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TESTING AN EXPECTED UTILITY MODEL OF CORPORATE DETERRENCE

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This article reports on the first quantitative perceptual deterrence study of corporate (rather than individual) deterrence. The study is based on interviews with 410 chief executives of small organizations and their officially recorded compliance with regulatory standards. We find partial support for the certainty of detection as a predictor of both self-reported and officially recorded compliance but no support for the certainty or severity of sanctioning. The narrow range of sanctions available in the particular regulatory domain studied (regulation of nursing home quality) has enabled a fuller specification than was possible in previous studies of an expected utility model for all available sanctions. Managers' expected corporate disutility from all sanctions fails to explain compliance. Deterrence does not work significantly more effectively for chief executives (a) of for-profit versus nonprofit organizations, (b) who are owners compared with those who are not owners, (c) who say they think about sanctions more (sanction salience), (d) who may better fit the rational choice model in that they are low on emotionality, (e) who have a weaker belief in the law. Nor is deterrence more effective when compliance costs are low.

I. INTRODUCTION

The revival of interest in deterrence fueled by the publication of three major books by Zimring and Hawkins (1973), Gibbs (1975) and Tittle (1980) and by two National Academy of Sciences panel reports (Blumstein et al. 1978; Roth et al. 1989) has seen a flood of studies examine the impact of perceived deterrent threats on compliance with the law.[1] These perceptual deterrence studies have

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[1] Waldo and Chiricos 1972; Bailey and Lott 1976; Kraut 1976; Silberman 1976; Spicer and Lundstedt 1976; Teevan 1976a, 1976b, 1976c; Anderson et al. 1977; Meier and Johnson 1977; Minor 1977; Cohen 1978; Jensen and Erickson 1978; Mason and Calvin 1978; Waerneryd and Walerud 1982; Akers, Krohn, Lanza-Kaduce, and Radosevich 1979; Grasmick and Bryjak 1980; Meier 1982;

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concerned self-reported juvenile delinquency or tax compliance. They have shown very little support for an effect of the perceived severity of sanctions on compliance but reasonable support for the hypothesis that the perceived certainty of punishment increases compliance with the law. The deterrence literature demonstrates a much stronger effect of perceived informal sanctions (such as family disapproval) on compliance than of formal sanctions.[2]

The present study, which builds on this research tradition, differs from all the earlier studies in the following ways: (1) it tests for the first time a perceptual deterrence model against organizational as opposed to individual compliance; (2) it seeks to estimate the actual perceived probabilities of detection, the perceived probability of all sanctions in prospect (rather than just some), and a ratio scale of perceived severity of all these sanctions—estimates required to construct an expected utility model; (3) it simultaneously tests perceptual deterrence models against both self-reported noncompliance and government-assessed noncompliance available from the same subjects for the same period; (4) it tests a perceptual deterrence model against laws that are regulatory and mostly not criminal; as a consequence of this particular choice, superior reliability and validity are accomplished on the dependent variable.

The context for the study is regulation of the Australian nursing home industry. Quality of care in Australian nursing homes was only loosely regulated until a series of scandals rocked the industry in the 1980s. Residents were found lying for hours in urine-soaked sheets, suffering from bed sores the size of a fist, undernourished, and denied a variety of basic human rights. Intensive media coverage of these scandals resulted in the introduction of a new set of thirty-one Commonwealth (federal) government standards in 1987 covering health care; the social independence, freedom of choice, privacy, and dignity enjoyed by residents; the environment of the nursing home; the variety of experience available to residents; and safety (including risks from fire, violence, infection, and the use of restraints).

This article seeks to assess whether management perceptions of deterrence have any effect on organizational compliance with these thirty-one standards. The basic theory is that compliance is a function of the perceived likelihood of detection and punishment

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Paternoster, Saltzman, Waldo, and Chiricos 1983a, 1983b; Bishop 1984; Williams 1985; Kinsey 1986; Paternoster and Iovanni 1986; Piliavin, Gartner, Thornton, and Matsueda 1986; Klepper and Nagin 1989a; 1989b; Paternoster 1989; Stalans, Smith, and Kinsey 1989; Alm, McClelland, and Schulze 1990; Grasmick and Bursik 1990.

[2] Burkett and Jensen 1975; Kraut 1976; Anderson et al. 1977; Meier and Johnson 1977; Jensen and Erickson 1978; Akers et al. 1979; Tittle 1980; Meier 1982; Paternoster et al. 1983a, 1983b; Bishop 1984; Williams 1985; Paternoster and Iovanni 1986; Paternoster 1989; but see Piliavin et al. 1986; Williams and Hawkins 1989; Simpson 1990.

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and the perceived severity of available sanctions. The theory is examined controlling for characteristics of management, residents, the nursing home itself, the geographical area where the nursing home is located, and characteristics of the inspection team. Even after entering these controls, the deterrence model we propose is a simple one. The deterrence literature suggests a variety of ways of qualifying simple expected utility models:

1. Deterrence threats will only be strong for managers who grant sanctioning some salience in their thinking (Zimring and Hawkins 1973:142–47). Therefore, an interaction with the salience of sanctions should be entered into the model.
2. Deterrence threats will only be strong for owners who have a profitability interest in the firm and not managers who are focused on objectives other than profits (Galbraith 1969).
3. Deterrence threats will only be strong with for-profit firms that will suffer commercially from sanctions (cf. Koetting 1980).
4. Deterrent threats will only be strong for managers who lack a moral commitment to voluntary compliance (Toby 1964:333; Silberman 1976; Tittle 1980; Kagan and Scholz 1984; Smith 1990). Therefore, an interaction with belief in the standards should be entered into the model.
5. Only managers who are "cold and calculating" will be affected by perceived deterrents (Kagan and Scholz 1984); less calculating managers who are higher on emotionality will not be influenced by deterrent threats (Zimring and Hawkins 1973:106–8).
6. Once the expected disutility of punishment passes a certain threshold, further increases in deterrence threats will make little difference. Therefore, a curvilinear model of deterrent effects should be explored (Zimring and Hawkins 1973:195; Alm et al. 1990).
7. Whether deterrence threats will have an effect on compliance will depend on the cost of compliance with the standards (Becker 1968; Ehrlich 1972; Viscusi and Zeckhauser 1979; Gibbs 1975:203–7; Piliavin et al. 1986).

Before considering such refinements, however, we begin in the next section with an account of how we should theorize deterrence of corporate rather than individual actors. Then in section III, we explain a simple expected utility model and gradually elaborate this into a more complex model. Section IV outlines data and measures that enable us to test expected utility models of varying degrees of complexity in section V. Qualifications 1–7 above for these models are then explored in section VI. The implications of our failure to find strong support for deterrence after considering

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these varying ways of specifying more complex and qualified models are considered in the conclusion.

II. THE KNOTTY PROBLEM OF CORPORATE DETERRENCE

Even radical methodological individualists (Cressey 1988) do not deny that it can be sensible to view organizations as responsible for violations of law and to sanction organizations accordingly (see Braithwaite and Fisse 1990). The question then arises as to how such organizations are deterred. Braithwaite and Geis (1982:300) argue for the potency of corporate deterrence: "deterrence is doubtful with traditional crime, but may well be strong with corporate crime," among other reasons because "corporate crimes are almost never crimes of passion; they are not spontaneous or emotional, but calculated risks taken by rational actors. As such, they should be more amenable to control by policies based on the utilitarian assumptions of the deterrence doctrine" (*ibid.*, p. 301–2). In this article we will begin to explore the truth of this assertion with data on management perceptions of deterrent threats. It differs from previous studies of corporate deterrence which have studied the effects of objective deterrent threats (Lewis-Beck and Alford 1980; Block et al. 1981; Jesilow et al. 1986).

One version of how deterrence is supposed to affect organizations is as follows. Top management of organizations are paid to protect the interests of those organizations; accordingly, they act to do so. When an organization is at risk of being punished, top management recognizes this risk and issues instructions to staff to avert the risk when the benefits of averting the risk exceed the costs. This model of top management as the rational fiduciary of the interests of the firm is the simplest model of corporate deterrence and the dominant one in economic and legal analysis of corporate behavior (Etzioni 1988).

There are good grounds for thinking that in a wide variety of contexts the model of top management as a rational fiduciary is misleadingly simple. Top management will often not be fiduciaries but will be self-interested. Or they might act in accordance with group loyalties other than to the firm (for example, loyalty to their profession, their co-workers, their government). And top management often will not be "rational." Perhaps most critically, top management often will not know about decisions to break the law in the interests of the corporation, as effective control over decisions to comply with or break the law is in the hands of middle managers over whom top management has limited control.

While corporate deterrence based on top management as a rational fiduciary is a crudely simple model, we can select a context in which it should be maximally appropriate. Such a context would be an organization with a flat management structure, ideally without *any* middle management at all, where top management can ex-

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ert total control over the organization. Australian nursing homes approximate such a context. The chief executive of the Australian nursing home is the director of nursing. The management culture, grounded in the British tradition of the all-powerful matron,[3] is reinforced by regulatory expectations, indeed regulatory requirements, that the director of nursing be in control. This differs from the situation in American nursing homes where both management tradition and regulatory mandate require the director of nursing to answer to an administrator above and to have a middle management structure below. With a few exceptions, the nursing homes in this study have flat management structures devoid of any concept of departmental heads. All staff in the organization are within the span of control of the director of nursing. This is possible because these are small organizations with an average of about forty employees.

In our analysis, we do not take this span of control issue for granted simply on the basis of the qualitative fieldwork we have done in these nursing homes. In our interviews with directors of nursing we included items to measure the extent to which the director of nursing was in direct control of the organization. To confirm the thrust of our claim about the context of top management control, less then 13 percent of directors of nursing disagreed with the statement "As Director of Nursing I have final say on most of the decisions that matter"; 12 percent neither agreed nor disagreed with this statement and 76 percent agreed. By no means do we claim perfect fit with the model of top management decisionmaking control over compliance with the law. We do claim that it would be hard to find an organizational context which better fits this simple model, and moreover we include two director of nursing control scales in our regression models to control for the extent to which each organization does not fit this model. On the assumption (thus qualified) that directors of nursing have the authority to issue directions to staff to ensure compliance with the law and to fire staff when those directions are not heeded, we tested perceptual corporate deterrence by asking directors of nursing what they perceive to be the risks of detection and punishment when the law is broken.

III. OPERATIONALIZING EXPECTED UTILITY

Formal Model

A simple expected utility model of organizational compliance posits compliance as a function of the probability that noncompliance will be detected, the probability of punishment given detection, and the cost of punishment:

[3] In fact, our field work in five hundred Australian and fifty British nursing homes suggests that Australian directors of nursing have more complete control of the management of the nursing home than have British matrons.

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$$\text{compliance} = \alpha + \beta_1(P_D \times P_P \times C_P) + \epsilon, \quad (1)$$

where α is the constant, β_1 is the coefficient, P_D is the probability of detection, P_P is the probability of punishment, C_P is the cost of punishment, and ϵ is the disturbance.

Unfortunately, we can never know the probability of detection of lawbreaking in Australia nor, we suspect, in any other country.[4] As a consequence, an expected utility theory cannot be tested by dint of the unknowability of the first requirement of the model. The great contribution of the perceptual deterrence tradition has been to show that there is a way around this problem (Waldo and Chiricos 1972; Geerken and Gove 1975). Implicit in the expected utility formulation is the assumption that a low probability of detection will result in the probability being perceived as low by the organization (Gibbs 1975). So we can test the central thrust of the theory without having to measure the actual probability of detection. The model is reformulated as a perceptual deterrence model:

$$\text{compliance} = \alpha + \beta_1(D_1 \times P_1 \times S_1) + \epsilon, \quad (2)$$

where α is the constant, β_1 is the coefficient, D_1 is the perceived probablity of detection, P_1 is the perceived probability of punishment, S_1 is the perceived severity of punishment, and ϵ is the disturbance. This is what Edwards (1961) calls a subjectively expected utility maximization model.

Many deterrence theorists would find this an unsatisfactory model because it implies that when the perceived probability of punishment is zero, the effect of the deterrence variables on compliance will be zero even if the perceived probability of detection is high. It can be argued that being caught out has a deterrent effect even if there are no sanctions in prospect. In other words, there may be additive effects of the components of deterrence above and beyond their multiplicative effects (Carroll 1982). This motivates the following addendum to the basic model:

$$\text{compliance} = \alpha + \beta_1(D_1 \times P_1 \times S_1) + \beta_2 D_1 + \beta_3 P_1 + \beta_4 S_1 + \epsilon. \quad (3)$$

Reservations

The perceptual deterrence literature has shied away from fully operationalizing this model. Researchers have doubted the capacity of respondents to answer questions about the probability of detection and the probability of punishment. Instead they have

[4] One might protest that victim surveys can measure undetected crime, for example. But many victims do not know that they have been victims. Even if we take the areas of crime with minimum error in victim surveys and minimum victim nonawareness of victimization (car theft would be the leading candidate), there are other problems. In Australia, we only have individual victim surveys, so we cannot count the number of undetected thefts of cars from organizational victims. Even if we surveyed all types of victims, the victims cannot tell us if four kids or one kid took their car for a joy ride. If we incorrectly count it as one, we fail to count three cases of thieves being undetected.

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used items like "A lot of people do things that are illegal, but only the ones who are unlucky or stupid ever get caught" (Bishop 1984:410). One problem which may have contributed to this view is the nature of the samples used by researchers on deterrence. More often than not, the samples have been relatively unsophisticated juveniles or random samples of the general population whose capacity to answer such questions may be limited. The respondents who form the basis of the analyses to follow, in contrast, were not only professionals but individuals who had made it to the most responsible position in their profession.[5] While our pilot study suggested that our respondents were capable of estimating probabilities and a ratio scale of severity, in hindsight we know that a minority of respondents in the study proper had difficulty with these estimation tasks. This minority would often say to our interviewers, "I'm just guessing," "Just a wild guess," or they would give up on answering the question. To be frank, therefore, we doubt whether the benefits of being able to estimate the actual probabilities required for an expected utility model justify the loss of data, even for professional respondents.[6]

Another limitation of existing perceptual deterrence studies is that they have not attempted to measure probabilities and severities for all potential sanctions. The basic expected utility model in a world of multiple sanctions is that

$$\text{compliance} = \alpha+\beta_1\Sigma[(D_1\times P_1\times S_1)+\ldots+(D_1\times P_k\times S_k)]+\epsilon, \quad (4)$$

where α is the constant, β_1 is the coefficient, D_1 is the perceived probability of detection, P_1 is the perceived probability of punishment, S_1 is the perceived severity of punishment, k is the full range of sanctions, and ϵ is the disturbance.

With respect to Australian government enforcement of nursing home quality of care, there were at the time of the study only three sanctions the Commonwealth government could impose:

1. Withdrawal of Commonwealth funding for new admissions to the nursing home
2. Withholding an annual Commonwealth funding increase to compensate for inflation
3. Cutting off all Commonwealth funding

The specificity and limited range of these sanctions mean that we can operationalize an expected utility for Commonwealth enforcement which is exhaustive with respect to Commonwealth sanctions. The sanction threats included in this model are shown

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[5] Higher status in the profession attaches to being a director of nursing in a major university hospital. However, these individuals exert their management prerogatives in power structures in which they are subservient to doctors and hospital administrators. The director of nursing in the nursing home enjoys much more responsibility and autonomy than they do.

[6] The level of missing data is higher on the perceived probability of detection and punishment than on the severity of punishment measure.

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in Figure 1 (as sanction threats 1, 2 and 3). However, an important complication arises in a federal system like that of Australia. In recent years, nursing home inspection has been mostly taken over by the Commonwealth government from the state governments. However, residual state government enforcement powers remain, are occasionally used in all states, and are quite often used in one state (Victoria). From time to time the Commonwealth government also works with the state government to use state powers against a nursing home when that seems the most strategic way to go. The old state government regulations cover many of the same conditions as the thirty-one Commonwealth standards.

A worthy question thus becomes whether the fear of state government sanctions could affect compliance with Commonwealth government standards. That is, the expected utility model is not fully specified until we add the effect of state government deterrence. Figure 1 also summarizes two possible state government enforcement possibilities (sanction threats 4 and 5). Unfortunately, these are not as cut and dried as the Commonwealth sanction threats because a criminal conviction could result in a range of sanctions, theoretically up to lengthy imprisonment (of a propri-

Commonwealth Sanction Threats

Initial component for sanction threats 1, 2, and 3:	*Probability of Detection*	
	Let's say the nursing home continually fails to meet 6 standards. What are the chances then that the Department of Community Services and Health will find out? (P_{CD})	
Assuming the 6 breaches are not fixed in the next year:	*Probability of Sanction*	*Severity of Sanction*
Sanction threat 1:	What do you think are the chances that the Commonwealth would cut off funding for new admissions (while continuing to pay the subsidy for new residents)? (P_{CA})	Withdrawal of Commonwealth funding for new admissions (S_{CA})
Sanction threat 2:	What do you think are the chances that it would withhold the annual increase in the level of funding for the home? (P_{CI})	Withholding annual Commonwealth funding increase (S_{CI})
Sanction threat 3:	What do you think are the chances that the Commonwealth will then totally cut off its funding for the home? (P_{CF})	Cutting off all Commonwealth funding (S_{CF})

State Government Sanction Threats

Initial component for sanction threats 4 and 5:	*Probability of Detection*	
	When a nursing home continually breaches 6 important state government regulations, what are the chances that the state government will find out? (P_{SD})	
Assuming the 6 breaches are not fixed in the next year:	*Probability of Sanction*	*Severity of Sanction*
Sanction threat 4:	What are the chances that they will prosecute and convict the nursing home? (P_{SC})	Prosecution and $2,000 fine ($S_{SC}$)
Sanction threat 5:	What are the chances that they will withdraw the nursing home's license (or force the licensee to sell to a more acceptable proprietor)? (P_{SL})	Withdrawal of home's license to operate (S_{SL})

Figure 1. Sanction threats

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etor rather than a director of nursing), although a prison sentence has never been imposed for noncompliance with quality of care standards.[7] In specifying the expected utility for state criminal conviction, we therefore tested two severity of sentence options—state criminal conviction and a $2,000 fine, and state withdrawal of the home's license.

For the full model we added the three Commonwealth sanction threats to the state criminal conviction sanction threat (threat 4) and the state license revocation sanction threat (threat 5). The full (Commonwealth and state) multiplicative and additive expected utility model thus becomes:

$$\text{compliance} = \alpha+\beta_1 M+\beta_2 P_{CD}+\beta_3 P_{CA}+\beta_4 S_{CA}+\beta_5 P_{CI}+\beta_6 S_{CI}+\beta_7 P_{CF}+\beta_8 S_{CF}+\beta_9 P_{SD}+\beta_{10} P_{SC}+\beta_{11} S_{SC}+\beta_{12} P_{SL}+\beta_{13} S_{SL}+\gamma' CV+\epsilon \quad (5)$$

where

- α = constant
- β_1 through β_{13} are coefficients
- γ' = a vector of coefficients for the control variables
- ϵ = the disturbance
- M = the sum of the expected disutilities of all sanctions which, using the terms defined below, may be expressed as $(P_{CD}\times P_{CA}\times S_{CA})+(P_{CD}\times P_{CI}\times S_{CI})+(P_{CD}\times P_{CF}\times S_{CF})+(P_{SD}\times P_{SC}\times S_{SC})+(P_{SD}\times P_{SL}\times S_{SL})$
- P_{CD} = probability that the Commonwealth will detect the breaches
- P_{CA} = probability of the Commonwealth cutting off funding for new admissions
- S_{CA} = cost of withdrawal of funding of new admissions
- P_{CI} = probability of the Commonwealth withholding the annual increase
- S_{CI} = cost of withholding the annual increase
- P_{CF} = probability of the Commonwealth cutting off all funding
- S_{CF} = cost of withdrawal of all funding
- P_{SD} = probability that the state will detect the breaches
- P_{SC} = probability of the state convicting
- S_{SC} = cost of the state convicting
- P_{SL} = probability of the state withdrawing the license
- S_{SL} = cost of the state withdrawing the license

The vector of variables CV are the control variables listed in the Appendix.

By attempting to incorporate the effective sanction threats on

[7] When the analyses were rerun with directors of nursing being asked to estimate how they perceived the severity of a prison sentence for the proprietor rather than a $2,000 fine, the results were substantially the same as those reported here.

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compliance with Commonwealth standards, we are taking the most comprehensive steps to fully, rather than selectively, specify the expected utility model. Unfortunately, the result is a complex model, and a model which can generate some multicollinearity problems. Our strategy, then, is to analyze both the effects of the comprehensive model and the simpler effects of its separate components. What we do not have in the model are data on the benefits of noncompliance to weigh against the costs of deterrence. Satisfactory data of this sort are extremely difficult to obtain. What we do to address this deficiency is to classify the standards crudely according to whether they have high, low, or intermediate compliance costs. Then we can assess whether the model has different explanatory power for these three types of standards.

For the probability estimates, the directors of nursing were asked by interviewers to give estimates ranging from "0% to 100% certain." While we have no direct quantitative measures of actual probability values, our qualitative fieldwork suggests that directors of nursing have unrealistically high expectations of the probability of detection and punishment. The mean estimates of the probability of Commonwealth detection if six standards were being breached was .76; for state detection it was .74. The probability that the Commonwealth would cut off all funding after such detection on average was estimated to be .42, while the mean estimated probability of each of the other sanctions clustered at just under .6.

For the severity estimate, the director of nursing was asked to rate how severe a consequence the sanction would be for "a nursing home like yours." Withdrawal of Commonwealth funding for new admissions was given an anchoring score of 10 for all respondents.[8] Respondents were then told to give any other sanction a score of 5 if it was only half as severe, 20 if it was twice as severe, and so on. The three well-trained interviewers were instructed to intervene to clarify the meaning of ratio scaling if respondents were clearly following interval scaling principles in rating the other sanctions (e.g., giving scores of 11 and 13). They were also trained to confirm the meaning of scores; for example, in response to a score of 11, asking "You mean that it is 10 per cent more se-

[8] Gibbs (1986:97) correctly points out that "any choice of a standard punishment is debatable; and whatever the standard, some respondents will perceive it as more severe than other respondents do." In this case, our qualitative fieldwork informed the choice of the anchor punishment. To choose the fine of $2,000 as the standard punishment and give it a score of 2,000 would have been an inferior choice, for example, because $2,000 means something different to small homes than to large ones and because for most homes the dollar concerns associated with punishment loom less large than other concerns. Cutting off new admissions looked like the choice most likely to impact nursing homes equally. Large homes have more or less proportionately more admissions than small ones, and all homes are more or less equally dependent on new admissions to fill their beds when their residents die, since government regulation of supply of beds ensures that all nursing homes operate at around 98 percent capacity.

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Table 1. Perceived Costs of Noncompliance, Descriptive Statistics

Severity of sanction	Median	Mean	(S.D.)	Minimum	Maximum
Cutting of Commonwealth funding for new admissions ($n=410$)	1.00	1.00	0.00		
Withholding annual Commonwealth funding increase ($n=401$)	2.00	3.04	4.41	0.10	50
Cutting off all Commonwealth funding ($n=401$)	5.00	8.52	14.60	0.50	200
Prosecution and $2,000 fine ($n=391$)	0.50	1.05	1.39	0.05	10
Withdrawal of home's license to operate ($n=400$)	8.00	10.42	19.93	0.50	300

vere than withdrawing funding for new admissions?" Table 1 provides descriptive statistics for the five severity measures, which have been divided by ten so that a score of 1 indicates that the sanction had the same weight as the cutting of Commonwealth funding for new admissions. Withdrawal of the home's license has the highest median cost followed by the cutting of all Commonwealth funding. The prosecution of the proprietor and imposition of fine has a lower median cost than the cutting of Commonwealth funding for new admissions. These subjective severities are thoroughly consistent with the likely objective economic consequences for the nursing home of such sanctions.

IV. DATA AND MEASURES

Data

Since 1987 the Australian Commonwealth government has taken over the major regulatory role of the Australian nursing home industry from the various state governments. A new regulatory process to monitor compliance with thirty-one national standards was introduced. Over a twenty-three-month period, from May 1988 to March 1990, interviews were conducted with the chief executives of 410 Australian nursing homes from regions (including some rural regions) surrounding four large metropolitan centers—Sydney, Melbourne, Brisbane, and Adelaide—following a visit from an inspection team. The data reported are extracted from a much larger four-nation study of nursing home regulation which is predominantly qualitative and historical. In many cases, proprietors, staff, and residents were also interviewed and inspection events observed by members of our research team.

The 410 nursing homes were selected in two ways. Two hundred and forty-two homes represent a proportionate random sample, stratified by number of beds, type of ownership, and the level of resident disability. The Australian government guaranteed that this group of nursing homes would be inspected over the twenty-month period. The remaining 168 nursing homes represent homes within the sampling region that were inspected by the teams but had not been chosen as part of the random sample. Preliminary

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analyses (see Braithwaite et al. 1990) have shown that the random sample and the supplementary sample do not differ from each other on a range of important variables.[9] However, all regressions here include a dummy variable controlling for sample status of the home. The analyses showed that this variable was not significant (see Tables 4–5). Of the randomly selected homes a remarkable 96 percent agreed to participate in the study. This was due to the commitment to the value of the research that the investigators were able to secure from the government, industry associations, trade unions, and consumer groups.

In addition to the extended interviews with the chief executive of the nursing home, we matched demographic statistics collected by the Australian government on each home in the country with the homes in this sample. The government data base also included a measure of each resident's disability level—the resident classification index (RCI)[10] (Australian Department of Community Services and Health 1988). As the dependent variable is compliance with the thirty-one outcome standards, we also matched the inspection team's assessment of the home's compliance with the standards for quality of nursing home care to each of the homes in the sample.

Temporality in Perceptual Deterrence Research

Most studies in the perceptual deterrence literature rely, like this article, on cross-sectional data.[11] Juveniles, for example, are asked to report their offending of the past twelve months and then to report on the same questionnaire their current perceptions of the certainty and severity of punishment. The problem with this sort of temporality is that an association between delinquency and low perceived certainty of punishment may mean that delinquents

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[9] These included geographic and organizational characteristics of the nursing homes, the socio-educational characteristics and attitudes of the directors of nursing, and the nursing homes' compliance ratings.

[10] The average level of disability for each home was estimated by taking each resident's service need and multiplying this by the number of average hours of nursing and personal care (NPC) required per week by a resident with that classification. The residents service need, also referred to as the residents classification index (RCI), can range from 1 to 5, based on information supplied by the nursing home. The hours of nursing and personal care estimated as required, as of 1 July 1988, are: 27 for an RCI of 1, 23.5 for an RIC of 2, 20 for an RCI of 3, 13 for an RCI of 4, and 10 for an RCI of 5 (Australian Department of Community Services and Health 1988).

[11] The director of nursing was interviewed as soon as the nursing home had completed the standards monitoring process. This means that the interview took place only after the initial inspection, the receipt of a draft or provisional report on compliance, negotiation concerning the accuracy of the compliance ratings in the report and negotiations concerning what action is required to come into compliance. The latter two stages in most cases involve further visits to the nursing home and further information gathering. This entire process often extended over a period of months. The median duration of the entire process was five months.

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learn from their experience with delinquency that punishment is unlikely. Recognition of this problem has motivated a recent shift to panel studies which measure perceived certainty and severity in advance of the period when delinquency is measured. This eliminates the interpretation that it was the measured delinquency that caused the perceptions of deterrence rather than the reverse.

Recognizing the legitimacy of this concern, we are conducting a second wave of data collection with those homes in the random sample. After two more years of data collection, we will again test the expected utility model on the second-wave compliance data. We do not, however, take the view that the test of the data on the second wave of compliance will necessarily be superior to the data in this article. There are three reasons for this. First, the sample for the second wave will be reduced in a nonrandom way by the closure of nursing homes and by the fact that we have secured undertakings from the Australian government only for the timely completion of the second wave on the random sample (that is, excluding the supplementary sample). Second, during the elapse of time between the first-wave and the second-wave inspections, there will have been some turnover in staff, including the director of nursing.

Third, the direction of causality problem is not so troubling with the present data as it is in the self-reported delinquency studies. The reason is that for all nursing homes in the study this was their first Commonwealth inspection under the new Commonwealth standards and the interview was conducted before any formal enforcement action was taken against any of the homes. At least with respect to the Commonwealth sanctions, therefore (although not with respect to the state enforcement sanctions), there is less room for the interpretation that "getting away with" the measured noncompliance caused the perceived certainty and severity of punishment. However, this is a complicated matter because measured compliance on one standard may miss the fact that this was a noncomplier who was not detected. Getting away with detection on this standard, even if not on others, may cause a reduction in the perceived certainty of detection. Therefore, it is best to test the model against both cross-sectional and panel data. Concerning the defense of cross-sectional perceptual deterrence studies more generally, see Klepper and Nagin (1989a:723–25), Lundman (1986), and Grasmick and Bursik (1990:807–8).

Operationalizing Compliance

Compliance was operationalized in two ways. First, compliance was rated on thirty-one government standards by an inspection team. The team never has fewer than two members and always includes at least one registered nurse. The modal number of team members is three and the maximum for this study nine. The

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team spends an average of 6.5 hours in the nursing home assessing compliance with the standards. After this initial visit to the nursing home the team meets to exchange information and agree on initial compliance ratings into three categories for each standard—"met," "met in part," or "not met." These initial ratings are then presented to the nursing home, normally at a second visit to the facility at which nursing home management presents further evidence in support of its views on compliance with the standards. The additional evidence gathered on this day often results in revisions of the team's initial ratings of compliance. The government compliance rating is calculated by adding these thirty-one trichotomous ratings. Elsewhere, Braithwaite et al. (1990) have justified the adding of scores from all standards (rather than taking clusters of standards or treating all standards individually) on the basis of factor analytic work on the ratings. The items were summed so that a high score (31) indicated high compliance and a low score (0) low compliance. The scale has a mean of 26 and a standard deviation of 4.78.

Breach of the standards is not a criminal offense except in New South Wales, where the state government has provided for criminal penalties for violation of the thirty-one standards. The available Commonwealth sanctions are all civil.[12] They are grounded in the fact that all nursing home residents attract a universal nursing home benefit from the Commonwealth to the nursing home proprietor and that new nursing homes or new nursing home beds are not provided without the approval of the Commonwealth. The civil sanctions available in Commonwealth law relate to the withdrawal or cutting of the universal nursing home benefits for existing or new admissions. The nursing home theoretically is subject to these sanctions for any noncompliance with the standards, but in practice sanctions are only considered for serious noncompliance that is not corrected.

A reliability study and considerable validation work has been undertaken on the standards (Braithwaite et al. 1991). In all, the ratings were tested with nineteen reliability and validity tests in this study. For the primary reliability work senior nurses who had experience of standards monitoring (but who were employees of the authors) joined the team for the inspection to independently rate the nursing home on the same day. Interrater reliability coefficients ranged between .93 and .96, which is much higher than reliabilities for U.S. nursing home inspectors (ibid.).

A major strength of the present design is that in the interviews the directors of nursing were asked what they thought the correct ratings were for the home. This process revealed 55 out of a possible 12,710 ratings where the directors of nursing gave their

[12] For a discussion of the somewhat ambiguous legal status of the standards, see McDonald and Bates (1989).

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home a tougher rating because of information the team missed. More commonly, in disagreements between directors of nursing and the government inspection teams, the director of nursing thought the team had been in error in being too tough in their ratings. Even so, the correlation between total self-reported compliance scores and official compliance scores was .88.[13] This validation of official recording of noncompliance with self-reports is very much higher than the modest correlations between self-reports and official records for traditional criminological data (Hindelang et al. 1981). On the other hand, because directors of nursing know the government ratings (indeed, the interviewer gives them a copy of the team ratings and asks if they disagree with them), our two data sources are not independent.

Overall, however, there can be little doubt that the reliability and validity data point to considerable measurement superiority of these data over either self-reports or official records of individual criminal behavior (Braithwaite et al. 1991). The data are also superior to other regulatory compliance data, primarily because of the comparative thoroughness of the data collection by standards monitoring teams—in terms of numbers and training of people and number of hours in the facility—compared with other regulatory inspectorates (compare the ninety-six agencies discussed in Grabosky and Braithwaite 1986). The crucial difference can be illustrated as follows. An occupational health and safety inspector spends a few hours in factory A and a few hours in factory B. In factory B she notices a violation of the safety standard for boilers and writes it up. The social scientist records factory B, but not factory A, as having a boiler violation. This could be a serious error because there is no assurance in such regulatory regimes that the inspector even looked at factory A's boilers. The Australian nursing home standards monitoring program in contrast requires the inspection team to collect all the information it needs to reach agreement on each standard. The existence of a boiler standard, in other words, means that the boiler must be checked. This, we believe, is at the heart of the superior reliability and validity of our compliance data compared with any other we have encountered in the literature. Other possible explanations for the quality of the data are discussed in Braithwaite et al. (1991).

Controls

The effects of six types of control variables were tested in preparing for this analysis: characteristics of the director of nursing, of the residents, of the home itself, of the geographical region where the home is located, of the inspection team, and whether the home was randomly selected. A large number of controls were

[13] The mean for self-reported compliance is 27.29 and its standard deviation is 3.97.

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initially tested for their effects on compliance on three grounds: (*a*) prior theory, (*b*) prior evidence, (*c*) the fact that they were demographically basic. Preliminary analyses of the sociodemographic characteristics of the director of nursing—gender, age, educational qualifications, aged care work experience, and church attendance—indicated that none of these were related to nursing home compliance. This was also the case with most of the demographic characteristics of the resident populations. Thus percentage Australian born, percentage English speaking, percentage receiving an aged pension (an indicator of economic standing), and percentage widowed did not contribute substantively to the analyses. However, percentage of female residents, percentage married (with a living spouse at time of admission), and the mean disability of residents have important effects in increasing compliance and were therefore included as controls (see the Appendix for means, standard deviations, and scoring for the control variables).

Three characteristics of the nursing home are controlled for in the analyses. The most basic candidate is the number of beds. On a resident-centered standard, a forty-bed home has, in a sense, twice as many chances to run afoul of the standard as a twenty-bed home. Surprisingly, this did not explain self-reported compliance levels but did affect government ratings. The age of the home—coded as the year when the main part of the nursing home was constructed—is another important control. Older homes have significantly lower compliance scores because they are often harder to maintain in compliance with fire and physical safety standards, for example. Finally, the type of ownership of the nursing home significantly affects compliance, with nonprofit nursing homes having higher compliance scores than for-profit homes. As mentioned, whether the home was part of the random or supplementary sample was also controlled for in the models.

The size of the inspection team is another important control variable. Teams range from two to nine members, but only two homes in the study had teams greater than four. In one instance a home had six inspectors while another had nine.[14] As with the number of beds in the home, team size has no significant impact on self-reported compliance, but it does have a significant negative effect on government-assessed compliance. This makes sense. More team members mean more eyes and ears for the government to detect instances of noncompliance; but there is no reason why this should affect self-reported noncompliance.

The geographic location of the home was controlled by entering three dummy variables indicating the state in which the nursing home is located. The reference category is South Australia as it is characterized by much lower levels of self-reported and govern-

[14] These two cases have been collapsed into the 4 category to avoid skewing the data.

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ment-recorded compliance on the thirty-one outcome standards, as compared with Queensland, New South Wales, and Victoria (Braithwaite et al. 1990).

Finally, we control for the extent of control the director of nursing has over the operations of the nursing home. This is a particularly important issue given our earlier hypothesis about the nature of control in Australian nursing homes. Seven items measuring director of nursing control of the organization were factor analyzed. The analysis presented in Table 2 indicates two distinct factors, one representing essentially downward control by the director of nursing over the staff, the other representing autonomy of the director of nursing from control from above, by a proprietor, administrator, board of directors, or other superordinate authority. As the Cronbach alpha for each group of items was reasonable and the correlation between the scales substantially lower, the items from these two factors summed to form two control scales. The scales were calculated so that the scores ranged from low control (0) to high control (10).[15] The mean score for control downward was 6.63, while control upwards has a mean score of 3.87.

Table 2. Factor Analysis of Director of Nursing Control Variables

	Factor		Item-to-Total
	1	2	Correlation
Director of nursing's control of those below:			
1. I have the authority to run this home in the way I think best[a]	.85	.07	.62
2. I have the freedom to run this home pretty much as I like[a]	.80	.05	.54
3. As director of nursing I have the final say on most of the decisions that matter[a]	.74	.14	.49
(Cronbach's alpha)			(.73)
Director of nursing's autonomy from control from above:			
4. How involved has the proprietor been in deciding what to do about the standards monitoring report?[b]	.06	.79	.46
5. Who has the most say over the setting of the budget for the nursing home?[c]	.18	.71	.40
6. During the recent standards monitoring process of this nursing home, did you have any important dealings with anyone above the Director of Nursing (e.g. proprietor, administrator)?[d,e]	−.02	.54	.22
7. Director of nursing has only minor responsibility for financial management[e]	.10	.52	.24
(Cronbach's alpha)			(.54)

[a] Response categories were "strongly agree," "agree," "neither agree nor disagree," "disagree," "strongly disagree."
[b] Response categories were collapsed to "not involved," "budget recommendations only," "both budget and management of the nursing home."
[c] Response categories were collapsed to "director of nursing," "equal director of nursing and proprietor," "other."
[d] This question was answered by the standards monitoring team.
[e] Responses coded were "yes," "no."

[15] To ensure that no one item dominated the scale, the variance of each item was standardized to 1. As the scales have no natural metric, they have been rescored from 0 to 10.

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Method

The analysis relies on ordinary least squares (OLS) regression, which assumes that the relationships between the variables are linear and additive and that the models have been correctly specified (Hanushek and Jackson 1977).[16]

V. RESULTS

Table 3 presents zero-order correlations between the two measures of compliance and each of the components of the deterrence models. Correlations between the compliance measures and each of the sanction threats are also shown. Essentially, the correlations show that there are weak associations between perceptual deterrence variables and both self-assessed compliance and government-assessed compliance. These weak correlations hold regardless of whether we view deterrence as a series of individual effects or as a more complex interaction between a series of deterrence measures. The exception to this is a single variable—probability of state detection—which has a significant positive correlation with

Table 3. Correlations Between Deterrence Measures and Compliance

	Compliance	
	Self Ratings	Government Ratings
Probability of detection:		
Probability of Commonwealth detection (P_{CD})	−.03	.01
Probability of state detection (P_{SD})	.09*	.10*
Probability of sanction:		
Probability of cutting Commonwealth funding for new admissions (P_{CA})	.02	−.01
Probability of withholding annual Commonwealth funding increase (P_{CI})	−.02	−.01
Probability of cutting all Commonwealth funding (P_{CF})	−.00	−.06
Probability of state prosecuting the home (P_{SC})	−.04	−.05
Probability of state withdrawing the homes license (P_{SL})	.02	.01
Severity of sanction:		
Withholding annual funding increase (S_{CI})	.02	−.03
Cutting off all funds (S_{CF})	.00	−.01
Prosecution and $2,000 fine ($S_{SC}$)	.02	.05
Withdrawal of home's license (S_{SL})	.02	.00
Sanction threats:		
Threat 1: $P_{CD} \times P_{CA}$	−.01	−.03
Threat 2: $P_{CD} \times P_{CI} \times S_{CI}$	.00	−.07
Threat 3: $P_{CD} \times P_{CF} \times S_{CF}$	.02	−.01
Threat 4: $P_{SD} \times P_{SC} \times S_{SC}$	−.00	.03
Threat 5: $P_{SD} \times P_{SL} \times S_{SL}$	.02	.02
Sum of sanction threats:		
$(P_{CD} \times P_{CA}) + (P_{CD} \times P_{CI} \times S_{CI}) + (P_{CD} \times P_{CF} \times S_{CF}) + (P_{SD} \times P_{SC} \times S_{SC}) + P_{SD} \times P_{SL} \times S_{SL})$	.02	−.01

* Significant at .05 level

[16] Missing data resulted in list-wise deletion.

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compliance. Thus as the probability of state detection is perceived to increase, so too does the level of compliance.

In Table 4, we examine the effect of each sanction threat on compliance as specified in equation (3), with the addition of a vector of control variables. There are five equations presented for each of the compliance measures. The first equation presents the standardized coefficients for the effects of the control variables, plus sanction threat 1 as described in Figure 1 and its components, on self-assessed compliance. Sanction threat 2 is presented in the second column, sanction threat 3 in the third column, and so on. These same equations are reestimated with government-assessed compliance as the dependent variable, and the results are presented on the right-hand side of Table 4.

In these models we have controlled for a range of variables (see the Appendix for a description of the variables). The effects of the control variables remain fairly consistent across the five situations. Thus those controls which are highly significant, such as the geographic location of the home, remain significant regardless of whether sanction threat 1 or sanction threat 5 is entered into the equation. There are, however, differences in the relative effects of some of the control variables on self-assessed as opposed to government-assessed compliance. We see that within each regression equation the effect of type of proprietor, number of beds in the home, and number on the inspection team are much stronger relative to the other variables in the model for government-assessed compliance than for self-assessed compliance. Interestingly, the aggregate variables—percentage of residents female, percentage of residents married, and mean disability—have relatively stronger effects on self-assessed compliance than on government-assessed compliance.

As with the zero-order correlation, perceived deterrence has little effect on compliance. The first Commonwealth equation examines the deterrent effect of cutting funds for new admissions. Neither the multiplicative factor of the expected utility model nor the additive components of this sanction threat significantly affect self-assessed or government-assessed compliance. A similar story can be told for the two other Commonwealth sanctions—withholding of annual funding and withdrawal of total funding.

A slightly more interesting story can be told about state sanctions. Although neither the multiplicative factor of the expected utility model for prosecution and fine nor for withdrawal of license significantly affects compliance, there is a significant deterrent effect for the probability of state detection. When the dependent variable is government-assessed compliance, there is a significant main affect for state detection for both the prosecution and fine equation and the withdrawal of license equation. When self-assessed compliance is the dependent variable, there is a significant main effect for state detection in the withdrawal of state

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Table 4. Assessing the Effect of Commonwealth and State Deterrence Models on Self-Reported Compliance and Government-Assessed Compliance

A. Effect of Commonwealth Sanction Threats

	Compliance—Self Ratings			Compliance—Government Ratings		
	Sanction Threat 1	Sanction Threat 2	Sanction Threat 3	Sanction Threat 1	Sanction Threat 2	Sanction Threat 3
Controls:						
Nonprofit home	.10*	.09	.10*	.13*	.12**	.14**
Director of nursing's control of those below	.09*	.09	.11*	.07	.08	.09*
Director of nursing's autonomy from control from above	.12*	.12*	.12**	.10*	.11*	.10*
Number of beds in home	−.09	−.08	−.09	−.10*	−.09	−.10*
Age of home	−.19**	−.21**	−.20**	−.15**	−.17**	−.16**
Percentage of residents female	.12*	.14*	.13**	.11*	.11*	.11*
Percentage of residents married	.12*	.13*	.13**	.10	.10	.10*
Mean disability of residents	.13**	.12*	.11*	.10	.10*	.09
Number on inspection team	−.05	−.05	−.06	−.11*	−.12*	−.11*
Queensland home	.42**	.42**	.43**	.43**	.44**	.45**
Victorian home	.37**	.36**	.38**	.36**	.37**	.39**
New South Wales home	.49**	.46**	.48**	.46**	.42**	.45**
Sample home	−.09	−.07	−.06	−.09	−.09	−.07
Components of sanction threat 1:						
Probability of Commonwealth detection	−.00			.10		
Probability of cut funding for new admissions	.01			.12		
Deterrence composite, threat 1, Detection × sanction	.01			−.17		
Components of sanction threat 2:						
Probability of Commonwealth detection		−.01			.00	
Probability of withholding annual funding increase		−.01			.03	
Severity of withholding annual funding increase		−.00			.04	
Deterrence composite, threat 2, Detection × sanction × severity		−.00			−.13	
Components of sanction threat 3:						
Probability of Commonwealth detection			−.02			.03
Probability of cutting all funding			.00			−.05
Severity of cutting all funding			.01			.03
Deterrence composite, threat 3, Detection × sanction × severity			.03			−.00
Constant	17.46	17.67	17.65	16.08	16.57	16.31
Adjusted R^2	.29	.29	.31	.29	.31	.30
N	354	335	352	354	335	352

* $p < .05$ ** $p < .01$

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Table 4 (Continued)

B. Effect of State Government Sanction Threats

	Compliance—Self Ratings		Compliance—Government Ratings	
	Sanction Threat 4	Sanction Threat 5	Sanction Threat 4	Sanction Threat 5
Controls:				
Nonprofit home	.10*	.10*	.13**	.14**
Director of nursing's control of those below	.10*	.09	.07	.06
Director of nursing's autonomy from control from above	.12*	.13**	.12*	.12**
Number of beds in home	−.10	−.08	−.11*	−.10*
Age of home	−.17**	−.18**	−.15**	−.15**
Percentage of residents female	.14*	.15**	.11*	.11*
Percentage of residents married	.13*	.14**	.11*	.13*
Mean disability of residents	.09	.07	.05	.04
Number on inspection team	−.04	−.05	−.11*	−.12*
Queensland home	.41**	.38**	.39**	.40**
Victorian home	.42**	.41**	.40**	.40**
New South Wales home	.50**	.50**	.42**	.44**
Sample home	−.08	−.06	−.07	−.06
Components of sanction threat 4:				
Probability of state detection	.07		.11*	
Probability of prosecution and fine	.05		−.07	
Severity of $2,000 fine	−.02		.04	
Deterrence composite, situation 4, Detection × sanction × severity	.02		.02	
Components of sanction threat 5:				
Probability of state detection		.12*		.14**
Probability of withdrawal of license		.03		.00
Severity of withdrawal of license		.08		.03
Deterrence composite, situation 5, Detection × sanction × severity		−.04		.01
Constant	17.65	16.52	17.96	16.81
Adjusted R^2	.31	.31	.29	.30
N	324	339	324	339

* $p < .05$ ** $p < .01$

license equation. In all three cases, as the probability of state detection increases, the level of compliance also increases.

Given these negative individual results, it is not surprising that when we include the full set of multiplicative factors for our expected utility model, the set does not have any significant explanatory power (see Table 5).[17] This is true whether we view compliance as a function of the sum of the disutilities associated with all of the available sanctions or as a function of the separate effects of the disutilities of each sanction.[18] It is probably worth noting that the significant main effect for state detection is no longer significant. However, there is a significant main effect for the severity of withholding the Commonwealth's annual funding

[17] When we fit the fully specified expected utility model, the listwise deletion of missing data resulted in the n dropping to 277 in Table 5. T-tests were used to compare the lost cases with those left in the analysis. There was no significant difference between the two groups in either their average levels of government-rated or self-reported compliance.

[18] The latter results, which have some serious multicollinearity problems, not reported here, are available on request from the authors.

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Table 5. Assessing the Effect of the Full Commonwealth/State Deterrence Model on Compliance

	Compliance	
	Self Ratings	Government Ratings
Controls:		
Nonprofit home	.09	.11*
Director of nursing's control of those below	.09	.08
Director of nursing's autonomy from control from above	.13*	.11*
Number of beds in the home	−.08	−.08
Age of the home	−.19**	−.15**
Percentage of residents female	.13*	.12*
Percentage of residents married	.13*	.12*
Mean disability of residents	.08	.06
Number on team visit	−.03	−.10
Queensland home	.42**	.44**
Victorian home	.42**	.41**
New South Wales home	.49**	.45**
Sample home	−.07	−.06
Deterrence measures:		
Probability of Commonwealth detection (P_{CD})	−.07	−.04
Probability of cut funding for new admissions (P_{CA})	.06	.03
Probability of withholding annual funding increase (P_{CI})	−.07	−.05
Probability of cutting all funding (P_{CF})	.00	−.05
Severity of withholding annual funding increase (S_{CI})	−.09	−.19*
Severity of cutting all funding (S_{CF})	−.05	−.00
Probability of State detection (P_{SD})	.11	.11
Probability prosecutes and $2,000 fine ($P_{SC}$)	−.10	−.09
Severity of $2,000 fine ($S_{SC}$)	.01	.07
Probability withdrawal of license (P_{SL})	.08	.07
Severity withdrawal of license (S_{SL})	.11	.12
Sum of multiplicative factors:		
$(P_{CD} \times P_{CA}) + (P_{CD} \times P_{CI} \times S_{CI}) + (P_{CD} \times P_{CF} \times S_{CF}) + (P_{SD} \times P_{SC} \times S_{SC}) + P_{SD} \times P_{SL} \times S_{SL})$	.06	.05
Constant	18.02	17.17
Adjusted R^2	.29	.30
N	277	277

* Significant at the .05 level.
** Significant at the .01 level.

increase on government ratings but not on self-ratings. The effect is not in the expected direction, with those who perceive the sanction as severe being less likely to comply. Given the presence of multicollinearity in the model that includes both the multiplicative expected utility function and the additive effects of its components, we must also view this result with caution.[19] For the model in Table 5, there are three correlations between independent variables over .70.[20] The cause of this problem is the decision to in-

[19] Yet another reason for viewing this effect with caution is that it becomes insignificant when outliers are deleted from the analysis.

[20] In Table 4 there is only one such correlation over .70 for each equation.

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clude the additive effects of components of the multiplicative expected utility function together with the function itself. If we delete the additive components (listed as "deterrence measures" in Table 5) and run with just the multiplicative model with controls, none of the correlations between independent variables exceeds .50. Elimination of the multicollinearity does not cause the expected utility effect to become significant.

VI. QUALIFYING THE MODEL TO REMEDY ITS FAILURE

We will make eight attempts to redeem this stark failure of deterrence to explain compliance with regulatory law: first, we will redefine the probability of detection variable; second, we will test whether there are some states where the deterrence models are supported; third, we will incorporate the salience of sanctions into the model; fourth, we will attempt to incorporate emotionality into the model as something that pushes out rational calculation; fifth, we will test for curvilinear effects; sixth, we will see if deterrence has some power among those who score low on belief in the standards; seventh, we will further tighten our rational fiduciary assumption; and eighth, we assess whether deterrence has different effects depending on the costs of compliance with the standards.

Redefining the Probability of Detection

Could it be that the probability of detection variable focuses on too extreme a situation of noncompliance (six standards not met) to be relevant to most nursing homes? If a home is rated "not met" on six or more standards, it will score 25 or less on the dependent variable. In our study, only 30 percent of nursing homes had a compliance score less that 25. To explore this criticism, an alternative probability of detection variable was included: a variable measuring risks of detection for much less serious noncompliance. We asked: "There are occasions when most nursing homes slip into temporary noncompliance with one standard or another. When noncompliance with one of the standards does occur for a month, what are the chances that the Department of Community Services and Health will find out? Please indicate from 0% to 100% certain."

This should be a matter that all, rather than just a minority of, directors of nursing have contemplated as a result of their direct experience. The correlation between this measure of the probability of detection and the probability of detection given six standards that are not met is .36. This alternative measure performed no better than the one used in explaining compliance. Its zero-order correlation with both measures of compliance was −.03, and it had no significant effect on compliance after entering the control variables.

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Geographical Interaction

The strongest predictor of compliance in this study is geography. South Australia has much more noncompliance than the other states. It therefore seems reasonable to raise the question whether our model is supported within any of the four states. There are two additional reasons for checking this. First, the extent of state government regulatory vigilance over nursing homes varies enormously, with the highest level of state enforcement being in Victoria, and the lowest in South Australia, which has no state enforcement. Second, our reliability tests on the rating of the standards are within-state reliabilities from New South Wales and Victoria only. Even though inspection teams in the other states operate the same federal regulatory process with very similar training, it does not necessarily follow that we have between-state reliability or within-state reliability in the two smaller states.

Our expected utility model, however, is not supported in any of the four states. When we tested for state interactions with the multiplicative deterrence models, none of the expected utility functions became significant.[21]

The Salience of Sanctions

Our qualitative fieldwork in the nursing homes exposed us to many instances in which directors of nursing said that they had really never thought much about sanctions for noncompliance with the standards. How could deterrence threats work with such people when they never turn their minds to these threats, let alone know what they are and calculate their utilities? We attempted to separate these people from the rest of the sample by asking them to indicate, on a five-point scale from strongly agree to strongly disagree, their response to the following statement: "I have never given much thought to what the legal consequences of serious noncompliance with the Commonwealth standards would be."

If we assume this item to measure the salience of sanctions, our hypothesis is that the expected utility model will not work for those directors of nursing who said they had never given much thought to the legal consequences of noncompliance. Thus, we are looking for an interaction between salience of sanctions and expected utility of sanctions in their effect on compliance. However, when we add a deterrence by salience interaction to all the equations derived from Figure 1, none of them are statistically significant. We should not dismiss the salience hypothesis too hastily,

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[21] When we attempted to test for state interactions with the additive components of the multiplicative models, severe multicollinearity problems became apparent, with betas greater than 1 appearing for some of the coefficients. Some deterrence variables in these analyses counterintuitively *increased* compliance.

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however, as we are using only a single-item measure here, and perhaps one with some social desirability bias.

Emotionality

A crude way of stating a central contribution of the sociology of the emotions is to say that human agents are not rational calculators; much of what they do is driven by such emotions as envy, love, shame, pride, and retribution. If the emotions rather than rational calculation are in control much of the time, then expected utility theory will have limited explanatory power. To address this question, an emotionality scale was used which has been validated on an Australian adult sample (Braithwaite 1987).

Our hypothesis is that directors of nursing low in emotionality will be "cold and calculating" and will fit the predictions of the expected utility model, while directors of nursing high on emotionality will not fit the model. Again, we are looking for an interaction between emotionality and the deterrence models in their effect on compliance. But when we add a deterrence by emotionality interaction to all the equations based on Figure 1, none are statistically significant.

Curvilinear Effects

When considering deterrent threats which are rather serious in their consequences for a nursing home, such as those in this study, it is a plausible hypothesis that once the expected disutility of punishment passes a certain threshold, further increases make little difference. If a situation is seen as catastrophic when the risk of a sanction passes 20 percent, it can hardly get much worse when it passes 30 and 40 percent. Hence, the predicted form of the relationship between deterrent threats and compliance is represented in Figure 2. Also consistent with this prediction is the finding of Alm et al. (1990) in the domain of tax compliance that people overweight low probability events: at low probabilities, compliance exceeds the levels predicted by expected utility theory. This Alm et al. (1990) interpret within the framework of prospect theory (Kahneman and Tversky 1979).

All the deterrence measures in Table 4 were logged and the equations were reestimated accordingly. The same substantive conclusions were drawn from the analyses—deterrence has a negligible effect on compliance, with only the probability of state detection having a significant effect. Thus the hypothesis of a nonlinear relationship which took the form of a logarithmic function is not supported. Nor do we find in raw plots or partial residual scatter plots any basis for fitting any other functional forms to the data.[22]

[22] An examination of the distributions of the variables showed that the severity measures and the multiplicative model in Table 5 were positively skewed. Logarithmic transformations were applied to the variables and then

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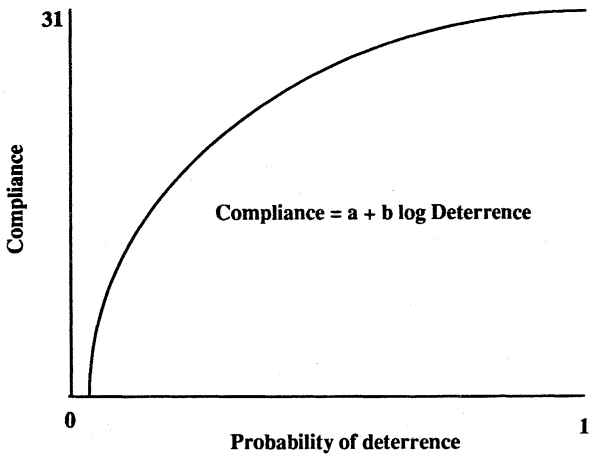

Figure 2. Hypothesized logarithmic relationship between deterrence and compliance

Belief in the Standards

A reviewer of the first version of this article posited the following possible explanation of the failure to find a deterrent effect: "most studies have found that a proportion of the subjects (often a very substantial proportion) always comply regardless of how low the odds of detection are or weakness of formal sanctions, often because they believe to do otherwise would be immoral." In other words, deterrence effects should not be found for those who have a strong belief in the standards, but they should be found where belief is weak. That is, we should test for the interaction of belief with deterrence.

We know from another analysis that belief in the standards has a modest effect in predicting government-rated compliance but not self-reported compliance (Makkai and Braithwaite 1991). Belief in the standards overall was measured there by combining data from sixty-two items on director of nursing ratings of the "desirability" and "practicality" of each standard. When we add a deterrence by belief interaction to all the equations based on Figure 1, none are statistically significant, although the belief main effect is significant for government-rated compliance.

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the analyses were run again, with no significant changes in our results. As it was thought that multivariate outliers among the independent variables may also be affecting the model, appropriate cases were deleted from the model using Mahalanobis distance (Tabachnick and Fidell 1989). The only change that occurred was that the main effect of severity of withholding Commonwealth annual funding increases in the full Commonwealth/state deterrence model becomes nonsignificant. We also excluded outliers on the two dependent variables. This also had no significant effect on results.

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Tightening the Rational Fiduciary Presumption

By our selection of managerial context and by including our two control scales for top management authority, we have chosen a test which has the best possible chance of meeting the assumptions of the rational fiduciary model. There is a step we can take to further tighten the plausibility of the assumption. This is to look at the deterrent effects only for those chief executives who also own the nursing home. There are sixty-four of these in our study (thirty-seven of them sole owners, twenty-seven part owners). Do the deterrent effects increase when we look at these owner-managers? The one-word answer is no. Coefficients for deterrent effects do increase slightly for owner-managers, but in no case does this cause a deterrence variable to be statistically significant that was not significant in the previous analysis. Surprisingly, even the item measuring the perceived severity of "a one year jail sentence *for the proprietor*" (emphasis added) did not have a significant effect on compliance for directors of nursing *who were proprietors* (just as it did not for directors of nursing who were not proprietors). It might be contended that rational fiduciary models will only have explanatory power, or will have maximum explanatory power, with for-profit organizations. Of the nursing homes in our sample 33 percent are nonprofits, mostly church-run nursing homes. It is often argued that church nursing homes are motivated by a calculus of caring for residents, while for-profits are motivated by the rational pursuit of organizational interests. However, among for-profit nursing homes alone, none of the nonsignificant deterrence effects in our analyses become significant.

Allowing for the Cost of Compliance

Arguably the greatest weakness of our model is that it fails as a fully specified expected utility model in that the costs of compliance are not incorporated. We do not have data on the costs of complying with the standards. However, we do have data on what directors of nursing estimated to be the costs of coming into compliance with standards that they did not fully meet. While the cost of shifting from a state of noncompliance (which mostly means partial compliance) to full compliance will mostly be different from the full costs of compliance, it seems reasonable to assume that these will be strongly positively correlated. However, there are other reasons to treat our cost data with great caution. The question asked was:

> For each standard which was "met in part" or "not met" I'm going to ask you how much it will cost roughly for the nursing home to make the changes needed to meet these standards over the next year, including all hidden costs in staff salaries, etc. Or, if you think it would save money, how much would it save? Now, for the first standard

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> which the home did not meet or met in part, how much, roughly, would it cost to make the required changes?

A common response of directors of nursing to this question was that they had no idea. Another response was that they believed that they already were in compliance, so how could they possibly estimate the cost of changes to reach a state that they believed they were already in? Many who answered the question did so only after consultation with other staff, accountants, and proprietors, consultation we actively urged. In some cases, the director of nusing said that if we checked with the owners, they would know. We did this in such cases and counted the owner's estimate in the data. Many of the answers to this question, we would have to say, are wild guesses. Nevertheless, it is better than no data and allows us to see if our results change for standards with different compliance costs, something that has not generally been done in perceptual deterrence studies (Piliavin et al. 1986). In the second wave of data collections, we are asking for costs experienced in coming into compliance disaggregated into capital and recurrent costs.

The crude cost data we have at this stage are used to group standards into three categories—high-, medium-, and low-cost standards. Average expected costs of coming into compliance are calculated for each standard, with expected savings given a minus sign in the calculation of average costs. Natural breaks in the costs of standards suggest groupings of six high-cost, twelve medium-cost, and thirteen low-cost standards.

It follows from the full expected utility model that we should find our deterrence effects to be strongest in one of these groups. The deterrence effects should be strongest in the group where the expected costs and benefits of noncompliance are closest to being identical.[23] Perceived sanction effects should be weaker in groups where, over a wide range of managers' perceptions, the benefit/cost trade-off made noncompliance either never preferred or always preferred.

What we find when we run our sanction equations on the three groups of standards is very little deterrence effect for any group. Across all groups we get significant coefficients for the probability of state detection variable. This is the effect we also consistently found for the aggregated standards. Of the remaining 174 opportunities to find significant deterrent effects for the tests in Tables 4 and 5, with standards disaggregated into the three cost groups, five significant effects were found—none for the low-cost standards, three for the medium-cost standards, and two for the high-cost standards. Crude as this accounting for cost of compliance has been, it gives little hint that systematically accounting for cost can salvage the deterrence thesis on these data.

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[23] We are most grateful to an anonymous reviewer for suggesting this analysis and thinking through this logic.

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VII. CONCLUSION

We have found little support for the additive or multiplicative effects of the certainty of detection, the certainty of punishment, and the severity of punishment in a simple corporate context. This failure of support for the deterrence doctrine holds whether we measure compliance by government records or self-reports of compliance. It fails under a variety of ways of specifying additive and multiplicative models. It fails even after an attempt to excise from consideration actors who do not give much thought to sanctions, actors who are high in emotionality, actors who believe strongly in the standards, and actors who are not proprietors of the nursing home as well as directors of nursing. The significant effect of the certainty of state government detection gives some hope that the deterrence doctrine is not a total irrelevance in this domain.

It is true, then, that for our entire sample, across the whole range of perceived deterrent threats, there is little warrant for accepting the deterrence hypotheses. However, our qualitative work is also suggesting that for certain minorities of actors, in certain minority contexts, deterrent threats can be important in their perceived effects on behavior. Perhaps an error of quantitative social science has been to look for deterrent effects that sweep across whole populations, instead of deterrence that has niches of contextual significance (see Simpson 1990). The attempt to discover these niches where deterrence might matter is one of the motivations of our continuing program of qualitative fieldwork on nursing home regulation in Australia, the United States, Britain, and Japan.

Even at the level of quantitative analysis, just because perceptual deterrence variables do not fare well in explaining compliance with the law among samples of North American students, and now a sample of Australian nurse managers, it does not follow that we will never discover populations where deterrence variables do have explanatory power right across these populations.

There remains some special appeal in testing deterrence theories with corporate compliance data. First, there are some theoretical grounds for expecting the deterrence doctrine to work better in the corporate domain than with individual criminality (Braithwaite and Geis 1982; Cullen and Dubeck 1985; but see Moore 1987). Second, corporate compliance data enable us to explore the fascinating interface between individual choice and corporate choice, a central issue for the social sciences at large, not just for law and society scholarship (Coleman 1990). The first step we have taken toward addressing this issue is a very small one. Being a first step, our strategy has been simplicity: small, simple organizations with the flattest "captain of the ship" command structure imaginable. But simplicity is only a virtue for first steps. What we must aspire to do with corporate deterrence research is to move beyond the rational fiduciary model. We must ask managers both what they see

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as their chances of punishment as individuals and what they see as the corporation's chances of punishment. With sanctions against corporations, we must ask managers both how serious a consequence this is for the organization and how serious a consequence it is for them as an individual. We must include reputational as well as economic consequences at both the individual and corporate level (Fisse and Braithwaite 1983; Braithwaite 1989:125–27). Then we may do some work of major importance to the social sciences in comparing individual effects with fiduciary effects within the world of organizational action.

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APPENDIX
DEFINITIONS, MEANS, AND STANDARD DEVIATIONS FOR CONTROL VARIABLES

Variable	Definition	Source	Mean	SD
Nonprofit home	1=yes, 0=no	Interviews with directors of nursing	34	0.47
Director of nursing's control of those below	low 0–high 10	Composite scale—see text	6.91	2.05
Director of nursing's autonomy from control from above	low 0–high10	Composite scale—see text	3.87	2.99
Number of beds in home	No.	Interviews with directors of nursing	49	36
Age of home	Years	Interviews with directors of nursing	36.4	30.6
Percentage of residents female	%	Commonwealth data base[a]	77.19	14.93
Percentage of residents married	%	Commonwealth data base[a]	23.51	11.02
Mean disability of residents	Mean hrs. care	Commonwealth data base[a] & see note 10	19	2.11
Number on inspection team	low 4–high 4	Interviews with directors of nursing	2.49	0.60
Queensland home	1=yes, 0=other	Interviews with directors of nursing	0.18	0.39
Victorian home	1=yes, 0=other	Interviews with directors of nursing	0.23	0.42
New South Wales home	1=yes, 0=other	Interviews with directors of nursing	0.41	0.49
Sample home	1=yes, 0=no		0.59	0.49

[a] Department of Community Services and Health data base contains basic demographic information about all residents within a nursing home.

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