Union Representation Elections:
Campaign and Vote

by

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ABSTRACT 

Three theories of how campaigns might influence voting in union representation elections are explicated. The first theory focuses on the role of campaigns in maintaining norm structures in the workplace, the second theory relates people's voting to their use of information and the third theory is concerned mainly with the role of intimidation in influencing people's voting decisions. 

Data on 1273 workers who took part in 31 union representation elections in the mid-west in 1972 and 1973 was used to estimate and simulate models of the individual voting decision. 

Subject to methodological qualifications it is concluded that campaigns do have a substantial impact on how people vote. In particular, illegal campaign practices are found to be important in determining the outcome of elections. It also appears likely that the National Labor Relations Board can determine when illegal campaign practices have affected the vote in an election. Finally, tests of the three theories of the role of campaigns allow the rejection of the first two theories as the sole explanation for the observed behavior and provide weak support for the third. The implications of these results for labor policy are developed in the conclusion. 

Thesis Supervisor: Dr. Henry Farber, Asst. Prof. of Economics
For Maureen

May her world look brighter
as time goes by.
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I. Introduction:

The concept of manipulation is rather uncongenial to economists, most of whom emphasize the fixedness of preferences and the smooth working of markets in response to preferences, and most of whom reject the notion of true underlying interests from which preferences might diverge. It is more akin to sociologists' concerns with the use of socialization processes to create in malleable man attitudes and behaviors opposed to his objective interests.

-Benjamin I. Page
Choices and Echoes
In Presidential Elections

Despite economists' failure to give much consideration to the possibility that people might not always act in their own best interest, the supposition that they often do not is at the root of a large amount of law. From food stamps to consumer protection, from occupational health and safety legislation to much of the national labor relations act, the government intervenes in many aspects of our daily lives to limit the range of our choices with the express intent of protecting us from our own mistakes and manipulation by others.

This type of legislation has always been fiercely debated in this country. One side decrees the interventions as "elitism" or "paternalism" which limits individual freedom and destroys individual initiative. On the other side, those who
defend such legislation argue that systematic biases in available information caused by disparities of economic power, coupled with the vulnerability of those most lacking in economic means, make the notion of free choice an empty parable.

Economics has not been entirely silent on these issues. It is possible to argue, within the framework of the economics of information, for legislation promoting descriptive labeling and prohibiting deception. Arguments can be made both on the grounds of efficiency and equity. However, such arguments do not go far enough to satisfy many people who design social policy. These people would argue that the economists' notion of individual rational decision making is an inadequate model for understanding people's behavior in a world where economic well-being is precarious and people are ill prepared to deal with the sophisticated techniques a powerful economic interest can wield.

This study is the first step in an attempt to develop a way of conceptualizing "manipulation" which is "congenial" to economists. What follows is an attempt to develop a model of a type of situation which has been subject to "protective" legislation, and where there has been considerable debate over the appropriate nature and extent of that regulation. It is hoped that this study will shed light on the specific policy questions raised in this area, as well as the general question of the appropriate nature of regulation.

The National Labor Relations Act (NLRA) provides standards
for the National Labor Relations Board (NLRB) to use in regulating the conduct of unions and employers in union representation elections. (1) Many activities which unions and employers might undertake are prohibited or limited by the act. The types of behavior which are prohibited include deceptive practices and much more. For instance, management is prohibited from making any threats or granting any benefits which are contingent on defeat of the union or support for the company. The provisions of the statute have been almost consistently interpreted by the NLRB and the courts as mandating "laboratory conditions" (2) meaning that a calm, rational atmosphere must be maintained so that employees will find it easy to weigh the long-term merits of union representation. However, the necessity of laboratory conditions, and even the meaning of the phrase, has been the subject of constant debate. (3)

In 1964 Derek C. Bok suggested that, because of the presence of people arguing for both the union and the company in a campaign and the difficulty of making "rational"

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(1) A union representation election is an election held under the auspices of the NLRB to determine whether a union has sufficient support among the workers in a prospective bargaining unit to warrant the certification of that union as the sole collective bargaining agent for that group of workers.

(2) The phrase "laboratory conditions" was first used by the board in General Shoe Co., 77 NLRB 124, 127 (1948), and has been used regularly since that time.

(3) Even in General Shoe two members of the board dissent on the judgement that the employer's conduct in that case warrants the board's decision to throw out the election.
decisions with very uncertain information, the effects of misrepresentations by either party would be minimal. Bok argued that in an adversary situation misrepresentations by one side will cause the other side to respond and supply the correct information. Bok also argued that because of the complexity of the issues people are likely to abandon attempts to make "rational" decisions and instead will vote their prejudices or vote with the crowd. On the basis of these and other arguments, Bok suggested that the impact of many union and company campaign tactics are of insufficient significance to warrant regulation when compared to the costs of regulation. (1)

Bok's attack on the NLRB's rational for intervention was picked up by Getman, Goldberg and Herman. The three authors conducted a study of 31 union representation elections which took place in 1972 and 1973. (2) From their study the authors conclude: 1) Workers pay little attention to the union and company campaigns. 2) Most people's minds are made up far in advance of the major union and company campaigning. 3) There is no evidence that illegal campaign practices affect the way people vote. 4) There is no way to discriminate between "successful" and "unsuccessful" campaigns.


From these conclusions about the nature of union representation elections, Getman, Goldberg and Herman argue that the board should not regulate the use of deceptive campaign tactics or the use of threats or promises of benefits by the parties to the election. The authors stop short of suggesting that regulation of such actions as plant closings or the firing of union supporters should be dropped. However, their conclusions would undermine the NLRB's rationale for intervention even in these cases.

The NLRB's first response to Getman, Goldberg and Herman's study came in their decision in Shopping Kart Food Mart. (1) In that decision the board announced their intent to cease the regulation of deceptive campaign practices. However, a year later, after a one member change in the membership of the NLRB, the board overturned its decision in Shopping Kart in the case of General Knit. (2) In its decision the board points to several flaws in the methodology of the Getman, Goldberg and Herman study and argues that, from its own experience, these types of tactics do have an effect on the outcome of elections.

The Getman, Goldberg and Herman study might have been the last word on this subject but for at least two important methodological problems. First, in examining the effects of illegal campaign practices, no attempt is made to control for

(1) Shopping Kart Food Market, Inc. 228 NLRB 1311 (1977).
(2) General Knit of California, Inc. 239 NLRB No. 101.
the differences between plants in potential gains from unionization. This may be important if there is a tendency for employers to campaign harder if they have more to lose and if there is a tendency for workers to be more likely to vote for unionization if they have more to gain from it. If both of these things are true, and employers who campaign hard are more likely to break the law, then the impact of illegal practices on the way people vote is likely to be underestimated if these other interests are not controlled for.

The second problem is that Getman, Goldberg and Herman consider only statistical significance in evaluating the impact of illegal campaign practices. Failure to reject the null-hypothesis does not warrant the rejection of the alternative hypothesis. Yet, by implication from their policy suggestions, this is what Getman et. al. conclude. The policy arguments made by the authors of Law and Reality would be justified only if the bounds of the confidence interval on the effect of illegal practices on vote were such that effects within that range were of no practical significance. This analysis was not performed.

The preceding discussion of regulation in general and of the regulation of union representation elections in particular, can be summarized in a few important questions. With respect to the development of an economic model of manipulation there are three: 1) Can the use of manipulative techniques be modeled as a function of economic interests? 2)
Do the techniques affect economic outcomes? 3) If the techniques are effective, how are they effective? The specific policy motivation also raises two more distinct questions: 4) Do the illegal campaign tactics affect the outcome of the election? 5) Do the various tactics used by employers and unions distort the information environment of the elections and thus make the process unfair? This study will look only at questions 2, 3, and 4 and to some extent question 5. Question 1 and a complete answer to question 5 will be left for later work. (1)

To do this analysis I drew on information from several disciplines. My original thoughts on these questions were heavily influenced by the political science literature on voting, the psychological literature on attitudes and on decision theory, as well as my background in economic theory and industrial relations. Of most help in getting some preliminary answers and in putting together the final model were the interviews I conducted with a number of union organizers, workers, managers, management consultants and lawyers. From this background I have tried to construct a model that, when estimated, will allow me to answer these questions.

The remainder of this study will be presented in nine chapters. In the next chapter, chapter II, I will examine some of the explanations given by people for how union

(1) See chapter X. for a discussion of the form this work will take.
representation campaigns affect the way people vote. I will also consider the question of how the different explanations can be distinguished empirically.

One of the proposed explanations from chapter II suggests the importance of understanding how people use information in making political decisions, so in chapter III. I will develop a model of information search in a political context, and in chapter IV. I will suggest a model of how people use information in making voting decisions. In preparation for estimation, Chapter V. presents a structural model of the union representation election process. In chapter V. I will also discuss some of the econometric problems posed by this structural model.

The theory work done, in chapter VI. I will describe the data used in the estimation of the voting model. In chapter VII. I will present the results of the estimation of a linear probit, reduced form approximation to the model presented in chapter V. These results give clear answers to a number of the important questions we have posed above. In chapter VIII., simulation results, based on the estimated model, are used to show the impact of campaign practices on the outcome of elections. Chapter IX. presents the results of the estimation of a more complex approximation to the full system that allows a test of the theories of how campaigns work.

Finally, chapter X. concludes the presentation with; a discussion of what answers the results suggest to the questions posed above, a discussion of what questions remain
unanswered, and suggestions for further research that might allow us to answer those questions. The final chapter also contains some specific policy recommendations.
II. Theories of Union Representation Election Campaigns' Influence:

Let us put aside for a moment the conclusions of Getman et. al. and ask the question, "If union representation election campaigns affect people's votes, how do they do it?"

(1)

My early research, including the interviews I did with people who had been involved in union representation elections, suggested three rather broad categories of explanations: The first is that campaigns work by providing people with information (correct or incorrect) that they use in making decisions. The second is that company campaigns work by restoring worker confidence that management will respect workplace rules (usually lost because of some incident which precipitated the union drive), while the union campaign works to undermine that confidence. The third broad class suggests that company campaigns work by intimidating workers into believing that they will lose their jobs if the union gets in or that work will be unbearable because the level of

(1) Considering the methodological criticisms raised in the last chapter, a prima facia case can be made against the findings of Getman et. al. in that: 1. Why would companies spend so much money on campaigns if they have no effect? (A consultant from Modern Management Methods, a Chicago based consulting firm, costs over $600 a day for the duration of the campaign.) 2. Absolutely every person who I talked to during my interviews insisted that campaigns do have an effect. Managers, workers, union organizers and management consultants all agreed. 3. Several management consulting firms claim very high success rates. Modern management Methods claims a 98% success rate.
conflict present during the campaign will continue as long as the union is around. The first of these categories I will refer to as information theoretic explanations, the second as social psychological, and the third as intimidation theoretic.

The most common explanation given in my conversations with people was that campaigns provide information. Both the company campaign and the union campaign were seen as working this way, although people tended to be disparaging about the quality of the information distributed by the side they favored the least. According to this view, the letters sent out by both sides, the handbills, and the meetings, all work to communicate information about the effects of unionization. Illegal campaign practices, in this view, have one of two effects: Misrepresentation, threats of retaliation, or the promises of or the granting of benefits influence people's perception of what ultimately will happen if the union gets in or if it does not. On the other hand, threats made against union supporters by the company or actions taken against them discourage them from open support for the union and consequently make it difficult for the union to carry its message to other workers. Similarly, pro-union workers may harass anti-union workers and have much the same affect on anti-union workers ability to argue for their side.

While I have referred to these as information theoretic explanations I would point out that the explanations given to me by the people involved, while indicating that people were thinking carefully about the questions, did not fit with the
standard economic notion of efficient use of all information available. What the explanations did sound like was Herbert Simon's descriptions of "bounded rationality." (1) This can be seen if one considers the two most outstanding features of much of the campaign literature used by both sides in these elections.

First, most of the letters and handbills are short and make one or two very simple points. Very little is provided in the way of supporting evidence for allegations. When evidence is provided it is more likely to be vivid anecdote rather than statistical summaries which would provide more "information."

Second, all aspects of the campaigns of both sides tend to be very repetitive, much more so than would be necessary if the object was only to be sure that everybody heard the message once.

When I asked union and company representatives why they used literature which had these qualities the answer was that most people do not have the time to pay much attention to the campaigns. Those that do, they said, would not be convinced by letters or handbills so there would be no point in aiming literature at them. The best explanation that I received was that the object of the campaign was to get people to remember

your side's issues and not the other sides. The best way to do this was to give memorable examples and to repeat the message many times. It would appear that most people are severely restricted in the amount of analytic resources that they are willing to devote to this type of problem. As a result, their decision process bears less resemblance to the standard economic model than it does to a "bounded rationality" model.

The basis of the social psychological explanation is the assumption that every workplace has a traditionally established "implicit contract" that dictates appropriate conduct for both workers and management. This "implicit contract" is the touchstone of fairness in the workplace. If management unilaterally violates some aspect of this code workers feel that their trust has been betrayed and look to a union as a way of enforcing their sense of fairness. According to this view, the function of management campaigns is to bind some wounds caused by the original transgression and, by showering attention on the workers, regain their trust by showing respect for their concerns. In this view, union campaigns affect the vote by convincing workers that they can never really trust management, and that the only insurance that they can get that they will be "treated fairly" is to join the union.

In many respects this explanation fits with what I heard from people in my interviews. Almost all campaigns began with some incident where the workers felt that they had been
treated unfairly. In one case it was a change in the rules for promotion, in another case it was a pay increase always given in the past that was delayed. In addition, it was very clear that to many people a union meant dignity and a way to insure that management would pay attention to their interests. Union campaigns did play quite a bit on how untrustworthy management was and on vague allusions to the lack of justice and dignity in the working conditions.

On the other hand, there are some things that go on in a campaign which do not fit with this explanation. First, there was always content to the campaign and people did pay attention to it. However, the biggest problem with this explanation is how to square the social psychological version of what the company is trying to do with the very frequent harassment of pro-union employees and the threats of plant-closing or relocation. Such actions or threats could hardly be expected to improve strained relations of the type described above.

One possibility is that, despite the frequency of these actions, they are really counter productive. This is hard to believe if one considers that the clients of many of the very successful law firms and consulting companies seem to use many of these tactics regularly. This of course does not mean that this explanation is entirely false, but it seems probable that there is more to what goes on in campaigns than this.

The last of the explanations was suggested by two different union organizers. Both had considerable experience
dealing with campaigns run by Modern Management Methods. Both of these organizers suggested that the way the most successful anti-union campaigns work is by making the workday tense, conflictual, and unpleasant for everybody. The object of the campaign is to convince people that the management is dead set against the union and that as long as the union is around there will be constant conflict that will make work unbearable, strain employee/employer relations, and make people's jobs precarious.

According to this view, management campaign literature, which emphasizes the likelihood of strikes, the "deterioration of relations with supervisors," the fact that economic strikers can be replaced, and the possibility that union wage increases may lead to staff reductions or plant closings, is acting to frighten people out of supporting the union. Also according to this view, the harassment of union supporters and the other illegal speech and actions are all aimed at creating an atmosphere charged with fear and conflict. The end results is that, while workers may resent the company waging such a bitter campaign, they become convinced that, no matter how bad things would be without a union, they would rather not have to put up with that level of tension on a permanent basis.

Each of these three explanations for how campaigns work suggest something very different about the nature of people's decision processes and the appropriate role of regulation. If the information theory explanation is true then people are looking at the available information, and making up their
minds as to how they are going to vote, in a more or less rational fashion. If this is the case perhaps there need to be procedural regulations to insure that both sides get a chance to make their case, and perhaps prohibitions on false or misleading statements late in the campaign when it is too late for the other side to develop an effective response, but it would be hard to argue for much beyond this.

If the social psychological explanation is true then there is little role for regulation at all. In this case most of the practices which are currently regulated would be expected to be counter productive. One might argue that even though the harassment of pro-union employee's is not effective in preventing unionization it should still be regulated for the sake of fairness to the employees. This would seem reasonable, but it would make more sense if the remedy for a violation was a fine or a requirement that the company pay damages to the employee involved. This as opposed to what is currently done; forcing the company to bargain with the union or having the election re-run. (1)

However, if the intimidation theory explanation is really the best interpretation of what is going on then the decision process is being badly distorted. The NLRA requires that workers be given the opportunity to decide, whether or not to organize, on the merits of what a union can do for them. Once

(1) If a worker is found to have been fired for pro-union activity the board may order the person reinstated with back pay.
workers choose a union the employer is expected to deal with that union in good faith. The disruption of "laboratory conditions" and the threat (stated or implied) that the company will not bargain in good faith, are serious violations of the intent of the NLRA. (1) If they can persist under the current interpretations of these laws and the given method of enforcement then changes are mandated.

Since it is important to know which of these theories is correct, (or if they all have some truth to them, which explanation is most important in understanding what goes on in union representation elections), the question remains, "how

(1) Section 8(a)(5) of the NLRA as amended by the "Labor Management Relations Act of 1947" (Taft-Hartley) reads: "It shall be an unfair labor practice for an employer to refuse to bargain with the representatives of his employees..." That the law demands a real substantial effort to reach agreement and not just the appearance of negotiation is clear. The NLRB has consistently held that a employer is required...

...to negotiate in good faith with his employee's representatives... and to make every reasonable effort to reach agreement.

NLRB decision in Honde Engineering Corporation, 1 NLRB (old) 35 (1934).

The intent of 8(5) is made clear by the committee report on that section which reads:

...the commitee has concluded that this fifth unfair labor practice should be inserted in the bill. It seems clear that a guarantee of the right of employees to bargain collectively through representatives of their own choosing is a mere delusion if it is not accompanied by the correlative duty on the part of the other party to recognize such representatives... and to negotiate with them in a bona fide effort to arrive at a collective agreement...

might we be able to distinguish the theories empirically?"

After a first examination of the implications of the three theories a clear distinction emerges between the information theory and the intimidation theory on one hand, and the social psychological on the other. From the social psychological theory we would expect that company meetings, letters, and promises of or granting of benefits would increase the probability that people would vote against unionization. On the other hand, one would expect that the harassment of pro-union workers and threats or punitive actions would only work to exacerbate the strained employee/employer relations which were the cause of the union drive. Thus, from this perspective we would expect that illegal campaign tactics involving negative sanctions or the threat of negative sanctions would be ineffective or even counterproductive.

Like the social psychological theory, both the information theory and the intimidation theory would lead us to expect that company letters, meetings and granting of benefits would induce people to vote against unionization. Depending on which theory we believed we might expect certain of these techniques to be more or less effective. But, since we have no objective measure of what more or less effective would mean, such priors do not allow us to discriminate between the theories. On the other hand, both of these theories would suggest that illegal tactics, which involve the harassing of pro-union workers, threats, or punitive actions,
would reduce the probability of workers voting union. Thus if we find that threats or negative sanctions reduce the probability of workers voting union, instead of having no effect or increasing the probability of workers voting union, we can reject the social psychological theory.

While it will be easy to distinguish the social psychological theory from the other two, the information theory and the intimidation theory can not be distinguished on the basis of their predictions about the relative effectiveness of different campaign tactics. If we are to be able to distinguish these two hypothesis we will need another basis for comparison. The approach, which I will develop here, is to compare the two theories on the basis of their predictions for which workers would be most affected by the campaigns.

As a first step I will try to identify who will be most influencable according to each theory. Later I will compare the predictions of the two theories to see how we might distinguish between them.

Under the intimidation hypothesis, I will argue, there would be four types of people who would be more susceptible to the campaigns: 1. People who would have a hard time finding another job. 2. People who are more risk averse than others. 3. People with no past experience with unions. 4. People in places where there are many people who do not support the union.

The fourth group, those in places where relatively few
people support the union, would be more vulnerable because the company threat to continue to fight against the union would only seem credible if they had some chance of winning that struggle. Also, there would be a feeling of safety in numbers which would make people feel less likely to be singled out for their pro-union sympathies.

Those in the third group, people with no past experience with a union, may not know that most unionized workplaces do not experience constant conflict and will be more likely to fear that.

The vulnerability of the first and second group can be easily demonstrated with the following simple formal model.

\[ E(I|\text{Union Victory}) = P(C) \max(A,B) + (1-P(C)) G \]  

(II.1)

where \( E(I|\text{Union Victory}) \) is the expected net present value of the individual's income stream (including psychic income) should the union win the election, \( A \) is the value the person attaches to the outcome of having to find another job, \( B \) is the expected income stream if the company really does continue to fight the union after the election, \( G \) is the expected income if the company does not fight, and \( P(C) \) is the probability the person places on the outcome of the company continuing to fight. That probability is a function of \( C \) which
is the level of the company campaign.

As long as some people prefer their certainty equivalent job to working in a constant state of conflict, or if \( B \) is a function of \( A \) (which it might be if people fear being fired in the event of continued conflict), then if people's certainty equivalent jobs improve in quality their expected utility contingent on unionization will increase. I will assume that this would increase the probability that they will vote union.

Since constant conflict or having to find another job are likely to involve greater changes than bringing in a union alone, (1) and since most elections are fairly close, for most people \( P(C) \) is probably less than .5. Thus any increase in \( P(C) \) increases the variance of the expected income contingent on unionization and would lower the utility value of that income to someone who was risk averse. (2)

It is more difficult to say who would be most affected by campaigns under the information hypothesis. To be able to say who would be more affected we need to know who uses information and how they use it. To continue the development of these ideas I will, in the next chapter, present a model of information gathering in the context of a campaign. In the

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(1) Formally: \(|E(I|Union loss)-G| < |E(I|Union loss)-\max(A,B)|\)

(2) In particular, one would expect that without any campaign, the thought that a high level of conflict between the union and the company would continue after the election would probably not occur to most workers so it would be a case of \( P(C) = 0 \) versus \( P(C) > 0 \), which will cause the variance of expected income to increase as long as \( P(C) \) does not equal one.
chapter after that I will develop a model of how people combine the information in campaigns with the information that they have hunted down, and how they use that information to how to vote. This will allow me to suggest how we might distinguish the information theory from the intimidation theory on the basis of which people would be most affected by the campaigns.
III. A Model of Information Search in a Political Context:

What will lead some people to search for information and others not to? To begin to construct an answer to this question let us consider the stories of three workers I interviewed.

One of the first people I interviewed was a student nurse in a hospital that had recently had a union representation election. She had not seen or heard much about the union or the election and kept apologizing for not knowing more. She voluntarily explained that had she felt that she had more at stake she would have spent more time finding out about the issues and maybe even becoming involved in the union campaign. She did not feel that she had much at stake, she said, because; she was only a part time worker and most of the benefits the union could win would not apply to her, she did not expect to work at the hospital much longer, and she did not expect that the union had much of a chance of winning.

Another example is a man in his early sixties who worked at a manufacturing firm. After he had expressed ignorance of a number of issues which had been raised in the campaign he had just been through, I asked him why he had not spent more time studying the matter. His answer was that he only had a few years left at work and did not feel that it was worth his while. "Leave it to the young kids," he said, "Its not my battle."

My last example is that of a young machinist who worked
at another manufacturing establishment. He was married, had several children, had worked for the firm for a number of years, and intended to continue to work for the firm for the foreseeable future. When he heard that a union was trying to get into the plant he first went and hunted down the organizer for the union. From the organizer he got the names of a number of other firms in the area which were organized by the same union. He went to one of those firms and talked to the workers there about how they liked the union, whether it had done what they thought it would do for them, and whether they thought that the bargaining agent was effective. When the workers he talked to expressed satisfaction with the union he went to a union meeting and "...tried to trip him (the organizer) up." When he was finally convinced that the union would be a good thing for his workplace he joined the organizing committee and worked on the campaign.

Four years earlier, when another union was trying to get in, he had done much the same thing. However, that time the workers he talked to at the plant he visited all expressed considerable hostility towards the union and said that they were trying to decertify it. After this he talked to a number of his friends and tried to convince them not to vote for the union.

What is most striking about these three examples is that each of these people had a good explanation for her or his decision to invest time in learning about the issues. The people with a great deal at stake tended to gather the most
information. When people did not feel that they had much interest in an election, or much hope of affecting the outcome, they did not bother to spend the time to figure out what was going on.

The above description can be represented formally as follows. First, let us assume that an individual's objective is to maximize expected utility. Second, let us assume that each individual has a set of priors about the net present value of their utility stream contingent on unionization. The priors take the form of an arbitrary probability distribution which can be characterized by two parameters; a mean and a variance. I will also assume (without loss of generality) that, should the union not win, the person knows the value of the future income stream exactly. I will normalize the utility measure so that that value is zero. Third, I will assume that after an investment of effort an individual can reduce the variance of their priors, and that it is on the basis of this second set of priors that the individual takes actions (such as voting or campaigning) which affect the outcome. Finally, I will assume that the lower the variance on an individual's final priors (i.e. the more information they have), the more he or she will be able to change the probability of a union victory by campaigning, all other things held equal. I can now specify the functional form of an individual's expected utility:
\[ E(U|e,c) = a \{ P(X1>0) \, Pu \, E(X2|X1>0) + P(X1<0) \, Pc \, E(X2|X1<0) \} \quad (\text{Eq. III} .1) \]

where \( E(U|e,c) \) is expected utility at time zero contingent on the amount of effort the individual puts into information search (e) and campaigning and/or voting (c), a is a multiplier for the length of time the person expects to be working in this place, \( X1 \) is the person's final priors or their priors at time 1 on the value of unionization, Pu is the probability of a union victory if the person campaigns for the union, \( X2 \) is the realization of the utility stream contingent on unionization, Pc is the probability of a union victory if the individual votes and/or campaigns for the company, and \( E(X2|.) \) is the mathematical expectation based on information available at time 1.

The probability that \( X1 \) will be greater than zero, given the information available at time 0, can be written:

\[ P(X1>0) = \Phi(X0|s(0)) \quad (\text{Eq. III} .2) \]

where \( \Phi(.) \) is the cumulative distribution function for the priors with variance \( s(0) \) and limits of integration running from minus infinity to \( X0 \).

Pu and Pc can be written:
\[ P_u = P + W(P, s(e), c) \quad \text{(Eq. III.3)} \]

and

\[ P_c = P - W(P, s(e), c) \quad \text{(Eq. III.4)} \]

where \( P \) is the probability of union victory if the individual takes no action at all, \( s(e) \) is the variance of the final priors as a function of the effort put into information search, and \( c \) is the effort put into voting and campaigning.

(1)

Finally, I will rewrite the conditional expectation of \( X_2 \) as:

\[ E(X_2|X_1>0) = \int_{-\infty}^{\infty} x_2 \phi(x_2|x_1>0, s(e)) \, dx_2 \quad \text{(eq. III.5)} \]

where \( \phi \) is the density function for the distribution of priors. Using Bayes' theorem the conditional density function \( \phi(x_2|x_1>0, s(e)) \) can be re-written so that:

(1) This assumes that the effect that a person can have on the probability of a union victory is symmetric. This is not a bad assumption if \( W \) is not very large, which it most likely is not.
E(X2|X1>0) = \int_{-\infty}^{\infty} X2 \frac{\phi(X2|X0,s(0)) \phi(X2|s(e))}{\phi(X0|s(0))} dX2 \quad \text{(eq. III.6)}

Substituting the right-hand-side of equations III.2, III.3, III.4 and III.6 into equation III.1 and simplifying yields:

\[ E(U|e,c) = a \left\{ PX0 + W(P,s(e),c) \right\} \int_{-\infty}^{\infty} X2 \phi(X2|X0,s(0)) (2\phi(X2|s(e)) - 1) dX2 \quad \text{(eq. III.7)} \]

The expected utility can be seen as the sum of the expected utility at time zero if the individual does nothing to affect the outcome (P X0) and the utility that a person can expect to add by taking action. The latter term is the product of the change in probability one can hope to cause (W) and a term (the integral) which increases as the individual can better distinguish the value of a union vs. no union outcome. This sum is multiplied by "a", which is the length of time the person expects to be at that job, to give the final utility measure.

Now that the expected utility contingent on the control variables is defined, the individual's objective function can be defined as:
\[
\max L = E(U|e,c) - e - f(c) \quad \text{(eq. III.8)}
\]
\[
w.r.t. \ e,c
\]

where utility is denominated in terms of effort spent on information search, and \(f(c)\) is the cost of \(c\) effort put into voting and/or campaigning.

The first step in determining who will be more likely to search for information is to find the optimal level of \(e\) and \(c\). To do this we need to obtain the first order conditions. Differentiating eq. III.8 yields:

\[
\frac{dL}{de} = F = a \left\{B \frac{dW}{de} + W \frac{dB}{de}\right\} - 1 = 0 \quad \text{(eq. III.9)}
\]

and

\[
\frac{dL}{dc} = G = a B \frac{dW}{dc} - f' = 0 \quad \text{(eq. III.10)}
\]

where \(B\) stands for the integral multiplying the \(W\) function in equation III.7.

Clearly, these first order conditions are too complex to solve explicitly. However, we can use the implicit function theorem to determine the effects of different parameters. To apply the implicit function theorem we first need the Hessian which we get by differentiating the first order conditions (eq. III.9 & 10):
\[ \frac{dF}{de} = a \left( \frac{d^2 W}{dede} B + 2 \frac{dW}{de} \frac{dB}{de} + W \frac{d^2 B}{dede} \right) \quad (\text{eq. III.11}) \]

and

\[ \frac{dF}{dc} = \frac{dG}{de} = a \left( \frac{d^2 W}{dcdc} B + \frac{dW}{dc} \frac{dB}{de} \right) \quad (\text{eq. III.12}) \]

and

\[ \frac{dG}{dc} = a \frac{d^2 W}{dcdc} B - f'' \quad (\text{eq. III.13}) \]

Now the second derivatives of \( L \) with respect to \( e \) and \( c \) must be negative by the second order conditions for a maximum. The sign of the cross derivative (eq. III.12) is easy to determine. First, "a" will be positive. Second, the cross-effects of \( e \) and \( c \) on \( W \) should be zero or complementary by assumption so that \( \frac{d^2 W}{dcdc} > 0 \). The integral \( B \) will also be positive since the density function is always positive, and since \( X2 \) and \( \left( 2\Phi(X2|s(e)) - 1 \right) \) always have the same sign. (1) The derivative \( \frac{dW}{dc} \) is positive by assumption and \( \frac{dB}{de} \) is positive since \( \frac{d\Phi}{de} \) has the same sign as \( X2 \).

Thus all elements of the inverse Hessian will be negative and the derivative of the implicit function \( e \) and \( c \) with respect to any parameter \( z \) will be positive or negative if \( z \) is positive or negative respectively.

We can now begin to examine the question of who will be

(1) This can be easily seen if \( \left( 2\Phi(X2|s(e)) - 1 \right) \) is re-written as \( \Phi(X2|s(e)) - \Phi(-X2|s(e)) \).
more likely to search for information. To begin with, it is easy to see that if we increase the amount of time that an individual expects to spend on the job, the equilibrium level of both e and c will be higher. Differentiating equations (III.9 :10) gives us:

\[ \frac{dF}{da} = B \frac{dW}{de} + W \frac{dB}{de} \quad (eq. \ III.14) \]

and

\[ \frac{dG}{da} = B \frac{dW}{dc} \quad (eq. \ III.15) \]

Since all terms are greater than or equal to zero, an increase in a implies an increase in e and c.

Next let us examine the effect of changes in people's expectations as to what the probability of a union victory would be without their intervention. The derivatives of the first order conditions (eq.III.9&10) with respect to P are:

\[ \frac{dF}{dP} = a \left\{ \frac{d^2W}{dP} + \frac{dW}{dP} \frac{dB}{de} \right\} \quad (eq. \ III.16) \]

and

\[ \frac{dG}{dP} = a \frac{d^2W}{dP} \frac{dB}{de} \quad (eq. \ III.17) \]

As before, a, B, and dB/de should be positive. We would expect that the effect of increased information on an
individual's ability to influence the outcome of an election, as well as the effect of increased effort, to stay the same or diminish as P moved away from .5 in either direction. (1)

While the comparative statics results with respect to a and P are unambiguous, such is not the case for X0, the person's initial priors. Differentiating the first order conditions (eq. III.9&10) yields:

\[ \frac{dF}{dX_0} = \frac{dW}{de} \frac{dB}{X_0} + W \frac{d^2B}{dedX_0} \quad (eq. \ III.18) \]

and

\[ \frac{dG}{dX_0} = \frac{dW}{dc} \frac{dB}{dX_0} \quad (eq. \ III.19) \]

It is easy to see that dB/dX0 is positive for positive values of X0 and negative for negative values of X0. As priors become more extreme the first term of equation III.18 indicates that the values of c and e should increase. On the

(1) This conclusion would derive from the assumption that an individual's ability to persuade others to vote union (company) was independent of the number of people expected to support the union (company). For example, if each individual who takes part in the campaign can expect to change the probability of a fixed number of other people voting union a certain amount for each unit of effort expended, the effects of this expenditure of effort will be less if the expected outcome of the election is not close. If the ability of a person to persuade others to vote union (company) is a declining function of support for the union (company) then the turning point may not be exactly .5 but will probably be close enough that .5 will do for our purposes. Thus an increase in |P-.5| will cause a decrease in the equilibrium level of e and c.
other hand, the second term of equation III.18 can be shown to be negative if $\phi$ is a uni-modal symmetric density which has a well defined first moment.

Intuitively, what is going on here is that as prior's become more extreme, the value of information for the purpose of persuasion is going up, but the value of information for determining which side to back is going down. If $W$ was a constant more extreme priors would unambiguously lead to less information search. If there was certainty, more extreme values of $X_0$ would mean larger values for $B$ and thus more information search.

Finally, since all of the terms of the first order conditions are positive, a decrease in $ds/de$ (and consequently an increase in $dW/de$ and $dB/de$) or an increase in $dW/dc$ would cause an increase in $e$ and $c$.

To summarize the results; people who intend to stay at their jobs longer, people in close elections, and people for whom information search is less expensive or who can expect to have more of an impact on the outcome of the election, can all be expected to gather more information.

These results do not differ from the standard findings of the economic theory of information. On the other hand, the standard finding, that people with extreme priors will put less effort into information search, does not hold. A person with extreme priors may seek more information or less information, or the two motives may cancel so that people with extreme priors will seek the same amount of information as
people with less extreme priors.

Now that the model of search for information has been developed, in the next chapter I will develop a theory of the use of the information in making political decisions.
IV. An Information Theoretic Description of Persuasion:

As I have noted before, it was my experience in doing my interviews that people did seem to care about the issues, or at least if they did not care they had good reasons not to care. However, as I have also suggested before, while people are in this sense rational, they hardly fit the economist's notion of efficient use of information. They have limited time to think about issues, they can only think about or remember so many issues at one time, and will often forget information or place less emphasis on older information. Given these limitations I would propose the following way of thinking about how campaigns influence the way people vote and act.

People's behaviors are modeled as being rational in the sense that it is assumed that they are using the information available to them to try to choose the alternative that will be in their best interest. It also assumes that they are being rational about gathering information. However, because of the limitations suggested above, the model proposed here does not suppose that people necessarily combine the information in the campaigns with the information that they collect in the most efficient fashion. Thus campaigns may influence people's perceptions of their best interests by biasing the information which they use to form their expectations.

To begin with, I will describe what goes on as a three
step process. First, people on the basis of all of their knowledge at the beginning of the campaign decide how much information to seek out. After they have done this, the company and the union give them information by campaigning. (1) Finally, each individual combines the information they gathered on their own and the information they received from the company and the union, and on the basis of this information decide how to vote. In this formulation, people pay for the information that they seek out in the first step, but the information in the campaigns is free. It is free because a person generally does not have to do anything out of the way to get it. Supervisors talk to the person, company captive audience meetings are held on work time, and friends talk about the campaign at lunch and on coffee breaks. Letters and leaflets take a small amount of time to read, but take far less time to read than it would for the person to come up with similar information on his or her own.

A formalization of this description can be developed as follows. First, let us assume that there are an infinite

(1) By making this process recursive I neglect the possible influence a campaign may have on a person's expectations, and through those expectations on how much information the individual gathers. This is probably not a serious problem for two reasons. First, most people who I talked to who had gathered much information on their own did so early in the campaign. Second, as was suggested in the last chapter, the effect of expectations on information gathering is ambiguous. The two motivations for information gathering based on priors; to get information to convince other people if one has extreme priors and to get information to aid ones own decision if ones priors are not strong, may partially or entirely cancel each other so that differences in priors may not be important.
number of potential pieces of information. Second, each piece has a utility value associated with it, unique for each individual, so that when people have a piece of information they would expect that their utility would increase (or decrease) by that amount if a union is certified. The person will realize a utility stream equal to the mean of the distribution of all bits should a union be certified. When people search they receive information on a random sample of all the pieces. The more they search, the more pieces they find the value of.

Campaigns provide workers with free information on a set of issues. The union will pick pieces of information that favor its point of view and the company will choose pieces favoring its point of view. Now, given this information, a person will vote union if the average piece of information, that he or she has information on, has a positive utility value and against unionization if the value is negative. To put this in algebraic notation let us designate the utility value of the i\textsuperscript{th} piece of information that an individual discovers the value of on his or her own as \( e_i \) and the i\textsuperscript{th} piece from either the union or company campaign as \( a_i \). Let us also designate the number of pieces of information a person discovers to be \( S \) and the number in the company and union campaign to be \( I \). Now, if the \( e_i \)'s have any arbitrary distribution for which the mean (\( u \)) and the variance (\( s \)) are defined, and the average of the I \( a_i \)'s is \( A \) then the value of the individual's average piece of information can be written
as:

\[ U = \left( \sum_{i=1}^{S} e_i + IA \right) / (S+I) \quad \text{(eq. IV.1)} \]

which will have a T distribution with mean \((Su+IA)/(S+I)\), variance \(Ss/(S+I)\), and \((S+I)\) degrees of freedom.

If we assume that \(S+I > 32\) or that the distribution of the \(e\)'s is normal then \(U\) will have a normal distribution. If we assume that this is the case, and normalize by setting \(s=1\), then the probability that an individual will vote union can be written:

\[ P(\text{union vote}) = \Phi(u + IA/S) \quad \text{(IV.2)} \]

where \(\Phi\) is the cumulative standard normal density function.

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(1) For those familiar with the political science literature on voting a note is in order about abstention. Almost no one eligible to vote in a union representation election fails to vote. Thus we can ignore the problem of abstention in this study. There are at least two good explanations for the low rate of abstention in these elections. First, the cost of voting is zero or negative for an hourly or salaried worker since time off is almost always given from work to vote and the polling place is on the work site. At worst it is a few minutes lost, at best it is a break in an otherwise monotonous day. Secondly, many workers would feel uncomfortable if the company or the union knew that they had not voted for them. At least by voting they can be sure that neither side will know that they did not vote for them.
An objection one might raise to this specification is that people should expect that the union and company campaigns will present biased information. If people can perfectly anticipate the bias then clearly the campaigns will only lower the variance of the U's. Even if people can not perfectly anticipate the bias but can anticipate it up to an error which has mean zero and is orthogonal to other things which might influence the person's decision, then the campaigns will have no effect on the expected value of U. (1)

Even in this case the campaigns might have an effect. By decreasing the variance of each individual's U the campaigns would increase the probability that an individual will vote for the option which will actually benefit him or her the most. (2) The fact that both sides campaign, even if the campaigns do not affect the expected value of U, could be explained if one were willing to argue that in each case one side was always over optimistic about what it could do for the workers. Another explanation would be that the campaigns are targeted so that the union talks mainly to people for whom

(1) Clearly, if the error in the anticipated bias does not have mean zero then the campaigns will still have an effect. Simply redefine \( A' = A' - E(B) \), where \( A' \) is the actual bias, and \( E(B) \) is the bias that the individual expects, then \( A \) will be the "effective bias." If the person expects the bias to be greater than it actually is a stronger campaign by one side may actually increase the probability of a person voting for the other side.

(2) That would be unionization if \( u \) is positive or no unionization if \( u \) is negative.
unionization would be preferable, and the company campaign is directed at those for whom unionization is not ultimately preferable. This however, does not fit with what I observed in my interviews. It also does not fit with the data which will be analyzed in the next section. (1)

These arguments seem untenable so I will assume that if campaigns are to have any effect in this model, people must not be anticipating the actual degree of the bias. At least on a conscious level, people claimed to be taking the issues raised by the company and the union campaigns seriously. Many people did suggest some skepticism of either the company or the union campaign or both, but the skepticism was a fear that the company or the union was lying. If the information was believed to be true it did not seem to be discounted in the formation of opinions. This of course does not rule out the possibility that the adjustment is being done unconsiously. However, there are at least four reasons why people may not expect the bias or may expect less bias than there is in a particular campaign.

First, people may simply not be sophisticated enough to realize that the issues that are raised in the campaign are not all the issues that could be raised. Thus they may assume that they have all the information necessary to make a

(1) Analysis of the data shows that people who were pro-union were more likely to report having contact with a supervisor, and pro-company workers were more likely to report having talked with union supporters. This could be because they actually did talk more often with supervisors or union supporters, or it could be that there is a reporting bias.
decision.

Second, it is not always possible to identify the source of a particular piece of information. Information picked up in conversation may have come from the union, it may have come from the company, or it may have been something someone else dug up on his or her own. Thus, one would not know how to discount it.

Third, people may expect that the biases of the two sides would counter-balance so that there would be no correction necessary. If they do not counterbalance it may be difficult to tell that they do not as it may be hard to distinguish an increase in the quantity of information from an increase in the bias. While the model has been set up making I and A conceptually distinct, in practice it may be very difficult to distinguish the two. What I have in mind as a piece of information is not a particular broad question, such as "how much would my wage increase?" but rather each point that might be raised by either side. An example of a series of what I mean by pieces of information would be:

company: Union dues will eat up your wage gains.
union: Dues are inconsequential compared to wage gains.
company: Strikes cost more than they gain in wages.
union: Only workers vote to authorize a strike.

In the course of a campaign a person will develop an impression of who is "ahead on the issues," but it will be
difficult for anyone to separate out whether the side that is ahead is ahead because of the strength of its arguments (A) or just because it has had the last word on more of the arguments (I). Thus it may be difficult for people to determine how much to discount the two campaigns.

Finally, even if people assume that the company and union will be as biased as they possibly can, they may underestimate the amount of effort that they will put in, or the resources available, to the development of campaign material. If this is the case, a worker may underestimate the bias because he or she may not believe, given his or her prior distribution, that that good a case could be made. Thus, the person would be induced to abandon their priors just as the model presented above suggests. Few workers I talked to were aware of the amount of research that went into the preparation of the campaign material. Most knew little or nothing about the union's research departments or the news clipping services that companies could subscribe to to get information on such things as union official's salaries, or the union's involvement in current strikes.

If people do not have a consistent anticipation of the bias of the campaigns, then the ones who will be least affected by the campaign will be those who gather the most information. This can be easily seen in equation IV.2. As $S$, the number of pieces of information an individual gathers on his or her own, increases, the importance of the campaign in determining the individual's vote diminishes. From the
analysis of the last chapter the people who can be expected to gather the most information are; people who expect to be at the job for a long time, people who expect that the election will be close, and people for whom gathering information is easy or who are more effective campaigners than average.

For it to be the case that these people will be less affected by the campaigns, the assumption that campaign information is essentially free must be true. If campaign information is just as costly as other information then we would expect that the people who would be most affected by the campaigns are those who search out their own information. Others would simply vote their prejudices.

Let us now recall the analysis of chapter two. In that chapter it was concluded that, under the intimidation theory, four types of people are more likely to be influenced by campaigns: 1. People who would have a hard time finding another job. 2. People who are more risk averse than others. 3. People with no past experience with unions. 4. People in places where there are many people who do not support the union. These categories, with one exception, do not immediately correspond to the categories developed in this chapter. However, the operationalization of these categories in terms of the data available for this study does reveal significant overlapping.

First, one pair of categories clearly does correspond. From the intimidation theory we would expect that as initial support for the union increases, the effects of the campaigns
would diminish. From the informational theory we would expect that, as the perceived probability of union victory increased, people would first be less affected by the campaign as they gathered more information in anticipation of a close election, and then more affected by the campaign as they stopped gathering information in the face of an inevitable union victory. As it would be expected that people's perception of how well the union was going to do would be closely related to its support during the campaign, here is the first test of the two theories. If the people are more susceptible to campaign influence as the percent of people initially for the union decreases we can reject the information hypothesis. If at any point campaign influence decreases as the percent of people for the union decreases we can reject the intimidation theory.

Second, when the specification for the estimation is developed, it will be seen that many people who we might expect to be at their currant job for a long time will be people who would also have a difficult time finding another job. From the intimidation theory we would expect that these people would be more affected by the campaigns. From the information theory we would expect them to be less affected.

Third, many people who have characteristics which might lead us to expect that they would be more risk averse than others should also be expected to stay at their jobs for a long time. Thus, by the intimidation theory, they should be more affected by the campaign, but by the information theory they should be less affected.
Finally, workers with experience with unions should also find it cheaper to gather information. Thus according to both theories, these people should be less affected by the campaigns.

Now I have developed the model of voting and finished specifying how we might distinguish the three hypothesis, about the effects of campaigns, proposed in chapter II. In the next chapter I will suggest a structural framework, for the study of the union representation election process, which will be the basis for the estimation of the voting model.
V. The Structural Specification for a Model of Union Representation Elections:

Before proceeding with estimation, the voting model must be imbeded in a model of the entire election process. This is an important step in any non-experimental research design where there is the possibility that several variables may be simultaneously determined. In the case under study, if some of the explanatory variables are determined simultaneously with the vote, the estimated coefficients of the vote model will be biased. Therefore, the rest of this chapter will be devoted to developing a structural model of the union representation election process.

To begin with, I will propose the following characterization of the causal relations which is represented in the flow diagram in figure (V.1). Boxes represent categories of variables, arrows going to boxes represent hypothesized causal flow, and arrows going to lines indicate hypothesized mediating relations.

In the diagram, people's background, their working conditions, and their past experiences with unions and union representation elections (Individual and Company Background), go into the formation of their prior expectations as to the benefits of unionization (Initial Disposition). These two categories of variables in turn contribute to the determination of the level of the company campaign, and the effort put in by the union organizer. These same two
FIGURE V.1

Causal Flow in a Structural Model of Union Representation Elections
variables also affect the amount of information search the individual will engage in. Together, the elements of the individual's background, working conditions and prior dispositions, along with the company campaign and the union campaign, mediated by the amount of information search, contribute to the joint determination of the individual's disposition during the course of the campaign and the individual's campaign activity. The employees' campaign is determined by their dispositions and by the company campaign. The employees' campaign feeds back on each individual's decision and is mediated by each individual's information search. Finally, individual disposition determines vote.

The idea behind the diagram is this: The background information, working conditions, priors and campaigns mediated by the individual's information search activities, affect how that person feels about unionization. How a person feels about unionization is likely to play a major role in the individual's decision as to whether or not to take part in the union campaign, or whether or not to try to convince other employees to vote against unionization. In addition, the company can, by overtly or covertly threatening or harassing pro-union workers, discourage workers from taking part in the pro-union campaign. (1) So the company campaign tactics, and

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(1) One may ask why the same is not true of union organizers. In some of my interviews I encountered cases where pro-union workers had harassed other workers who had been working to defeat the union. To the best of my knowledge this sort of activity is very rarely incited by union organizers and would therefore best be viewed as part of the employee campaign.
the individual worker's dispositions, together affect the level of the employee campaign activities which, in turn, affect people's dispositions.

In the diagram, the box for disposition is drawn with dotted lines. This is to indicate that "disposition" is an unobserved variable. What is observed is how an individual votes. Since disposition is not observed, even though temporally vote follows the employee campaign, we must treat vote and the employee campaign as being determined simultaneously.

Perhaps the one thing in this diagram which most requires further discussion and justification is the specification of company campaigns and union organizer's effort as being pre-determined relative to employee's disposition and campaigning.

An extreme interpretation of the assumption of rationality would require that the decisions of all parties to the union representation elections should interact constantly throughout the entire course of the campaign. Such an assumption would make it impossible to distinguish the effects of the campaigns on vote or disposition at any particular time from the effect of disposition on the intensity of the campaigns. To estimate these effects a data set with weekly, if not daily data would be required.

Thus, the effect falls within the employee campaign box. For the purpose of estimation, given the data set used here, this will not be a problem as no such activities were reported in the elections studied.
From my interviews it is clear to me that, to some extent, this constant adjusting of campaign intensity to the current disposition of the workers does go on. However, I will argue that these adjustments are inconsequential when compared to the initial commitments, both in the company and in the union case.

In the company case there are two major basis for this argument: First, management campaigns are extensively planned in advance and the plans are followed fairly closely. Second, in almost every case a manager hires a consultant or lawyer, and each law firm or consulting firm tends to run campaigns of consistent intensity that are different from what another firm would do.

My impression, that management campaigns tend to be rather extensively planned in advance, was confirmed by almost all my sources. It is also the suggestion of the literature on how to run an anti-union campaign. (1) By this I do not mean to imply that companies figure out exactly what they are going to say and when they are going to say it. Rather, I am arguing that the decision to hold so many meetings, to send a series of letters to workers' homes, and the decision to run a clean campaign as opposed to a campaign where the labor law is violated, is made, for the most part, before the campaign begins.

(1) See, for example, Robert Lewis and William A Krupman, Winning NLRB Elections: Management's Strategy and Preventive Programs, Practicing Law Institute, New York, 1972. In particular see the campaign calendar in chapter 9.
Besides the evidence from the literature, I could cite as support for this view the statements made by labor relations consultants that I talked to. For instance, one said that what a consultant does is to determine how much campaigning is necessary to "get the job done" and then does it. This included getting necessary time from the labor board or the courts and whatever else was seen at this early stage as being "needed" to win the campaign.

Union organizers said that, while they sometimes thought that perhaps an employer had changed strategy in midstream and put on a hard campaign towards the end, they really could not be sure that that was what was going on because, "they (management) always turn it on right at the end."

Most of the management representatives I talked to also stressed that the company had a strategy which it tended to stick to no matter what. In fact, one management representative I talked with described a situation where the company president wanted to come out with an unscheduled response to a union handbill and was talked out of it by his lawyer on the grounds that "everything is on schedule, these are just bumps and waves along the way, just keep the big picture and on election day we will come out ahead."

This brings me to the second reason for arguing that the intensity of company campaigns are largely determined before the campaign begins; that the consultants or lawyers hired at the start of the campaign tend to make most of the campaign decisions and that each different law firm or consulting firm
will tend to run campaigns of uniform intensity. This is
definitely the opinion of the union organizers who I talked
with who claimed that after a week or two they can easily tell
which consulting firm or law firm they are up against by the
nature of the campaign being run against them. Although the
consultants, lawyers, and most of the managers I talked to
disavowed this picture of what they do, the one disaffected
member of a management staff who I talked to did report this
pattern; that the company hired a labor lawyer, and the
lawyer ran the campaign. Also, the labor relations
consultants I talked to, while explicitly disavowing the role
of campaign director, made a number of statements along the
way which tended to contradict their disavowals.

The picture that emerges of the primary management
intensity decision is that the company chooses a law firm or
consultant from the range of available choices. The choices
range from cheap consultants with mediocre records, to the
best firms with high prices who claim to be practically able
to guarantee success. (1) Once the manager has made this
choice the control of the campaign is virtually out of his or
her hands.

As for the union campaign, the case is less cut and dry.
Here I will argue that the most important union decision is a

(1) Modern Management Methods, a consulting firm with its main
offices in Chicago claims a 98% success record. There is no
evidence that they are at all selective in taking on clients
except that they will, allegedly, refuse to take on a case late
in the campaign.
go/no-go decision made at the very beginning of the campaign. The resources that will be available to devote to the campaign are determined when it is decided how many drives to have underway at a given time. As most of these commitments are long term, usually a year or more, there is little room for adjustment of effort along the way. Clearly some adjustment does take place as the organizers decide on a day to day basis to put a little more time into one campaign as opposed to another, but the range of this discretion is circumscribed by the demands of all the campaigns that the union local has underway. Organizers did report being able to appeal to national offices for help, sometimes, at the beginning of a big campaign. But, such help was certainly not available on short notice to respond to a change in the situation in an ongoing campaign. Even if the financial resources were available, much of the work of an organizer requires an intimate knowledge of the situation and the individuals involved. This knowledge and rapport can only be developed over time through involvement with a particular campaign.

For these reasons I feel it is arguable that the campaign intensity is overwhelmingly causally prior to the decisions individuals make in the course of the campaign.

While I have argued that we can treat the company campaign and the union organizer's efforts as being causally prior to each individual's decision, the efforts of employees' are clearly endogenous. This is a problem because there are virtually no measures of union campaign activity
available, in the data set which was used for this study, which measure only the contribution of the organizers. This is because the workers normally play a very major role in the pro-union campaign. Thus, all the union campaign variables must be treated as endogenous.

This is not a problem with the company campaign because workers generally play a relatively small role in the company campaign. There are two institutional reasons for this difference between union and company campaigns. First, the company is explicitly forbidden by the NLRA to deal in any way with any employee committee before the elections are held. This makes it difficult for a company, which wants to mobilize worker support, to aid a worker group or to coordinate activities with them. Secondly, union organizers may be excluded from the grounds of a company at the discretion of the management in most situations. This makes an in-house organizing committee of workers almost a necessity if the organizers are to reach the majority of the workers with the union message.

Because of the simultaneous determination of the union campaign and individual votes, the determination of the impact of all the variables, represented in figure V.1, on vote would require the estimation of a system of simultaneous equations. Estimating this structural form would be difficult if not impossible given existing techniques. The estimation of the system of equations by full information maximum likelihood is a computationally intractable problem because of the necessity
of evaluating a very difficult jacobian.

Unfortunately, there do not appear to be any limited information techniques which are appropriate either. Because of the probit specification of the vote equation simple non-linear-two-stage-least-squares can not be used. Heckman has developed an analog to two-stage-least-squares for systems of simultaneous equations involving limited or truncated dependent variables. (1) However, the application of Heckman's method requires that one be able to find the reduced form of the system with which one is working. Because of the non-linear nature of the underlying probit in the vote equation (eq. IV.2) and the non-linear nature of the equation determining each individual's campaign effort, (2) it is impossible to find the explicit reduced form.

For these reasons, the models estimated here will all be approximations to the reduced form of the structural model described above. That is, the variables measuring the union campaigns will be excluded. We can probably assume that, to the degree that the union has access to the same resources as the company, union campaigns should have the same effect.

In the next chapter I will present the results from the estimation of two approximations to the model just described.


(2) This equation is not developed in this study. For an example of a specification which might be used see Dickens, "Union Representation Elections: Theory and Model", mimeo December, 1979.
VI. Data:

The analysis which follows uses data collected for the study, *Union Representation Elections: Law and Reality*, done by Getman, Goldberg and Herman. (1) The authors collected data on 1273 people who took part in 31 union representation elections that took place in five Mid-Western states in 1972 and 1973.

The subjects were interviewed, either by phone or in person, on two occasions. The "first-wave" interviews were done a mean average of just over nine weeks after the date of petition for election and three-and-a-half weeks before the elections were held. (2) The second occasion was immediately after the election was held. In the interviews the subjects were asked questions about their background, their demographic characteristics, their wage, their experience with and memory of many aspects of the company and union campaigns, and how they voted in the election.

In addition to the information on the individuals. The authors of Law and Reality also collected data on the campaigns run by the union and the company, and the illegal practices committed by both sides. Getman et. al. kept a record of; the numbers and the date of company captive audience meetings, the numbers and dates of union meetings, (1)


*(2) The median time was just over six weeks after the date of petition and eighteen days before the election.*
the number of union and company handbills and letters and the
days they were passed out, the dates on which the first cards
were signed, the filing date for the petition for election,
and the date of the election. Getman et. al. also analyzed
all the union and company campaign literature in each election
to determine what issues were raised by each side. In
addition, the authors kept track of all the allegations of
illegal campaign practices, any illegal campaign practices
admitted by the parties in private interviews, and any NLRB
findings of illegal practices and the remedies which were
imposed.

The authors also did some investigation of complaints in
elections where no formal complaints were made. The evidence
they gathered was given to an off-duty NLRB Administrative Law
Judge who told them what his findings would have been if he
had been presented with this evidence in his official
capacity, and what remedy he would recommend. For a more
thorough description of Getman, Goldberg and Herman's data and
sampling techniques see their book: Union Representation
Elections; Law and Reality.

From this data I constructed a number of averages and
sums which are used in this study. These variables will be
described in the places they are used.

Because not everybody in the sample answered all
questions, I was forced to develop a sub-sample. The criteria
for a subject being included in my subsample was that the
person have answered all of the following questions: 1.
Whether or not the person had taken part in the campaign in any way (question 16a on the first wave interview schedule). 2. Whether or not the person had voted in an NLRB election before (question 17a on the first schedule). 3. How many people the subject was supporting (question 22 on first schedule). 4. How many years of education the person had (question 23 on the first schedule). 5. The wage received by the person (question 28 on the first interview schedule). 6. Whether or not the person had talked to a company representative during the campaign (question 2a on the second interview schedule). 7. How the person voted (question 13 on the second interview schedule).

If an individual had missing data on any of the other questions, her or his answer for that question was set equal to the modal answer for that question in the sample. There were very few people with missing data on questions besides the seven listed above.

Whenever there is sample selection on the basis of attrition or refusal to answer there is always the possibility of sample selection bias. As a weak test of the existence of sample selection bias I computed the percent of people voting union in my sample and compared it with the percent of people voting union in the elections studied by Getman et. al., and the percent voting union in the sample used in that study. Forty-Five-point-three percent of the people in my sample voted union. In the elections studied by Getman et. al., as well as in their sample, fourty-five percent of the people
voted union. (The authors do not report the third significant digit). (1) As the standard error on any possible difference between these means is approximately 1.8%, no possible difference would be close to being statistically significant. As the mean union vote in my sample is the same as the percent of people voting union in the elections to at least two significant digits, and since the difference could not possibly be statistically significant, it seem likely that sample selection bias is not a problem here, although this is admittedly a weak test.

In addition to the Getman, Goldberg and Herman data, I have constructed one additional variable for use in this study. From descriptions provided to me by the authors of Law and Reality, I was able to classify the firms which took part in the study by three digit census industry. In order to get some measure of the potential monetary gains a worker in one of these plants might expect, I added to the data file on each company the average union wage in that three digit industry. As this statistic is not available from any source I was able to find, I constructed the variable from the Current Population Survey tapes for 1973, 1974, and 1975. (2) Using the questions on average weekly income, average hours worked, and whether or not the individual's job was covered by a

(1) Getman et. al. page 41.

(2) I am indebted to Prof. James Medoff of Harvard University for making the tapes and computer resources, for the construction of this variable, available to me.
collective bargaining contract, I constructed the average hourly wage for union and non-union jobs in each three digit industry for each year. The results for the three years were averaged after the wage rates had been put in terms of 1972 dollars by dividing by the Citi-Bank data base wage deflator. (1)

Of the elections studied by Getman et. al. the union won 24% which is far less than the national average for the period of 1972-73 when the study was conducted. During those years unions won about 49% of the elections they took part in. (2)

The mean value of company campaign variables in the sample was 1.9 captive audience speeches per election and 5.13 written communications. On average supervisors talked with 14% of all workers at least once about the election.

Complaints of illegal practices were made by one or more parties in 23% of the elections and the NLRB found violations in 6% of the cases. As Getman et. al. tried to pick a sample where there would be a high proportion of illegal practices it is not surprising that this is much higher than the national average for this period which was 9.4% for objections and 1.6% for objections upheld. (3)

(1) Average union and non-union wages for three digit industries are available from this author on request.

(2) Percent of elections involving only one union won by union in NLRB fiscal year 1973 from the Annual Report of the NLRB for 1973. Getman et. al. only studied elections where only one union was involved. This is the case with the overwhelming majority of elections (93.3% in 1973).

Of the workers in Getman, Goldberg and Herman's sample; 40.2% were women, 11.9% were of minority background, their average age was approximately 38 years, their average wage was about $3.20 per hour and 28% had been on the job for less than one year. The figures for the civilian labor force for that same period were; 44.7% were women, 10.8% were non-white, the average age was about 39 years, the average wage was $3.85 per hour and 25% had been on the job less than one year. (1)

Of the elections studied, in 57% of them the union running for certification was a AFL-CIO union, 30% of the elections involved the Teamsters, 10% involved the UAW and 3% were independent unions. These figures are very similar to to the national averages except for the over-representation of the UAW which might be explained by the mid-western location the plants. (2)

The rough industry breakdown is identical to the national averages for all union representation elections of that period with 35% in service, wholesale and retail and the rest in manufacturing and other industries. (3)

Thus the only large difference between the sample here and the national averages is the frequency of illegal

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(1) Sources: Statistical Abstract of the U.S. 1978

(2) Nationally 57% of the elections involve AFL-CIO unions, 34% involve the Teamsters, 6% involve other national unions and 3% involve other local unions (source: Annual Report of the NLRB 1973).

practices, the outcomes and the geographic location. As the differences in outcome is attributable to the selection of the sample on the basis of the exogenous variable of expected campaign intensity the consistency of the parameter estimates in the types of statistical procedures employed here should not be affected. These differences will, however, complicate the interpretation of the simulation results presented in chapter VIII and more will be said about these problems there.

This concludes the description of the data used for this study. The next three chapters present the results of the data analysis.
VII. Reduced Form Estimates of Campaign Influence.

The full model proposed in chapter V is quite complex and poses many problems for estimation. However, some of the most interesting questions can be addressed in the framework of a simpler reduced form linear probit approximation to the full system. Taking this approach involves estimating equations which predict the probability of a person voting for unionization on the basis of all the relevant pre-determined variables. From the previous discussion, the list of predetermined variables would include: individuals' background, the potential gains or losses from unionization, the company campaign measures and measures of the extent of the union organizer's effort.

A number of things complicate what would otherwise be a very straightforward problem of estimating the reduced form probits. First, we really do not have any measure of the intensity of the union organizer's effort. The one potential measure that I tried was the percent of people in each company who had contact with a union organizer. There are at least two major problems with this measure. First, organizers from different unions have very different practices with respect to how visible they make themselves in a campaign. To the extent that we can not use dummy variables to control for the unions involved, this could act as a proxy for the union. Secondly, and probably more important, organizers tend to do more behind the scenes support work, and are less visible, in an election
where the workers are very active. (1) Thus there will be a
tendency for the effect of organizers, measured in this way,
to be biased downward. In fact, when this variable was tried
in a few specifications it had a negative coefficient which
would otherwise indicate that union organizers work against
the union cause.

The problem with not including a control for the union
organizer's effort is that it will probably introduce a
tendency for the effects of the company campaigns to be
underestimated. If companies run harder campaigns when they
expect a harder union campaign then the increased company
effort will be offset by an unobserved increase in union
effort. Hopefully, controlling for the union involved with
union dummies will mitigate much of this potential effect.

While the lack of measures of the union campaign poses
one problem, the multiplicity of measures of the company
campaign activities are a second complication. Because of the
wealth of data collected by Getman et. al. there are several
potential measures of: illegal company campaign practices,
company captive audience meetings, written communications, and
the activity of supervisors. Much experimentation and much
thought was required to come up with the final specifications.
The results presented here are not meant to be the "best" in

(1) I am still assuming as before that the overall level of
the organizer's effort is predetermined. What I am suggesting
is that the allocation of that effort among different
activities depends on the state of worker involvement in the
campaign.
any sense. Rather they are representative of the types of results that were obtained using different approaches to measuring the composition of the campaigns. Mostly the results for other specifications are similar to those presented here. Where they are not I will comment in the text.

To begin with, there are several different measures of illegal practices committed by the companies. The results for two specifications are presented here. One specification uses a measure of illegal practices which is broken down by the type of violation, the other uses a measure which is broken down by the proposed or actual remedy.

In setting up the specifications one has to choose between the union allegations, those violations alleged by the authors, violations admitted to by the parties, and the findings of the N.L.R.B. and the off duty N.L.R.B. judge. I started off the analysis using a combination of what the N.L.R.B. found, what the authors alleged and what the parties admitted. The results presented here use only those violations admitted by the parties and those determined by the N.L.R.B. or the A.L.J. The results for both sets of data were basically the same except that Getman et. al. alleged illegal speech far more often than the board found it. When the authors allegations of illegal speech were used instead of the N.L.R.B. or A.L.J. findings, illegal speech seemed to cause people to vote union.

Once the decision was made to use the N.L.R.B. findings,
with respect to specific violations, a scheme had to be found
to classify the various illegal practices. The categories had
to be chosen so that there were a fair number of elections
with violations in each category while maintaining the
important distinctions between different types of violations.
Three different systems of categorization were tried. The
results for all were similar. (1) The classification system
used in the specifications presented here breaks the observed
illegal practices down into three categories: 1. Illegal
Speech; any general promises of benefits or threats of
retaliation directed at all workers, or any statement judged
to be misleading. (There were 17 elections with this type of
violation.) 2. Illegal Action; any benefit granted to all
workers, retaliation made against all workers, interrogation
or surveillance of employee's union activities, failure to
hire pro-union workers, or dealing with an employee committee
before the election. (There were 19 elections with this type
of violation) 3. Threats or Actions against pro-union
employees. (There were five elections with this type of
violation.) (2)

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(1) In some cases, where the classification of violations
broke the categories down more than the system used here, some
violations had positive coefficients. However, the overall
impact of the average level of illegal practices remained much
the same.

(2) In election 19 there was not enough evidence to find
illegal practices, but the union and the company agreed to a
re-run election because they both admitted to having committed
violations. The election was scored as having both illegal
speech and actions.
Remedies were easily divided into two categories: "bargaining order" and "other." There were nine elections with bargaining orders and 13 elections with other remedies. Of those 13 elections there were twelve where the remedy was to re-run the election and one cease and desist order.

Once the categories were decided, dummy variables were constructed for each individual for each violation and the two remedies. The variables were set equal to one if the violation had taken place in, or remedy had been suggested for, the election the individual took part in.

In developing a measure of company captive audience meetings I was faced with two possibilities. First, Getman, et. al. watched each campaign and kept track of the number of meetings and the dates they were held. The second possibility that was considered was that a measure could be developed from the number of meetings that each subject reported attending. Each of the two measures have advantages and disadvantages. A measure, (or measures) constructed from the Getman et. al.'s data could take into account the fact that early meetings might be either more or less effective than later meetings. One might expect that what is said at earlier meetings might be forgotten while what is said at later meetings is better remembered at voting time. On the other hand, one might hypothesize that earlier meetings catch people when their opinions are still unformed and thus have more of an effect. In either case it would be useful to
measure early and late meetings separately.

If the measure constructed from individual reports is used this advantage is lost. On the other hand, meetings held are not necessarily meetings attended. Both measures were tried in different specifications. Neither substantially changed the results with respect to the impact of meetings or of other variables. The measure used in the specification presented here was constructed using the Getman et. al. reports. Two variables were constructed; one measuring the number of meetings held before Getman et. al.'s first wave interviews and another measuring those held after the first wave. (1)

Much the same considerations applied to the task of developing a measure of written communications. However the decision as to which measure to use was more clear cut. While people probably have little trouble recalling meetings they attended, they probably have considerable trouble remembering every little piece of paper that was handed to them. For these reasons a variable constructed from Getman et. al.'s records was used. As with meetings, two variables were constructed. One variable was set equal to the number of written communications distributed before wave-one and one was set equal to the number distributed after the wave-one

(1) The first wave interviews are used as the point of demarcation between late and early meetings because in some cases the only information on the time a meeting was held was whether it was held before or after wave 1. The same demarcation point is used for early and late written communications.
interviews.

Finally, everybody I talked to about anti-union campaigns agreed that the most important aspect of the company campaign was the supervisors' individual talks with workers. Unfortunately, this is also the most difficult aspect of the company campaign to measure. Probably the best way to measure this variable would have been to ask each individual how many times they talked to a supervisor alone about the election. Getman et. al. did not do this, maybe because they feared that people would not remember correctly the number of contacts that they had. However, the authors did ask people whether or not they were approached by a supervisor or management official to talk about the election. This information could be used in two ways.

One approach would be to construct a dummy variable for each individual equal to one if that person was contacted by a company representative. There are two problems with this approach. First, it does not allow any distinction in the intensity of contacts. How many times was a person contacted? Secondly, a supervisor talking to one person is not only going to affect that person. He or she may talk to fellow employee's about what was said. Thus the variable that I have used here is the percent of people in the bargaining unit who were approached by a supervisor to talk about the election. One would imagine that in an election where 50% of the workers were approached each worker who talked to a supervisor would have been more likely to have talked to him or her more than
once compared to an election where only five percent of the workforce talked to a supervisor. Also, each individual would have been more likely to have heard what the supervisors were saying through the "grape-vine" even if they had not talked with a supervisor directly.

The campaign variables, once constructed, were put together with a number of measures of individual background, and background on the elections, to estimate the reduced form probits. The list of background variables includes: a dummy for whether or not the individual had worked at that particular firm for less than a year, a dummy for part-time workers, a measure of the person's age and their age squared (because of the hypothesized non-linear relation between age and interests in unionization), a dummy for married workers, a variable measuring the number of dependents a worker has, a measure of the years of education he or she has, a race dummy, and a dummy for workers who had relatives (spouse, mother or father) who were union members. In addition to these demographic background variables three more variables relating to an individual's background were constructed.

The first of these was a measure of the wage change a person might expect in the event that the shop he or she was working in was unionized. This variable was constructed by subtracting the person's current wage from the average union wage in the three digit industry in which she or he worked. While it is not expected that everybody would anticipate a wage increase (or decrease in some cases) of exactly this
amount, it is hoped that this variable would capture two important effects: workers in firms where the average wage is far below the union average in the industry would expect their wages to go up more than someone who is in a firm where the wages are at the average or above. Secondly, since unions tend to compress the wage distribution, workers at the top of a firm's earnings structure may expect their wages to drop or stay constant relative to workers at the bottom who will probably move up more. (1)

The last set of individual background variables are the measures of individual pre-disposition at the time of the card-signing drive. Two variables are used here. From the data collected by Getman et. al. we know for each individual; if they were asked to sign a card, if they did whether they signed, and if they signed whether they were for the union at that time. The first variable measuring pre-disposition is set equal to one if a person signed a card and said that at that time he or she had been for unionization. This variable is set equal to zero if the person reported that he or she either refused to sign the card or signed but was not for unionization. If the person was not asked to sign a card the variable is set equal to the percent of people in that firm asked to sign cards who were for the union at that time.

Using this variable alone would require the assumption that a person who is not asked to sign a card has the same probability of being pro-union as someone who was asked. This is highly unlikely. People collecting signatures undoubtedly know that some people are dead set against unionization and avoid those people. To allow for this, a second variable was constructed. This is a dummy variable equal to one if a person was not asked to sign a card and zero if they were. This allows for people who were not asked to sign a card to be less likely than average to hold pro-union views by some constant factor.

Four different types of background variables were included on each election: First, dummies for each union that took part in more than one election were used. Second, a measure of the size of the bargaining unit was included on the grounds that differences in technology or management style between large and small firms might make a difference in the probability of an individual voting for or against unionization. Third, a variable was constructed which was equal to the average number of people, who were asked to sign cards in the bargaining unit, who said that they were for the union at that time. Given that we also have a measure of each individual's disposition, this is best viewed as a measure of the likely intensity of peer pressure and the union campaign. As was mentioned in chapter V., the union relies to a great degree on workers' help in developing the pro-union campaign. Finally, a measure of the average education of workers that
each union deals with was constructed from the data set. It was included because of its theoretical importance in determining the style of an organizer's campaign and the effectiveness of the the worker-organized pro-union campaign.

Table VII.1 presents the average value for each variable for the sample used to estimate the linear probit model.

Two specifications of the several that were estimated are presented here. The results, with few exceptions, are similar in all major respects to the other specifications tried. The results for these two specifications are presented in table VII.2. The first column under each heading gives the value for the probit coefficients. The second column contains the standard errors. These are both self-explanatory. What might need some explanation is the third column under the heading; "Average dP/dX."

If one estimates a linear probability model, the coefficients of the regression are easily interpreted as the percent change in the probability of the outcome given a one unit change in the corresponding dependent variable. Because of the non-linear nature of probit probability equations, probit coefficients do not have an easy intuitive interpretation. In particular, the change in probability that a one unit change in a particular independent variable will cause depends on the value of all the other independent variables. Despite this problem it would be nice to have some way to compare the impact of different right-hand-side variables. To facilitate the intuitive understanding of the
Table VII.1

Average Values for Independent Variables

**Individual Background:**

1. Tenure < one year  
   2. Part-time worker  
   3. Age code  
   4. Age code squared  
   5. Married  
   6. Number of dependents  
   7. Education code  
   8. White  
   9. Relative union member  
   10. Initial disposition union  
   11. Not asked to sign card  
   12. Expected wage change

**Election Background:**

13. Union is U.A.W.  
14. Union is Teamsters  
15. Union is Steelworkers  
16. Union is Retail Clerks  
17. Union is Machinists  
18. % for union at start  
19. Avg. Ed. for union (code)  
20. # of workers in election

**Campaign Measures:**

21. Illegal speech  
22. Illegal actions  
23. Threats against union  
24. Early company letters  
25. Late company letters  
26. Early company meetings  
27. Late company meetings  
28. % of workers talk with sup.  
29. Remedy is Bargaining order  
30. Other remedy

Total number of workers: 966
% Voting union: 45.3
| Table VII.2 |
|---|---|---|---|---|---|
| **Probit Results** | **Avg.** | **Coef.** | **S.E.** | **dp/dX** | **Coef.** | **S.E.** | **dp/dX** |
| **Individual Background:** | | | | | | | |
| 1. Tenure<1 year | 0.033 | 0.133 | -0.008 | 0.040 | 0.134 | 0.010 |
| 2. Part-time worker | -0.250 | 0.265 | -0.064 | -0.256 | 0.260 | -0.066 |
| 3. Age code | 0.184 | 0.137 | -0.047 | 0.172 | 0.193 | 0.044 |
| 4. Age code squared | -0.042 | 0.033 | -0.011 | -0.040 | 0.033 | -0.010 |
| 5. Married | -0.186 | 0.137 | -0.047 | -0.199 | 0.135 | -0.051 |
| 6. # of dependents | 0.032 | 0.044 | -0.008 | 0.030 | 0.044 | -0.008 |
| 7. Education Code | -0.072 | 0.061 | -0.018 | -0.081 | 0.060 | -0.021 |
| 8. White | -0.001 | 0.133 | -0.000 | -0.005 | 0.132 | -0.001 |
| 9. Relative U. member | 0.225 | 0.109 | -0.057 | 0.253 | 0.108 | -0.065 |
| 10. Initial Disp. | 1.691 | 0.151 | -0.430 | 1.655 | 0.149 | -0.427 |
| 11. No card | -0.622 | 0.108 | -0.158 | -0.615 | 0.107 | -0.159 |
| 12. Expected Δ wage | 0.498 | 0.085 | -0.127 | 0.504 | 0.085 | -0.130 |
| **Election Background:** | | | | | | | |
| 13. U.A.W. | -0.838 | 0.244 | -0.213 | -0.697 | 0.232 | -0.180 |
| 14. Teamsters | -0.591 | 0.172 | -0.150 | -0.444 | 0.174 | -0.115 |
| 15. Steelworkers | 0.680 | 0.245 | -0.173 | 0.876 | 0.223 | -0.226 |
| 16. Retail Clerks | -1.266 | 0.598 | -0.320 | -1.224 | 0.548 | -0.316 |
| 17. Machinists | -1.036 | 0.322 | -0.416 | -1.315 | 0.452 | -0.339 |
| 18. % for union | 2.220 | 0.611 | -0.565 | 2.175 | 0.504 | -0.561 |
| 19. Union avg. ed. | 1.038 | 0.272 | -0.264 | 1.372 | 0.238 | -0.354 |
| 20. # of workers | 0.013 | 0.004 | -0.003 | 0.012 | 0.004 | -0.003 |
| **Campaign Measures:** | | | | | | | |
| 21. Illegal Speech | -0.087 | 0.236 | -0.022 | - | - | - |
| 22. Illegal actions | -0.095 | 0.274 | -0.024 | - | - | - |
| 23. Threats v. union | -0.608 | 0.274 | -0.155 | - | - | - |
| 24. Early letters | 0.041 | 0.031 | -0.010 | 0.082 | 0.026 | -0.021 |
| 25. Late letters | -0.145 | 0.043 | -0.037 | -0.134 | 0.044 | -0.035 |
| 26. Early meetings | -0.205 | 0.096 | -0.052 | -0.262 | 0.103 | -0.068 |
| 27. Late meetings | -0.099 | 0.101 | -0.025 | 0.014 | 0.083 | 0.004 |
| 28. % talk to sup. | 0.260 | 0.603 | -0.066 | -0.497 | 0.505 | -0.128 |
| 29. Remedy is Bargain | - | - | - | -0.282 | 0.227 | -0.073 |
| 30. Other Remedy | - | - | - | -0.196 | 0.142 | -0.051 |

**Constant** = 5.690 1.120  -6.906 1.014

**Number of Observations** 966

**Log of Likelihood Value** -438.6 -444.0
results I have constructed this table. What it shows is the average value for $dP/dX$, for people in the sample. The symbol $dP/dX$ stands for the derivative of the estimated probability of an individual voting union with respect to the right hand side variables. It should be remembered that the actual value of this derivative varies from one individual to the next, and that this is the average for people in this sample only. The derivative will be highest for an individual when his or her probability of voting union is .5 and will be lower if that probability is higher or lower. For our purpose though, the numbers in this column can be reasonably interpreted as the average expected change in probability of a union vote given a one unit change in the independent variable.

Two more comments are in order before I begin the explication of the results. First, although there are 966 individuals, there are only 31 elections. When the coefficient on a variable is statistically significant this is telling us that there is probably a significant difference between the elections where, for example, the Teamsters took part and those where they did not, or between elections where one written communication was sent out and those where two were sent out. Those differences may or may not have anything to do with the presence of the Teamsters or of the extra written communications.

In a laboratory experiment, (which is the environment for which the probit technique was initially developed), one can be fairly sure that any differences between treatment groups
is due to the treatment that they received. In an uncontrolled setting, such as the one we are studying here, there is a chance that the differences between one group and another are not being caused by the phenomena that we have used to distinguish the groups. The probability that this is the case depends on how many elections have a particular characteristic. Thus while the estimates of the impact of supervisors' activities or of the union involved may be rather untrustworthy (because of the few elections in which each union took part and the few elections where heavy use was made of supervisors). The impact of the other election level variables is probably fairly sound.

The problem described above is the classical "left-out-variable" problem. Because we can not be sure that we have controlled for everything that went on in a particular election, we can not be as sure of these findings as we could be if we could conduct a controlled experiment. If these "left-out-variables" are correlated with the included variables, the estimated coefficients will be biased. However, even if the left out variables are not correlated with the included variables, they still pose a problem.

Using a probit specification, an individual's vote is assumed to be determined by the equation:

\[
\text{Vote} = \begin{cases} 
\text{union if } X_1 B + e > 0 \\
\text{otherwise no union}
\end{cases} \quad \text{(eq. VII.1)}
\]
where $X_1$ is a vector of individual and election characteristics, $B$ is a vector of parameters, and $e$ is a standard normal random variable. Probit, like many other regression type procedures, requires the assumption that the errors are independent across individuals. While this assumption is not required to get consistent coefficient estimates, it is required to get consistent standard errors for the coefficients.

If there are left out variables at the company level, the errors for the individual's in the same firm will be correlated. If this correlation were large, the estimated standard errors would be biased. In the extreme (as the correlation of the errors approaches 1.), the distribution of the coefficients, which is asymptotically normal, begins to deteriorate just as the $T$ distribution changes as the degrees of freedom decline. (1)

Because it is possible that this may be a problem with the models presented here, the correlation of the individual errors within elections was computed. The technique used was a new estimator suggested to me by Paul Ruud. (2)

---

(1) Indeed, in the extreme case of a correlation of 1, there are effectively only as many observations as there are elections.

(2) Ruud's method is to find the value of the correlation of the errors such that the function for the expected value of the summation of the product of the hazard rates for all pairs of workers in the same firm, is equal to the value of that sum.
Error correlations for all the models presented in this paper were estimated using this method. None were found to have an absolute value greater than .02, and the standard error of estimate for these values is less than .09. As correlations of this magnitude will not cause much bias, the standard errors reported for the coefficients are those estimated under the assumption that the 966 observations are independent.

The second item which deserves note is that in the presentation that follows I have downplayed the question of statistical significance. This is because statistical significance is not a very interesting question here. Instead I have tried to show the range of the probable magnitude of various effects. In a sense, statistical significance is just a special case of this type of analysis.

of products. This is equivalent to finding \( r \) such that:

\[
B(Fij,Fik|r) - \Phi(Fij) \Phi(Fik) - Sij Sik \Phi(-SijFij) \Phi(-SikFik) = 0 \quad (eq.. \ VII.2)
\]

where \( B \) is the cumulative bivariate standard normal density function with correlation \( r \), \( \Phi \) is the cumulative uni-variate standard normal density function, \( Fij \) is the systematic part of the underlying probit for the jth individual in election i computed from the data and consistent estimates of the parameters, and \( Sij \) is a variable equal to one if the ijth person voted union and negative one if the person voted against unionization. A paper by Paul Ruud demonstrating the consistency of this estimator is forthcoming. For now, monte-carlo studies of the estimator I have done show it to be consistent with standard errors for this problem ranging from about .05 to .15 depending on the true value of \( r \).
To say that a coefficient in a probit model is statistically significantly negative at the .05 level is to say that the probability that the actual value of that coefficient is greater than zero is 95 percent. This is not really what we want to know to answer policy questions. Consider two examples.

First, take a case where the estimated impact of a variable is such that on average we would expect a one unit change in that variable to result in a twenty percent change in the probability of a worker voting union. Let us also assume that the standard error on that coefficient is such that the probability that the actual value of this coefficient is greater than zero is only 89 percent. Thus it is not "statistically significant from zero." However, to conclude on that basis that this variable has no effect on the probability of someone voting union would be clearly wrong. For the purposes of policy evaluation we should try to convey some feel for the probable magnitudes of this effect. In this case we might report that; the probability that a one unit increase in the value of this variable will increase the likelihood of an average individual voting union by more than one percent is about 88 percent, that the probability that the effect is greater than 5 percent is over 75 percent, and that there is even a 10 percent probability that the effect is greater than 35 percent.

Second, consider the case where the estimated impact of some dummy variable is to change the probability of someone
voting union by .1 percent. Let us assume also that the standard error on this variable is even smaller than that so that this effect is statistically significant. Now this coefficient, as opposed to the last one, is statistically significant, but clearly it is not very practically significant. What we should report here is that the probability that this dummy variable will change the likelihood of someone voting union by more than .5 percent is far less than one percent.

These are admittedly extreme examples. However, errors of the first kind described are very often made. Errors of the second kind are more rare.

The question of statistical significance is properly raised in testing the predictions of theories. The analysis of the intimidation theory and the information theory presented in chapter IX will rely more heavily on the question of statistical significance.

Let us now look at the results of the reduced form probits. Turning first to the individual demographic variables, we see that they are not, in general, statistically or practically very significant. This is not surprising as we would expect most of the interests coming from a person's background would be reflected in his or her initial disposition which is controlled for here. Two variables which are important are marital status and having a parent or spouse who is a union member. one can easily understand why having a relative who is a union member may put pressure on a person to
shift his or her initial disposition towards unionization. Having a spouse to support may tend to make one conservative when a heated campaign leaves one in doubt about the actual value of unionization.

Education and age effects are a bit harder to understand, unless more educated workers are easier to convince that their own interests would not be served by unionization. Perhaps this is also the explanation for the results with respect to age. It could be that younger members of the work force are easier to convince that they have some interest in stopping the introduction of seniority and work rules, while older workers are just afraid to rock the boat when they are close to retirement. In short, the best single explanation for all of these results is probably that all these people have the same interests before and after the campaign. However, the campaign may bring out information which they had not considered in forming their initial opinions and the tendency is for them to move in the direction of their interests.

This is probably also the explanation for the sign and the importance of the expected change in wage variable. As the campaign progresses people get new and better information on the likely impact of unionization on their wages and vote their pocketbook.

Finally, with respect to the individual background variables, individual pre-disposition is very important in determining the outcome of the elections as has been suggested by previous authors. A person with a pro-union disposition is
about forty-three percent more likely to vote union than someone who is disposed against the union. Also important is the dummy variable that was put in to capture the difference between those who were asked to sign cards and those who were not. A person who was not asked to sign a card is, on average, about sixteen percent less likely to vote for unionization than the average person who was asked to sign a card.

It is not particularly easy to know what to make of the union dummies. They are clearly significant both statistically and practically in that it is, according to these results, much more difficult for Machinists to win an election than for the Steel Workers. The first interpretation of results that occurs is that these union dummies are picking up the difference in organizational effort put forth by unions and the workers' reactions to the unions. These explanations are plausible with two major reservations. First, a number of unions in this sample, including the U.A.W. and the Machinists, are organizing shops which are out of their normal field. Thus they may experience difficulty in convincing workers that they are an appropriate union. Secondly, with the exception of the Teamsters, each of the other unions participated in very few of the elections. Thus the union dummies could well be picking up the experience of that union in a very limited number of circumstances, and the circumstances may have more to do with the results than the union.
As expected, for reasons described earlier, an increase in the percent of people holding pro-union sympathies has a very positive and statistically significant impact on the probability of people voting union. For every one percent increase in this variable we could, on average, expect a one-half to one percent increase in the probability of any particular person voting union (controlling, of course, for their own disposition.)

Finally, a look at the coefficient on our measure of union member's education shows that as the education of the average person in the plants being organized by each union goes up, the probability of someone voting union in an election involving that union goes up significantly. It could be that organizers who deal with better educated workers are better organizers, or it could be that this variable is acting as a proxy for average education of the workers in the plant. It could be that if an individual's educational level increases, holding other worker's education constant, that person's interest in unionization decreases and therefore his or her probability of voting union. On the other hand, if everybody's educational level is higher this may cause a more critical atmosphere. If the companies tended to run more intense campaigns in this sample than did the unions, it is possible that workers in the plants with better educated co-workers were harder to persuade, and thus more likely to vote union.

Now let us turn to the results with respect to the
company campaign. I will break the results here down into three parts: First, results with respect to illegal campaign practices. Second, the results with respect to the other company campaign practices. Finally, in the next chapter I will present the results of some election simulations which were run to demonstrate the importance of the company campaigns in determining the outcome of the elections.

Let us begin by looking at the results with respect to specific violations. A first glance shows all three coefficients are negative. However, of the three only the coefficient on threats and actions taken against the union is significantly different from zero at standard levels of significance.

According to the best estimates of the impact of these illegal tactics; "illegal speech" and "illegal activities" on average cause only about a two percent reduction in the probability of the average worker voting union. On the other hand, the probability of the average worker voting union, in an election where the employer has threatened or taken action against pro-union employees, is reduced by over 15 percent.

However, point estimates do no tell the whole story. Standard errors give us information on how sure we can be of the magnitude of certain effects. The probability that the effect of illegal speech of of illegal actions is to reduce the probability of the average person voting union by more than one percent is 57 percent. The probability that the effect of actions or threats against the union is greater than
a one percent reduction in the probability of an average individual voting union is 98 percent.

While effects of the magnitude of a one or two percent reduction in the probability of a person voting union may seem small, they are hardly inconsequential as we will see when we get to the results of the simulations. Because many elections are very close, an average change in the probability of voting union of only one percent is amplified and may easily make the difference in an election.

However, because of the size of the standard errors on the coefficients we can not be very sure at all of the magnitude of these impacts with the exception of the impact of actions and threats against the union. There are two possible causes for this uncertainty. First, high standard errors can be the result of high variance in the effect of variables within the sample. If this is the case then the only way to increase the accuracy of the point estimates of the impact of these practices would be to increase the size of the sample. On the other hand, even if the variance of the effects in the data are relatively low, if a number of measures are very correlated the statistical procedure can not separate out the effect of one category of actions from the other. Thus, the standard error of each effect will be large, while if we were to look at the standard error of the joint effect of all the actions it would be relatively smaller. It is quite possible that we have the latter problem here as the three illegal practices are all very highly correlated.
On the other hand, it is also possible that the joint effect of all illegal practices is relatively insignificant. The only effect that we are at all very sure of is the effect of threats and actions against the union, which are relatively uncommon compared to the other two illegal practices. Thus, it would seem important to look at illegal practices as a whole rather than to look at only the effects of the individual practices.

To do this we multiply the unconditional probability of the commission of each type of violation times the coefficient for these actions. This yields an estimated coefficient value for the average commission of illegal practices versus no illegal practices. The estimate of this "coefficient" has a value of -.177. This roughly corresponds to a four percent decrease in the probability of the average person voting union. The standard error on this value is .092 which means that the effect is statistically significant at the .05 level. Finally, the probability that, on average, illegal actions in this sample reduced the probability of people voting union by more than one percent relative to what would have been the case if no illegal actions had taken place is greater than 90 percent.

Let us turn now to the effects of illegal practices as measured by the remedies imposed by the NLRB or those suggested by the ALJ. A first glance shows that both coefficients are negative, though only one is statistically significant (and then at the ten percent level). However, it
should be remembered once again what statistical significance means. The probability that, on average, voters were more than one percent less likely to vote union, in elections involving illegal practices, is greater than 85 percent for both remedies. If we look at the point estimates, we can determine the most likely impact of illegal practices serious enough to warrant a bargaining order. It appears that these practices make people, on average, more than seven percent less likely to vote union. Practices warranting other remedies make people more than five percent less likely to vote union on average.

If we once again look at the effect of the average level of illegal practices we find that the coefficient value is equal to -.155 with a standard error of .086. This is statistically significant at the .05 level and the probability that the impact of the average level of illegal activity reduced the probability of people voting union by more than one percent is greater than 90 percent.

While it seems highly likely from these results that the NLRB can tell when violations have influenced the outcome of the election, it might also be interesting to look at the question of whether violations which the NLRB or the ALJ felt were serious enough to warrant bargaining orders had more of an effect on people's vote than violations which were felt to warrant lesser remedies. Here the evidence is far from conclusive. The probability that bargaining order violations are more serious than other violations is 63 percent. If we
consider the question of whether bargaining order violations on average reduce the probability of people voting union by more than one percent the probability is smaller (closer to 50 percent). The probability that it is greater than two percent is almost exactly 50 percent and the probability that it is greater than five percent is about 32 percent.

Now let us take a look at the results with respect to the legal aspects of the company campaigns. Here, I have broken the aspects of the campaigns down into three parts: written communications, meetings, and the activities of supervisors.

The results with respect to written communications are peculiar. It would seem that early written communications are a small help to the union while late written communications are a relatively big help to the company.

Looking at the point estimates, it seems that each written communication sent out after the first wave interviews, on average, made people three to four percent less likely to vote for unionization, while the written communications sent out before wave-one had the effect of making people one to two percent more likely to vote for unionization. Three out of the four effects are statistically significant at the .01 level. The other is near significant at the .1 level. Looking at the value of the coefficients and the standard errors we see that the probability that each written communication, on average, reduces the probability of a person voting union by more than one percent is greater than 99 percent in both cases for late written communications and less
than one percent, in both cases, for the early written communications.

It is hard to understand why a company would do anything to hurt its own interests. Thus, it is very difficult to understand why the early written communications should help the union. A possible explanation is suggested by what some organizers told me about companies' use of written communications and what is said in company handbooks on how to run a campaign. Both the organizers and the book agree that early written communications should be used to build up the company's credibility by handing out facts on the elections, the workers situation relative to other workers, and on the nature of the union. The organizers all suggested that most companies would wait for the last week before sending out any written communications in which they came down hard on the union. When I asked why, they said it was because early written communications and handbills left the union time to refute the arguments. Often, refutation required research taking several days. If the union could refute company charges successfully it made the company look bad. The good company campaign director waited for the last minute and then sent out a barrage of arguments. This was alleged to be very effective, especially if the company had built up a record of credibility in its early communications. Thus, a campaign where no late and only a few early written communications are sent out may be a poorly run campaign. This could account for the positive sign on early written communications.
The results with respect to written communications are virtually reversed with company meetings. Looking at the point estimates of the effects of meetings it seems that early meetings decrease the average probability of workers voting union by about 5 to 7 percent. Late meetings seem to decrease that probability by 0 to 3 percent.

Looking at the standard errors we see that the coefficients for early meetings are both significant at the .05 level and that the probability that, on average, an early meeting reduces the probability of a union vote by more than one percent is over 95 percent in both specifications. On the other hand, neither coefficient on late meetings is statistically significantly different from zero. The probability that a late meeting reduces the likelihood of a worker voting union by more than one percent is 71 percent by the estimate in one specification and 26 percent according to the other. The probability, that the effects of late meetings is to reduce the likelihood of people voting union, is greater than 42 percent in one specification and greater than 88 percent according to the other.

It would seem that the best conclusion here would be that early company meetings do have a significant effect in discouraging people from voting union while the late meetings probably have a small effect of discouraging support for the union, if they have any effect at all. Why this is the other way around from the effects of written communications is hard to say. It could be that meetings have more of a long run
effect than do letters or handbills. This would fit with the observations in the study of persuasion that reasoned argument tends to have more of an influence over time. On the other hand, sharp emotional appeal tends to have an immediate but short lived effect. It would make sense that captive audience meetings would be more the place for the former type of argument, as there is more time and there is less of a need to get and hold people's attention. This as opposed to the case of a hand-bill or letter which can just be thrown away or put in a pocket.

Nearly everybody that I talked to while doing my interviews agreed that the most important aspect of the employer campaign was the use of supervisors to talk directly to workers on a one-to-one basis. Unfortunately, the data does not really allow us to examine this hypothesis because the standard errors on the coefficients are so large. The point estimates from one specification suggest that the effect of supervisors talking to everybody would be to lower the probability of the average worker voting union by nearly thirteen percent. The other specification suggests that it would raise the probability six percent. However, when we turn to the standard errors, we find that the probability that the effect of supervisors is to deter unionization is 83 percent according to the results for one specification and 33 percent according to the other. The probability that having supervisors talk to everybody would decrease their likelihood of voting union by more than one percent is 81 percent or 31
percent depending on the specification. The probability that the effect would be to decrease the likelihood by more than 5 percent is 71 percent or 22 percent. Thus, given the uncertainty of this data it is difficult to say anything about the importance of this tactic.

There are at least three possible causes for this lack of acuity in the estimates of the impact of supervisors: First, it is true that the use of supervisors is highly correlated with the other campaign practices. In particular, it is very highly correlated with the illegal practices. Thus, it is understandable that it would have a large standard error and that the coefficient value would be sensitive to the specification of the illegal practices. It is also possible that if we had a better measure of the activity of supervisors we would have both a lower standard error and larger coefficient values as there is a well known tendency for errors in variables to bias coefficients towards zero. Finally, there is the problem that only a few firms in the sample made extensive use of their supervisors. Only about 13 percent of the people in the sample reported talking to supervisors. Thus, a larger sample with better measures of supervisor activity would probably be the only way to nail down the true importance of this tactic.

All along I have been suggesting that multi-collinearity has made it difficult to measure accurately the effects of the campaign variables. However, as I have already demonstrated with the case of illegal practices, when we look at aggregate
measures of the impact of the campaigns the uncertainty is reduced considerably. Table VII.3 presents the estimates of the difference in impact between the average campaign and no

<table>
<thead>
<tr>
<th>Specification</th>
<th>Coefficient (s.e. in paren)</th>
<th>Probability that effect is to reduce likelihood of union vote by:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&gt;1%</td>
</tr>
<tr>
<td><strong>N.L.R.B. Remedy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effect of Violations</td>
<td>-.155* (.089)</td>
<td>90%</td>
</tr>
<tr>
<td>Effect of Legal Campaign</td>
<td>-.385* (.229)</td>
<td>93%</td>
</tr>
<tr>
<td>Effect of Total Campaign</td>
<td>-.540** (.224)</td>
<td>98%</td>
</tr>
<tr>
<td><strong>Specific Violations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effects of Violations</td>
<td>-.177* (.092)</td>
<td>93%</td>
</tr>
<tr>
<td>Effect of Legal Campaign</td>
<td>-.473** (.197)</td>
<td>98%</td>
</tr>
<tr>
<td>Effect of Total Campaign</td>
<td>-.650*** (.181)</td>
<td>99%</td>
</tr>
</tbody>
</table>

**Statistical Significance:**

* = .05 (one tail)
** = .01 (one tail)
*** = .001 (one tail)
campaign, (1) and the estimated standard error of that value. From this, the probability that an average campaign reduces the likelihood of the average worker voting union by different amounts is calculated.

As can be seen by looking at this table, the most likely range of effect of the average level of illegal practices is between a one and five percent reduction in the probability of the average worker voting union. The probability that the effect is less than one percent is small, but the probability that it is greater than five percent is moderate. The effect is almost certainly less than ten percent.

Turning to legal company campaign practices we see that the most likely level of effect for the average campaign is to reduce the likelihood of the average person voting union by around ten percent. The probability that the effect is greater than twenty percent is small as is the probability that the effect is less than five percent.

Finally, the combined effect of the average level of all campaign practices can be seen to have an expected value in the range of ten to twenty percent. It is unlikely that it is above or below this range.

So far we have been looking at the importance of variables in the model in terms of the likelihood that they will cause different amounts of change in the probability of

(1) The impact of the average campaign was measured by multiplying the average value for all the company campaign variables by the coefficients for those variables.
the "average" worker voting union. However, what we are most interested in knowing is whether these practices affect the outcomes of elections. To examine this issue I have run a number of simulations, the results of which are presented in the next chapter.
VIII. Simulation Results:

To show how votes might translate into elections I ran a number of simulation experiments in which I took the estimated effects of the different campaign practices and, while I retained each individual's background information and the background information for each election, I changed the values taken by the campaign variables. To simulate each individual's vote I first used the probit model to compute the probability that she or he would vote union given his or her background, the election background, and the simulated company campaign practices. Then, I compared the individual's predicted probability to a random number between zero and one. If the random number was smaller than the probability of a union vote the person was considered to have voted union. The individuals' simulated votes were tallied and the winner of each of the 31 elections in the sample was computed. Using this method I "re-ran the world" 100 times or more for each specification of the campaign variables, thus simulating 3,100 elections or more. The results of these simulations are presented in tables VIII.1, 2 and 3.

The first experiment performed was just to see how percent probability of voting union translated into elections won and lost. Table VIII.1 shows the results of the 31,000 simulated elections for the cases where each individual's probability of voting union was computed from actual data and then increased by one and five percent. As can be seen, a one
<table>
<thead>
<tr>
<th>Percent of elections won by the union</th>
<th>Actual data</th>
<th>Actual Prob. +1%</th>
<th>Actual Prob. +5%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36.1%</td>
<td>38.5%</td>
<td>45.5%</td>
</tr>
<tr>
<td>Change in percent of elections won</td>
<td>-</td>
<td>2.3%</td>
<td>9.4%</td>
</tr>
<tr>
<td>Number of simulated elections</td>
<td>31,000</td>
<td>31,000</td>
<td>31,000</td>
</tr>
</tbody>
</table>

Percent change in the probability of voting union translates roughly (in this sample) into a two percent change in the number of elections won by the union. (1) It can also be seen that the effect is slightly less for larger changes in vote probability.

(1) It is important to remember that these results are very dependent on the sample of elections studied. If the number of close elections in the sample were increased the sensitivity of the percent of elections won by the union to changes in the probabilities of individuals voting union would be increased. Likewise, if the number of close elections were decreased the results would be less sensitive. These experiments are presented only to show that company campaign practices could have made a difference in this arbitrary set of elections. No claim is made that the specific percentage changes found in this sample would generalize to any other set of union representation elections.
Turning now to table VIII.2 we can see the results of seven sets of simulations run using the coefficients for both specifications of the effect of illegal practices.

The actual data was used as a starting point. When the 31 elections were simulated 100 times the unions won 36 percent of the 3,100 elections.

One might notice that the percent of simulated elections won by the union is greater than the percent actually won (24% vs. 36%). An explanation is in order. First, the percent of people voting union in the simulations where the actual level of campaigning was used was the same as the percent of people voting union in the actual data. Thus, the problem is not

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**Table VIII.2**

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N.L.R.B. Remedy</td>
<td>36%</td>
<td>25%</td>
<td>44%</td>
<td>66%</td>
<td>5%</td>
<td>9%</td>
<td>58%</td>
</tr>
<tr>
<td>Specific Violations</td>
<td>36%</td>
<td>17%</td>
<td>47%</td>
<td>67%</td>
<td>4%</td>
<td>22%</td>
<td>63%</td>
</tr>
</tbody>
</table>

Percent of elections won by union.
3,100 simulated elections in each cell.
that the model is predicting too many union votes. Rather, there are two other explanations. First, a majority of the people sampled by Getman Goldberg and Herman voted union in 31% of the elections. (The authors did not interview everybody in each election.) This explains over half the difference. Second, in the sample, the companies won six out of the seven elections were there were less than twenty participants. A few votes switched in any of these elections could change the outcome and increase the percent of union victories. From the perspective of the voting model the unions were probably "unlucky" to lose that many of the small elections. As a result they may win one or two more of these elections in each simulation (on average). This would easily account for the rest of the observed difference between the actual percent of union victories and the simulated percent.

Next, the elections were re-run keeping the original values for the legal part of the campaign, but setting the data to simulate the situation where all illegal practices were committed in all elections. (Or a bargaining order was issued for the simulations run under that specification.) The results show a considerable drop in the number of elections the union wins. Next, 100 simulations were run where the original data on the legal parts of the company campaigns was retained, but the data on violations was changed to simulate the situation where every company ran a "clean" campaign. Once again, the simulations show that the illegal practices probably make a big difference.
The next set of simulations show what the most likely effects of the legal components of the campaigns, and the campaigns as a whole, are. First, 100 simulations were run where the data was set to simulate the situation of no company campaigns at all. Second, a representative "strong campaign" was chosen. In this campaign, all three of the illegal practices took place, the company sent out five early written communications and six late ones, held two early meetings and had its supervisors talk to 59 percent of the workers.

To get some idea of what part of that effect is due to the illegal campaign practices and what part is due to the legal part of the campaign a set of simulations were run where every company ran the representative strong campaign but only the legal parts. The results show that the legal parts probably have a substantial effect. The magnitude of that effect is in question though, since the estimation of the specification that uses specific violations attributes more of the effect to the violations than does the specification which measures violations in terms of NLRB remedies. This could be the result of either the lack of acuity in NLRB rulings, or of specification error that is influencing the measurement of the effects of the specific violations.

Finally, everybody in the sample ran some sort of campaign. So a representative light campaign was chosen and all the elections were re-run using these values. This representative light campaign had no illegal practices, one early written communication, one early meeting, and the
supervisors talked to only fifteen percent of the workforce. The results would seem to show that even this level of campaigning probably has a noticeable effect on the outcome of some elections.

One thing which these simulations neglect is that the point estimates of the effects of the different campaign practices are only the most likely levels of effect. To give some idea of the range of possible effects I have conducted one last set of simulation experiments.

Using the point estimates for the specification that measures illegal practices in terms of specific types of violations and the standard errors for that specification, I have constructed two sets of coefficients.

If the true value of the reduced form coefficients for the campaign variables is $B$, the new values to be found are $b$, the data matrix is $X$, and the average value of the campaign variables is $v$, then what I have done is to find $b$ to:

$$\max L(b|X) \quad (\text{eq. VIII.1})$$

$$\text{s.t. } \text{Prob}(B^v > b^v) = .95 \quad (\text{eq. VIII.2})$$

where $L(b|X)$ is the likelihood of the estimated coefficient vector given the data. Thus $b$ will be the most likely estimate of the campaign effects subject to the constraint that the probability, that the actual aggregate impact of the average campaign is greater than the new estimate, is 95%. 
The second set of coefficients is much the same except that the constraint is changed to:

\[ \text{s.t. } \text{Prob}(B'v < b'v) = .95 \ (\text{eq. VIII.3}) \]

These coefficients can be seen as giving an upper and a lower bound on the range of probable values for the effects of the average company campaign. Table VIII.3 presents the

<table>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Uppper bound on effect of average campaign</td>
<td>35%</td>
<td>16%</td>
<td>47%</td>
<td>75%</td>
<td>3%</td>
<td>14%</td>
<td>69%</td>
<td></td>
</tr>
<tr>
<td>Actual Coefficient Estimates</td>
<td>36%</td>
<td>17%</td>
<td>47%</td>
<td>67%</td>
<td>4%</td>
<td>22%</td>
<td>63%</td>
<td></td>
</tr>
<tr>
<td>Lower bound on effect of average campaign</td>
<td>36%</td>
<td>17%</td>
<td>46%</td>
<td>53%</td>
<td>10%</td>
<td>34%</td>
<td>57%</td>
<td></td>
</tr>
</tbody>
</table>

Percent of 3,100 simulated elections won by union.
results for simulations run with these coefficients. (The results of the simulations run with the estimated coefficients are replicated here for the sake of comparison.) These results demonstrate that even the very conservative estimate of the effect of the average campaign shows it to be substantial.

What can we conclude from the results of the estimation of the voting model and from the results of the simulations? First, as past authors have suggested, it is clear that pre-disposition is very important. However, viewing pre-disposition as being the same thing as uninformed prejudice is probably incorrect. When the probit model was estimated, leaving out the measures of individual pre-disposition, all the background variables, including the proxy for expected wage gain, became much more important. This suggests that people's pre-dispositions are shaped by a number of factors including their own objective economic interests.

Also, despite the importance of pre-disposition, cross-pressure from things in people's demographic backgrounds, as well as their objective economic interests, do play a role in shaping opinions during the course of the campaign. Also important during this period are the pre-dispositions of other workers which, as I have suggested, probably affect the individual both directly, through conversations, and indirectly, through the strength of the union campaign.
The results with respect to specific violations of the law are mixed and difficult to interpret. The same holds true if we look at the effects of violations which warrant bargaining orders or violations which warrant lesser remedies by themselves. But, if we look at the effects of illegal campaign practices as a whole it seems indisputable that they have some effect, and highly probable that that effect is, or can be, large and very practically important. It is also more likely than not that the NLRB can tell when something has been done which affects an outcome of the election and can discriminate between more and less serious violations of the labor law.

The results with respect to the legal aspects of campaigns are also somewhat mixed. However, it seems that it can be said that early meetings and late written communications have a substantial impact on the outcome of the elections and that late meetings have little effect. Early written communications may either have a positive effect on people voting union or they may be acting as a proxy for poorly run campaign as I have suggested. The results with respect to the use of supervisors seem very inconclusive.

However, as with the case of illegal practices, when we treat the company campaign as a whole the results are not at all ambiguous. The campaigns have a clear and large effect. The results are even more clear if the illegal and legal campaign practices are treated as a whole. The average campaign observed in this sample made at least a 17 percent
difference in the number of elections that the union could expect to win.

Because of specification problems, data problems, and because there were no cases in the sample of unions having been found to have committed labor law violations, we could not say anything directly about the effects of union campaigns. However, it seems fair to draw two inferences.

First, to the degree that the percent of people in the firm initially favoring the union reflects the intensity of the pro-union campaign, it is very clear that the campaign has an important effect. Secondly, to the degree that the union has access to the same resources as the company, we would expect that the union campaign would have the same influence.

How do these results bear on the questions raised in the introduction and the theories of campaign effects developed in the section on theories and models? First, it is clear that the campaigns do have a significant effect on how people vote and the outcome of elections. Statistically and practically, the campaigns affect the way people vote and the outcome of elections. What these results do not tell us much about is how the campaigns affect the way people vote.

In this respect, one thing can be concluded from these results. It is that the social psychological theory, at least by itself, does not provide an adequate explanation for what goes on in a campaign. The illegal speech and illegal activity variables cover both positive and negative sanctions; both promises and threats. However, threats or actions taken
against union supporters are always punitive. From the social psychological perspective we would not expect such actions to help the company campaign. We might even expect that they would hurt the company campaign. Since the results show that threats or actions taken against union supporters do help the company campaign a good deal, it is clear that the social psychological explanation is inadequate.

In the next chapter I will present the results of a model which was estimated in an attempt to test the predictions of the other two hypothesis; the information theory, and the intimidation theory.
IX. Non-Linear Probit Estimates:

In order to determine which people are more susceptible to campaigns a new specification is needed which allows for interaction between the campaign variables and the variables which are expected to influence susceptibility. The basis for such a specification was developed earlier in chapter IV.

Recall equation IV.2:

\[ P(\text{union vote}) = \Phi(u + IA/S) \]  \hspace{1cm} (eq. IV.2)

Here \( \Phi \) is the cumulative standard normal density function, \( u \) is the mean of the distribution of issue values for the individual being considered, \( I \) is the intensity of the campaigns and \( A \) is the degree of bias. Finally, \( S \) is the amount of information search that an individual puts in.

Besides being the exact specification derived for the information search model developed in chapters III. and IV., this specification is also one of many which fits the more general requirements of the intimidation theory. By making \( S \) a function of both the variables which are expected to influence information search and the variables which should affect how susceptible an individual is to intimidation the two theories can be nested in the same model and compared.

What remains is to complete the specification of \( u, I, A, \)
and S. A person's stated disposition at the time of the card signing drive, their individual background, and their expected wage change can be used to form a linear approximation to \( u \).

The variable I is campaign intensity. For the company campaign component of I we can use a linear approximation with the same variables that were used in the reduced form estimation; pre- and post-wave-one letters and meetings, percent of workers who talked with supervisors about the election, and the three dummy variables for illegal campaign practices. The union campaign intensity will be approximated with the percent of people who supported the union at the time of the card signing drive. Leaving out more direct measures of the intensity of the union campaign should have the same effect here that it had in the linear reduced form model which is to introduce a tendency for the estimated effects of the company campaigns to be biased downward.

The variable A represents the campaign bias. As there is no information in the data set on this variable, and because it cannot be identified separately from the coefficients of the intensity measure, A is fundamentally underidentified. This is not a problem since none of the hypothesis tests that we wish to perform require that A be identified.

For the information theory, S is the information search function. As was concluded in chapter III., this is a very complex function. For the purpose of estimation, I will approximate S as a linear function of several variables.

Recalling the conclusions of chapter III., there are
three groups of people who can be expected to gather more information; people who expect to be at their jobs longer, people who are good at campaigning or who find information search cheaper, and people in close elections. To finish the specification proxy variables for these categories will have to be developed.

The first category is people who expect to stay on their jobs longer than others. There are several variables in the data set which can be thought of as proxies for this. First, people who have only been on the job for a short time are more likely to leave than people who have been on the job for a long time (controlling for age). Thus we might expect that people with job tenure of more than one year might expect to be staying longer. This, however, is a weak relationship as people with short tenure may not realize that they are going to want to change jobs. Second, people who are part time workers are both more likely to turn-over, and they spend less time on the job. Third, young and old people can be expected to be at their jobs for shorter times. Older people will stay for a shorter time for the obvious reason of retirement. Younger people can be expected to spend less time at any one job because of their tendency to change jobs many times before settling down. Fourth, labor market analysts have suggested that a number of different types of people are more likely to be in stable jobs. Married men and men with dependents supposedly have more of an interest in job stability. White people, and males are also expected to be more stable because
discrimination against women and non-whites forces them to take less stable jobs. (1) (2) Finally, people who said in their first interviews that they would find it difficult to find another job as good as their current job could be expected to be at their current jobs for longer.

The second category of people who could be expected to gather more information were those who were more effective campaigners or those who could gather information with less


(2) The relation between age, job tenure and turnover are well known and well documented (for a summary of the evidence see James L. Price, The Study of Turnover, Iowa State University Press, Ames Iowa, 1977). The relation between race and turnover is less clear. Articles have appeared finding both more and less turnover among racial minorities. The studies differ primarily in what groups they are looking at and what variables besides race are controlled for. For our purposes, the simple fact that uncontrolled studies show that blacks experience the same quit rates and higher layoff rates justifies the use of this proxy (this was the finding of Robert J. Flanagan's analysis of the NLS data. See "Discrimination Theory, Labor Turnover and Racial Unemployment Differentials," Journal of Human Resources, Vol. 13, 2, Spring 1978, p187-207). The evidence on sex differences is even more difficult to interpret. This is probably the weakest of the proxies used here. For some evidence that it may be appropriate see Farrell E. Block's analysis of industry turnover data in "Labor Turnover in U.S. Manufacturing Industries," Journal of Human Resources, Vol 14, Spring 1979, p236-246. Part time workers by definition spend less time on the job. This alone warrants the use of this characteristic in the S function. No direct evidence can be found that part-time workers are more likely to quit or be laid off, but Barrie O. Pettman (Labor Turnover, p31-48) gives cites evidence that workers in jobs with lower status experience higher turnover rates. Finally, the role of dependents in reducing turnover is well known but little studied. One recent study which did consider this factor was that of Wayne F. Cascio, "Turnover, Biographical Data, and Fair Employment Practice," Journal of Applied Psychology, 1976, Vol. 615, p576-580.
expense. More educated people could be expected to be better campaigners and also to be able to gather information with a smaller expenditure of time. However, their shadow wage should also be higher so we cannot unambiguously say that information will be cheaper for more educated people. Second, people with past experience with unions or union representation elections should have both cheaper access to certain kinds of information and should be better campaigners. People with relatives who are union members should also have an easier time gathering information, and may be able to argue more authoritatively.

The last category was people in close elections. Most information gathering seemed, from my interviews, to go on early in the campaigns. For this reason I will use the percent of people who said they were for the union at the time of the card signing drive to form a proxy for people's expectations. According to the information theory people in elections where either many or few people are for the union will gather less information.

Although we cannot a priori expect that the sign on the coefficient on people's priors will be either positive or negative, theoretically they may matter. So, in addition to the above list of variables, I will also include a dummy variable for people who are undecided at the time of the card-signing drive.

To complete the linear approximation a constant is needed. However, since the bottom and the top of the IA/S
ratio are both linear functions, not all the parameters can be identified. At least one coefficient must be fixed at an arbitrary value. A natural choice is this constant. For the purpose of identification it will arbitrarily be set equal to 1. Once again, the underidentification of this coefficient is no problem since we are not interested in testing any hypothesis about it.

This completes the list of variables which should be part of the S function under the information theory. The same variables also belong in the S function under the intimidation theory. In this case the S function is an index of susceptibility to intimidation. The smaller the value of the S function, the more susceptible the individual is to intimidation. The means and standard deviations of all the variables used in this specification can be found in table IX.1.

In order to compare the two theories, it is necessary to put the predictions of the different theories in terms of the signs we would expect on the coefficients of the variables in the S function. For the information theory this is almost done. Variables which are expected to increase the intensity of information search should have a positive sign. This would mean that the dummy variable for people who have held their jobs for less than one year should have a negative coefficient, and the dummy for part time workers should have a negative sign.
### Table IX.1
**Means and Standard-Deviation**

<table>
<thead>
<tr>
<th>Variables in U:</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tenureone year</td>
<td>.270</td>
<td>.444</td>
</tr>
<tr>
<td>2. Part-time worker</td>
<td>.070</td>
<td>.257</td>
</tr>
<tr>
<td>3. Age</td>
<td>36.882</td>
<td>13.904</td>
</tr>
<tr>
<td>4. Age squared</td>
<td>1553.438</td>
<td>1107.730</td>
</tr>
<tr>
<td>5. Married</td>
<td>.734</td>
<td>.442</td>
</tr>
<tr>
<td>6. Number of dependents</td>
<td>2.362</td>
<td>1.497</td>
</tr>
<tr>
<td>7. Education</td>
<td>10.438</td>
<td>2.775</td>
</tr>
<tr>
<td>8. White</td>
<td>.838</td>
<td>.368</td>
</tr>
<tr>
<td>9. Male</td>
<td>.617</td>
<td>.466</td>
</tr>
<tr>
<td>10. Expected Wage Change</td>
<td>.792</td>
<td>.929</td>
</tr>
<tr>
<td>11. Initial Disposition Union</td>
<td>.616</td>
<td>.379</td>
</tr>
<tr>
<td>12. Not asked to sign card</td>
<td>.410</td>
<td>.481</td>
</tr>
<tr>
<td>13. Union is U.A.W.</td>
<td>.176</td>
<td>.301</td>
</tr>
<tr>
<td>14. Union is Teamsters</td>
<td>.353</td>
<td>.478</td>
</tr>
<tr>
<td>15. Union is Steelworkers</td>
<td>.105</td>
<td>.306</td>
</tr>
<tr>
<td>16. Union is Retail Clerks</td>
<td>.024</td>
<td>.153</td>
</tr>
<tr>
<td>17. Union is Machinists</td>
<td>.014</td>
<td>.129</td>
</tr>
<tr>
<td>19. # of workers in election</td>
<td>49.081</td>
<td>22.26</td>
</tr>
<tr>
<td>20. Undecided</td>
<td>.054</td>
<td>.226</td>
</tr>
<tr>
<td>21. Constant</td>
<td>1.000</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables in I:</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>22. % for union at start</td>
<td>.568</td>
<td>.146</td>
</tr>
<tr>
<td>23. Early company letters</td>
<td>4.159</td>
<td>2.743</td>
</tr>
<tr>
<td>24. Late company letters</td>
<td>2.245</td>
<td>2.032</td>
</tr>
<tr>
<td>25. Early company meetings</td>
<td>1.401</td>
<td>.796</td>
</tr>
<tr>
<td>26. Late company meetings</td>
<td>.649</td>
<td>.833</td>
</tr>
<tr>
<td>27. Illegal Speech</td>
<td>.623</td>
<td>.465</td>
</tr>
<tr>
<td>28. Illegal Actions</td>
<td>.470</td>
<td>.499</td>
</tr>
<tr>
<td>29. Threats Against Union</td>
<td>.131</td>
<td>.338</td>
</tr>
<tr>
<td>30. % of workers talk with sup.</td>
<td>.138</td>
<td>.160</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables in S:</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>31. Tenureone year</td>
<td>.270</td>
<td>.444</td>
</tr>
<tr>
<td>32. Part-time worker</td>
<td>.070</td>
<td>.257</td>
</tr>
<tr>
<td>33. Age</td>
<td>36.882</td>
<td>13.904</td>
</tr>
<tr>
<td>34. Age squared</td>
<td>1553.438</td>
<td>1107.730</td>
</tr>
<tr>
<td>35. Married</td>
<td>.734</td>
<td>.442</td>
</tr>
<tr>
<td>36. Number of dependents</td>
<td>2.582</td>
<td>1.497</td>
</tr>
<tr>
<td>37. Education</td>
<td>10.438</td>
<td>2.775</td>
</tr>
<tr>
<td>38. White</td>
<td>.838</td>
<td>.368</td>
</tr>
<tr>
<td>39. Male</td>
<td>.617</td>
<td>.486</td>
</tr>
<tr>
<td>40. Relative union member</td>
<td>.560</td>
<td>.494</td>
</tr>
<tr>
<td>41. Past union member</td>
<td>.411</td>
<td>.492</td>
</tr>
<tr>
<td>42. Voted before</td>
<td>.335</td>
<td>.472</td>
</tr>
<tr>
<td>43. Difficult to find job</td>
<td>.351</td>
<td>.499</td>
</tr>
<tr>
<td>44. Undecided</td>
<td>.054</td>
<td>.226</td>
</tr>
<tr>
<td>45. % for union at start</td>
<td>.568</td>
<td>.146</td>
</tr>
</tbody>
</table>

Percent voting union: 45.3%
Number of observations: 986
Two age variables are needed since the relation between age and information search is expected to be non-linear. I will use a quadratic approximation so an age and an age squared term will be used. If we expect older people and younger people to gather less information we would expect that the sign on the age term would be positive, and the sign on the age squared term would be negative.

From the discussion before we would expect that people who are married and people with dependents are more likely to gather information. Thus, the coefficients on these variables should have positive signs. Whites and males might be expected to gather more information so the coefficients on the dummy variables for these people should have a positive sign. A dummy variable for people who said that it would be difficult to find another job should also have a coefficient with a positive sign.

If educated people find information search cheaper, or if they are better campaigners, then the education variable should have a positive coefficient. People with relatives who are union members, or people who have been union members themselves, or who have voted before in union representation election should all find information search easier and may be more effective campaigners. Thus we would expect that dummy variables for these characteristics would have positive coefficients.

Finally, worker support for the union should also have a non-linear effect on people's information gathering. Here, it
is expected that people in elections with a lot of union support or with little support for the union will gather less information. If a quadratic approximation is used then it would be expected that the coefficient on the first order term would have a positive sign, while the coefficient on the squared term would have a negative sign.

The information theory gives us no reason to expect any particular sign on the coefficient of the dummy variable for people who are undecided. This concludes the list of predictions based on the information theory.

Recall now the analysis of the intimidation theory in chapter II. There it was suggested that four categories of people would be more susceptible to intimidation; those who would have a hard time finding another job, those who are more risk averse, those with no past experience with unions, and those who were in firms where few people supported the union. Thus the following signs could be expected:

People who are new on a job and people who work part time would probably find it less difficult to get another job so both of the coefficients on these variables should have positive signs.

As older people are more likely to have built up seniority rights and pensions, and because it is usually more difficult for them to find jobs, it would be expected that older people would be more easily intimidated. Thus, the sign on the coefficient of the age variable should be negative and the sign on the coefficient of the squared term could be
negative, zero or positive, so long as the average intimidability increases with age.

Married people and people with dependents are less likely to be able to maintain their living standard in the face of large swings in income and can thus be expected to be more risk averse. Given this, we would expect that the signs on the coefficients of these variables would be negative.

Men and people who are white may be expected to be able to find jobs easier. Consequently, it would be expected that the coefficients on these variables would have positive signs. The coefficient on the dummy variable for people who said that they would have difficulty finding as good a job elsewhere should have a negative sign by the same reasoning.

People who are more educated probably have a higher ratio of general to specific training and could therefore change jobs with less cost. Thus, it would be expected that the education variable would have a positive coefficient. Since most union/company relations do not involve constant conflict people who have been union members or who have relatives who are union members will probably be less likely to believe that the company will really resist the union after the election. Therefore we might expect that the dummy variables for these traits would have positive coefficients.

There is no reason to believe that people who have voted before are any more or less easy to intimidate if we control for whether or not these people are union members. On the other hand, it is possible that this variable could act as a
proxy for whether or not there has been a recent union representation election in the plant the individual is in. If there has been a recent election, and another is being held, it can be concluded that the union did not win the first election. Workers in such a situation would have one more bit of information that would lead them to expect that the union would not have much support in this election. Thus, the coefficient on the dummy variable for people who have voted before may have a negative sign.

Since we are assuming that most people base their estimate of union support on the early union support, if the percent of people for the union at the time of the card signing drive is increased we would expect that it would be more difficult to intimidate people. This would mean that the coefficient on the variable, which is equal to the percent of people in each election who were for the union at the time they were asked to sign a card, should have a positive sign. The squared term may have any sign. All the theory predicts is that the function value should increase as union support increases.

The intimidation theory also gives us no reason to expect any particular sign on the coefficient of the variable for undecided people so this concludes the list of predictions from the intimidation theory.

Table IX.2 presents the results off the estimation of this model. The results are problematic and should be taken as being only suggestive. The estimation of non-linear models
<table>
<thead>
<tr>
<th>Variables in u:</th>
<th>Coef.</th>
<th>S.e.</th>
<th>T-stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tenure: one year</td>
<td>-0.694</td>
<td>0.246</td>
<td>-2.75</td>
</tr>
<tr>
<td>2. Part-time worker</td>
<td>-0.228</td>
<td>0.142</td>
<td>-1.65</td>
</tr>
<tr>
<td>3. Age</td>
<td>-0.883E-2</td>
<td>0.446E-1</td>
<td>-0.19</td>
</tr>
<tr>
<td>4. Age squared</td>
<td>-0.213E-4</td>
<td>0.563E-3</td>
<td>-0.04</td>
</tr>
<tr>
<td>5. Married</td>
<td>-0.186</td>
<td>0.227</td>
<td>-0.80</td>
</tr>
<tr>
<td>6. Number of Dependents</td>
<td>-0.007</td>
<td>0.075</td>
<td>-0.10</td>
</tr>
<tr>
<td>7. Education</td>
<td>-0.018</td>
<td>3.548</td>
<td>-0.01</td>
</tr>
<tr>
<td>8. White</td>
<td>0.167</td>
<td>0.240</td>
<td>0.68</td>
</tr>
<tr>
<td>9. Male</td>
<td>-0.307</td>
<td>0.248</td>
<td>-1.21</td>
</tr>
<tr>
<td>10. Expected Wage Change</td>
<td>0.401</td>
<td>0.094</td>
<td>4.41</td>
</tr>
<tr>
<td>11. Initial Disposition Union</td>
<td>1.818</td>
<td>1.168</td>
<td>10.56</td>
</tr>
<tr>
<td>12. Not asked to sign card</td>
<td>-0.840</td>
<td>1.128</td>
<td>-0.74</td>
</tr>
<tr>
<td>13. Union is U.A.W.</td>
<td>-0.864</td>
<td>0.309</td>
<td>-2.73</td>
</tr>
<tr>
<td>14. Union is Teamsters</td>
<td>-0.099</td>
<td>0.188</td>
<td>-0.51</td>
</tr>
<tr>
<td>15. Union is Steelworkers</td>
<td>0.154</td>
<td>0.320</td>
<td>0.48</td>
</tr>
<tr>
<td>16. Union is Retail Clerks</td>
<td>-0.205</td>
<td>1.046</td>
<td>0.19</td>
</tr>
<tr>
<td>17. Union is Machinists</td>
<td>0.162</td>
<td>0.540</td>
<td>0.37</td>
</tr>
<tr>
<td>18. Avg. Ed. in plant</td>
<td>0.565</td>
<td>0.108</td>
<td>5.11</td>
</tr>
<tr>
<td>19. # of workers in election</td>
<td>0.060</td>
<td>0.041</td>
<td>1.42</td>
</tr>
<tr>
<td>20. Undecided</td>
<td>0.829</td>
<td>0.324</td>
<td>2.50</td>
</tr>
<tr>
<td>21. Constant</td>
<td>-0.344</td>
<td>1.082</td>
<td>-0.31</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables in I:</th>
<th>Coef.</th>
<th>S.e.</th>
<th>T-stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>22. % for union at start</td>
<td>-0.113</td>
<td>0.101</td>
<td>-1.10</td>
</tr>
<tr>
<td>23. Early company letters</td>
<td>-0.012</td>
<td>0.005</td>
<td>-2.43</td>
</tr>
<tr>
<td>24. Late company letters</td>
<td>-0.025</td>
<td>0.011</td>
<td>-2.24</td>
</tr>
<tr>
<td>25. Early company meetings</td>
<td>-0.017</td>
<td>0.021</td>
<td>-0.79</td>
</tr>
<tr>
<td>26. Late company meetings</td>
<td>-0.038</td>
<td>0.020</td>
<td>-1.88</td>
</tr>
<tr>
<td>27. Illegal speech</td>
<td>0.036</td>
<td>0.027</td>
<td>1.27</td>
</tr>
<tr>
<td>28. Illegal Actions</td>
<td>0.031</td>
<td>0.033</td>
<td>0.91</td>
</tr>
<tr>
<td>29. Threats Against Union</td>
<td>-0.167</td>
<td>0.083</td>
<td>-2.00</td>
</tr>
<tr>
<td>30. % of workers talk with Sup.</td>
<td>0.221</td>
<td>0.080</td>
<td>2.70</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables in S:</th>
<th>Coef.</th>
<th>S.e.</th>
<th>T-stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>31. Tenure: one year</td>
<td>0.036</td>
<td>0.018</td>
<td>1.92</td>
</tr>
<tr>
<td>32. Part-time worker</td>
<td>-0.001</td>
<td>0.026</td>
<td>-0.03</td>
</tr>
<tr>
<td>33. Age</td>
<td>0.163E-2</td>
<td>0.197E-2</td>
<td>0.81</td>
</tr>
<tr>
<td>34. Age squared</td>
<td>-0.140E-4</td>
<td>0.239E-4</td>
<td>-0.57</td>
</tr>
<tr>
<td>35. Married</td>
<td>0.004</td>
<td>0.009</td>
<td>0.43</td>
</tr>
<tr>
<td>36. Number of Dependents</td>
<td>0.003</td>
<td>0.004</td>
<td>0.83</td>
</tr>
<tr>
<td>37. Education</td>
<td>-0.007</td>
<td>0.014</td>
<td>-0.49</td>
</tr>
<tr>
<td>38. White</td>
<td>-0.016</td>
<td>0.015</td>
<td>-1.06</td>
</tr>
<tr>
<td>39. Male</td>
<td>0.014</td>
<td>0.012</td>
<td>1.17</td>
</tr>
<tr>
<td>40. Relative union member</td>
<td>0.013</td>
<td>0.007</td>
<td>1.93</td>
</tr>
<tr>
<td>41. Past union member</td>
<td>-0.001</td>
<td>0.005</td>
<td>-0.12</td>
</tr>
<tr>
<td>42. Voted before</td>
<td>-0.012</td>
<td>0.008</td>
<td>-1.56</td>
</tr>
<tr>
<td>43. Diff. to find job</td>
<td>-0.012</td>
<td>0.006</td>
<td>-2.00</td>
</tr>
<tr>
<td>44. Undecided at start</td>
<td>0.001</td>
<td>0.012</td>
<td>0.09</td>
</tr>
<tr>
<td>45. % for union at start</td>
<td>-3.794</td>
<td>-1.29</td>
<td>-19.37</td>
</tr>
<tr>
<td>46. % for union squared</td>
<td>3.7936</td>
<td>-3.29</td>
<td>15.30</td>
</tr>
</tbody>
</table>

Specification:

\[ P(\text{Vote union}) = \Phi( u + I/A/S ) \]
such as this one poses many problems. One problem which often occurs is that there can be many "local-maximums" of a likelihood function for a model such as the one estimated here. This can mean that when the model converges to a set of parameter estimates, these estimates may not be the true maximum likelihood estimates. The way one normally deals with this problem is to try several different starting values for the parameters and then to take the results with the highest likelihood. I could not do this here because the model only converged on one set of parameter estimates, and then only with great difficulty. Thus, those results may not be the maximum likelihood estimates for this model. Also, although it is difficult to tell, since no other models converged, the results seemed to be very sensitive to specification. Finally, some of the anticipations concerning signs on the coefficients of the variables in the $S$ function were based on rather weak prior assumptions and were also complicated by the necessity of using proxy variables for many of the categories. These problems also make the results difficult to interpret. For these reasons the reader should not put overly much faith in these results. Hopefully, future research will give more robust answers to these questions.

For what the results tell us, what we are most interested in is the signs on the variables in the approximation of the $S$ function. I will get to these after a quick review of the other results.

First, the only individual background variables which are
now statistically significant are the dummy variable for those with less than a year of job tenure, and the variable for expected wage change. The coefficients on the election background variables are mostly the same as the linear model of chapter VII. except that the coefficient on the dummy variable for retail clerks union has changed signs and is no longer statistically significant.

There are a number of changes in the coefficients on the campaign variables. One change which is not important is the change in magnitude of many of the variables. The actual effect of these variables does not depend only on the value of the coefficients, but also on the size of S. If S is very small, the effect of the campaign variables will be exaggerated. Other changes are more difficult to explain. Now the coefficient on the variables representing all legal tactics, with the exception of the percent of people who have talked with supervisors, have positive signs. The standard error on the measure of supervisor's activity is also much smaller now so that the effect is statistically significantly positive.

Of the illegal tactics, the signs on the coefficients of the dummies for illegal speech and illegal actions are now positive. However, given the size of the standard errors, there is still a fair probability that the actual values are less than zero. It is hard to know quite what to make of these results. In particular the positive sign on the measure of supervisors' activity and the negative sign on the proxy
for union campaign are hard to understand. Perhaps these are just bad proxies for the effects they are supposed to be measuring and the coefficients are the result of specification error. In any case, these results also suggest caution in the interpretation of the results of this model.

The results with respect to the two theories of campaign effects are quite inconclusive. One thing that can be concluded though is that the moderating variables do add considerably to the explanatory power of the model. A likelihood ratio test on the inclusion of the variables yields a chi-square of over 50 with 16 degrees of freedom. The practical significance of the different variables is hard to assess individually since the effect of each variable depends on the value taken by all the others. However, the model suggests that at least one variable makes a difference in orders of magnitude in the effectiveness of the campaigns.

Going through the list of variables and comparing the predictions of the two theories to the results we find the following:

1. The dummy variable for people who have worked at a job for less than one year has a statistically significant positive coefficient. This fits with the intimidation theory but forces us to reject the prediction of the information theory.

2. The coefficient on the dummy variable for part-time workers is negative but very small relative to the other coefficients and is probably not very important. The positive
sign fits with the information theory and does not fit with the intimidation theory. However, the standard error is also large relative to the coefficient size so the positive sign is not very meaningful.

3. The coefficients on the age variables are such that the campaign has less effect as age increases up to age 58 and then begins to have more effect. This fits the information theory fairly well but does not fit the intimidation theory. However, once again the standard errors on the coefficients are large enough that the pattern is not statistically significant and the intimidation theory can not be rejected on the basis of these results.

4. The coefficients on the variables for marital status, and the number of dependents a person has, both have positive signs which are not statistically significant. These results fit with the information theory, but because they are not statistically significant, do not allow us to reject the intimidation theory.

5. According to these results white people are more susceptible to campaign influences than others. This does not fit with what we expected from the two theories, but once again the effect is not statistically significant and does not warrant the rejection of either theory.

6. As expected, males were found to be less influencable than women although the effect is not statistically significant.

7. The estimated coefficient on the variable for people
who felt that it would be difficult for them to find as good a job elsewhere is statistically significantly negative. This is what we would expect from the intimidation theory, but it allows us to reject another prediction of the information theory.

8. The coefficient on the education variable is negative which fits neither the information theory nor the intimidation theory. However, since the sign on the coefficient is not statistically significant, neither predictions can be rejected.

9. The coefficient on the dummy variable for people who have relatives who are union members is statistically significantly positive. This fits both the information theory and the intimidation theory.

10. The coefficient on the dummy variable for people who were past union members is almost zero. The standard error is also small so that it is improbable that the effect is important. This is difficult to square with the fact that the coefficient on the dummy for relatives being union members has the right sign and is statistically significant. It is hard to understand why people who have been union members are no different from those who have not while those who have relatives who are union members are less influencable.

11. The dummy variable for people who have voted in union representation elections before has a negative coefficient which is statistically significant in a one tail test at the .1 level. This fits with the predictions of the intimidation
theory and is a weak rejection of one of the predictions of the information theory.

12. Finally, we come to the results with respect to the measures of the percent of people who were for the union at the time of the card signing drive. At first glance it is obvious that the coefficients are extremely large and the standard errors small relative to the size of the coefficients. However, this does not mean that the standard error for any particular point estimate of the effects of these variables is small. Once the standard error is computed, a general trend can be identified. Where the percent of people saying they are for the union is about fifty percent, participants in the election are most vulnerable to the campaigns. Where union support is either low or high people are least susceptible to persuasion. This is exactly the opposite of what we would expect from the information theory. It also would not seem to fit well with the intimidation theory at first blush.

A quick look at figure IX.1 shows the predicted value for the quadratic function with a solid line. The dotted line indicates the 95% confidence interval on each point estimate. The dots along the bottom horizontal axis are the values taken by the variable for the 31 elections. On the one hand there are a number of elections where the percent of people, who said that they supported the union at the time of the card signing drive, is quite large. On the other hand there is only one election where the percent supporting the union is
Figure IX.1

Percent for Union Component of S Function:

- Quadratic function \((-3.7937x + 3.7359x^2)\)
- Third order function \((-3.829x + 3.87x^2 - 1.126x^3)\)
- 95% confidence interval on quadratic
- Function value plus value for dummy \((-0.57)\)

† Value taken by % for union variable in an election.
small. A possible interpretation of the results is that once
the initial union support falls below a certain level, people
do not become significantly more susceptible to the campaigns,
but that above that level they do become significantly less
susceptible. This would fit with the prediction of the
intimidation theory; that people's susceptibility to
intimidation should decline as the number of people supporting
the union increases. This would mean that the one election
where there was little union support should be an outlier. If
a dummy variable for that election is added to the S function
it should have a negative coefficient which when added to the
values of the quadratic approximation will yield a point
estimate of S in the range of -.9 to -1.

To test this hypothesis, a specification of this model
was estimated where a third order term and a dummy for the one
election where the percent of people favoring the union is
equal to .11 was added to the S function. Because it proved
to be quite difficult to get the parameter estimates to
converge, I estimated the three coefficients of the third
order approximation and the coefficient on the dummy holding
all the other coefficients constant at their estimated values.
The coefficients on the two terms of the quadratic did not
change much. The coefficient on the third order term was
small and not significantly different from zero. The
coefficient on the dummy variable was equal to -.57. These
results fit with the suggested hypothesis that below .6 people
are equally intimidatable and above that value people become
less susceptible to intimidation as the percent of people supporting the union increases. Thus, these results fit with the intimidation theory and not with the information theory. The fact that people in elections where the union seems a sure winner are less affected by the campaigns than close elections constitutes another rejection of a predictions of the information theory.

At this point it can be seen that besides the percent of people favoring unionization, only the education variable can change the value of $S$ by a large amount. This does not, however, mean that the other variables are of little practical significance. For instance, if the values of the education variable and the percent for union variable are such that the value of $S$ is .05, one of the dummy variables with a coefficient of approximately .01, could make a difference of about 20% in a person's susceptibility to the campaign.

All the results with respect to the predictions of the two theories are presented in table IX.3. The results are such that not much can be concluded. One thing that can be said is that it is clear that the information theory is not by itself adequate to explain the effects that campaigns seem to have. Its predictions with respect to the signs of the coefficients of; the variables constructed from the percent of people for the union at the time of the cardsigning drive, the dummy variable for those who had been on the job less than one year, for the dummy variable for those who had voted before, and the dummy for those who said it would be difficult
Table IX.3

Theory Predictions Summary

<table>
<thead>
<tr>
<th></th>
<th>Information Theory</th>
<th>Intimidation Theory</th>
<th>Actual Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>31. Tenure one year</td>
<td>-</td>
<td>+</td>
<td>+ **</td>
</tr>
<tr>
<td>32. Part-time worker</td>
<td>-</td>
<td>+</td>
<td>(-)</td>
</tr>
<tr>
<td>33. Age</td>
<td>+</td>
<td>?</td>
<td>+</td>
</tr>
<tr>
<td>34. Age squared</td>
<td>-</td>
<td>?</td>
<td>-</td>
</tr>
<tr>
<td>35. Married</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>36. Number of dependents</td>
<td>+</td>
<td>-</td>
<td>(+)</td>
</tr>
<tr>
<td>37. Education</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>38. White</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>39. Male</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>40. Relative union member</td>
<td>+</td>
<td>+</td>
<td>+ **</td>
</tr>
<tr>
<td>41. Past union member</td>
<td>+</td>
<td>+</td>
<td>(-)</td>
</tr>
<tr>
<td>42. Voted before</td>
<td>+</td>
<td>-</td>
<td>- *</td>
</tr>
<tr>
<td>43. Difficult to find job</td>
<td>+</td>
<td>-</td>
<td>- ***</td>
</tr>
<tr>
<td>44. Undecided at start</td>
<td>?</td>
<td>?</td>
<td>(+)</td>
</tr>
<tr>
<td>45. % for union at start</td>
<td>+</td>
<td>?</td>
<td>- ****</td>
</tr>
<tr>
<td>46. % for union squared</td>
<td>-</td>
<td>?</td>
<td>+ ****</td>
</tr>
</tbody>
</table>

( ) coefficient small

Statistical Significance:
(One-tailed test)

* .10 level
** .05 level
*** .025 level
**** .005 level
for them to find another job as good as their current job, were all rejected. The only predictions of the information theory which was confirmed was also a predictions of the intimidation theory, although a number of coefficients had the right sign but were not statistically significant.

By a process of elimination, this leaves the intimidation theory as the only theory which has not had any of its predictions refuted. However, the problems mentioned at the beginning of this chapter, the strange results with respect to supervisors and the proxy for the union campaign, and the several signs which were wrong but not statistically significant, make this theory highly suspect also.

Given these results, the conclusion must be to except the intimidation theory, but only very tentatively, keeping in mind all of the problems that have been encountered in the attempts to estimate this model.
X. Conclusions:

To begin with, let us review the findings of the previous chapters. First, the results presented in chapters VII and VIII showed, subject to the reservations suggested in chapter VI and VII, that company campaigns can and do affect the outcome of elections. Secondly, these results also seem to show, specifically, that illegal campaign tactics affect the outcome of elections. Third, the NLRB can probably tell when a violation is affecting the outcome of an election, and it would be improper to conclude that the NLRB can not tell more severe from less severe violations. The results of chapter VII also allow us to reject the social psychological theory as the sole explanation of the campaign effects.

The results reported in chapter IX probably allow us to reject the information theory of campaign effects. This should mean that we are left with the intimidation theory. However, even the intimidation theory did not fare particularly well. While it is the best remaining explanation, it can be accepted only very tentatively. The convergence problems, the inability to look at alternative specifications, and the problems with the use of proxy variables all add up to make these results difficult to interpret.

In the introduction five questions were raised which summarized the motivation for exploring this topic. Of the five questions this study endeavored to answer four. The
first question was whether the actions of the company and the union have an affect on economic outcomes. The answer to this question, at least with respect to company campaigns, is yes. Earlier it was suggested that if company campaign effects were found then it could be concluded that union campaigns would have similar effects to the degree that the union had access to the same resources. However, if the intimidation theory provides the explanation for a majority of the effectiveness of company campaigns, unions simply do not have access to the same resources for intimidation that the companies do and the union campaigns may have no effect or may only work to neutralize the effects of company campaigns.

The second question that was to be answered was question 3; "How do the campaigns work." As I have suggested, this question has not really received a satisfactory answer. To the degree that we do have an answer, it would be that behavior is not manipulated by confusing people about what is in their best interest as the information theory would suggest. Rather, the campaigns seem to work by changing the outcomes to make it in people's objective interests to choose one outcome as opposed to another. Companies can do this because they have influence over so many aspects of their employees' lives. Thus the relevance of this finding is limited to those sorts of situations where one or more agents have very direct control over many aspects of people's lives. For the purpose of regulatory policy this would include situations such as the work environment, or perhaps other
situations such as landlord/tenant relations. In these situations the results suggest that regulation may be necessary to protect people from coercion.

Question 4 asked whether campaign practices, particularly illegal practices, affect the outcome of elections. The answer would seem to be yes. Thus the NLRB regulation of illegal practices would appear to be justified.

The last question was whether "Campaign tactics distort the decision environment in such a way as to make the process unfair." We do not have a clear answer to this question as we can not be sure how the campaigns work. However, if the intimidation theory is true, and it is considered unfair to use economic power to influence outcomes, then the answer is yes.

More to the point, the stated goal of the National Labor Relations Act is to promote unionization where it is appropriate. (1) It is implied that it is the workers who are

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(1) Section I paragraph 5 of the National Labor Relations Act as Amended by the Labor Management Relations Act of 1947 (Taft-Hartley) reads:

It is hereby declared to be the policy of the United States to eliminate the causes of certain substantial obstructions to the free flow of commerce and to mitigate and eliminate these obstructions when they have occurred by encouraging the practice and procedure of collective bargaining and by protecting the exercise by workers of full freedom of association, self-organization, and designation of representatives of their own choosing for the purpose of negotiating the terms and conditions of their employment or other mutual aid or protection.
supposed to decide where it is that union are appropriate. (1) It is also the clear intent of this law that workers be allowed to make this decision on the basis of the long-run merits of unionization. The law requires that the company recognize the union and bargain in good faith if the union wins the election. (2) If the intimidation theory does explain the effectiveness of company campaigns to any significant degree the current interpretations of the law and/or the enforcement are not consistent with the intent of the law and changes are mandated.

Several specific policy recommendations are in order. At the very least, the data strongly suggest that illegal campaign practices have an effect and that the NLRB can probably tell which ones are likely to affect outcomes and which are not. No argument that regulation is not cost effective, because the campaigns have no effect, is warranted given these results. If anything, these findings would suggest that illegal campaign practices can make quite a bit of difference and, given the stated goals of the NLRA, stricter regulation of at least company campaigns would be in


(2) See footnote 1 on page 22 for an exposition of the requirement of good faith bargaining.
order.

Going further, on the basis of the intimidation theory the following recommendations could be made. According to the intimidation theory, the company campaign works by convincing workers that the company can get back at them if they bring in the union. Thus, regulation should aim both to protect workers from the company's use of its economic power and to make it difficult for the company to threaten to use that power. The law must also insure that companies actually do recognize unions and bargain in good faith. Several specific changes could further these general goals:

First, all parts of the process should be expedited. Union organizers I talked with suggested that one of the chief tactics of companies using this strategy is to draw out elections and then to draw out the period before a contract is signed by several different legal maneuvers. Making this sort of delaying difficult would be an important first step in limiting management's ability to use intimidation tactics.

Next, it should be made more difficult for companies to harass pro-union workers, and punish workers for voting to certify a union. This would probably mean an expanded definition of what constitutes illegal discrimination against union workers and stricter enforcement with larger penalties for violations.

Finally, limiting management's power alone may not be enough. Even if they can not act, if they can threaten they may still be able to intimidate workers. Once again, an
expanded definition of threats is called for as is stricter enforcement of existing laws and larger penalties for their violation.

All of the above recommendations take the stated goal of the NLRA as given. It is possible that the goals of the NLRA are not consistent with the best interests of society. Much has been written on the welfare consequences of unionization and there is little I could add here.

These last recommendations also depend crucially on the finding that the intimidation theory of campaign effects is indeed a good characterization of what goes on. However, given these results that can be concluded only very weakly.

None the less, the rejection of the other two theories of how campaigns influence votes leaves us in a state where we have very little knowledge. The question we should now ask is if we are to err should we err on the side of being overprotective of underprotective of worker interests? If the decision is that we would rather be over cautious than take the chance of having workers intimidated out of acting in their perceived best interests then the above recommendations should be adopted.

More research is called for if the question of how campaigns influence voting is to be answered with any degree of certainty. There are three possible routes to finding an answer to this question. In order of the amount of effort they would require they are as follows:

The first possibility is that an improved specification
would allow a clearer answer to this question. Perhaps a different functional form for S would solve the problem that I had trying to get the models to converge. The value of the IA/S function goes through a singularity as S goes from being positive to being negative. If a few observations had S values close to zero then even small changes in the values of parameters might cause them to change their likelihood values radically and make it difficult to find an increasing step. A different functional form for S might make estimation easier. This would provide the opportunity to try more specifications which would allow more confidence in the robustness of the final result.

Another possible specification change that might yield better results would be a better measure of the union campaign. The implementation of this approach would probably involve finding a solution to the simultaneity problem.

The second possible route would be to examine the possibility that the different theories of campaign effects are all correct but apply in different situations. Taking this approach would require that I develop a hypothesis to explain when one theory holds and when another does. A model could then be developed and estimated based on this new hypothesis.

Lastly, if these attempts do not work there is always the possibility that data collected for a new study which was designed specifically to test these hypotheses could settle this question.
What follows is a sketch of an "ideal" study. Undoubtedly practical considerations of cost and the ability to obtain the cooperation of parties to the elections one desired to study would restrict the form of a new research design. None the less, a description of what is most desirable can serve as a good reference in the development of more realistic plans.

The first thing that another study should do is to attempt to gather a number of different types of data at a much earlier stage than did Getman, Goldberg and Herman. Information on worker's attitudes towards unionization would be of more value if they were measured before the union and company campaigns have had any chance to influence them. At this early stage it would be appropriate to try to obtain information on the amount of resources the company and the union intended to put into the campaign.

One of the major problems which makes it difficult to interpret the results of chapter IX could be eliminated if one could obtain direct information on; whether or not people expected to be at their jobs a long time, whether they had cognitive skills that would make campaigning or information search easier, how risk averse subjects were and on what people's perceptions of normal union/company relations were. Information such as this would eliminate the need for proxy variables.

In addition to this information it would be useful to know about the economic condition of the firm and the union
locals financial position and disposition towards organizing.

As the campaign progressed it would be best if the campaign efforts of the company and the union could be kept track of on a weekly basis. Besides the types of variables used in this study, it would be useful to know how much money was spent by both sides on different activities, how much time the union organizers devoted to the campaign, how many people supervisors talked to about the election and what sorts of things were said. It might also be useful to sample people's dispositions as the campaign progresses and their involvement in the campaigns.

In addition to the information suggested above and the type of information collected by the authors of Law and Reality, a historical description of each shop and the proceedings of the campaigns and the election might prove valuable. Such a record could allow the development of categories of different types of campaign styles which would help in understanding how campaigns work to influence votes.

Finally, the number of elections studied should be increased. A study with information on 100 elections would probably afford more acuity in the measurement of the impact of specific campaign practices, and allow a better chance of sorting out the question of how campaigns influence the way people vote.

The above design would allow us to look at a number of questions that are difficult, if not impossible, to approach given the existing data. First, information on the original
intent of the company and the union along with the data on actual campaign intensities would allow a test of the assumption used in this study that the intensity of the company campaigns and union organizers would provide more exogenous variables and make it possible to determine the impact of the union organizers' efforts separate from those of the employees. Finally, the information on supervisor's effort are predominantly pre-determined. Second, if the campaigns prove not to be pre-determined then the weekly data probably would make it possible to chart the interaction of the campaigns and allow more accurate estimates of campaign influences. Third, the data on union organizers effort would allow a better understanding of the importance of supervisor's activities to the company campaigns.

Besides the question of how campaigns work, there are a number of other questions which have been broached in this presentation but have not been answered. The first of these is the first question raised in the introduction; "can the use of manipulative techniques be explained as a function of economic interests?"

An economist would assume this is the case, but almost everybody I interviewed suggested otherwise. Union organizers all insisted that it was not the money that managers cared about when faced with unionization. Rather, according to the organizer, it was the managers' personal loss of power and face. This was also the most common opinion expressed by the workers who I talked to. Labor relation consultants and
lawyers all argued that unionization in any situation was worth fighting to the fullest no matter what the potential monetary losses. They insisted that the loss of management perogative was always worth more than the cost of any campaign. When asked to explain differences in observed campaign intensity between companies they suggested that the more intelligent the manager the more he or she would spend.

Even managers did not seem to think that the amount of money they stood to lose figured very much in their decision as to how much to spend. Most of them suggested that they spent what they felt was necessary to beat the union. However, an economist would point out that even if people are not aware that they are making economic calculations they may be doing it unconsciously. The definition of what is "necessary to beat the union" is quite slippery. It could be that what is seen as necessary may change depending on how costly losing is likely to be. Since the question is debatable and since there are at least two good motivations for the study, it would be very interesting to pursue this question further.

The motivation for looking into this question is both broadly theoretical and immediately practical. If we want to model the effects of different distributions of manipulative power within society it is important to know if this power is used in any systematic fashion. Economists suggest that it is likely to be, others suggest that it may not. Also, the interview responses suggest other systems for understanding
when manipulative power will be used.

A more immediately practical consideration is whether companies can be expected to respond to economic incentives in this area. If they can then fines may be the most appropriate method of enforcement for violations of the labor law. If companies do not respond to economic incentives then other methods, perhaps criminal sanctions, would have to be used to obtain effective enforcement.

To study this question with the data used here would be difficult but possible. The major problem is that there are observations on only 31 campaigns. This means that there would be degrees of freedom problems if one were to estimate simple linear models with only one left hand side variable and several right hand side variables. However, if one models company campaign intensity as a function of a number of variables, and then the observed company campaign activities as functions of the one variable; campaign intensity, a maximum likelihood model can be developed with several equations with across equation constraints. This improves the power of the estimator both by effectively increasing the degrees of freedom and by allowing for the information in the covariance of the errors of the equations to be taken into account. The model has to be estimated using maximum likelihood techniques because of the limitations on the values taken by some of the measures of company campaign intensity. I hope to develop such a model and estimate it in the near future.
It is possible that none of the theories of campaign effects suggested here is by itself adequate to explain how campaigns work. If the information theory is to any significant degree true it would be important for both the wider theory of regulation, and for the specific problem of the regulation of union representation elections.

In general, an information theoretic approach would suggest the importance of law to insure that both sides to a debate have equal access to the audience and equal resources to make their cases. In particular, if the information theoretic explanations are ever important, and the harassment of union supporters makes it difficult for the union to make its case, this would provide a different rationale for the protection of pro-union workers. Thus, if the information theoretic explanation has any validity it would be important to determine whether company campaigns are effective in preventing union campaigns. There could be two approaches to answering this question.

The first approach would be to estimate a linear reduced form model like the vote model presented in chapter VII, with the dependent variable being a dummy set equal to one for people who said that they had tried to convince people to vote union. Some early attempts to estimate this model, as well as some attempts to use this variable as a proxy for union campaign activity, suggest that it may not be a good measure of union campaigns.

The second approach would be to estimate a model of the
union campaign similar to the one just suggested for the company campaign. One could then tell if company campaigns reduced the level of union campaign activity.

In addition to addressing the broad questions about regulation and specific questions about the regulation of union representation elections, it is hoped that this study is instructive in another vein. Although the role of statistical research in policy formation is firmly established in other areas, its role in labor policy has been less well developed, defined and institutionalized. There are a number of things I hope I have shown with this study. First, the major value of statistical analysis is that it allows us a way of summarizing vast amounts of data and discerning relations which a casual observer might not realize. Second, statistical techniques allow us to subject theories of behavior to rigorous testing. This is no less true in the area of labor policy than anywhere else. However, it is important that the statistical techniques which are applied be appropriate to the problem, and that their shortcomings be well understood. This has been a problem in labor policy for two reasons. First, most questions in labor policy require the analysis of large amounts of data on individuals. Because the nature of the questions important to labor policy allow few opportunities for experimentation, sophisticated modeling techniques are necessary if we are to make inferences about causation. Since it is only recently that the computational power to handle this type of analysis with reasonable costs has become
available, it is not surprising that the use of statistical method has not been developed more in this area.

Secondly, because it is easy to make methodological errors in the development of this type of analysis, it is important that all statistical findings be subjected to criticism, and that the existing data be approached from several different perspectives to determine the robustness of conclusions under alternative assumptions. Only then is statistical evidence easily integrated into the process of policy formation. This type of criticism requires that a body of people who are sophisticated in statistical methodology be always paying attention to the debate on the issues and actively contributing to the analysis of the available data. This has been the norm among people developing economic stabilization policy for years. It has not been the case with labor policy. Hopefully, others will follow the lead of the authors of Law and Reality and take up this kind of research.

It is also hoped that this study will demonstrate the importance of the type of criticism I have just described. Different approaches to the same data can lead to different conclusions. Each approach requires different assumptions in order for its findings to be valid. The best the researcher can do is to make the assumptions that seem most reasonable to him or her and then to make them clear to the readers. I believe that I have argued persuasively for the superiority of my assumptions over those of the authors of Law and Reality, but it is possible that another study could analyze this data
and come to different conclusions. This is not a failing of the statistical method. Ultimately we must always make assumptions in making any type of decision. What statistics can do is to give us a way of structuring our thought on policy issues and to allow us to use the information available as efficiently as possible. It is hoped that the information presented here will help in the formation of better labor policy, and ultimately in the shaping of a better society.
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