DO UNIONS MAKE ENTERPRISES INSOLVENT?

RICHARD B. FREEMAN and MORRIS M. KLEINER*

Version: 1/5/98

ABSTRACT

This study investigates the impact of unionization on the closure of firms, business lines, or establishments using two major data sets: one on the union status of solvent and insolvent enterprises and business lines from the Compustat files, and one on the union status of workers who have lost their jobs due to permanent plant closures or business failures obtained by matching files from the Current Population Survey. We find little support for the hypothesis that unionization increases the insolvency of firms. The results are consistent with the hypothesis that unions behave in an economically rational manner, pushing wages to the point where union firms may expand less rapidly than nonunion firms, but not to the point where the firm, plant, or business line closes down.

"The worst crime against working people is a company which fails to operate at a profit."

-- Samuel Gompers (<u>Great Business Quotations</u> 1986, p. 52)

Does unionization increase the likelihood that a firm or plant will go out of business or drop a line of business? Does unionization contribute to higher unemployment because unionized plants are more likely to close than nonunion plants? Do unions commit Samuel Gompers' "worst crime" of forcing company's to operate at a loss, and thus shut down?

Analyses of the economic effects of unionism do not provide a clear answer to these important questions. Virtually all studies find that unionism is associated with higher wages and benefits for workers and lower profits for firms, but reduced profits do not necessarily translate into greater insolvency of unionized firms. If union wage gains come out of normal profits, the reduction in profits could potentially push firms closer to shutdown points and increase insolvency, though it might also simply lead firms to reduce their size of operation. But if union wage gains are a form of rent sharing, higher union wages come out of "excess profits" (including union-induced increases in productivity) and will not threaten the life of the firm. If firm survival is threatened, unionized workers have a surplus from which to give concessions (Blanchflower and Oswald 1993). Empirical studies disagree on whether or not the union induced reduction in profits comes out of normal returns or out of excess profits.[1]

Whether unions do or do not increase firm insolvency has implications for workers' choosing to unionize and for union organizing drives. A 1988 Gallup Poll found that 35 percent of the population believed that union establishments are "much more likely to go out of business than nonunion

establishments" while 51 percent disagreed. Among those who disapproved of unions, 45 percent reported that they believed unionized workplaces are more likely to go out of business, a belief which may color their attitudes (Gallup 1988). Unsupported threats of a shutdown or plant relocation are illegal in organizing drives, but such threats or predictions are common (Textile Workers v. Darlington Mfg. Co., 1965, and Wall Street Journal, July 28, 1992).

In this paper we analyze the relation between unionization and firm, business line, or establishment survival using a firm-based data set on the union status of solvent and insolvent enterprises and business lines from Compustat files and an individual-based data set on the union status of workers who have lost their jobs due to permanent plant closures or business failures from Current Population Survey (CPS) displaced workers files. Our analysis leads us to reject the notion that unionization adversely affects firm or business line survival or that unionization increases the likelihood that workers lose their jobs due to plant closure. We also find no union effect on survival rates in an industry data set and find rates of plant closure in union won certification or Federal Mediation and Conciliation Service dispute cases that are similar to plant closure rates in the broader economy. Overall, our results are consistent with the hypothesis that unions behave in an economically rational manner, pushing wages to the point where union firms may expand less rapidly or contract more rapidly than nonunion firms, but not to the point where the firm, plant, or business line closes down.

I. FIRM SURVIVAL AND UNION BEHAVIOR

The economic analysis of short run enterprise survival focuses on the factors that determine whether average variable costs (AVC) exceed average revenues (AR) at the profit-maximizing output. When AVC > AR, management shuts down the plant; otherwise it keeps operating. Average variable

costs depend on labor productivity and compensation, both of which are likely to be influenced by unionism, and on the costs of other variable factors exogenous to unionization. Average revenues will depend on market conditions that determine entry of competitive firms and market prices or shares. More sophisticated versions of the AVC > AR analysis (McCall 1965)[2] include studies that distinguish the classes of claimants of bankruptcies within publicly traded firms, such as bondholders, bank lenders, and equity holders (Bulow and Shoven 1978).

How might unions affect firms' decision to shutdown a facility? Extant theory holds that unions care about employment of existing members as well as their wages, and relevant evidence shows that unions give considerable weight to the employment goal. Thus while unions have incentives to drive up the wages and benefits of employees at the expense of potential new workers, they should seek to protect the employment of current members as long as those members earn a premium over their next best alternative employment. The rational union will not raise wages to the point where the firm is sufficiently unprofitable to go out-of-business (Kuhn 1986) and should grant wage concessions to keep the firm afloat as long as the post-concession compensation exceeds the next best alternative for the workers.

There are two exceptions to the general expectation that unions will not drive firms out of business. First, unions might have limited information about normal profits and might make a faulty assessment of the firms' financial situation. This is most likely when the firm alleges that it cannot afford the unions' demands or a strike but refuses to open its books for the union to examine. Under U.S. labor law, a firm that claims that it cannot grant a wage increase or other benefit for reasons of "inability to pay" must show its books to the union. But most firms use circumlocutions to claim inability to pay to

avoid the legal obligation to open their books. This may be rational, since if they open the books in bad times and not in good times or refuse to open the books in good times, unions will know when profits are high, and may make higher union wage demands in good times. The union, in turn, will distrust claims of inability to pay that firms refuse to verify by opening their books. Second, unions might be willing to push one establishment or firm out of business to maintain a "standard rate" of pay within an industry. In Sweden, the conscious policy of the main union federation, the LO, was to make low-productivity employers pay higher wages, freeing those workers to move to more productive sectors or firms. In some U.S. industries, unions and employers bargain industry wide or follow "pattern bargaining" that has similar outcomes, with all firms paying comparable wages. But, in general, U.S. collective bargaining occurs at the establishment or enterprise level, which allows local parties to tailor their wage settlements to the risk of a potential shutdown or major job loss. Whether these "exceptions" are important enough to produce a different survival rate for unionized establishments or firms than for otherwise identical nonunion establishments or firms is an empirical question that has not, to our knowledge, been explored in the U.S.

In the long run, firm or establishment survival depends on whether total revenues exceed total costs (fixed as well as variable cost). Here too, there are competing considerations. On the one hand, union-induced reductions in likely future profits can be expected to deter research and development expenditures and other forms of investment, making organized plants less technologically up-to-date (Hirsch 1992), and putting them at greater risk of going out-of-business as market conditions change. On the other hand, union organizers may limit their organizational campaigns to firms that are likely to be able to pay union wages and benefits -- those with sufficient economic rent to raise pay without

increasing the probability of long-run business failure. Moreover, in some industries, by sharing rents with unionized workers, a firm may reduce the probability that competitors enter its industry, as new entrants may have to pay higher wages to attract labor and face the risk that union concessions will allow the incumbent firm to lower costs and thus beat them in competition. The endgame bargaining model of Lawrence and Lawrence (1985) offers another complication. This model posits that unions negotiate greater increases in wages when they feel a plant or firm is likely to fail, gaining quasi-rents for workers while increasing the pressure on the firm to shutdown. A positive correlation between union wages and the probability of going-out-of-business in this case would not necessarily reflect the causal effect of unionism on firm survival, but rather the converse effect of likely survival on union wage premia. By contrast, in rent-sharing models, unions lower wages to try to save jobs when the firm is in trouble. A rational union, whose members earn above-market wages and benefits should give concessions up to the point where the firm chooses just to stay in business.[3] In sum, the question of whether unions reduce the solvency of enterprises is an empirical matter which cannot be answered without directly examining the relation between unionism and enterprise survival.

II. ANALYSIS OF COMPUSTAT DATA FILES

The ideal way to estimate whether unionization affects the survival of establishments or firms would be to randomly assign union status to otherwise identical business units and to observe their survival over time. Lacking such an experiment, we develop a data file using COMPUSTAT to determine the difference between union and nonunion survival rates, and use multivariate statistics to control for factors likely to affect enterprise survival. We take union status as given to the firm by events years earlier. This is a reasonable assumption since unions have organized relatively few new

workplaces in recent years. The base for our data are the 1983-1990 Compustat files on publicly-traded firms and their business lines that were traded on the New York, American or regional stock exchanges. These data sets contain annual information on almost 1,300 firms and over 6,250 business lines. We extracted the sample of firms or business lines from these files in industries with 30 percent or more of production workers were unionized, which covers industries which are moderately or heavily organized (Hirsch 1991). This gave us information on firms and business lines in the manufacturing and transportation sectors where most unionized firms are located.

For the firms in our sample we have information on bankruptcy or liquidation for 1983 to 1990. We define a firm death as whether a firm filed for bankruptcy or was liquidated. This data is listed for firms in the COMPUSTAT data. However, given bankruptcy laws, many of the firms continued to operate under receivership. Similarly, liquidation at times means change of ownership rather than closure and elimination of jobs. By our definition, about 9 percent of the firms in our sample went out-of-business from 1983 to 1990.

For business lines, we know if the line of business was dropped by the parent company during the 1980s through 1990. It is possible that the line was dropped because it was spun off and sold to another enterprise, or reorganized within the company with some other business line, rather than because it was closed. We called each firm to determine if the line of business was dropped due to severe financial difficulty or to some other cause. We identify a business line as closed only if it was eliminated from the company due to the financial distress it was causing the parent company. Further, we checked to see if any of the firms or lines of business closed in one part of the country reopened in

7

another, and found that none of the organizations in our sample did this. By our definition, about 19 percent of the business lines were dropped from 1983 to 1990.

We obtained information on union status for our firms and business lines from several sources. For solvent firms in 1990 we used percent of workers who were unionized from Barry Hirsch's mail and telephone survey of Compustat companies in 1987 (Hirsch 1991). For firms that became insolvent during this period, we asked competitors if they knew whether a given firm was organized, and the percentage of workers in the insolvent firm who were organized.[4] To identify unionized business lines, we surveyed firms that dropped business lines and those that did not, asking them the rate of unionization of workers in the relevant business line. We obtained a 40 percent response rate, which, while not high, exceeds the 25 percent response rate obtained by Hirsch in his analysis of unionization rates of Compustat firms.

SAMPLES

The final samples of firms and business lines for which we obtained union status are a subset of the initial Compustat files. For firms, we identified the status of 319 observations, of whom 252 had not filed for bankruptcy or been liquidated, and of whom 67 had filed for bankruptcy or liquidation from 1983 through 1990. For our business-line sample, we had 314 observations, which consisted of 255 living lines and 59 terminated lines of business. While each of the samples have data missing, together they provide us with data on 633 business units, of whom 126 became insolvent. Moreover, they cover a large number of workers: the 319 firms had approximately 7,268,000 workers; and the 173 business lines that report employment had almost 479,000 workers.

Because we have responses for only a portion of the population of interest, we examined whether our sample of firms was representative of all firms and business lines in the Compustat file. We compared the characteristics of the insolvent firms from whom we obtained information with the characteristics of other insolvent firms. We found no statistically significant differences in size or other major financial characteristics, such as profitability. Using the same approach for business lines, we found no significant difference in financial characteristics between our sample and the population of insolvent business lines, though dropped business lines in our sample were somewhat larger than the other dropped lines in the data files. This suggests that our dropped business line sample may be over represented with unionized lines since larger organizations tend to be more heavily organized.

RESULTS

Table 1 gives the union status and means for other key variables for the three years prior to closure for insolvent firms or business lines in our data set by the solvency status of the organization. Because solvent and insolvent firms and business lines differ in important ways, such as size or time in business, that are likely to be correlated with unionism, these statistics should be viewed simply as descriptive of our sample and not as providing insight into the effects of unionism on solvency. In any case, they give a different picture depending on whether we look at presence of a union or percentage of workers covered, and at firms or business lines. Among firms, 34.3 percent of insolvent firms had some union present compared to 75.6 percent of solvent firms; by contrast, the percentage of workers unionized is virtually the same in solvent and insolvent firms. Among lines of business, 51 percent of continuing lines had a union present, and approximately the same percentage of terminated lines had a

9

union present; similarly, the percentage of workers unionized among the living lines was 30.1 percent

compared to 31.6 percent among the terminated lines of business.

To determine the effect of unionism on firm solvency, we estimated a probit equation for the

0-1 going out-of-business variable as a function of a 0-1 unionization variable and our percentage

unionized variables and covariates for the 1983 through 1990 time period. To maintain as large a

sample as possible when Compustat lacked information on a covariate, we substituted the means for

missing values and added a dummy variable that took the value 1 when the mean value was put in and 0

otherwise (Little and Rubin 1987). Finally, to maximize the number of observations in our statistical

analysis, we pooled our firm and business-line data into a single sample, and included a dummy variable

for whether the observation refers to a firm or business line.[5]

Table 2 gives our results. Panel A presents probit equations of the estimated effect of unionism

on business closure when the key independent variables are both a 0-1 unionization dummy and the

percent unionization of the workforce in the firm. Column 1 gives the coefficient on the presence of a

union and percent union from computations that only controls for whether the observation is for firm or

line of business.[6] The coefficient on the presence of a union is significantly negative, indicating that

firms/business lines with some union presence are less likely to fold than others, but the value for

percent union is positive and significant, suggesting that as the union presence grows, firms are more

likely to go out of business. Column 2 adds the age of the firm and log sales and a set of covariates for

industry characteristics designed to reflect characteristics of the market in which the firms/business lines

operate: one-digit industry dummies, and two-digit industry concentration ratios, three-digit import

penetration ratios, the two-digit industry bankruptcy rate (U.S. Census of Manufactures 1987;

10

NBER 1991; Statistical Abstract, 1980-90). These variables are not specific to the enterprise and thus

control for the potential location of unionized establishments in sectors of the economy with greater or

lesser likelihood of enterprise or business-line closure. The results continue to show that union presence

has a negative effect and that percent organized has a positive effect, but the coefficient on union

presence drops substantially. The variable that reduces the union presence effect is the size of the

firm/business line, measured by the log of its sales.[7] In column 3 we added another industry level

variable, the extent of union wage concessions in the sector during the late 1980s as estimated by Bell

(1989). If the rent-sharing model is correct, and unions maintain firms by giving concessions when they

are in trouble, the addition of this variable ought to raise the coefficients on percentage union. There is,

however, no support for this relationship in these data; the concession variable has no relation to

insolvency and does not affect the unionization coefficient. In column 4 of the Table we estimate the

effect of unionization with categories of union density similar to those specified by Barry Hirsch (1991)

relative to no unionization. In this case low unionization is defined as between 1 percent and 30 percent,

medium is 31 percent to 59 percent, and high is 60 and above. Our results show that low and medium

levels of unionization are associated with no greater levels of firm insolvency, but high levels are

associated with greater levels of enterprise termination relative to no union presence.[8]

Given that union presence is associated with firms having a smaller chances of closure, but that

the percentage union raises shutdown chances, the effect of unionism on closure depends on the level of

unionization of the organization. Panel B presents the closure rates for comparable firms by union

presence and differing levels of percent union in the business unit. In column one we present the

predicted closure rates using the unionization variables and whether the observation was a firm or line of

business. In column two we present the predicted closure rates for firms with the mean independent variable characteristics in our sample and no unionization. In the following row we show predicted closure rate for firms with the mean characteristics in our sample that had a union and a 10 percent unionization rate. The likelihood of firm closure drops from 19 percent when no union is present, to 8 percent when there is union but only ten percent of the workforce is organized. The closure rate for unionized firms goes above the nonunion rate at 60 percent of the workforce, which is over twice the average unionization rate of the organizations in our sample. The estimates in column 3 show the same predicted closure rates for comparable levels of union status on the solvency rate with the more fully specified model. In column 4 we show estimates of closure in the model from column 4 of panel A. These results show that low and medium rates of unionization reduce closure rates, but that high rates of unionization increase enterprise termination relative to no unionization. Overall, however, at the average rates of unionization in our sample, unions have no net effect on closure.

Is it possible that our estimated negligible effect of unionism on business survival is due to the fact that, for unknown reasons, unions do not reduce profits in our sample? If this were the case, we might attribute the result to some peculiarity of our sample and would be unwilling to generalize on the basis of this finding. To see if unionization had the negative effect on profits in our data as in other studies, we regressed the ratio of net income/assets three years prior to firm or business line closure on unionization, log capital expenditures to sales, log R&D, and other covariates used in estimating profit equations (Hirsch 1991; Voos and Mishel 1986). The results in column 1 of Table 3 show that in our data set the 0/1 unionization of a firm reduces profits by about 0.03 relative to an average profit level of about 0.10, but it is imprecisely estimated. In column 2 of Table 3 we specify a model consistent with

the ones estimated in Table 2 on insolvency. For this estimation, we use unionization and the percent unionized with our set of covariates. We find that union presence is negatively associated with profits, but percent unionization is positive but small and imprecisely estimated. The results in column 3 show a comparable adverse effect of the level of unionization on profits when we use a breakdown by low, medium, and high levels of unionization. Thus, our finding that unions have on average a negligible effects on firm or business line closure is consistent with an adverse union effect on profits.

Note finally that even the insolvent firms in our sample have been solvent for a long time. It is possible that unionism causes insolvency early in a firm's life and that the absence of a union effect in our analysis is because the union firms are those that survived paying higher union compensation. Then, one might interpret the results as implying that there is no greater chance of insolvency among a set of long-lived surviving organizations. In section V, we present some evidence on plant closures from Federal Mediation and Conciliation Service that shows that newly unionized firms do not appear to close any more frequently than other firms, which argues against a big initial unionization effect.

III. ANALYSIS OF CPS DISPLACED WORKERS

Data on workers who lost their job due to the closure of an enterprise offers an alternative way to see if unionization is associated with insolvency. In this case the ideal data set would be a longitudinal file on the employment of workers by union status, from which we could calculate the proportion of union and nonunion workers who lose their job due to plant or firm closure, controlling for all other relevant factors, such as plant or firm size. If unionized workers were disproportionately represented among those displaced by plant closure, we would infer that unions increased insolvency rates.

While available data do not provide the ideal longitudinal file for large numbers of workers, the

Current Population Survey's Displaced Worker supplements do offer a possible way to estimate the

effect of unions on plant closure. The CPS displaced worker supplements for February 1994 and

February 1996, in particular, ask adults (aged 20 or over) whether in the past three calendar years they

lost or left a job because a plant or company closed or moved or for a variety of other reasons

(insufficient work, position or shift abolished, seasonal job completed)[9] and also ask workers whether

they were a member of a union or an employee association similar to a union on that job. We can

determine from the outgoing rotation groups of the CPS the union status of the general work population

from 1991 to 1995, including that of persons who reported that they were not displaced in the

February samples. These data allow us to assess whether or not unionism contributes to the probability

of a job loss due to plant closure.[10]

Table 4 records the sample sizes, unionization rate and other major variables for workers in our

displaced worker files and in our samples of the working population and of the non-displaced. The

samples in all cases are limited to employees in the private sector. In the February displaced workers'

surveys we have 8,796 workers who lost their job, and 2,321 workers who were displaced because of

plant closing and who reported union status. Among workers displaced for reasons of plant closure, the

rate of unionization is 12.0 percent; among all displaced workers the unionization rate is slightly higher

at 12.3 percent. The nonagricultural private sector workers aged 20 to 64 from the outgoing rotation

groups for 1991 to 1995 give us a massive sample of 749,555 observations, which provides us with a

very precise estimate of unionization in the private non-agricultral work force as a whole of 11.7

percent -- the population from which displaced workers are drawn.[11]   Thus a slightly larger proportion

of displaced workers held union jobs than of all workers. Taking the unionization rate for the

comparison groups as the population rate, the t-statistic testing for whether the unionization rate for

workers displaced for reasons of plant closure differs from the population rate, is an insignificant 0.43;

while the t-statistic between the unionization rate for all displaced workers and the "population" rate is

larger (due to the larger sample size producing a smaller standard error) at 1.50.[12] Simple comparison

of means thus suggests that unionism raise the probability of displacement for reasons of plant closure

slightly but raises displacement for other reasons by a modestly larger amount that is still insignificantly

different from zero.

As with our enterprise data sets, however, displaced workers differ from other workers in ways

likely to be correlated with unionization, suggesting the virtue of a multi-variate analysis to compare

persons with similar demographic and economic characteristics. As Table 4 shows, workers displaced

for reasons of plant closure have lower schooling, and are more likely to be in manufacturing and in blue

collar jobs than others. Most of these differences suggest that comparing mean unionization rates

between displaced and other workers in the CPS files overstates the potential effect of unions. One

way to control for these differences is to estimate the effect of worker characteristics on the probability

of unionization in the huge outgoing rotation sample and then to use the resultant equation to predict the

proportion of workers who should be unionized in the displaced worker sample. If unionization

increased displacement among otherwise similar workers, the actual proportion unionized in the

displaced sample should exceed the proportion predicted from the overall population. Using a linear

regression model, we conducted such an analysis, and present the results in table 5. The regression is

based on a smaller sample than the means reported in table 4 because we have deleted observations

that do not have information on all variables. We calculated the actual proportion unionized for the same sample. The results are clear. The proportion of workers who are unionized among those displaced for reasons of plant closure or for any reason is virtually identical to the proportion predicted on the basis of unionization among persons with the characteristics of the displaced sample.

While informative, this analysis does not give us the effect of unionization on the probability of being displaced comparable to our firm and business line based estimates. To estimate the effect of unionization on displacement we use a multi-variate probit analysis in which we relate displacement for reasons of plant closure to union membership and to various employee characteristics. For this analysis we must combine the displaced worker sample with a "control" sample of workers who have not been displaced and for whom we have union status, and use this pooled sample for analysis.

The huge out-going rotation group sample is a natural starting point for giving us a control sample, but it has two difficulties. First, its very size creates a problem since pooling it with the displaced workers creates an unbalanced sample with relatively few displaced workers. This problem can be dealt with by weighting the observations in the out-going rotation sample so that the pooled sample contains the right proportion of displaced and non-displaced workers. In the two displaced worker surveys, 13.8 percent said that they had been displaced in the preceding three years, which gives a ratio of displaced to nondisplaced workers of 0.160. To obtain a comparable ratio of displaced workers to other workers in our pooled displaced workers-outgoing rotation group sample, we give a weight of .073 to persons in the ORG and a weight of 1 to persons from the displaced worker survey.[13] We then estimated the effect of unionism on the probability that a worker would be displaced using a weighted probit model.

Columns 1 and 2 of table 6 shows the results of this analysis. The first row gives the coefficient of the probit on unionism for being displaced because of plant closure, in which we have included the basic demographic characteristics of workers (and a dummy for the year of the observation), and industry and occupation dummy variables. It also includes the coefficients on several other independent variables. The coefficient on earnings is negative in all cases; the coefficients on the schooling dummies show that education generally reduces the probability of displacement, though the effects are not monotonic. In column 1, where the dependent variable is the probability of displacement due to plant closing, the coefficient on unionism is negative insignificant. In column 2, where the dependent variable is any displacement, the coefficient is also insignificant negative.

But the second problem is that not all persons in the outgoing rotation group for 1991-95 are non displaced workers. According to the displaced worker survey about 14 percent were displaced in the past three or so years. Thus there is measurement error in the dependent variable in the analyzes in columns 1 and 2. We know for certain who is displaced, but some persons who we treated as non-displaced will in fact have been displaced. This will bias the coefficients in the probits toward zero. As the estimated effect of unionism in columns 1 and 2 is negative, this bias cannot readily have caused our result. Still, if we can find a group of workers who we know for certain were not displaced over the period, we can do better. The group that we know were not displaced are workers who responded negatively to the displacement question on the February displaced workers survey. If the displaced survey had asked them about the characteristics of the job that they hold over the past three years, we could simply use that information. But it did not do so. To find out if these workers held a union or nonunion job and other relevant characteristics of their job, we need another source of information.

17

That source is the outgoing rotation groups of the CPS. By the design of the CPS, workers asked about displacement survey were in the outgoing group in the months of February, March, April and May of 1994 and 1996. We matched persons on the displaced workers survey with those in the relevant outgoing rotation group for the February 1994 and 1996 surveys and then from the NBER outgoing files for the remaining months. We used household ID, line number, sex, and race, and age (allowing workers to gain one year due to their having birthdates in March, April, or May). Our rate of matching was 70.2 percent for the 1996 displaced worker survey and 74.1 percent for the 1994 displaced worker survey, giving us a sample of 59018 matched workers in 1996 and 40294 workers in 1994. As a substantial number of these workers did not specify that they worked in the private sector or had missing information on other variables, the samples we analyze are considerably smaller but still sizeable (see table 6, columns 5 and 6).

There is one final hurdle, however, before we can use the February samples to estimate the effect of unionization on plant closure. The job information on the outgoing rotation group relates to the current job, whereas the information on the displaced worker survey refers to the last job from which the worker was displaced in the previous three years. Workers who changed jobs for reasons other than displacement over the period will be providing information on their new job rather than on a job held over the past years. One way to address this problem is to eliminate from the sample all workers who reported that they changed jobs in the past month: they are not reporting on the job held during most of the period of interest. Another way is to limit the sample to workers with specified tenure: those who have tenure of at least 3 years are reporting about the job they held over the entire period

18

covered by the displacement question; those with tenure of at least 1.5 years are reporting about the

job they held from the midpoint of the three year period covered by the displacement question.

The February 1996 survey contains a tenure question that allows us to eliminate from our

sample workers who changed jobs in the relevant months or whose tenure status implies that the job on

which they provide data is not the one they held during the relevant three year period. But the February

1994 survey does not contain such a question. Hence in columns 3 and 4 of table 6, we have limited

our analysis to the February 1996 survey data. Here we report the coefficient on union membership

and other covariates in an analysis that restricts the "control" group to workers with at least three years

of tenure. Because young workers have little tenure, this calculation removes a sizeable number of

younger persons, which we adjust for by estimating a weighted probit that gives greater weight to the

younger workers.[14] Note also that we have included a tenure on the previous job as an additional

independent variable: the displaced worker survey asks specifically about tenure on the job of

displacement; for the nondisplaced we use tenure on the current job minus 1.5 years. The negative

coefficient suggests that displacement is greater in plants with low tenure, presumably because they are

newer start-ups, as opposed to older plants where workers can obtain greater tenure. The results are

not sensitive to these or other modest changes in specification. The coefficient on unionization in the

column 3 analysis of plant closure is positive but small; it implies a difference in the probability of plant

closure of .005 percentage points) and not significant. The coefficient in the column 4 analysis of

displacement for any reason is modestly larger but still insignificant; it implies a union effect on the

probability of any displacement of .011 percentage points.

Finally, to use the February 1994 data set in the analysis as well, we estimated the probit equation for being displaced in the full February 1994 and 1996 samples without any restriction for tenure (about which we have no information in the 1994 survey). While this adds measurement error to our measures of the job held by nondisplaced persons, the magnitude of error in the key union membership variable may not be that large. Nonunion workers who change jobs are very likely to go to a nonunion job, while a large proportion of union workers who change jobs go to a union job, so that information on the union status of the current job held provides some indication of union status on the job held during the three year period covered by the displacement survey.[15] In any case, the results in columns 5 and 6 of table 6 confirm our general conclusion that unionism has little or no effect on plant closure; the coefficients on union status on plant closure are positive but not significantly different from zero while those for any form of displacement are negative but not significantly different from zero.

The bottom line of all of these CPS-based calculations is that they tell a story consistent with our analyzes of firms and business lines: in all of the various samples and analyzes the probability a worker will be displaced for reasons of plant closure (or for any reason) is not substantially affected by a union setting. To be sure, the two sets of analyses differ in various ways, so that we should not expect identical results. The CPS does not provide information on the size of the establishment or firm, which we saw affected the rate of firm/business line closure. Since union establishments tend to be larger than nonunion establishments, and since larger establishments are less likely to go out of business, our CPS results potentially understate any potential adverse effect of unions on the probability that a worker would lose their job due to plant closure. But there is a countervailing factor if we are concerned with the effect of unionization on the probability that a plant or firm will close, rather than on

the chance that a worker will be displaced because of plant closure. Any given closure or form of group displacement will, after all, produce a larger number of union job-losers than nonunion job-losers if union workplaces are larger. Thus, even if union and nonunion establishments had the same probability of closure, we would expect higher rates of displacement among union workers than among nonunion workers. That we did not find such a result strengthens our Compustat-based conclusion that there is little or no difference in the probability of firm or business line shutdown by union status.

IV. ADDITIONAL EVIDENCE

We have checked our finding of that unionism has on average no discernible effect on business survival with two additional types of data: industry-level data on plant closure; and data on the outcomes of National Labor Relations Board elections won by unions and of labor/management disputes that were taken to the Federal Mediation and Conciliation Service. First, we compared plant death rates for 37 two-digit industries in 1987 from the Census of Manufacturing LRD file (Davis and Haltiwanger 1992). We matched these rates with percent organized in an industry and other industry level characteristics. We estimated a set of regressions models to see if we could find one in which percent organized was statistically significant. We could not. Our industry result is consistent with results by Dunne and MacPherson for the late 1970s and early 1980s which also find no significant impact of percent unionization on overall plant deaths at an industry and plant level (Dunne and MacPherson 1994).[16]

Second, we obtained information on the rate of plant closure in unionized settings from the files of the Federal Mediation and Conciliation Service. The FMCS tabulates data on the outcomes of first contract bargaining in workplaces that the NLRB has certified as having voted for unionization, and on

outcomes in dispute cases exclusive of certification elections. The data are derived from the Initial

Report and Final Report completed by field mediators. The FMCS distinguishes between several

potential outcomes in both cases, ranging from agreement between the parties to various administrative

actions (referred to other government agencies) to plant or operation closing, which the FMCS defines

as consisting of "cases where the plant or operation is planning to close in the near future, and no further

bargaining is to occur; or the plant or operation has already closed, and no bargaining will occur; or the

plant or operation is pending a transfer of ownership, and bargaining has ceased and is not anticipated

to resume for an extended period of time". By inclusion of the transfer category, the FMCS data

overstates the extent of closure in these units by our earlier definitions. The virtue of these data is that

they provide some information on the effect of unionization on firm insolvency right after the initial

unionization.

Table 7 records the outcome data from the FMCS reports for fiscal year 1986 through fiscal

year 1993. Columns 1 and 2 show the outcomes in the cases closed by the FMCS for new NLRB

election certifications. Columns 3 and 4 present the outcomes in dispute cases, excluding certification

cases, closed by the FMCS. Since the issue in union organizing campaigns is not whether unionization

on average reduces firm or establishment survival but whether new unionization causes a plant to close

the FMCS data on newly certified NLRB elections is of particular importance. How frequent is it for

newly unionized workplaces to close?

The information in column 1 shows that just 341 of nearly 11,000 certification elections, or

3.2 percent, resulted in a plant closure. Lacking a comparison group of "otherwise identical"

workplaces that did not choose unionization, we cannot readily determine the effects of unionism per se

22

on closure. But, the 3.2 percent magnitude has some meaning in itself. To take one extreme, assume that none of the newly organized worksites would have closed absent the union drive. Then, we have an upper bound estimate of the risk that newly organized workers face of plant closure: it is 3.2 percent. More realistically, we can contrast the 3.2 percent with estimates of business failures or plant failures. Dun & Bradstreet figures show business failure rates that vary cyclically, averaging 1.0 percent in the period 1985 to 1992, but are somewhat higher in manufacturing, and in some other areas of relatively intense unionization. Since these figures relate to business failure rather than plant failure they understate the failure rate of facilities. Estimates of plant closure rates from the Annual Survey of Manufactures show that the annual plant closure rate between 1974 and 1978 was approximately 3.4 percent (Dunne and Roberts 1990). If we take these measure as crude indicators of the average rate of plant closure absent new unionization, there is virtually no union effect on closure of new plants.[17]

Column 3 of the table shows that 3,009 plants were closed out of 168,945 dispute cases before the FMCS -- or 1.8 percent. Again, lacking an appropriate control group, we can only approximate the extent to which this closure rate might be attributable to unionization. But, compared to the business or plant failure rates given above, it is hard to argue that there is a notable difference in the rate of closure of plants whose disputes reach the attention of the FMCS and the average establishment. In sum, while the FMCS evidence is limited, the magnitude of closures it reports in unionized settings is consistent with unions on average having a slight insignificant effect on plant closure, as in our Compustat and CPS data.

V. CONCLUSION

Empirical analyses of firm failure and plant closure have not addressed the role of unions in the survival of firms or plants, in part because of a lack of adequate data, and in part because the issue lies at the border of labor economics, industrial relations, and industrial organization. The economic analysis of a union as a rational optimizer concerned with members' employment and wages suggests that unions will not drive a firm out of business as long as the firm can pay union members' wages, benefits, or working conditions above their next best alternative, although it may reduce employment of new workers. Our multivariate estimates support the view that unions do not on average drive firms or business lines out of business or produce high displacement rates for unionized workers. In our calculations, at the mean of our samples the probability that union firms, or business lines suffer plant closures or insolvency is not discernibly different from that of nonunion entities, although for very high levels of unionization the impact was positive in our firm/business line analysis. Our results with the CPS are consistent, with the proportion of union members among those displaced almost perfectly predicted by the characteristics of the displaced and with unionism obtaining insignificant coefficients in models of plant closure that use various "control groups" in the CPS. In addition, FMCS data show that even upper bound estimates of the union effect on the viability of newly organized plants are modest. Unions reduce profits but they do not "destroy the goose that lays the golden egg". They would be foolish to do so, and while they may make mistakes in collective bargaining (just as management may), they are not foolish to the extent of forcing organized firms out of business.

24

REFERENCES

Becker, Brian E., and Craig A. Olson. 1992. "Unions and Firm Profits." <u>Industrial Relations</u>, Vol. 31, No. 3 (Fall), pp. 395-432.

Bell, Linda. 1989. "Union Concessions in the 1980s." Federal Reserve Bank of New York, <u>Quarterly Review</u>, (Summer), pp. 44-58.

Blanchflower, David G., and Andrew J. Oswald. 1989. "Unionization and Plant Closures." Mimeographed, University of Survey and Centre for Labour Economics, London School of Economics, (February).

Bronars, Stephen G., and Donald R. Deere. 1990. "Union Representation Elections and Firm Profitability." <u>Industrial Relations</u>, Vol. 29 (Winter), pp. 15-37.

Bulow, J.I., and J.B. Shoven. 1978. "The Bankruptcy Decision." <u>Bell Journal of Economics</u>, Vol. 9, No. 2 (Autumn), pp. 437-456.

Clark, Kim B. 1984. "Unionization and Firm Performance: The Impact on Profits, Growth, and Productivity." <u>American Economic Review</u>, Vol. 74 (December), pp. 893-919.

Connolly, Robert A., Barry T. Hirsch, and Mark Hirschey. 1986. "Union Rent Seeking, Intangible Capital, and Market Value of the Firm." <u>Review of Economics and Statistics</u>, Vol. 68 (November), pp. 567-77.

Davis, Steve J., and John Haltiwanger. 1992. "Gross Job Creation, Gross Job Destruction and Employment Reallocation." <u>Quarterly Journal of Economics</u>, Vol. 107 (August), pp. 819-863.

Domowitz, Ian, R. Glenn Hubbard, and Bruce C. Petersen. 1986. "The Intertemporal Stability of the

      Concentration-Margins Relationship." <u>Journal of Industrial Economics</u>, Vol. 35 (September),

      pp. 13-34.

Dunne, Timothy, and David A. McPherson. 1994. "Unionism and Gross Employment Flows."

      <u>Southern Economic Journal</u>, Vol. 60 (January), pp. 727-38.

Farber, Henry S. 1986. "The Analysis of Union Behavior." In Orley Ashenfelter and

      Richard Layard, eds., <u>Handbook of Labor Economics</u>. Vol. 2, Amsterdam/London: Elsevier

      Science Publications Co., pp. 1039-89.

Freeman, Richard B. 1983. "Unionism, Price-Cost Margins, and the Return to Capital." National

      Bureau of Economic Research Working Paper No. 1164, (July).

_____, and Morris M. Kleiner. 1990. "The Impact of New Unionization on Wages and Working

      Conditions." <u>Journal of Labor Economics</u>, (January), pp. S-8-S-25.

_____, and Edward Lazear. 1995. "An Economic Analysis of Works Councils, in <u>Works Councils</u>,

      edited by Joel Rogers and Wolgang Streek, University of Chicago Press and National Bureau

      of Economic Research, Chicago, pp. 27-52.

_____, and James L. Medoff. 1984. <u>What Do Unions Do?</u> New York: Basic Books.

Gallup Poll. 1988. "Survey of Public Knowledge and Opinion Concerning the Labor Movement."

Hirsch, Barry T. 1992. "Firm Investment Behavior and Collective Bargaining Strategy." <u>Industrial</u>

      <u>Relations</u>, Vol. 31, No. 1 (Winter), pp. 95-121.

_____. 1991. <u>Labor Unions and Economic Performance of Firms</u>. Kalamazoo, MI: Upjohn Institute.

Hirsch, Barry T., and Robert A. Connolly. 1987. "Do Unions Capture Monopoly Profits?" <u>Industrial and Labor Relations Review</u>, Vol. 41 (October), pp. 118-36.

Karier, Thomas. 1985. "Unions and Monopoly Profits." <u>Review of Economics and Statistics</u>, Vol. 67 (February), pp. 34-42.

Kleiner, Morris. 1984. "Public Policy Implications of Financial Information Requirements Under the National Labor Relations Act." <u>Journal of Accounting and Public Policy</u>, Vol. 3, No. 4 (Winter), pp. 253-57.

Kuhn, Peter. 1986. "Wages, Effort, and Incentive Compatibility in Life-Cycle Employment Contracts." <u>Journal of Labor Economics</u>, Vol. 4, No. 1 (January), pp. 28-49.

Lawrence, Colin, and Robert Lawrence. 1985. "Manufacturing Wage Dispersion: An End Game Interpretation." <u>Brookings Papers on Economic Activity</u>, No. 1, pp. 47-106.

Leonard, Jonathan. 1992. "Unions and Employment Growth" <u>Industrial Relations</u>, Vol. 31, No. 1 (Winter), pp. 80-94.

Little, Roderick, and Donald Rubin. 1987. <u>Statistical Analysis with Missing Data</u>. New York: John Wiley & Sons.

McCall, J.J. 1965. "The Economics of Information and Optimal Stopping Rules." <u>The Journal of Business</u>, (July), pp. 300-317.

NBER Trade Data Files. 1991. Cambridge, Massachusetts.

<u>N.L.R.B. v. Truitt Manufacturing Co.</u> 1956. Supreme Court, 351 U.S. 149, 76 S.Ct. 753.

Pencavel, John. 1984. "The Tradeoff Between Wages and Employment in Trade Union Objectives." <u>Quarterly Journal of Economics</u>, 99(2), pp. 215-31.

Perrachi, Franco, and Finis Welch. 1995. "How Representative are CPS Matched Samples?: Evidence from the Current Population Survey." <u>Journal of Econometrics</u>, Vol. 68, pp. 153-179.

Ruback, Richard S., and Martin B. Zimmerman. 1984. "Unionization and Profitability: Evidence from the Capital Market." <u>Journal of Political Economy</u>, Vol. 92 (December), pp. 1134-57.

Salinger, Michael A. 1984. "Tobin's q, Unionization, and the Concentration-Profits Relationship." <u>Rand Journal of Economics</u>, Vol. 15 (Summer), pp. 159-70.

Salter, W.E.G. 1966. <u>Productivity and Technical Change</u>. Cambridge, U.K.: Cambridge Press.

<u>Textile Workers Union v. Darlington Mfg. Co.</u> 1965. Supreme Court, 380 U.S. 263.

U.S. Census of Manufactures. 1987. U.S. Bureau of the Census.

<u>U.S. Statistical Abstract</u>. 1980-1990. U.S. Department of Commerce**,** Washington, D.C.

Voos, Paula B., and Lawrence R. Mishel. 1986. "The Union Impact on Profits: Evidence from Industry Price-Cost Margin Data." <u>Journal of Labor Economics</u>, Vol. 4 (January), pp. 105-33.

<u>Wall Street Journal</u>. 1992. July 28, p. A-1.

White, Rolf B., ed. 1986. <u>Great Business Quotations</u>. Secaucus, N.J.: Lyle Stuart Inc., p. 52.

Table 1. Mean Characteristics of Existing and Insolvent Firms and Business Lines Three Years Before Insolvency.

	*FIRMS**		*BUSINESS LINES**	
	Existing	*Insolvent*	*Existing*	*Insolvent*
Number of observations	252	67	255	59
Age	67.0	34.0	37.50	33.12
Sales (in millions)	3,709.00	380.66	875.40	467.90
R&D (in millions)	123.90	67.25	39.45	32.15
Assets (in millions)	3,113.00	223.78	432.58	249.78
Net income/assets	.10	-.25	.11	.07
Capital expenditure / sales	.93	8.85	.22	4.85
Profits / Assets	---	---	.10	.004
Tobin's Q (Equity / Assets)	.46	.18	---	---
Employment	28,522	2,354	5,803	2,786
Percent of firms with any union present	74.6	34.3	51.0	50.8
Percent of unionized workers in organization	24.0	23.9	30.1	31.6

Source: Source of business line and firm financial data was COMPUSTAT I and II files. Unionization information on existing firms was obtained from a survey conducted by Barry Hirsch. Union information on business lines and insolvent firms was obtained through a telephone survey.

*The percentage of firms or business lines with any union present is based on calculations that give a firm with a union in any facility a 1 and a firm with no union in any facility a 0.

Table 2. Probit Estimates of Union Effects on Enterprise or Business Line Insolvency (standard errors in parentheses).

| | PANEL A | | | |
| | Probit Coefficients and Standard Errors | | | |
	Column 1*	Column 2**	Column 3**	Column 4**
Union	-1.60	-1.01	-1.01	
	(.23)	(.34)	(.34)	
Percent Union	.020	.021	.021	
	(.004)	(.005)	(.005)	
Low				-.39
				(.30)
Medium				-.19
				(.26)
High				.61
				(.21)
Age	---	-.002	-.002	-.002
		(.003)	(.003)	(.003)
Log Sales	---	-.42	-.42	-.43
		(.05)	(.05)	(.05)
Concessions	---	---	.001	.001
			(.003)	(.003)
Constant	-.74	-.56	-.65	-.67
	(.10)	(.61)	(.65)	(.64)
Log Likelihood	-287.14	-184.89	-184.81	-187.41

| | PANEL B | | | |
| | Closure Rates for Comparable Firms by Percent Union | | | |
	Estimated from the Model in Panel A			
No Union	29%	19 %	19%	19%
10% Low Unionization Rate	3%	8 %	8%	13%
30% Medium Unionization Rate	6%	13%	13%	16%
60% High Unionization Rate	18%	23%	23%	30%

Notes:
  *With dummy variables for whether the observation was a firm or line of business.
**Estimated with controls for 1-digit industry dummies, 2-digit industry bankruptcy rate, 2-digit
  concentration ratio, 2-digit industry growth rate of sales, 3-digit import penetration rate, and missing values.

Table 3.   Union Impacts on Net Income/Assets (standard errors in parentheses).

	1*	*2**	*3**
Age	.0006	.0005	.0006
	(.0005)	(.0005)	(.0005)
Log (Capital Expenditures / Sales)	.02	.02	.02
	(.01)	(.01)	(.01)
Log R&D	-.001	-.001	-.001
	(.006)	(.006)	(.006)
Union Presence	-.03	-.09	---
	(.03)	(.05)	
Percent Union		.001	
		(.001)	
Low Unionization Rate	---		-.07
			(.04)
Medium Unionization Rate	---		-.03
			(.04)
High Unionization Rate	---		.001
			(.041)
Constant	.22	.18	.20
	(.38)	(.38)	(.38)

R^2		.07	.07	.07

Table 4.   Characteristics of Workers by Displacement and Status
1991-1996

	Outgoing Rotation Group, 1991-1995	*Displaced Because of Plant Shutdown, Feb 1994 and Feb 1996*	*Displaced for Any Reason, Feb 1994 and Feb 1996*
Sample Size	749,555	2,321	8,796
Percent Union	11.7	12.0	12.3
Age	37.6	38.2	37.0
Percent Male	50.5	51.6	56.0
Percent White	85.7	84.0	85.6
Education: # 8th grade	3.9	3.9	3.3
9-11 grade	8.5	10.0	9.0
High School Grad	38.1	36.6	35.5
Some College	28.5	33.2	32.1
College Grad	15.2	12.9	15.2
Graduate School	5.9	3.3	4.9
Usual Weekly Earnings	$486	$460	$489

Percent Blue Collar	31.1	35.5	38.2
Percent Manufacturing	22.9	27.5	25.8
Percent Retail Trade	19.3	25.9	18.3

Source: Tabulated from February Displaced Worker CPS files for 1994 and 1996 and Annual Demographic files of CPS for 1991-1995. The sample for the characteristics is often somewhat smaller than the sample size because of missing observations. Mean characteristics for workers in regression samples will differ slightly from those here since the regressions exclude workers with missing observations on any independent variable.

Table 5: The Proportion Unionized Predicted Among Displaced Workers and the Actual Proportion Unionized

Group/Sample Size	Predicted Proportion Unionized	Actual Proportion Unionized
Displaced for plant closing (1881)	.121	.118
Displaced for any reason (5229)	.124	.124

Notes: The predicted values are based on a linear regression model that has the dependent variable union membership and that includes 4 age group dummy variables, 5 education level dummy variables, the log of weekly earnings, a race dumy variable, a sex dummy variable, and 10 industry and 7 occupation dummy variables and 4 dummy variables for years. The sample was the outgoing rotation groups for 1991-95. The sample size was smaller than in Table 4 because some variables were missing. The sample was still massive, 642,706. The actual values are calculated only for persons who report the characteristics used in the regressions.

Table 6. Probit Equation Estimates and Standard Errors of the Effect of Unionization on Displacement Because of Plant Closure and For All Reasons (standard errors are in parenthesis).

Sample	Pooled Displaced + ORG		Pooled Displaced + Nondisplaced, Feb 1996 (Tenure $ 3)		Pooled Displaced + Nondisplaced, Feb '96 and Feb '94	
	Plant Closing (1)	All displaced (2)	Plant Closing (3)	All displaced (4)	Plant Closing (5)	All displaced (6)
Unionism	-.020 (.033)	-.011 (.023)	.052 (.057)	.057 (.044)	.011 (.041)	-.014 (.030)
Ln Usual Weekly Earnings	-.001 (.019)	-.038 (.013)	-.17 (.03)	-.23 (.03)	-.073 (.020)	-.112 (.014)
Tenure on Past Job	-	-	-.019 (.004)	-.044 (.003)		
Male=1	-.12 (.03)	-.038 (.018)	-.11 (.04)	-.04 (.03)	-.11 (.03)	-.041 (.021)
White=1	-.09 (.03)	-.005 (.021)	-.05 (.05)	.04 (.04)	-.09 (.03)	.017 (.026)
Education: # 8th grade	.18 (.08)	-.12 (.06)	.06 (.14)	-.21 (.11)	.06 (.09)	-.163 (.067)
9-11 grade	.23 (.07)	.02 (.04)	.02 (.11)	-.07 (.08)	.11 (.08)	-.036 (.054)
High School Grad	.10 (.06)	-.06 (.04)	-.14 (.10)	-.25 (.07)	-.02 (.07)	-.119 (.045)
Some College	.21 (.06)	.07 (.04)	-.00 (.09)	-.10 (.07)	.06 (.07)	-.016 (.044)
College Grad	.11 (.06)	.06 (.04)	-.02 (.09)	-.12 (.07)	.00 (.07)	-.023 (.044)
Graduate School	-	-	-	-	-	-
Year Dummies	x	x			x	x
Occupation Dummies	x	x	x	x	x	x
Industry Dummies	x	x	x	x	x	x
Number of Observations	644,587	644,587	14,901	14,901	41,478	41,478
Ln Likelihood	-12620.516	-12468.12	(.005)	(.011)		

Source: Calculated from February 1994 and 1996 CPS Displaced Worker files pooled with Outgoing Rotation Groups 1991-1995. There are 7 occupation dummies and 10 industry dummies. Dashes mean that this is the deleted group from the regression.

Note: Columns (1) and (2) are weighted probits with ORG sample weighted at .073, as discussed in the text. Columns (3) and (4) are also weighted probits with weights to adjust for the loss of young workers in the nondisplaced sample, as discussed in the text. Columns (5) and (6) are unweighted probits.

Table 7. Outcomes in New NLRB Certified Union Election Victories and in FMCS Dispute Cases, Fiscal Year 1986 to Fiscal Year 1993.

	NLRB Certified Election Cases		FMCS Dispute Cases	
	# of Cases	*Percent of Cases*	*# of Cases*	*Percent of Cases*
Number of Certifications Reason for Closing the Case	10,783	100.0	168,945	100.0
Plant Closed	341	3.2	3,009	1.8
Agreement Reached	6,009	55.7	136,007	80.5
Diverse Factors for Closing*	488	4.5	7,520	4.5
Question of Representation	580	5.4	1,661	1.0
Referred to NLRB	563	5.2	---	---
Other	2,802	26.0	20,748	12.3

*These factors are: state or other mediation; referred to Federal Services Impasse Panel; referred to Federal Labor Relations Authority; not in jurisdiction; no need for mediation; administratively closed. Prior to 1991 or 1992 some of these small categories were not distinguished separately.

NOTES

1. The finding that unions reduce profitability (Freeman 1983; Freeman and Medoff 1984; Clark 1984; Salinger 1984; Ruback and Zimmerman 1984; Karier 1985; Voos and Mishel 1986; Domowitz, Hubbard, and Petersen 1986; Connolly, Hirsch, and Hirschey 1986; Hirsch and Connolly 1987; Bronars and Deere 1988; Becker and Olson 1992), whether profitability is measured in share value, profits/capital, Tobin's q, or price-cost margins, does not help us determine whether unions increase firm insolvency. This is because it is not clear whether the reduction in profitability comes out of normal profits, so inducing the firm or establishment to shutdown in the long run, if not in the short run. Some studies (Freeman 1983; Salinger 1984 [criticized by Hirsch and Connolly 1987], Karier 1985) show that unions reduce profits in concentrated sectors with high profitability, while others find the opposite (Clark 1984; Hirsch 1991). Some of these studies use concentration to reflect market power, but union gains could come from other sources of market power.

2. The rate of technological change in the sector, costs of new plant and machinery, interest rates, as well as wages influence the shutdown decision. (See Salter 1966).

3. This outcome is subject to various provisos having to do with information, the ease of regaining concessions in succeeding periods, the reputation of the union in bargaining, different levels of risk aversion, and the like.

4. In those cases where the individual we talked to only knew the percent unionized of the production workers, we took this number and used the same procedure as Hirsch (1991). Namely, we obtained the three-digit SIC production to total employment ratio and assumed the non-production workers were not organized. This ratio was used for the percent organized for these cases. We used this

procedure for 67 business units.

5. There was no evidence that any of the covariates had a markedly different effect on the firms than on the business lines in our data set.

6. We also estimated the model separately with firms between SICs 20-30 (n=167) and those between 30-40 (n=344). The coefficients and standard errors for union presence was .04 (.49) and -.03 (.26). Further estimates using right censored Cox proportional hazard models produced similar results for the presence of unions and percent union on firm insolvency using the same covariates as the ones presented in Table 2.

7. Since sales data, which is our control for size, are three years prior to the event, we expect the causal flow to be from sales to the outcome. We would not expect sales to be directly influenced by unionization, and have not found any direct statistical evidence of this relationship.

8. Using a Chi squared test for the joint significance of low and medium levels showed a value of 1.93 which was not statistically significant.

9. The exact question is "Which of these specific reasons describes why you are no longer working at that job (the job they lost) ... plant or company closed down or moved. And then asks for those for whom the plant or company was operating, whether they lost their job because of: insufficient work; position or shift abolished; seasonal job completed; self-operated business failed; some other reason"

10. In an earlier version of this paper, we used the January 1984, January 1988, January 1990 CPS files, which provide data on workers who lost their job because the "plant or company closed down or moved" or for other reasons. But these surveys do not ask whether the job was unionized or not. We dealt with this problem by supplementing the January CPSs with data from the preceding year's CPS

outgoing rotation group files. We have added the January 1992 CPS file to this data base, and obtained

results comparable to those in the text: no statistically discernible union effect on plant closure. These

results are available on request.

11. The February CPS supplements asks about membership in "a union or employee association

similar to a union". Thus, in the outgoing rotation group file, we used respondents' reports on union

membership rather than collective bargaining coverage (which is the more relevant concept). In the U.S.

private sector the two are very close.

12. Specifically, with a population rate of unionization of 0.117, the standard error for the difference in

the unionization rate for all workers displaced is just square root of [.117(.883)/ number of

observations in the displaced group]. For those displaced for reasons of plant closure the number who

answered the question on unionisation at the job from which they were displaced was 2196, giving a

standard error is .0069. For the all displaced group the number who gave valid answers was 6045 ,

giving a standard error is .004. The difference between the population unionization rate and the rate for

those displaced for reasons of plant closure is .003; the difference between the population unionization

rate and the unionization rate for the all displaced is .006. The text gives the ratios of these differences

to the standard errors.

13.   These calculations are based on a pooled data set for the February 1994 and 1996 displaced

worker surveys. The sample was 63,845, of whom 8796 said they had been displaced. The

proportion displaced in the two years differed modestly. We then calculated the weight by requiring

that the number in the displaced sample, 8796 divided by the weighted number in the outgoing rotation

sample be 0.16. The weight that produced the appropriate ratio was 0.073.

14. The sample for which we matched in February 1996 had 23725 observations; restricting tenure to 3 years of more gave a sample of 15455. Twenty four point two percent of the larger sample were in the age group 20-29 compared to just 15.4 percent in the smaller sample. The weights we used for the groups were 20-29, 1.65; 30-39, 0.96; 40-49, 0.88; 50-59, 0.82; 60-64, 0.87

15. For example, among displaced workers, 94 percent of those displaced from a nonunion job went to a nonunion job, while 48 percent of those displaced from a union job went to a union job. This is based on a tabulation of the matched displaced workers survey for February 1994 and February 1996, using 2611 observations, of which 2301 were persons who had a nonunion job from which they were displaced and 310 had a union job from which they were displaced.

16. The estimates by Dunne and MacPherson did show that unionization was positively related to employment contraction and negatively related with employment expansion (Dunne and MacPherson 1994). This is consistent with the model we describe in section I and with other empirical work on union effects of growth rates (Leonard 1992): that unions reduce employment but do not force firms to close.

17. An additional analysis of organizing drives on the likelihood of plants going out-of-business during the early and mid-1980s found that virtually the same percentage of plants that had organizing drives went out-of-business in comparison to those without an organizing drive (Freeman and Kleiner 1990, p. S-12).