expressed are those of the authors and do not reflect the position of the FTC or other members of its staff. Thanks but no blame are due to John Calfee, William Dougan, Richard Higgins, Pauline Ippolito, Mitchell Polinsky, and the editors of the **Yale Journal on Regulation** for helpful comments on an earlier draft.

Enforcing Government Policy: The Evolution of Efficient Regulations

I. Introduction

The theoretical basis for government intervention in the marketplace is well established in the economics literature. For instance, although society demands some level of environmental quality, there is no market mechanism for satisfying these preferences without some form of collective action. To satisfy this demand, the government has established a policy designed to reduce the level of pollution. Economists have long advocated policies that make use of private incentives (such as emission fees) because they are **efficient**.¹

Although formulating efficient policies is important, it should be remembered that these policies must be implemented. The implementation of policies requires a detailed set of rules. We make a distinction between **policy** and **rules**. A policy is a social decision to regulate a certain activity. A rule is the method used to implement the policy. Setting overall pollution abatement goals or emission tax rates are examples of policies. Implementing these policies (e.g. distribution of emission limits, monitoring rates, document requirements, etc.) requires the use of rules. Each regulatory agency has its own set of regulations and accompanying internal rules, procedures, and precedents for the practice of policies on a daily basis.² The efficiency of government programs will be greatly affected by the efficiency of these rules.

Our approach to government regulation differs considerably from much of the previous work by economists in this field, which generally ignores issues of implementation and simply assumes efficient policies (once designed) will work. For example, suppose it was determined that each ton of pollution causes \$10 in social damages. Economic theory would tell us to impose a tax of \$10 per ton of emissions. In a world with sufficient information, in which authorities could foresee all relevant contingencies, there would be no need for rules to implement this policy. However, when questions arise such as, did the suspected polluter really pollute and, if so, by how much, precedents will evolve to define the rules of the (enforcement) game.

Unlike previous authors, we specifically take into account the fact that government regulators will not efficiently implement policy.³ Because government agencies do not have the correct economic incentives, we expect them to be inefficient in enforcing public policy. We argue that in addition to choosing efficient policies, the government should correctly choose enforcement institutions. In particular, we advocate the use of private incentives for **enforcement** of public policy. Enhanced economic efficiency will result from greatly increasing the extent to which private parties with the appropriate incentives are relied upon for implementing public policy. This can be achieved by having the government auction off the right to enforce its policies to private enforcement agents endowed with incentives to regulate in an economically efficient manner.

In this paper, we argue that some insights from the law and economics literature dealing with the efficiency of common law are useful in analyzing the problem of the optimal form of rules. In particular, enforcement of public policy by private organizations will tend to promote the evolution of efficient rules because private enforcement agents (unlike government regulators) will be endowed with ongoing economic interests in the type of case under dispute. The rules we expect to evolve will be efficient in that the enforcement agent will have an incentive to regulate efficiently.

In addition to our claim that the use of private enforcement agents will yield efficient rules, there are other benefits from our proposal. Private firms are generally more efficient in their operations than public agencies. Furthermore, it is a much simpler task to choose the correct parties to a dispute and to endow them with property rights than it is to choose the correct (i.e. efficient) rules.

The mechanisms we propose will make enforcement of any policy more efficient, whether or not the basic policy itself efficient. That is, there may be cases where government specifies inefficient policies (e.g., a level of pollution reduction beyond that which is economically justified or a government transfer program based on equity considerations). But even though a policy may be inefficient, there are still social benefits to be gained by not wasting resources on enforcement. Of course, efficient policies are to be preferred. Nonetheless, if we do decide to achieve too high a level of pollution abatement, we do not want to spend more resources than are necessary to reach this level.

In the next section of the paper, we discuss the problems currently encountered with implementing regulatory policy through the use of government enforcement agents. Specific examples of government policies that have been inefficiently implemented are provided. We argue that these inefficiencies are inherent in any public enforcement agency. In the third section we detail our proposal for shifting enforcement of government regulation to the private sector. We provide several examples to illustrate ways in which our proposal could be adopted. A fourth section discusses the efficiency gains we expect our proposal to yield, and summarizes the advantages of private enforcement. Section 5 will discuss some of the practical problems and criticisms we expect to encounter in implementing our proposal. The final section contains both a summary of our analysis and a few concluding remarks.

II. Inefficient Enforcement of Government Regulation

Economists long ago recognized that government regulators lack incentives to adopt efficient regulations. Although there is disagreement about how to model the regulators' objectives, few theorists believe that social welfare maximization is a useful assumption in analyzing bureaucratic behavior. One argument often used by economists in modeling bureaucratic behavior is that utility maximization on the part of bureaucrats leads to budget maximization,

rather than to efficient regulation.⁴ Several reforms have been proposed to overcome this inherent problem, such as establishing competing agencies and awarding bureaucrats a share of cost saving innovations. Unfortunately, many of these proposals are of limited applicability, or, at the least, have not been widely implemented. A competing theory of regulation holds that government regulators are "political support maximizers."⁵ This theory has different implications than the budget maximization model, but it also suggests that efficient regulation will be the exception rather than the rule.

The economic theories of bureaucratic behavior mentioned above are often used to explain inefficient regulatory policies and rules. The following examples illustrate how inefficient implementation can occur, independently of the efficiency or inefficiency of the underlying policy.

A recent empirical analysis of the Federal Reserve Board provides evidence that is consistent with the budget maximization hypothesis.⁶ Since expansionary monetary policy allows the agency to hire additional workers, budget maximization implies expansionary policy will be favored over contractionary monetary policy. Empirical estimates of Fed policy were found to be consistent with this hypothesis.

A second example illustrates ways in which government agencies can write inefficient rules to implement what may seem to be innocuous government policies. In 1975, the SEC adopted rules on measuring research and development costs for external reporting purposes. Even though these rules appeared to be only technical changes in reporting requirements, they had the effect of reducing R&D expenditures for small, high technology firms.⁷

As another example of a policy that was inefficiently implemented, consider the FDA's regulations implementing the 1962 Amendments to the Food, Drug and Cosmetics Act. The Amendments authorized the FDA to require "proof-of-efficacy" for new drugs before they could be marketed to consumers. If there was significant consumer demand for independent evaluations of new drugs, this policy may have been justified as providing a public good. Regardless of whether or not the policy was efficient, Peltzman (1973) found evidence that the FDA regulations implementing that policy resulted in a net loss to society. This result is not surprising, since FDA has no incentive to determine the socially efficient level of government intervention in the testing process. In fact, FDA's rules for testing new drugs and lengthy review process resulted in delays of up to several years for the introduction of many effective drugs.⁸ Peltzman estimated that the FDA's budget increased 12-25% as a result of these amendments, a fact that is consistent with the budget maximization hypothesis.

There is also evidence that government bureaucracies are often unable to adequately monitor compliance with their own regulations. For example, a recent study by a House Energy and Commerce subcommittee found that EPA's monitoring of hazardous waste dump sites is "inaccurate, incomplete and unreliable." The study found that although 25 percent of the sites had inadequate wells (3 1/2 years after they should have been in compliance with EPA regulations), "the EPA had taken no action or sent only informal warnings" to the companies involved.⁹

Finally, there is evidence that even a relatively efficiently designed policy has been inefficiently implemented by government regulators. The Environmental Protection Agency (EPA) has instituted an emissions trading program called the "offset policy." Under this policy, a new firm that wishes to pollute in an area of the country that is in violation of the national ambient air quality standards is required to obtain a (more than) offsetting reduction in some other firm's pollution. However, as we argue throughout this paper, actual implementation of such a system will require a very detailed set of rules: How are the initial rights allocated? What rules govern the transfer of such rights? How will contractual disputes between buyers and sellers of rights be resolved? How will the amount of pollution be measured?... Even if the basic policy is chosen efficiently, inefficiencies in the implementation rules may serve to make it operate inefficiently.

In fact, a recent study found that EPA's implementation of the offset policy has been far from efficient.¹⁰ One of the major problems with the offset policy has concerned the comparison and measurement of the pollutants of the two firms wishing to trade emission rights. The EPA must approve each offset. Since EPA has no institutional incentive to approve offsets that are socially beneficial, it is not surprising that the program has only been marginally successful. Even though some proposed trades may result in net improvements in social welfare, they have not always been allowed. We argue that a private enforcement agent could be endowed with incentives to ensure that socially beneficial trades are permitted.

III. A Proposal for Private Enforcement Agents

A. Introduction

Coase (1960) argued that when parties have property rights in valuable resources, they will be able to allocate these resources efficiently amongst themselves. In his model, rules about resource allocation do not matter, because parties will be able to choose efficient allocations with no outside interference. All that matters is that property rights are clearly defined, so that parties will have a base from which to negotiate.¹¹ The primary implication of the Coase theorem for regulation of economic activity is that less such regulation is needed than had been previously thought. That is, for many externalities in which intervention appears to be needed, a redefinition of property rights may solve the problem without requiring any further government action.

The major problem in applying the Coase theorem to policy decisions is the problem of transaction and negotiation costs. In many situations, transaction costs are sufficiently high to prevent the outcome predicted by the theorem, since much of the theorem's power rests upon an assumption of no transaction costs. When transaction costs are too high, some government intervention may be required beyond the mere definition of property rights. In such a situation, it may be efficient for government to allocate rights. That is, in the face of high transaction costs, rules do matter.

Posner (1977) has argued that in situations where transaction costs are too high for private bargaining to reach an optimal solution, the courts should attempt to simulate markets. That is, the courts should attempt to determine who would have bought the property right if transaction costs had been low enough to allow a transaction to occur, and then allocate the right to the party who would have bought it. Otherwise, it is argued that without this type of court involvement (in the presence of high transaction costs), the right will generally remain with the party to whom it is initially assigned.

Empirically, Posner (1977) has observed that the courts often do attempt to mimic markets in allocating rights. One possible explanation for these efficient outcomes is simply that judges understand the Coase theorem and are wise in their application of economic principles of efficiency. Following this line of reasoning, one might argue that many statutes and regulations have arisen through some error in the common law. For example, the need for much regulation could be alleviated simply by allowing more class action suits. Once a class has been formed, judges can once again attempt to simulate markets in disputes involving the class.

However, the above argument (which leads to a call for more class action suits) is logically flawed.¹² If the common law is efficient because of the wisdom of judges, then judges should have perceived the value of such class actions and allowed them. Moreover, there is no reason to assume that making all class actions easier would lead to greater efficiency; in many situations class actions could lead to reduced efficiency.¹³

Rubin has proposed an alternative explanation for common law efficiency, which considers the evolution of laws and argues that certain evolutionary forces sometimes lead to efficiency.¹⁴ These evolutionary forces operate independently of any intelligence on the part of judges; they are the result of individual wealth maximizing behavior by potential litigants. In their current form, the evolutionary arguments imply that the law will be efficient if the parties to disputes are "correctly" chosen. In particular, if the parties have ongoing economic interests in the type of case under dispute, and if they have the same stakes in the case that future disputants are likely to have, then there are pressures for efficiency. For example, this would be true of two insurance companies litigating in an automobile accident case.¹⁵

Conversely, if both parties to a dispute have an interest only in the case at hand, but no ongoing interest in cases of this sort, there will be no pressure for efficiency. If one party does have an ongoing interest in the sort of case under dispute and the other party has no such interest, there will be pressure for the law to evolve so as to favor the party with the continuing interest, independently of the efficiency of this outcome.

Our proposal for private enforcement would essentially create a new party with appropriate economic interests in cases. Currently, government enforcement agents have ongoing interests, but these interests are not necessarily related to the costs and benefits of cases or rules. By creating private enforcement agents whose economic interests are directly related to the social costs and benefits of their actions, both parties to disputes would have

appropriate stakes in future cases so that the enforcement rules that evolve would be efficient.

The policy implication of this (efficient evolution of law) theory is that in addition to choosing a policy, one must correctly define the set of agents who will choose rules. If we choose the agents correctly, and give them the correct incentives, the correct set of rules will evolve. This policy prescription applies not only to common law situations, but also to situations that are now handled through regulation. It has important policy implications that have not been explored in the literature.

Focusing our attention on the agents who are to be allowed to interact, rather than on the rules which must be obeyed, reveals an additional advantage besides the efficiency of the rules which will evolve. In some circumstances, when agents are chosen correctly, the outcome of the process will be "privately enforceable". An institution is said to be privately enforceable when it sets up mechanisms that make it in the self interest of decision makers to perform according to the desires of the designer of the institution. That is, costs and benefits (e.g. profits) for the decision maker are structured in such a way that in maximizing his own self interest, the decision maker will also maximize the interest of the designer of the system. An important advantage of privately enforceable mechanisms is that they economise on monitoring and enforcement costs. Since it pays for the decision maker to act in desirable ways, there is no need for authorities to monitor the decision maker's behavior.

It appears that most common law remedies are privately enforceable. That is, in most common law cases the remedies proposed are such that little or no further enforcement by the courts is necessary. For example, a common law remedy which is often used is the creation of a property right that is vested in one party to the dispute. Once such a right is created, then the owner of the right has a private incentive to enforce the right; no further monitoring by the court is needed.

In contrast, the standard remedies in most regulatory matters are not privately enforceable. For example, assume a firm is prohibited from polluting. Regulations designed to implement this pollution ban are not privately enforceable. The firm has incentives to continue polluting, unless the enforcement agency monitors and penalizes the firm if it violates the regulation. In the common law case, once the court reaches a decision, the outcome may be left to private parties. In a typical regulatory matter, this is not so. It may be that the sort of activities which are regulated by enforcement agencies do not readily lend themselves to private enforceability.¹⁶ Nonetheless, to the extent that private enforceability is possible, it is a desirable feature of regulation.

In addition to examining the private enforceability of regulations, one can ask whether or not policies are privately enforceable. For example, if Congress decides to ban a firm from polluting, this ban is not privately enforceable. Once again, the firm has incentives to continue polluting, unless the enforcement agency monitors the firm and penalizes the activity. But there also need to be incentives for the government enforcement agency to monitor the

firm. Congress must resort to its own means of monitoring the enforcers (e.g. oversight hearings and appropriation bills).

Furthermore, even if the enforcement agency does implement Congressional policy, there is no incentive for this to be done in an efficient manner. Unless the enforcement agency's compensation is structured so that it depends on the net social benefits of its action, there is no reason to expect efficient rules to develop. But this is somewhat circular, since Congress designs the regulatory institution in the first place. Although Congress may specify a cost-benefit framework in some areas of regulation, it may lack any incentive to design efficient regulatory institutions.¹⁷

If the correct set of agents is chosen, there will be a tendency for the right set of rules to evolve. Government agencies often lack the incentive to design efficient rules. Thus, we propose giving enforcement agents the proper incentives to efficiently implement government policy. As argued above, it may be easier to determine which set of agents is correct than to determine which set of rules is correct. To choose the right set of agents requires that we know what sort of agents will have ongoing, symmetric interests in certain types of cases, and to endow them with incentives to maximize social welfare. To choose the optimal set of rules requires that we know enough to actually choose these rules, a problem which seems a priori more difficult in a dynamic economy.

The argument so far is that public policy should be enforced by parties who are created with incentives to regulate efficiently. In the remainder of this section, some possible applications will be developed in order to show how the concept might be applied. It should be pointed out, however, that these examples are illustrative; if the indicated policies were to be seriously considered for adoption, much more analysis would be needed.

B. Auto Safety

The National Traffic and Motor Vehicle Safety Act of 1966 sets forth the policy whereby new cars are to be manufactured "to reduce accidents involving motor vehicles and to reduce the deaths and injuries occurring in such accidents." The Act requires that the Secretary of Transportation issue motor vehicle safety performance standards that are consistent with this goal and that take into account relevant motor vehicle safety research data and whether or not the standard is "reasonable, practicable and appropriate."¹⁸ Like much legislation in the U.S., the National Traffic and Motor Vehicle Safety Act is written in such general terms that the government regulator must act as both policymaker and rulemaker. That is, the regulator must first (implicitly) redefine the policy so that it can be expressed in terms of accident rates, dollars, etc. Once the policy has been clearly defined, the regulator must implement that policy by writing and enforcing rules.

The National Highway Traffic Safety Administration (NHTSA) currently defines safety policy, writes the rules, and implements this policy by requiring new automobiles to be manufactured in compliance with various safety standards.¹⁹ These rules implicitly define what the terms "reasonable,

practicable and appropriate" mean in practice (i.e. they implicitly define the policy). In deciding which devices to mandate, even though NHTSA takes into account the costs and benefits of its action, there is no mechanism to guarantee that the analysis is done correctly. For example, in the case of air bags, Blomquist and Peltzman (1981) argue that NHTSA's analysis failed to take into account the fact that drivers will substitute safety devices and that unsafe drivers impose costs on other drivers and pedestrians. Their prescriptions for better auto safety policy are the traditional economic solutions. They suggest the possibility of moving towards financial incentives for safe driving and they call upon government regulators to be more careful in doing their cost-benefit analyses.

Our analysis will focus on the latter approach - regulation of the auto industry.²⁰ Unfortunately, even if the staff economists at NHTSA performed cost-benefit analyses exactly as described by Blomquist and Peltzman, there is no guarantee that the efficient solution will be chosen by the government regulators. The marketplace automatically penalizes inefficiency, but there is no mechanism in the government to penalize wrong or inefficient decisions. Our proposal for private enforcement of government policies is an attempt to use the discipline of the market to ensure that regulatory decisions are efficient.

Instead of the current regulatory approach, suppose NHTSA's role in auto safety were simply to determine the current mortality and morbidity rates caused by auto accidents (controlling for such variables as number of miles driven, average age of driver, etc.) They (or Congress) would also place a dollar value on the social costs of injuries and death. But NHTSA could not force anyone to comply with safety standards. Thus, Congress and NHTSA would become (explicit) policymakers, not regulators.

Instead of relying on NHTSA to promulgate and enforce rules to implement the auto safety policy, suppose the government auctioned off the right to enforce automobile safety regulations. In other words, create a private agent, called the enforcement agent, with an interest in reducing the injuries and fatalities caused by automobile accidents. The enforcement agent would be given the power to take any violator to court to ensure compliance with the current standards, but auto makers could not be forced to go beyond the current safety standards.

The enforcement agent would be paid an amount equal to the social benefits of any reduction in injuries from the baseline estimate, or would pay the government for any increased injuries. He would have the freedom to accept any level of compliance from any auto maker. Thus, if an auto maker believed its new safety device could save 100 lives per year at a cost of \$20 million, and the government was willing to pay \$500,000 per life saved, it would be socially efficient to install the new device. Under our scheme, the enforcer and auto maker would find it in their mutual interest to agree to install the device if it were socially efficient to do so. The enforcer would be willing to pay the auto maker up to \$50 million for installing the devices, while the auto maker would have to spend \$20 million. Thus, there is no need for the enforcement agent to "command" the firm to improve safety. The incentive scheme we propose will make it in the interest of both parties to negotiate a settlement of any disputes.

It is important to realize that this proposal is significantly different from the more traditional form of market-based regulation often advocated. One could also have proposed that NHTSA implement this policy by offering to pay any auto maker \$500,000 per life saved as a result of any safety device installed. The problem with this approach has to do with the private enforceability of this policy. There is no guarantee that the government enforcer will evaluate the proposed safety device from a social cost-benefit criteria. For example, a budget maximizing bureaucrat may require an enormous (and inefficient) amount of test data, since he would have to hire additional technical staff to evaluate each proposed safety device. On the other hand, our private enforcer would only require additional tests if it was socially efficient to do so, since his compensation depends on actual net social benefits.²¹

To illustrate how this enforcement scheme would work, consider the problem of an enforcement agent who must decide whether or not to adopt a newly developed safety device. Suppose there are currently A_0 accidents that cause fatalities.²² Let p be the dollar value the government has decided to pay per life saved²³ and $C(A_0)$ be the current total amount spent by all auto makers on safety devices. Finally, if the enforcement agent requires this device, it incurs additional monitoring costs of M to ensure the device is properly installed. Then, if the proposed safety device is expected to reduce accidents from A_0 to A , the enforcement agent's expected income from this proposal is:

$$p(A_0 - A) - M \quad (1)$$

That is, the enforcement agent expects to receive a payment from the government equal to the social benefit of the reduced fatality rate. Net income is equal to this payment from the government, $p(A_0 - A)$, less any administrative expenses it incurs from monitoring compliance by auto makers (M).

Each auto maker incurs a cost of meeting the new safety standard. The total cost to the auto manufacturers from implementing this new safety device is:

$$C(A_0) - C(A) \quad (2)$$

Given the above notation, a proposed safety device is socially beneficial if (1) is greater than (2), i.e. if the expected social benefit of the reduction in fatalities exceeds the cost of obtaining that reduced fatality rate.

The enforcer is willing to pay the auto makers up to its net income (1) to install the new device. The incentives in this proposal are such that if the device is socially beneficial, this amount is greater than the cost of installing the devices; thus the auto makers will agree to the transaction. However, if the device was inefficient, then the net income to the enforcer (1) would be less than the cost of the new safety device (2), and the enforcer would not offer auto makers enough money to induce them to install the new device.

As another example, suppose some current safety standard is socially inefficient. Under our proposal, the auto makers could bribe the enforcement agent not to enforce that inefficient standard. The auto makers would be willing to pay an amount less than the cost of the safety device currently being installed to comply with the standard, but more than the offsetting loss in revenue to the enforcement firm from having a higher fatality rate. In the notation above, suppose the auto makers want to stop installing a device, with an expected increase in accidents of A_2 . By not installing this safety device, auto makers reduce their production costs by an amount equal to $C(A_2)$. Thus, auto makers would be willing to make a side payment to the enforcer up to the amount of their savings.

Since (in this example) there is one less standard to enforce, the enforcement agent can eliminate that portion of its monitoring of auto makers that is devoted to ensuring compliance with that safety standard. This results in a savings to the enforcement agent of M_2 . However, since there are now expected to be more fatalities, the government's payment to the enforcement agent will be reduced by $p(A_2)$, an amount equal to the social cost of the added fatalities. Thus, the cost to the enforcement agent if he permits this relaxation of safety is:

$$p(A_2) - M_2 \quad (3)$$

Since we have assumed this safety device is socially inefficient, the expected social cost of the increased fatalities must be less than the social benefit to be gained from reduced production and monitoring costs. In the notation above, it must be that:

$$p(A_2) < C(A_2) + M_2 \quad (4)$$

Rearranging (4), we have:

$$p(A_2) - M_2 < C(A_2) \quad (5)$$

(5) shows that the reduction in income to the enforcement agent, $p(A_2) - M_2$, is less than the cost savings to the auto makers, $C(A_2)$. Since the auto makers are willing to pay a sum greater than the enforcer's loss in income, this socially inefficient device will be scrapped.

In the simple example above, all auto makers were assumed to be identical. However, it is quite likely that manufacturers differ in their propensity to produce safe cars. It is not just that some auto makers are better at producing safe cars than others. Automobiles are composite goods with various attributes such as performance, comfort, safety and fuel economy. Technological and economic constraints are such that these attributes must often be traded off amongst each other.²⁴

Firms that have a comparative advantage in producing safe cars may be asked to spend more than those that are less efficient in producing safety. An auto maker who is asked to spend more than the baseline amount of safety expenditures will be fully compensated by the enforcement agent. Since it is socially beneficial to have this company increase its safety expenditures, the

payment from the government to the enforcement agent for reduced fatalities due to this company's increased safety will more than offset the cost of the additional safety related expenditures. Thus, the enforcement agent can afford to fully compensate the auto maker for its added expenses.

On the other hand, a firm whose cost of obtaining the current level of safety exceeds the social benefit of that level may desire to reduce its safety level. That firm may have to pay the enforcement agent an amount equal to the reduced social benefits. However, since the social benefit is less than the firm's cost savings, the auto maker will be able to stop producing that socially inefficient level of safety and compensate the enforcement agent for its reduced government revenue. Furthermore, it is in the interest of the enforcement agent to accept this proposed change. If accidents increase, the enforcement agent will have to pay the government (or receive less compensation from the government for its other safety enhancing activities) an amount equal to the social cost of this increase. However, the enforcement agent will have received an amount at least as large as this from the auto maker, since it is a socially inefficient standard.

C. Pollution

Emission fees and marketable pollution rights have been proposed as alternative schemes to the command and control regulatory approach that is currently in use. The literature has generally focused on the relative merits of these alternative policies.²⁵ Very little discussion has taken place over the proper form of enforcement of these policies.²⁶

Consider an emission fee scheme for the reduction of pollution. For a given water body or air shed, the government can create a schedule of fines for polluting based on the social cost of pollution in each location. So far, this scheme does not differ from others proposed in the literature. The EPA (or Congress) would set governmental policy by determining the value it places on clean water or air.

The next step is a modification: Sell the right to collect these fines. Once again, we would create a private enforcement agent with an interest in collecting the fines from polluters. If the right was sold to the highest bidder, we could assume that costs of collection would be as low as possible.²⁷ Not only will the tax be collected efficiently, we claim there will be additional benefits due to the evolution of efficient rules that implement this tax scheme.

Suppose the government has determined that it wishes to place a per unit tax t on pollution. Let Z be the initial quantity of pollution, and $C(.)$ be the abatement cost function.²⁸ The enforcer is permitted to keep any tax revenue and the government pays the enforcer an amount equal to the value of any reduced pollution. Let M be any monitoring and/or enforcement expenses incurred by the enforcement agent and X be the amount of pollution abated.

The enforcement agent's profit is:

$$t(Z-X) - M + tX = tZ - M \quad (6)$$

(minus the lump sum payment from being the high bidder in the auction). That is, the enforcement agent collects a tax from the polluting firm for any uncontrolled emissions, $t(Z-X)$, and collects a payment from the government equal to any reduction in pollution from the baseline level, tX . This income is reduced by M , the amount spent monitoring the polluting firm.

The polluting firm's cost of pollution is:

$$t(Z-X) + C(Z-X) \quad (7)$$

It must pay a tax on any unabated emissions as well as incur abatement costs for any reduction in emissions beyond the initial level of pollution.

Combining (6) and (7) yields:

$$tX - C(Z-X) - M \quad (8)$$

(8) is the combined profit of the two private firms. Since the two firms are free to negotiate the level of emissions, they will jointly maximize (8). This is also the net social benefit of abatement, since tX is the social value of reduced emissions, $C(Z-X)$ is the cost of abating X , and M is the cost of enforcing this level of abatement. Thus, given enforcement and abatement technologies, the socially efficient level of pollution and enforcement will be obtained.²⁹

Under our proposal, the polluting firm must pay a higher tax for higher levels of pollution, $t(Z-X)$, and thus has incentives to reduce pollution up to the point where the social costs of abatement equal the social benefits. Since the enforcement agent receives payments from both the polluter and government, the net result is a fixed fee tZ , which is independent of the final level of pollution. To the extent that monitoring is socially costly, the enforcement agent has an incentive to reduce monitoring expenses.³⁰

To illustrate the dynamic process whereby private enforcement tends to produce efficient rules, suppose that the enforcer has developed a new technique to detect pollution. At a cost of M_1 , the enforcer can find that a firm who had been taxed on the basis of Z_0 units of pollution and X_0 units of abatement is actually polluting $Z_1 > Z_0$ and abating X_0 . For example, suppose the current monitor takes readings once a week and the polluting firm is able to adjust its pollution daily and keep its tax low by reducing emissions on days when the monitor is present. The proposed method may be a daily monitor. If the new monitor is adopted, the polluting firm will have to pay a higher tax and will increase its abatement efforts. Suppose the firm reduces its emissions by X_1 , where $X_1 > X_0$. In other words, the firm will abate more than it did under the weekly monitor, although the net result may be more or less pollution than the enforcer originally thought was being emitted. That is, $Z_0 - X_0$ (the measured emission level under a weekly monitor) may be greater than or less than $Z_1 - X_1$ (the actual emission level under a daily monitor). Adoption

of the new technique is socially efficient if:

$$t(X_1 - X_0) - C(Z_1 - X_1) + C(Z_1 - X_0) - M_1 > 0 \quad (9)$$

The first term of (9) is the social benefit of reducing the actual pollution level from $(Z_1 - X_0)$ to $(Z_1 - X_1)$. The second and third terms of (9) are the difference in actual abatement costs. The last term is the additional monitoring cost.

The enforcement agent will propose the new technique if:

$$t(Z_1 - X_1) + tX_1 - t(Z_0 - X_0) + t(X_0) - M_1 > 0 \quad (10)$$

The first two terms in (10) are the tax receipts and government transfer payments under the daily monitor. The third and fourth terms in (10) are these receipts under the current weekly monitor, and the last term is the added expense of switching to a daily monitor. (10) can be rewritten as:

$$t(Z_1 - Z_0) - M_1 > 0 \quad (11)$$

That is, the lower the enforcement costs and larger the discrepancy between the actual and supposed pollution levels, the more likely is the enforcer to propose the new monitor.

On the other hand, the new monitoring technique will cost the polluting firm an additional amount:

$$t(Z_1 - X_1) - t(Z_0 - X_0) + C(Z_1 - X_1) - C(Z_1 - X_0) \quad (12)^{31}$$

If the increased expense to the firm exceeds the gain to the enforcer (i.e. $(12) > (11)$), there is room for negotiation, and the polluting firm can pay the enforcer not to undertake the new monitoring technique. Notice that $(11) - (12) = (9)$, so that jointly, the polluting firm and enforcement agent once again maximize net social benefits.

Note that the incentives for a budget maximizing bureaucrat are opposite of those confronting our enforcement agent. If the cost of detection increases, the perceived need to adopt the new technique becomes more compelling irrespective of whether or not there is a large discrepancy between the daily and weekly readings (i.e. regardless of whether or not the extra monitoring is socially worth its cost). This is because implementing the new monitor will require a larger budget. In addition, since the bureaucrat's compensation is independent of the tax collected, there is no incentive to drop proposed enforcement techniques that do not add to social benefits (or that reduce net social benefits). Under our proposal, if there are few social benefits from a newly proposed enforcement technique, there is little financial incentive for the private enforcer to adopt the new technique.

Similarly, a political support maximizer is unlikely to adopt the socially efficient outcome. It is not possible to determine exactly what incentives the regulator would have without a more elaborate model of the gainers and losers from regulation. However, the government regulator may have little incentive

to develop a new monitor (or to even investigate whether or not there is a possible need for a new monitoring technique), since those adversely affected by pollution are unlikely to have enough information about emission levels or monitoring technologies to exert any pressure for these new monitors.

D. Other Examples

We examined in some detail two possible applications of private enforcement of public policy - automobile safety and pollution control. Many other areas of government intervention could benefit from this approach. Here, we briefly sketch out three possible examples.

Continuing with health and safety issues, Viscusi (1984) recently put forth several proposals for dealing with the problem of occupational disease. He argues for a combination of social insurance for victims and financial incentives (penalty taxes) for firms. By setting performance standards instead of specification standards, and by allowing firms to determine compliance through their choice of tax payments, the market will determine the efficient level of risk (based on the politically determined value of life). However, there is no guarantee that the implementing regulations will be efficiently designed. Specifically, there is no reason to believe that OSHA will efficiently monitor the workplace or the workers. Further, OSHA inspectors could not be expected to efficiently determine which industries and/or firms should be targeted for more frequent inspections.³² These problems could be eliminated with the establishment of a private enforcement agent who is given the proper incentives. In this case, since more hazardous substances and/or more toxic doses would result in a higher tax payment, our approach would involve a scheme similar to that proposed for pollution control.

In the area of consumer protection regulation, there is some evidence that the FTC has not historically been entirely efficient at enforcement of advertising regulation.³³ Instead of relying on government enforcement, it may be possible to auction off the right to challenge advertising claims as being false. The enforcer would be able to require firms to provide substantiating evidence for claims it believed to be questionable. If it found a claim to be true, the enforcer would have to reimburse the firm for its test. If found to be false, the firm would be penalized for its claim.³⁴

Another possible application of private enforcement is in the more traditional governmental function of tax collection. There is no incentive for the IRS to collect taxes in the most efficient manner. For example, if a private enforcement firm collected taxes and had to pay interest on tax money not refunded on time, the recent delays by the IRS in sending back tax refunds would likely not have occurred. Moreover, there is evidence that each dollar spent auditing returns (at the margin) yields a large increase in tax revenue. At the same time, budgetary pressures have resulted in a proposed reduction in IRS enforcement expenditures.³⁵ Under our approach, private parties would bid for the right to collect taxes, and their compensation could be based both on the efficiency of their refund procedures and the overall yield to the Treasury. It would be up to the private enforcer to determine the proper level of enforcement that is consistent with these socially prescribed policies.³⁶

IV. Efficiency Gains from Private Enforcement

From the previous examples, it should be clear that our justification for proposing private enforcement of public policy is based on presumed cost savings and efficiency gains to society. The efficiency gains we foresee can be identified as those (a) normally accruing from market-based incentive schemes, (b) due to the private nature of the enforcement organization, and (c) resulting from the evolution of efficient rules of implementation. In this section we distinguish between these three different sources of efficiency gains. In particular, we emphasize the difference between those social gains that we expect to be realized by allowing private parties to determine the rules under which public policy will be enforced, and those gains that could be realized from other government enforced market-based regulatory proposals. Finally, we argue that even inefficient policies can be implemented more efficiently through private enforcement.

A. Market-Based Policy

The standard benefits associated with market-based incentive schemes also apply here. For example, in the case of auto safety, there are three benefits of our proposal that would be achievable even if the scheme were enforced by government. First, the information requirements are much less than under the current regulatory framework. The government does not need to know the socially optimal level of injuries. It only needs to know the social benefits of reducing each injury or death. The market scheme proposed here would automatically find the socially optimal injury level, as firms with the least cost methods of preventing injuries or death would install the necessary safety devices, up to the point where the costs exceed the social benefits. Thus, unlike the current regulatory approach to auto safety, it does not matter if the government incorrectly determines what the baseline level of safety ought to be. All that is required is that the government correctly determines the social benefits of preventing injury or death.

This is an important advantage over current regulatory schemes. Government regulators do not have access to auto makers' private information about the cost of installing proposed safety devices. Further, under the current regulatory approach, auto makers are likely to overstate the costs and understate the technical feasibility of safety devices.³⁷ Under our proposal, this informational asymmetry is irrelevant for determining the ultimate level of safety. Auto makers will be paid to increase safety, and the amount the enforcement agent is willing to pay depends on the benefits of the device (not its costs). Of course, the auto makers may still be able to exploit this informational asymmetry to extract the highest possible compensation from the enforcement firm. But since these transfer payments only occur when the device is socially efficient, the exact amount of the payment will determine the relative wealth of the auto makers and enforcement agent, not social welfare.³⁸

Second, this scheme is well suited to both adapt to changing technologies and to foster research into improved safety technology. Under the current regulatory environment, NHTSA may require a new performance standard if it

determines it is technologically feasible. However, since auto makers will have to increase production costs to implement any more stringent standard, there is no incentive for auto makers to develop these new technologies themselves.³⁹ Under our approach, the auto maker who developed a new (efficient) safety device would be reimbursed for its full production costs (and possibly more) by the enforcement agent. Thus, auto makers would have incentives to develop new safety devices (if they are efficient) even if they will not displace currently installed devices.

Third, this scheme is much less susceptible to interest group pressure once it is adopted. Auto makers can actually benefit from new safety devices, and costly/inefficient devices will be scrapped. Public interest groups that previously fought for more safety at any price will no longer be able to lobby for such proposals. Instead, the debate will center on the social value of life and injuries.

B. Private Organizations

The second source of efficiency gain is due to the private nature of the enforcement agent. Private firms are generally more efficient than public firms.⁴⁰ A profit maximizing business has incentives to minimize overhead expenses. For example, profit maximizing firms would have incentives to find ways to reduce monitoring costs without necessarily decreasing monitoring ability, such as developing new technologies, bargaining for cheaper labor, or eliminating unproductive employee or management practices. The incentives for a budget maximizing bureau are just the opposite.

C. Efficient Rules

Finally, we have argued throughout that there is a third source of efficiency to be gained from our proposal. We expect the rules which govern enforcement of public policy to develop efficiently. Examples of these rules are the frequency with which emissions are monitored, the definition of an accident, the standards of measurement for pollutants, and the burden of proof required by firms who claim to be in compliance with a standard. Rules will develop efficiently because the incentives for both parties to these transactions are such that the efficient solution will evolve.

Efficient rules can be expected for two reasons. First, the agents involved in this proposal are of the sort that are needed in order for rules to evolve efficiently. In disputes, agents will be automobile manufacturers (or polluters) on one side and enforcement agents on the other. Both parties will have ongoing economic interests in disputes of the sort involved in any one case, and therefore incentives are roughly correct for negotiation (or litigation) to achieve efficient rules. That is, inefficient rules are more likely to be litigated until overturned, and efficient rules are less likely to be challenged. Government bureaus are motivated to achieve precedents, but there is no motivation for them to seek efficient precedents or rules.

Second, the rules will be privately enforceable in the sense that the party with the responsibility to enforce safety regulations has an incentive to do so when it is socially efficient. Government is needed to create the schedule of values for morbidity, mortality or pollution, and to auction off the right to enforce. Once the right is sold, government is not needed further (except to monitor the final outcome).

D. Efficient Implementation of Inefficient Policy

The latter two benefits of our proposal would accrue even if the government policy itself was socially inefficient. For example, the government may decide for equity or political reasons that it wants to exempt certain industries from pollution control requirements. Or, the government may decide on a level of auto safety that is "too safe," in the sense that the marginal social cost of reducing the fatality rate far exceeds the social benefit. Private enforcement of these inefficient policies will still produce social benefits, assuming the goal is now to implement that policy in the least expensive manner. In terms of our examples, one could simply set a tax rate (or value of life) that is different from the socially optimal one. The level of pollution (or fatalities) consistent with this policy will be implemented in the most efficient manner.

Furthermore, our proposal can be attached to either a market-based incentive scheme or a more traditional command-and-control regulatory approach. The novelty of our proposal is that it concerns the rules and implementation of a policy, not the policy itself. For example, one could still benefit by applying our private enforcement proposal to a command-and-control based pollution standard. Although the actual policy would be inferior to an emissions fee system (e.g. it would have a built in bias against technological development of process changes in favor of established end-of-pipe treatment), at least the rules implementing the regulatory standard would be efficient. Of course, we would argue further that our proposal should be used to implement policies that are themselves efficient.

E. Illustration of Benefits

To illustrate the difference between these three efficiency gains, consider once again the auto safety example. The first benefit from our proposal is that this is a market-based regulatory approach instead of a command-and-control regulation. Thus, unlike the current system whereby auto makers are told their automobiles must meet certain safety performance standards, our proposal is to put a price on safety and let technology and the market determine how safe automobiles should be. This creates incentives for auto makers (or others) to develop new and more efficient safety devices. However, there is nothing novel about this part of our proposal. It is simply a market-based policy that could be implemented by either a government or private enforcement agent.

The second benefit would result directly from the fact that the enforcement agent is a private firm, not a public agency. For example, there may be significant savings simply by replacing most of NHTSA's employees with employees of the private enforcement firm. Unproductive employees would not have the almost indisputable employment guarantees currently afforded to most government workers. Furthermore, the private firm will not be burdened by many of the administrative procedures government agencies must adhere to. For example, under the Administrative Procedures Act, if NHTSA wishes to revise an existing rule, it must issue an advance notice of the proposal and give the public an opportunity to comment. In some instances, public hearings must be held. Various other procedural requirements make the rulemaking process extremely burdensome. In fact, the process of rewriting a rule may take several years.

The third benefit would come from efficiently designed rules. For example, NHTSA has specific test requirements to determine performance of vehicles in avoiding injuries during a crash.⁴¹ Since NHTSA has no inherent incentive to design test standards that are efficient, auto makers have had to rely on costly litigation to stop the regulators from adopting test procedures they felt were inaccurate.⁴² Under our proposal, the enforcer and auto manufacturers would jointly have incentives to design these tests so they yield results as close as possible to real life crash conditions, since each firm's compensation is based on actual results (i.e. injuries and deaths).

Since this third efficiency gain is the most important part of our analysis, consider a final example which illustrates the difference between our proposal for private enforcement and an efficiently-designed policy that is publicly enforced. Ackerman and Hassler (1980, 1981) studied clean air rules enacted by Congress and the EPA for coal-burning power plants. They suggest Congress write "ends-oriented" legislation, such as requiring the EPA to "achieve ambient air quality improvements that promised to add at least 25,000 years to the life expectancies of the American people...(in 7 years)."⁴³ According to Ackerman and Hassler, this proposal was designed to deal with the problem of bureaucratic inertia. They claimed EPA had spent several million dollars modeling sulfur dioxide pollution when advances in scientific knowledge had already shown that the more significant health risks were associated with sulfates. Further, EPA had collected little data on levels of sulfate in the environment. The purpose of their proposal is to ensure the agency no longer concerns itself with pollution levels for their own sake, but instead to "force" the agency to concern itself with the real problem - health benefits.

Suppose the Ackerman and Hassler goal were written into law and EPA was given the authority to charge emission fees commensurate with their estimate of how this goal could be achieved. We argue there is no incentive for EPA to accurately estimate the emission fee required to meet this goal, or (more generally) to achieve the goal at all. Since Congress cannot simply "command" an agency to implement its legislation, it would not be surprising to find the agency ignoring important factors that would improve future air quality. In fact, bureaucratic incentives may be such that it is in their interest to make sure that goal is not met. Instead, we have argued that a private enforcement agent could be endowed with the proper incentives to ensure this goal is

achieved. (For example, the enforcement agent may be paid a lump-sum in 7 years if the goal is achieved.)

V. Problems of Implementation

Since our proposal would mandate a significant change in the nature of public policy, we do not expect our plan to be readily accepted without extensive debate. Furthermore, although some may agree with the theoretical justification for private enforcement, we expect there will be many criticisms over the practicality of implementing our idea. In this section, we attempt to anticipate some of these criticisms and to respond to them.⁴⁴ The potential problems we address here are: monitoring the enforcers; the number of enforcers; the cost of the program; and the required return for enforcers. Though we address some potential criticisms, we obviously cannot anticipate all such arguments.

A. Monitoring the Enforcers

One of the most basic problems with our proposal is that somebody (i.e. the government) must monitor the enforcers. As mentioned earlier, our proposal would create a principal-agent relationship between the government and the enforcement agent. Like any other contract, there must be some mechanism whereby the parties can determine whether the contract provisions have been complied with. That is, the government must be able to observe something, whether it be the number of auto accidents and injuries or pollution levels. Of course, this problem is not unique to our proposal - under the current regulatory setup, the government enforcer is an agent for Congress.⁴⁵

For example, in the pollution control case, the enforcer and the polluting firm may be able to collude and make higher joint profits by paying a lower tax rate on a higher level of pollution than is optimal. However, for such a scheme to be profitable, the firms would have to lie to the government about the amount of pollution abated. Thus, the colluders would hope to extract more from the government than they are entitled to and at the same time reduce abatement costs.

Although this is potentially a very serious problem, we argue it is not so critical as to negate the other benefits of our proposal. A government enforcement agent is also prone to collusion. Bribes and kickbacks are certainly not the exclusive domain of the private sector. There is no reason to believe the problem would be any better or worse with a private enforcement agent.

One possible solution that has been proposed to overcome this problem in public law enforcement is to require police to post a performance bond against any malfeasance.⁴⁶ This proposal may also be adopted in private enforcement schemes. Not only would this performance bond deter bribery, but it may also discourage shirking. Since it is very costly to continuously monitor the

actions of agents (e.g. enforcement officials), policymakers may want to find other ways to guard against shirking. By creating a penalty for shirking or malfeasance (i.e. the enforcement official loses the performance bond), the principal is effectively writing an incentive contract designed to mitigate the asymmetric information inherent in any agency relationship.⁴⁷ As long as there is a positive probability of being caught, the size of the enforcement official's bond can be adjusted upwards to provide him with adequate incentives not to shirk.

Unfortunately, the absence of misconduct (or of any conduct) does not mean that laws will be optimally enforced.⁴⁸ This problem could be overcome by restructuring the compensation scheme for enforcement officials. If the policymaker knows what an optimal enforcement policy is, he can provide incentives for the law enforcement official to follow this optimal strategy. Providing financial incentives for optimal enforcement may be a reasonable solution in a static economy. However, in a dynamic world, there are likely to be additional efficiency gains that will not be exploited by simply restructuring the enforcement agent's compensation. One way to provide incentives for an efficient enforcement strategy in a dynamic context is to allow private enforcers to compete with one another to collect fines from violators.⁴⁹ In addition to achieving the (current) optimal level of enforcement, competition in the market for enforcers could spur technological innovation in law enforcement techniques. Competition may also lower the cost of enforcement, as private firms tend to be less wasteful.⁵⁰

Many of the solutions offered in the law enforcement literature can be applied here. In fact, our proposal is less prone to some of these problems, since the private enforcement agency must compete for the right to enforce. Moreover, the government can probably mitigate a large part of this collusion problem by structuring the compensation scheme so that it is based on easily observable data. In particular, there is no need to monitor the amount of resources devoted to enforcement, or the level of compliance.⁵¹

Returning to the pollution tax proposal above, the government may want to base its portion of the payment on exogenously measured ambient air quality (adjusted for weather, changes in capacity utilization, etc.) Thus, it does not have to rely on the reported transfer payment between the enforcement agent and polluter. Instead, the government has an independent check on overall compliance. This need not be a very costly endeavor, since there is no need to verify the emissions level of each firm, only the jurisdiction's air quality. The degree to which this problem can be overcome depends on the type of externality being regulated. In fact, in the auto safety example, this is not a problem at all, since the government already collects auto accident data.

B. The Number of Enforcers

It might be argued that the market for enforcers would be a thin market, as there would be few bidders in any given area. However, there is no reason to expect thin markets to be a major problem. Indeed, as the scope of the program expands, the number of potential competitors would also increase. For example, a firm with the enforcement rights over auto safety would be a strong competitor for the enforcement rights to workplace safety. This competition could arise either through capital market competition (e.g. if the auto safety enforcer is convinced it could do a better job in workplace safety, it could buy the stock of the current workplace safety firm), or through a formal mechanism for periodically re-auctioning the rights. In either case, programs could be designed to maximize the number of potential competitors. In the pollution case, for example, we could initially require separate enforcement firms for different media (e.g. air and water) and for different geographic locations. Competition between the different firms could be allowed after they develop some expertise in enforcement.

A related criticism might be that since there would be only one enforcer in an area, monopoly problems would occur. However, it is the number of bidders which is relevant, not the number of actual participants in the market.⁵²

Finally, it must be remembered that the current enforcer is the government, which is itself a monopolist. Thus, our scheme would be no worse than the current situation. It is currently possible for government bureaus to compete among themselves in limited ways.⁵³ Under our proposal, this sort of competition would still be possible. However, there would be the additional possibility of capital market competition, so that there would be more, not less, competition than currently exists.

C. The Cost of the Program

This proposal may entail substantial costs. In our example of auto safety, the net result of the program may be that large payments would be made to auto manufacturers in order to induce them to increase the level of safety.⁵⁴ Thus, there would be a net transfer from taxpayers to automobile purchasers. However, these transfer payments are a feature of the market-based policies we have used as examples; they are not inherent in our proposal for private enforcement agents. Nevertheless, there are three points to note about this transfer (if it occurs).

First, the program imposes no net costs on society. Someone must pay for safety. Under the current regulatory approach, auto companies pay directly (and auto buyers indirectly) for safety features. Under our proposal, taxpayers (rather than auto buyers) would pay for this safety, but it does not increase the total cost over the current system. On the contrary: to the extent the program increases efficiency, the cost of achieving a given level of safety would actually be reduced.

Second, from an efficiency point of view, it is not clear who should pay for this increased safety. Purchasers of automobiles desire some level of safety; manufacturers respond by offering that level. If we as a society decide to regulate auto safety, we are arguing that for some reason people privately purchase too little safety, and it might be argued that taxpayers should pay for the increase in safety over and above the level which buyers want to purchase. At any rate, the Coase theorem tells us that it does not matter in terms of efficiency; the only question is who has the property right in safety. If car buyers have the right to determine the level of safety, then taxpayers should pay for any desired increase in this level; if society has this right, then auto owners should be forced to bear the cost. However, the allocation of this property right has no effect on the level of safety or on the method of achieving such safety. With an efficient scheme, the lowest price will be paid for the increased safety, and the correct level will be achieved.

Third, if (for equity reasons) it is decided that auto buyers should pay for the increased safety, then it is possible to shift the burden to them. A tax on drivers' licenses or on gasoline (for example) could be used to generate the revenue which would be used to pay for the increased level of safety.⁵⁵ For any other application of our proposal, similar taxes and transfers could be used to achieve the desired set of payments.

D. The Required Return for Enforcers

In the auto safety example, the enforcing firm may offer a large payment to automobile companies in order to induce them to undertake an investment in safety equipment with the expectation that accidents or fatalities will be reduced. If this estimate is wrong, then the enforcement firm will lose a substantial amount of money. This may seem like a risky investment, and thus the rate of return required to attract firms to bid for this activity may be high.

Although this may be true initially, any new economic activity is risky. However, once the market has had time to adapt to the nature of the new activity, there is no reason to expect it to be any riskier than other investments. For example, a firm investing in a new product is not certain that there will be a market for the product, and this is no different from investing in a new safety technology. Just as a new product may be test marketed to reduce the risk of major losses, the enforcement agent can be expected to test newly proposed safety devices to minimize this risk.

In the auto safety example, it is likely that the auto manufacturers will have better information about the likelihood that their safety devices will succeed in reducing fatalities. Thus, it would be natural for the auto companies to be asked to share in this risk. In other words, the private enforcer could be expected to shift some of the risk over to the auto companies by offering to pay a premium for successful results (and possibly pay less than the cost of the devices if they do not live up to expectations).

Moreover, it is important to note that switching an activity from the public to the private sector does not increase its level of risk; the risk just becomes more explicit. This is actually a benefit of our proposal, rather than a disadvantage. For example, if NHTSA believes some new device may be able to achieve a new level of safety, it may mandate that level of performance. However, from society's standpoint, mandating the new standard is risky: there is no certainty that it can be achieved. Further, there is no incentive for NHTSA to wait for the optimal amount of research before mandating a new safety standard. On the other hand, if enforcement is made private, the risk will become explicit. If the expected benefit from future research exceeds the expected cost of the research, the private enforcer will not implement the new standard.

Our proposal also makes explicit another form of risk - that political decision makers will not follow through with their promises. Firms who invest in pollution control or safety equipment do so based on current policy. However, there is always the risk that new laws will be enacted, making the current investment obsolete. Similarly, there is always the possibility that Congress will change policy in a way that will adversely affect the private enforcement agent. To the extent this is perceived to be a problem, there may be some reluctance on the part of private parties to undertake this endeavor. However, this is the same type of risk associated with all beneficiaries of government programs. Once the vested interest is created, the private enforcement agency will certainly lobby Congress to keep its side of the bargain.

VI. Summary

The normative literature on government regulation focuses on efficient policies. However, efficient policies do not often yield efficient results in practice. That is because all policies must be implemented through a set of detailed rules and enforcement procedures. If regulation is to be efficient, then these rules must also be efficient. This important problem has been largely neglected in the literature.

The law and economics literature has developed some concepts which are useful in designing efficient rules. We may trace the history of the modern economic analysis of legal rules from Coase through the evolutionary models of legal change. Coase argued that rules did not matter as long as property rights are clearly defined. However, this result is only true in the absence of high transaction costs. The evolutionary models of legal change argue that rules do matter and are endogenous to the system. Rules take their existing form as a result of behavior of interested parties who base their decisions on profit maximization. If the affected parties are chosen correctly, the result of this maximization process is likely to be a set of rules that are efficient.

It is possible to apply this insight to the problem of designing optimal regulatory institutions. The implication of these evolutionary models is that (once a policy is agreed upon) the object of choice in regulatory matters should be the parties to disputes, rather than the rules themselves. If the

parties are chosen correctly and given proper incentives, then evolutionary forces will lead to efficient rules. There are two major advantages to this system. First, it is easier to choose parties correctly than to choose rules correctly, so that an efficient result is more likely to occur if we concentrate on choosing parties. Second, choosing parties to potential disputes and vesting them with property rights creates a system which is privately enforceable, so that monitoring and enforcement costs are reduced.

The fact that the scheme proposed here is not perfect may not be coincidental. In this proposal, government intervention is needed because of a market failure-- that is, because no agent possesses the correct set of property rights. If such an agent existed, then intervention would not be needed; the legal process and appropriate definitions of property rights would be sufficient to guarantee efficiency in both resource usage and in rules. In situations where government intervention is truly needed, there can be no agent with exactly the correct set of incentives to achieve efficiency, since if such an agent existed (or could be created), no government intervention would be needed. Thus, in the case of true market failures, it may be that no perfect scheme is possible. Instead, we may still attempt to design proposals which more closely approximate efficiency. Moreover, the disadvantages of this scheme are shared by virtually all existing or proposed enforcement schemes, so that, net, it is an improvement.

Of course, this entire analysis has been performed assuming that decision makers want efficient policies. If rules are truly endogenous, then it may be that they are chosen inefficiently due to the interests of those choosing the policies.⁵⁶ Furthermore, there may be strong vested interests against our proposal. For example, in our pollution control proposal, polluting firms would be subject to a new tax. Enforcement power (and presumably jobs) would be taken away from environmental regulators. Both of these parties can be expected to oppose our plan. On the other hand, if those who would become collecting firms could determine this in advance, they might have an incentive to lobby for the plan. This disadvantage is similar to that encountered by the more traditional effluent fee schemes proposed in the literature. It does not affect the desirability of adopting the approach, only the likelihood that it will be adopted. Moreover, through the appropriate use of government transfer payments, this specific example could be restructured so that current polluters do not pay more than under the current regulatory approach.⁵⁷

Finally, we should mention that what we have called "policies" and "rules" are somewhat arbitrary. In the auto safety example, we let government policy decide the explicit value of life and endowed a private enforcement agent with the entitlement to that monetary amount. In our example, the actual number of accidents and injuries would be determined by the market through rules adopted by the enforcement agent. An alternative proposal could let government policy specify a target number of accidents and injuries (similar to the Ackerman and Hassler proposal), and let technology and the market (through the rules developed by the private enforcement agent) decide the cost to be borne by society to achieve that policy. Although the former approach may be more efficient (since presumably the government does not know the optimal amount of safety), either proposal could be implemented efficiently through private enforcement, and would have the associated benefits.

Footnotes

1. For example, see Schultze (1977). In the context of government regulation, an efficient policy is defined to be one that attains the social goal at the least cost. More generally, an efficient policy is one that maximizes the difference between the social benefits and costs of the policy.

2. The Code of Federal Regulations (CFR) is a compilation of all such regulations. The current issue of the CFR contains 105,654 pages. This does not include many of the day-to-day operating precedents and internal rules that are used by the regulatory agencies. According to the 1982 Economic Report of the President, the federal government budgeted \$7.1 billion in 1981 for over 50 regulatory agencies. During 1981, of the 2,715 newly proposed regulations reviewed by the Office of Management and Budget, only 169 were determined to be inconsistent with White House policy at the time.

3. Wolf (1979) argues that "policy studies rarely raise, and almost never answer such questions as **who** would have to do **what**, and **when**, and with what foreseeable resistance, modifications, and compromises if alternative A were chosen, or B, or C?" Although Wolf suggests that implementation issues should be considered while designing government policy, he does not consider alternatives to public enforcement. However, he does suggest that "reprivatization" of some public services should be considered. The issue of replacing traditional governmental functions with private sector employment has been discussed by Savas (1982). He proposes that many public service functions (such as fire protection and sewage treatment) be taken over by the private sector, and documents significant cost savings that have been realized by various levels of government that have relied on private firms to provide these services. But Savas deals primarily with the provision of services, not with the issue of regulation.

4. See Niskanen (1972).

5. See Stigler (1971) and Peltzman (1976).

6. Shughart and Tollison (1983).

7. Horwitz and Kolodny (1981). It is unclear exactly why this result occurred. One possible explanation is that managers' compensation packages were already tied to reported earnings data that would be adversely affected by increased R&D expenditures due to the new measurement techniques.

8. For a discussion of how FDA implemented the 1962 Amendments and what effect this had on the drug market, see Wardell and Lasagna (1975).

9. Washington Post, "Tainted Ground Water Indicated at 559 Dumps," April 29, 1985, p. A4. There is growing interest in the extent to which agencies use their discretion in deciding how much or how little enforcement they will undertake. For example, see Shapiro (1983), and Epple and Visscher (1984).

10. See Roberts (1983). In the first four years of operation under this policy, over a thousand offset permits were issued. However, all but 35 of these were within the firm itself - i.e. the firm reduced pollution at one of its existing plants in order to increase its emissions at a new plant. Only 9-10 offsets actually occurred between two different firms, the rest being donated by various government agencies. Roberts attributes these minimal results to such barriers as measurement problems, comparability of pollutants, geographic location and timing, and administrative transaction costs. For example, EPA had originally decided that even after receiving state approval, each offset would have to go through the administrative proceedings normally afforded to regulations, including public hearings.

11. Coase applied his argument to disputes arising in the common law. He showed that in many cases common law judges behaved as if they grasped the principles of his argument, even though they did not articulate it. However, the implications of the Coase theorem go well beyond common law.

12. See Rubin (1982), (1983).

13. For example, all tenants in some city might form a class and litigate in favor of rent control on the basis that prevailing rents are "unconscionable." For a discussion of the modern use of the theory of unconscionability, see Epstein (1975). Epstein (1984) has argued that recent "mass tort" litigation (i.e., Agent orange, or DES) has imposed enormous efficiency losses on society. These cases could not arise without some method of aggregating individual claims, either through class actions or through other means.

14. For a survey of this growing literature, see Rubin (1982), (1983).

15. There is some evidence that the set of rules evolved in such cases is efficient. See Landes (1982).

16. One reason why we may not observe privately enforceable rules is because of the very nature of those things that are regulated. Wittman (1984) has argued that the choice between regulation by punishment and by reward is implicitly made in such a manner as to minimize the number of required transactions. If this is so, there may be limits to the possibility of private enforcement. Nonetheless, to the extent that punishment-based enforcement can simulate mechanisms evolved in private enforcement situations, transactions costs can be reduced.

17. Members of Congress may design regulatory institutions in this manner to maximize their own visibility and usefulness in serving their constituents. See Fiorina (1977).

18. Public Law 89-563, 80 Stat 718.

19. The National Traffic and Motor Vehicle Safety Act of 1966, as amended, requires the issuance of performance standards rather than specific equipment-based standards. There is no provision for a cost-benefit analysis. Instead, according to Nash (1981), "...courts have refused to impose economic conditions on safety rulemaking but have indicated that safety standards should consider economic factors. The National Highway Traffic Safety Administration agrees and has conducted economic analysis that date back to the early 1970s."

20. We are not concerned here with the actual policy adopted, only the enforcement scheme designed to implement that policy. Thus we have ignored Blomquist and Peltzman's proposal to move toward financial incentives for safe driving. However, even if their proposal was shown to be superior to a policy directed toward auto manufacturers, we would argue that the government's role should be limited to determining the values to be placed on reduced injuries and deaths. A private enforcement agent could best determine the structure of the financial incentives and rules needed to efficiently implement such a program.

21. Of course, one could always argue that our proposal could be replicated with public officials by simply "relabeling" the title of the private enforcer to be a "public" official. However, this public official would not look like the public servants we know today. For example, the enforcer could not be constrained by civil service protections and administrative procedures. Thus, he would be a "public" enforcer in name only.

22. For simplicity, it is assumed that there are no injuries, only fatalities. The extension to the case of multiple values placed on different injuries and fatalities is trivial as long as someone determines the appropriate values. Furthermore, it is assumed throughout that the enforcement agent is risk neutral, so that his goal is to maximize expected wealth. Otherwise, the agent's compensation scheme would have to be adjusted to account for risk aversion.

23. This value may be chosen in any way the decision maker desires. However, if no explicit value is placed on lives saved, the regulatory process will implicitly determine one. Failure to explicitly use a consistent value will ultimately result in needless fatalities, since some additional lives could inevitably be saved by increasing auto safety in one area and reducing it in another (without spending any additional net resources on safety).

24. For example, larger automobiles may increase safety and yet reduce fuel economy. "In order to achieve greater fuel economy, either weight must be reduced, thus reducing safety, or the engine must be retuned, thus increasing emissions." See Lester B. Lave, "Conflicting Objectives in Regulating the Automobile," Science, May 22, 1981, 893-99.

25. See for example, Baumol and Oates (1975).

26. Monitoring and enforcement of environmental regulation have not generally been considered in the economics literature on pollution control. Exceptions are Harford (1978) who examined the problem of a firm subject to imperfect monitoring, and Epple and Visscher (1984) who estimated such a model of firm behavior in the case of oil transport vessels. Cohen (1985b), estimated the costs and benefits of the U.S. Coast Guard's enforcement program for preventing vessel-related oil spills, and found that although the benefits exceed the costs, additional social welfare gains could be achieved by increasing the enforcement effort. McKean (1980) discusses the difficulty of enforcing environmental and safety regulations and urges policymakers to take into account enforcement costs and the fact that firms may devote resources to avoid detection. He also cautions that the incentives of enforcement agencies may not coincide with policymakers. Some of these ideas are formalized in recent papers by Lee (1983, 1984), who considers the incentives of government regulators to monitor under a pollution taxation scheme.

27. See Demsetz (1968).

28. It is assumed that initially there is no abatement, thus $C(Z) = 0$. Further, it is costly to reduce pollution, $C'(\cdot) < 0$.

29. For simplicity, we have assumed the firm is unable to devote resources to avoid detection of the pollution. Although this may be a reasonable assumption for some pollutants, even if detection avoidance is possible, it does not change the nature of our argument. For a formal analysis that takes into account a firm's ability to devote resources to avoid detection, see Lee (1984).

30. Jointly, the two firms' profits increase with the level of abatement until the efficient level of abatement is reached. As discussed in Section 5, this proposal would still require some government monitoring to ensure that the overall pollution levels have actually decreased.

31. Note that the emission fee paid by the polluting firm may be higher or lower under the daily monitor, depending on the amount of extra abatement induced by this new monitor. However, it is reasonable to assume that on balance, (12) is positive, since (under the weekly monitor) the polluting firm is adjusting its daily emission rate in order to decrease its total costs.

32. In fact, there is considerable evidence that OSHA does not enforce its current standards (however flawed) in an efficient manner. In a study of industrial compliance and OSHA enforcement efforts, Bartel and Thomas (1985) found that the threat of penalties has had some effect on firm compliance and worker safety. However, they found that OSHA enforcement behavior is consistent with the political support maximization models such as those developed by Stigler (1971) and Peltzman (1976).

33. See Jordan and Rubin (1979), and Rubin (1983).

34. Of course, the courts would still retain the right to make the ultimate determination about whether or not the claim is false.

35. For example, see "IRS Foul-Ups Likely to Continue As Returns Rise and Staff is Cut," Wall Street Journal, May 6, 1985, p. 37.

36. One potential problem with this proposal is the fact that tax returns contain valuable private information. Private enforcement agents may be able to abuse the power inherent in owning this information. However, this is really no different than the problem of confidentiality currently faced by the government. There is no guarantee that government employees will not betray this trust. Moreover, private firms, such as defense contractors, are often entrusted with valuable information.

37. If the government regulator wishes to set a "safety" tax, it does not need to know the cost of increased safety if there is only one firm, or if social damages are independent of the level of fatalities. However, if there are several firms and social damages are dependent on the level of safety, the government needs to know the cost of achieving various safety levels in order to set the proper tax.

38. These advantages are not fully realized in the case of pollution control. Although the market scheme advocated here may require less information than a command-and-control approach, some informational asymmetry will still exist. Authors who have proposed various incentive schemes to overcome this informational asymmetry include Roberts and Spence (1976), Kwerel (1977), Dasgupta, Hammond and Maskin (1980) and Bailey and Collinge (1983). Cohen (1985a) provides several examples where firms have apparently used their private information about regulatory compliance costs to their advantage, and suggests that discriminatory regulation (such as selective exemptions) may be used to partially mitigate this informational problem. However, discriminatory regulation does not fully solve this informational problem. Instead, it is an attempt to find the second-best solution, i.e. the best that can be expected given the informational asymmetry that exists.

39. Since NHTSA uses performance standards, there is an incentive for auto makers to develop cheaper ways to achieve the same results. However, auto makers would have no incentive to find a technologically and economically feasible way to achieve a higher safety level if it costs the same as or more than is currently being spent on safety.

40. See DeAlessi (1980).

41. See "Anthropomorphic Test Dummies," 49 CFR 572.

42. See Nash (1981) for a discussion of this issue. The relevant court case was Chrysler Corporation v. Department of Transportation, 472 F. 2d (6th Cir. 1972).

43. Ackerman and Hassler (1981), p. 124.

44. We would like to thank the editors of the **Yale Journal on Regulation** for suggesting some of these potential criticisms.

45. See Niskanen (1972), and more recently Weingast and Moran (1983).

46. See Becker and Stigler (1974).

47. See Harris and Raviv (1978).

48. Becker and Stigler (1974).

49. This proposal was advocated by Becker and Stigler (1974).
50. This point was made by Polinsky (1980). Landes and Posner (1975) challenged the Becker and Stigler results, claiming that private enforcement will lead to overenforcement. However, they assume the enforcer is able to keep any collected fine. If the government is permitted to design an optimal compensation scheme, this problem disappears; see Friedman (1984).
51. With a risk neutral agent, the government need not observe the level of effort, only the final outcome. Moreover, the government's monitor of outcomes (or effort) need not be perfect. See Harris and Raviv (1978), (1979).
52. Demsetz (1968).
53. Niskanen (1972) and Breton and Wintrobe (1982).
54. This proposal will not necessarily require large transfer payments to the auto makers. The magnitude and direction of payments depend both on where the enforcement "baseline" is set and on the value of life established by Congress. For example, if the baseline level of safety were set high enough or the value of life low enough, there might actually be a transfer of wealth from the manufacturer to the enforcer (or to the government).
55. Of course, one would have to be careful not to add taxes which are themselves highly distortionary. For example, in the case of auto safety, one may argue that a flat tax on drivers' licenses would treat drivers of safe and unsafe autos equally. Instead, one could envision a registration tax related to the model's safety record.
56. For example, see footnote 17.
57. For a good discussion of the impact of various pollution control policies on the affected interest groups, see Dewees (1983). He argues that one should attempt to find regulatory "...mechanisms that may achieve the desirable efficiency goals of market policies yet also possess distributional characteristics that give them some hope of being adopted." A recent paper by Hahn and Noll (1983) attempts to find an efficient policy that is also politically feasible by designing a marketable permits scheme that minimizes the wealth effects on current polluters.

References

Ackerman, B. and W. Hassler, "Beyond the New Deal: Coal and the Clean Air Act," Yale Law Journal, 89, 1980, 1466.

_____, Clean Coal/Dirty Air, (New Haven: Yale University Press), 1981.

Bailey, M.J. and R. A. Collinge, "Optimal Quasi-Market Choice in the presence of Pollution Externalities," Journal of Environmental Economics and Management, 10 (1983), p. 221.

Bartel, A. and L. Thomas, "Direct and Indirect Effects of Regulation: A New Look at OSHA's Impact," Journal of Law and Economics, 28, 1985, p. 1.

Baumol, William J. and Wallace E. Oates, The Theory of Environmental Policy, (Prentice-Hall), 1975.

Becker, Gary S. and George J. Stigler, "Law Enforcement, Malfeasance, and Compensation of Enforcers," Journal of Legal Studies, 3, 1974, p. 1.

Blomquist, Glenn C. and Sam Peltzman, "Passive Restraints: A Economist's View," in The Scientific Basis of Health and Safety Regulation, (edited by Robert W. Crandall and Lester B. Lave), The Brookings Institution, 1981, pp. 37-52.

Coase, Ronald, "The Problem of Social Cost," Journal of Law and Economics, 3, 1960, p. 1.

Cohen, Mark A., "Discriminatory Regulation of Pollution with Asymmetric Cost Information," (Chapter 1 of PhD. Thesis, "Essays in the Economics of Information and Environmental Regulation"), Carnegie-Mellon University, 1985a.

_____, "The Costs and Benefits of Oil Spill Prevention and Enforcement," Journal of Environmental Economics and Management (forthcoming), 1985b.

Dasgupta, P., P. Hammond and E. Maskin, "On Imperfect Information and Optimal Pollution Control," Review of Economic Studies, 47 (1980), p. 857.

DeAlessi, Louis, "The Economics of Property Rights: A Review of the Evidence", Research in Law and Economics, 2, 1980, p. 1.

Demsetz, Harold, "Why Regulate Utilities?," Journal of Law and Economics, 11, 1968, p. 55.

Deweese, Donald N., "Instrument Choice in Environmental Policy," Economic Inquiry, 21, 1983, p. 53.

Epple, Dennis and Michael Visscher, "Oil Spill Frequency and Size: Modeling Occurrence, Detection and Deterrence," Journal of Law and Economics, 1984.

Epstein, Richard A., "Unconscionability: A Critical Reappraisal", Journal of Law and Economics, 18, 1975, p. 293.

_____, "The Legal and Insurance Dynamics of Mass Tort Litigation", Journal of Legal Studies, 13, 1984, p. 475.

Fiorina, Morris P., Congress - Keystone of the Washington Establishment, Yale University Press, 1977.

Friedman, David, "Efficient Institutions for the Private Enforcement of Law", Journal of Legal Studies, 13, 1984, p. 379.

Hahn, Robert W. and Roger G. Noll, "Barriers to Implementing Tradable Air Pollution Permits: Problems of Regulatory Interactions," Yale Journal on Regulation, 1, 1983, 63-91.

Harford, Jon D., "Firm Behavior Under Imperfectly Enforceable Pollution Standards and Taxes," Journal of Environmental Economics and Management, 5, 1978, p. 26-43.

Harris, Milton and Artur Raviv, "Some Results on Incentive Contracts with Applications to Education and Employment, Health Insurance, and Law Enforcement", American Economic Review, 68, 1978, p. 20.

_____, "Optimal Incentive Contracts with Imperfect Information," Journal of Economic Theory, 20, 1979, pg. 231.

Horwitz, Bertrand and Richard Kolodny, "The FASB, the SEC, and R&D," Bell Journal of Economics, 12, 1981, p. 249.

Jordan, Ellen and Paul H. Rubin, "An Economic Analysis of the Law of False Advertising" Journal of Legal Studies, 8, June, 1979, p. 527.

Kwerel, E. "To Tell the Truth: Imperfect Information and Optimal Pollution Control," Review of Economic Studies, 44 (1977), p. 595.

Landes, Elisabeth M., "Insurance, Liability, and Accidents: A Theoretical and Empirical Investigation of the Effect of No-Fault Accidents," Journal of Law and Economics, 25, 1982, p. 49.

_____ and Richard A. Posner, "Adjudication as a Private Good," Journal of Legal Studies, 8, 1979, p. 235.

Lave, Lester B., "Conflicting Objectives in Regulating the Automobile," Science, May 22, 1981, pp. 893-99.

Lee, Dwight R., "Monitoring and Budget Maximization in the Control of Pollution," Economic Inquiry, 21, 1983, p. 565-75.

_____, "The Economics of Enforcing Pollution Taxation," Journal of Environmental Economics and Management, 11, 1984, 147-60.

McKean, Roland N., "Enforcement Costs in Environmental and Safety Regulation," Policy Analysis, 6, 1980, 269-89.

Nash, Carl E., "Passive Restraints: A Regulator's View," in The Scientific Basis of Health and Safety Regulation, (edited by Robert W. Crandall and Lester B. Lave), The Brookings Institution, 1981, pg. 53-67.

Niskanen, William. Bureaucracy and Representative Government, 1972, (Chicago: Aldine Press, Inc.)

Peltzman, Sam. "Towards a More General Theory of Regulation," Journal of Law and Economics, Oct. 1976, p. 211.

_____, "An Evaluation of Consumer Protection Legislation: The 1962 Drug Amendments," Journal of Political Economy, 81, 1973, p. 1049.

Polinsky, A. Mitchell, "Private versus Public Enforcement of Fines," Journal of Legal Studies, 9, 1980 p. 105.

Posner, Richard A., Economic Analysis of Law, Little, Brown, Boston, 1977. (First ed., 1973).

Roberts, Marc J., "Some Problems of Implementing Marketable Pollution Rights Schemes: The Case of the Clean Air Act," in Reform of Environmental Regulation (edited by Wesley A. Magat), 1982, pg. 93-117.

_____ and M. Spence, "Effluent Charges and Licenses Under Uncertainty," Journal of Public Economics, 5, 1976, p. 193.

Rubin, Paul H., "Common Law and Statute Law," Journal of Legal Studies, 11, 1982, p. 205.

_____, Business Firms and the Common Law, Praeger, New York, 1983.

Savas, Emmanuel S., Privatizing the Public Sector: How to Shrink Government, Chatham House, Chatham, N.J., 1982.

Schultze, Charles L., The Public Use of Private Interest, Brookings, Washington, 1977.

Shapiro, Martin, "Administrative Discretion: The Next Stage," Yale Law Journal, 92, 1983, p. 1487.

Shugart, William F., II, and Robert D. Tollison, "Preliminary Evidence on the Use of Inputs by the Federal Reserve System," American Economic Review, 73, 1983, p. 291.

Stigler, George J., "The Theory of Economic Regulation," The Bell Journal of Economics and Management Science, 2, 1971, p. 3

Wardell, William M. and Louis Lasagna, Regulation and Drug Development, American Enterprise Institute, 1975.

Weingast, Barry R. and Mark J. Moran, "Bureaucratic Discretion or Congressional Control? Regulatory Policymaking by the Federal Trade Commission," Journal of Political Economy, 91, 1983, p. 765.

Wittman, Donald, "Liability for Harm or Restitution for Benefit?", Journal of Legal Studies, 13, 1984, p. 57.

Wolf, Charles, Jr., "A Theory of Nonmarket Failure: Framework for Implementation Analysis," Journal of Law and Economics, 22, 1979, p. 107.

Viscusi, W. Kip, "Structuring an Effective Occupational Disease Policy: Victim Compensation and Risk Regulation," Yale Journal on Regulation, 2, 1984, p. 53.