BARGAINING UNIT, UNION, INDUSTRY,
AND LOCATIONAL CORRELATES OF UNION
SUPPORT IN CERTIFICATION AND
DECERTIFICATION ELECTIONS

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ABSTRACT

This paper investigates the correlates of union success in NLRB certification and decertification elections. The analysis includes a wide variety of bargaining unit, union, industry, and geographic attributes, many of which have not been considered in previous studies.

Variables having a statistically significant relation with voting in certification elections are the size of the unit, employer consent to the definition of the bargaining unit, the length of campaigns, union organizing effort, union dues, union wages, non-union wage variance, the industry unemployment rate and percentage of black workers and the concentration of jobs among a few employers in a geographic area.

The same specification was estimated for decertification elections. Variables having a statistically significant association with voting are unit size, length of campaign, and the non-union wage variance.

Examination of the magnitude of the estimated coefficients suggests that, only unit size and union organizing effort might affect outcomes in more than a small percent of all certification elections. Estimated correlations for voting in dercertification elections are not accurate enough to allow such a judgment.

Finally, comparison of the regression results for certifications and de-certifications shows that the process determining how workers vote is very different in the two types of elections.

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I. INTRODUCTION

Certification and decertification elections are a mechanism of union growth and decline. Between 1954 and 1976, the number of certification elections held doubled while the number of decertification elections quintupled. In the same time span, membership loss due to decertification has quadrupled while the membership gained through certification elections has been halved.[1]

The research reported here presents information on two new aspects of the correlates of union success. First, past research has considered the correlation of union success with geographic location,[2] union characteristics,[3] and industry[4] primarily by using dummy variables. While this is a useful technique to see whether or not a correlation exists or simply to control for these factors, the interpretation of these dummy variables is difficult. To ascertain what specific aspects of location, unions and industries are associated with election outcomes, we have included a number of attributes of each of these categories in the analysis.

For example, several authors have studied the relation of a southern location with the outcome of representation elections.[5] The South differs from other areas in many ways: lower levels of unionization, higher incidence of right-to-work laws, lower industrial concentration, etc. In an attempt to determine which, if any, of these factors can account for observed differences in election outcomes between the south and other areas, these and other geographic characteristics are included in this analysis.

Second, past research has considered the correlates of either certification or decertification elections. But there has been no examination of the similarities and differences between the two processes. Differences found by comparing the two types of studies could be due to differences in the

processes or differences in the specifications estimated. By using the same regression specification for both types of elections the work presented here allows a direct comparison of the importance of several factors in determining the outcome of certification elections to their importance in decertifications.

Our presentation proceeds in four parts. The next section develops the regression specification. The third section describes the data. The fourth presents our results, and the last is a conclusion summarizing the results and considering their implications.

II. THE SPECIFICATION

The dependent variable is a Haldane-Logit transformation of union support in certification and decertification elections measured at the bargaining unit level. Aspects of bargaining units, union affiliation, industry, and community, which are likely to be related to union support, are identified from the literature on certification and decertification elections, and the literature on union organizing.

1. Bargaining Unit

There are two bargaining unit characteristics identifiable in this data set which are probably related to union support in certification and decertification elections. The first, unit size, has repeatedly been demonstrated to be important. The second, factor, management resistance, has received less attention.

The common finding relating size to decertification outcomes is increasing size reduces the probability of a union being decertified.[6] The usual argument given to explain this finding is that large units are more economical

to service and more attractive to a union. As a consequence, service for union members is good, making them satisfied with and supportive of the union. Further, since the unit is large the union expends substantial resources to keep the unit.

If this argument is followed for certification elections, a similar positive relationship between unit size and union support would be expected. However, the most common finding in studies of certification elections is that unit size is negatively related to the union support.[7] Cooke[8] provides an explanation. He argues pro-union groups are able to exert more pressure in small groups because they are better able to communicate, maintain cohesiveness, and apply pressure to force social conformity. This explanation is consistent with the decertification findings because the mobilized group in a decertification is attempting to oust the union.

A third possibility is that differences in technology or management style between small and large firms (reflected here in unit size) affect election outcomes.

Since there are potentially many different factors at work, we have chosen a polynomial specification which allows the marginal effects of increasing size to differ between different size firms.

The second factor associated with bargaining units is management resistance. Two variables which may signal the intensity of management resistance in certification campaigns are whether or not the election is a consent election, and the amount of time between when the petition for an election is filed and when the election is held.

There are three ways consent elections may reflect less management resistance in a certification election. First, when the management consents to the union definition of the bargaining unit they signal employees that they

may not intend to fight union efforts. Second, in a consent election the bargaining unit requested by the union is not modified. If a union has defined a unit to its own advantage and the company successfully contests it the union may loose supporters who are removed by the redefinition or find its strength diluted by additional workers.[9] Third, the absence of management consent may serve as a proxy for the use of other management campaign tactics such as meetings, letters, hand bills, and intimidation of union supporters which have been shown to affect voting.[10]

Consent elections are probably not a sign of management resistance in decertification elections. First, failure to consent does not signal an attempt to change the bargaining unit. In addition, while it is almost always management that fails to consent to certifications, either the union or management may not consent to decertification elections. Therefore, we have no expectations concerning the relationship between consent elections and union support in decertification elections.

Management resistance may also be reflected in the amount of time, between the date when the petition for an election is filed and the date the election is held. Union support is usually at its peak when the petition is filed. The greater the delay, the more opportunity employers will have to counter union efforts and hire workers screened for pro-union sympathies. This again should lead to less union support.[11] Delays may also signal the use of other anti-union tactics.

These arguments do not generalize to decertifications. Therefore we have no expectations concerning the sign of the effect of delays in decertification elections.

It should be noted that management resistance in these circumstances may be endogenous. If firms respond to stronger pro-union sentiments by

increasing the intensity of anti-union efforts, the measured effects of management resistance would probably be biased downward. If firms respond by dropping anti-union efforts the measured effects of management resistance would probably be biased upward.[12]

2. Union

Empirical results linking particular unions to the outcome of certification and decertification elections are mixed. In separate studies: Sandver found Teamsters win fewer elections than other unions,[13] Cooke found union support to be lower in certification elections where Teamsters where involved,[14] Anderson et al. found no difference between Teamsters and other unions in union support in decertification elections,[15] and Dickens finds substantial differences between several unions.[16] One potential reason for these ambiguous results is the presence of a number of different, and conflicting, factors associated with unions which may affect voting.

The size of a union may be related to its success in certification and decertification elections for many reasons. A larger union may have more resources available for fighting representation campaigns and is more attractive to workers if they feel that a large union has more leverage in negotiations.[17] On the other hand, large unions may be more bureaucratic and less responsive to membership. Thus, the sign of the union size effect may be either positive or negative in certification and decertifications.

In discussing unions' organizing activity, it is useful to distinguish between its extent and its intensity. Roughly speaking, the extent would be measured by the number of elections a union engaged in and the intensity by the amount of effort put into each campaign. All other things held equal, one would expect that the more intense a union's organizing effort, the more

successful it would be in each certification campaign. On the other hand, as a union increases the extent of its organizing efforts by attempting to organize more units, it is forced to try more marginal units with a lower probability of success. However, we cannot expect that all other things are held equal.

Even if we had good measures of the extent and intensity of union organizing efforts, we would still face the problem that more intense efforts may be a response by a union to a more difficult territory. More extensive organizing may be a response to a larger number of opportunities.

In addition, while we can measure the extent of organizing activity -- the number of elections in which a union participates -- we can get at intensity only by a much less direct route.[18] We have used the average size of the unit a union organizes and the total number of workers involved in all elections as proxies for intensity. To interpret these as proxies for intensity one must assume that unions organizing larger units will put more effort into each campaign. This would be a reasonable assumption if there are economies of scale in servicing larger units, but income from a unit is proportional to its size. This effect will be picked up by unit size, which is already controlled for, but it may also be reflected in the organizing strategy of a union. Thus, unions which organize larger units on average may tend to put more effort into each campaign even when organizing smaller units.

How the extent and intensity of union organizing efforts will affect success in decertifications is even less clear. Organizing skills and resources may be useful in fighting decertifications. On the other hand, more extensive and intensive effort may lead to the certification of marginal units with a greater tendency to decertify. It has also been suggested that unions face a trade-off between organizing and servicing,[19] Unions devoting

considerable effort to organizing may not have the resources to adequately service existing units and may loose more decertifications. Thus no attempt is made to predict the effect of organizing effort on decertifications.

The final union attributes we will consider are membership costs and benefits. Controlling for other factors, the greater the cost of participating in the union, the lower should be the union support in an election. The greater the benefits from unionization the greater should be union support. This study includes a measure of average union dues per member and the average dollar value of union benefits[20] (health care, pension contribution, recreational services, etc.) per member.

3. Industry

The use of dummy variables is again found in the analysis of industry effects on election outcomes. Rose classified industries into four major groups and found little difference in certification election outcome between them.[21] Sandver classified industries on the basis of capital intensity and had inconclusive results studying certification elections.[22] In a study of decertification elections, Anderson, Busman, and O'Reilly found bargaining units were more likely to vote for the union in the service industry and against the union in the retail industry.[23]

This study considers eight industry attributes potentially affecting the outcome of representation elections: the level of strike activity, potential wage gains from unionization, wage levels, potential improvements in wage equity from unionization, wage dispersion in non-union firms, the percent of the workforce that is unionized, the percent of the workforce that is black, and the industry unemployment rate.

Strikes are costly to workers so they may view them as something to be avoided. Controlling for other factors, on might expect to find less support for unions in both certification elections and decertification elections in industries with more strike activity.

Industries differ considerably both in average wages and in average wage differences between union and non-union workers. If expected wage gains from unionization are related to average industry union/non-union differences, then union support in both certifications and decertifications should be greater in industries with larger union/non-union differences.

Pencavel argues that unionism is a normal good and that desire for unionization increases with income.[24] Thus, not only the difference between union and non-union wages should matter, but also the overall wage level.

It has been argued that workers prefer more equitable compensation systems and unions respond to these desires by lowering the variance of wages.[25] If workers do prefer lower wage variance, they should be more likely to vote union in industries where unions reduce the wage variance more.

Two arguments can be found concerning the likely effects of industry unionization on vote. The first argument is the saturationist argument. Ashenfelter and Pencavel[26] argue that as unionization increases, further gains from organizing are more difficult to obtain. The consequence is a diminishing return to organizing efforts as more marginal bargaining units are organized. Therefore, as unionization increases, union support should decrease. On the other hand, when unionization is low within an industry, employers strongly resist union organizing. In fact, employers strive to prevent the entry of unions anywhere within the industry. Thus, if union membership is not extensive within an industry, unions should be less likely to win representation elections. Taking these two arguments together suggests

that unionization is related to union support in a U-shaped fashion, with unions having the greatest probability of success in moderately unionized industries. On the other hand, if unions organize in each industry up to the point where marginal costs of obtaining a new member are equal to the marginal benefits of that new member, no relation if marginal benefits are constant or perceived as constant with respect to the level of unionization.

During periods of high unemployment, resistance of employers to unions increases and the risk to a worker of joining a union increases. In the case of decertification elections, increasing unemployment may increase employer resistance to unions and cause dissatisfaction of union members with the union because of loss of job security.[27] Thus, industry unemployment is expected to be negatively related to union support in certification and decertification elections.

Black workers have been found to be more likely to vote union.[28] Farber and Saks suggest that this is because unions impose a formal mechanism for resolving disputes providing blacks with some protection from discrimination.[29] If this is true the percent of workers who are black in an industry should be positively related to union support in certification and decertification elections.

4. Location

The primary geographic variable researchers have looked at in analyzing certification and decertification elections is whether or not the bargaining unit is located in a Southern or Right-to-Work state. Analyzing certification elections, Rose found a slight tendency for unions to have a greater chance of success in the South.[30] Sandver argued this effect was due to differences in unit size and election type between Southern and other states.[31] In analysis

of decertification elections, Krislov found unions in Southern and Midwestern states had a greater chance of success than unions elsewhere.[32] On the other hand, Anderson, Busman, and O'Reilly found location in the South to be an unimportant factor in explaining election outcomes.[33] Ellwood and Fine consider the effects of right-to-work laws on union success in certification drives and find that it drops slightly in the years immediately following the passage of the law and then increases slightly in later years.[34] Cooke finds that unions are less successful in certification elections in Southern Right-to-Work States.[35] The only other geographic factor analyzed is the effect of a metropolitan location. Rose finds that unions in non-metropolitan areas tended to experience a greater degree of success in certification elections.[36]

This study considers nine attributes of the location of an election: whether the firm is located in the South or a rural area, strike activity, the percent of the population which is black, right-to-work laws, community unionization, community unemployment, community urbanization, and the structure of local industry.

It is well known that states with right-to-work laws have a significantly lower percentage of the work force organized.[37] However, as the evidence presented above suggests, the relationship between right-to-work laws and election outcomes is ambiguous. Three arguments can be proposed linking right-to-work laws to union support in certification and decertification elections.

First, while right-to-work laws make it possible for "free-riders" to reap the benefits of union membership without paying the costs, thus reducing the incentive to _join_ unions, they might make workers more likely to _vote_ union. Right-to-work laws lower the potential cost of voting pro-union

because, if the worker does not like the union, he does not have to join. It is to the worker's advantage to give the union a chance. Second, the presence of right-to-work laws could make unions less likely to expend resources organizing marginal units, concentrating instead on units likely to be organized successfully. Since right-to-work laws are associated with low unionization, there should be many prime sites to organize. Both of these factors imply a positive relationship between right-to-work laws and union success. But, right-to-work laws are usually enacted in states where there is little community support for unionization. Therefore, the sign of the corre- lation of right-to-work laws with voting can't be predicted.

The arguments for the relevance of community unemployment, unionization, strike activity, and the percent black are similar to the arguments presented above for industry effects.

While union organizers have felt urban areas were easier to organize than rural areas, Rose found unions have slightly more success in rural areas.[38] In cities, alternative jobs are easier to find. This decreases the expected cost of voting for a union in a certification election. On the other hand, the greater cost of organizing and servicing units in rural areas may lead unions to attempt to organize only in those firms where they have a high probability of success. Therefore there is no reason to anticipate a positive or negative relation.

Another factor affecting the availability of alternative jobs is local industry concentration. If most jobs in an area are concentrated among a few employers, one would expect workers to have fewer opportunities and view certifying or decertifying a union as a potentially more costly experiment. Alternatively, workers who don't like a company or a union are less likely to quit and more likely to try to change conditions by voting for certification

or decertification. Once again there is no reason to anticipate a positive or negative relationship.

III. DATA SOURCES AND ESTIMATION TECHNIQUE

The dependent variables arẽare constructed for data on union support in certification and decertification elections. Union is measured as the proportion of workers voting union in an election.

National Labor Relation Board election report data covering all cases closed in the years 1977 to 1979 form the basis of the sample. This data contains the outcome of the election, the type of election, the three digit standard industrial classification codes, the location of the election, the date of the petition for election, the date the election was held, and the petitioning union. From all cases closed in these years we choose all those involving only one union for which our dependent and all independent variables could be constructed. This left a sample of 12,009 certification election and 1,320 decertification elections.

The bargaining unit characteristics, size of unit, the length of the campaign, and whether or not the election was a consent election, are constructed from the National Labor Relations Board data. The size of the unit is constructed as the number of eligible voters in the unit in thousands. The log of the number of months between the petition for election and the date the election was held is used as a measure of the length of the campaign, and a dummy variable is constructed for whether or not the election was a consent election.

Union size (in hundreds of thousands) is measured as the average reported size in the 1977 and 1979 union directories. Union dues are computed as the total amount of dues and per capita payments, in hundreds of dollars in the

years 1977 through 1979, to every local affiliated with the national union and to the national, divided by union membership.[39] Similarly, union benefits are measured as the total value of benefits in hundreds of dollars provided by all locals affiliated with a national and by the national to members of the union divided by union membership.[40] The extent of union organizing efforts was measured by the number of elections the union took part in during the period. Two variables which were included in an attempt to control for the intensity of organizing efforts are the average size of units a union was organizing and the total number of workers in all units a union attempted to organize. Finally, a dummy variable for elections involving Teamsters was included to see if the union attributes we have considered can explain the relation found by past authors.

The industry data is coded at the two and three-digit standard industrial classification level. Industry percent black, percent unemployed, and mandays lost per 100 workers are coded at the two digit level.[40] The fraction unionized is coded at the three-digit level.[41] A quadratic term for industry unionization was included to allow for a curvilinear relationship between industrial unionization and union support.

Wage levels, and union-non-union differences are accounted for by including the average union wage and the average non-union wage at the three-digit standard industrial classification level. Similarly, union and non-union wage dispersion is included using the standard deviation of the union wage and the standard deviation of the non-union wage in each industry.[42]

A dummy variable coded 1 for elections in states having a right-to-work law and 0 otherwise is included. Another dummy variable coded 1 for southern states is also included.[43] Finally, a third dummy, coded 1 for observations

outside an SMSA for which no SMSA or county data is available, is included. SMSA and county variables are coded as zero for these observations.

SMSA data is the percent of all workers unionized within the SMSA and the percent unemployed. A quadratic term is included to allow a curvilinear relationship between community unionization and union support. Unemployment rates are matched on an annual basis with election data. Mandays lost per employee was averaged over the three years to obtain a stable measure of propensity to strike.[44] The remainder of the geographic variables are coded at the county level. The variables included are job concentration, blacks as a fraction of population, and urbanization.[45]

The means and standard deviations of the variables are reported in table 1. The two equations were estimated using a modification of the Haldane Minimum Chi-Squared Logit method proposed by Dickens.[46] The method allows for both individual and firm level error variance components. A description of the method can be found in the Appendix.

IV. FINDINGS

The estimated coefficients and their standard errors are presented in Table 2. The approximate impact of a one unit change in each variable on the probability of voting union is also reported. There are two things worth noting about the general nature of these results. First, although many variables have statistically significant relations with vote, point estimates and standard errors tell another story. With the exception of unit size, organizing effort, in both equations, and union size, and the Teamster dummy in the de-certification equation, no other variables have large impacts. Given point estimates, variation of other variables within the range of plus or minus two standard deviations would be associated with less than a 10%

change in the percent of workers voting union. While such changes could affect a large number of elections, none would be decisive in even a majority of elections.

Second, these results make it quite clear that the decertification process is very different from the certification process. Of the 31 pairs of coefficients, only 17 have the same sign. Although all variables which have a statistically significant relation to decertification voting also have statistically significant relations to certification voting, the signs are not the same in 2 out of 3 cases.

We now proceed with consideration of the relations in each category.

1. Bargaining Unit

The variable with the largest discernible relation within its normal range of variation is unit size. Figures 1 and 2 depict the estimated relation. Our findings are largely the same as those of past authors -- larger units are less likely to decertify or certify. The results for certification elections are qualitatively similar to Cook's in that the functional form forces a flattering out of the size effect in larger units. But, this flattering takes place at a much larger unit size. This may be due to our use of a more flexible functional form.

The other two variables measured at the bargaining unit level are interpreted for certifications as indications of management resistance. Both are statistically significant with the anticipated sign. Workers taking part in consent elections are about seven percent more likely to vote for the union. Every doubling in the length of the campaign leads to about a 3% drop in percent voting union.

Interestingly, the measured effect of campaign length in decertifications is nearly the same as in certifications. While it is arguable that drawing out certification drives is in management's interest, it is hard to see why this would be the case for decertifications. The one hypothesis which seems consistent with these findings is that, whatever the reason for the length of the campaign, management's superior access to workers allows them to make better use of the time.

As anticipated, the effects of consent elections in decertifications is small and not statistically significant.

Since both the consent and length of elections variable are not predetermined (we might expect employers to vary their resistance in response to charges in the significance of the union threat) both equations were estimated leaving these variables out. All results with respect to other variables were qualitatively unaffected.

2. Union

Two of the variables measured at the union level are statistically significant in the certifications model. None are in the decertification model. In the certification model the relation of union size to voting is not statistically or practically very significant. The coefficient in decertifications is larger but is not measured with as much accuracy.

One of the three organizing variables is statistically significant in certification elections. For every one standard deviation (43,000) increase in the number of workers eligible to vote in elections involving the union, the predicted probability of a worker voting union increases by about 9.3%. The probability of workers voting union drops by more than 12% with each standard deviation (1130) increase in the number of elections a union engages

in. (Although this effect is not significant at the .05 level, it would be at a .08 level.) Holding these two variables constant, average unit size has almost no relation to voting.

Interpreting these relations as causal, the net effect of increasing the number of units organized for a union organizing average sized units is positive. Taking both effects into account, a union which organizes 1,000 more average sized units can be expected to have about a 4% higher probability of workers voting union. A union which organized units with less than 50 workers (on average) would have a lower probability of success if it engaged in more drives.

Although the signs on these coefficients are consistent with the "extensive-intensive" interpretation suggested above, there may be other interpretations. For instance, there may be differences in the types of units which are being organized by different unions. These differences might be reflected in the size of the units a union organizes.

The coefficients of these organizing variables in the decertification model are large, but are not measured accurately.

Of considerable interest are the results with respect to dues and benefits. Both are related to voting with the expected signs in both models and dues are statistically significant in the certifications model. The coefficients in decertifications are larger than in certifications, which is what would be expected if workers gain information on these union attributes over time. However, the coefficients are quite small. An increase of two standard deviations in union dues ($124 per year) is related to only slightly more than a 2% decline in the number of workers voting union in certification elections and 4% in decertifications.

Once these other union effects are controlled for, the Teamster dummy is no longer statistically significant. Despite this, one can not say that Teamster involvement in an election is unimportant. Rather, one cannot distinguish the effect of Teamster involvement from the effects of other attributes of that union -- particularly its extensive organizing efforts.

3. Industry

Several of the industry level variables have statistically significant coefficients in the certifications specification. One is statistically significant in the decertifications specification.

With other variables controlled for, strike activity is clearly uncorrelated with voting in certifications and decertifications. A two standard deviation increase in this variable is associated with less than a 1.5% increase or decrease in the probability of a worker voting union. Further, the 95% confidence bounds for these effects are in the range of plus or minus 1.8% for certifications and 4.3% for decertifications.

Two studies using micro data have already suggested the importance of the union wage effect.[47] The coefficients found here for certification elections are statistically significant but considerably smaller. There are two possible explanations for this. Since both previous studies confound the effects of within plant relative wages with the expected union wage gain it is possible that much of the previously measured effect is due to the relative wage effect. Alternatively, the average difference between union and non-union wages in an industry could be much larger than the average expected wage gain in a union representation election election. This would be true, if, for example, the firms with the largest potential wage change were unionized first. By 1979 the expected gain could be considerably less than

the average union-non-union difference. This would bias coefficient estimates downward.

Finally, it has been suggested that unionism is a "normal good" -- that people demand more unionism as their incomes increase. The point estimates for the certification model are suggestive of this hypothesis in that if both union and (non-union wages) are a dollar higher, the probability of workers voting union is higher, but the effect is very small and far from statistically significant.

The point estimates of the wage effects in decertifications are small and imprecise. They also do not have the expected signs.

It has been argued that unions lower the dispersion of wages and that they do this because workers want them to. The results of the certifications model provides statistical support for the second part of this contention. Workers in industries where non-union wages have a higher standard deviation are slightly more likely to vote union. But, the relation in decertifications is the opposite. Perhaps union attempts to compress wages in industries with higher variance leads to more strife -- increasing the probability of union loss.

Turning to the coefficients of the level of unionization in the industry, we find no evidence of any saturation effect. But, given the lack of precision of the estimates, we cannot rule out a substantial relation -- particularly in decertification elections.

As we anticipated, workers in industries with higher unemployment rates are less likely to vote union in both certifications and decertifications. A two standard deviation increase in the unemployment rate (2.9%) is associated with a 1.5% decrease in the probability of a worker voting union in a certification election and a an almost 3% decrease in a decertification.

Finally, we find the expected relation between percent black and probability of voting union in certifications. A two standard deviation increase in the percent of an industry's workforce which is black (5.98%) is associated with more than a 2% increase in the probability of workers voting union. No association can be verified for decertifications.

4. Location

Only two location variables are statistically significant in the certifications equation. None are in the decertifications equation.

Workers are about 1.6% more likely to vote union in certification elections held in right-to-work states. Workers in industries where a large fraction of local jobs are concentrated among a few employers are slightly less likely to vote union in certifications. A two standard deviation increase in the concentration measure (.076) is associated with about a 1.3% decrease in the probability of a worker voting union in a certification. Strangely, SMSA unemployment is positively related to union success. The only explanation we can think of is that cities with anti-union atomospheres have been more prosperous in recent years. The estimates of the coefficients of other geographic variables are too imprecise for us to say much about them.

V. CONCLUSION

We have examined the influence of 26 variables on voting in certification and decertification elections. Many are statistically significantly related to how workers vote in both certification and decertification elections. However, only unit size and organizing activity were found to have both a large and statistically significant relation. The effects of other variables

were small or imprecisely measured. These results contrast sharply with the large effects that have been found when more detailed information was available on each election and/or the attitudes of workers who took part in the elections.[49] Evidently the overwhelming majority of the variation in union support is within industries, unions, and geographic locations rather than between.

A second finding is that union support in certification elections and in decertification elections are determined by very different processes. The differences between the effects of variables in certification and decertification elections noted in the literature survey are real and not the results of past authors using different samples or specifications.

One of the unique aspects of this study is our examination of a number of "economic variables" not used in previous studies. Most of these variables are statistically significantly related in the expected manner to voting in certifications, but the coefficients are small. One interesting finding is that workers in industries with more non-union wage dispersion among production workers are somewhat more likely to vote union than others. This provides some support for the view that union wage compression is a response to worker desires.

Our two measures of management resistance have a larger measured relation to voting than most of the other variables considered but still less than other studies. Although it could be that by controlling for a number of previously unstudied variables we have reduced the impact of these variables, it seems more likely that the variables we have chosen were poor proxies. Voos,[50] who also used length of campaign to measure management resistance obtains similarly weak results. Seeber and Cooke[51] find a very large effect for consent elections, but they use aggregate data. Our results suggest that

either their consent election variable is acting as a measure of "climate" rather than reflecting the direct effects of fewer consent elections, or that their time series measure is correlated with some left out variable.

Notes

1. Joseph Krislov, "Decertification Elections Increase but Remain no Major Burden to Unions," <u>Monthly Labor Review</u>, Vol. 102 (November, 1979), pp. 147-161.

2. For example, see John Drotning, "NLRB Remedies for Election Misconduct: An Analysis of Election Outcomes and Their Determinants," <u>Journal of Business</u>, Vol. 40 (April 1967), pp. 137-148; Joseph B. Rose, "What Factors Influence Union Representation Elections," <u>Monthly Labor Review</u>, Vol. 95 (October 1972), pp. 49-51; Gary N. Chaison, "Unit Size and Union Success in Representation Elections," <u>Monthly Labor Review</u>, Vol. 96 (February 1973), pp.51-52; Sandver, "South-Nonsouth Differentials in National Labor Relations Board Certification Elections;" William N. Cooke, "Determinants of the Outcomes of Union Certification Elections," <u>Industrial & Labor Relations Review</u>, Vol. 36 (April 1983), pp. 402-414. Two recent reviews of the literature on Union certification elections are Jack Fiorito and Charles R. Greer "Determinants of the U.S. Unionism: Past Research and Future Needs," <u>Industrial Relations</u>, Vol. 21, #1 (Winter, 1982) pp. 1-32, and Herbert G. Heneman III and Marcus H. Sandver, "Predicting the Outcome of Union Certification Elections: A Review of the Literature," <u>Industrial and Labor Relations Review</u>, Vol. 36, #4 (July 1983), pp. 537-575.

3. For example, see Joseph Krislov, "Union Decertifications," <u>Industrial & Labor Relations Review</u>, Vol. 9 (July 1956), pp.589-594; William Fulmer, "When Employees Want to Oust Their Unions," <u>Harvard Business Review</u>, Vol. 56 (March/April 1978), pp. 163-170; John C. Anderson, Gloria Busman, and Charles O'Reilly, "What Factors Influence the Outcome of Decertification Elections?" <u>Monthly Labor Review</u>, Vol. 102 (November 1979), pp. 32-36; John C. Anderson, Gloria Busman, and Charles O'Reilly, "The Decertification Process: Evidence from California," <u>Industrial Relations</u>, Vol. 19 (Winter 1982), pp. 178-195; Israel Chafetz and C.R.P. Fraser, "Union Decertification: An Exploratory Analysis," <u>Industrial Relations</u>, Vol. 18 (Winter 1979), pp. 56-69; James Dworkin and Marian Extejt, "Recent Trends in Union Decertification/ Deauthorization <u>Proceedings of the Thirty-second Annual Meeting of the Industrial Relations Research Association</u>, Madison, Wisconsin, pp.226-234.

4. For example, see Krislov, "Union Decertifications;" William T. Dickens, "The Effect of Company Campaigns on Certification Elections: <u>Law and Reality</u> Once Again," <u>Industrial and Labor Relations Review</u> (July 1983); Rose, "What Factors Influence Union Representation Elections;" Anderson, Busman, and O'Reilly, "What Factors Influence the Outcome of Decertification Elections;" Sandver, "South-Nonsouth Differentials in National Labor Relations Board Certification Election Outcomes." Chafetz and Fraser, "Union Decertification: An Exploratory Analysis;" Anderson, Busman, and O'Reilly, "What Factors Influence the Outcome of Decertification Elections;" Dworkin and Extejt, "Recent Trends in Union Decertification/Deauthorization Elections;" Sandver, "South-Nonsouth Differentials in National Labor Relations Board Certification Election Outcomes;" Cooke, "Determinants of the Outcomes of Union Certification Elections."

5. For example, see Rose, "What Factors Influence Union Representation Elections;" Chafetz and Fraser, "Union Decertification: An Exploratory Analysis;" Anderson, Busman, and O'Reilly, "What Factors Influence the Outcome of Decertification Elections;" Sandver, "South-Nonsouth Differentials in National Labor Relations Board Certification Election Outcomes."

6. Krislov, "Union Decertification;" Anderson, Busman, and O'Reilly, "What Factors Influence the Outcome of Decertification Elections?" Chafetz and Fraser, "Union Decertification: An Exploratory Analysis;" Dworkin and Extejt, "Recent Trends in Union Decertification/Deauthorization Elections."

7. Rose, "What Factors Influence Union Representation Elections?" Chaison, "Unit Size and Union Success in Representation Elections;" Sandver, "South-Nonsouth Differentials in National Labor Relations Board Election Outcomes;" Cooke, "Determinants of the Outcomes of Union Certification," Dickens "The Effect of Company Campaigns..." is an exception finding union support increasing with size.

8. Cooke, "Determinants of the Outcomes of Union Certification Elections," p. 404.

9. Cooke, "Determinants of the Outcomes of Union Certification Elections," p. 406.

10. Dickens, "The Effect of Company Campaigns..."

11. Cooke, "Determinants of the Outcomes of Union Certification Elections," p. 407.

12. We say "probably" biased upward or downward because the direction of the bias depends on the sign of the partial correlation as opposed to the simple correlation of these factors. We think it is likely that they would have the same sign.

13. Sandver, "South-Nonsouth Differentials in National Labor Relations Board Certification Election Outcomes."

14. Cooke, "Determinants of the Outcomes of Union Certification Elections."

15. Anderson, Busman, and O'Reilly, "What Factors Influence the Outcome of Decertification Elections?"

16. Dickens, "The Effect of Company Campaigns..."

17. Which they would if they could mobilize more support for a strike.

18. Attempts were made to obtain union expenditures on organizing, but they could only be found for a few unions.

19. Berkowitz, "The Economic of Trade Union Organization and Administration;" Black, "Union Organizing and the Allocation of Union Resources."

20. Two other benefits of union membership -- expected wage gains and improved pay equity are included in the study but are measured at the industry level and are discussed in the section on industry effects. The measure of benefits does not include changes in working conditions associated with unionization.

21. Rose, "What Factors Influence Union Representation Elections."

22. Sandver, "South-Nonsouth Differentials in National Labor Relations Board Certification Election Outcomes."

23. Anderson, Busman, and O'Reilly, "What Factors Influence the Outcome of Decertification Elections?"

24. Pencavel, John H. "The Demand for Union Services: An Exercise," Industrial and Labor Relations Review, XXIV (January 1971), pp. 180-190.

25. Farber & Saks, "Why Workers Want Unions:..", p. 51.

26. Orley Ashenfelter and John H. Pencavel, "American Trade Union Growth: 1900-1960, Quarterly Journal of Economics, Vol. 83(1969), p.438.

27. Anderson, O'Reilly, and Busman, "Union Decertification in the U.S.: 1947-1977."

28. Farber and Saks, "Why Workers Want Unions: The Role of Relative Wages and Job Characteristics"; Dickens "The Effect of Company Campaigns...."

29. Farber and Saks, "Why Workers Want Unions..."

30. Rose, "What Factors Influence Union Representation Elections."

31. Sandver, "South-Nonsouth Differentials in National Labor Relations Board Certification Election Outcomes."

32. Krislov, "Union Decertifications."

33. Anderson, Busman, and O'Reilly, "What Factors Influence the Outcome of Decertification Elections?"

34. David T. Ellwood and Glenn A. Fine, "The Impact of Right-to-Work Laws on Union Organizing," NBER Working paper 1116 (May, 1983), p. 30.

35. Cooke, "Determinants of the Outcomes...," p. 411.

36. Rose, "What Factors Influence Union Representation Elections."

37. For example see Keith Lumsden and Craig Petersen, "The Effects of Right-to-work Laws on Unionization in the United States," Journal of Political Economy, Vol. 83 (December 1975), pp. 1237-1248.

38. Rose, "What Factors Influence Union Representation Elections."

39. The sources of the union size data are the Department of Labor, <u>Directory of National Unions and Employee Associations</u> (Washington, D.C: Bureau of Labor Statistics, Bulletin 2044, 1977; Bulletin 2079, 1979). Reported union sizes for 1977 and 1979 were averaged to obtain the size used in analysis. The sources of union financial data are the Department of Labor, Labor Organization Annual Report: Forms LM-2 and LM-3. These are obtainable in computer readable format for 1977 to 1979 from the Labor Management Services Administration in Washington, D.C.

40. Percent Black and Percent Unemployed were obtained from the Department of Labor, <u>Handbook of Labor Statistics</u> (Washington, D.C.: Bureau of Labor Statistics, Bulletin 2070, 1980). Strike frequency was obtained from the Dept. of Labor, <u>Analysis of Work Stoppages</u> (Washington D.C.: Bureau of Labor Statistics, 1977; 1978 and 1979). Mandays lost per employee was coded as the average mandays lost for 1977, 1978, 1979 divided by the employment in the industry. Mandays lost in each industry was obtained from <u>Analysis of Work Stoppages</u> (1977,1978, 1979). Industry Employment came from BLS employment data for 1978.

41. The estimates for SMSA unionization and industry unionization were obtained from Richard B. Freeman and James L. Medoff, "New Estimates of Private Sector Unionism in the United States," <u>Industrial & Labor Relations Review</u>, Vol. 32 (January 1979), pp. 143-174.

42. Union and non-union average wages and standard deviations were computed using the May 1975 CPS tapes.

43. Right-To-Work states are Alabama, Arizona, Arkansas, Florida, Georgia, Iowa, Kansas, Louisiana, Mississippi, North Carolina, North Dakota, Nebraska, Nevada, South Carolina, Tennessee, Texas, Utah, Virginia, and Wyoming. Southern states are Alabama, Arkansas, District of Columbia, Delaware, Florida, Georgia, Kentucky, Lousiana, Maryland, Oklahoma, South Carolina, Tennessee, Texas, Virginia, Mississippi, North Carolina, and West Virginia.

44. The unionization data was obtained from Freeman and Medoff, "New Estimates of Private Sector Unionism in the United States," and the unemployment data was obtained from Department of Labor, Geographic Profile of Employment and Unemployment, 1978 (Washington, D.C.: Bureau of Labor Statistics, 1979) and Department of Labor, Geographic Profile of Employment and Unemployment, 1979 (Washington, D.C.: Bureau of Labor Statistics, 1980) and strike data was obtained from the Department of Labor, Analysis of Work Stoppages (Washington, D.C.: Bureau of Labor Statistics, 1977, 1978, 1979). Mandays lost per employee was coded as the average mandays per year for the years 1977, 1978, and 1979 divided by the average of employment in 1977 and 1978. Mandays lost was obtained from <u>Analysis of Work Stoppages</u> (1977, 1978, 1979) and employment was obtained from Bureau of the Census, <u>County Business Patterns</u>, U.S. Summary and SMSA (1977; 1978). Prepared by the Bureau of Census. Washington D.C.: U.S. Government Printing Office.

45. Job concentration was coded using <u>County Business Pattern</u> (1978): File 2 [machine readable data file] prepared by the Bureau of the Census, Washington: The Bureau [producer and distributor]. Job concentration was

measured for each industry in each county using the Herfindahl-Hirschman Index with the value of this index increasing as concentration increases. For construction of this index, see F.M. Scherer, <u>Industrial Market Structure and Economic Performance</u>, Second Edition (Chicago: Rand McNally College Publishing Company, 1980), p. 58. Percent black and urbanization were obtained from the Bureau of Census, <u>County and City Data Book, 1977</u> (Washington, D.C.: U.S. Government Printing Office, 1978).

46. William T. Dickens, "Error Components in Grouped Data: Why Its Never Worth Weighting," NBER technical working paper #43, February 1985.

47. Farber and Saks, "Why Workers Want Unions...," and Dickens, "The Effect of Company Campaigns..."

48. Such a large increase is unimaginable. We are only interested in the comparison of marginal charges but use the one dollar to figure for illustrative purposes.

49. Getman, Goldberg and Herman <u>... Law and Reality</u>, Farber and Saks, "Why Workers Want Union...," Dickens, "The Effects of Company Campaigns..." Beatrice Frieberg "Clerical Unionism: the Impact of the Runaway Office on Union Representation Elections," mimeo, Berkeley (1983).

50. Paula B. Voos, "Union Organizing: Costs and Benefits," <u>Industrial and Labor Relations Review</u> Vol. 36 #4, (July 1983), p. 58.

51. Ronald L. Seeber and William N. Cooke, "The Decline in Union Success in NLRB Representation Elections," <u>Industrial Relations</u> Vol. 22, #1, (Winter, 1983), p. 374-380.

Table 1

Means and Standard Deviations
of Variables Used in the Analysis

Variables	Certification Elections		Decertification Elections	
	mean	s.d.	mean	s.d.
percent voting union	.518	.269	.326	.260
BARGAINING UNIT				
eligible voters/1,000	.065	.152	.051	.121
consent elections	.062	.241	.108	.310
months of campaign (log)	.534	.552	.532	.620
UNION				
membership/1,000	1.058	.710	1.091	.715
dues per member/100	1.776	.619	1.751	.589
benefits per member	.306	.186	.306	.190
workers in organizing drives /100,000	.470	.430	.445	.430
number of organizing attempts/1,000	.992	1.131	.957	1.119
average size of unit (hundreds of workers)	.710	.416	.652	.349
Teamsters	.326	.469	.312	.463
INDUSTRY				
mandays lost per worker	.033	.464	.034	.494
union wage	5.02	1.00	5.00	1.06
non-union wage	4.06	1.03	3.94	1.01
union wage dispersion	1.676	.791	1.709	.906
non-union wage dispersion	2.360	1.440	2.465	1.729
fraction union in industry	.312	.169	.284	.169
fraction union squared	.126	.116	.109	.111
percent black	10.889	2.991	10.523	2.920
percent unemployed	5.882	1.445	6.004	1.391
LOCATION				
South	.219	.413	.160	.367
Right-to-work	.199	.400	.159	.365
Not in SMSA	.547	.498	.481	.500
SMSA:				
mandays lost per person	.231	.372	.279	.389
fraction workers unionized	.182	.215	.209	.217
fraction unionized squared	.079	.106	.090	.107
percent unemployed	2.766	3.183	3.111	3.162
COUNTRY:				
fraction black	.071	.113	.074	.111
fraction urbanized	.428	.473	.491	.476
job concentration	.014	.038	.013	.036
fraction union in population	.058	.078	.068	.081

Table 2
Minimum Chi-squared Logit Model
of Voting in Union Representation Elections:
Percent Voting Union is Dependent Variable

Variables	Certification Elections			Decertification Elections		
	coef.	s.e.	+dP/dX	coef.	s.e.	+dP/dX
Constant	-.108	.232	-.027	-.326	.715	-.072
BARGAINING UNIT						
eligible voters/1,000	-.639***	.120	-.160	2.589***	.489	.569
eligible voters/1,000 squared	.380***	.080	.095	-.267	.296	-.059
eligible voters/1,000 cubed	-42.786***	9.267	-10.683	43.139	27.103	9.479
consent elections	.288***	.053	.072	.125	.119	.027
log of months of campaign	-.129***	.022	-.032	-.182***	1.309	-.040
UNION						
membership/1000	-.065	.113	-.016	-.351	.364	-.077
dues per member/100	-.069*	.040	-.017	-.151	.112	-.033
benefits per member	.148	.139	.037	.260	.363	.057
workers in organizing drives/100,000	.861**	.374	.215	.624	1.309	.137
number of organizing attempts/1,000	-.450	.312	-.112	.688	.973	.151
average unit size (hundreds of workers)	-.074	.059	-.019	.249	.202	.054
Teamsters	.260	.594	.065	-1.919	1.798	-.422
INDUSTRY						
mandays lost per worker	-.024	.026	-.006	.048	.073	.011
union wage	.056***	.019	.014	-.041	.053	-.009
non-union wage	-.023	.020	-.006	.077	.057	.017
union wage dispersion	-.023	.019	-.006	.067	.047	.015
non-union wage dispersion	.037***	.011	.009	-.057***	.024	-.013
fraction union	.514	2.641	.128	.844	.773	.185
fraction union squared	-.005	.038	-.001	-.906	1.154	-.199
percent black	.016***	.004	.004	.000	.013	.000
percent unemployed	-.023***	.009	-.006	-.047	.030	-.010

LOCATION

South	-.032	.042	-.008	.063	.140	.014
Right-to-work	.038	.044	.010	-.133	.148	-.029
Not in SMSA	.123	.183	.031	-.286	.575	-.063
SMSA:						
mandays lost per worker	-.017	.053	-.004	-.021	.157	-.005
fraction of workers unionized	-.046	.929	-.011	-2.031	2.947	-.446
fraction of workers unionized squared	.410	1.179	.102	2.941	3.729	.646
percent unemployed	.023***	.014	.006	.003	.038	.001
COUNTY:						
fraction black	-.153	.157	-.038	-.071	.459	-.016
job concentration	-.688*	.355	-.172	-1.484	1.117	-.326

N	11,899	1,278
Standard Error of Unobserved Error Component	1.169	1.079

Significance levels for one-tailed
t test for null hypothesis that
coefficient equals zero
*** p .01 ** p .025 * p .05

+dP/dX is the approximate effect of a one unit change in the dependent
variable on the probability of a worker voting union. It is calculated
as β_i (1-p)p where β_i is the logit coefficient and p

is the proportion voting union.

FIGURE !.

Estimated Effects of
Unit Size in
Certification Elections
and Confidence
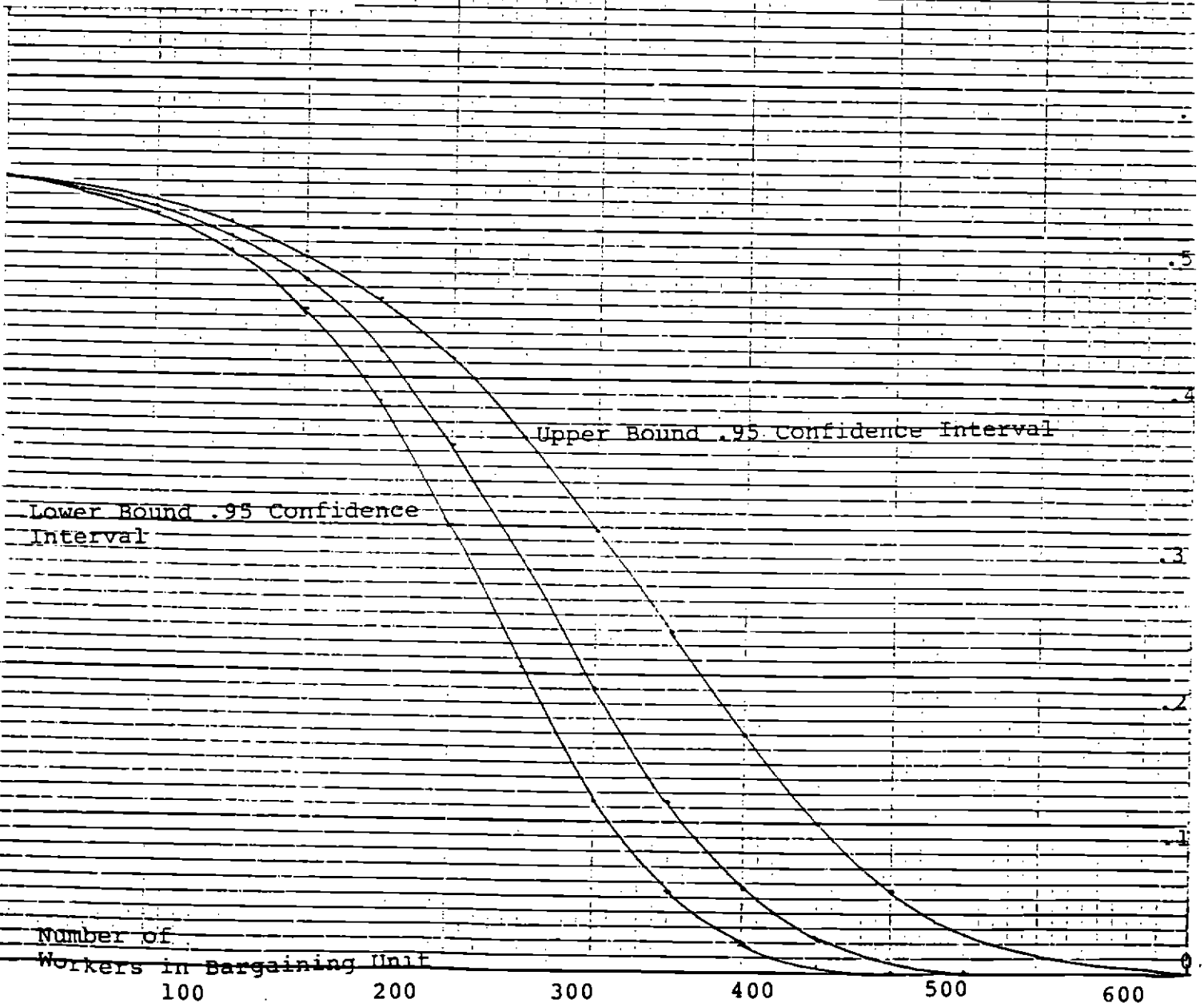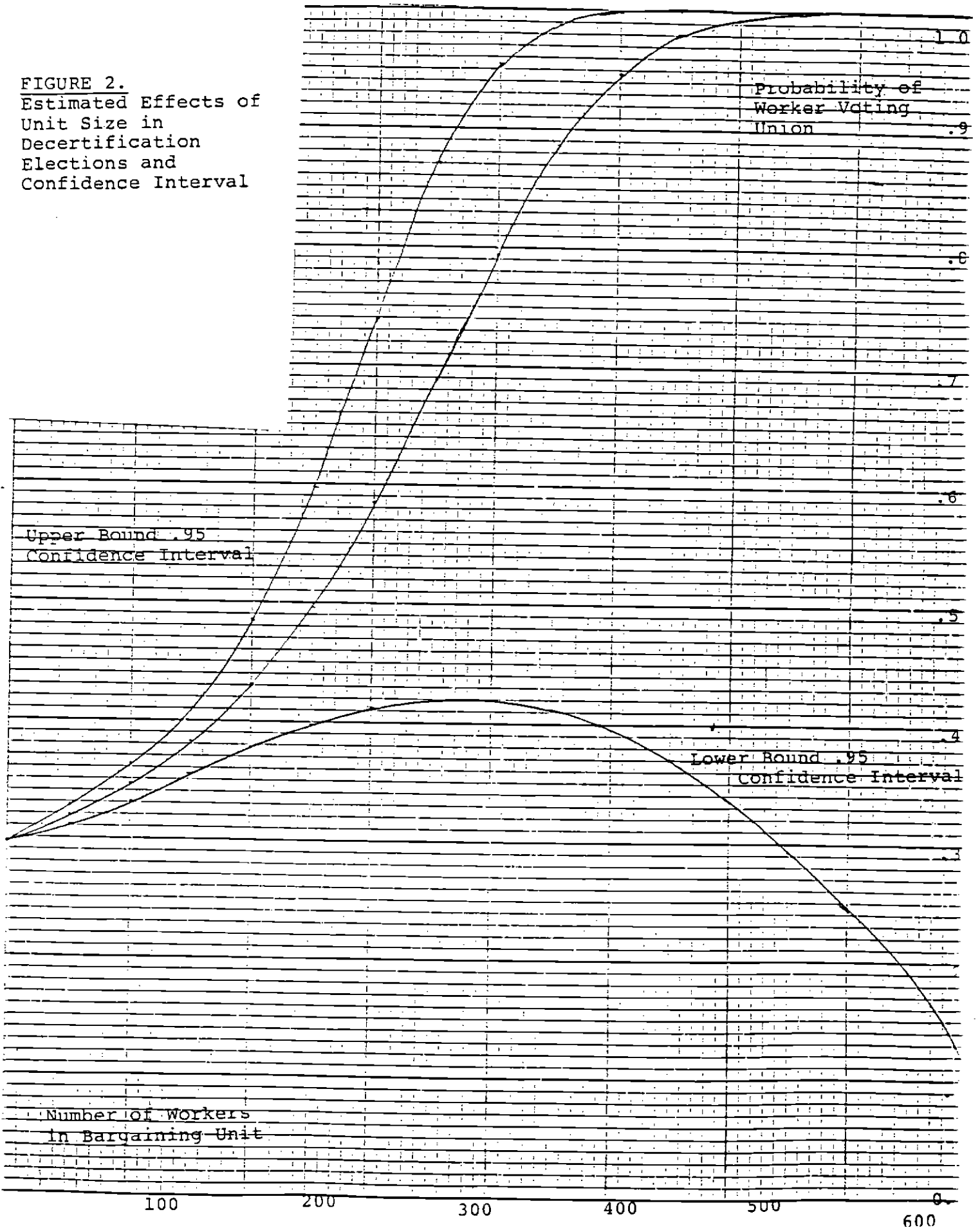Interval

Probability of
Worker Voting
Union

Upper Bound .95 Confidence Interval

Lower Bound .95 Confidence
Interval

Number of
Workers in Bargaining Unit

FIGURE 2.
Estimated Effects of
Unit Size in
Decertification
Elections and
Confidence Interval

Probability of
Worker Voting
Union

Upper Bound .95
Confidence Interval

Lower Bound .95
Confidence Interval

Number of Workers
in Bargaining Unit

1.0

.9

.8

.7

.6

.5

.4

.3

100   200   300   400   500   0

600

Appendix 1

Estimation Technique

One standard approach to estimating models where the dependent variable is a proportion is to assume that the expected value for the proportion for each observation p_i is a logistic function of observed variables $\vec{X}_i$ or

(1)
$$p_i = \frac{1}{1 + e^{-\vec{X}_i \beta}} \quad .$$

Designating the size of each group i as N_i and the actual proportion as $\hat{p}_i$, if we assume that $N_i \hat{p}_i$ is a binomially distributed random variable with expected value $p_i N_i$ then the β s of (1) can be consistently estimated by regressing

$$\log \left[p_i / (1-p_i) \right] \quad \text{on the} \quad X_i \text{ s}$$

and can be efficiently estimated if the variables are all weighted by an appropriate approximation to the variance of the random variable

$$V_i = \log \left[\hat{p}_i / (1-\hat{p}_i) \right] - \log \left[p_i / (1-p_i) \right] \quad .$$

This is the method of Minimum Chi-Squared Logit.

There are two problems with this as an approach to the data used here. First some of the p_i s are equal to one or zero so that the standard logit transformation is undefined. This problem is remedied by adopting the alternative transformation proposed by Haldane,

$$L_i = \log\left[\left(p_i + \frac{1}{2N_i}\right) \bigg/ \left(1 - p_i + \frac{1}{2N_i}\right)\right] = X_i\beta \quad .$$

The second problem is that both logit transformations assume that all attributes of an election unit which determine the probability of a worker voting union are observed. This is certainly not the case. To solve this problem we augment the Haldane model by assuming

$$L_i = X_i\beta + \gamma_i$$

where γ_i is an unobserved i.i.d. error term. Dickens [1985] shows that this model can be efficiently estimated using a 2-step procedure. In the first step consistent estimates of the β s and the variance of the γ_i are obtained. Weighted estimation is done in the second step to obtain efficient estimates.