MANAGERIAL DECISION-MAKING IN NON-MARKET ENVIRONMENTS:

A SURVEY EXPERIMENT

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ABSTRACT

In this paper we consider a number of experiments to determine whether aspiring managers can solve non-market strategy problems. Conducting a survey of nearly 300 MBA students, we show that with simple, single-stage problems, managers are very competent in reaching the optimal choice given their non-market environment. As problems become more complex, however, they have much greater difficulty in arriving at the optimal result. In this regard, analysts must use some caution when evaluating empirical results and applying theoretical results.

INTRODUCTION

Over the past decade, scholars and business executives alike have

recognized that, in many businesses, effective non-market strategy is critical to

sustaining profits and growth (Baron 1996, 1997, 1999; Krehbiel 1999; de

Figueiredo and Spiller 2000; de Figueiredo and Tiller 2001, Henisz and Zelner

2001).[1] But while scholars have made substantial progress in generating both

positive and normative analyses of the components of effective non-market

strategy, it is still an open question as to what degree practitioners are capable of

incorporating institutional and strategic analysis into their thinking. Indeed, as

has been commented on before, managers are only marginally trained to cope

with such problems (Weingast 1987). As an important precursor to this research,

therefore, it is necessary to understand the extent to which managers can solve

non-market strategy problems, and the extent to which such solutions can be

incorporated in mainstream strategic planning.

In practice, natural experiments to answer this type of question are

difficult to identify in the real-world. As has long been recognized, the difficulty

of controlling for a variety of complex and often times idiosyncratic strategic

situations makes it hard to localize the extent to which the non-market component

has either been effectively pursued or resulted in favorable competitive

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[1] To cite some examples, Baron (1997) shows how in one case, the trade dispute between Kodak and Fujifilm, the rents earned by proper execution of non-market strategy are potentially substantial. de Figueiredo and Spiller (2000) similarly argue that the enormous rents on the table for telecommunications firms were distributed differentially in the United States and Europe among interexchange carriers and local exchange carriers depending on the regulatory environment in the United States and Europe. de Figueiredo and Kim (2001) estimate that even the recent administrative regulatory dispute over payphone calling card pricing for long distance calls could cost the players $400 million over ten years. Finally, de Figueiredo and Silverman

advantage. This problem suggests that an alternate approach, experimentation, might help us identify how managers can cope with non-market strategy problems. Since experimentation allows for independent controls over the strategic setting and institutions, it has the advantage of decomposing the "compositeness" of field data (Smith 1989).

Experimentation as a way of identifying managerial behavior has a significant tradition in both economics and psychology (see Camerer 1999). In general, there have been two uses of experiments: 1) to evaluate the predictions of particular theories, and 2) to identify appropriate behavioral assumptions for further development of theory. In economics, one example of the rich use of experimentation has been in testing theories of markets and the institutional rules that undergird them. Experiments have allowed economists to evaluate both the speed and efficiency of market institutions (Smith 1989). At the same time, they have allowed analysts to refine behavioral assumptions about agents' choices (Camerer and Lovallo 1998; Chacon and Camerer 1996; Cox, Smith and Walker 1988; Smith 1989).[2] As Roth (1991: 107) comments, experiments can help "game theory bridge the gap between the study of ideally rational behavior and the study of actual behavior." In psychology, experimentalists have also undertaken a large research program to identify the degree to which individuals can act as the *homo economicus* of economic theory. Thaler (1980) for example,

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(2002) determine there are hundreds of millions of dollars at stake every year in the university approproriations process, which can be attributed to university lobbying.
[2] A primary example of this type of approach has been the identification that agents tend to bid on "the risk-averse side of Vickrey's linear bid function" in first-price sealed bid auctions (Smith 1989: 158). This finding led to further experimentation and subsequent theory modification to include heterogeneity in risk-aversion in auctions (Kagel and Levin 1986).

relates the "endowment effect" to an aversion for losses (see also Kahneman, Knestch and Thaler 1990). Similarly, Kahneman and Tversky (1979) provide experimental results which identify the ability, and inability, of individuals to conduct Bayesian inference in the way rational agents are posited to behave (see also Bazerman 1985). In both of these fields, experimentation has allowed analysts to modify the axiomatic assumptions of behavior to develop richer theories of social interaction (see, e.g., O'Donoghue and Rabin 1999; Hermalin and Isen 2000). Although there has been an enormous amount of work completed on repeated "market" games and games with uncertainty (see Kagel and Roth 1995; Camerer 2001, for a nice summary), there has been little applied to non-market strategy. Given the significance of non-market strategy in today's markets, it is useful to undertake a similar exercise to determine the extent to which executives in firms can solve strategic non-market problems. In order to evaluate whether managers are so able, we present the results of a survey experiment that sheds light on this question. The survey was given to almost three hundred masters degree students at two leading business schools in the United States.[3] Each respondent was given a series of non-market situations pertaining to activity in administrative regulatory institutions (government agencies and the courts). In addition, various versions of the questions—with more or less information—were given to explore the effects such information has on non-market decision-making. The survey was designed to answer two questions. First, in general, can managers solve simple non-market problems? Second, to what extent does greater uncertainty or less clarity affect these decisions? Although our survey cannot

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[3] As we discuss below, MBA students were engaged as a proxy for managers.

differentiate whether the performance in the questions is attributable to issues of bounded rationality and an inability of solve expected value calculations, or to the precise nature of non-market settings, it does show that expected value calculations in non-market environments are not trouble-free for managers.

To summarize our results, we find that when the problem is fairly simple—requiring only a single non-market forum to assess—the students (managers) perform well: almost ninety percent propose the optimal strategy. When the problem is more complex, however, performance drops considerably: when students must allocate resources across a range of non-market outcomes, only two-thirds propose the payoff maximizing strategy. Finally, when non-market strategy requires thinking not just about the suppliers of policy but also competitors, the managers (students) performed even worse, only half achieving the optimal strategy.

A second set of results has to do with the degree to which managers can cope with less precision in non-market problems. To that end, we modify the survey for certain respondents as a way of understanding how managers deal with such uncertainty. First, we examine the extent to which managers can learn over time about non-market problems. In this case, the managers were given a series of questions of the same form to determine if the answers converged to the "right" or optimal one, over the series. In fact, our results here are heartening for the economic analysis of non-market strategy; they show that as students are given problems of a similar form, over time they reduce the losses from suboptimal answers. We also provided some students with less information—for example,

with only "fuzzy" probabilities that map actions into outcomes. Here we found that, in general, managers who are faced with only imprecise information about outcomes perform similarly to those with more precise information. However, one result stands out: when faced with low probability events, the managers perform more poorly with less information. Finally, in the same vein, we also assessed the degree to which managers would be willing to seek outside advice on non-market problems. It is easy to theorize that the relationship between advice-seeking and competence could be either positive—as more competent managers are also better at recognizing the need for outside advice—or negative—as less competent managers garner more value from outside advice. Here, two results stand out. First, managers who are worse at solving these problems are more likely to hire advisors to solve the problems for them. Second, managers faced with greater uncertainty are more likely to seek outside advice than those in which the environment is more precisely understood.

The paper therefore provides some behavioral regularities which are important to incorporate in developing the literature on non-market strategy. In particular, as managers face more and more complex non-market environments, they are more likely to act in a boundedly rational way. Thus, hyper-rational, non-repeated, complex theoretical models of non-market strategy may be beyond the capabilities of managers to play optimally in real life. On the other hand, when faced with single or repeated, complex situations, the traditional *homo economicus* might become a reasonable approximation of behavior.

The paper proceeds as follows. In the following section we describe the survey instrument used and the sample of students. In Section III, we present the analysis of increasingly complex strategy situations and how respondents performed. In addition, we also examine the nature of biases, if any, in responses. In Section IV, we turn to extensions of the basic instrument to determine how uncertainty, fuzziness and learning affect the basic results. In Section V we offer concluding remarks.

II. THE SAMPLE AND INSTRUMENT

In order to explore whether managers can solve simple games involving non-market strategy, we conducted a survey of 289 MBA students at two leading business schools. We purposefully chose MBA students (as opposed to political science students) because, first, in general, most of these students have been managers prior to entering business school; and second, these are students who will confront non-market problems as they progress through their careers. Thus, to a first approximation, they are more likely to reflect the managerial ranks than are other types of students.

In Business School #1, we randomly sampled one-half of the first year class (179 students). All students were enrolled in a "core" sequence that included economics, statistics, strategic management, organizational behavior, communications, and accounting. In the economics course, all students were introduced to simple, one-stage Nash equilibrium games and simple repeated games concepts.

In Business School #2, we sampled 60% of the second year class (110

students).[4] All students had completed their core sequence and had completed

over 75% of their electives. These students had also taken many of the same core

courses as those students had in Business School #1, and were introduced to the

same game theoretic concepts. In addition, the students in Business School #2

who took the survey were also concurrently enrolled in a required second year

course on business-government relations.

TABLE 1 ABOUT HERE

In Table 1 we present the descriptive statistics for the sample. The full

sample is presented in the first column, followed by the Business School #1 and

Business School #2 subsamples. We believe this group is fairly representative of

middle management at most domestic companies. The average age of the sample

is 27-30 years, with 4-6 years work experience. Two thirds are male, and roughly

two thirds are native English speakers. Nearly a quarter have another graduate

degree (besides the MBA they are earning), and nearly 85% have GMAT scores

higher than 700. The risk tendencies of members of the group are presented in a

number of other questions. While it is hard to measure risk tendency, we ask a

number of questions to attempt to capture the differing dimensions of risk. With

respect to risk for body injury, 90% of students wear seat belts, and less than 10%

smoke regularly. With respect to financial risk tendencies, over 20% of survey

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[4] The sample for Business School #2 may not be random. In Business School #1, 179 of 180
students took the survey, representing nearly three full sections of the MBA class. To the extent
that students are somewhat randomly assigned to sections, then the Business School #1 sample is
random. In Business School #2, 40% of students did not attend the class. To the extent that the
missing students were nonrandom, then the sample can be considered nonrandom. Nevertheless,
the results from the two schools are remarkably similar.

participants have over 90% of their savings in stocks, which, for this age group, would be considered an "aggressive" financial strategy. Only 10% of respondents have children, which might lower their tendency to take many types of physical and financial risks. We do not expect students to have special knowledge of the scenario used in the survey, as only 5% could name the Federal Communications Commission (FCC) Chairman, and only 7% had sued or have been sued.

Although the two business schools are relatively homogeneous by most measures, there are some small differences. The average age and the number of years work experience at Business School #2 is higher than at Business School #1. However, Business School #1 has a higher proportion of individuals with graduate degrees, and has higher mean GMAT scores.

The survey instrument was given to each student in class, and they had 20 minutes to complete the exercise. Students were told the survey was optional; names and other identifying information was not requested. To motivate the students to do well, we positioned the survey as a way for diagnosing their understanding of non-market issues, and as a competition between Business School #1 and Business School #2, to see which students performed better.[5] No questions were permitted after the instrument was handed out.

A copy of most of the questions in the survey instrument is found in Appendix 1. The survey instrument was piloted on ten students and modified before being issued to the 289 MBA students. We have included five questions on the survey instrument displayed, although the actual survey instrument had only three questions for each student (hence the varying sample sizes). The actual

three questions and the ordering of the questions differed across students, so that we could conduct statistical tests of question independence. Every student received a question about Lobbying Alone (Question 1). Every student received a question about Lobbying and Litigation—some received a question with fixed probabilities, while others received a question with fuzzy probabilities (Question 2). Finally, every student received a question about competitive lobbying. Some received a question without learning, while others received a question with learning (Question 3). We include the descriptive statistics for the questions answered in Table 2.

TABLE 2 ABOUT HERE

III. SURVEY QUESTIONS AND RESULTS

Lobbying Alone

In this section of the paper, we review the main questions that help us to understand the ability of students to solve non-market games. We are trying to determine if students can solve economic games that are couched as non-market strategy games, and whether there are systematic mistakes that are made by managers.

The first question that is asked of every student is a question about lobbying alone. Students are asked to choose a non-market investment level that is optimal given the structure of the payoff function. This question is designed to reflect the managerial decision-making about how much to lobby, thinking of lobbying as an investment.

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[5] For MBA students, this actually serves as a good motivator.

By construction, the payoff function maintains constant marginal returns, with a peak at a $50 million investment in lobbying. We illustrate this in Figure 1, as a loss function. Firms are at threat to lose $200 million if they do nothing. By investing some amount, they mitigate that loss. Every $1 million investment enhances the probability of being successful in lobbying by 2%, to a maximum of 100%. Thus, the minimum of the linear loss function resides at a corner of a $50 million investment. It is also important to recognize that the loss function is not symmetric, because the (opportunity) cost of underinvesting by $1 million (a missed opportunity to earn $3 million – 2% of $200 million, less the $1 million in lobbying expense) is greater than the cost of overinvesting (above $50 million which costs simply $1 million for every million invested). So, by construction, there are smaller penalties for overshooting, than for undershooting investment.

INSERT FIGURE 1 ABOUT HERE

Figure 1 illustrates that nearly 90% of respondents chose to invest in lobbying at the highest expected payoff level. Further, despite the asymmetric marginal benefit function, nearly twice as many respondents underinvested in lobbying than overinvested in lobbying. The underinvestors did 20% worse than the overinvestors on average. Nevertheless, the results for underinvestors (relative to overinvestors) were better than expected because those who underinvested tended to underinvest only slightly; those who over invested, overinvested substantially. On the whole, this first question provides us with a good benchmark to what is a relatively straightforward non-market question: how

much should I invest in lobbying if I consider the lobbying game in isolation?

Nine out of ten MBA students are able to lobby optimally.

Lobbying and Litigation with Certainty

The second question explores the relationship between lobbying and

litigation. In reality, firms can lobby regulators for a favorable rule in an

administrative agency. However, if the rule is unfavorable, parties are usually

free to litigate in court over the outcomes. This question is designed to see if

managers can solve this simple two-stage game when all information is

deterministic.

The first part of question two offers the same game as before, but in this

case appends a litigation outcome. The first part of the question assumes that

there is a 50% chance the court will rule in your favor; all else carries over from

the previous question. The question poses: given this second stage litigation, how

much should the firm invest in lobbying in the first stage? The nature of this

question is actually quite simple to implement in practice, but sometimes difficult

for managers to internalize. A 50% probability of being overturned means merely

that the expected payoff to lobbying is now cut in half. That is, lobbying

investment is loss with certainty, but the expected payoff to investment is half of

what it was without the court. This results in a symmetric loss curve as the

marginal payoff to small amounts of lobbying is flatter. Thus, the global

minimum of the loss function is still at a $50 million investment, but expected

return is -$150 million rather than -$50 million as it was in the previous question.

Overshooting and undershooting are equally costly because of the symmetry of the loss curve. We illustrate the results in Figure 2.

INSERT FIGURE 2 ABOUT HERE

In this part of the question, 64% of respondents chose the payoff-maximizing level of investment in lobbying, conditional on a 50/50 chance of winning in litigation ex post. Nearly 10% of respondents chose to overinvest (investing up to $100M) while over one-quarter of respondents chose to underinvest.

In the second part of the question, we try to explore the behavior of managers further along this dimension. Given the same setup, we ask a subset of students to evaluate how much they would invest in lobbying given a 20% probability of a favorable outcome in court.[6] This question is designed to show that if there is a very high probability of losing in court, it may make sense not to invest in lobbying at all, even if you can obtain a favorable outcome. The way this question is structured, the optimal investment is $0. This is because the loss function when lobbying is always lower than the loss function when there is not lobbying—that is there is a corner solution to the problem (see Figure 3).

INSERT FIGURE 3 ABOUT HERE

Almost 35% of respondents chose the payoff maximizing level of lobbying, choosing to invest nothing, while nearly two-thirds chose to overinvest. In this situation, however, small overinvestments do not hurt you very much, because the loss curve does not become steep until after $50 million. Almost

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[6] de Figueiredo and de Figueiredo (2002) develop a game-theory model showing how lobbying and litigation are linked.

27% chose to invest between $40M and $50M in lobbying, which was the policy payoff maximum level in the 50% probability question. Ten percent opted to spend more than $50 million.

Competitive Lobbying

The third question we pose to MBA students focuses on competitive lobbying. The recent literature on competitive lobbying (e.g. Austen-Smith and Wright 1996, Groseclose and Snyder 1996) suggests that lobbying does not occur in a vacuum, but in competition with opposing interest groups. Thus, while the first two questions focused on noncompetitive lobbying, the competition between interest groups is explicitly addressed in this question.

Here, we assume that there are two groups competitively lobbying for rents. They move sequentially, so that the MBA student's firm moves first, and is then followed by the competitive firm. (This insures a unique equilibrium.) While the marginal value to lobbying is the same as it was before, the value is determined by the net difference in lobbying expenditures between the student and the competitor. Whereas before, in Question 1, $50 million was the global maximum ($50M times 2%= 100% probability of not losing $200 million), in this case, the returns to lobbying would be (Your Expenditure – Competitor Expected Expenditure) times 2%. This problem calls to mind the model of Groseclose and Snyder (1996) of buying supermajorities, where we have sequential moves and the optimal strategy of the first-mover often limits the second-mover's ability to "cherry pick" cheap individuals from thin majorities.

To solve this problem, which can be complex, students have to recognize that if they invest too little, the second mover will come in and obtain all the rents. So while the optimal investment may first seem to be $50 million, it is clear that the competitor will come in investing $100 million and win the $200 million prize with certainty. Students must recognize that there is a blocking strategy so that their investment will prevent entry. If we assume that the ties are given to the first mover, then the blocking strategy is to invest $150 million or more to earn the $200 million with certainty. There is no incentive for the second mover to invest, because the return is at best zero. We illustrate this as a loss function in Figure 4.

INSERT FIGURE 4 ABOUT HERE

Figure 4 provides the frequency distribution for respondents. A full 50% of the respondents chose to invest at the payoff maximizing level, $150 million.[7] This group would effectively block second movers from lobbying for policy, and receive the highest payoff. Alternatively, 50% of respondents did not respond with the optimal value. Nearly 20% overinvested in lobbying, while 30% underinvested in lobbying. Those who underinvested took a particularly large hit, because not only did they not prevent lobbying by a second-mover, but they also lost their investment. (Contrast this to those who overinvested, and lost their investment, but blocked entry by a second mover.) Those respondents who underinvested found themselves substantially worse off than those who overinvested. The extra loss attributed to underinvestment was nearly three times,

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[7] Because the tie-breaking rule was not clear in the survey instrument, we have combined those that answered $150M and $151M into "$150M", and report our results as thus going forward.

on average, the loss from overinvestment. Taken together, it would suggest that

managers might have some difficulty thinking about competitive lobbying and

lobbying coupled with litigation, which does not afflict managerial decision-

making in noncompetitive lobbying.

EXTENSIONS

In this section, we introduce three extensions to the analysis.[8] The first is

an analysis of learning. Although managers may be asked to make decisions

regarding non-market strategy, it is equivocal whether managers are "thrown"

into this situation or gradually "ramp-up" to learning about the situation over

time.[9] While learning over many years is difficult to replicate in a survey, we

have introduced one question with learning. On the competitive lobbying

question, we included, on some surveys, a question where students were "guided"

to the correct answer with leading questions. Rather than just asking them for the

answer on the question, we asked a series of questions so that they could

triangulate on the equilibrium. In doing this, we hoped that they would

understand in what range the equilibrium existed, and they would figure out how

to solve this problem. Thus, as an addendum to question 3, we asked how much

the student would spend in lobbying if the competitor had spent $50, $100, $125,

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[8] We conducted an econometric analysis of the data to see if we could determine what are the
characteristics of managers who perform well in these types of non-market strategy questions.
The results were, on the whole, not statistically significant. We did find in one regression on
competitive lobbying without learning, that students with GMAT scores above 700 did save up to
$45M in excessive losses at a 95% level of statistical significance. There were also small
performance differences in performance across business schools.
[9] In interviews with executives, the former seems to be a better characterization. These interviews
have suggested that managers move along in their careers managing their market strategies. When

$175, and $195 million respectively. We expected to have students learn that the

answer was somewhere between $125 and $175 million, and the intuition would

be clear.

<center>INSERT FIGURE 5 ABOUT HERE</center>

Figure 5 illustrates the results under learning. Although 7% fewer of the

respondents chose the correct answer in this situation than did in the situation

without learning, a much higher percentage chose to over-invest rather than

under-invest in the optimal lobbying effort. This is quite interesting. It is likely

due to the nature of learning mechanism. The survey asked what one expected

the second mover to invest if you, as the first mover invested $100, $125, $175,

and $195 million. The $175 million is the first answer where blocking occurs.

Thus, 22% of respondents focused on the $175 million expenditure and wrote this

as their level of investment, rather than understanding the precise mechanism by

which blocking occurred, and thus obtain blocking a cheaper price. Nevertheless,

students did seem to learn, and greatly increased their investment over the "non-

learning" situation, because they tended to over-invest for benefit, rather than

under-invest. This in turn, results in a much better situation for the firm, than

underinvestment.

The second extension we introduced was uncertainty. As with many

problems managers face, the exact probabilities are unknown. Rather, managers,

through advisors or other means, usually obtain fuzzy probabilities of success,

such as "low", "moderate", "high". We incorporated this thinking into the

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they reach the executive ranks, they are suddenly confronted with a host of non-market issues,
with which they are ill-equipped to contend.

analysis of litigation. We replicated question 2 on litigation. However, instead of giving the participants concrete probabilities of winning in litigation, we asked them how much they would invest in lobbying (the lobbying production function is known with certainty) when the probability of winning in litigation was "moderate" and "low".

The mean value of investment under moderate probabilities of winning was $46.7M, compared to $46.6M investment for a 50% chance of winning for a non-overlapping set of questionnaires. The optimal lobbying investment in this situation is $50M. This would suggest that students impute a 50% chance of winning in litigation when they are told they have a "moderate" chance. When told they have a "low" chance of winning, the mean investment in lobbying is $21.5M, compared to $27.5M when told they have a 20% chance of winning in litigation. This result suggests two things. First, the respondents likely impute a probably lower than 20% when they are told they have a "low" probability of winning. Second, it may be better to have fuzzy low probabilities, because then the managers choose closer to the optimal investment, $0M.[10] Notably, this result is consistent with the literature on low and negative probabilities and human behavior. That is, managers have difficulty in dealing with low probability events

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[10] There is another way of looking at this. That is, assume that managers choose the optimal investment with fuzzy probabilities. What is the probability they impute? Unfortunately we cannot answer this question, because with constant marginal benefit, managers should only choose $0M or $50M. To the extent that there is a bimodal distribution, reflecting indifference between the two corners, and we see $21.5M as the outcome, this would suggest that 40% of managers believed that "low" meant less than 25% probability of winning, while 60% of managers believed that "low" meant 25% or greater probability of winning. Note, however, that this strictly economic interpretation must be taken carefully, as the results of question two are at odds with this outcome.

and making what are profit-maximizing decisions in this realm (Kahneman and Tversky 1979, Viscusi 1999).

A final extension we introduced into the survey was on the reliance on consultants. A common critique made of the non-market strategy field is that managers do not have to know non-market management tools, because they have people who can advise them.[11] We tackle this critique in this survey instrument. These experienced advisors and consultants can offer managers the "right" answer. We append to question two additional questions related to how much a manager would be willing to pay an advisor under conditions of certainty and under conditions of uncertainty. This allows us to identify how confident managers are in their calculations. It also allows us to see if managers are willing to pay advisors more under uncertainty (where supposedly their value is higher) than under conditions of certainty. The relationship between advice-seeking and competence could be either positive—as more competent managers are also better at recognizing the need for outside advice—or negative—as less competent managers garner more value from outside advice. We ask these questions for both the high and low probability of winning in litigation, where the consultant offers advice on optimal lobbying investments.

The first interesting result is that managers are willing to pay consultants more the higher the likelihood of winning in court. With a 50% chance of winning in litigation, a consultant is paid on average $20M by the firm, but with a

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It is also interesting to note how frustrated many respondents were with the idea of having to make decisions with fuzzy probabilities. Many students, after the questionnaire was completed, wanted to know how they were supposed to make decisions without knowing the actual numbers.

20% chance of winning in litigation, a consultant is paid $11M by the firm. This is interesting because the consultant may be of more value when the probability is low, and the firm should not waste its time investing. To examine whether there were systematic differences between those respondents who chose the payoff-maximizing investment and those who did not, we constructed a dummy variable that is equal to one if the optimal investment is chosen and zero otherwise. With a 50% chance of winning, the consultant makes no more nor less money from those people who chose the correct answer than those who chose the incorrect answer (correlation -.02). However, at the 20% chance of winning in litigation, the manager is likely to pay the consultant more if the manager is unable to calculate the correct answer herself. This correlation of -.25 is statistically significant and suggests that managers who cannot solve these problems do hire consultants, especially when probabilities are in the tails.

We then compared these results to the results with fuzzy probability. The mean consulting fee for a firm that faces a moderate probability of winning in litigation is $23.0M, and $17.8M for low probability of winning in litigation. First, recognize that both of these numbers are higher than the fees they earn under certainty (paragraph above). So managers pay advisors more the greater the uncertainty. Second, managers still pay advisors more the better the outcome. That is, high probabilities of winning are associated with higher fees, despite the fact that the loss function may be quite steep at low probabilities.

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[11] This is somewhat akin to managers don't need to know accounting, because they can hire accountants. Managers only need to know how to "manage."

CONCLUSION

As we commented in the introduction, as the field of non-market strategy develops, it is crucial to understand the degree to which practitioners conform to the stark behavioral assumptions underlying theories. As a means of assessing the degree to which the rational assumptions underlying these theories are reasonable approximations, we provided almost three hundred prospective managers with increasingly complex strategic situations. Our purpose was to assess the degree to which the respondents could solve such problems. Indeed, to the extent that the question had precise answers which could be analytically derived, the first set of results speak more to the question of whether managers can solve expected utility problems—in this case couched as non-market problems.

In general our results show that with simple, single-stage problems, managers are very competent in reaching the optimal choice given their environment. As problems become more complex, however, they have much greater difficulty in arriving at the optimal result. In this regard, analysts must use some caution when evaluating and applying theoretical results. Thus, moving ahead, we must be careful about how we interpret non-market strategy empirical results. Studies with non-results do not necessarily suggest that non-market strategy is not important, but perhaps that managers have not figured out their optimal strategy.

That said, however, our results also include a strong optimism for economic analysis of non-market strategy. For they show that at least in the stark environment we provided, that over time, when confronted with similar problems,

managers can adapt and learn about their environment and improve their

performance. Further, our final set of results show that when faced with problems

they cannot solve, managers will seek outside advice in order to reach a "better"

solution.

Certainly, experiments in non-market strategy are useful in simplifying

and controlling for a variety of complex situations that make it hard to identify the

extent to which the non-market component has either been effectively pursued or

resulted in favorable competitive advantage. As extensions to the work, it would

be interesting to replicate this experimental study in other settings. Jaffee and

Freeman (2002), in this volume, suggest sophisticated non-market strategies are

being employed in Germany. Creating experiments to compare the sophistication

of managers in other national settings, to those in the United States, would be an

interesting comparative study to follow. In addition, replicating our experiments

in a market setting would be a useful extension of this work, because our survey

cannot determine whether any shortcomings by respondents is due to general

problems of bounded rationality, or specifically to the non-market setting of the

questionnaire. Identifying analogous questions and setups in the market

environment, and conducting a similar survey, would allow us to separate out the

effects of our results that are generated from the "non-market environment"

versus the "analytical setup and bounded rationality." Nevertheless, there are a

number of reasons to believe that the application of traditional self-interest

calculations might have to be modified when moving to non-market settings.

Therefore, a final path to pursue is to separate out exactly how non-market

strategy questions might differ systematically from market strategy questions.

ACKNOWLEDGMENT

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TABLE 1: PARTICIPANT CHARACTERISTICS

Variable	Full Sample	Business School #1	Business School #2
CALCULATOR USED	0.08	0.08	0.08
MALE	0.67	0.71	0.61
AGE <26	0.13	0.18	0.05
AGE 27-30	0.71	0.70	0.72
AGE 31-35	0.14	0.09	0.21
AGE 35+	0.01	0.02	0.01
GRADUATE SCHOOL	0.24	0.27	0.20
0-3 YRS WORK EXP	0.22	0.26	0.16
4-6 YRS WORK EXP	0.58	0.58	0.60
7-9 YRS WORK EXP	0.13	0.10	0.17
10+ YRS WORK EXP	0.04	0.05	0.03
ENGLISH FIRST LANGUAGE	0.63	0.65	0.59
WEAR SEAT BELTS	0.89	0.87	0.94
SMOKER	0.09	0.09	0.08
PARENT	0.09	0.07	0.11
90% INVESTMENT STOCKS	0.22	0.23	0.20
FORMER GOVT EMPLOYEE	0.16	0.16	0.15
SUED BEFORE	0.07	0.07	0.07
GMAT <500	0.00	0.00	0.01
GMAT 500-549	0.00	0.01	0.00
GMAT 550-599	0.01	0.00	0.03
GMAT 600-649	0.08	0.08	0.08
GMAT 650-699	0.34	0.31	0.39
GMAT 700-800	0.49	0.53	0.43
CAN NAMECHAIRMAN FCC	0.05	0.06	0.05

Note: Means presented. All variables are dummy variables. N= 289 for full sample, n_1=179 for Business School #1, n_2=110 for Business School #2

TABLE 2: SURVEY RESPONSES

| Variable	Obs	Mean	Std. Dev	Min	Max
CALCULATOR USED	289	0.08	0.28	0	1
MALE	289	0.67	0.47	0	1
AGE <26	289	0.13	0.34	0	1
AGE 27-30	289	0.71	0.46	0	1
AGE 31-35	289	0.14	0.35	0	1
AGE 35+	289	0.01	0.12	0	1
GRADUATE SCHOOL	289	0.24	0.43	0	1
0-3 YRS WORK EXP	289	0.22	0.42	0	1
4-6 YRS WORK EXP	289	0.58	0.49	0	1
7-9 YRS WORK EXP	289	0.13	0.33	0	1
10+ YRS WORK EXP	289	0.04	0.20	0	1
ENGLISH FIRST LANGUAGE	289	0.63	0.48	0	1
WEAR SEAT BELTS	289	0.89	0.31	0	1
SMOKER	289	0.09	0.28	0	1
PARENT	289	0.09	0.28	0	1
90% INVESTMENT STOCKS	289	0.22	0.41	0	1
FORMER GOVT EMPLOYEE	289	0.16	0.37	0	1
SUED BEFORE	289	0.07	0.26	0	1
GMAT <500	289	0.00	0.06	0	1
GMAT 500-549	289	0.00	0.06	0	1
GMAT 550-599	289	0.01	0.10	0	1
GMAT 600-649	289	0.08	0.27	0	1
GMAT 650-699	289	0.34	0.47	0	1
GMAT 700-800	289	0.49	0.50	0	1
CAN NAME CHAIRMAN FCC	289	0.05	0.22	0	1
Q1 LOBBYING	274	50.31	12.36	0	149
Q2A 50% LITIGATION	159	46.60	22.22	0	100
Q2B 20% LITIGATION	154	27.52	35.14	0	200
Q2C 50% CONSULTANT PAY	145	20.23	32.29	0	160
Q2D 20% CONSULTANT PAY	140	11.19	28.58	0	160
Q2A MODERATE LITIGATION	110	46.72	23.31	0	160
Q2B LOW LITIGATION	108	21.50	33.15	0	200
Q2C MODERATE CONSULTANT PAY	103	23.04	39.57	0	151
Q2C LOW CONSULTANT PAY	98	17.80	36.81	0	200
Q3A 50M COMPETITOR	275	98.45	12.85	50	150
Q3B 100M COMPETITOR	275	133.02	47.10	0	200
Q3C EQUILIBRIUM COMPETITOR	170	127.79	58.65	0	200
Q3D EQUILIBRIUM OWN	165	25.28	52.17	0	201
Q3C 125M COMPETITOR LEARNING	98	151.08	57.74	0	199
Q3D 175M COMPETITOR LEARNING	98	31.63	72.53	0	225
Q3E 195M COMPETITOR LEARNING	97	25.25	68.64	0	245
Q3F LEARNING EQ COMPETITOR	97	143.68	51.12	0	399
Q3G LEARNING EQ OWN	93	28.70	59.56	0	200

FIGURE 1: LOBBYING ALONE

Q1: Expected value calculation to lobbying under constant marginal benefit.
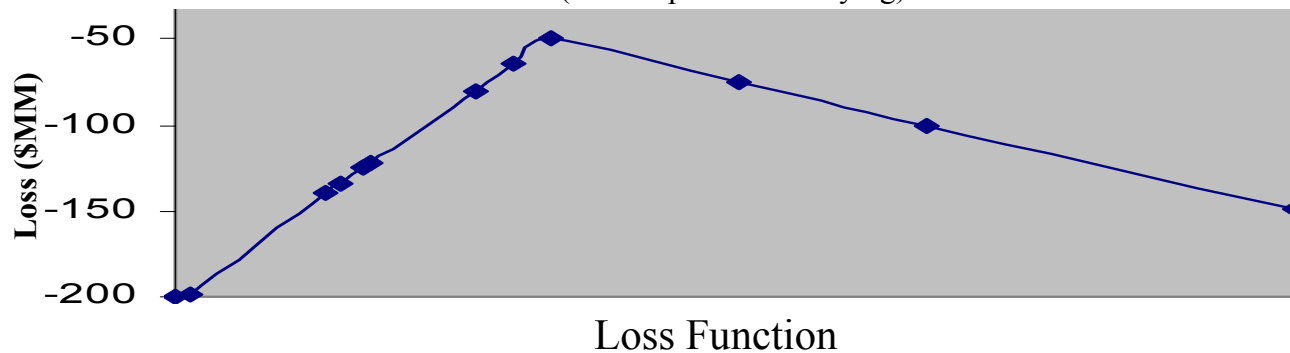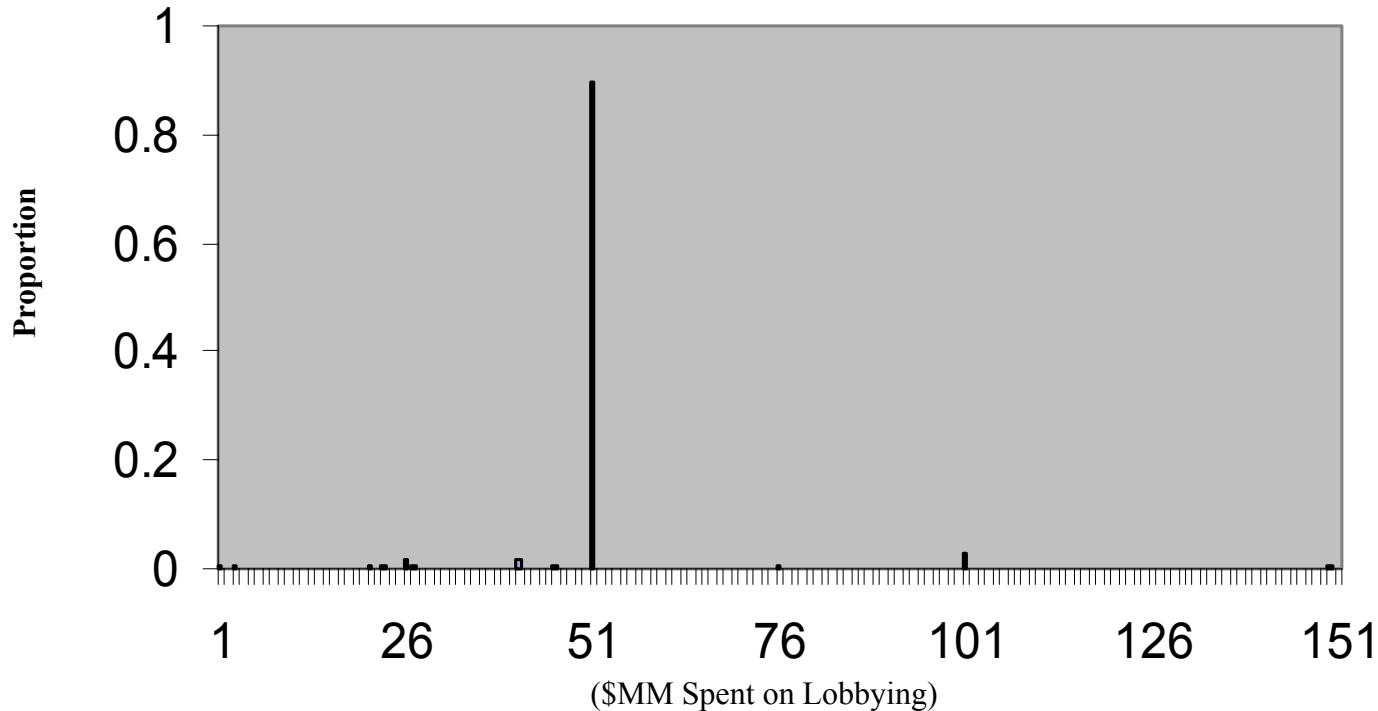
Note: The bottom graph represents the payoff function (loss function) to lobbying. The top graph represents the frequency distribution of chosen investment levels in lobbying, given an experimental question with the payoff function in the bottom graph. Nearly 90% of respondents chose the level of investment that would maximize his/her payoff (minimize the loss).
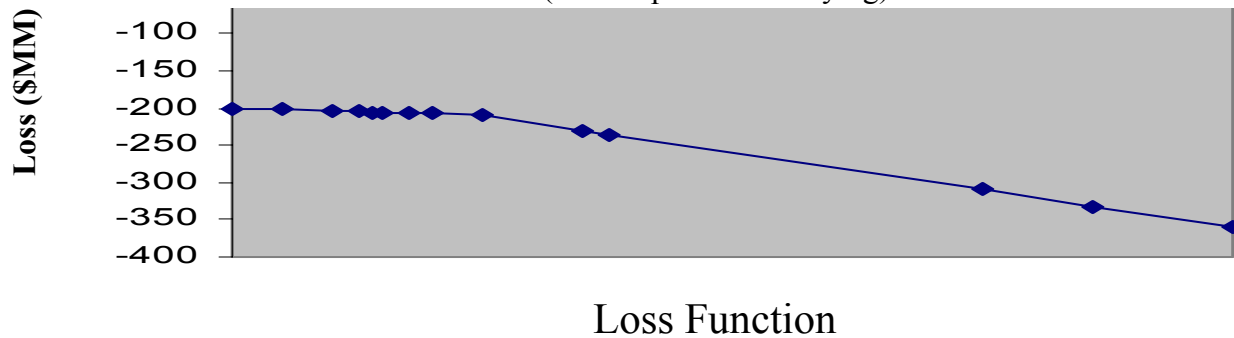
FIGURE 2: LOBBYING AND LITIGATION (50%)

Q2: Lobbying with 50% overturn chance in the courts.
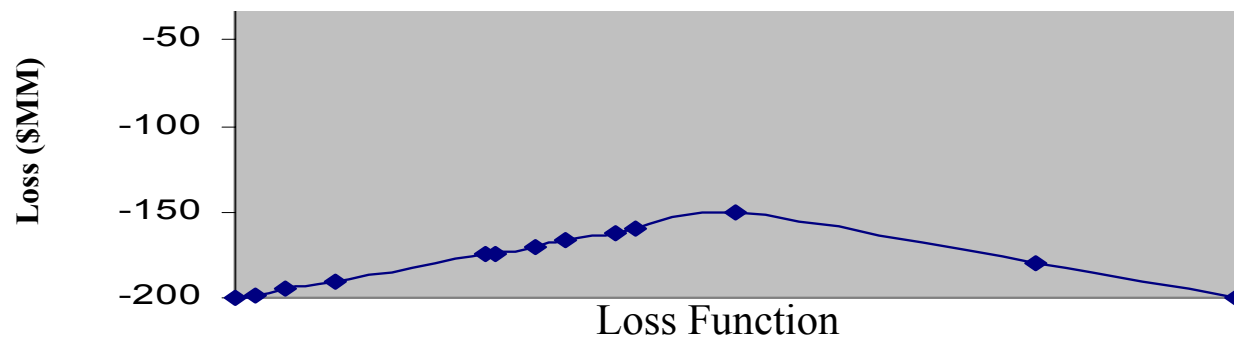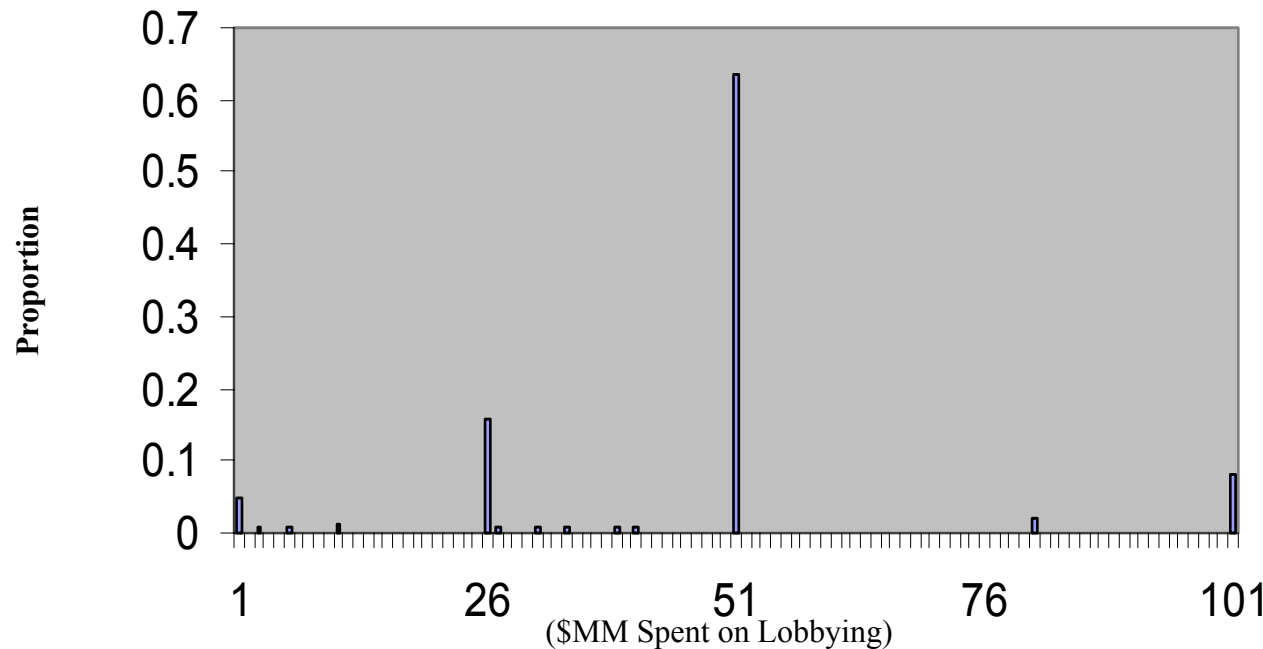
Note: The bottom graph represents the payoff function (loss function) to lobbying when there is a 50% probability that the court will overrule the agency. The top graph represents the frequency distribution of chosen investment levels in lobbying, given an experimental question with the payoff function in the bottom graph. The maximum payoff occurs at $50M investment. Almost 64% of respondents chose the payoff maximizing level of lobbying. Ten percent chose over-investment, while 26% chose to under-invest.

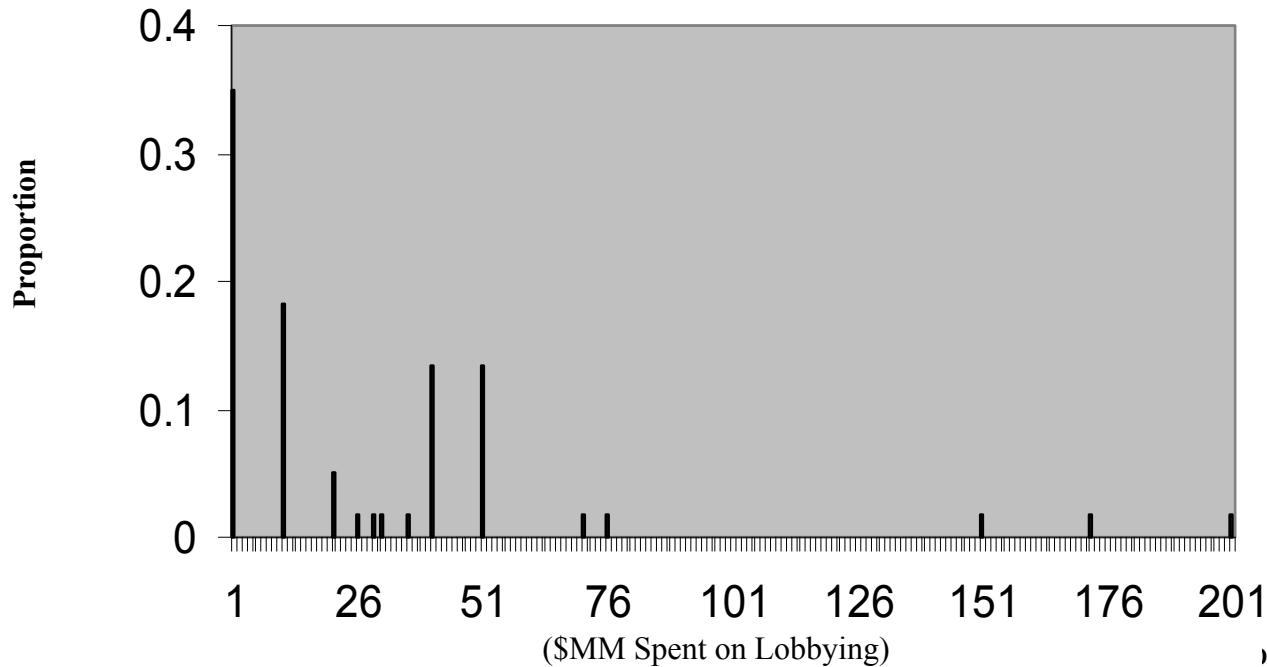# FIGURE 3: LOBBYING AND LITIGATION (20%)

Q2: Lobbying with 20% overturn chance in the courts.

Note: The bottom graph represents the payoff function (loss function) to lobbying when there is a 20% probability that the court will overrule the agency. The top graph represents the frequency distribution of chosen investment levels in lobbying, given an experimental question with the payoff function in the bottom graph. The maximum payoff occurs at $0M investment, Almost 35% of respondents chose the payoff maximizing level of lobbying, while nearly two-thirds chose to over-invest. Almost 27% chose to invest between $40M and $50M in lobbying.

FIGURE 4: COMPETITIVE LOBBYING

Q3c: Competitive Lobbying Equilibrium
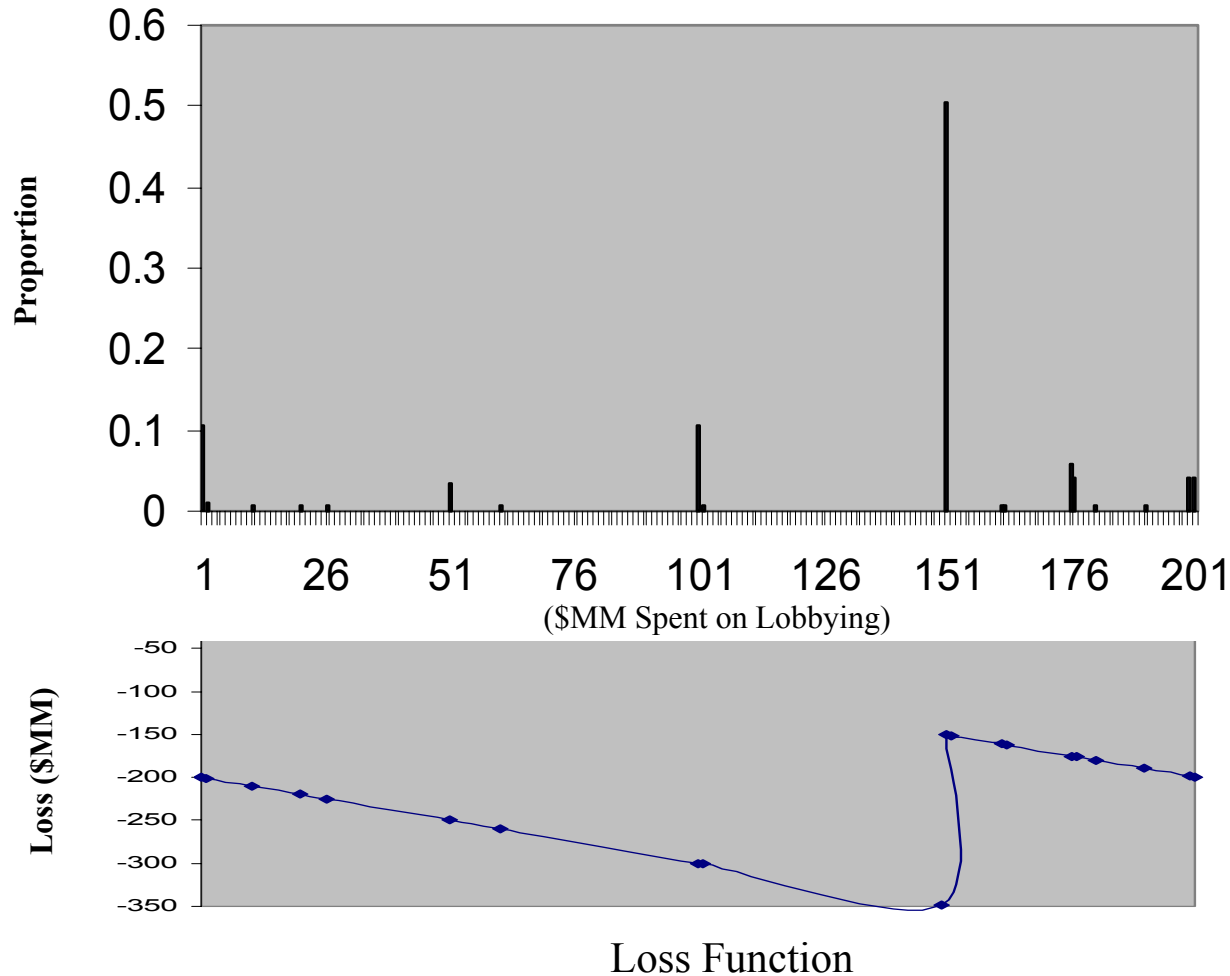
Note: The bottom graph represents the payoff function (loss function) to competitive lobbying. The top graph represents the frequency distribution of chosen investment levels in lobbying, given an experimental question with the payoff function in the bottom graph. The maximum payoff occurs when one deters a second mover from lobbying. This occurs when the lobbying expenditure by the first mover is sufficiently high. Approximately 50% of respondents chose the maximum of the payoff with 30% under-investing and 20% over-investing.

FIGURE 5: COMPETITIVE LOBBYING WITH LEARNING

Q3f: Competitive Lobbying with Learning Equilibrium
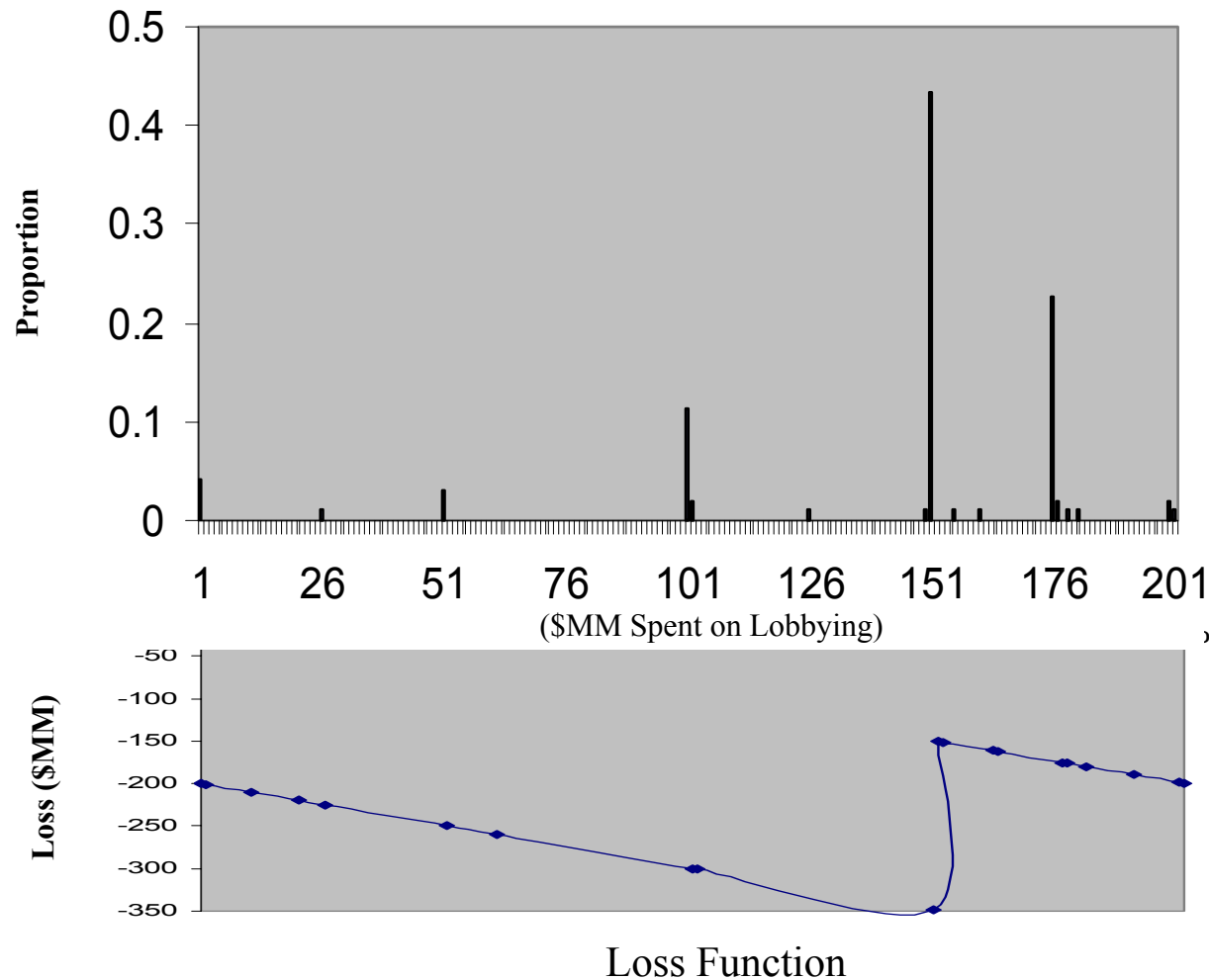

Note: The bottom graph represents the payoff function (loss function) to competitive lobbying. The top graph represents the frequency distribution of chosen investment levels in lobbying, given an experimental question with the payoff function in the bottom graph. The maximum payoff occurs when one deters a second mover from lobbying. This occurs when the lobbying expenditure by the first mover is sufficiently high. Approximately 43% of respondents chose the maximum of the payoff function with 25% under-investing and 32% over-investing. Note that 23% of respondents chose to invests $175M, the tipping point in the survey question.

Non-Market Strategy Questionnaire

The attached questionnaire is completely OPTIONAL and ANONYMOUS. It will be used for the purposes of teaching and research. In addition, any published results or presentation of the results will be only concerning aggregate patterns of responses. All answers will be kept otherwise anonymous.

You have 25 minutes to answer the questions. You may use blank spaces for calculations. You may use a calculator or other electronic device.

Please note: the boxed part of each question is identical across all questions.

Please answer the two questions below before you leave.

PLEASE WRITE THE TIME ON THE CLOCK WHEN YOU TURN IN THIS SURVEY. TIME ON CLOCK AT COMPLETION: _____

DID YOU USE A CALCULATOR OR COMPUTER TO ANSWER ANY OF THE QUESTIONS?   YES   NO

Please answer the following questions. We are not asking for your name or otherwise identifying information. You will remain anonymous. This is for our records so that our analysis can be complete.

Sex: Male   Female

Age (circle): less than 26   26-30   31-35   35+

In addition to your current MBA studies, have you completed any other graduate degree?   Yes   No

Number of Years Full Time Work Experience (circle):   0-3   4-6   7-9   10+

Native Language: English   Other (Specify)_____

Do you wear seat belts more than 80% of the time?   Yes   No

Do you smoke more than one cigarette a week?   Yes   No

Do you have children?   Yes   No

Is more than 90% of your wealth in the stock market?   Yes   No

Have you worked for more than three months as a government employee?   Yes   No

Have you ever been sued or sued anyone?   Yes   No

GMAT math score (circle):

less than 500   500-549   550-599   600-649   650-699   700+   don't know

Please name the Chairman of the Federal Communications Commission, if you know who it is, otherwise write a zero?
NAME:_____

Q1. You are the Chief Operating Officer of Telco, Inc., a very large telecommunications company. Many of your activities are regulated by the Federal Communications Commission (FCC), a government commission that oversees the activities of telecommunications companies.

Under current regulations set by the FCC, you are required to pay, for the next year only, a tax to the government of $200 million. The $200 million tax will be transferred to LDCo, a long distance company. After next year, the tax will end.

The Board and CEO have come to you and are asking you to eliminate that tax. Studies have shown that this reduction in tax will have NO impact on the volume of calls or the prices which are charged by you or the long distance companies. It only impacts the amount of the transfer. So if the tax is eliminated, you, as Telco, will earn an additional $200 million next year.

In this question only, your sole means to influence the FCC is to lobby (or persuade) the FCC to lower the tax. No other actors can influence the outcome. For every $1 million you spend, there is a 2% increase in the probability (to a maximum of 100%) that the FCC will vote in your favor and eliminate the tax. So, for example, if you spend $10 million, there is a 20% chance the FCC will vote for no tax, and an 80% chance the FCC will keep the $200 million tax.

In this question, there are no other avenues of appeal of an FCC decision. The FCC decision is final.

How much do you spend on lobbying?

PUT ANSWER HERE: _____

Q2 and 3. You are the Chief Operating Officer of Telco, Inc., a very large telecommunications company. Many of your activities are regulated by the Federal Communications Commission (FCC), a government commission that oversees the activities of telecommunications companies.

Under current regulations set by the FCC, you are required to pay, for the next year only, a tax to the government of $200 million. The $200 million tax will be transferred to LDCo, a long distance company. After next year, the tax will end.

The Board and CEO have come to you and are asking you to eliminate that tax. Studies have shown that this reduction in tax will have NO impact on the volume of calls or the prices which are charged by you or the long distance companies. It only impacts the amount of the transfer. So if the tax is eliminated, you, as Telco, will earn an additional $200 million next year.

In this question only, regulation in the United States is a two-stage process. First, you can lobby (or persuade) the FCC to lower the tax. No other actors can influence the outcome at this stage. For every $1 million you spend, there is a 2% increase in the probability (to a maximum of 100%) that the FCC will vote in your favor and eliminate the tax. So, for example, if you spend $10 million, there is a 20% chance the FCC will vote for no tax, and an 80% chance the FCC will keep the $200 million tax.

Second, a party who does not like the ruling, can appeal to the court. You are relatively certain LDCo would be unhappy by a lower tax, and would choose to take the case to court if the FCC decided to lower the tax.   In general, the court can uphold the decision of the FCC, or, if the decision is different from the original state of affairs, revert back to the original state of affairs. The original state of affairs is a taxation rate of $200 million.

In our example, if the FCC ruled $200 million then the Court could only rule $200 million. However, if the FCC ruled no tax, the Court would have a choice of upholding the FCC decision at no tax or reverting back to $200 million.

Suppose that the FCC is deciding between reducing the one-time tax to nothing or keeping the tax at $200 million, and the court will then rule.

[The questions appear on the next page.]

A. Suppose the court has a 50% chance of upholding the FCC and a 50% chance of overturning the FCC ruling. How much would you as Telco spend on lobbying?

PUT YOUR ANSWER HERE: _____

B. Suppose the court has a 20% chance of upholding the FCC and an 80% chance of overturning the FCC ruling. How much would you as Telco spend on lobbying?

PUT YOUR ANSWER HERE: _____

C. How much would you as Telco pay a litigation consultant, who is very experienced at making these calculations, as a consulting fee, to advise you on your optimal expenditures, assuming the chances in court are 50/50 as in part A of this question?

PUT YOUR ANSWER HERE: _____

D. How much would you as Telco pay a litigation consultant, who is very experienced at making these calculations, as a consulting fee, to advise you on your optimal expenditures, assuming the chances in court are 20/80 as in part B of this question?

PUT YOUR ANSWER HERE: _____

Q4. You are the Chief Operating Officer of Telco, Inc., a very large telecommunications company. Many of your activities are regulated by the Federal Communications Commission (FCC), a government commission that oversees the activities of telecommunications companies.

Under current regulations set by the FCC, you are required to pay, for the next year only, a tax to the government of $200 million. The $200 million tax will be transferred to LDCo, a long distance company. After next year, the tax will end.

The Board and CEO have come to you and are asking you to eliminate that tax. Studies have shown that this reduction in tax will have NO impact on the volume of calls or the prices which are charged by you or the long distance companies. It only impacts the amount of the transfer. So if the tax is eliminated, you, as Telco, will earn an additional $200 million next year.

In this question, your sole means to influence the FCC is to lobby (or persuade) the FCC to lower the tax. For every $1 million you spend, there is a 2% increase in the probability (to a maximum of 100%) that the FCC will vote in your favor and eliminate the tax. So, for example, if you spend $10 million, there is a 20% chance the FCC will vote for no tax, and an 80% chance the FCC will keep the $200 million tax.

Unfortunately, in this question only, you are not alone. LDCo is also lobbying. The FCC decision will be determined based on the *net* amount spent on lobbying. In particular, the probability the FCC will vote to eliminate the tax will increase by 2% for every $1 million *more* that Telco spends than LDCo (to a maximum of 100%). If the net amount is zero or negative then the FCC will not change the tax. So for example, if LDCo spends $100 million on lobbying and Telco spends $125 million then the probability that the FCC will rule to eliminate the tax will be 50% (i.e. $125 million spent by Telco - $100 million spent by LDCo = $25 million x 2% = 50% chance the FCC will rule to eliminate the tax).

In this question, there are no other avenues of appeal of an FCC decision. The FCC decision is final.

[The questions appear on the next page.]

A. If LDCo has spent $50 million on lobbying, how much will you as Telco spend on lobbying?

PUT YOUR ANSWER HERE: _____

B. If LDCo has spent $100 million on lobbying, how much will you as Telco spend on lobbying?

PUT YOU ANSWER HERE: _____

C. If you do not know how much LDCo has spent on lobbying, how much would you expect them to spend, assuming they spend money first, and they know Telco receives a 2% higher probability of winning for every million dollars more Telco spends than LDCo spends?

PUT YOUR ANSWER HERE: LDCo:_____

How much would you as Telco spend on lobbying, given LDCo has already spent the amount you have calculated above?

PUT YOUR ANSWER HERE: Telco:_____

Q5. You are the Chief Operating Officer of Telco, Inc., a very large telecommunications company. Many of your activities are regulated by the Federal Communications Commission (FCC), a government commission that oversees the activities of telecommunications companies.

Under current regulations set by the FCC, you are required to pay, for the next year only, a tax to the government of $200 million. The $200 million tax will be transferred to LDCo, a long distance company. After next year, the tax will end.

The Board and CEO have come to you and are asking you to eliminate that tax. Studies have shown that this reduction in tax will have NO impact on the volume of calls or the prices which are charged by you or the long distance companies. It only impacts the amount of the transfer. So if the tax is eliminated, you, as Telco, will earn an additional $200 million next year.

In this question, your sole means to influence the FCC is to lobby (or persuade) the FCC to lower the tax. For every $1 million you spend, there is a 2% increase in the probability (to a maximum of 100%) that the FCC will vote in your favor and eliminate the tax. So, for example, if you spend $10 million, there is a 20% chance the FCC will vote for no tax, and an 80% chance the FCC will keep the $200 million tax.

Unfortunately, in this question only, you are not alone. LDCo is also lobbying. The FCC decision will be determined based on the *net* amount spent on lobbying. In particular, the probability the FCC will vote to eliminate the tax will increase by 2% for every $1 million *more* that Telco spends than LDCo (to a maximum of 100%). If the net amount is zero or negative then the FCC will not change the tax. So for example, if LDCo spends $100 million on lobbying and Telco spends $125 million then the probability that the FCC will rule to eliminate the tax will be 50% (i.e. $125 million spent by Telco - $100 million spent by LDCo = $25 million x 2% = 50% chance the FCC will rule to eliminate the tax).

In this question, there are no other avenues of appeal of an FCC decision. The FCC decision is final.

[The questions appear on the next page.]

A. If LDCo has spent $50 million on lobbying, how much will you as Telco spend on lobbying?

PUT YOUR ANSWER HERE: _____

B. If LDCo has spent $100 million on lobbying, how much will you as Telco spend on lobbying?

PUT YOU ANSWER HERE: _____

C. If LDCo has spent $125 million on lobbying, how much will you as Telco spend on lobbying?

PUT YOU ANSWER HERE: _____

D. If LDCo has spent $175 million on lobbying, how much will you as Telco spend on lobbying?

PUT YOU ANSWER HERE: _____

E. If LDCo has spent $195 million on lobbying, how much will you as Telco spend on lobbying?

PUT YOU ANSWER HERE: _____

F. If you do not know how much LDCo has spent on lobbying, how much would you expect them to spend, assuming they spend money first, and they know Telco receives a 2% higher probability of winning for every million dollars more Telco spends than LDCo spends?

PUT YOUR ANSWER HERE: LDCo:_____

How much would you as Telco spend on lobbying, given LDCo has already spent the amount you have calculated above?

PUT YOUR ANSWER HERE: Telco:_____