

The Limits of the Economic Analysis of Regulation: An Empirical Case and a Case for Empiricism*

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Can the tools of the economic analysis of law be used to identify the optimal level of stringency in regulatory standards? Data on the costs of nursing home regulatory compliance suggest that in this domain such models could only produce wildly false estimates of the optimal level of stringency. Among the reasons for this are that: (a) actual costs of compliance explain only 19 percent of the variance in the subjectively expected costs that should inform rational choices; and (b) while there is a powerful effect of expected cost on compliance disaggregated by standard, this is not a monotonic increasing effect but a parabolic relationship. The reason for the finding that almost half the nursing homes lie on the wrong side of the turning point of this parabola is that these homes tend to be run by managers who are "disengagers" from the regulatory culture. Their behavior is not to be understood in terms of rational game playing but in terms of dropping out of the regulatory game. The disengagers are in the regulatory system but not of it and certainly not economically calculative about it.

"Judge Bork's view that 'to abandon economic theory is to abandon the possibilities of rational antitrust law' applies with equal force to all governmental regulation of economic activity. Designing penalties for corporate 'misbehavior' that will improve the functioning of the economic system requires the implementation of optimal penalty theory." Michael Block, former member, U.S. Sentencing Commission (Block, 1991: 410).

I. INTRODUCTION

One of the simple-minded assumptions made by most activists in public interest groups is that successful lobbying campaigns to strengthen business

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regulatory standards will actually improve the level of protection the community enjoys. Legislators generally share this simple assumption. That is, they assume that if they pass a law to set tougher pollution control standards, so long as that law is enforced, there will be less pollution. They surely recognize that the tougher standard will impose extra costs on business; so they see their job as making decisions about whether to trade off increasing costs against improving environmental protection.

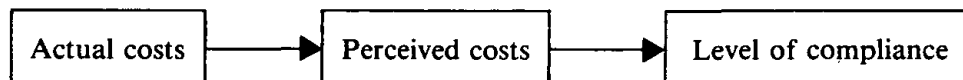
This comfortable process of trading off economic costs against public benefits of different levels of stringency in regulatory standards was unsettled during the 1980s by the theoretical insights of the economic analysis of law. The key insight was that it is possible that increasing the level of stringency in say the level of coal dust allowed in mines could cause more miners to die from exposure to coal dust. The expense of tough coal dust standards is great with huge continuous machines ripping coal from a seam at high speed in a confined space. The risk is that tougher standards will cause firms that are complying with existing standards to cheat rather than bear the cost of the higher standards. If enough firms stop bothering about compliance, the average exposure of miners to dust across the industry might actually increase as a result of more regulatory stringency. Indeed, this is perhaps a good area to illustrate the dilemma as in 1990 the U.S. Labor Department alleged that it received faked coal dust samples from 40 percent of the mines it audited. It sought to levy fines against five hundred companies for tampering fraud. The practices alleged included vacuuming filters on detection devices and spraying them with the household dust-reducing product, Endust (*Multinational Monitor*, 1991: 33; Schneider, 1991; *Corporate Crime Reporter*, 1991).

This paper tests this simple hypothesis: *the higher are compliance costs, the lower will be compliance with regulatory standards*. As the law demands higher standards at higher costs, an economically optimal level of the standard should eventually be passed. Beyond this point, the law will certainly continue to demand higher and higher standards, but the rising costs will result in higher and higher noncompliance. Beyond this optimal level of stringency in the law, harm reduction from higher standards is outweighed by heightened harm from increasing noncompliance. These are the underlying assumptions of Viscusi and Zeckhauser's (1979) seminal article on this topic.

Economic analysis supplies an invaluable insight here about the possibility that by tightening a safety standard, regulators might have just the opposite effect on safety than they intended. But the trouble is that the optimum level of stringency in a regulatory standard identified by an economic analysis is always false. This is because there are other things that affect compliance besides the expected costs of compliance – for example, whether management of the firm agrees with the law, its competence at mobilizing the technology needed to improve safety, perceptions of the probability of getting caught violating the standards, and so on.

The simple economic analysis provided above is at the level of economic sophistication of the taxation policy debates that occurred in Western democracies during the 1980s: if tax rates are cut, more people might pay their taxes honestly, so the government might actually collect more tax. But the typical level of sophistication of work in this area is very high, results differ depending on what is assumed about the level of enforcement resources available to regulatory agencies and the variable penalty functions mobilized by agencies that are incapable of perfect enforcement (Langbein & Kerwin, 1985; Sutinen & Andersen, 1985; Braden, et al., 1987; Jones, 1989). The question addressed here is: how solid is the simple explanatory foundation on which these increasingly complex analyses of the optimal level of standards is based? Is building more and more sophisticated and specified models worth the candle?

Most models of the effect of the expected cost of compliance on compliance assume that there will be a human actor who does the expecting. In the corporate context this means that when the cost of compliance is in fact high, a manager, whose job it is to watch costs, will notice that the cost is high. It is this subjective perception of high costs that will be the proximate cause of reluctance by the firm to comply.¹ At least management expectations of cost are a more proximate cause of compliance than actual costs, because the implicit theory normally is:



Law and economics scholars have tended to obscure the perceptual step in their analysis because:

1. It seems reasonable to assume that perceived costs will move with actual costs;
2. Actual costs rather than perceived costs are what government policies can most readily effect; and
3. Collecting data on actual costs rather than perceived costs seems a more manageable research objective.

This paper begins with an empirical examination of the theoretical assumption that what managers subjectively expect the cost of compliance to be in advance of making compliance decisions and what those costs actually turn out to be are interchangeable. If there is not a strong relationship between these two, then formal analyses of the effect of real compliance costs on compliance may mislead us sorely. First, however, the domain of regulation in which these questions will be explored – Australian nursing home quality of care standards – is described.

II. AUSTRALIAN NURSING HOME REGULATION

Since 1987 Australia has had a set of thirty-one outcome-oriented nursing home standards. These govern areas such as the quality of various types of health care, the quality of food and nutrition, the variety of experience available to residents (activities programs, etc.), and respect for residents' rights to privacy, freedom of choice and other social goods.² Inspections are made by teams of at least two government inspectors who make at least two visits to the home (the first averaging 6.5 hours, the second about 3 hours) before reaching final ratings.³ For each of the thirty-one standards, the inspection team rates nursing homes on a three point scale – "met," "met in part," "not met."

A sample of 410 nursing homes representing both a stratified random component from four regions of Australia and a non-random component of all nursing homes inspected during the course of the study within these regions (see Braithwaite, et al., 1993) form the basis for the analyses.⁴ For each nursing home the government ratings for each of the thirty-one standards following an initial inspection were collected. Then ratings following a subsequent inspection (eighteen months to two years, mostly eighteen to twenty months, later) were obtained for 342 homes.⁵

A reliability study found independent ratings of the same nursing homes by reliability raters generated test-retest reliability coefficients ranging from .93 to .96 on total compliance scores (Braithwaite, Braithwaite, Gibson, Landau & Makkai, 1992). In short, this domain of regulation in Australia provides a metrically superior assessment of compliance and certainly one that is much superior to U.S. nursing home compliance scores. The reasons for the metric superiority of these data compared to other regulatory compliance data have been discussed at length elsewhere (Braithwaite, Braithwaite, Gibson & Makkai, 1992a).

Compliance levels were similar for the first and second inspections. Seventy-five percent of ratings following the first inspection and 73 percent following the second inspection were "mets;" while 17 percent were "met in part" and 8 percent "not met" following the first inspection and 20 percent were "met in part" and 7 percent were "not met" following the second inspection.

III. COSTS AND COMPLIANCE

A. MEASURING THE COSTS OF COMPLIANCE

In collecting data on costs the difficult question of whose perceptions count arises. In a complex organization, there may be many managers involved in regulatory decision making, all with somewhat different perceptions of regulatory costs. This problem is solved in the present study by selecting very simple organizations in which there is a single manager who is the

obvious appropriate choice as the locus of perceptions of regulatory costs. Australian nursing homes are small organizations, with a median staff of around forty employees and a flat management structure under the authority of a director of nursing. The regulatory system is an important part of what makes the director of nursing a chief executive with effective control over regulatory decision making. When there is non-compliance with a standard, inspectors inform the director of nursing and they expect her or him to develop a plan of action to bring the nursing home back into compliance. Because of these facts about the way regulatory demands are transacted and because of the small size of Australian nursing homes, these are organizations virtually devoid of a middle management structure. This contrasts with larger American nursing homes which consistently have "department heads" (e.g., head of dietary), partly because the regulatory apparatus imposes demands on heads of dietary departments.

To confirm empirically our claim about chief executive control of these organizations, the 410 directors of nursing in this study were asked the extent to which they agreed or disagreed with the following statement: "As Director of Nursing I have final say on most of the decisions that matter." Fewer than 13 percent of directors of nursing disagreed with this statement, 12 percent neither agreed nor disagreed and 76 percent agreed. So here is a simple structure that enables a simple test of the perceptual assumptions that underlie the economic analysis of regulation.

If a nursing home achieves other than a "met" rating, a plan of action is negotiated. It was the actual and perceived cost of implementing each plan of action relating to a "not met" or "met in part" rating that directors of nursing (in consultation with other nursing home personnel) were asked to estimate. Measuring the actual costs of compliance with the law requires that managers have actually faced and dealt with the problems associated with implementing an action plan to comply with the law. It follows that the actual costs associated with compliance need to be measured following the period during which the organization sets about responding to the inspection process. On the other hand, an accurate measure of expected costs must be sought prior to the period during which the organization implements a plan of correction.

Interviewers were conscientious in following up the cost expectations: for twenty-five of the thirty-one standards, over 90 percent of homes with a "not met" or "met in part" rating supplied the cost estimate. For the other six standards, cost expectations were supplied by between 80 and 90 percent of nursing homes (see Braithwaite, et al., 1993). To limit decontextualized questionnaire-driven judgments, directors of nursing were allowed to consult with their accounting advisers, other staff, and proprietors about what they expected to be the costs of compliance. They very often did this because they had enormous difficulty estimating what the likely costs of coming into compliance would be. The first finding to report therefore is a qualitative one: in this industry that is subject to unusually heavy regu-

lation, chief executives who make the critical decisions about regulatory compliance for organizations have little idea of the costs of compliance and have great difficulty estimating them. This indeed is the first and most fatal empirical flaw in the economic analysis: actors who are assumed to change their behavior in light of certain kinds of facts will not do so if they never get to know those facts.

In a sense, this study cheated on behalf of the economic analysis by forcing chief executives to engage with these facts – by thinking about them for the first time (a very common situation) or by acquiring a view about them for the first time (by, say, talking to the accountant). After forcing them to come to a view on what they expected the cost of compliance to be, we then studied whether those expectations affected subsequent compliance. That is, we tested the effect of expected costs of compliance on subsequent compliance under conditions of unnatural knowledge and contemplation of those costs.

The average estimated cost for implementing a plan of action to come into compliance was \$7,658, but the median cost was only \$50. The big gap between the mean and median reflects two facts: a small number of very high cost estimates combined with 45 percent of cost estimates being zero or less.⁶ Examples of standards which generally had zero-cost action plans were those relating to dignity (instruct staff to refrain from calling residents by their first names when they would prefer to be called Mrs.) and privacy (put medical records where residents cannot read them; close the door when toileting).

The actual costs of compliance could not be determined until after the nursing home had set about implementing its agreed action plans. Some eighteen to twenty-four months later, directors of nursing were asked how much it had actually cost the nursing home to come into compliance for those standards which had not been met on the initial inspection visit. Directors of nursing were asked to provide the information in a format that divided costs between capital and recurrent costs per month. The recurrent and capital costs were summed for a twelve month period to provide a cost for each standard that was out of compliance at the initial inspection.

Unlike the first wave of data collection where trained interviewers were used to collect the data, the second wave was collected via a mailed questionnaire. A respectable 80 percent response was achieved with this second contact, but there was considerable missing data on the costs question. There were 1,353 standards on which actual costs data ought to have been provided but in only 468 cases (35 percent) did directors of nursing provide such data.⁷ Only twenty-three directors of nursing (13 percent) provided actual cost data for all standards that were not met at the first inspection of their nursing home. Without pressure from an interviewer, a large proportion of respondents took the easy way out – replying that they did not know what implementing the action plan had cost or simply failing to fill out an answer to the question.

For the 468 cases, the average cost of implementing the action plans was \$12,018 while the median was \$550. As with the expected costs there were a small number of very high costs (two action plans cost over \$1,000,000 to implement) while 18 percent of action plans ($n=85$) involved the organization in zero costs.

B. CAN ACTUAL AND EXPECTED COSTS BE INTERCHANGED?

There are 2,464 cases where a standard was out of compliance and there is an estimate of the expected costs of coming into compliance for that standard. However, given the extent of missing data on the actual costs ($n=1,997$), Figure 1 compares the distribution of the expected and actual costs for complete data pairs only.⁸ Many more managers estimated that costs would be zero than was found to be the case: 37 percent of expected costs were estimated to be zero while only 18 percent of costs actually were zero. The majority of actual costs were between \$100 and \$5,000. There were very few high estimated or actual costs associated with complying with the standards. For expected costs 2 percent of estimates were greater than \$50,000 while 4 percent of actual costs were greater than this amount.

When expected costs are regressed onto actual costs there is no relationship at all between these two measures of absolute costs. The plot also confirms the problem of skewness as indicated by the earlier discussion of the mean and median costs. Further work indicated that there is a nonlinear relationship between these two measures. It appears that a dynamic growth

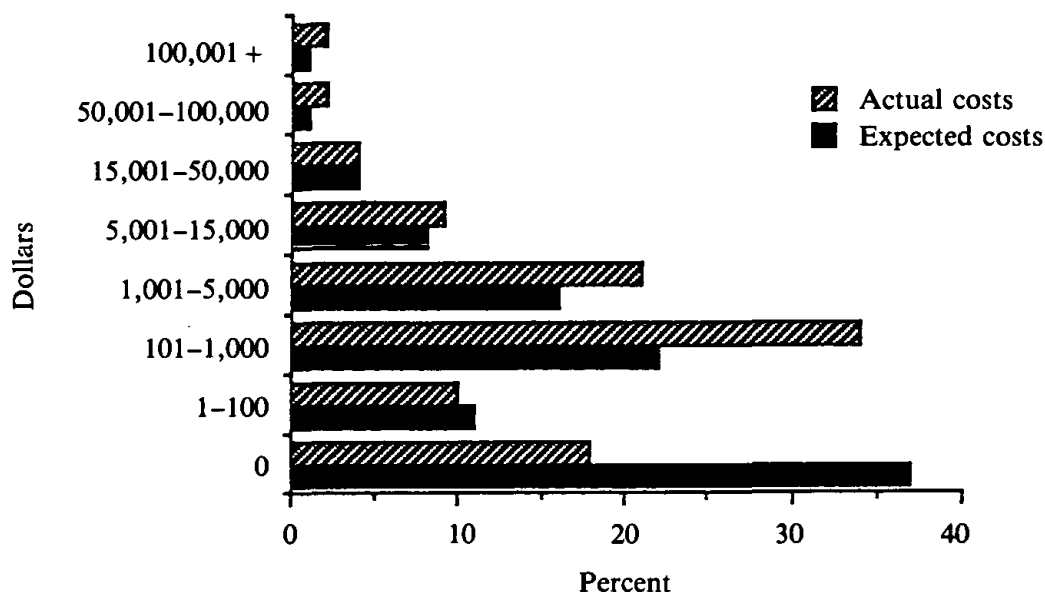
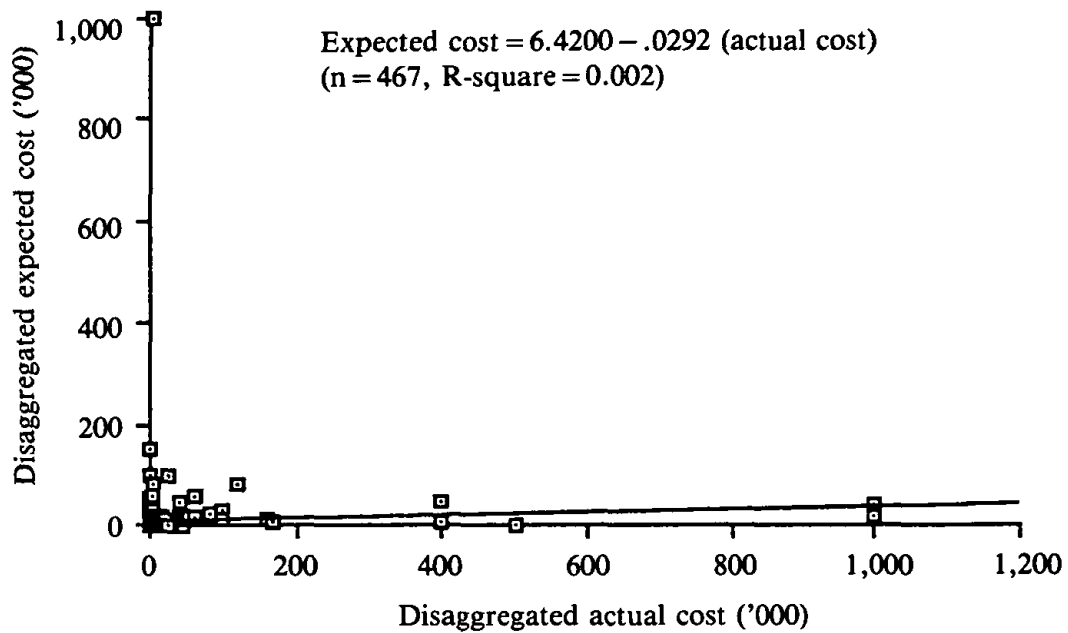


Figure 1: Comparison of expected and actual costs for complete pairs only ($n = 467$)

Panel 1: Unlogged model



Panel 2: Logged data

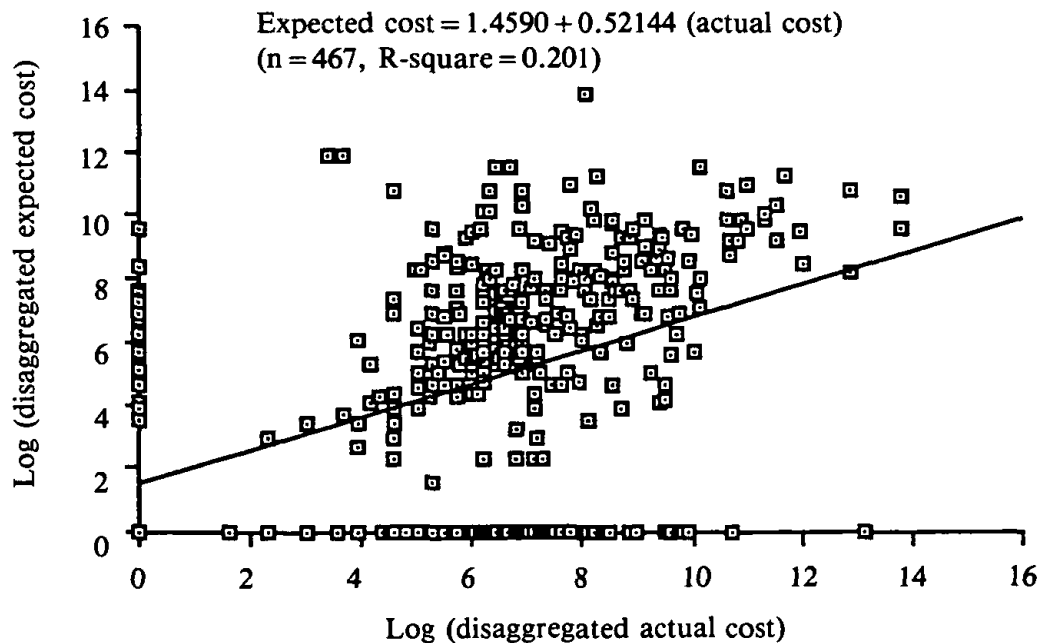


Figure 2: Relationship between expected and actual costs for models using unlogged and logged data

model rather than a static model is more appropriate, with the rate of growth of expected costs being directly proportional to the amount of growth of actual costs. This relationship is captured by taking the log transformation of the expected and actual absolute costs of compliance. The data are shown in the second panel of Figure 2.⁹

There is a significant improvement in the fit of the model. However, even with this transformation only 19 percent of the variation in expected costs is explained by actual costs.¹⁰ Part of the reason for the weak relationship may be due to those standards that were expected to have a zero cost but did actually cost something at the end of the day. However, excluding the zero expected costs from the data does not improve the overall fit of the relationship.¹¹ These data lend little support for the assumption that actual and expected costs can be interchanged. Chief executives who were the pre-eminent decision makers in these highly regulated organizations on decisions to comply with the law had poor ability to predict the costs of action plans required of them by the regulators.

The failure of expected costs to bear a strong relationship to actual costs is not surprising given the experiences gained in interviewing the directors of nursing. It was apparent when asking about the expected costs of compliance that these chief executives had not thought deeply about costs. Even when they spoke to others about these costs, these others also had not thought much about them. Nursing home management agreed to the action plan in most cases without deliberating the cost greatly except in extreme cases. Mostly, they had the attitude that they had agreed to it; it was a requirement of the law, and they would implement the action plan whatever it cost. And indeed most action plans were implemented (Braithwaite, et al., 1993). According to this psycho-logic, there was no point agonizing over what it would cost because it just had to be done to satisfy the regulators. This result will come as no surprise to anyone who has had the experience of running an organization, such as, for example, a university department. Heads of departments, in our encounters, have no idea what it costs their departments to comply with occupational health and safety laws.

Even at the time of the second inspection, when the money had been spent on implementing the action plan, most directors of nursing had no idea what they had spent. Their accounting systems were not set up to monitor the cost of complying with individual standards, and they had no interest in bending them to that purpose. Given that actual costs explain relatively little of the variation in expected costs, do expectations in any event contribute toward compliance with the law?

C. DOES EXPECTED COST AFFECT SUBSEQUENT COMPLIANCE?

Logistic regression was used to estimate the effect of the log of expected costs on whether or not the nursing home met the standard after controlling

for a variety of factors. The dependent variable initially had three categories: "met," "met in part" or "not met." To simplify interpretation of the data, it was decided to group "met in part" and "not met" together forming a dichotomous measure. Table 1 provides the coefficient, its standard error, the partial correlation between the dependent variable and each of the independent variables and the odds (exponential of the coefficient) of having a "met" on the compliance score.

Controls are entered into the equation for variables that previous theoretical and empirical work have shown to be important (Makkai & Braithwaite, 1991). These are geographical location of the home, the size and age of the home, the percent of residents who are female, the average level of care provided in the nursing home, the type of home ownership, whether the director of nursing had changed between the first and second inspections, the length of time between the first and second inspection, and whether or not the home had been chosen as part of the random sample. It has already been noted that a sizable number of costs were expected by

Table 1: Maximum Likelihood Logit Estimates Predicting Nursing Home Compliance (disaggregated data; n = 2464)

	b	(SE)	r	Odds (Exp(b))
Control variables^a				
New South Wales home	.61**	.13	.08	1.83
Victorian home	-.21	.15	.00	.81
Queensland home	.38	.17	.03	1.46
Percent of residents female	.01*	.00	.03	1.01
Director of nursing change between initial and subsequent inspection	-.27*	.09	-.04	.76
Length of time between the first and second inspections	-.02	.01	-.01	.98
Number of beds in the home	-.00	.00	.00	1.00
Non-profit home	.35**	.11	.05	1.42
Sample home	-.37	.13	-.04	.69
Mean disability of residents	-.02	.02	.00	.98
Age of the home	-.10	.03	-.04	.91
Belief in the standards	-.16***	.15	.00	.86
Number of "not mets" per home	.01	.01	.00	1.01
Full deterrence measure	-.01*	.00	-.04	1.00
Costs				
Expected costs at wave 1	-.17**	.03	-.11	.85
Zero costs	-.85**	.20	-.07	.43
Constant	1.97			
(Likelihood ratio $\chi^2 = 196.89$, 16 d.f.)				

^a See Appendix Table A for a description of the control variables.

* $p < .05$, ** $p < .01$, *** $p < .001$.

directors of nursing to be zero. To determine whether there is something different about homes that estimate their costs at zero, a dummy variable was entered into the equation to capture the effect. Appendix Table A provides a description of the variables and their means and standard deviations.

Two important factors which were thought to mediate the relationship between costs and compliance were belief in or acceptance of the standards as legitimate and the extent to which chief executives perceived a deterrent effect from government sanctions for noncompliance. Elsewhere we have shown that belief in the standards is an important predictor of compliance (see Makkai & Braithwaite, 1991); a long tradition of business regulatory studies shows that if industry does not believe the regulatory standards are desirable, practical, or just, then voluntary compliance is difficult to secure. For this reason the model includes a measure of the extent to which chief executives think the standards are desirable and practical. For each standard, the chief executive officer was asked whether they believed the standard was desirable and practical. Belief in the standards is generally very high with 91 percent of chief executives reporting that they believe the standard is both desirable or practical.

There has been a renewed interest since the mid-1970s in the effect of perceived deterrence threats on compliance with the law (Zimring & Hawkins, 1973; Gibbs, 1975; Tittle, 1980; Blumstein, Cohen & Nagin, 1978; Roth, Scholz & White, 1989). In the deterrence literature, compliance is seen as a function of the perceived likelihood of detection and punishment and the perceived severity of available sanctions. The theory is that if the product of these three contingencies is high then compliance with the standards will in turn be high. There has, however, been limited support found for the deterrence model with nursing home compliance. Braithwaite and Makkai (1991) showed that managers' expected perceptions of deterrence from all sanctions failed significantly to explain compliance. An accumulating body of evidence is demonstrating that perceived informal sanctions have a stronger effect on compliance with the law than formal sanctions.¹²

In the context of this study, the Australian Commonwealth government can impose three sanctions for noncompliance: (1) withdraw Commonwealth funding for new admissions to the nursing home, (2) withhold annual Commonwealth funding increase to compensate for inflation, and (3) cut off all Commonwealth funding. However, in a federalist political system the state governments also retain some sanctions that can also be imposed on nursing homes. The chief executives of each nursing home were asked about the probability of detection and punishment and the perceived severity of the sanction for the three Commonwealth sanctions plus two state sanctions (prosecution and conviction of the nursing home and withdrawal of the nursing home's license). An expected utility model for these five sanctions was then developed (see Braithwaite & Makkai, 1991, for a

detailed discussion of the development of this model). This perceptual deterrence measure was then entered as a control into the model.

Table 1 shows that the impact of expected costs on subsequent compliance for each standard separately is significant. The simple prediction at the foundation of the economic analysis of law is supported.¹³ The odds of getting a "met" rather than a "not met" are decreased by a factor of .85 as we move from zero to high costs. To examine this relationship more closely, Figure 3 shows the estimated probability of complying with the standards for different cost expectations.¹⁴ These estimates show both that the expected costs effect is quite strong and that there is an interesting discontinuity in the relationship. Contrary to the economic analysis of law prediction, directors of nursing who expect the costs of implementing a plan of action to be zero are less likely to comply at the subsequent inspection than directors of nursing who expect the costs to be up to (and well beyond) the median cost of \$70. Indeed, there is a substantial jump in the estimated probability of subsequent compliance when the expected costs increase from zero to just two dollars! How can this make sense?

In a study designed to test Kagan and Scholz's (1984) typology of regulatory styles and corresponding motivational types among regulated actors, limited support was found for their model (Braithwaite, Braithwaite,

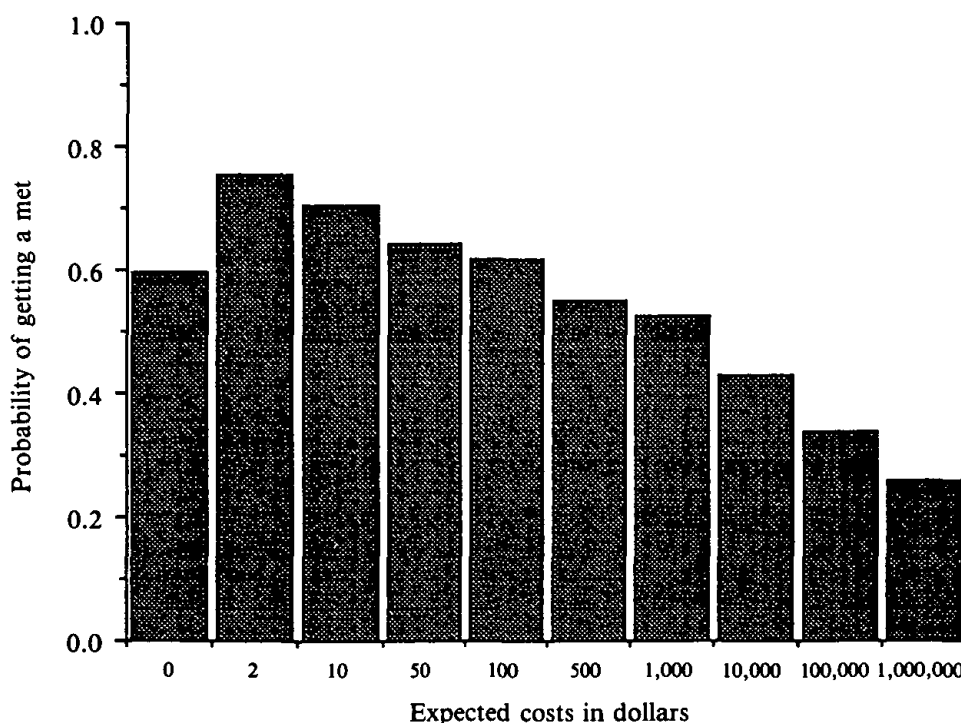


Figure 3: Estimated probability of complying with the standard for an average home for specific expected costs

Gibson & Makkai, 1992b). However, a motivational type that turned out to be quite important among directors of nursing on these data was labelled "disengagers." Disengaging was measured by a scale consisting of six attitude items answered by the director of nursing (*ibid.*).¹⁵ These items referred to the director of nursing's failure to take professional responsibility for the nursing home's performance on the standards and a rejection of cooperation with the regulatory body. The analysis showed that a director of nursing who was a disengager in the first wave of data collection predicted low compliance at the subsequent inspection (*ibid.*). Once there was disengagement from the regulatory culture (Meidinger, 1986), subsequent compliance suffered, indicating that noncompliance was less a result of rational game playing and more a result of dropping out of the game.

So who are these directors of nursing in Figure 3 who expect that the costs of meeting action plans will be zero? Figure 4 shows that they are more likely to be disengagers. The figure plots the average level of disengagement for six cost groupings. Group one of the cost groupings represents the 44 percent of zero expected costs, with the remaining 56 percent of cases divided fairly equally between five groups: group one representing the bottom 10 percent of expected costs and group five the top 15 percent of expected costs. As can be seen the average level of disengagement is higher

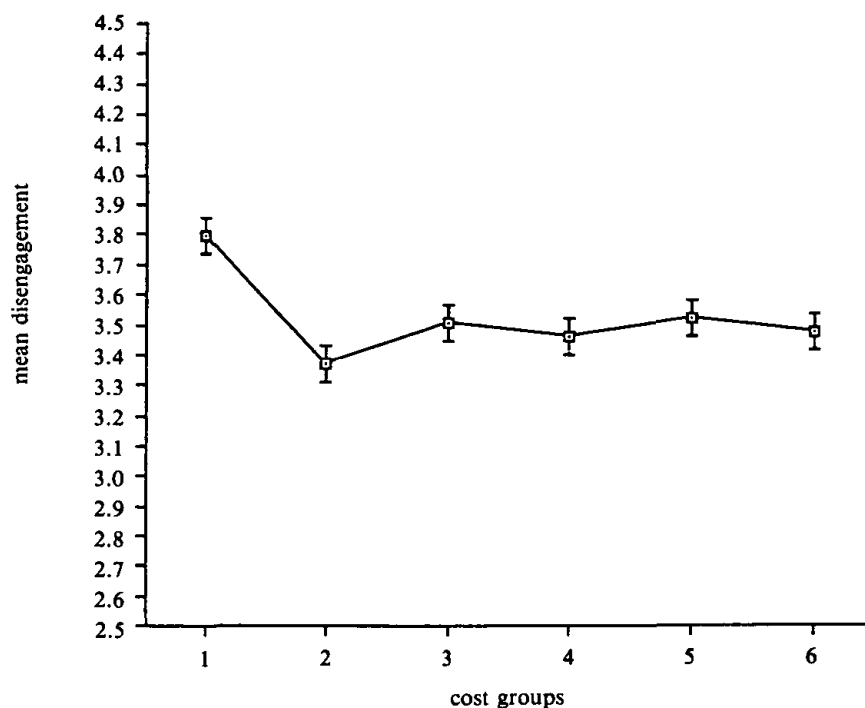


Figure 4: Mean level (and confidence intervals) of disengagement for cost groupings (see text for details regarding disengagement scale and cost groupings)

for the zero costs (group 1) than for the other groups. The graph also indicates the confidence intervals for each mean level of disengagement. A series of a priori contrasts were undertaken which confirmed that the mean level of disengagement for the zero cost group was significantly different from the other five cost groupings either as one category or as separate categories.

Disengagers are prone either to think that they will not bother to do anything about the action plan (hence zero costs) or that all they need to do is "tell the staff not to do it again" and the problem will go away. How then can we make sense of what appears on the surface to be so tiny a difference between zero and two dollar expected costs? A director of nursing who says that the expected costs will be two dollars is engaged with the need for something to be done to assure future compliance. The two dollars may be the estimated cost of photocopying a memo to all staff members, making a change to a single resident's care plan, revising a policy document, or tightening screws in some loose handrails. Even if two dollars is a slightly low estimate of such costs, the estimation of some cost, any cost, indicates that the director of nursing is engaged with the need to follow through with some action. As might be expected from this discussion, adding the "disengagers" scale as an additional variable in the model improves the overall fit of the model while marginally reducing the significant cost effects.¹⁶

Having accounted for the turning point in this parabolic relationship, the relationship is very strong indeed from the turning point on. The estimated probability of getting a "met" rating for an average home falls continuously from .76 for action plans of minimal expected cost to .26 for action plans of \$1 million or more. Enthusiastic endorsement of the economic analysis of law within these limits must be qualified by an appreciation that the fit of the model is not impressive. In the first case the model only predicts just over half of the observed "not mets" correctly (51 percent) and just under three-quarters of the "mets" (73 percent). Although the model, as specified in Table 1, is a significant improvement over a model with just the constant, the likelihood of the observed results given the parameter estimates indicates there is significant room for improvement in the model specification.

Entering belief in the standards and perceptual deterrence did not substantially affect the relationship between costs and compliance.¹⁷ We also tested for possible interactions between costs and belief, and costs and deterrence on compliance. Neither interaction was significant. Research elsewhere has shown that type of ownership is an important factor in explaining compliance (Makkai & Braithwaite, 1993). The primary distinction made in the literature is between profit and non-profit homes and multivariate analyses have shown that non-profit homes have significantly higher compliance than for-profit homes.¹⁸ It might be argued that the expected costs and compliance model would be more likely to hold in the for-profit sector. To test for this, the model was fitted separately for the two groups. The data show support for this hypothesis with effects for

the cost variables being stronger in the for-profit sector. In fact, the dummy variable for zero costs is non-significant in the non-profit sector, though the parabolic relationship holds for both sectors.¹⁹

In short, the hypothesis that increasing expected compliance costs will reduce compliance is supported, but the extent to which expected costs can adequately explain compliance is limited. In addition, where homes estimated the expected cost of compliance to be zero, the odds of compliance are lower than for those homes where the costs are estimated to be an actual value, but still relatively small. This relationship holds regardless of whether the nursing home is located in the for-profit or non-profit sector.

IV. CONCLUSION

The expected cost of compliance is a significant predictor of subsequent compliance with the law; thus, the economic analysis of law must be taken very seriously as an explanatory framework. On the other hand, the data raise three reasons why it might be foolish to use extant models from the economics of regulation literature to estimate the optimal levels of stringency for regulatory standards and their enforcement. These are: (1) the finding that the relationship between disaggregated expected costs and compliance is not monotonic (it has a turning point, with almost half the cases lying on the wrong side of the turning point); (2) the imperfect fit of the expected costs model showing that there are other factors that will effect the optimum level in standards besides costs (as illustrated by the improved fit from adding attitudes of disengagement to the model); and, most devastatingly, (3) the finding that only 19 percent of the variance in expected costs can be explained by actual costs. Together, these three points imply that with Australian nursing home regulation, an attempt to calculate the optimal level in regulatory standards using any of the economic models in the literature would produce results that would be wildly false.

These results might exaggerate the power of the economic analysis or they might understate it. The possibility for overstatement concerns the way the data collection forced managers to think about costs in a more calculative, deliberative way than would occur naturally. The interviewers (including one of the authors) were made painfully aware of how unaccustomed directors of nursing were to contemplating compliance costs. Even when they were badgered to consult with their proprietors, accountants, and other staff, they usually found that these other actors, while they might know more about costs, had little basis for connecting cost to compliance and had no experience of doing so. There could be multiple sources of method-induced error here. First, these actors were being forced to consider an economic rationality of deliberation that did not come naturally to them.

Second, having forced them to come to an understanding of costs that they would not normally have, that understanding may indeed have changed subsequent compliance conduct, but in a way that would not have occurred without the intervention of the study. Third, even in cases where organizational knowledge did exist about compliance costs, that knowledge may naturally reside with actors who do not have control over compliance decisions (e.g., accountants). In other words, this research intervention may have forced those with knowledge but no power to communicate that knowledge to managers who normally have power but no knowledge on compliance costs. The methodology may have contributed to the result by bringing organizational knowledge and power together in an artificial way.

The most important way that the kind of quantitative analysis undertaken here may underestimate the power of the economic analysis is as follows. A director of nursing agrees to an action plan in the way that was found to be typical during the fieldwork, that is, without deliberating seriously about implementation costs. Consequently, her poorly founded expected cost may not predict subsequent compliance. However, when she seeks to implement the most expensive part of the plan, she finds that she does not have the liquid funds to do so. Thus, implementation is delayed and delayed again past the date of the next inspection, when she is found to be still out of compliance. External fieldwork observing Australian, English, and U.S. nursing home regulation has found this to be quite a common scenario. The director of nursing agrees with the need for the action plan and intends to implement it; it is just that high cost causes repeated delays in implementation. In this way actual cost can cause repeated noncompliance in a way that is not mediated by expected cost. But this is a less grand and more contextual account of the importance of real costs to compliance than the imperial importance found in the elegant equations of the economic analyses of regulation.

Perhaps Australian nursing home regulation is a special case. It is an industry subjected to unusually intensive regulatory scrutiny that affects every facet of the firm's decision making, yet the regulatory demands imposed are outcome-oriented and flexible in a way that keeps compliance costs mostly low. All areas of regulation are special cases, however, a fact suppressed by the global theorizing of the law and economics tradition. The economic analyses of regulation will not be taken very seriously by policymakers and should not be taken very seriously by scientists until they get beyond the self-description of one study that "employs pseudo-data techniques to generate information that is used to parameterize the displacement optimization model" (Braden, Tampke & Wu, 1987: 324). This paper shows that there is a case for collecting empirical data that test these ideas against the actions of real managers in real organizations. When this is done, economic variables are shown to matter, but not in a way that allows us to determine the optimal level of stringency in regulatory standards. There are clearly limits to an economic analysis of regulation.

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NOTES

1. One can, of course, subscribe to a radical Chicago school view that organizations minimize costs not because there is intentional choice to do so, but simply because the firms that fail to minimize costs do not survive. The Australian nursing home industry is one in which most income comes from state subsidies and supply is tightly regulated to a bed-occupancy rate over 98 percent. The result is a low-risk industry where the natural selection of the market has limited explanatory capabilities.
2. In spite of the diversity of standards involved, compliance on each standard is significantly correlated with compliance on all the other standards (Braithwaite, Braithwaite, Gibson, Landau & Makkai, 1992).
3. This is an unusually intensive inspection process by unusually well-trained inspectors, compared with, say, the average occupational health and safety inspection.
4. Detailed analyses of the two groups of homes showed no significant differences between those randomly and non-randomly selected. In order to increase the power of the tests the two groups are combined.
5. See Braithwaite, et al., (1993: Appendix A) for a detailed discussion of the data and methods.
6. Directors of nursing estimated that four action plans would actually save the nursing home money. These outliers have been excluded from the analyses.
7. Note this number is lower than the number of expected costs ($n=2482$) due to home closures, change in the director of nursing, and the home not having a second inspection.
8. The relationship between actual and expected costs can occur at either the aggregated level (that is, at the level of total costs across all standards for each nursing home) or the disaggregated level (that is, at the level of the costs for each standard in each nursing home). The underlying premise of the aggregate cost measure is that there is a total pool of liquid resources available for improvements to sustain compliance, such that high cost demands under one standard do deplete the resources available for sustaining compliance with other standards. However, the finer detail provided in the data is lost. The disaggregated approach retains this finer detail by analyzing the impact of the expected costs on subsequent compliance for each particular standard. The advantage of this second approach over the first is that it simply examines the effect of expected compliance costs for a particular standard on subsequent compliance for that standard alone. That is, it jettisons the possibly implausible assumption that escalating costs on one standard might have effects on compliance with other standards. Given the extent of missing data on the actual

costs, disaggregation provides 467 cases where actual cost data was supplied for a standard that was out of compliance on the initial visit while aggregation results in only twenty-three nursing homes with total actual cost data.

9. As it is mathematically impossible to take the log of zero, zero costs were assigned to the value of \$1 resulting in the log of a dollar cost being zero.
10. One of the reviewers of this paper suggested that a proportional measure of cash flows rather than absolute dollar amounts would be more appropriate. Unfortunately our data do not provide overall profit/surplus measures for the nursing home. We did, however, calculate the proportion of cost per standard of the overall costs to meet the standards. A plot of the proportions for actual and expected costs showed that there was certainly an improvement over the absolute dollar amounts in panel 1 of Figure 2. However, the fit is not quite as good as the logged model in panel 2 of Figure 2. For this reason the analysis focuses on the logged data.
11. In fact the amount of variance explained declines to .16.
12. Burkett & Jensen, 1975; Kraut, 1976; Anderson, Chiricos & Waldo, 1977; Meier & Johnson, 1977; Jensen & Erickson, 1978; Akers, et al., 1979; Tittle, 1980; Meier, 1982; Paternoster, et al., 1983a, 1983b; Bishop, 1984; Williams, 1985; Paternoster & Iovanni, 1986; Paternoster, 1989; but see Piliavin, et al., 1986; Williams & Hawkins, 1989; Simpson, 1990.
13. A similar analysis of the aggregated data showed that the effect of the log of total expected cost of action plans on subsequent total compliance is in the direction predicted by the economic analysis of regulation, but it is well short of statistical significance. This is also the case for the change in compliance: having controlled for initial levels of compliance, total cost expectations fail to significantly predict homes that either improve or decline.
14. The estimated probability of getting a "met" is $(1/1 + e^{-Z})$ where Z is calculated by summing the coefficients and substituting in specific characteristics. In Figure 2 the mean values are substituted for the control variables with expected costs set at the amounts indicated on the figure.
15. Respondents were asked their extent of agreement on a five point scale with each statement and these responses were then summed to form the disengager scale. To ensure that no particular item dominated the scale the items were divided by their standard deviation, prior to summing, ensuring that each item had a variance of one while still retaining its original mean. As the resulting scale had no natural metric, it was rescored from 0 to 10 with 0 indicating a low level of disengagement and 10 a high level of disengagement. Missing data was coded to the mean.
16. The results are available on request from the authors. The change in the chi-square with the addition of the disengager scale to the model is 17.80 with 1 degree of freedom. The Wald statistic for the log of expected costs declines marginally from 39.82 to 39.61 with the addition of the disengager scale.
17. Although the belief variable is a nonsignificant predictor of compliance the perceptual deterrence measure has a significant negative affect on compliance. This finding is counter-intuitive in that it suggests that chief executives who have high levels of perceptual deterrence perform more poorly than chief executives who perceive low deterrent effects. Elsewhere (Makkai & Braithwaite, n.d.) we have argued that there is a dialectic of deterrence where deterrence works for certain types of chief executives, while for others, deterrence not only fails, but backfires. For this paper, however, we are simply interested in ensuring that the relationship between costs and compliance is uncontaminated by perceptual deterrence.
18. More detailed analyses divided for-profit homes into those where the director of nursing was an employee and where the director of nursing was an owner or

- part-owner of the organization. These analyses showed that non-profit and for-profit employees have significantly higher compliance levels than directors of nursing who are owners (Makkai & Braithwaite, 1993).
19. The results are available on request from the authors.

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Appendix Table A: Definitions, means and standard deviations for control variables

Variables	Definition	Mean	SD
Non-profit home	1 = yes, 0 = no	.25	.43
Number of beds in the home	Number	49.92	26.87
Age of the home	In years	3.26	1.39
Percent of residents female	Percent	75.82	15.32
Mean disability of residents	Mean hours of care	18.97	2.14
Queensland home	1 = yes, 0 = other	.12	.33
Victorian home	1 = yes, 0 = other	.24	.43
New South Wales home	1 = yes, 0 = other	.42	.49
Sample home	1 = yes, 0 = no	.71	.45
Length of time between the first and second inspections	In months	21.59	4.95
Director of nursing change between initial and subsequent inspection	1 = yes, 0 = no	.33	.47
Belief in the standards	1 = high, 0 = low	.90	.30
Full deterrence measure	0 (low) thru 300 (high)	9.26	25.69
Number of not mets per home	1 thru 29	12.00	6.08

