NBER WORKING PAPER SERIES

TRADE SENSITIVITY, TECHNOLOGY, AND LABOR DISPLACEMENT

John T. Addison
Douglas A. Fox
Christopher J. Ruhm

Working Paper 5621

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
June 1996

We would like to thank Eli Berman and Lori Kletzer for helpful comments on an earlier version of this paper. This paper is part of NBER's research programs in Labor Studies and International Trade and Investment. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

© 1996 by John T. Addison, Douglas A. Fox and Christopher J. Ruhm. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

NBER Working Paper 5621
June 1996

TRADE SENSITIVITY, TECHNOLOGY, AND LABOR DISPLACEMENT

ABSTRACT

This study examines the relationship between international trade, technology, and the probability and consequences of job displacement, using data on displaced workers as well as those at risk of job dislocation for 1984-86 and 1989-91. Workers employed in industries with elevated import shares and high levels of investment in computers appear to have increased rates of job loss, with the results for export penetration varying on the time period examined. These risks do not, however, translate into unfavorable postdisplacement labor market outcomes. Indeed, there is some evidence that individuals displaced from export-oriented sectors have fewer adjustment problems than the generality of dislocated workers, while those terminated from sectors investing heavily in computer technologies are more likely to retain health insurance coverage. That being said, our findings are frequently sensitive to the choice of specifications and time periods.

John T. Addison
Department of Economics
University of Hull
Cottingham Road
Hull HU6 7RX
GREAT BRITAIN

Douglas A. Fox
Pennsylvania State University-Shenango
147 Shenango Avenue
Sharon, PA 16146

Christopher J. Ruhm
Department of Economics
University of North Carolina Greensboro
Greensboro, NC 27412-5001
and NBER

Trade Sensitivity, Technology, and Labor Displacement

I. Introduction

The last 25 years have witnessed a substantial growth of inequality throughout most industrialized nations. In the United States this has taken the form of an increasingly unequal distribution of earnings, whereas in Europe it has resulted in a dramatic rise in joblessness.[1] The sources of these trends have been the subject of much study. Two main factors, technological change and international trade, have received the bulk of attention.

Most economists have emphasized the role of technology, arguing that skill-biased technological improvements have reduced the relative wages of less skilled workers in the United States and, given its lower levels of labor market flexibility, resulted in substantially higher unemployment for such workers in Europe. Conversely, a minority of researchers believe that international trade is of key importance. They hold that the growth of trade with less developed countries has led to a dramatic increase in the stock of available unskilled workers, thereby reducing the returns to "raw" labor. Trade has also received more attention from the public and policy-makers; for instance, much of the debate over NAFTA reflected concerns over its likely effects on wages and job destruction.

Trade or technology could, in principle, increase inequality without causing any employment consequences. However, this would require wages to exhibit an exceptionally high degree of downward flexibility, so that it is more likely that employment reductions will be one

[1] For example, the differential in log wages between the ninetieth and the tenth percentile of U.S. males grew from 1.15 in 1969 to 1.49 in 1989 (Katz, Loveman, and Blanchflower, 1995). The male unemployment rate in European OECD countries averaged 3.4% over the 1974-79 period but then trended upward to an average of 8.1% between 1990 and 1993 (Organisation for Economic Co-operation and Development, 1995).

important consequence of trade or technology shocks. And, unless these can be accomplished through attrition, some persons will suffer permanent layoffs.

Displacements are of particular concern because they initially increase unemployment and subsequently result in substantial and lasting reductions in earnings.[2] This has led to a variety of government efforts aimed at aiding dislocated workers. Significantly, despite the lack of research confirming the contribution of increased economic integration to labor displacement, special assistance has long been available, through categorical programs, to those perceived as losing jobs as the result of international trade (e.g. the Trade Assistance Adjustment Program and, most recently, the NAFTA Transitional Adjustment Program).[3] By contrast, special support has generally not been provided to workers dislocated by reason of changes in technology, even though this might be a more important source of job loss and reemployment difficulties.

This paper provides new evidence on the relationship between trade sensitivity, technological change, and labor displacement. We analyze both the exposure to job loss and a variety of postdisplacement outcomes. In addition to providing a more detailed analysis than previous investigations, data are employed on workers who are either displaced or at risk of job loss for the intervals 1984-86 and 1989-91, with postdisplacement outcomes being measured in 1988 and 1992, respectively. This allows us to examine whether the relationship between trade

---

[2] For instance, Ruhm (1991) estimates that the long-term earnings losses of displaced workers are at least 10% per year, while Jacobson, LaLonde, and Sullivan (1993) indicate still larger reductions, in the region of 25%, for higher-tenure (over 5 years) workers who change jobs.

[3] The rationale for these programs is that it is equitable to compensate those whose loss of employment makes possible the societal gains resulting from increasingly open economies. This case has also been supplemented by second-best efficiency arguments, emphasizing the ability of producer interests to jeopardize further relaxation of trade barriers, unless social clauses or adjustment programs are inserted into trade agreements. Ehrenberg (1994) provides a detailed discussion of the importance of adjustment policies in assisting the process of economic integration.

or technology and the probability or consequences of economic dislocation has been stable over time – although our technology measure pertains to a single intermediate year.

Inevitably the issues involved are more complex than our simple regression analysis allows. For example, much of our discussion focuses on relative outcomes among individuals experiencing displacements. This neglects the consequences for persons who, though technically nondislocated, may nevertheless have been affected by heightened international trade or changes in technology. Nonetheless, we believe that this first-pass empirical procedure is justified by the paucity of relevant research in the job loss literature, in contrast to the far more numerous studies examining how trade and technology affect the relative wages of employed individuals.

To summarize the findings which follow, we report that persons employed in industries with high import shares or rapid technological change, as proxied by investments in computers, are more likely than other workers to experience job displacements; more ambiguous results are obtained for the industry export variable. There is also some evidence of improved reemployment prospects, following the displacement event, for persons previously employed in export-oriented industries, but there is little indication that the probability of avoiding joblessness or the duration of any resulting spells is strongly correlated with either the trade or the technology variables. Similarly, there is little evidence that reemployment earnings are materially affected by trade or technology developments in the predisplacement industry, although persons leaving positions in sectors with high rates of computer investment do appear more likely to retain or obtain health insurance coverage.

II. Previous Literature

An extensive literature has recently developed examining how increases in international trade have affected the relative wages (and the employment levels) of less skilled workers. The approach most commonly used by labor economists has involved calculating the "factor content" of imports and exports to estimate the changes in factor endowments resulting from trade; these changes are then combined with assumed demand and supply elasticities of labor to calculate how trade has affected equilibrium wages.[4] Conversely, trade economists have more frequently focused on changes in relative prices, noting inter al. that the *threat* of import competition could affect prices, and consequently wages and employment, even if no trade actually occurs.[5]

Generally, the effect of technological change has not been estimated directly; rather the proportion of the time trends which cannot be attributed to changes in trade or other observed factors (e.g. demographic characteristics, unionization rates, and so on) is assumed to result from skill-biased technological change. This residual approach is somewhat unsatisfactory, most obviously because any errors in calculating the effects of the other factors will lead to (potentially serious) errors in the estimated effect of technology. This problem has led some researchers (e.g. Berman, Bound, and Griliches, 1994) to include direct proxies for technological improvements, which is also the approach used in our analysis.[6]

---

[4] A series of articles in the Summer 1995 issue of the *Journal of Economic Perspectives* (viz. Freeman, 1995; Richardson, 1995; and Wood, 1995) provides an excellent introduction into research on these issues. Useful alternative sources are Burtless (1995) and the January 1995 issue of the *Economic Policy Review*, published by the Federal Reserve Bank of New York, which is entirely devoted to an examination of wage trends in the United States.

[5] Leamer (1994) provides a forceful exposition of this argument.

[6] In addition, Berman, Bound, and Griliches (1994) show that the ratio of skilled to unskilled workers has increased primarily *within* industries as would be expected with skill-biased technological change, rather than across industries as might occur if international trade were the dominant factor.

Employment reductions caused by trade or technology may be accompanied by falling wages or greater rates of job attrition. Other things being equal, greater wage flexibility will be associated with smaller numbers of permanent layoffs. This notwithstanding, decreases in real wages or heightened quits do not provide the same stimulus for policy activism as job displacements.[7] Conversely, increasing employment may coexist with rising import shares if foreign production is more elastic than domestic supply. Nonetheless, if product demand is controlled for, growth of imports will generally be associated with some disemployment effect. Technological change has a more ambiguous impact. The new technologies reduce the need for labor, at given levels of output, but product demand will increase as cost-savings are passed on to customers. Displacement per se is still more complicated, since net employment could decline, without permanent layoffs, if firms are able sufficiently to reduce the rate of hires or induce quits.[8]

The consensus of much of the early literature (e.g. Grossman, 1987; Mann, 1988; Dickens, 1991) was that rising imports were responsible for, at most, only a small portion of the domestic employment reduction observed in trade sensitive industries. This result, coupled with the increased relative use of skilled workers across a variety of industries at a time of rising skill differentials, led most researchers to conclude that technological change, rather than international competition, has been the most important factor explaining changes in relative wages and

[7] Furthermore, union bargaining strategies could even be associated with rising wages in some declining industries (Lawrence and Lawrence, 1985).

[8] Kletzer's (1995) study of trade and job displacement attempts to account for these types of labor market transitions.

employment during the last 15 years.[9] However, some more recent studies (e.g. Freeman and Katz, 1991; Revenga, 1992), using both quantity-based and price-based measures of import competition, obtain much stronger trade disemployment effects.[10]

There have been relatively few studies of the relationship between trade and displacement and, to our knowledge, none that explicitly link technological change to probabilities of job loss. Using data from the Displaced Worker Supplement (DWS) to the January 1984 Current Population Survey (CPS) and the NBER Trade and Immigration data file, Kruse (1988) reports that an increase in the import share of the worker's predisplacement industry is positively associated with the subsequent duration of joblessness. He argues that this occurs because workers displaced from high import change industries have characteristics that are associated with increased adjustment difficulties and because import growth is related to industry decline.[11] Shelburne and Bednarzik (1993) provide evidence that trade sensitive industries are geographically concentrated, which increases the impact of job losses on local unemployment rates and makes it more difficult for displaced workers to adjust.[12]

---

[9] The link between wages and employment is quite direct. Thus, for example, Juhn, Murphy, and Topel (1991) show that both wages and working hours declined most over time for those at the bottom of the earnings distribution in the United States. See also Topel (1993).

[10] Borjas and Ramey (1995) provide a recent quantity-based extension, which reports that international trade could explain roughly one half the decline in employment in highly concentrated trade sensitive industries. The authors argue that the observed increase in wage inequality in the U.S. can be directly linked to this phenomenon, since these industries are believed to share rents with their workers and also to employ a disproportionate number of less educated individuals who bear the brunt of the adjustment to rising imports. See also Borjas and Ramey (1994), and Wood (1995).

[11] Similarly, Bednarzik (1993) indicates that workers in import-sensitive industries are more likely than those in export-sensitive industries to be female, black, Hispanic, young, and part-time workers and that they are less likely to be college graduates and to hold professional, managerial, or technical jobs.

[12] They do point out, however, that the geographical concentration of export-sensitive industries on the one hand and import-sensitive sectors on the other does not coincide.

Addison, Fox, and Ruhm (1995) provide a more comprehensive albeit descriptive treatment of the relationship between trade sensitivity, displacement rates, and reemployment outcomes. Their investigation, which is restricted to workers employed in or displaced from manufacturing industries, uses data from the January 1988 DWS matched with industry trade data provided by the U.S. Commerce Department for the period 1982 through 1986. The authors demonstrate that exposure to trade is positively associated with risk of job loss but uncover little indication that import or export penetration rates are correlated with postdisplacement adjustment problems, as measured by subsequent joblessness, earnings, or health insurance benefits.

Most recently, Kletzer (1995) has studied the impact of trade sensitivity on displacement rates, reemployment probabilities, and changes in earnings, using displacement data from the 1984 through 1992 DWSs matched with trade information contained in the NBER Trade and Immigration data file. Industry-level displacement probabilities are shown to be increasing (decreasing) in the growth of imports (exports), although the import change coefficient estimate is statistically insignificant.[13] Kletzer also examines the probability of reemployment, using individual data and measuring trade sensitivity by levels (rather than changes) in imports and exports. Statistically insignificant results are obtained for both trade variables, once demographic characteristics are controlled for. Finally, neither exports nor imports emerges as a statistically significant determinant of postdisplacement earnings changes.

Overall, the impact of trade on displacement probabilities and subsequent adjustment difficulties appears rather muted and we know even less about the effects of investments in

[13] In a separate specification capturing trade sensitivity via changes in domestic prices of the import goods (relative to the aggregate price level), and which controls for changes in GDP and industry, the import measure also narrowly fails to achieve significance at the .10 level.

technology. As indicated above, this is only one part of the story since trade or technology could reduce total employment or increase income inequality without leading to higher rates of permanent layoffs. Displacement is the focus of our current analysis, however, because of the limited attention paid to it in the trade/technology literature and its particular relevance for public policy. We improve upon earlier related studies by utilizing more recent data, by investigating a broader set of outcomes, including a preliminary analysis of the role of technology, and in examining whether the results are robust to changes in the time period analyzed.

Our investigation of the effects of international trade is quantity rather than price based (i.e. we look at trade penetration rates rather than changes in relative prices) for several reasons. First, we are persuaded by the Krugman's (1995, p.35) theoretical argument that the factor content approach is "entirely justified in the context of a general equilibrium model when the trade share is sufficiently small". Second, as Krugman also points out, changes in relative prices may reflect developments that would have occurred even in the absence of increased trade (e.g. changes in tastes). Third, the results of empirical examinations which focus on price changes turn out to be quite fragile, that is, they are sensitive to changes in measurement and specification.[14] Finally, the factor price equalization arguments which underpin the exclusive focus on relative prices imply that wages will be unaffected by domestic labor market developments. This assumption is at odds with the substantial body of evidence indicating that earnings differentials are influenced by local changes in the supply and demand for labor (e.g.

[14] For example, see the interchange between Lawrence and Slaughter (1993) and Sachs and Shatz (1994) on whether or not computer prices should be included in the calculations of relative price changes.

cohort changes in the size of the labor force, local or international migration, changes in educational attainment, etc.).[15]

III. Data and Methods

This analysis uses data from the Displaced Worker Supplements to the January 1988 and 1992 Current Population Surveys. The DWS contain retrospective information on individuals permanently losing their jobs during the previous five years.[16] When examining postdisplacement outcomes, our samples are comprised of workers terminated from jobs in a manufacturing industry (since our trade data relate solely to manufacturing) by reason of plant closing, slack work, or abolition of shift or position. Corresponding information on persons employed in manufacturing industries at the survey date but not reporting a job loss during the previous five years is also used in our prior analysis of displacement probabilities. The only other restriction is that we confine our samples to those aged 25 to 60 years at survey date. Younger workers are excluded because they change jobs frequently, making displacement less traumatic and less meaningful for them (see Topel and Ward, 1992). Older persons are excluded because their labor market experiences may be dominated by the retirement decision.

This inquiry also uses Department of Commerce trade data on manufacturing industries for the periods 1984-86 and 1989-91, between which intervals the industry definitions were changed. For the earlier period the data conform to 1972 SIC codes, whereas for the latter period

[15] See Katz and Murphy (1992) for an example of research emphasizing the impact of changes in domestic supply and demand upon relative wages.

[16] The surveys, which have been conducted biennially since 1984, are well described elsewhere (e.g. Herz, 1990).

the 1987 categories apply.[17] We obtained data on imports, exports, and U.S. product shipments at the 4-digit industry level.[18] Therefore, the SIC-based trade data had to be aggregated to obtain consistency with the industry basis of the displaced worker data set, which conforms to the Census of Production Industrial Classification (CPIC) system. Aggregating the 4-digit trade data to the most detailed industry level available in the CPIC system (the 3-digit level) yielded samples of 74 manufacturing industries for each of the two periods.

The import penetration rate for each industry is defined as the value of imports of goods into the United States divided by domestic supply (total imports plus domestic product shipments). Export penetration rates are the ratio of U.S. exports to total U.S. product shipments for the industry. Annual import and export penetration rates, for each industry, were averaged over the three year sample periods to produce the trade measures we focus upon in this analysis. We also calculated *changes* in the import and export penetration measures, defined as the percentage point difference in levels of import or export shares between the beginning and end of each sample period. However, given the brevity of the periods over which the changes were measured, as well as some ambiguity concerning the best measure of changes in trade sensitivity, we do not emphasize the results using these variables below.[19]

---

[17] Our sample periods are dictated by the three-year periods for which data were available. The Commerce Department did not match product shipment data to SIC codes in 1988 and we avoided using 1987 to maintain consistency of the SIC code definitions across sample years.

[18] We thank Robert Bednarzik of the Bureau of International Affairs, U.S. Department of Labor for providing us with the 1984-86 data and Marge Paviliscak of the Office of Trade and Economic Analysis, U.S. Department of Commerce for supplying the corresponding information for 1989-91.

[19] For instance, in calculating changes in trade sensitivity, it is not obvious whether it is preferable to use percentage point differences in levels or corresponding growth rates.

Finally, we merged onto the data set information on the ratio of computer expenditures to total investment (hereafter also referred to as the computer investment ratio) for the year 1987. The computer investment ratio is included as a proxy of technological change. This is justified by the evidence that computerization has played an important role in most technological innovations during the 1980s (Mark, 1987) and by the successful deployment of this variable as a measure of technology in past research (e.g. Berman, Bound, and Griliches, 1994). As with the trade data, the 4-digit SIC level information on computer expenditures was aggregated to 3-digit Census industries.[20]

The relationship between trade sensitivity and probability of job loss was analyzed by constructing a dichotomous dependent variable taking the value of one for CPS respondents who stated that they experienced a permanent layoff during the three year sample period and zero if no job loss was reported. In analyzing the consequences job dislocation, six outcome measures were identified: 1) the probability that the displaced worker moved directly into new employment without any intervening period of joblessness; 2) the duration of joblessness for individuals experiencing some period out of work; 3) the probability that the individual was reemployed at the survey date; 4) the weekly earnings of reemployed workers; 5) the probability that the individual had employer-based health insurance at the survey date; 6) the probability that employer-based health insurance was lost as a result of the displacement event (i.e. the

[20] We thank Eli Berman for providing us with this data. The information originally came from the Census of Manufactures and some industries did not report computer investments. We used the following procedure to deal with the missing data. If the data were available for some, but not all, of the 4-digit SIC industries included in the 3-digit Census classification, the investment ratio was calculated over just the non-missing components. If the computer data were unavailable for all of the SIC industries, as was the case for three of the Census industries (230, 321, and 322), the computer investment ratio was treated as a missing value in most of the analysis and assigned a zero value in some of the regressions, as reported below.

probability of having no health insurance at the survey date, conditional on being covered in the predisplacement job).

All of the dichotomous dependent variables were modeled as maximum likelihood probit equations. The duration of joblessness was estimated using a Cox proportional hazard specification.[21] The Cox model uses information on the rank ordering of the outcomes and leaves the parametric form of the baseline hazard unspecified. Higher hazard rates (larger positive coefficients) correspond to shorter durations of joblessness.[22] Finally, the wage equations were estimated by OLS, with the dependent variable expressed in natural logs. We did not attempt to control for selection bias, given the difficulty in obtaining variables which might appropriately be included in the reemployment equations but which do not determine wages.

Many of our regression specifications include controls for demographic and job characteristics, in addition to computer investment ratios and trade penetration rates. These data were obtained from the DWS and the parent CPS, plus some additional sources as noted below. Wherever possible, we have used a common regression specification for all of the dependent variables, although there are minor differences in the displacement rate and postdisplacement outcome equations.

The demographic characteristics include dummy variables for sex, race (white vs. nonwhite), marital status, completed years of schooling (5 categories), and the presence of minor

---

[21] In proportional hazard models, the hazard rate at duration t (i.e. the probability of exiting the state at t, conditional on remaining in it at t-1) is modeled as: $h_i(t) = h_0(t)\exp(X_i\beta)$, where $h_i(t)$ is the hazard rate at t and $h_0(t)$ is the baseline hazard.

[22] As an alternative, we also estimated a flexible 3-parameter extended generalized gamma accelerated failure time (AFT) duration model. The AFT results correspond closely to the hazard estimates and are not reported here.

dependent children in the household at the survey date. Continuous variables include (a quadratic in) years of age, the state unemployment rate, union density (namely, the proportion of individuals in the industry covered by a collective bargaining agreement), and the change in domestic product demand. In some of the displacement probability equations, relative industry earnings are also controlled for.[23] Changes in domestic product demand, calculated as the percentage change in product shipments between the beginning and the end of the sample period(s), were included to capture the effects of shifts in labor demand. The state unemployment rate and union density measures were calculated for the year of job loss in the displacement probability equations and were averaged over the three-year sample periods when considering postdisplacement outcomes.[24]

Finally, the outcome equations contain several controls for characteristics of the predisplacement job and for the sources of the employment termination. These include dummy variables for the type of layoff (plant closing, position or shift abolished, or slack work), region (4 categories), year of displacement, and a quadratic in years of tenure on the predisplacement job.

Table 1 displays sample means for key variables during each of the two time periods. In all cases the statistics refer to subsamples of displaced manufacturing workers, rather than to all CPS respondents, and are weighted so as to be nationally representative. Beginning with the

---

[23] Industry relative earnings are calculated by regressing the natural log of weekly earnings, (for the full CPS sample) on education, age, age squared, marital status, sex, region, and 74 industry dummy variables. The coefficients on the industry variables are constrained to sum to zero and represent the relative wage.

[24] Information on state unemployment rates were obtained from U.S. Department of Labor, Bureau of Labor Statistics (various years) while that on industry unionization rates is from Hirsch and Macpherson (1993).

trade variables, it can be seen that average import and export shares are higher in the more recent sample -- import penetration rises from 13% to 15% and export penetration from 8% to 13%. These findings are consistent with the increasing openness of the U.S. economy. The demographic and skill profiles of the samples are roughly comparable across the time periods. But there are some differences in other variables and, particularly, in the outcome measures. The percentage of displaced workers covered by collective bargaining agreements falls over time, reflecting declining unionization rates in U.S. manufacturing industries. Also the share of workers losing jobs by reason of plant closings decreases, while terminations due to slack work become more important in the later period.

Workers displaced between 1989 and 1991 have shorter durations of joblessness but larger wage losses and greater probabilities of losing health insurance benefits than those terminated during the earlier sample period. Some of these differences reflect disparities in the number of years between the date of displacement and the survey. In particular, the sample of respondents taken from the 1988 DWS lost jobs at least one but no more than four years prior to being interviewed, while those from the 1992 survey did so at some point within three years of the survey. As a result, fewer unemployment spells are censored in the earlier sample (12% vs. 27%) and durations of joblessness are longer. Furthermore, since respondents to the later survey had less time to adjust to the loss of jobs, their reemployment wages are likely to be lower and they will less often have health insurance. There are also signs, however, that the overall economic climate became more favorable over time (e.g. unemployment rates fell, employment growth rose, and a higher percentage of displaced workers avoiding joblessness altogether increased), which may also explain some of the observed differences.

IV. Displacement Probabilities

Probit models estimating the probability of job loss are summarized in Table 2. Column (1) examines the effects of trade sensitivity, ignoring all other determinants. In both periods, the level of import penetration seems to be positively related to displacement rates. For their part, higher export shares appear to increase probabilities of job loss in the earlier period but either to have no effect on them or to lower the risk in the latter interval. The inclusion of controls for changes in domestic product demand (column (b)) reduces the import and export share coefficients, although the former remain positive and statistically significant in both periods. The addition of demographic covariates (column (c)) does not substantially change the estimated import penetration rate effect but cuts the negative export coefficient estimate by more than 50%.[25]

We next entered relative industry earnings as an additional regressor, to examine whether displacements were concentrated among high- or low-paying sectors. The results, shown in column (d), indicate that persons employed in industries with negative wage differentials were substantially more likely to be displaced between 1984 and 1986 but not during the 1989-91 period.[26] To the extent that other included explanatory variables are causally related to displacement probabilities and also are associated with industry rents, the inclusion of the

---

[25] We also investigated the role of changes in import and export penetration rates. For the earlier period, increases in export share were associated with lower displacement probabilities, while higher growth in import penetration raised them. For the latter period, we obtained exactly the opposite results. We have little confidence in these findings, given the fragility of the estimated effects to the time period chosen and because the changes were estimated over such short (three year) time periods.

[26] Conversely, Borjas and Ramey (1995) argue that workers receiving rents became more prone to trade-induced displacement in recent years. One explanation for the difference in results is that our analysis controls for trade sensitivity directly, whereas their investigation does not.

relative pay variable may introduce bias. For instance, Bernard and Jensen (1995) indicate that exporters offer relatively high wages. Since well-paid workers were also less likely to be displaced during the 1984-86 period, the addition of the relative earnings variable sharply inflates the coefficient estimate for export penetration (increasing it from .5029 in column (c) to 1.493 in column (d)). This indicates that estimates which control for relative earnings may be problematic, to the extent that this covariate mediates the impact of the trade sensitivity variables but does not actually cause changes in displacement rates. For this reason we abstract from relative earnings considerations in the balance of this exercise.

Columns (e) and (f) add the 1987 computer investment ratio, our proxy for technology, as a final regressor. The distinction between the two specifications is that model (e) includes data for all industries, with a zero value entered for cases where information on the ratio was missing, while (f) includes only those industries for which information on computer investment was actually available.

Workers have relatively high probabilities of losing jobs in industries with high rates of technological change, as measured by the computer investment ratio. The point estimate is large and highly significant for the 1984-86 period and is also substantial in both 1989-91 specifications, although not quite statistically significant in model (f).[27] The inclusion of the computer investment variable has only slight effects on the import share coefficients but more obviously reduces the estimated effect of exports. The latter result is consistent with the possibility that export industries have relatively high rates of technological change.

[27] Similar point estimates are obtained for equations that exclude demographic characteristics. For instance, the coefficient estimate for the computer investment ratio obtained for a model analogous to column (f), but without the additional regressors, is 1.240 for the earlier period and .9262 for the latter interval.

Results for the full vector of covariates are shown for one specification (model (c)) in appendix Table A.1. The coefficient estimates for the demographic variables are often statistically insignificant and there is sometimes an indication of differences across sample periods.[28] For example, race has the standard effect on the probability of job loss in the latter period but has no impact in the earlier one. There is also a sign reversal in respect of the dependent children covariate, although on this occasion the difference is not statistically significant. Conversely, married individuals are clearly less likely to be displaced in both periods, while another common influence is the role of growing industry demand in reducing the likelihood of individual displacement.

In order to more easily summarize the effects of trade and technology on the probabilities of job loss, Table 3 shows the predicted effects of moving from one standard deviation below the average value of the specified variable to one standard deviation above it. These estimates are obtained from specification (f) of Table 2 and are calculated assuming that covariates, other than that specified to change, are set equal to their sample means. For example, increasing the import penetration rate from one standard deviation (9.1 percentage points) below its mean value to one standard deviation above it, during the 1984-86 period, is predicted to raise displacement probabilities from 7.3% to 8.7%, an increase of 19.8%. Corresponding increases in export penetration rates and computer investment ratios boost expected permanent layoff rates by 5% and 31%. For 1989-91, the specified movement in imports, exports, and computer investment ratios changes expected displacement probabilities by 18%, -5%, and 12% respectively. These results suggest that import sensitivity and technological advance are associated with relatively

[28] Virtually identical estimates are obtained for the demographic coefficients in the other specifications of the job loss equation not reported here.

large increases in dislocation rates, while changes in export propensities have uncertain and much weaker effects. However, the findings are again qualified by the sensitivity of the predicted effects to the choice of time periods, which signals that our empirical specifications fail to capture at least some important determinants of layoffs.

V. Postdisplacement Outcomes

We next consider the relationship between trade sensitivity and postdisplacement outcomes for individuals losing jobs during the specified time period. The dependent variables in Table 4 include the probabilities of being reemployed at the survey date and of avoiding postdisplacement joblessness, as well as the duration of joblessness (conditional on some positive spell). Table 5 summarizes results for the natural log of postdisplacement earnings and the probability of having or losing employer-based health insurance coverage. For each outcome we display the results of three regression models. Column (a) includes controls for just the two trade variables; column (b) adds the full set of product demand, demographic, and job covariates; and, finally, column (c) contains all of the aforementioned regressors plus the computer investment ratio. The three specifications of the earnings equation also include predisplacement wages as an explanatory variable.

Results for covariates other than the trade penetration rates and computer investment ratio, which are not displayed in the tables, are fairly conventional. Thus, whites, males, married individuals, and more educated persons generally have fewer adjustment problems than their counterparts. Many of the coefficients are statistically insignificant, however, and there are numerous differences across outcomes and time periods.

As shown in Table 4, there is little indication that either exposure to international trade or employment in industries with high levels of computer investment ratios impairs the ability of workers to find new jobs following the displacement event. Import penetration rates are never significantly related to rates of survey date reemployment, the probability of avoiding joblessness, or the duration of time out of work. Export probabilities are postively related to the probability of working at the survey date, significantly so in the earlier period, but there is again little evidence that export shares are associated with either the probability of experiencing joblessness or with the duration of the jobless spell. Finally, a statistically significant relationship is never obtained between the level of technology, as proxied by the computer investment ratio, and the three employment variables and the sign of the coefficients can be seen to differ across time periods for two of the three outcomes.

The wage results in Table 5 are rather interesting. Other things equal, workers losing jobs in industries with high levels of exports earn relatively high wages on the new job. Those terminated from industries with substantial import penetration or high computer investment ratios also fare relatively well in the early period but poorly in the latter. The trade results are sensitive, however, to the method of controlling for predisplacement wages. The coefficient on previous wages (not shown on the table) is .5933 for the 1984-1986 sample and .5212 for the 1989-1991 group.[29] Both of these point estimates are highly significant and indicate that slightly over half of the wage differentials received on the old jobs are transferred to the new employment.

[29] These coefficients are for specification (b). Similar results are obtained for the other models.

As previously noted, export sensitive industries pay relatively high wages. Therefore, when previous earnings are not held constant, the export coefficient increases substantially in size and becomes highly significant, while the import coefficient declines in magnitude. Conversely, when the outcome variable is the *change* in wages, which effectively constrains the coefficient on previous earnings to one, the export coefficient falls while that on imports rises. There are no such corresponding patterns for the computer investment coefficient estimates, which suggests the absence of a strong relationship between earnings and investments in computer technology.[30]

The last six columns of Table 5 indicate that persons displaced from industries with elevated computer investment ratios are relatively more likely to have group health insurance coverage at the survey date, and comparatively infrequently lose this fringe benefit as a result of the job termination. The relationship between trade penetration rates and group health insurance benefits is much weaker. The data do provide some suggestion that persons leaving jobs in industries with high rates of exports are more likely to retain insurance coverage in the future, but this result occurs entirely because export industries offer higher levels of compensation and highly paid persons typically receive a disproportionate share of their total compensation in the

[30] For the fully specified model (column (c)), the coefficient estimate (standard error) for import penetration rates is -1.592 (.2628) and -.7465 (.1938) for the earlier and later period, respectively, when predisplacement wages are not controlled for. The corresponding coefficients on export penetration rates are .7416 (.4014) and .8895 (.2717) and for the computer investment ratio they are 1.555 (.7316) and -.7596 (.6206). Coefficient estimates for imports, exports, and the computer investment ratio in the wage change equation, are .4301 (.2470) and .1713 (.1907), -.0774 (.3771) and .1714 (.2676), and .8960 (.6874) and -1.002 (.6111) for the earlier and later period, respectively.

form of fringe benefits. By contrast, the strong positive effect of computer investments on coverage rates does not result from confounding with high wages.[31]

VI. Conclusion

Previous research highlights the importance of international trade and technological change as sources of secular changes in inequality or unemployment. Yet none of the prior studies has focused on job displacements, which represent a potentially important component of the trends and receive particular attention from policy-makers and the public. We provide evidence that the risk of job loss is relatively high for workers employed in industries investing heavily in computer technologies and for those in sectors with substantial exposure to import competition. Conversely, we find little evidence of a consistent relationship between export levels and rates of job loss. There is some indication that individuals terminated from export-oriented industries have easier transitions into new employment, or into jobs offering high pay or generous fringe benefits, than their peers displaced from sectors with less export activity. It is not clear, however, to what extent these differences are due to inter-industry heterogeneity in worker or geographic characteristics and to what degree trade performance itself is causing the disparities.

Many of our estimates vary considerably across model specifications or time periods. This fragility reduces our confidence in the findings and provides a cautionary note for this and related research. Ideally, it would be desirable if theoretical developments could guide the choice of empirical specifications. Absent this, it is incumbent on researchers to carefully check

[31] Thus, the computer investment coefficients remain virtually unchanged when the predisplacement wage is included as an additional regressor.

the robustness of their results to reasonable changes in model specification, to utilize alternative data sources, and to investigate the effects over a variety of time periods.

Our limited analysis suggests that both trade and technology contribute to employment instability. However, we find little evidence that the adjustment problems of displaced workers depend critically on the characteristics of the previously held job identified here. This at the very least raises questions about the usefulness of existing categorical programs providing special aid to workers losing jobs as the result of international trade.

References

Addison, John T., Douglas A. Fox, and Christopher J. Ruhm. "Trade and Displacement in Manufacturing." *Monthly Labor Review* 118 (April 1995): 58-67.

Bednarzik, Robert W. "An Analysis of U.S. Industries Sensitive to Foreign Trade." *Monthly Labor Review* 104 (February 1993): 15-31.

Berman, Eli, John Bound, and Zvi Griliches. "Changes in the Demand for Skilled Labor Within U.S. Manufacturing: Evidence from the Annual Survey of Manufactures." *Quarterly Journal of Economics* 109 (May 1994): 367-397.

Bernard, Andrew B., and J. Bradford Jensen. "Exporters, Jobs, and Wages in U.S. Manufacturing: 1976-1987." *Brookings Papers on Economic Activity: Microeconomics* (1995): 67-112.

Borjas, George S., and Valerie A. Ramey. "Foreign Competition, Market Power, and Wage Inequality." *Quarterly Journal of Economics* 110 (November 1995): 1075-1110.

Borjas, George S., and Valerie A. Ramey. "Time-Series Evidence of the Sources of Trends in Wage Inequality." *American Economic Review* 84 (May 1994): 10-16.

Burtless, Gary. "International Trade and the Rise in Earnings Inequality." *Journal of Economic Literature* 33 (June 1995): 800-816.

Dickens, William T. "The Effects of Trade on Employment: Techniques and Evidence." In Laura D'Andrea Tyson, William T. Dickens, and John Zysman (eds.), *The Dynamics of Trade and Employment.* Cambridge, MA: Ballinger, 1988, 41-85.

Ehrenberg, Ronald G. *Labor Markets and Integrating National Economies.* Washington, D.C.: The Brookings Institution, 1994.

Freeman, Richard B. "Are Your Wages Set in Beijing?" *Journal of Economic Perspectives* 9 (Summer 1995): 15-32.

Freeman, Richard B., and Lawrence F. Katz. "Industrial Wage and Employment Determination in an Open Economy." In John M. Abowd (ed.), *Immigration, Trade, and the Labor Market.* Chicago, IL: University of Chicago Press, 1991, 235-260.

Grossman, Gene. "The Employment and Wage Effects of Import Competition." *Journal of International Economic Integration* 2 (1987): 1-23.

Herz, Diane E. "Worker Displacement in a Period of Rapid Expansion: 1983-87." *Monthly Labor Review* 113 (May 1990): 21-33.

Hirsch, Barry T., and David A. MacPherson. "Union Membership and Coverage Files from the Current Population Survey: Note." *Industrial and Labor Relations Review* 46 (April 1993): 574-78, and related computer data files.

Jacobson, Louis S., Robert J. LaLonde, and Daniel Sullivan. "Earnings Losses of Displaced Workers." *American Economic Review* 83 (September 1993): 685-709.

Juhn, Chinui, Kevin Murphy, and Robert Topel. "Why Has the Natural Rate of Unemployment Increased Over Time." *Brookings Papers on Economic Activity* (1991, No. 2): 75-142.

Katz, Lawrence F., Gary W. Loveman, and David G. Blanchflower. "A Comparison of Changes in the Structure of Wages in Four OECD Countries." In Richard B. Freeman and Lawrence F. Katz (eds.), *Differences and Changes in Wage Structures.* Chicago, IL: University of Chicago Press, 1995, 25-65.

Katz, Lawrence F. and Kevin M. Murphy. "Changes in Relative Wages in the United States, 1963-87: Supply and Demand Factors." *Quarterly Journal of Economics* 107 (February 1992): 35-78.

Kletzer, Lori G. "International Trade and Job Displacement in U.S. Manufacturing, 1979-1991." Working Paper #331. University of California, Santa Cruz, September 1995.

Krugman, Paul. "Technology, Trade, and Factor Prices." National Bureau of Economic Research Working Paper No. 5355, November 1995.

Kruse, Douglas, L. "International Trade and the Labor Market Experience of Displaced Workers." *Industrial and Labor Relations Review* 41 (April 1988): 402-417.

Lawrence, Colin, and Robert Z. Lawrence. "Manufacturing Wage Dispersion: An End Game Interpretation." *Brookings Papers on Economic Activity* (1985, No. 1): 47-106.

Lawrence, Robert Z., and Matthew Slaughter. "Trade and U.S. Wages in the 1980s: Giant Sucking Sound or Small Hiccup?" *Brookings Papers on Economic Activity: Microeconomics* (1993), 161-210.

Leamer, Edward E. "Trade, Wages, and Revolving Door Ideas." NBER Working Paper No. 4716, April 1994.

Mann, Catherine L. "The Effect of Foreign Competition in Prices and Quantities on the Employment in Import-Sensitive U.S. Industries." *International Trade Journal* 2 (Summer 1988): 409-444.

Mark, Jerome S. "Technological Change and Employment: Some Results from BLS Research." *Monthly Labor Review* 60 (April 1987): 26-29.

Organisation for Economic Co-operation and Development. *Historical Statistics: 1960-1993.* Paris: OECD, 1995.

Revenga, Ana L. "Exporting Jobs? The Impact of Import Competition on Employment and wages in U.S. Manufacturing." *Quarterly Journal of Economics* 107 (February 1992): 255-284.

Richardson, J. David. "Income Inequality and Trade: How to Think, What to Conclude?" *Journal of Economic Perspectives* 9 (Summer 1995): 33-56.

Ruhm, Christopher J. "Are Workers Permanently Scarred By Job Displacements?" *American Economic Review* 81 (March 1991): 319-323,

Sachs, Jeffrey D., and Howard J. Shatz, "Trade and Jobs in U.S. Manufacturing." *Brookings Papers on Economic Activity* (1994, No. 1), 1-84.

Shelburne, Robert C., and Robert W. Bednarzik. "Geographic Concentration of Trade Sensitive Employment." *Monthly Labor Review* 116 (June 1993): 3-13.

Topel, Robert H. "What Have We Learned from Empirical Studies of Unemployment and Turnover?" *American Economic Review* 83 (May 1993): 110-115.

Topel, Robert H. and Michael Ward. "Job Mobility and the Careers of Young Men." *Quarterly Journal of Economics* 107 (May 1992): 441-479.

U.S. Department of Labor, Bureau of Labor Statistics, *Geographic Profile of Employment and Unemployment.*" Washington, D.C.: U.S. Government Printing Office (various years).

Wood, Adrian, "How Trade Hurt Unskilled Workers." *Journal of Economic Perspectives* 9 (Summer 1995): 57-80.

Table 1: Sample Means For Key Variables

Variable	Period of Displacement: 1984-1986	1989-1991
Dependent Variables		
Employed at Survey Date	79.8 %	62.8 %
Joblessness Avoided	8.9 %	10.7 %
Weeks of Joblessness	29.3 wks	22.1 wks
Weekly Wages at Survey Date	$324	$271
Health Insurance at Survey Date	71.7 %	58.5 %
Loss of Health Insurance	18.8 %	26.0 %
Explanatory Variables		
Import Penetration Rate	13.0 %	15.1 %
Export Penetration Rate	8.0 %	13.0 %
Computer Investment Ratio (in 1987)	6.8%	6.9%
Male	64.7 %	62.1 %
White	86.5 %	81.8 %
Married	69.3 %	66.2 %
Education:		
<12 years	19.5 %	20.9 %
12 years	50.3 %	42.1 %
13-15 years	17.3 %	23.6 %
16 years	9.2%	10.6 %
>16 years	3.7 %	2.8 %
Age	39.0 yrs	39.2 yrs
Children in Household	49.0 %	45.1 %
Predisplacement Job Tenure	6.9 yrs	5.7 yrs
Worker Anticipated Displacement	59.1 %	54.7 %
Reason for Displacement:		
Slack Work	34.7%	46.2%
Plant Closing	56.3 %	42.8 %
Position or Shift Abolished	9.0 %	12.0 %
Unionization Rate	28.1 %	21.3 %
State Unemployment Rate	7.4 %	6.0 %

Note: Sample includes persons between the age of 25 and 60, at the survey date, who were displaced from manufacturing jobs during the time period specified. Table shows sample means of specified variables, weighted so as to be nationally representative.

Table 2: Determinants of the Probability of Job Loss

Sample/Variable	(a)	(b)	(c)	(d)	(e)	(f)
Period of Potential Displacement: 1984-1986						
Import Penetration Rate	1.006	.6971	.6913	.2747	.5037	.5280
	(.1973)	(.2052)	(.2101)	(.2249)	(.2189)	(.2197)
Export Penetration Rate	.7389	.4198	.5029	1.493	.2356	.2008
	(.3179)	(.3211)	(.3300)	(.3769)	(.3391)	(.3470)
Change in Product Demand		-1.051	-1.057	-1.031	-1.424	-1.436
		(.2304)	(.2074)	(.2186)	(.2408)	(.2408)
Industry Earnings				-1.076		
				(.1988)		
Computer Investment Ratio					1.495	1.523
					(.5173)	(.5312)
Period of Potential Displacement: 1989-1991						
Import Penetration Rate	.7602	.6579	.4654	.4153	.4288	.4351
	(.1481)	(.1553)	(.1592)	(.1661)	(.1595)	(.1611)
Export Penetration Rate	-.2799	-.3640	-.1654	-.0820	-.2146	-.1353
	(.1659)	(.1706)	(.1797)	(.1975)	(.1799)	(.2096)
Change in Product Demand		-.4752	-.6571	-.6546	-.8151	-.8931
		(.2002)	(.2151)	(.2153)	(.2262)	(.2448)
Industry Earnings				-.1734		
				(.1687)		
Computer Investment Ratio					.8694	.6959
					(.3854)	(.4344)
Demographic Covariates	No	No	Yes	Yes	Yes	Yes

Note: Sample includes persons between the age of 25 and 60 at the survey date who were either working in manufacturing jobs at the time of the interview or who were displaced from manufacturing employment during the time period specified. Equations show coefficients from probit equations estimated by maximum likelihood. Asymptotic standard errors in parentheses. Specifications (e) and (f) differ in that the former includes observations for all industries, with a zero values entered for the computer investment ratio in cases where information on this variable is missing, whereas the latter includes observations only for those industries for which data on the computer investment ratio were obtained. Sample sizes are 9359 in columns (a) through (e) and 9235 in column (f), for 1984-86. Corresponding sample sizes for 1989-91 are 9618 and 9227, respectively.

Table 3: Predicted Displacement Probabilities at Different Trade Penetration Rates and Computer Investment Ratios

	1984-1986		1989-1991	
	1 St. Dev. Below Mean	**1 St. Dev. Above Mean**	**1 St. Dev. Below Mean**	**1 St. Dev. Above Mean**
Import Penetration Rate	7.29%	8.73%	10.86%	12.84%
Export Penetration Rate	7.81%	8.16%	12.11%	11.53%
Computer Investment Ratio	6.96%	9.12%	11.18%	12.49%

Note: Predicted displacement rates are calculated from probit estimates of specification (f) in Table 2, with variables other than the respective trade penetration rate or computer investment ratio set equal to their sample means. The standard deviations of the import penetration rate, export penetration rate, and computer investment ratio are respectively 9.1%, 5.9%, and 4.8% for the 1984-86 sample; 11.5%, 10.8%, and 4.8% for 1989-91.

Table 4: Determinants of Survey Date Employment and Postdisplacement Joblessness

	Employed at Survey Date			Joblessness Avoided			Duration of Joblessness		
Sample/Variable	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Period of Displacement: 1984-1986									
Import Penetration Rate	-.5072	-.2768	-.4938	-1.456	-1.436	-1.706	.3219	.4047	.3766
	(.4884)	(.5774)	(.6263)	(.7722)	(.8982)	(.9295)	(.4052)	(.4553)	(.4927)
Export Penetration Rate	3.108	2.958	2.186	.9974	.7481	-.0256	1.046	.6275	.3770
	(.8844)	(.9924)	(1.074)	(.9756)	(1.158)	(1.275)	(.6415)	(.7273)	(.7981)
Computer Investment Ratio			2.561			3.063			.6863
			(1.825)			(2.293)			(1.308)
n	715		705	706		696	644		636
Period of Displacement: 1989-1991									
Import Penetration Rate	-.0836	.2844	.3481	.4935	.9784	.8502	-.1423	.2068	.2727
	(.3218)	(.3568)	(.3609)	(.4350)	(.4737)	(.4827)	(.3315)	(.3453)	(.3515)
Export Penetration Rate	.5356	.3113	.7979	.5684	.5959	.5074	-.0346	-.2067	.1548
	(.3751)	(.4187)	(.5253)	(.4921)	(.5548)	(.7228)	(.3743)	(.4007)	(.5112)
Computer Investment Ratio			-1.690			.7067			-1.460
			(1.161)			(1.698)			(1.073)
n	1026		982	1011		967	921		881
Demographic Covariates	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Note: See note to Table 2. Sample includes persons displaced during the time period specified. Specifications (b) and (c) include all of the demographic covariates held constant in Table 2, except for relative industry earnings. Job tenure, region of the country, and the type and year of displacement are also controlled for. The joblessness duration equations were estimated as Cox proportional hazard models, the other equations as maximum likelihood probit models.

Table 5: Determinants of Survey Date Earnings and Health Insurance Coverage

	Log of Weekly Wages at Survey Date			Health Insurance at Survey Date			Loss of Health Insurance Coverage		
Sample/Variable	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Period of Displacement: 1984-1986									
Import Penetration Rate	.2373 (.2119)	.3278 (.2191)	.1900 (.2339)	-.3405 (.3669)	.0703 (.6523)	-.5503 (.7062)	.4498 (.6633)	.2031 (.7671)	.7328 (.8318)
Export Penetration Rate	.7548 (.3212)	.5151 (.3241)	.2563 (.3568)	1.434 (.8882)	1.639 (.9885)	.7064 (1.121)	-.9385 (1.021)	-2.113 (1.158)	-1.313 (1.302)
Computer Investment Ratio			1.164 (.6468)			4.449 (2.070)			-3.802 (2.413)
n	525		516	570		560	457		447
Period of Displacement: 1989-1991									
Import Penetration Rate	-.2792 (.1814)	-.2976 (.1801)	-.2663 (.1812)	-.1182 (.4337)	.2954 (.4812)	.3212 (.4896)	-.4120 (.5950)	-.6702 (.6571)	-.5927 (.6652)
Export Penetration Rate	.2948 (.2015)	.2425 (.1995)	.5138 (.2487)	2.196 (.5434)	2.231 (.6074)	1.608 (.7328)	-1.033 (.6102)	-1.166 (.6879)	-.2367 (.8434)
Computer Investment Ratio			-.8865 (.5626)			1.460 (1.592)			-2.120 (1.893)
n	583		556	632		602	477		453
Demographic Covariates	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Note: See notes to Table 2 and 4. The equations include the same explanatory variables as the corresponding specification in Table 4. The earnings equation also includes predisplacement weekly wages as a regressor in all specifications. The wage equations are estimated by OLS, the health insurance equations as maximum likelihood probit models.

Table A.1: Detailed Estimates of the Determinants of the Probability of Job Loss

	Period of Potential Displacement	
Variable	**1984-1986**	**1989-1991**
Import Penetration Rate	.6913 (.2101)	.4654 (.1592)
Export Penetration Rate	.5029 (.3300)	-.1654 (.1797)
Change in Product Demand	-1.057 (.2074)	-.6571 (.2151)
Male	-.0181 (.0417)	-.0460 (.0364)
White	.0207 (.0580)	-.1407 (.0465)
Married	-.1019 (.0468)	-.1015 (.0402)
Education: 12 years	.0051 (.0514)	-.1966 (.0458)
Education: 13-15 years	.0219 (.0628)	-.2075 (.0528)
Education: 16 years	-.1332 (.0748)	-.3935 (.0626)
Education: >16 years	-.1330 (.0971)	-.4486 (.0970)
Age	-.0381 (.0175)	-.0121 (.0157)
Age Squared	.0004 (.0002)	.0001 (.0002)
Children Present	.0473 (.0451)	-.0297 (.0393)
State Unemployment Rate	.0141 (.0105)	.0432 (.0161)
Unionization Rate	-.0009 (.0014)	-.0047 (.0014)

Note: The specification conforms to column (c) of Table 2.