SMALL BUSINESS

RESEARCH SUMMARY

Impact of Firm Size on Dollar Amount of Penalties Assessed By Government Agencies

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Purpose

Enforcement of federal environmental regulations typically results in administrative penalties against the firm found in violation. Theoretically, the U.S. Environmental Protection Agency (EPA) considers a firm's ability to pay when setting fines for environmental violations. Because a firm's ability to pay potentially varies with the firm's size, data on EPA administrative penalties should reflect a strong relationship between firm size and penalty amounts. If properly designed, EPA's penalty policy should result in the same level of deterrence against small firm violations as against large firm violations.

This project examines the effect of firm size-based penalty policies on regulatory compliance and EPA's enforcement resource allocation decisions. Analysis of results offers insights into optimal penalty theories and informational requirements needed to optimize EPA's enforcement policy. The empirical work also permits speculation on the causes of inefficient regulatory enforcement spending. Due to severe limitations on data quality, the project report best serves as a roadmap for future research on this subject.

Scope and Methodology

The first half of the report concentrates on a theoretical analysis of enforcement policy. Employing a common model from the tax evasion literature, the research applies game theory to decisions on penalty policy and responses to the policy in an attempt to determine the optimal penalty for different sizes of firms. The model consists of a three-stage game with three groups of players. In stage one, the social planners (enforcement policy managers) establish fines to maximize the net social benefits of regulation. In stage two, the regulators (enforcement line officers) determine the level of monitoring and enforcement resources that minimize the costs of compliance, net of penalty revenues. Simultaneously, firms decide whether or not to comply with a regulatory requirement. In the final stage, firms optimize their behavior and produce the equilibrium level of pollution, given their compliance decision. The firms base their decisions on the size of the fine and the probability of being caught.

The second half of the report examines the significance of alternative penalty theories, based on EPA's enforcement data systems. The research attempts to measure the deterrence effect of enforcement monitoring and inspection activities (the threat of being caught) compared with the size of penalties (the punishment when actually caught). In addition, the research tests the empirical data in an

effort to discover whether EPA should predicate an "optimal" fine on: 1) the environmental harm caused, 2) the economic gain to the firm or 3) the ability of the firm to pay the fine, all in light of the firm size. The empirical data used to test or evaluate research hypotheses consists of reports on a cross-section of 158 EPA administrative fines assessed in 1995 as retrieved from EPA's Integrated Data for Enforcement Analysis (IDEA) system. Financial and industry data on the parent company of the violating facility supplemented the IDEA data. EPA budget information on regional compliance monitoring and enforcement data for 1990 through 1995 and industry data on pollution abatement and control expenditures rounded out the basic data used to test theories.

Highlights

Mathematics allows formulation of a model that represents the behavior of government and industry, and thus holds out the promise of identifying the optimum condition when government policies and firm behaviors lead to full compliance with regulations. Under the assumptions of the model, however, the relative incentives on government and firms prevent full compliance. The model produces maximum net social benefits at a point where some firms would rather risk enforcement penalties than pay to attain regulatory compliance.

The model relies heavily on the number of firms within a regulated industry and the difficulty the government faces when monitoring regulatory compliance. The net social benefit depends on assumptions about these two factors. Specifically, the net social benefit of regulating decreases as the size of an industry increases when government must pay significant monitoring costs. In the absence of a governmental compliance budget that increases with the cost of monitoring, an increase in the number of firms in an industry reduces the probability any one will receive government attention and produces a smaller incentive to comply with regulations, thus producing less environmental benefit.

These findings suffer from the limitations of theoretical models. The models assume the Congress (or perhaps EPA) acts as a social planner and succeeds at identifying and applying a socially optimal penalty policy—one that optimizes compliance. Neither EPA nor the Congress explicitly examines or considers net social benefits when establishing penalty policies. Nor does EPA calculate penalties based on an intent to cover the cost of enforcement. Penalties flow to the general treasury, not to EPA, and neither EPA nor Congress knows the difference between penalties and costs, much less attempts to balance the two. Finally, the model does not account for a firm's compliance incentives that do not relate to a balance between penalties and compliance costs, such as the effect of violations on firm reputation, stockholder confidence in management and stock brokers' profit expectations. These limitations seriously undermine the relevance of the models used in the first half of the report.

Assessment of 158 penalties imposed under six environmental acts suggests that penalties (fines) increase with the annual sales of the firm—EPA imposes larger fines on larger firms. Empirically, a one percent increase in sales signals a 0.2 percent increase in fines. Further, reductions in EPA enforcement budgets produce larger fines per firm, for large firms, reflecting the agency's intent to maintain the dollar amount of penalties, regardless of the resources it has to prosecute violations or the number of violations it prosecutes. Penalties on small firms reflect both the environmental harm assumed from, and the economic gain realized through violation of a rule. Moreover, the size of penalties for small firms varies depending on the environmental law violated. In contrast, EPA imposes penalties on large firms based primarily on firm size, reflecting their ability to pay large fines.

Ordering Information

The complete report, along with research summaries of other studies performed under contract to the SBA Office of Advocacy, is available on the World Wide Web at: www.sba.gov/advo/research

Printed copies are available from:

National Technical Information Service
U.S. Department of Commerce
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It is also available in
The Journal of Regulatory Economics 14: 127-148 (1998).