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The Regressive Nature of Civil Penalties*

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I. Introduction

The Federal Trade Commission (FTC) is empowered to seek civil penalties in district court against firms found in violation of the Commission's rules and orders. The provisions of the FTC Act which authorize such penalties are vague with respect to size, stating only that penalties shall not exceed $10,000 for each violation, each day of noncompliance constituting a separate violation. In determining the total amount, the Commission is instructed to consider "the degree of culpability, and history of prior such conduct, ability to pay, effect on ability to continue to do business, and such other matters as justice may require."[1]

Most previous discussions of enforcement strategies for civil violations omit details about the implementation of monetary remedies. Gary Becker, in his theoretical work on crime in general, pointed out that in focusing on optimal policies he had paid little attention to actual policies although he believed a positive correspondence might exist between the two.[2] On the other hand, George Stigler suspected the difference between optimal and actual enforcement policies might be very great for civil violations. As an example, he singled out the FTC's enforcement of truthful labeling for furs and textiles. According to Stigler the Commission in its annual report recites "scandals corrected and others still unrepressed, but neither offers nor possesses a criterion by which to determine the correct scale of its activities."[3]

Although much empirical work has been done in the area of criminal violations, little attention has been paid to civil violations.[4] What is lacking are empirical analyses directed toward identifying whether the way in which civil penalties are actually assessed is consistent with optimal enforcement, or even with the professed goals of the law enforcement agencies. Furthermore, little work has been done to test the responsiveness of offenders to changes in the allocation of enforcement resources and to the type and severity of punishment.[5]

Our paper is frankly empirical. As such, we do not attempt to determine whether fines levied by the Commission are consistent with an optimal enforcement strategy. Rather, we offer evidence on the factors that have entered into the determination of civil penalty amounts assessed historically by the FTC in its consumer protection mission. Our goal is to shed some light on the implicit methodology employed by the Commission in calculating monetary penalties.

Based on data derived from 57 civil penalty cases before the Commission between 1979 and 1981, we find evidence that suggests monetary fines transfer wealth from small to large firms. That is, although civil penalty amounts are found to be influenced by Commission judgments of culpability and ability to pay, and most firms violating previous cease

and desist orders pay higher fines than first offenders or nonrespondents, the majority of the variation in civil penalty amounts is explained by variations in firm size, where "size" is measured by sales. Moreover, an increase in firm size results in a less than proportional increase in penalty, ceteris paribus. Thus, civil penalties operate as a regressive tax.

The data and empirical results are contained in the following section. Concluding remarks are offered in Section III.

II. Empirical Determinants of Civil Penalties

The Commission interprets its rather broad enforcement mandate as requiring that it adopt a "flexible judicial" approach in assessing civil penalties.[6] According to this approach, monetary fine determinations are made on the basis of certain statutory, judicial, and practical requirements that attempt to balance the sometimes conflicting goals of deterrence, consumer compensation, and industry guidance.

In this section we investigate empirically the factors that enter into the determination of civil penalty amounts by the FTC. To do so we estimate the following regression model which incorporates criteria consistent with judicial flexibility in setting fines.

$$PENALTY = b_o + b_1\ SALES + b_2\ SALES51 + b_3\ I51 + b_4\ SUBSID + b_5\ ABLE + b_6\ INST + b_7\ LARGE + b_8\ GUILT + b_9\ OTHER + b_{10}\ PROG\ I06 + b_{11}\ PROG\ L03 + e,$$

where

SALES = Annual sales of respondents;

SALES 51 = Sales of firms violating §5(1);

I51 = §5(1) dummy variable (= 1 if violation of §5(1), = 0 otherwise);

SUBSID = subsidiary dummy variable (= 1 if case involves a subsidiary of a larger firm, = 0 otherwise);

ABLE = ability-to-pay dummy variable (= 1 if firm considered able to pay, = 0 otherwise);

INST = installment dummy variable (= 1 if fine paid in installments, = 0 otherwise);

LARGE = injury dummy variable (= 1 if violation thought to cause "large" consumer injury, = 0 otherwise);

GUILT = culpability dummy variable (= 1 if respondent acted in bad faith, = 0 otherwise);

OTHER = remedy dummy variable (= 1 if other remedies imposed, = 0 otherwise);

PROG I06 = program code dummy variable (= 1 if program I06, = 0 otherwise);

PROG L03 = program code dummy variable (= 1 if program L03, = 0 otherwise); and

e = regression error term.

Sales to varying degrees can serve as a surrogate for private economic gain, consumer injury, or ability to pay. In a deterrence model, an optimal enforcement strategy would establish monetary fines such that the firm's expected gain from illegal behavior is equal to zero.[7] However, estimating economic gain requires information on the firm's revenue from engaging in illegal behavior, appropriately discounted, and on its expectations about the probabilities of being caught and found guilty. In the absence of such information, sales may be used as a proxy for economic gain, assuming a positive relationship between private benefit from the violation and total revenue.

Sales might also serve as an estimate of the degree of consumer injury. The relationship of sales to consumer injury will be much less direct than with economic gain, however. For example, Peltzman argues that the cost to consumers of false advertising is the value of the next best

alternative given up by the consumer to purchase the misrepresented commodity.[8] Since the degree of consumer injury will be specific to each case, no systematic relationship with sales revenue may be apparent.

In a simple bureaucratic model, the relative size of firms might serve as an indicator of ease of penalty collection. However, sales would be only an imperfect surrogate for ability to pay because they reflect revenue but not costs.

In sum, the use of sales to determine civil penalty amounts is consistent with three strategies--deterrence, compensation, or simply concern with collectability--each of which implies that an increase in firm size would lead to larger fines, ceteris paribus. Our model does not distinguish among these competing explanations, however.

Our division of sales into categories according to FTC Act section violated reflects differences in statutory authority for assessing penalties and in the type of violation involved. In particular, civil penalties may be assessed under three different provisions of the FTC Act. Under Section 5(l) the Commission may impose penalties on firms that are directly subject to and found in violation of outstanding FTC cease and desist orders. In addition, in 1975 the Magnuson-Moss Warranty/Federal Trade Commission

Improvement Act provided more sweeping authority for imposition of civil penalties: Under Section 5(m)(1)(A) firms found to be in violation of Commission rules and statutes are subject to fine, and under Section 5(m)(1)(B) firms can be penalized if they are found to be knowingly in violation of a Commission cease and desist order even if they are not themselves directly subject to it.[9]

Penalties administered under Section 5(m) might be expected to be less than those under Section 5(1). This is because many of the rules and statutes subject to Section 5(m)(1)(A) are relatively new and respondents may have benefited from some educational grace period. In addition, the constitutionality of Section 5(m)(1)(B) has not been clearly established. However, the knowledge standard required for conviction under the three provisions also differs, with Section 5(1) having the lowest knowledge requirement and Section 5(m)(1)(B) the highest. Because a low standard concerning a firm's knowledge about existing Commission orders raises the probability of conviction, Section 5(1) respondents may incur lower penalties than those subject to Section 5(m). Therefore, it is difficult to predict a priori the effect these different statutory authorities may have on the size of civil penalties. The two sales variables, SALES and SALES51, along with the

Section 5(l) dummy variable, I51, permit us to test whether the Commission treats these provisions differently, i.e., whether the regression slope and intercept differ according to statutory authority.

SUBSID indicates whether the sales data are for a corporate subsidiary or for a company as a whole. This dummy variable allows us to make inferences about alternative enforcement strategies in the case of multi-product firms. If one assumes that economic gain relates most directly to the revenue from the product line involved in the violation, then bringing cases against subsidiaries would be consistent with a deterrence strategy.[10] In contrast, if subsidiary status is associated with larger fines, a concern with ability to pay could be inferred.

Inclusion of the variables ABLE and INST provide a more direct test of the ability-to-pay proposition. In particular, ABLE is assigned a value of unity if the respondent was considered able to pay a monetary fine, and INST indicates the presence of an arrangement to pay the penalty in installments. Inability to pay or necessity for a series of payments might indicate that the respondent's financial condition is viewed as weak, perhaps inducing the Commission to lower the total size of the penalty.

LARGE denotes violations considered to have caused substantial consumer injury. Such violations would be expected to increase civil penalty amounts, ceteris paribus. Moreover, the FTC Act requires the Commission to consider degree of culpability in assessing fines. For purposes of this study, GUILT is lesser or greater according to whether the respondent was said to have acted in good or bad faith, with larger penalties expected to be assessed in the latter case, other things equal.[11]

Civil penalties are often accompanied by other types of relief, notably injunctions, consumer redress, or some informational requirement such as notifying customers of their rights under a trade regulation rule. These additional remedies also impose costs on the firm, contributing in part to removal of the economic gain from noncompliance and in part to deterrence of future violations. The variable OTHER denotes the presence or absence of additional remedial measures which may lead to a reduction in the size of the fine so as to hold constant the total cost to the firm of the entire relief package.

In addition to the above considerations, the type of violation may also affect the size of the penalty. For example, if the Commission pursues a goal of historical consistency, we would expect penalties to fall within a

given range for similar types of infractions, with values within the range varying according to mitigating or aggravating circumstances. To test for such an effect we classified the civil penalty cases on the basis of the consumer protection program area in which enforcement action was initiated. There were ten such program areas for the cases in our sample. The two that we focus on, cigarette advertising practices and enforcement of the Equal Credit Opportunity Act, are the only two program areas found to differ signicantly from the mean.

The Data

To test empirically the relative importance of firm size, statutory authority, and other factors in assessing monetary fines we examined the complaint files on 57 civil penalty cases before the Commission between 1979 and 1981. (Respondents and civil penalty amounts are listed in the appendix.)[12] Where possible, the relevant data were derived from staff memoranda and other internal documents since such information was relied upon by the Commission in reaching its decisions on guilt and in establishing civil penalty amounts. In the case of sales, however, observations on 13 respondents were missing from Commission documents; data from company annual reports were therefore obtained to fill the gaps.[13]

Information on some of the qualitative explanatory variables included in the regression was not always available for every case. The staff memoranda may have discussed consumer injury in one case, culpability in another, and ability to pay in still another. Rarely were all mitigating and aggravating circumstances covered in the context of any single respondent. Such missing observation problems were handled by the method of modified zero order regression.[14]

Sample statistics by FTC program area are listed in Table 1. The smallest civil penalty assessed by the Commission between 1979 and 1981 was $1,000; the largest was $1,750,000. On average, the heaviest fines were imposed for violations of outstanding orders and for Equal Credit Opportunity Act infractions. Deceptive sales practices drew the smallest average penalties.

The Results

Our empirical model suggests that civil penalty amounts are a positive function of firm size as measured by sales and are also affected by mitigating and aggravating circumstances reflecting company financial condition, extent of consumer injury, degree of culpability, imposition of other remedial requirements, and institutional factors associated with statutory authority and type of violation.

The regression results are presented in Table 2.[15] Overall, variations in the explanatory variables explain 85 percent of the variation in civil penalty amounts. With the exception of the extent of consumer injury, all parameter estimates are significantly different from zero at the 1 percent level.[16]

Sales and FTC Act Authority. Firm size is apparently an important consideration in setting civil penalty amounts. (In fact, variations in sales alone explain 58 percent of the variation in monetary fines.)[17] The coefficient on SALES indicates that a 1 percent increase in firm size results in a .23 percent increase in penalty amount, suggesting that the penalty burden falls disproportionately on smaller respondents.

The sales effect also differed according to which section of the FTC Act was the source of authority for the penalty assessment. The results indicate that the marginal effect of sales on penalty size is larger for Section 5(l) matters, ceteris paribus, with each 1 percent increase in sales resulting in a .41 percent increase in the size of the fine. No significant difference between penalties assessed in Section 5(m)(1)(A) and Section 5(m)(1)(B) matters was apparent, however.

Table 1

Sample Civil Penalties by Program Area, 1979-1981

Program Area	Number of Cases	Average Penalty	Standard Deviation
Cigarette Advertising Practices	6	97,000	7,144
Deceptive Sales Practices	4	10,000	0
Business Opportunities, Franchising	1	25,000	--
Children's Advertising	1	100,000	--
General Credit Practices	8	51,000	36,198
Equal Credit Opportunity Act	4	115,000	88,412
Credit Information	14	36,600	22,636
Rule and Statute Enforcement	5	21,000	4,183
Compliance	14	161,000	459,561[a]

[a] The high variation in the Compliance program area is because it included both the highest (Readers Digest, $1,750,000) and the lowest (R. Paron, $1,000 and Tri-West Construction, $2,000) penalties.

Table 2

Regression Results for Civil Penalties Assessed by the FTC in Consumer Protection Matters, 1979-1981

Dependent Variable: Logarithm of Civil Penalty Amount

Independent Variable	Parameter Estimate	Standard Error	Relative Effect
Intercept	4.84***	0.60	
Log Sales	0.23***	0.04	0.23[a]
Log Sales for §5(1)	0.18***	0.06	0.41[b]
§5(1) intercept diff.	-2.69***	0.96	-0.96[c]
Subsidiary of larger firm	0.75***	0.24	1.05
Able to pay	0.56***	0.26	0.69
Installment payment	0.60***	0.20	0.79
Large consumer injury	0.04	0.32	--
Culpability	0.72***	0.26	0.99
Other remedial actions	0.57***	0.17	0.73
Program Code I06	-1.62***	0.44	-0.82
L03	-1.00***	0.37	-0.66

R^2 = 0.85, N=57

***Statistically significant at the 1 percent level.

[a]The slope of the sales function for §5(m) violations.

[b]The slope of the sales function for §5(1) violations, equal to the sum of the parameter estimates for log sales and log sales for §5(1).

[c]See note 18.

For very small firms Section 5(m) violators (of orders against other firms or of Commission rules) incurred relatively larger penalties than violators of Section 5(l) (those directly subject to Commission orders), but the reverse was true for larger firms, specifically those with sales of over $4 million in 1981 dollars, which included most of the firms in the sample. Overall, our findings are consistent with the interpretation that violators of the recently legislated Section 5(m) did indeed enjoy a grace period during the sample period. Moreover, considering the relatively high probability of conviction for violating a previous order under Section 5(l) along with the relatively high penalty amounts assessed for such violations, one can conclude that the expected cost to respondents of Section 5(l) charges is much greater than that for Section 5(m) infractions.

The results also show that the existence of a parent company had a significant effect on the absolute size of the penalty. For such firms the fine was more than twice as high at each sales level than for firms that were not subsidiaries of a larger corporation.[18] The absolutely larger penalties for subsidiaries is not enough to offset the overall regressivity in the penalty rate, however.

Ability to Pay. When financial condition was discussed in internal Commission documents and the respondent was judged able to pay, the fine tended to be almost 70 percent higher than when the firm was considered unable to pay. This finding, together with the significance of subsidiary status discussed above, suggests that ability to pay is an important determinant of civil penalty amounts.

The conjecture that penalty payment by installments might be a sign of financial weakness and therefore be associated with reduced fines is not supported by the regression estimates. In particular, fines paid by installment were almost 80 percent larger than those penalties paid in a lump sum, indicating that installment arrangements are a device for assessing greater fines than otherwise.[19]

Consumer Injury. Judgments concerning the degree of consumer injury caused by a particular violation had no impact on civil penalty amounts, other things equal. It is interesting to note, however, that when any judgment was made about consumer injury, whether large or small, fines were lower by more than 60 percent than when the subject was not touched upon at all in Commission documents.[20]

Culpability. Firms with a history of noncompliance, those found in violation of more than one rule, statute, or order, and companies showing bad faith in dealing with the Commission faced fines more than double the amount imposed on "good behavers." The fact that this variable was significant despite the inclusion of separate information on Section 5(1) violations suggests that companies judged by the Commission staff to be acting in bad faith increase their liability substantially. (Section 5(1) infractions involve repeat offenders by definition.)

Other Remedial Provisions. The inclusion of additional relief measures in civil penalty cases tends to raise the amount of the fine rather than reduce it. When other remedies were imposed along with fines to form a larger relief package, the expected size of the penalty was increased by 73 percent. This suggests that consumer compensation and nonmonetary remedies serve as complements to and not substitutes for direct fines.

Type of Violation. The regression model tested for the existence of consistency and predictability among types of violations by including dummy variables for the Commission program areas responsible for bringing each of the cases. Differences between program areas would indicate that consistency within specific types of violations was an important concern in setting penalty size. The results did

not support this conjecture for eight of the ten program areas covered by our sample. However, the means of program codes I06 (cigarette advertising practices) and L03 (Equal Credit Opportunity Act) were significantly lower, the former by more than 80 percent, the latter by more than 60 percent, after controlling for other variables. Thus, penalties assessed within these two areas tend to be more consistent from violation to violation than the fines imposed in the other FTC program areas.

In sum, the regression model explains quite well the factors that enter into the determination of civil penalty amounts. It is important to keep in mind, however, that the qualitative data were derived from internal FTC documents. The possibility exists that when the penalty was relatively large, claims of large consumer injury, significant culpability, and adequate ability to pay were invoked as an afterthought to justify imposing a large fine, and conversely when the penalty was relatively small. Our results nevertheless provide evidence that in setting civil penalties the FTC places a disproportionate burden on small firms.

III. Concluding Remarks

In this paper we have reported results from an empirical analysis of the factors that have entered into the determination of civil penalties assessed by the FTC in its consumer protection mission. Based on data derived from 57 civil penalty cases before the Commission between 1979 and 1981, we found evidence that suggests monetary fines transfer wealth from small firms to large firms. In particular, nearly 60 percent of the variation in civil penalty amounts was explained by variations in firm size, where "size" was measured by sales.

Moreover, an increase in firm size resulted in a less than proportional increase in penalty, ceteris paribus. Such a policy might be rational if the expected net returns to actions that are in violation of FTC rules and orders were relatively greater for small firms or if the probability of detection and conviction increases as the size of the offending firm increases. Greater expected returns in relative terms to small firms might come about if large firms were more constrained by market forces to maintain the integrity of their products. Market forces in many instances provide an implicit guarantee of quality by punishing firms through loss of future sales for degarding quality.[21] Such a market check may be more effective for larger firms if they have

significantly greater investments in intangible assets such as brand name capital that could be destroyed by loss of consumer confidence in their products. Small firms, on the other hand, would have less to lose from "hit and run" tactics if they have relatively fewer intangible assets at stake, especially if, as is often the case, they operate in industries with no significant economies of scale. Additionally, greater visibility of large violators may increase the probability of detection, so that if the objective is to maintain a constant degree of deterrence across firms, penalties would increase less than in direct proportion to private benefit as an offset to the increasing probability of detection for larger violators.

These reasons suggest that it may be rational for the FTC to impose relatively larger penalties on smaller firms, since maximization of social welfare requires that penalties be just large enough to achieve the desired degree of compliance. On the other hand, the disparity may simply reflect greater bargaining skills or better legal counsel for larger corporations. Whatever the explanation for this observed regressivity, the fact remains that the penalty structure for the FTC's consumer protection mission is disproportionately weighted against smaller firms.

We also found that judgments concerning respondents' ability to pay and their degree of culpability were important in explaining the size of fines. That is, violators that were subsidiaries of larger companies or that were otherwise thought to be able to bear monetary penalties paid higher fines than did other respondents. In addition, firms acting in bad faith or showing a history of noncompliance faced stiffer penalties than first offenders or good behavers. Moreover, other relief measures appeared to serve as complements to and not substitutes for direct monetary fines. Finally, neither the extent of consumer injury caused by a violation nor a concern with consistency within particular types of infractions appeared to be given much consideration in setting civil penalty amounts.

Appendix

Cases Included in Sample with Size of Civil Penalty

	Respondents	Civil Penalty
1.	American Brands	$100,000
2.	Amoco (Standard Ind.)	200,000
3.	A. Abraham	25,000
4.	Associated Dry Goods	75,000
5.	Atlantic Hosiery	16,000
6.	Atlantic Industries	10,000
7.	Britene Interntl Textiles	20,000
8.	Brown & Williamson	100,000
9.	Budget Marketing	125,000
10.	Cadence Industries	50,000
11.	Capital Credit	75,000
12.	Centex (Midwest)	50,000
13.	Collectron & Telechek	65,000
14.	Credit Rating Bureau	10,000
15.	Crosland	20,000
16.	Dixieland	10,000
17.	Downing	10,000
18.	Exxon	100,000
19.	General Mills	100,000
20.	Georgia Telco	10,000
21.	Hylton	28,000
22.	Intaltex	15,000

Appendix (cont'd)

	Respondents	Civil Penalty
23.	Ivy International	25,000
24.	Kettler	25,000
25.	Lawson Hill	15,000
26.	Liggett	82,500
27.	Lorillard	100,000
28.	Maralco Enterprises	15,000
29.	Modern Home	10,000
30.	Mod-Maid Imports	25,000
31.	Montgomery Ward	175,000
32.	National Siding	10,000
33.	Nationwide	10,000
34.	Neighborhood Periodicals	150,000
35.	Phillip Morris	100,000
36.	Pulte Home	70,000
37.	Radiology Consultant	30,000
38.	Readers Digest	1,750,000
39.	R. Paron	1,000
40.	Ricardo Pagnini	20,000
41.	R.J. Reynolds	100,000
42.	RJR Foods	70,000
43.	Scarborough	50,000
44.	Edward W. Scott	10,000
45.	Sure Products	30,000

Appendix (cont'd)

	Respondents	Civil Penalty
46.	Tasemkins Furniture	20,000
47.	Tri-Texas, Inc.	25,000
48.	Tri-West Construction	2,000
49.	United Corp.	15,000
50.	Universal Collection	90,000
51.	U.S. Homes	90,000
52.	Van Schaack	30,000
53.	Virginia Builders	30,000
54.	Wauwatosa Realty	15,000
55.	Westminster	50,000
56.	Yeonas	25,000
57.	Young Ford, Inc.	10,000

Footnotes

*The opinions expressed in this paper are those of the authors and do not necessarily reflect the views of the Federal Trade Commission, its staff, or any individual Commissioner. We are grateful to Robert Tollison and Richard Higgins for comments on an earlier draft. The usual caveat applies.

[1] Section 5(m)(1)(c) of the FTC Act, Pub. L. No. 93-637, title II, Sec. 205, 88 Stat. 2200 (1975). Codified as 15 U.S.C. Sec. 45(m) (Supp. V 1975).

[2] Gary Becker, "Crime and Punishment: An Economic Approach," 76 Journal of Political Economy 169 (1968).

[3] George Stigler, "The Optimum Enforcement of Laws," 78 Journal of Political Economy 526 (1970) -

[4] For recent empirical work on criminal violations, see Isaac Ehrlich, "Capital Punishment and Deterrence: Some Further Thoughts and Additional Evidence," 85 Journal of Political Economy 741 (1977); and Gary Becker and W.M. Landes, eds., Essays in the Economics of Crime and Punishment (1974).

[5] See Colin Diver, "The Assessment and Mitigation of Civil Money Penalties by Federal Administrative Agencies," 79 Columbia Law Review 1436 (1979).

[6] FTC Bureaus of Consumer Protection and Economics, Civil Penalties: Policy Review Session, July 1982.

[7] A. Michael Polinsky and Steven Shavell, "The Optimal Tradeoff Between the Probability and Magnitude of Fines," 69 American Economic Review 880 (1979).

[8] Sam Peltzman, "An Evaluation of Consumer Protection Legislation: The 1962 Drug Amendments," 81 Journal of Political Economy 1049 (1973).

[9] See David Bickart, "Civil Penalties Under Section 5(m) of the Federal Trade Commission Act," 44 University of Chicago Law Review 761 (1977).

[10] By levying fines proportional to the sales of the product line involved in the offense rather than to sales of the entire firm, firms' incentives at the margin for committing offenses are not distorted. On the other hand, penalties levied according to firm-wide sales might encourage firm-wide violations.

[11] Instances of bad faith included those respondents with a history of noncompliance and firms violating more than one rule, statute, or order.

[12] There were actually 66 civil penalty cases during the 1979-1981 period. Four were excluded from our sample because sales data were not available. These were Haband Company ($30,000 penalty), Macmen Financial Services ($20,000 penalty), National Talent Associates ($25,000 penalty), and Womack Nursery ($10,000 penalty). Five other cases were excluded either because their files were missing or because the matters were still active: J.B. Williams ($75,000 penalty), Sydney N. Floersheim ($75,000 penalty), Korman Corp. ($35,000 penalty), Paul Ramage ($10,000 penalty), and National Dynamics ($100,000 penalty).

[13] Sales data generally were for the most recent year in which the violation was said to have occurred.

[14] See Jan Kmenta, Elements of Econometrics (1971), pp. 336-44.

[15] Sales and penalty values were deflated by the consumer price index and then transformed by taking natural logarithms.

[16] The results therefore do not display the symptoms of multicollinearity, a frequent problem with three or more dummy variables.

[17] Based on a regression of the log of penalty amount on the log of sales by itself.

[18] For dummy variables the relative effect is measured by

$$\hat{g} = \exp(\hat{b} - 0.5\hat{\sigma}^2_{\hat{b}}(\hat{b})) - 1,$$

where $\hat{b}$ is the estimated regression coefficient, $\hat{\sigma}^2_{\hat{b}}$ is the estimate of its variance, and $100\hat{g}$ measures the percentage impact of the dummy variable on the dependent variable. For a discussion of this method, see Peter Kennedy, "Estimation with Correctly Interpreted Dummy Variables in Semilogarithmic Equations," 71 American Economic Review 801 (1981).

[19] Since in none of the cases did installments extend beyond three years, the absolutely larger fines are not the result of present value calculations. Indeed, in at least one case an interest rate of 6 percent was added to the penalty.

[20] From the zero order regression method, discussed in Kmenta, supra n. 14.

[21] See Benjamin Klein and Keith Leffler, "The Role of Market Forces in Assuring Contractual Performance," 89 Journal of Political Economy 615 (1981).