DECISION THEORY AND THE CONTROL OF SOCIALLY UNDESIRABLE BEHAVIOR

BY

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INTRODUCTION

The purpose of any legal system is, when expressed in broad terms, the identification of socially undesirable behavior and the development of mechanisms to control that behavior. The development of these control mechanisms requires knowledge of the nature of compliance in the form of information concerned with the compliance decision process. Any attempts to develop legal and social programs to discourage socially undesirable behavior made in the absence of specific information concerning the compliance process are unlikely to be of an optimal nature. Only when the factors influencing an individual's decision to comply with the law are explicitly identified can rational, intelligent, policy making take place.

The general purpose of this paper is to present such a general theory of compliance: A general statement of a compliance decision rule and theory based upon the concepts of utility maximization will be advanced; an attempt to establish the validity of that theory in light of existing empirical evidence will be made; specific forms of the general theory will be presented and applied to each of three disparate non-complier groups (criminal law violators, polluters, and malfeasant public official); policy prescriptions resulting from the application of the specific forms of the general
theory will be presented; and means for increasing the probability of being detected, adjudicated, and sanctioned will be discussed.

Before turning to the derivation of a utility-based compliance theory it is necessary to define several terms. The "crimes" referred to throughout this paper are violations of any formal legal rule that generate social costs or uncompensated externalities. Benefits are the satisfaction or gain that an individual accrues, in both pecuniary and non-pecuniary terms, from a given event. Conversely, costs are the dissatisfaction or loss that an individual suffers as the outcome of an event. As with benefits costs include pecuniary and non-pecuniary elements.
THE GENERAL MODEL

The basis for the development for any general theory of compliance relies on the identification of decision rules for individuals faced with a choice between compliance and non-compliance. In formulating a general decision rule the assumption is made that these individuals are utility maximizers. When faced with a situation requiring a choice to be made between two alternatives these individuals will choose that alternative yielding the highest perceived satisfaction or utility. According to Stover and Brown:

The utility of a given action will be determined by a person's values (conceived so as to encompass all wants, needs, desires, and drives and the relative intensity with which they are felt) and expectations (perceived probabilities) that performing the action will gratify these values positively or negatively.  

Hence the maximization of utility by an individual faced with a choice of a discrete nature will involve that individual's weighing of the subjectively determined probabilities of the benefits and costs of each course of action and its associated consequences. Applied to an individual's choice between compliance and non-compliance with a formal legal rule, the utility maximization principle implies that the individual will choose that course of action yielding the greater utility. This decision rule is expressed symbolically in equation 1.
\[ U_{nc} \preceq U_c \quad \text{equation 1} \]

Since the utility of an action is equivalent to the sum of the benefits and costs associated with that action to further isolate the various components involved in compliance choice, each side of equation 1 may be decomposed into its respective benefit and cost elements, resulting in equation 2.

\[ B_{nc} + C_{nc} = B_c + C_c \quad \text{equation 2} \]

In equation 2, \( B_{nc} \) and \( B_c \) are the positive values associated with each alternative course of action and \( C_{nc} \) and \( C_c \) are the negative values of the costs of non-compliance and compliance. The net utility that can be expected from a non-compliant act can be ascertained by subtracting the benefits and costs of compliance from the benefits and costs of non-compliance. This operation yields equation 3, where \( \hat{U}_{nc} \) is the net utility of non-compliance.

\[ \hat{U}_{nc} = (B_{nc} + C_{nc}) - (B_c + C_c) \quad \text{equation 3} \]

If \( \hat{U}_{nc} > 0 \) then the individual will be expected to choose the non-compliant course of action, if \( \hat{U}_{nc} = 0 \) the individual will be indifferent as to which action he chooses, and if \( \hat{U}_{nc} < 0 \) the individual will comply.

This individual decision equation can be applied to an aggregate population if the assumption is made that there exists some distribution of net utility functions and that for every possible state of existence for that population some
proportion of these functions will assume a positive value, resulting in a specific level of non-compliance associated with each state. Altering the values of any of the components of the equation cause the $U_{nc}$ values of individuals at the margin to change and may thus be expected to alter the general level of compliance.

Although this compliance decision equation could be expected to apply to any compliance choice situation, the bulk of the empirical evidence relating to this decision equation can be found in the crime control and deterrence literature. Although available data provides only indirect confirmation of the validity of this utility based compliance theory it is unfortunately the best available. Results of previous empirical investigations are interpreted as providing some sort of confirmation if they suggest relationships between the level of criminality and variables that could be subsumed into one of the four elements of the utility decision theory that are consistent with the theory. In other words, variables which could be considered elements of the benefits of compliance ($B_c$) or the costs of non-compliance ($C_{nc}$) should, if reported results are consistent with the theory, be inversely related to indicators of the level of criminality. Conversely, variables reflecting either the benefits of non-compliance ($B_{nc}$) or the costs of compliance ($C_c$) should be positively related to measures of criminality. In selecting empirical investigations for examination here,
an attempt was made to choose those investigations having theoretical foundations similar to the present utility based compliance theory. The empirical results examined come from: 1) Ehrlich's study of index crimes; 2) Brown and MacDougal's "A Utility Analysis of Non-compliance With Law: Crime in California Cities" which reports the results of regression analysis of the relationships between selected indices of the costs and benefits of crime and the crime rates in 108 California cities; and Sjoquist's "Property Crime and Economic Behavior." Because of the similarities in underlying theory the results of these studies should provide a reasonably accurate indication of the validity and the explanatory power of the theory presented here.

Ehrlich found that significant negative relationships existed between both the probability of conviction and the average length of sentence received (both potentially components of the cost of non-compliance) and the rate of crimes against both persons and property. Additionally, this study revealed positive relationships between median family income (although this variable in a component of both \( B_c \) and \( B_{nc} \), the fact that crime is committed disproportionately by low income groups indicates that it may be more of an indicator of the level of returns to crimes and hence an element of \( B_{nc} \) than it is an indicator of legitimate economic opportunity, an element of \( B_c \)) and crime rates. Strong positive relationships are evidenced between the number of families living
on annual incomes below one half of the median family income, the percentage of the population classified as non-white, and the level of criminal activity. This positive relationship is consistent with the expectations of the theory. Since the number of families living in poverty provides a reasonable proxy for the economic opportunity available to potential criminals, it follows that the more poverty, the lower the expected value of $B_c$, and hence, the higher the level of criminality. Similarly, if discrimination and the relatively level of economic opportunity available to non-white individuals would be expected to depress the value of $B_c$ for this subpopulation. If this is the case the positive relationship between the percentage of the population that was non-white and crime rates was consistent with the expectations of the theory. In sum, Ehrlich's investigation provides strong, albeit indirect, evidence of the validity of this utility based compliance theory.

The Brown and MacDouglas study since it tested an identical decision rule provides more direct support. The results of this study are presented in Table 1.

-----------------------------------
Insert Table 1 about here
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As can be ascertained from Table 1, the results of the Brown and MacDouglas study provide general confirmation of the validity of the theory. Especially interesting in the
relative strength of the relationships of $C_{nc}$ and $B_c$ to the crime rates. The strong negative relationships between the $B_c$ variables and the crime rates indicate that in some instances the benefits of compliance may have a greater effect upon potential non-compliers than the costs of non-compliance. The great degree of consistency between the expectancies of the utility based theory and the empirical results of the Brown and MacDouglas study lend further support to the assumed validity of the decision theory presented in this paper.

Sjoquist\textsuperscript{9} limited his investigation to property crime and relied on a slightly different theoretical base than the one presented here, but his results provide further indirect evidence consistent with a utility based decision theory. Taken in sum, empirical evidence would seem to indicate that this theory has some degree of validity. If the basic validity of the theory is accepted specific forms of the decision equation can now be presented and analysed for criminal law violators, polluters, and malfeasant public officials.
**TABLE 1**

**ZERO-ORDER RELATIONSHIPS BETWEEN CRIME RATES AND INDICATORS OF CN, BN, AND BC***

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Auto Theft</th>
<th>Auto Theft</th>
<th>Burglary</th>
<th>Robbery</th>
<th>Assault</th>
<th>Rape</th>
<th>Homicide</th>
<th>Crime Rates (all felonies)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CN:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>-.10</td>
<td>-.06</td>
<td>-.22</td>
<td>-.10</td>
<td>.01</td>
<td>.07</td>
<td>.10</td>
<td>-.17</td>
</tr>
<tr>
<td>PAc Offense</td>
<td>-.17</td>
<td>-.35</td>
<td>-.18</td>
<td>-.22</td>
<td>-.32</td>
<td>-.08</td>
<td>.06</td>
<td>--</td>
</tr>
<tr>
<td><strong>BN:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RETCAP</td>
<td>--</td>
<td>.35</td>
<td>.24</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>.33</td>
</tr>
<tr>
<td>AUTODEN</td>
<td>.39</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>.13</td>
</tr>
<tr>
<td>POPDEN</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>.39</td>
<td>.16</td>
<td>.23</td>
<td>.02</td>
<td>.18</td>
</tr>
<tr>
<td>OLD</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>.35</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>.34</td>
</tr>
<tr>
<td>INCOME+</td>
<td>-.37</td>
<td>.05</td>
<td>-.29</td>
<td>-.41</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>-.37</td>
</tr>
<tr>
<td><strong>BC:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MFPART</td>
<td>-.18</td>
<td>-.08</td>
<td>-.31</td>
<td>-.18</td>
<td>-.34</td>
<td>-.18</td>
<td>-.20</td>
<td>-.27</td>
</tr>
<tr>
<td>NBLACK</td>
<td>-.41</td>
<td>-.05</td>
<td>-.30</td>
<td>-.34</td>
<td>-.47</td>
<td>-.31</td>
<td>-.39</td>
<td>-.36</td>
</tr>
<tr>
<td>POVLEV</td>
<td>-.43</td>
<td>-.07</td>
<td>-.48</td>
<td>-.48</td>
<td>-.56</td>
<td>-.44</td>
<td>-.60</td>
<td>-.53</td>
</tr>
<tr>
<td>EMP</td>
<td>-.30</td>
<td>-.05</td>
<td>-.30</td>
<td>-.34</td>
<td>-.47</td>
<td>-.31</td>
<td>-.39</td>
<td>-.36</td>
</tr>
<tr>
<td><strong>Control:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POP</td>
<td>.35</td>
<td>-.01</td>
<td>.37</td>
<td>.17</td>
<td>.14</td>
<td>.34</td>
<td>.22</td>
<td>.37</td>
</tr>
</tbody>
</table>

*Pearson coefficients of correlation

†Income picks up effects of both BN and BC: see text.

**Key:**
- PA = probability of arrest (.10: y arrest/felony crimes)
- PAc Offense = probability of arrest ofr offense indicated (arrests for offense/offenses)
- RETCAP = retail sales per capita
- AUTODON = autos per square mile
- OLD = percentage of population 65 years of age and older
- INCOME = median family income
- POVLEV = percentage of families with inc. . above poverty level
- EMP = employment rate
- MFPART = work force participation rate
- NBLACK = percentage of population, not black
- POPDEN = population per sq. mile

CRIMINAL LAW VIOLATORS

Since the bulk of the compliance literature deals with criminal law violators\(^\text{10}\) and since several detailed models of criminal choice based upon utility maximization have been presented elsewhere,\(^\text{11}\) compliance with criminal law will be addressed only briefly here. This is not to minimize the importance of developing adequate control theory and mechanisms for criminal law violators, it is merely a recognition that with limited time and space, resources would be better utilized examining the relatively unexplored areas of pollution control and control of malfeasant public officials.

A decision equation for potential criminal law non-compliers derived from equation \(3\) will be presented. This equation subsumes the same basic elements as equation \(3\) (i.e. \(B_{nc}, C_{nc}, B_c, C_c\)), but each element is specified in greater detail to reflect the particular set of conditions facing a potential criminal law non-complier. The criminal compliance decision is represented symbolically by equation \(4\).

\[
\hat{U}_{nc} = \left[ \left( 1 - P_s \right) E_{nc} + \psi_{bno} \right] - \left[ P_s \left( S + \delta E_c + \psi_{cnc} \right) + L_{nc} \right]
\]

\[
- \left[ \left( E_c + \psi_{bc} \right) - \left( L_c + \psi_{cc} \right) \right]
\]

(4)

The variables used in equation \(4\) are defined in Table 2.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1-P_s$</td>
<td>Probability of successful non-compliance</td>
</tr>
<tr>
<td>$B_{nc}$</td>
<td>Economic gain of non-compliance</td>
</tr>
<tr>
<td>$E_{nc}$</td>
<td>Psychic and social gains of non-compliance</td>
</tr>
<tr>
<td>$\psi_{bnc}$</td>
<td>Probability of Sanction</td>
</tr>
<tr>
<td>$P_s$</td>
<td>Sanction: pecuniary and non-pecuniary direct costs of sanction</td>
</tr>
<tr>
<td>$U_{nc}$</td>
<td>Discounted present value of earnings lost because of criminal record or time removed from job market</td>
</tr>
<tr>
<td>$C_{nc}$</td>
<td>Resources devoted to non-compliant activity</td>
</tr>
<tr>
<td>$E_c$</td>
<td>Psychic costs of non-compliant behavior (Loss of freedom, prestige, self-respect, etc.)</td>
</tr>
<tr>
<td>$\psi_{cnc}$</td>
<td>Economic gain from legitimate activity (i.e. compliance)</td>
</tr>
<tr>
<td>$B_c$</td>
<td>Psychic benefits of compliance</td>
</tr>
<tr>
<td>$\psi_{bc}$</td>
<td>Resources devoted to compliant behavior</td>
</tr>
<tr>
<td>$C_{cc}$</td>
<td>Psychic costs of compliant behavior</td>
</tr>
</tbody>
</table>

It should be noted that all the benefits and costs specified in equation 4 are based upon expectations. Although it would seem reasonable to assume that some linkage exists between objective costs, benefits and probabilities and an individual's expectations, the linkages and the degree to
which they are related is far from clear. This point merits specific mention because it is such an important consideration when formulating crime control policies: the relevant values to be manipulated are the expectations of the potential non-complier, more than the actual objective values. A more obvious aspect of the equation is that it contains four elements. Although traditional crime control policies have been preoccupied with increasing the costs of non-compliance, it is evident that policies affecting all four elements of the decision equation should be given consideration.

The most common means of providing incentives for compliance with criminal law are: 1) prison sentences, 2) fines, 3) probation and parole, and 4) denial of specific rights and stigmatization. Alternate policy approaches might include increasing legitimate employment opportunity, increasing income, and increasing educational levels. The effects of each of these policies upon the criminal law compliance equation (equation 4) are summarized in Table 3.
TABLE 3

Effects of various incentives upon
the criminal compliance equation

<table>
<thead>
<tr>
<th>Incentive</th>
<th>Probability of Imposition</th>
<th>Direct Effect</th>
<th>Indirect Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imprisonment</td>
<td>P &lt; 1</td>
<td>S</td>
<td>( \psi_{cnc} )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( \delta E_c )</td>
<td></td>
</tr>
<tr>
<td>Fines</td>
<td>P &lt; 1</td>
<td>S</td>
<td>( \psi_{cnc} )</td>
</tr>
<tr>
<td>Probation and Parole</td>
<td>P &lt; 1</td>
<td>( \psi_{cnc} )</td>
<td>( \psi_{cnc} )</td>
</tr>
<tr>
<td>Improved Employment Opportunity</td>
<td>P &lt; 1</td>
<td>( E_c )</td>
<td>( \psi_{bc} )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( \delta E_c )</td>
<td>( \psi_{cc} )</td>
</tr>
<tr>
<td>Increased Income</td>
<td>P &lt; 1</td>
<td>( E_c )</td>
<td>( \psi_{bc} )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( \delta E_c )</td>
<td>( \psi_{cc} )</td>
</tr>
<tr>
<td>Increased Education</td>
<td>P &lt; 1</td>
<td>( E_c )</td>
<td>( \psi_{bc} )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( \delta E_c )</td>
<td>( \psi_{cc} )</td>
</tr>
<tr>
<td>Stigmatization and Denial of Specific Rights</td>
<td>P &lt; 1</td>
<td>( \psi_{bc} )</td>
<td>( \psi_{bnc} )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( \psi_{bnc} )</td>
<td>( \delta E_c )</td>
</tr>
</tbody>
</table>
ENVIRONMENTAL LAW VIOLATORS

The development of workable compliance mechanisms for the environmental protection area is quite difficult. There are two reasons for this difficulty. First, environmental law is in no way customary. Compliance with pollution regulation is not ingrained into the public conscience like prohibitions against murder, rape and robbery. Since there is no popular or customary conception of what constitutes an illegal level of pollution, the end result of all this is that polluters are unlikely to experience internalized psychic costs or social stigmatization because of their non-compliance with pollution control laws. Thus, a control device that could be very effective against the type of individual most prone to non-compliance with pollution control laws. The second, and perhaps more important, complication arises from the nature of the non-compliers themselves. Criminal law violations are, for the most part, committed by identifiable individuals. In contrast, pollution law violations are the result of actions by two interrelated legal entities: business firms and their managers. The decision to comply or not to comply with pollution control regulations will ultimately be the decision of a firm's managers and if the goals of managers and firms were the same (i.e. profit maximization) a compliance decision rule
for pollution violators could treat the firm and its managers as a unit. Unfortunately, this does not seem to be the case. Management theorists have postulated a wide range of divergences between the goals of managers and firms.\(^1\) In recognition of this factor social control policy must include some explicit recognition of these disparities. The decision equation for managers faced with the choice of compliance and non-compliance with environmental protection legislation presented below includes provision for such divergences. The form of the general compliance equation applicable to pollution violations is presented in equation 5.

\[
\hat{U}_{nc} = \left\{ \left[ \pi_{c} + \pi_{nc} + (1-P)\left(\psi_{bnc}+M_{bnc}\right) \right] - \left[ P\left(S+\psi_{cnc}+M_{cnc}\right) \right. \right.
\]

\[+\left.\left.\mathrm{CST}^{-}\right\}\right\} \left(\pi_{c}+\psi_{bc}+M_{bc}\right) - \left(\mathrm{PC} + \mathrm{CST} + \psi_{cc} + M_{cc}\right) \right\}
\]

(5)

Explanation of the variables in equation 5 is provided in Table 4.

The polluter's decision equation presented above reflects the assumption that the major incentive for firms to pollute is the realization of incremental increases in profit (\(\pi_{nc}^{-}\)) over their normal profit level (\(\pi_{c}\)).\(^1\) Other benefits a firm may receive from non-compliance include the competitive advantage that may result from being able to produce at lower costs than complying rivals. Non-compliant firms also avoid the direct costs of the installation and maintenance of pollution control devices. Managers may
<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>( w_c )</td>
<td>Profit level attainable while in compliance with pollution control regulations</td>
</tr>
<tr>
<td>( w_{nc} )</td>
<td>Incremental increase in profit level directly attributable to non-compliance</td>
</tr>
<tr>
<td>((1-P_s))</td>
<td>Probability of successful non-compliance</td>
</tr>
<tr>
<td>( \psi_{bnc} )</td>
<td>Portmanteau variable of benefits accruing to the firm as a direct result of non-compliance (i.e. competitive advantage gained by use of lower cost polluting process)</td>
</tr>
<tr>
<td>( M_{bnc} )</td>
<td>Portmanteau variable reflecting benefits received or expected as a result of non-compliance by manager</td>
</tr>
<tr>
<td>( P_s )</td>
<td>Probability of sanction</td>
</tr>
<tr>
<td>( S )</td>
<td>Sanction: direct cost of fine, tax or alternate penalty</td>
</tr>
<tr>
<td>( \psi_{cnc} )</td>
<td>Firm's portmanteau comprising costs of non-successful non-compliance (i.e. public ill will)</td>
</tr>
<tr>
<td>( M_{cnc} )</td>
<td>Manager's portmanteau comprising costs of non-successful non-compliance (i.e. loss of position, reduced rate of career growth)</td>
</tr>
<tr>
<td>( \text{CST}' )</td>
<td>Production costs while non-compliant</td>
</tr>
<tr>
<td>( \hat{w}_c )</td>
<td>As above</td>
</tr>
<tr>
<td>( \psi_{bc} )</td>
<td>Firm's benefits of compliance (i.e. good public image, good governmental relations)</td>
</tr>
<tr>
<td>( M_{bc} )</td>
<td>Manager's benefits of compliance (avoidance of risk, etc.)</td>
</tr>
<tr>
<td>( \text{PC} )</td>
<td>Direct costs of pollution control devices or processes</td>
</tr>
<tr>
<td>( \text{CST} )</td>
<td>Production costs while firm is in a state of compliance</td>
</tr>
<tr>
<td>( \psi_{cc} )</td>
<td>Portmanteau of firm's cost of compliance (i.e. loss of competitive advantage)</td>
</tr>
<tr>
<td>( M_{cc} )</td>
<td>Manager's costs of compliance (i.e. reduced rewards due to lower profit margins)</td>
</tr>
</tbody>
</table>
benefit from non-compliance because the incremental increases in profits, reduction in cost, or the competitive advantages gained while polluting make them appear to be more effective managers than they really are. Since in most cases rewards to managers are predicated upon some performance measure, the increased performance of the firm resulting from non-compliance may produce benefits for the manager in the form of larger salaries, promotions, or larger staffs.

The benefits of compliance for firms are likely to include such intangibles as enhanced public image or improved relations with the government. Managers will, or at least some of them will, benefit from the increased security arising from compliance and the satisfaction resulting from the knowledge that they are not contributing to environmental degradation. Since for most firms the benefits of compliance are relatively minor compared to the benefits of non-compliance, the need for additional incentives is obvious.

Nagel lists the following as potential compliance incentives: "1) Discharge taxes or fees, 2) Contingent injunctions, 3) Tax rewards and subsidies, 4) Objective civil penalties, 5) Publicizing wrongdoers, 6) Selective government buying power, 7) fines and jail sentences, and 8) conference persuasion." Table 5 illustrates the probable effect of each of these incentives on each of the components of the polluters' decision equation.
TABLE 5
Effect of incentive upon polluter's decision equation

<table>
<thead>
<tr>
<th>Incentive</th>
<th>Prob. of Imposition</th>
<th>Direct Effect</th>
<th>Indirect Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge fees or taxes</td>
<td>$P &lt; 1$</td>
<td>$S$</td>
<td>$\psi_{cnc}$</td>
</tr>
<tr>
<td>Injunctions</td>
<td>$P &lt; 1$</td>
<td>$S^2$</td>
<td>$\psi_{cnc}$</td>
</tr>
<tr>
<td>Tax rewards and subsidies</td>
<td>$P \geq 1$</td>
<td>$PC$</td>
<td>$\psi_{bnc}$</td>
</tr>
<tr>
<td>Civil penalties</td>
<td>$P = 1$</td>
<td>$S$</td>
<td>$\psi_{cnc}$</td>
</tr>
<tr>
<td>Publicizing wrongdoers</td>
<td>$P = 1$</td>
<td>$\psi_{bnc}$</td>
<td>$\psi_{cnc}$</td>
</tr>
<tr>
<td>Selective government buying</td>
<td>Discretion of government</td>
<td>$\psi_{bc}$</td>
<td>$\psi_{bc}$</td>
</tr>
<tr>
<td>Fines</td>
<td>$P = 1$</td>
<td>$S$</td>
<td>$M_{cnc}$</td>
</tr>
<tr>
<td>Jail sentences</td>
<td>$P = 1$</td>
<td>$S$</td>
<td>$M_{cnc}$</td>
</tr>
</tbody>
</table>

Conference persuasion unlikely to have any effect

Notes: 1 Incentives from S. Nagel, "Incentives for Compliance With Environmental Law," Improving the Legal Process, 1975, pp. 341. 2 Imposition would result in closing of plant. 3 Assumes companies pay fines. 4 Assumes executives serve jail terms.
ANTITRUST LAW VIOLATORS

In light of the immense costs anti-competitive activity is believed to inflict upon society, and the fact that antitrust remedies are the only available means to deter and remedy such activity, the paucity of analytic work pertaining to these remedies is indeed amazing. The purpose of the present paper is to provide such analysis. What is felt to be a reasonably complete analytic framework is developed by: 1) presentation of a model of the choice to engage in anti-competitive activity; 2) an examination of the social costs arising from the existence of market power distortions—both those costs associated with conduct and those associated with market structure; 3) an examination of the deterrent and remedial effectiveness of the present set of antitrust remedies in terms of their impact upon market structure and performance; and 4) a set of recommendations for the development of optimal antitrust remedies. The analysis set forth in this paper is admittedly tentative, but it does provide some insight in an area much in need of thoroughgoing analysis.
The Decision Model

Before attempting any analysis of antitrust remedies it is necessary to present, in some detail, the elements of the decision to engage in anti-competitive activity. The assumption is made that managers are utility maximizers, and that as such, they will approach the decision to engage in anti-competitive activity by considering the set of expected benefits and costs associated with each possible choice and then selecting that activity level which yields the highest level of net benefits or expected utility. Expected utility based models of the criminal choice have been advanced by Becker, Ehrlich, and Block and Heineke, and while these models serve as a point of departure for the present model, there are some basic differences in the nature of the underlying choice that necessitate a somewhat different approach. Basically, the manager making the decision to engage in a certain level of anti-competitive activity is assessing various combinations of risk and return and choosing among these combinations in a manner similar to an investment decision. Since "labor" is assumed to be a relatively minor element in anti-competitive activities, the investment decision form is a more accurate depiction of this choice than is an occupational choice model. The amount of anti-competitive activity a given firm may engage in is constrained by the amount of risk it is willing to bear and the structural conditions of the markets in which it operates,
not by the amount of time or other resources it is willing to devote to this activity. A second distinction between the choice models concerns the fact that individuals involved in types of criminal activity outside the realm of antitrust can expect returns only when they actively engage in some activity. Such is not the case with anti-competitive activity; substantial returns may be realized without engaging any risk. These two distinctions determine to a significant degree the structure of the present decision model.

The benefits accruing to a manager engaged in anti-competitive activity will be of two types: 1) an incremental increase in the profits of the firm (\(\pi^*\)) over and above the "normal" profits associated with competitive conditions (\(\pi\)); and 2) those non-pecuniary benefits like increased power and prestige or more pleasant working conditions (b) that the manager receives or obtains for himself as a result of anti-competitive activity. The magnitude of the supranormal profit available will be a function of two factors. First, the degree to which the firm enjoys structurally based market power, such as barriers to entry, differentiated product, high concentration, fewness of sellers, etc., and the degree to which the manager makes his price and output decisions to utilize that structural market power (u). The second factor determining the amount of supranormal profit is the degree to which the firm engages in overt anticompetitive conduct (m). This overt conduct is what has traditionally
been the target of antitrust enforcement and includes behavior ranging from "conscious parallelism" to outright cartelization. The following expression relate the assumed relationships between monopoly profits and the structure and conduct variables.

\[ \pi' = f(u,m) \]

where \[ \frac{\partial \pi'}{\partial u} > 0 \] and \[ \frac{\partial \pi'}{\partial m} > 0 \]

The non-pecuniary benefits a manager gains from anti-competitive activity are more or less relevant to the decision to engage in such activity, depending on the degree to which assumptions about managerial profit maximization are accepted. If it is assumed that managers are profit maximizers, the goals of managers and firms (or their owners) will converge and the non-pecuniary benefits term will cease to have a role in the decision. If, however, managers attempt to maximize such diverse things as sales or assets growth, salaries, prerequisites, leisure, etc., the impact of the non-pecuniary benefits term may become quite important. For example, managers could utilize anti-competitive structure and conduct in order to maximize sales growth without due consideration being given to the profitability of such actions. In this case the supranormal profits would be only a minor consideration, and the non-pecuniary benefits would be of paramount importance. Although some observers reject the notion of any diversity of managerial goals—claiming managers
are effectively prevented from maximizing elements other than profit by either active sanctions or the relationships between managerial goals and profit maximization—the vast body of literature supportive of the existence of significant deviations between managerial utility maximization and profit maximization suggests that it would be a mistake to ignore the non-pecuniary benefits that a manager receives. To do so would result in a much less accurate description of the factors considered by managers when deciding whether or not to engage in anti-competitive activity.

The expected costs of anti-competitive activity are the costs of litigation \( (C_{i}) \) multiplied by the probability of detection \( (P_{d}) \) plus the costs of the sanctions imposed \( (C_{s}) \) multiplied by the probability of sanction \( (P_{s}) \). Included in the cost of litigation variable are all those costs incurred subsequent to the discovery of the violation. These costs are the direct costs of litigation, the opportunity costs of the resource devoted to avoiding sanction once detected, the costs incurred from a possible loss of consumer good will, and possibly, an increase in the cost of capital to the firm resulting from the depression in stock prices that sometimes accompanies pendency of antitrust litigation. Characteristically, the duration, and hence the cost of litigation is determined by the defendant in antitrust cases. Since the willingness of a defendant to engage in litigation it is likely to be positively related to the level of possible
sanction the following relationship should hold:

\[ C_1 = f(C_s) \text{ where } \frac{\partial C_1}{\partial C_s} > 0 \]

This relationship is evidenced by the greater resources defendant firms devote to defensive litigation in private treble damage suits, where the eventual cost of sanctions may be relatively high, than to criminal actions by the government, where penalties are almost uniformly low.²³

Each type of sanction imposes a somewhat different set of costs. Fines impose direct monetary costs on either the firm or the manager,²⁴ although the extent to which individual managers bear the costs of these fines is uncertain. Civil damages provide for a penalty of three times the damages resulting from anti-competitive activity to be paid to the injured parties by the offending firm.²⁵ Imprisonment imposes the costs of wages lost by the jailed individual and the psychic costs that are likely to be generated by loss of freedom, etc., directly on the responsible manager.²⁶ In this instance, the firm may lessen the impact of imprisonment on the individual manager by compensation, but full compensation is probably unlikely. Finally, corporate dissolution imposes both the costs of the operational compliance with dissolution orders (transactions costs in sales of assets, etc.) and the present value of lost monopoly rents. Ideally, the level of sanction cost imposed should be an increasing function of the benefits received,
but such a system of increasing marginal punishments does not appear to be in effect. In those instances where sanctions are imposed through criminal proceedings, two factors work in combination to preclude such a relationship. First, since criminal sanctions are imposed on the basis of degree of illegal conduct, not on the basis of the supranormal profits a firm might accumulate, only those firms that must rely on overt conduct to realize monopoly profits are subject to criminal sanction. Firms blessed with favorable structural conditions (or for that matter, firms who have been able to impose such conditions in the past) are able to reap large monopoly profits without risk of sanction. As a result, sanction levels are a function only of the level of overt activity, not of the actual degree of anticompetitive conditions.

$$C_s = f(m), \quad \text{where} \quad \frac{\partial C_s}{\partial m} >$$

Second, this relationship is weakened by the constraint imposed by low fine levels and infrequent use of the subjectively more severe jail sentences.27 In the case of treble damages the relationship between monopoly gains and sanction levels would appear to be more direct. In general, sanctions in civil actions, since they are based upon damages, will conform more closely to the notion of a positive relationship between benefits and sanction levels.28
\[ C_s = f(\pi') \quad \text{where} \quad \frac{\partial C_s}{\partial \pi'} > 0 \]

Few, if any a priori assumptions about the sanctions costs of dissolution can be made other than that the transactions costs generated will depend on the size of the firm, the degree of divisibility of assets, and the degree of dissolution ordered. The value of the lost future monopoly rents will be a function of the amount of structural market power lost by the firm as a result of the dissolution.

Recent examinations of the determinants of anti-trust enforcement activity by Asch\textsuperscript{29} and Siegfried\textsuperscript{30} have indicated that economic variables such as level of profitability and industry size play only a limited role in precipitating enforcement activity. Since this, in essence, means that enforcement agencies are not considering either the result of anti-competitive conditions, profits; or the potential pre-conditions for those profits, industry structure; as sufficient to cute enforcement activity, these two variables should be expected to have only a limited impact upon the probability of detection or sanction. Given the nature of the legal requirements for proof of illegal conduct rather than merely the existence of anti-competitive conditions, it would seem reasonable to assume that there exists some positive relationship between the level of anticompetitive conduct and the probability of detection and sanction. The following relations:
\[ P_d = f(m) \quad \text{where} \quad \frac{\partial P_d}{\partial m} > 0 \]

reflect the assumptions that, the more overt activity a firm engages in, the more visible the firm's illegal activity becomes, the more individuals will become aware that they have been injured by the firm's anti-competitive activity, and the more potential "squealers" will be produced. These aggrieved parties are the primary means of detection of illegal activity, so the more produced, the more likely detection becomes. The relations

\[ P_s = f(m) \quad \text{where} \quad \frac{\partial P_s}{\partial m} > 0 \]

reflect the fact that the more overt activity a firm engages in the stronger the case delivered to the authorities is likely to be. A firm engaging in "conscious parallel" is likely to produce evidence attesting to the existence of such practices. In contrast, a firm actively participating in a price-fixing conspiracy will be likely to create evidence of that participation at every turn.

The presence of structural factors facilitating anti-competitive activity is likely to be negatively related to the probability of detection or sanction. Those highly successful collusive arrangements that can rely primarily on structural conditions with only minor needs to engage in any overt activity are unlikely to be detected or sanctioned. The following expressions denote these relationships and
their direction.

\[ P_s = f(u) \text{ and } P_d = f(u) \text{ where } \frac{\partial P_s}{\partial u} < 0 \text{ and } \frac{\partial P_d}{\partial u} < 0 \]

The end result of these relationships is that relatively less successful anti-competitive activity is the type most prone detection and sanction, and that present enforcement practices are unlikely to have any impact upon the most successful of the anti-competitors.

An additional element of the decision to engage in anti-competitive activity is the set of expectations concerning the amount of time the returns from anti-competitive activity will be attainable and the amount of time that will elapse before any sanction is levied.\(^3\) The monopoly rents are expected to continue over time, while the litigation and sanction costs will not be incurred until some point in the future, so an accurate representation of the benefit/cost equation should take into account these time considerations. The equation should compare the present value of the flow of monopoly rents and the properly discounted present value of the litigation and sanction costs.\(^3\) Posner reports that the average duration of those conspiracies involved in litigation with the Antitrust Division was seven and one half years,\(^3\) (and since these conspiracies can be, by virtue of their involvement with the Justice Department, classified as less than successful conspiracies, this average may be subject to a significant downward bias) and that the average
duration of Antitrust Division Litigation for almost four years. If even those anti-competitive activities that run afoul of enforcement agencies enjoy this sort of life-span it is apparent that such time considerations are far from trivial.

The amount of time elapsed before detection ($t_d$) and prior to imposition of sanction ($t_s$) are made even more important in the decision calculus by virtue of the high rates of return ($r$) that firms with market power are purportedly able to achieve. This above normal rate of return serves to further minimize the effects of costs incurred some distance in the future.

Now that the set of underlying assumptions has been presented and discussed, the final functional form of the decision equation may be expressed. Two forms of this equation are presented. Equation 1 is applicable in those situations where the supracompetitive profits received by the firm are generated primarily by structural conditions. In this case, since there is no overt conduct that must cease after detection it is assumed that monopoly rents will be received until some structural remedy is imposed. Hence, the benefits from anti-competitive conditions would be available during the period between detection and sanction and probably, given the limited effectiveness of present modes of structural relief, subsequent to sanction. For purposes of simplicity it is assumed that some sort of effective
relief can be imposed so monopoly rents end with the imposition of the sanction.

Equation 1

\[ EU = \pi_0 + \frac{\pi^l + b_1}{(1+r)^l} + \frac{\pi^l_{td} + b_{td} - C_{l}(t_d)}{(1+r)^{td-1}} + \frac{\pi^l_{ts} + b_{ts} - C_{l}(t_s)}{(1+r)^{ts}} \]

In the second form of the equation, which expresses the conditions facing a firm whose supranormal profits arise from anti-competitive conduct. In this case it is assumed that anti-competitive conduct ceases soon, if not immediately after detection.

Equation 2

\[ EU = \pi_0 + \frac{\pi^l + b_1}{(1+r)^l} + \frac{\pi^l_{td} + b_{td} - C_{l}(t_d)}{(1+r)^{td-1}} - \frac{C_{l}(t_s)}{(1+r)^{ts}} + \frac{C_s}{(1+r)^{ts}} \]

Since it is unlikely that firms could be so neatly dichotomized on the basis of the source of their supranormal profits, equation 1 probably presents the more accurate version of the decision equation. But in recognition of the fact that
for most firms supranormal profits arise from some combination of structure and conduct, the gains from the intermediate period \((t_s - t_d)\) should be devalued by the percentage attributable to conduct. The variables used in the two equations are defined in the following table.

**The Costs of Monopoly**

A fairly complete specification of the sources and types of social costs arising from anti-competitive conduct and structure is necessary for a rational development of antitrust remedies. If these costs and their sources are not properly identified it will be impossible to calculate the relative benefits of the antitrust remedies. The sources of monopoly costs can be divided into two types: those resulting from a misallocation of resources and those resulting from a redistribution of income.

Dalton and Levin\(^{38}\) distinguish two types of resource misallocation costs. The first are those costs arising from the higher prices and lower output levels that characterize monopolistic behavior, what is described as the "price" effect. This cost may be most directly reduced by either the elimination of the market power facilitating such behavior or by forcing those firms with market power to forego its utilization. The traditional, conduct oriented remedies, will have an impact upon this cost element only to the degree to which the underlying market power is obtained through overt behavior. That portion of this cost that results from
<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>Expected utility of anti-competitive activity to manager</td>
</tr>
<tr>
<td>( \pi )</td>
<td>&quot;Normal&quot; or competitive profits</td>
</tr>
<tr>
<td>( \pi' )</td>
<td>Incremental increase in profits realized as a result of anti-competitive activity</td>
</tr>
<tr>
<td>b</td>
<td>Non-pecuniary benefits received by manager as a result of anti-competitive activity</td>
</tr>
<tr>
<td>u</td>
<td>Level of structural market power distortion</td>
</tr>
<tr>
<td>m</td>
<td>Level of anti-competitive activity</td>
</tr>
<tr>
<td>( P_d )</td>
<td>Probability that activity or structure will be discovered and considered actionable by discovering party</td>
</tr>
<tr>
<td>( P_s )</td>
<td>Probability that a sanction of some sort will be imposed</td>
</tr>
<tr>
<td>( C_l )</td>
<td>Direct and indirect costs of litigation to the firm</td>
</tr>
<tr>
<td>( C_s )</td>
<td>Cost of sanction imposed to the firm</td>
</tr>
<tr>
<td>( t_d )</td>
<td>Time period, in number of years, until activity or structure is detected</td>
</tr>
<tr>
<td>( t_s )</td>
<td>Time period, in number of years, until sanction is imposed</td>
</tr>
<tr>
<td>r</td>
<td>Rate of return realized by the firm</td>
</tr>
</tbody>
</table>
structural market distortions is likely to be reachable only with the application of structural remedies.

The second component of resource misallocation is the cost effect. According to Dalton and Levin:

There are several possible sources of inflated costs. The monopoly profits can induce 'organizational slack' which, in the absence of pressures to minimize costs, results in waste. This waste could take the form of protecting suboptimal, excess, or obsolete capacity; and management may satisfy its preference for higher income and certain amenities. In addition, wages may be higher, other things being equal, in monopolistic vis-a-vis competitive industries; promotional outlays may be inflated beyond the informative level, and higher costs are associated with delivered pricing systems which encourage cross-hauling, and foster non-optimal plant location decisions.39

The common element of these costs is that they all arise from the lack of competitive pressures to minimize costs. It seems reasonable to assume that the majority of these costs are generated by structural conditions. It seems unlikely that managers who are forced to engage in anti-competitive conduct in order to earn monopoly profits will be as complacent about inflated costs as are those managers who have monopoly returns virtually thrust upon them by structural conditions. For this reason, the harm generated by the cost effect should be positively related to the prevalence of structural monopoly conditions. From this assumption it follows rationally that the most effective means to reduce such costs is the use of structural remedies.

The second major cost source, income redistribution, is much harder to deal with in an effective manner. All
forms of monopolization will produce some level of income redistribution from consumers to the owners of monopoly capital or to managers of firms with market power. Although economists have traditionally avoided making judgments concerning the marginal utility of money for different income groups, the magnitude of the redistribution involved (Dalton and Levin report estimates of 3 percent of gross national product) precludes ignoring redistribution when formulating antitrust remedies. It is desirable, if for no other reason than equity to try and stem the tide of this redistribution and to try and return as much of the monopoly profits as is possible to consumers and injured competitors.

From this discussion of monopoly costs the following conclusions are drawn:

1) Since costs arise from market power distortions caused by both conduct and structure, to fabricate remedies dealing only with conduct severely limits the potential benefits of antitrust activity.

2) In order to reach both of the components of resource misallocation, structural relief becomes even more of a necessity. The price effect, monopoly power are generally fairly obvious, but the cost effects are much harder to isolate. Hence, it is necessary to deal with the source of the cost, rather than the cost itself. The only means to reduce inefficiency and waste is to insure the existence of
competitive pressures to minimize costs and the surest way to do that is with the application of structural relief.

3) The magnitude of the income redistribution associated with monopoly power makes that redistribution a valid consideration when formulating antitrust policy. Remedies should be designed to disperse monopoly profits as well as monopoly power.

The Remedies

There are essentially three dimensions on which to judge the effectiveness of antitrust remedies, these being:
1) their effectiveness as deterrents to those activities that generate monopoly costs; 2) the degree to which they can provide relief for past harms; and 3) the social cost of the remedy itself. The following are the basic relief forms available under the current statutory framework:

1) Fines paid to the government
2) Treble damages paid to injured parties
3) Incarceration
4) Dissolution or divestiture.

Little, if anything can be said about the deterrent effectiveness of fines on the basis of past experience. Given that the level of fines imposed in the past has been very low compared to the profits of antitrust law violations it is hardly surprising that the deterrent effect of fines has been minimal. Fines have not be imposed at a magnitude that had any meaningful impact upon managerial benefit-cost
calculations. However, this is not an inherent weakness of the remedy, but a weakness in past applications. The implication of the decision model is that if fines were increased to some meaningful level, effective deterrence of anti-competitive behavior could be achieved.

The remedial effectiveness of fines is harder to evaluate. Although they may, if properly calculated, force the monopolist to bear the full costs of his monopolistic behavior the extent to which fines may aid injured parties is limited. A more positive effect of fines is their probable impact on income distribution. Fines may prove to be a very effective means of transferring income away from the holders of monopoly power and back to society at large.

Breit and Elzinga reached very favorable conclusions concerning the social costs of enforcement activities utilizing fines as a remedy. They contend:

Strictly on the basis of costs, ..., fines paid to the state, is the least costly (remedy) to effectuate. Like all other penalties, fines require the use of resources to prove the anti-trust violation, but presumably this cost is the same regardless of the penalty imposed. The efficiency advantage of fines is that the marginal social cost of imposing a higher rather than a lower fine is virtually zero. Congress or the courts (or whoever is charged with setting the magnitude of the fine) can alter this level at practically no cost, since obviously, imposing the higher fine uses up no more resource than charging a lower fine. 41

Although certain parts of this discussion might be open to question (most notably the assumptions concerning the constant cost of the proof of a violation: the nature of the
legal process seems to indicate that the cost of proof of violation will be positively related to the potential sanction level) it is fairly clear that two factors: the use of criminal proceedings as opposed to civil proceedings, and the ability to vary the fine level without elaborate damage determination proceedings, work together to make fines a reasonably low cost remedy.

On its face, since the private treble damages suit purportedly imposes costs of three times the damage done on the monopolist, it would be reasonable to assume that treble damage actions provide a significant deterrent. This, unfortunately is not the case. Erickson examined this remedy and found that a variety of factors converged to make it less than completely effective as a deterrent device. These factors were: 1) that the "coverage ratio," or the percentage of monopoly profits used to calculate damages tended to be very low; 2) that the time lags due to the concealability of the acts and the nature of the legal process allowed the offending firms time to make significant additional returns on monopoly profits; 3) that the probability of detection was very low; and 4) that the discrepancies in resources between the defendants and those bringing suit were typically large enough that the defendants could "wait out" the plaintiffs and force them into accepting an early, lesser settlement. The end result of the combination of these factors is that treble damage actions are unlikely to impose
costs upon the monopolist of a sufficient magnitude to discourage anti-competitive activity.

A second question concerns the effectiveness of treble damages as a remedy to the results of past anti-competitive activity. While theoretically any damages action has the potential to remedy past harm, such does not appear to be the operational case with treble damage actions. The aforementioned factors limiting the effectiveness of the action as a deterrent device also limit its usefulness as a remedy. Damages that cannot be proven in court, cannot be remedied.

Yet another objection may be raised to treble damage actions on the basis of the costs they generate. Breit and Elzinga present the following comparison of the costs of fines and treble damage actions:

The societal costs of the two alternatives, however, are not the same. While the imposition of fines is not costless, . . . , still the costs of a fine imposing procedure are considerably less than those associated with a private damage reparations action. In stark contrast to a deterrent system relying on fines, a reparations system demands the expenditure of real resources in the determination and allocation of the damages themselves. In addition, as now constituted, the reparations system involves resource consuming mechanisms of private pleading and discovery, joinder, class actions, multidistrict litigation, and all the other paraphernalia of private damage actions.43

In the absence of any clear evidence that treble damages provide any greater deterrent than is possible with a fine system and that private actions do provide superior relief, the wise choice is the lesser cost remedy, fines.
Incarnation is very seldom used in action against individuals who violate the antitrust laws, and unless fines prove to provide an inadequate deterrent to such activity, it probably should not be imposed. Incarceration's only purpose is deterrence, it provides no relief. The only instances where it should be employed are those where the benefits of the monopolization foregone outway the cost of incarceration. It is advanced that very few situations exist where a properly determined fine would not provide the same deterrence at a much lower social cost (This does not mean that incarceration is completely unnecessary, if for some reason the courts are unable or unwilling to impose adequate fines, incarceration may provide the best alternative).

One of the major criticisms that may be leveled against current antitrust enforcement activity is that its preoccupation with conduct severely limits the benefits it can generate. As has been demonstrated in the presentation of the decision model and the discussion of the sources of the costs of monopoly, structure is of paramount importance. Structure determines to a large extent whether or not anti-competitive behavior will be practiced, the profitability of that behavior and the costs imposed on society as a result. "The White House Task Force Report On Antitrust Policy" provides explicit recognition for the need to develop structural relief:
Market structure is an important concern of antitrust laws for two reasons. First, the more competitive a market structure the greater the difficulty of maintaining collusive behavior and the more easily such behavior can be detected. Second, in markets a very few firms effects equivalent to those of collusion may occur even in the absence of collusion. . . , phrases such as 'price leadership' or 'administered pricing' often do no more than describe behavior which is the inevitable result of structure. Under such conditions, it does not suffice for antitrust law to attempt to reach anti-competitive behavior; it cannot order the several firms (in an oligopolistic market) to ignore each other's existence. The alternatives, other than accepting the undesirable economic consequences, are either regulation of price or improving the competitive structure of the market.45

On the basis of this evidence the need for structural relief becomes obvious.

There are essentially three broad approaches to the reduction of structural monopoly power. The first, "The Yale Brozen Approach" involves doing nothing but waiting for the gradual diminution of monopoly power by the forces of the marketplace.46 While it is true that the structural conditions Brozen examined tended to dissipate within a ten year period47—a period roughly equal to the Posner reports as the amount of time it took to implement structural relief48—his analysis overlooks the following facts: 1) the delay before the imposition of structural relief is a measure of past performance, not potential; and 2) the natural rate of structural monopoly power decay is quite likely to be inversely related to the original level of monopoly power. Hence, those situations that precipitate the greatest social costs are the ones that will be the longest lived. Those monopolists
who lose their market power over a short period of time are likely to be the holders of marginal levels of monopoly power that would not have been the proper targets of structural relief. The end result of these factors is a probable downward bias in the estimates of the effectiveness of structural remedies. It is quite likely that the most damaging situations will not just pack up and go away, and that efficiently designed structural relief could accomplish its task within a much shorter time frame. Another issue concerns the level to which individuals with market power will exploit the conditions available to them. If there was no threat of action on the basis of structure the rational monopolist would fully exploit his market power. In contrast, if structure were actionable, and the modes of relief effective in eliminating market power, the potential losses associated with action to reduce market power when it was detected would provide an incentive for the limitation of the degree to which structural market power would be utilized. The deterrent effect of a potential loss of market power would thus be expected to precipitate a sort of "limit monopolization" at a level below full structural exploitation and the social losses from monopolization could be reduced.

Using a similar line of reasoning, several commentators, Bresnahan and Elzinga⁴⁹ and Posner,⁵⁰ among them, have advanced the idea that the imposition of heavy financial
penalties can reduce structural monopoly power. Posner contends that:

A damages judgment against a monopolist that imposed on him costs equal to the social costs of his monopoly would give him a strong incentive to eliminate the adverse consequences of the monopoly and to do so at the lowest cost. The least cost method might simply be to cease charging monopoly prices. . . . The appropriate sanction would be to place the cost of the illegality on the violator and let him figure out the cheapest way of avoiding that cost. 51

Although this approach is not within its theoretical elegance, several factors lessen its effectiveness as a means of structural relief. First and foremost there is the problem of determining the social cost of monopoly. If experience is any guide, courts of law are not particularly good arenas in which to calculate social costs. Erikson recounts the difficulty that faces damage calculations in private civil actions—ineffective assessments of the magnitude of damages, seriously foreshortened estimates of the duration of the monopolistic conditions, etc. 52—and it seems unlikely that fines could be determined any more accurately.

Turning to the decision model, the magnitude of the fine necessary to precipitate structural changes becomes apparent. Since the benefits of monopolization flow over time (a fairly long period of time, if generalization from Posner's statistics is possible) and at a high rate of return, it becomes clear that necessary fine levels might very well exceed the level which the legal process is willing to impose.
If this is the case, such methods are unlikely to result in meaningful structural relief.

The last means of affecting structural relief is by direct manipulation of market structure by dissolution and divestiture of existing firms. This direct impact upon market structure is one of the most attractive aspects of dissolution and divestiture. These approaches are not without their problems, however. In the absence of meaningful incentives provided to the subject firms to comply with dissolution and divestiture orders and to produce viable firms as a result of that compliance, these relieve forms are unlikely to be very successful. Fortunately, there appears to be an ideal way to provide such incentives through the use of "spinoffs." Glassman concludes that:

The single best incentive that seems to work in the direction of creating viable partial divestitures is the utilization of spinoffs rather than the sale of assets. The respondent firm is told what assets must be divested and approximately what volume of sales the divested firm should be able to realize, and the respondent is told to create a new firm including those assets by issuing stock in the spinoff entity to the respondent’s shareholders. If the firm created is not viable, the respondent’s shareholders suffer. A strong incentive is thereby provided for accomplishing a divestiture in a profit-maximizing (i.e. least cost) fashion.53

Using this method of relief significant changes can be made in industry structure. Changes whose type and magnitude can be specified as part of the relief order.

The major conclusions that can be reached from this investigation are: 1) The most important target of anti-trust relief should be structure; 2) To change that structure,
the structure itself, not just conduct will have to be made actionable under antitrust law, and 3) Structure is apparently most successfully attacked by explicitly structural remedies.
MALFEASANT PUBLIC OFFICIALS

I as much as the general effectiveness and legitimacy of a legal system depends upon the faithful fulfillment of duties by public officials, control over malfeasant public is a critical area. Applying the general net utility of non-compliance formula to the choice faced by a potentially malfeasant public official results in the following equation.

\[
U_{nc} = \left\{ [W_c + (1-P_s(b+\psi_{bnc})] - [L_c + P_s(S+\psi_{cnc}) + L_{nc}] \right\} - \left\{ [W_c + \psi_{bc}] - [L_c + \psi_{cc}] \right\}
\]

(6)

The variable used in equation 6 is presented in Table 6 below.

This analysis assumes that the major benefits to be obtained from public malfeasance are some monetary benefit or "bribe" and some non-pecuniary benefit of non-compliance generated in addition to the "bribe". One example of such non-pecuniary benefits might be the social advantages of being a member of a corrupt group. Also the assumption is made that a malfeasant public official, whether he be a police officer or a congressman, will retain his regular salary while engaging in non-compliant activities. A malfeasant official seeks to supplement his legitimate income by engaging in non-compliant activity much the same way a firm engages
### Table 6

Definition of variables used in the malfeasor's decision equation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>$W$</td>
<td>Wage received from compliant activity</td>
</tr>
<tr>
<td>$(1-P_s)$</td>
<td>Probability of successful non-compliance</td>
</tr>
<tr>
<td>$b$</td>
<td>Bribe or other pecuniary gain resulting from non-compliance</td>
</tr>
<tr>
<td>$\psi_{bnc}$</td>
<td>Portmanteau comprising non-pecuniary benefits of non-compliance</td>
</tr>
<tr>
<td>$L_{c}$</td>
<td>Resources devoted to legitimate activity while engaged in non-compliance</td>
</tr>
<tr>
<td>$P_s$</td>
<td>Probability of sanction</td>
</tr>
<tr>
<td>$S$</td>
<td>Sanction imposed as a result of unsuccessful non-compliance: $S = W_c$, discounted present value of loss of job + fine + imprisonment</td>
</tr>
<tr>
<td>$\psi_{cnc}$</td>
<td>Portmanteau comprising cost of non-compliance</td>
</tr>
<tr>
<td>$L_{nc}$</td>
<td>Value of resource devoted to non-compliant activity</td>
</tr>
<tr>
<td>$W_c$</td>
<td>Same as above</td>
</tr>
<tr>
<td>$\psi_{bc}$</td>
<td>Portmanteau of compliance benefits</td>
</tr>
<tr>
<td>$L_c$</td>
<td>Resource devoted to legitimate activity</td>
</tr>
<tr>
<td>$\psi_{cc}$</td>
<td>Portmanteau comprising costs of compliance</td>
</tr>
</tbody>
</table>
in pollution violations to supplement or increase its normal level of profits. The costs of non-compliance include the value of the resources an official devotes to non-compliance plus the psychic costs incurred. These costs will be incurred whether the official is sanctioned or not. If an official is sanctioned, since dismissal is the most common sanction, he will incur a cost equal to the discounted present value of his future income stream. In the event that fines or imprisonment are imposed the value of these sanctions will be added to the total cost of malfeasance. A second set of costs is incurred in the form of lost prestige, limitations placed upon future employment opportunity, personal embarrassment, etc. The benefits of compliance include the value of the salary received plus the value assigned to the psychic benefits of honesty and security. The costs of compliance comprise the value of the resource devoted to legitimate activity plus the costs a compliant official may occur because of low relative income levels (i.e. psychic costs of some sort).

Aside from the traditional means of controlling public officials (i.e. dismissal, fines, and imprisonment) there exists several other means to encourage compliance by altering the relative benefits and costs of non-compliance. One means of producing an incentive for honest or compliant behavior would be to raise the salary levels of public officials. An increase in salary would increase the
relative benefits of compliance, most probably in both pecuniary and non-pecuniary terms, since an increase in salary level would be expected to increase the status of public service occupations. Also, such increases would add to the cost of non-compliance by making the income lost in the event of dismissal greater.

A second means of inducing compliance would be to utilize some variation of a bonding scheme. Every public official would be required to post a bond before he could assume his position. Interest would be paid and retained with the principle, but both would be forfeited in the event of detected malfeasance. This method would increase the amount of the sanction levied against malfeasors by increasing the amount they stand to lose upon detection of malfeasance of some sort. In addition to the loss of the bond principle and accrued interest malfeasors would lose the discounted present value of the expected income of the bond principle over time. This incentive device has the additional advantage of being relatively inexpensive to administer. An incentive system similar to this bonding system already exists in the form of public employee pension plans whose benefits are denied employees who have been dismissed for malfeasance.

One last alternative approaches the problem from a somewhat different direction by increasing the penalties for
attempted bribery, thereby reducing the supply of bribes available to public officials.

The direct and indirect effects of each of these proposed incentive systems upon the various elements of the decision equation are presented in Table 7.

**TABLE 7**

The effects of various incentives upon the malfeasanor's compliance equation

<table>
<thead>
<tr>
<th>Incentive</th>
<th>Prob. of Imposition</th>
<th>Direct Effect</th>
<th>Indirect Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dismissal</td>
<td>$P &lt; 1$</td>
<td>$S$</td>
<td>$\psi_{cnc}$</td>
</tr>
<tr>
<td>Fines</td>
<td>$P &lt; 1$</td>
<td>$S$</td>
<td></td>
</tr>
<tr>
<td>Imprisonment</td>
<td>$P &lt; 1$</td>
<td>$S$</td>
<td>$\psi_{cnc}$</td>
</tr>
<tr>
<td>Increased Discretionary Salary</td>
<td></td>
<td>$W_c$</td>
<td>$\psi_{bc}$</td>
</tr>
<tr>
<td>Bond</td>
<td>&quot;</td>
<td>$S$</td>
<td>$\psi_{cnc}$</td>
</tr>
<tr>
<td>Increased Penalties for Attempted Bribery</td>
<td>$P &lt; 1$</td>
<td>$b$</td>
<td>$\psi_{bnc}$</td>
</tr>
</tbody>
</table>
INCREASING THE PROBABILITY OF BEING DETECTED, ADJUDICATED AND SANCTIONED

The other element of the expected utility equation is the probability of a non-compliant individual's being detected, adjudicated, and sanctioned. In terms of policy decisions, increasing these probabilities is often viewed as a means to supplement the effectiveness of increased penalties for non-compliant behavior or as a means of increasing compliance while holding benefit and cost levels constant. Before this conclusion can be reached there are several considerations that should be made: 1) Some assessment of the relative efficiency of increases in the probability of being sanctioned as compared to the effectiveness of altering the various components of the benefit-cost formulation; 2) the cost effectiveness of increasing the probability of being sanctioned; and 3) the possibility of the existence of alternative means of enforcement that could increase the probability of being sanctioned more effectively than existing enforcement mechanisms.

The degree to which a person is sensitive to changes in the probability of being sanctioned is, according to Becker, a function of the individual's risk preference. Individuals who could be classified as risk preferrers are more sensitive to changes in the probability of being sanctioned than in the level of sanction; those classified as being risk neutral are
indifferent to compensated changes; while those classified
as risk averse are more sensitive to changes in the level
of sanctions than in the probability of sanction. The
implication of this difference in risk preference for
attempts to increase compliance is obvious. It is possible,
depending upon the relative magnitude of these effects,
for there to exist subpopulations of risk preferring poten-
tial non-compliers who will not be deterred as effectively
by increases in the level of punishment as by increasing
the probability of sanction. Conversely, a risk averse
subpopulation could be easily controlled by increasing the
severity of punishment. If the risk preference patterns
for non-compliant subpopulations could be determined the
optimum cost-benefit/sanction mix could be established for
each population. The implications of the existence of
differentiated risk preference patterns for the subpopula-
tions of criminal law violators, polluters, and malfeasant
public officials are presented below.

Criminal law violators: Although it is of
course difficult to make generalizations about
as diverse a population as criminals both
theoretical and empirical evidence would seem
to indicate that criminals are risk preferers. If this is the case, rational policy making will
concentrate upon increasing the probability of
sanction.
Polluters: Since no empirical or theoretical evidence exists, risk neutrality will be assumed. Policy choice should focus upon the most cost effective means of inducing compliance—whether it involves increasing probabilities or sanction.

Malfeasant public officials: Again, there exist no theoretical or empirical estimates of the risk preferences of public officials, but if the characteristics of public employees in general can be extrapolated to malfeasant public officials, they would be expected to be risk averse. If this is in fact the case, incentive plans to encourage compliance by public officials will emphasize alterations in benefit cost levels rather than attempts to increase the probability of sanction.

None of these assessments of risk preference is intended to imply any prescription for altering the relative levels of costs and probabilities solely on the basis of risk preferences, but it is a factor that should be taken into account when attempting to make optimal policy decisions.

When attempting to derive policies to encourage compliance, a second less ambiguous issue, is the cost of increasing the probability of being sanctioned. The most obvious means to the accomplishment of the end of an increased certainty of sanction, at least from the policy standpoint, is to simply increase the resources devoted to
enforcement. Although law enforcement, like any other activity, is undoubtedly subject to decreasing returns at the margin, extra crime control dollars, more resources devoted to environmental protection agency policing programs, and more resources devoted to policing public officials and institutions, should be expected to result in higher probabilities of being detected, adjudicated and sanctioned in each of these areas.

As an alternative to increased public enforcement expenditures to increase the probability of sanction, some form of private enforcement is proposed. Private enforcement encompasses a wide range of activities and already exists in many areas of the law. Becker and Stigler observe that:

Persons charged in excess of the legal ceiling on rents report their landlords because they anticipate a reduction in their rents. Laws against shoplifting are enforced primarily by stores, often using private police, because the shopkeepers are the immediate beneficiaries. Similarly, libel laws are enforced by those libeled because they anticipate compensation. Private triple damage suits have become the only effective sanction of the anti-trust laws. . . . The recently developed class action suits extend victim enforcement to include many situations where the damage is so diffuse that no one victim alone has much incentive to enforcement.61

In addition to victim enforcement as described above, if the fines charged for various offenses greater than the cost of enforcement plus the amount due the victim in restitution and this excess money were paid to the successful enforcer an incentive for the formulation of a free market system of enforcement would be provided. Since these enforcers
would exist in a competitive market they would be expected to provide enforcement at cost—a condition of optimality not always satisfied by public enforcement. As an additional advantage Becker and Stigler note that:

The right amount of self protection by potential victims is encouraged, not the excessive (wasteful) self-protection that results when victims are not compensated, or the inadequate self-protection that results when they are automatically compensated. Further, the rewards of innovation will spur technical progress in private enforcement as in other callings.
CONCLUSIONS

The major conclusions that can be drawn from this paper are that: 1) the utility based compliance theory presented here can be effectively generalized to a wide variety of specific applications outside the purview of traditional criminal justice applications; 2) that public policy should approach problems of providing incentives for compliance from directions other than those involving increasing the sanctions meted out to non-compliers; that due consideration should be given to solutions incorporating positive sanctions for compliance; and 3) that a great deal more research and investigation will be necessary before firm answer can be given regarding the question of optimal policies for social control.
Footnotes


8 Brown and MacDougal, p. 3.

9 Sjoquist, p. 206-209.


15 Alchian, p. 30-41.

16 The extent to which these intangibles exist will, of course, depend to a great degree upon the nature of the firm. A consumer products manufacturer would be expected to place a higher value on public image than the producer of industrial consumption products. Similarly, a company engaged in a large number of government contracts would be more concerned with maintaining good relations with government than a firm that did not have government work.


24 15 U.S.C. Secs. 1-2 provide for fines of up to $100,000 for individual offenders and up to $1,000,000 for corporate offenders.


26 There are, however, some problems arising from this direct imposition of fines. It is often very difficult to identify the managers directly responsible for the conduct of the firm.


36 Although the controversy over the empirical measurement of monopoly profits rages on, theoretically there should be no quarrel with the assumption that monopolist's are able to earn an above normal rate of return.


42. Walter Erikson, "Profitability," 83.


52. Erikson, "profitability" 101


55 Becker and Stigler, p. 6.
56 Becker and Stigler, 6-11.
57 Becker and Stigler, p. 7.

59 Ehrlich observed a greater elasticity of the crime rate with changes in the probability of being sanctioned than with respect to the absolute level of sanctions, "Participation in Illegitimate Activities," p. 550-551.


61 Becker and Stigler, p. 13.
REFERENCES


Brown, Don and Robert Stover, "An Economic Approach to Compliance with Court Decisions" (mimeographed paper presented at the American Political Science Association, 1974).


