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Threat Effect of Foreign Direct Investment on Labor Union Wage Premium

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Abstract

This paper explores the impact of "threat effects" of foreign direct investment on labor markets in the United States. In this context, the term "threat effect" refers to the use by employers of the implicit or explicit threat that they will move all or part of their production to a different location, even if they do not actually do so. In this paper, I construct a unique industry level panel data set and I show that the union wage premium has been negatively associated with the stock of outward FDI in the U.S. manufacturing sector for the period of 1983-1996. The union wage premium is chosen as the dependent variable to test the hypothesis that the increased capital mobility changes the nature of bargaining between workers and employers as predicted in threat effect theory.

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1. Introduction

The last few decades have witnessed growing global economic integration. Most measures of national openness to the world economy such as the share of import and exports in the GDP and the share of foreign capital in the domestic capital market have dramatically increased in both developed and developing countries. Growing numbers of studies investigating the impacts of this globalization on economic phenomena have drawn attention to labor market distortions, with an extensive focus on deepening wage inequality between skilled and un-skilled workers in the U.S. and increasing unemployment in advanced European economies. These studies concentrate on the question of whether or not the growing international trade between developed and developing countries serves as the primary cause of the increasing inequality by investigating the impact of international trade on moving the labor demand in favor of skilled workers (see Cline, 1997, Slaughter, 1998, Feenstra, 2000 for recent surveys).

The theoretical basis for these studies is mostly provided by Heckscher-Ohlin's factor price equalization theorem. The theorem predicts the decline of wages of unskilled workers in unskilled-labor-scarce-developed countries due to the decrease in the relative demand for unskilled labors, which resulted from the trade between skilled-labor-abundant-developed countries and unskilled-labor-abundant-developing countries. With much of the empirical works that attempt to find a decrease in demand for unskilled labor in developed countries, the consensus is that the price changes caused by trade have not been large enough to account for the trend of wage inequality (see Slaughter, 1999 and Baldwin, 1995, for survey; Wood, 1994, 1998, however, has found larger effects). Not surprisingly, most studies that have closely studied production integration by outsourcing and foreign direct investment between developed and developing countries have found contrasting results. While Feenstra and Hanson (1996) found that the change in outsourcing is positively associated with the change in the skilled wage share for the period of 1979-1990, Slaughter (2000) reported that multinational enterprises (MNE) transfer activity did not contribute to the U.S. skill upgrading for the period of 1973-1994.

However, fear of the possible negative impact of globalization on the economy of developed countries, such as the job insecurity of the current workforce has been ever increasing among the public. According to recent studies of the perceptions of American workers about globalization (Scheve and Slaughter 2001), even though the majority of American workers acknowledge gains and benefits from international transactions, they are concerned with the adverse labor market impacts of the international transactions and they tend to weight the costs more heavily than the benefits.

Accordingly, several researchers have suggested the need for a new perspective to investigate the impact of global economic integration, especially international capital mobility. They argue that the previous studies have attempted to find a decreased relative demand for unskilled workers, have overlooked the impact of a change in the elasticity of the relative demand for unskilled/skilled workers on the nature of the bargaining relationship between workers and employers resulting from economic integration. The new perspective can be referred to as "*Threat effect*" – it suggests that the threat by firms to move production abroad, or the threat to outsource may have an important impact on wages and profits even in the absence of large price or quantity changes due to changes in the environment of capital mobility, such as the establishment of NAFTA and WTO. (see Crotty, Epstein and Kelly, 1998; Rodrik 1997; 1999, other authors who have mentioned threats as potentially important are Freeman 1995, Slaughter 1998a, and Budd and Slaughter, 2000). Sometimes this is referred to as the *bargaining channel* (Reddy 2000).

Among others, the threat effect is well described in Freeman (1995):

> It isn't necessary that the West import the toys. The threat to import them or to move plants to less-developed countries to produce the toys may suffice to force low-skilled westerners to take a cut in pay to maintain employment. In this situation, the open economy can cause lower pay for low-skilled westerners even without trade; to save my job, I accept Chinese-level pay, and that prevents imports [or moving plants]. The invisible hand would have done its job, with proper invisibility.[1]

[1] Words in brackets are added.

Several theoretical studies explain the effect of strategic foreign direct investment (FDI) on wage and employment not only in the hosting country, but also in the home country.[2] By using a Nash-Bargaining model, they examine the strategic bargaining relationship between workers (union) and employers (management) (Rodrik, 1997; 1999; Zhao, 1995; 1998; Bughin and Vannini, 1994; Naylor and Santoni, 1999). These studies treat outward FDI as the increasing outside option that the firm could rely on when bargaining with the labor union in the home country breaks down in a Nash-Bargaining setting. In general, most of these studies found that an increased outside option had a negative impact on the wage level for union members. The direction of the impact on employment depends on the union's utility function which reflects the union's policy on employment.

There has been a relative lack of empirical work that tries to prove the threat effect using quantitative measures. Only a few studies have tried to relate outward foreign direct investment to the U.S. labor market. For instance, Slaughter (2000) focuses on the effect of multinational enterprises (MNE) activity measured in various ways on the wage differential between production (less-skilled) and non-production (more-skilled) workers to test the hypothesis that MNEs' transfers have contributed to skill upgrading within U.S. industries. He finds that most of his measures of MNE transfers have small and imprecisely estimated effects on the U.S. relative labor demand. In the study of union wage sensitivity to trade and protection, Gaston and Trefler (1995) include the majority-owned foreign affiliates (MOFA) employment, i.e. employment outside the U.S. hired by U.S. multinationals from their majority-owned foreign affiliates as an alternative proxy for the firm's bargaining strength. They find that MOFA employment has a negative but not significant impact on the wage premium in the union sample. However, they did not look at within industry variation since they looked only one time cross-section variation. Therefore this study is different from Gaston

[2] To answer the question of why firms invest abroad itself is not the main purpose of this study. Since threat effect results from the very fact that firms can go abroad more easily, it can be utilized no matter what the firms' purposes of abroad investment are. As to the question of why multinational firms go abroad, studies cite primarily two reasons: (1) access to the markets (horizontal FDI), (2) looking for factor price differences (vertical FDI). Traditionally, horizontal FDI has been a major form of FDI of US headquartered multinationals. A recent study finds that vertical FDI is more common and suggests to distinguish different types of FDI according to how multinationals' strategies respond to government policy (See Hanson et al, 2001).

and Trefler (1995) in two aspects: (1) MOFA employment share is treated as a proxy for the employers' outside option rather than a proxy for a employer's bargaining power.[3] (2) This study investigate the within industry variation by using panel data analysis.

This paper will discuss the impact of enhanced capital mobility on the union wage premium by focusing on the threat effect of foreign direct investment. It attempts to fill in the gap between the theoretical and empirical work on the threat effect by suggesting one way to assess the validity of a threat effect and measure its impact through an empirical study. The impact of the trend of outward FDI of U.S. firms on the trend of union wage premiums during 1983 to 1996 is directly investigated by constructing a unique panel dataset from three well-known public datasets.

The union wage premium is chosen as the dependent variable to test the hypothesis that the increased capital mobility as an industry-specific change affects the bargaining outcome or rent sharing between workers and employers by altering the nature of the bargaining as predicted in threat effect theory. There are two reasons to focus on union wage premium in this study. First, the threat effect may occur more explicitly in a bargaining setting as will be described in the following section so that the union wage premium as direct bargaining outcomes will be reflected by the threat effect if any. Secondly, in relation to the study of wage dispersion between skilled and less skilled workers, this study looks further for the relevant factors that can affect the de-unionization process by decreasing bargaining outcomes among certain skilled group to investigate the widening wage gap. The study of union behavior has provided the evidences for the facts that the union has been played important role in narrowing the wage gap among different groups and therefore de-unionization is an important factor in explaining the rise in wage inequality (see DiNardo, Fortin and Lemieux, 1996). By investigating the impact of capital mobility on the union's bargaining outcome directly and also by showing that the union wage premium moves with the wage differentials among less-skilled workers, we can distinguish the impact of capital mobility on the specific group from the impact on economy wide.

In this paper the union wage premiums are computed as the inter-industry wage differential for union members as compared to the average worker in the U.S. manufacturing

[3] The bargaining power is assumed to be constant in a traditional Nash bargaining model.

sector. In this context the present paper is related to studies that search for valid explanations to large and persistent inter-industry wage differentials observed in the U.S. in the last few decades.

To preview the result of this study, the evidence indicates a significant negative impact of FDI, measured by the MOFA's employment share in U.S. industry-wide employment, on union worker's bargaining outcomes, measured by the inter-industry union wage differential. Among union members, wages for workers who has only high school education has been more severely associated with the increase in outward foreign direct investment.

The paper proceeds as follows. Empirical implications are drawn from the theoretical considerations and a model based on simple Nash bargaining presented in section 2. Section three describes in detail the data and methods adopted in this study. Section four presents and discusses the empirical findings. In section five, I will close with some concluding remarks.

2. Theoretical Considerations of the Threat Effect in a Nash-Bargaining Model

2.1 How does the threat effect work?

The threat effect of outward FDI is closely related to the employers' likelihood of investing abroad (or moving production facility abroad) and a change in the elasticity of labor demand rather than an actual shift in labor demand. It is reasonable to assume that the likelihood of investing abroad is positively associated with the degree of ease with which investment abroad can be carried out. The degree of ease is closely related to the technological development in telecommunications and transportation as well as institutional changes such as NAFTA and the WTO, which facilitate international transactions. If workers' mobility does not increase as much as that of employers, employers will take advantage of the unequal mobility between labor and capital. If there are differences in mobility among workers, it is the less mobile workers who will be more affected by increased capital mobility. Several studies have found that more educated workers (skilled workers) are more mobile than less skilled workers (see Magnani, 1997). More specifically, if an industry has a relatively large share of foreign affiliates of production, workers in this industry perceive that their employers are more likely to

invest abroad than their counterparts in an industry that has less shares of production abroad. When it comes to the bargaining table, labor unions representing workers who are affiliated in an industry has relatively large likelihood of moving abroad will accept wage cut, so that the rent they enjoy from the monopoly power of their labor union will be negatively affected. In the following section, the generalized Nash-bargaining model is presented to understand the threat effect in broader perspective.

2.2 The Threat Effect in a Nash-Bargaining Model[4]

In this section, a simple Nash-bargaining model is presented to examine the implications of the threat effect. Let's consider a bargaining game between the labor union and firm-owner.[5] The wage and employment are determined only through bargaining process in the organized labor market and unilaterally by the firm-owner in the competitive labor market.[6] The wage level determined in the competitive market is considered to be the reservation wage, w^* for labor in the organized market. Let f and $1-f$ be the bargaining power of labor union and employer, respectively, and p^* for the profit level that the employer could attain by operating somewhere else, i.e. potential profit level by moving production facilities abroad or outsourcing. It is p^* that is affected by the firm's accessibility overseas investment, which is positively associated with the degree of ease with which the relocations or investment can be

[4] The Nash-Bargaining model has been widely used in studies that investigate the impact of openness (trade, outsourcing, or FDI) on wages and employment in the field of labor economics. The seminal work on this topic can be found in the efficient contract model in the labor market by McDonald and Solow (1981). In my paper, Blanchflower, Oswald and Sanfey's rent sharing model is used to formulate the relevant empirical question. Their model is extended to incorporate the employer's outside option. This extension can also be also found in Rodrik (1999) and Zhao (1998).

[5] The firm-owner represents shareholders, or management who share the interest of maximizing profits. Employer, the firm-owner, and management are used interchangeably in this paper.

[6] In labor economics, there are two types of models that explain bargaining between employers and unions: (1) the right-to-manage model and (2) the monopoly union model. In the right-to-manage model, while unions and employers bargain over the wage, employers decide the employment level unilaterally. In the monopoly union model framework, wage and employment both are bargained. I take the monopoly union model to draw the empirical implications in this study. See Manning (1987) for a full survey of these two models.

carried out. Therefore, the potential profit from relocations, p^*, increases as the firm has a greater access to overseas investment. p^* also increases when trade barriers lower and transportation and communication costs decrease so that the mobility of production is enhanced. The stock of FDI is a good proxy for the accessibility of overseas investment, since the more FDI stock a firm (or an affiliated industry) has, the easier the firm can access outside options. The maximization problem in a Nash bargaining can be written as follows:

$$\max_{w,n} \phi \log\left[\left(u(w)-u\left(w^*\right)\right)n\right]+(1-\phi)\log\left(\pi-\pi^*\right) \tag{1}$$

where n is the number of employees in the union. Conventional assumptions hold for the utility function of the labor union, i.e. $u'(w)>0$ and $u''(w)<0$. The concavity of the production function is also assumed and the profit function is defined as $f(n)-wn$.

The first order conditions are:

$$w: \frac{\phi \cdot u'(w)}{u(w)-u(w^*)} - \frac{(1-\phi)n}{\pi-\pi^*} = 0 \tag{2}$$

$$n: \frac{\phi}{n} - (1-\phi)\frac{f'(n)-w}{\pi-\pi^*} = 0 \tag{3}$$

Following Blanchflower, Oswald and Sanfey (1996), the result of first order approximation of the equation (5) gives:

$$u(w^*) \cong u(w) + (w^*-w)u'(w) \tag{4}$$

Substituting this into the equation (5), we have

$$w \cong w^* + \frac{\phi}{1-\phi}\left(\frac{\pi-\pi^*}{n}\right) \tag{5}$$

The wage is determined by the reservation wage available outside the organized market in the event of a breakdown in bargaining, the relative bargaining power of the two sides and the profit level per employee.

Equation (5) implies that:

(6) $$\partial w / \partial \pi^* < 0$$

The equilibrium bargaining wage must fall if the firm has more enhanced mobility of production. The empirical implication of this model is that the more foreign direct investment the firm has (i.e. the more opportunity of increasing profit level abroad the firm has), less wage difference above the competitive wage level the workers will receive. Putting it differently, having more stock of FDI within a firm (or an affiliated industry) will signify the firm's increased outside option to the labor union at the bargaining table, and labor unions bargaining with such firms will make more wage concessions than labor unions facing firms with less investments abroad. In this study, due to the difficulty of getting firm level data, the industry takes the role of the firm in the model. The hypothesis to be tested in this study is that, all else equal, a union representing workers in a firm whose affiliated industry has more outside options -- as represented by their stock of foreign direct investment abroad – is more likely to concede in wage bargaining, accordingly members will receive a smaller union wage premium.

3. Empirical Methodology, Data Preview, and Results

3.1 Data Source

To investigate the effect of the trend of outward FDI on the trend of union wage premiums, an ideal data set would both have individual firm's finance information including foreign investments and provide controls for workers' socio-economic information. However, since there are no data source of this kind, mainly three different sources of data are used to

construct a unique industry level panel dataset[7]: (1) the Merged Outgoing Rotation Group (MORG) of the Current Population Survey (CPS) data extracted by the National Bureau of Economic Research (NBER), (2) *U.S. Direct Investment Abroad* data collected by the Bureau of Economic Analysis (BEA), and (3) the National Bureau of Economic Research (NBER) Manufacturing Productivity Database.[8]

Potential inconsistencies arising from merging three different sources can be an issue for the credibility of data. However, the data merging practice has been widely used in labor economics field, and merging data by matching industry codes can be easily done since each data set reports the conversion rule to Standard Industrial Classification (SIC) categories from its own. As a result of the matching process, the complete dataset for this study includes 31 manufacturing industries for the period of 1983 to 1996.[9] As for the procedure of matching three different datasets, Census Industry Codes (CIC) of MORG are first converted to Standard Industrial Classification Codes (SIC). BEA industry classifications (ISI categories) are also converted to SIC codes.[10]

3.2 The Methodology and Data Preview

In this study, relative wages and the structure of wages across manufacturing industries will be examined to determine whether they are correlated with the difference in the average industry capital mobility measured by the average stock of outward foreign direct investments.

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[7] I used United Nations Trade Data to calculate the import penetration defined as $(imports_j/(gdp_j+imports_j+exports_j))$, where $imports_j$ refers to imports in industry *j*, gdp_j refers to domestic output of industry *j*, and $exports_j$ refers to exports of industry *j*.

[8] CPS MORG data limits the beginning of the time period studied to 1983 because questions about union status were not included prior to 1983. NBER data is available only up to 1996, and thus limit the end of the time period studied to 1996.

[9] Details for the classification of 31 manufacturing industries are in Appendix I. The BEA has 32 manufacturing industry categories: International Surveys Industry (ISI) Categories. Other Electrical Machinery (SICs 361, 362, 364, 369) is merged with Electronic Components and Accessories (SIC 367) in order to match with CPS data in this study. The CPS industry classification (ind 80) does not distinguish between Other Electrical Machinery from Electronic Components and Accessories.

[10] Matching Census data with NBER data has been widely practiced in studies that relate the labor market outcomes to industry characteristics since there are no alternatives of dataset with both individual and industry-level data. An additional matching with BEA data is practiced to obtain data for FDI in this

To do so, I use the two-step regression method. This two-step regression approach is proposed by Dickens and Katz (1987), and Krueger and Summers (1988) for their studies of inter-industry wage differentials and has been widely used to study the impact of external economic changes such as growth of trade and technical change on individuals' wages and on the inter-industry wage structure. In the study of inter-industry wage differentials, wages are assumed to be above the market-clearing wage level. As analyzed in section 2, market can reach non-clearing wage equilibrium due to some institutional reasons, for instance, collective action through union, employer's rent sharing wage setting mechanism, or gift-exchange wage setting mechanism.

In the first step, the individual earnings are regressed on individual characteristic variables and socio-economic variables with mutually exclusive industry dummies to calculate different measures of wage premiums.[11] The wage premium will be measured in three different ways: (1) inter-industry wage differentials by pooling union and non-union members, (2) inter-industry wage differentials by using only union members, and (3) inter-industry union wage differentials by including the interaction terms between industry dummies and union status in the wage equation. Two different measures of union wage premium are used to check the sensitivity of the FDI variable to the different specifications.[12] Since the union wage premium is more appropriate to the bargaining model, which is a central idea of this study, than industry wage differentials, the focus will be on the union wage premium. All inter-industry differentials in this study are weighted by industry's employment shares and normalized to compare with average workers wage level.

Estimating the union/non-union wage differentials itself has long been a highly debated issue in labor economics. The literature in this field mostly focuses on developing an appropriate econometric method to estimate the union/non-union wage differential in the presence of the potential endogeneity of union status (Lewis, 1986). Two methods are widely

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study. The matching NBER productivity dataset with BEA outward foreign direct investment data can also be found in Slaughter (1995,2000).

[11] 31 manufacturing industry dummies sorted according to their two or three digit SIC codes.

[12] This measure of union wage differential has been used as a proxy for so-called "union rent" by Cebula and Nair-Reichert (2000). Details about the regression equation will be discussed later.

used depending on the characteristics and the availability of the data on union status.[13] First, an OLS cross-section method is used based on an exogeneity assumption, i.e., the unobservables correlated with wages has no correlation with union status. This method has been widely used in studies that estimate union wage differentials in relation to the industry wage differentials (among others, Dickens and Katz ,1987; Gaston and Trefler, 1995; Cebula and Nair-Reichert, 2000). Second, the simultaneous equations model has been developed to deal with the endogeneity of unionism.[14] For instance, among many others, Macpherson and Stewart (1990) used this method to examine the impact of international competition on union and nonunion wages.

In this study, an OLS cross-section method and extended method that includes union status and industry dummy interaction terms are used for estimating the union/non-union wage differentials for two reasons. First, the OLS cross-section is not only easy to use but also the results between OLS and two-steps are not really different when calculating a trend. Thus OLS has been used in many studies that investigate the union wage differential in relation to the other economic changes as does this study. Second, despite the attractiveness of the simultaneous equations method, it can not provide useful estimates if the size of the data set is limited. Because this study only uses data for union workers in the manufacturing sector, the simultaneous equation method cannot give a consistent regression result.

In the first regression, the log of individual hourly wages is regressed on the socio-economic variables, demographic variables, and industry dummies to get the first two wage premiums: (1) industry wage premium from pooled data of union and non-union members, (2) union wage premium from only union members. Estimated coefficients of industry dummies represent the wage differentials due to an individual's industry affiliation in both cases.

$$(7) \qquad \log(w_{ij}) = a + b_h H_i + b_j D_j + e_{ij}, \quad i = 1,...,I, \quad j = 1,...,\mathrm{J}$$

[13] A semi-parametric method is also suggested to deal with the endogeneity issue. However, it has not been widely practiced and the results are similar to two-step methods. See Lanot and Walker (1998).
[14] Freeman and Medoff (1981) questioned the usefulness of using the simultaneous method by pointing out its sensitivity to modifications of specifications.

where w_{ij} is the hourly wage of individual i in industry j, H_i is a vector of individual characteristics and demographic variables, D_j is a vector of mutually exclusive dummy variables indicating industry of affiliation, and e_{ij} is a random error with mean zero and variance σ^2.[15]

The extension attempts to calculate the third wage premium, which is interpreted as "union rent" (for instance, Cebula and Nair-Reichert, 2000). The estimated coefficients of interaction terms between union status dummy and industry dummies in the cross-section regression are interpreted as the wage differential due to a worker's union status and her industry affiliation. In other words, they are the wage differences earned by a worker who is covered by a union contract and employed in an industry compared to the workers in an omitted industry in the manufacturing sector:

$$\log(w_{ij}) = \alpha + \beta_h H_i + \beta_j D_j + \omega_j^{**}(D_j^{*} U_i) + e_{ij}, \quad i = 1,...,I, \quad j = 1,...,J \tag{8}$$

where U_i is the union dummy,[16] and everything else is the same as equation (7).

The estimation is restricted to workers aged 16-76 who satisfied sample-selection rules: (1) the individual was employed in private sector; (2) the individual worked for pay more than one hour a week; (3) the individual earned more than a dollar and less than 250 dollars an hour; (4) the individual employed in a manufacturing sector except petroleum industry.[17] Although it is tempting to include the FDI variable in the above individual earnings equation, it is well known that the resulting OLS standard errors are incorrect and exaggerate the significance of the included aggregate variables (Moulton, 1985).

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[15] H_j contains schooling, labor force experience, union member, gender, race, marital status, geographic locations, veteran status, skilled level divided by the occupational categories and interactions terms between gender and schooling. The coefficients and standard errors of these variables are quite similar to those of the previous studies and are not reported here.

[16] In this study, the workers who are either union members or whose contract is covered by a collective bargaining process are classified as being unionized, and U_i =1, U_i =0 if workers are neither.

[17] Petroleum industry is not separated from oil-producing industry in BEA public data so that one can not separate the data for manufacturing sector from mining industry. An individual employed in oil or gas related manufacturing industries from CPS data are also excluded in regression.

The various mean log wage gaps among different group of workers calculated by using CPS MORG and reported in Table 1. Table 1 shows that wage dispersion between less-educated workers and more-educated workers increased during sample years and supports findings from the previous studies. The difference in log hourly wages between workers with a high school diploma and workers with less than a high school diploma increased to .46 in 1995 from .31 in 1983. At the same time, the wage gap between workers covered by collective bargaining and workers without collective bargaining decreased. Especially among workers without a high school diploma, the gap in mean log wages between workers with collective bargaining and workers without bargaining decreased from .36 to .29. The evidence suggests that the decrease in collective bargaining outcomes contributed to the increase in wage dispersion between less educated workers and more educated workers during sample periods. However, the mean log wage dispersion can be correlated with individual's socio-economic characteristics.

The estimated inter-industry union wage differentials and t-ratios from the first step regressions are reported in table 2. The explanatory power of this model in terms of R-square values stays between 0.51 and 0.53 throughout the period from 1983 to 1993 and declined to 0.47 for the last three years. The number of observation also declined to less than 29,000 for these last three years. The statistical significance of these inter-industry union wage coefficients are consistently at the 5% level except for several years in the cases of industry categories 5, 6, 7, 8, and 14. According to the regression results, for example, if a worker who is employed in a firm and also a union member (or at least covered by collective bargaining) in beverages industry (industry category 2) will earn 25% more than a worker who has exactly the same socioeconomic characteristics but is affiliated to the omitted industries (dairy and meat industries) in 1983.[18] However, differences in mean log wage gap among different groups can be associated with worker's socio economic characteristics.

To see the difference of union wage differentials between skilled and unskilled labor after controlling the observed workers characteristics that can contribute wage levels, I estimated the same regression equation using two different groups divided by skill level. In this study skill is measured by the CPS occupation classifications listed in Appendix 1. The results

in Table 3 and 4 confirm that unions have generally been regarded as useful to promoting the interests of unskilled workers (Card, 1996).

Table 5 presents the trend of FDI measured by employment share of Majority Owned Affiliates (MOFA) in U.S. employment. The average employment share has steadily increased from 20.6% in 1983 to 22.4% in 1996. Industries have relatively high MOFA employments' share are Drugs (industry category 5), Soap, cleaners, and toilet goods (6), Motor vehicles and equipment (19), and Tobacco (21).

Figure 1 illustrates a simple negative relationship between the growth in the industry's FDI measured by the employment share and the change of the industry union wage premium. The numbers that mark each data point correspond to the industry category used in this study. A simple negative relationship between the union wage premium and FDI shown in Figure 1 implies the regression results. Details about the other variables used in the second step regression are reported in Appendix 1.

The Second Step

In the second step, several inter-industry wage differentials among different groups of workers, the coefficients of 31 industry dummies or 31 interaction terms between industry dummies, and union status are regressed on several industry characteristic variables including the FDI variable. The coefficients from the first step are interpreted to be the wage premiums that are not explained by individuals' characteristics, and are attributed to their affiliation to the industry:

$$w_{jt}^{**} = a + b_p P_{jt} + b_f F_{jt} + h_{jt} \tag{9}$$

where w_{jt}^{**} is the wage premium in industry j, and P_{jt} is the vector of control variables for industry characteristics: unionization, rent, capital-labor ratio, unskilled labor share, average education level of the employee, and average establishment size as well as import penetration and proxy for technological change, F_{jt} is the outside option for the industry j measured either

[18] Workers were employed in meat and dairy products are omitted in regressions.

by the foreign affiliate's employment share or the capital stock share of U.S. industry-wide activity, and *t* indexes time.

Table 6 reports results form the second step regression. Estimates of OLS and Instrumental variables method (IV) estimates of equation (9) are reported for union wage premium specifications.[19] The same regressors are included in all specifications. I used both ordinary least squares and instrumental variables method to address the potential endogeneity of industry unionization. For the instrumental variable, I computed a composite of union hospitality by weighting the service sector union membership rate by the number of employees of each industry in 51 different locations (50 states and DC area). For instance, if the Motor Vehicles and Equipment sector has more employees in Midwest states than anywhere else and the service sector union membership in these states are higher than anywhere else, the composite of the union hospitality of the Motor Vehicles and Equipment sector will be relatively high.

The estimates from OLS are similar but to those of IV in all specifications. The first and second columns present the OLS and IV method results from the regression of union wage premium using inter-industry wage differentials among union members. The union wage premium using the estimates of the interactions terms between union status and industry dummies are used as dependent variables in the column (3) and (4). The estimates of FDI in all specifications indicate that higher ratios of the affiliates' employment share of U.S. industry-wide employment are significantly associated with lower union wage premiums. Import penetration ratios, however, are not statistically significant at any conventional level. Estimates of the proxy for technological change are all positive but not significantly different from zero. In the case of inter-industry wage differentials using pooled sample (see column 5), the coefficients of FDI and technology from OLS are positive but not significant at all. The significantly (at the 5% level) negative coefficients of import penetration ratio suggests that the firm that is affiliated to an industry where the import penetration level is relatively high, pays

[19] The disturbances in the second step regressions are heteroscedastic because dependent variables in the second-step regression equations are estimated coefficients of the first step regressions. I used GLS

lower wages to its employees than its counterparts in the industry with a low level of import penetration ratio. Notice that the FDI variable is statistically significant in both OLS and IV method in the case of union wage premium specifications. This result indicates that the FDI is not sensitive to the specification.

In specification of inter-industry wage differentials among union members, the result suggests that, assuming all employees are covered by collective bargaining, a union member affiliated to an industry with a higher level of FDI is paid less than a union member affiliated to an industry with a low level of FDI, as is predicted by the bargaining model in the previous section. The size of the FDI coefficient can also be interpreted by considering that a unionized worker is shifted from an industry with an average level of FDI abroad (21%) to an industry with no FDI. The estimated coefficients in the union wage premium specifications (column 1-4) imply that worker's union wage premium shows an increase that may range from 3.1% to 7.6% (21% times coefficients). In those industries with the highest levels of FDI such as soap, cleaners, and toilet goods, the FDI threat effect is significant. For instance, these industries have an average FDI level of 50.7% and organized workers in these industries earn 18.4% (50.7% $\times$ -0.36) less than unorganized workers with the same observable characteristics in industries with no FDI. The elasticity of union wage premium with respect to FDI ranges from 0.33 to 0.80.

As for the other control variables, the findings of this study are consistent with those of previous studies.[20] The coefficients of unionization in the union wage premium specifications are significantly positive. Since the elasticity of demand for organized workers tends to be lower as the unionization increases, the employer will have to pay more to organized labor (Dickens and Katz, 1987). The inter-industry differentials are also higher in more unionized industries, which supports the so-called union-threat effect. The firm will pay more to its employees in a more unionized industry to prevent its employees from being organized (Dickens, 1985).

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estimation with weights proportional to the covariance matrix of the estimated wage differentials from the first step regressions. The GLS estimates are very similar to OLS and I report OLS estimates here.

[20] Dickens and Katz (1987) provide a comprehensive review of all the existing study of industries wages.

The positive coefficient of average schooling of employees in the industry in the case of the inter-industry wage specification suggests that the firm paying higher wages attracts the better qualified workers even though the higher wages are not set explicitly to compensate them for their socio-economic characteristics (Dickens and Katz, 1987). The negative coefficient of unskilled labor share measured by occupation category at the industry level suggests that the firm affiliated to the industry where the unskilled jobs are relatively greater has stronger bargaining power so that it can keep the wage relatively lower.

Although coefficients of average establishment size variable in every union wage premium specifications are significant at the conventional level, they are close to zero. In previous studies (for instance, Bloch and Kushin, 1978 and Podgursky, 1986), the union wage premium decreases with establishment size.[21]

To see the different impact of employer's mobility on different groups of workers who are divided according to their union membership and education level, the second step regression is conducted separately for different groups and the results are reported in table 7. Among all workers in manufacturing sectors (pooled sample in table 7), higher import penetration is significantly associated with lower wage level for workers with 12 years schooling (up to high school diploma), while technological change is positively and significantly associated with higher wage level. Estimate of FDI variable is not statistically significant at any level in pooled sample specifications. However, it becomes significantly negative in union sample specifications. Particularly, the workers with only 12 years schooling suffer from the decreased bargaining outcome due to the higher outward FDI level while bargaining outcomes for unionized workers with more than high school educations are not influenced by the employers' increased mobility. The import penetration ratio is also an important factor of reduced union worker's bargaining outcomes. Note that while import penetration has negative impact on both inter-industry wage differential and union wage premium, FDI has negative impact on only union wage premiums. This difference implies that

[21] There are two approaches to explaining why the union/non-union wage differential is affected by establishment size. First, the threat of unionization is greater in larger nonunion firms so they may give higher compensation to its employee than smaller firms. Second, bigger firms give high wages to enhance workers' effort level, reduce workers' turnover, or to attract better employees. These two

outward FDI influences worker's wage level through the bargaining channel as the threat effect model suggests, while import does this through demand and supply process directly.

The estimation method used in this study assumes that industry's outward FDI levels are randomly distributed and that the change of stock of FDI is independent of industry characteristics. This exogeneity assumption is a strict assumption. To assess the validity of this assumption, I regressed the changes in outward FDI on the initial level of union wage premiums, growth of union wage premium, and other industry characteristics. The results are reported in table 8 and the results from the regression suggest that industry's outward FDI is not significantly associated with the wage premium of union members.

4. Discussion and conclusion

This study has shown that the increased outward investment in U.S. manufacturing industries has been negatively associated with the wage premium that union members shared during the period from 1983 to 1996. Unlike previous studies of the impact of FDI on the workers' welfare, this study attempts to understand the implicit threat effect of FDI by looking at the bargaining outcome instead of investigating the change in the relative demand for unskilled labor. The previous studies have focused on understanding the changes in U.S. labor demand in favor of skilled labor, and related this phenomenon to changes of trade, outsourcing, and technology. We may fail to detect important changes in the welfare of unskilled workers if we narrow our search to such channels. The abundance of anecdotes about the actual displacement of the traditional worker's job and the worker's ever-growing sense of job insecurity nowadays keep stimulating us to identify the right channel for analysis.

Threat effect theory may lead us to the right channel. This study chooses the manufacturing sector since blue collar and less educated workers are over-represented in this sector.[22] This study also looks at workers who are covered by collective bargaining to see the explicit impact of globalization on the bargaining outcome, because workers' fear, if any, must

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approaches predict the union wage premium is smaller in bigger establishments. Similar findings have been reported previously.

affect their performance at the bargaining table. As the threat effect theory suggests, this study finds that the firm's enhanced locational mobility due to the globalization process (e.g. the recent launches of NAFTA and WTO) is effective in pressuring workers, who fear of losing their jobs, to concede at the bargaining table and accept a lower share of the rent.

[22] 23 percent of those with not more than a high-school education, as compared to 14 percent of those with a college education, were employed in manufacturing sector as of 1987 (Berman *et al*., 1994).

Appendix 1 Description of variables, data sources and sample statistics

The union wage premium data are calculated through three different ways as discussed in the paper.

The Unionization data are calculated by using Freeman and Medoff's method (1979). Union membership percentage was calculated as:

$$U_j = \frac{\sum_i A_{ij} W_{ij}}{\sum_i W_{ij}} \bullet 100 \qquad \text{(A-1)}$$

where U_j is the percentage of workers in industry j who are unionized, A_{ij} = 1 if worker i is employed and in a union, and is zero otherwise, W_{ij} is the CPS sampling weight. The MORG of CPS data are used for the computation.

The Foreign Direct Investment data are derived by using *U.S. Direct Investment Abroad* data from Bureau of Economic Analysis (BEA) and National Bureau of Economic Research (NBER) manufacturing industry productivity data. The BEA has collected the information about U.S multinational enterprises through censuses and surveys. Within manufacturing, for its publicly released data the BEA aggregates parents and affiliates into 32 different industries in manufacturing sector. Some are individual three-digit SIC industries; others are the sum of several three-digit or two-digit SIC industries. NBER manufacturing productivity data include four-digit SIC industries. The actual FDI data are calculated either as the employment share of Majority-owned non-bank foreign affiliates of non-bank U.S. parent (MOFA)[23] in the U.S. industry wide employment or as the capital stock share of MOFA in the U.S. industry wide capital stock. 31 manufacturing industry categories are used in this study.

The Import Penetration data are calculated by using United Nation's Trade Data. The import penetration is defined as ($imports_j$/(gdp_j+$imports_j$+$exports_j$)), where $imports_j$ refers to imports in industry j, gdp_j refers to domestic output of industry j, and $exports_j$ refers to exports of industry j.

The Rent is measured by rent residual based on the method of Leamer et al. (2000) by using NBER manufacturing industry productivity data:

$$\frac{VA_i - w \cdot EMP_i}{EMP_i} = \alpha + \beta \cdot \frac{Capital}{Emp} + \varepsilon_i \qquad \text{(A-2)}$$

where the coefficient a represents the per-worker cost of non-wage benefits plus average rents, b represents the capital-rental costs, and e is the rent residual. Since it is impossible to separate from the constant that part which represents average rents, I use only the estimated rent residuals.

[23] Majority-owned affiliates (MOFA) are those in which parents hold at least a 50% ownership stake.

The Capital Labor Ratio data are computed by using NBER manufacturing industry productivity data.

The Unskilled Labor Share data are derived as:

$$S_j = \frac{\sum_i B_{ij} W_{ij}}{\sum_i W_{ij}} \bullet 100 \qquad \text{(A-3)}$$

where S_j is the percentage of workers in industry j who are unskilled labor, B_{ij} = 1 if worker i is employed and unskilled labor and is zero otherwise, W_{ij} is the CPS sampling weight. Unskilled worker is defined according to his/her occupation by using the CPS occupation classification. CPS occupation classification 403-469, 499, and 863-889 are used as the unskilled occupations. The MORG of CPS data are used for the computation. This method of classifications is used in Gaston and Trefler (1994).

The Technological Change is measured by the share of engineers and scientists in each industry. I used the CPS MORG data to calculate. Allen (1996) uses the share of engineers and scientists in each industry as proxies for the technological change.

The Size is the establishment size defined as log of industry employment divided by the number of establishments. The NBER manufacturing industry productivity database is used and the Economic Census data are used for the number of establishments.

Appendix 2 Industry Classification

IC*	Name of Industries (base on BEA classifications)	Constituent SIC
1	Grain mill and bakery products	204, 205
2	Beverages	208
3	Other bakery products	206, 207, 209
4	Industrial chemicals and synthetics	281, 282, 286
5	Drugs	283
6	Soap, cleaners, and toilet goods	284
7	Agricultural chemicals	287
8	Other chemical products	285, 289
9	Ferrous Metal	331, 332, 339
10	Nonferrous Metal	333, 334, 335, 336
11	Fabricated metal products	34
12	Farm and garden machinery	352
13	Construction, mining, and materials handling machinery	353
14	Office and computing machines	357
15	Other Machinery	351, 354, 355, 356, 358, 359
16	Household appliances	363
17	Household audio and video, and communication equipment	365, 366
18	Other Electrical Machinery (including Electronic components and accessories)	361, 362, 364, 367, 369
19	Motor vehicles and equipment	371
20	Other Transportation equipment	372-376, 379
21	Tobacco manufactures	21
22	Textile products and apparel	22, 23
23	Lumber, wood, furniture, and fixtures	24, 25
24	Paper and allied products	26
25	Printing and publishing	27
26	Rubber products	301, 302, 305, 306
27	Miscellaneous plastics products	307
28	Glass products	321-323
29	Stone, clay, and other nonmetallic mineral products	324-329
30	Instruments and related products	38
31	Other Manufactures	31, 39

* Industry Classifications used in this study.

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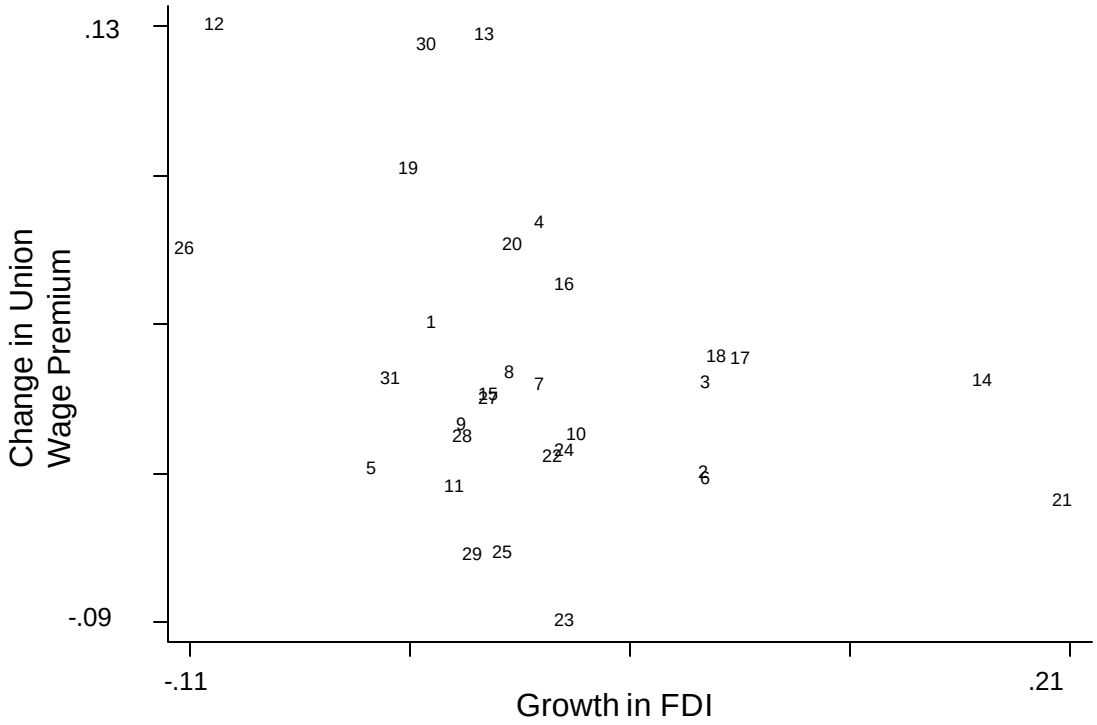
Figure 1. Differences between first three years averages and last three years averages



Note: Numbers in graph represent the industry categories used in this study

Table 1. Logarithm Hourly Wages Differentials in U.S. Manufacturing 1983-1996

Wage differentials	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95	'96
Union - Non-Union Members	0.11	0.12	0.12	0.12	0.12	0.12	0.1	0.09	0.08	0.1	0.11	0.13	0.1	0.1
Union – Non-Union Members with School 0-11	0.32	0.34	0.35	0.36	0.35	0.35	0.34	0.33	0.28	0.32	0.3	0.29	0.29	0.29
School 12+ -School 0-11	0.31	0.31	0.33	0.34	0.35	0.33	0.35	0.38	0.39	0.39	0.4	0.44	0.46	0.44
School college –School 0-11	0.44	0.44	0.46	0.48	0.5	0.47	0.5	0.53	0.53	0.51	0.52	0.54	0.56	0.55
School college+-School 0-11	0.79	0.83	0.84	0.85	0.87	0.81	0.91	0.95	0.95	1.01	1.02	1.08	1.04	1.01

Note: Calculations made by author by using CPS MORG.

Table 2. Estimated Inter-industry Union Wage Differentials (the third measure of wage premium)

Industry	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	0.28	0.23	0.19	0.23	0.21	0.21	0.23	0.24	0.18	0.18	0.18	0.31	0.21	0.25
	(10.10)	(8.14)	(7.06)	(8.00)	(6.80)	(6.35)	(7.30)	(7.76)	(5.63)	(4.97)	(5.19)	(7.91)	(5.45)	(5.91)
2	0.25	0.28	0.27	0.26	0.25	0.26	0.19	0.18	0.17	0.25	0.12	0.21	0.24	0.26
	(6.68)	(7.74)	(7.75)	(7.24)	(6.28)	(6.23)	(4.49)	(4.15)	(3.79)	(5.22)	(2.63)	(3.83)	(4.37)	(5.08)
3	0.16	0.20	0.11	0.18	0.21	0.16	0.21	0.13	0.15	0.10	0.17	0.18	0.10	0.19
	(5.51)	(6.63)	(3.71)	(5.58)	(5.99)	(4.67)	(6.12)	(4.03)	(4.31)	(2.64)	(4.33)	(4.31)	(2.31)	(4.10)
4	0.05	0.01	0.06	0.07	0.11	0.06	0.02	0.10	0.08	0.10	0.10	0.17	0.06	0.07
	(2.31)	(0.52)	(2.35)	(2.70)	(4.58)	(2.54)	(0.89)	(4.07)	(3.05)	(3.36)	(3.26)	(5.10)	(1.78)	(1.88)
5	-0.09	0.07	0.05	-0.01	0.01	0.04	0.08	0.05	-0.03	-0.09	0.06	-0.08	0.05	-0.03
	(-1.70)	(-1.07)	(0.89)	(-0.20)	(0.17)	(0.69)	(1.22)	(1.00)	(-0.60)	(-1.50)	0.92	(-1.20)	0.70	(-0.50)
6	0.10	0.12	0.07	0.02	0.07	0.06	0.01	0.07	0.12	0.06	-0.01	0.13	0.07	-0.02
	(1.90)	(2.30)	(1.29)	(0.48)	(1.23)	(0.99)	(0.25)	(1.11)	(2.01)	(0.95)	(-0.20)	(2.07)	(0.92)	(-0.20)
7	0.14	-0.06	0.13	0.01	0.18	-0.05	0.11	0.15	0.13	0.1	0.1	0.05	0.03	0.12
	(1.76)	-(0.7)	(1.41)	(0.1)	(1.64)	-(0.5)	(0.87)	(1.25)	(1.25)	(0.79)	(0.53)	(0.41)	(0.16)	(0.73)
8	0.11	0.05	0.11	0.10	0.09	0.12	0.09	-0.03	-0.02	0.17	0.14	0.14	0.08	0.06
	(1.40)	(0.72)	(1.31)	(1.19)	(1.12)	(1.55)	(0.99)	(-0.30)	(-0.30)	(1.73)	(1.10)	(1.39)	(0.85)	(0.52)
9	0.13	0.13	0.13	0.14	0.14	0.11	0.11	0.11	0.07	0.07	0.12	0.12	0.08	0.15
	(5.12)	(5.25)	(5.21)	(5.61)	(5.37)	(4.19)	(4.08)	(4.28)	(2.42)	(2.38)	(4.21)	(3.67)	(2.47)	(4.18)
10	0.13	0.15	0.09	0.04	0.13	0.01	0.10	0.07	0.04	0.04	0.06	0.14	0.10	0.09
	(4.67)	(5.23)	(3.14)	(1.43)	(4.43)	(0.47)	(3.14)	(2.34)	(1.22)	(1.15)	(1.61)	(3.47)	(2.54)	(2.05)
11	0.14	0.18	0.18	0.19	0.17	0.13	0.12	0.09	0.14	0.09	0.15	0.15	0.11	0.14
	(8.58)	(11.00)	(10.70)	(10.80)	(9.25)	(6.70)	(6.10)	(4.85)	(6.94)	(4.28)	(6.74)	(6.21)	(4.42)	(5.38)
12	0.20	0.15	0.12	0.28	0.24	0.18	0.24	0.25	0.25	0.30	0.25	0.26	0.33	0.27
	(4.44)	(3.14)	(2.43)	(4.81)	(4.47)	(3.46)	(3.75)	(4.62)	(4.46)	(4.91)	(4.09)	(3.18)	(4.32)	(3.38)
13	0.10	0.10	0.11	0.16	0.09	0.17	0.19	0.16	0.15	0.17	0.10	0.18	0.30	0.22
	(2.76)	(2.73)	(2.90)	(3.98)	(2.22)	(4.05)	(4.37)	(3.75)	(3.28)	(3.40)	(1.93)	(3.26)	(5.83)	(3.54)
14	-0.09	-0.01	-0.03	-0.01	-0.03	0.05	-0.08	0.00	-0.08	-0.04	0.01	-0.03	-0.02	-0.08
	(-2.30)	(-0.30)	(-0.80)	(-0.30)	(-0.60)	0.82	(-1.50)	0.00	(-1.40)	(-0.50)	0.20	(-0.40)	(-0.20)	(-0.90)
15	0.12	0.12	0.11	0.14	0.13	0.11	0.09	0.12	0.12	0.11	0.06	0.15	0.10	0.09
	(6.97)	(6.93)	(6.42)	(7.49)	(6.99)	(5.80)	(4.50)	(5.97)	(5.53)	(4.60)	(2.29)	(6.25)	(3.70)	(3.16)
16	0.16	0.13	0.11	0.11	0.16	0.19	0.12	0.03	0.12	0.21	0.15	0.22	0.20	0.09
	(3.65)	(3.12)	(2.63)	(2.64)	(3.88)	(4.44)	(2.62)	(0.68)	(2.27)	(3.99)	(2.84)	(3.36)	(2.96)	(1.24)
17	0.12	0.08	0.06	0.10	0.10	0.07	0.06	-0.03	0.03	-0.01	0.11	0.17	0.02	0.10
	(4.55)	(3.21)	(2.27)	(3.18)	(3.16)	(2.14)	(1.76)	(-0.60)	(0.78)	(-0.30)	(2.43)	(3.53)	(0.37)	(1.89)
18	0.07	0.11	0.10	0.09	0.06	0.09	0.12	0.09	0.07	0.10	0.12	0.13	0.12	0.06
	(4.27)	(6.39)	(5.40)	(4.53)	(3.26)	(3.97)	(5.63)	(4.37)	(3.18)	(4.31)	(4.53)	(4.65)	(3.91)	(1.76)
19	0.20	0.19	0.22	0.23	0.21	0.24	0.22	0.24	0.23	0.24	0.28	0.27	0.30	0.27
	(10.80)	(11.50)	(13.50)	(14.40)	(12.90)	(14.60)	(12.80)	(13.50)	(12.80)	(13.40)	(15.80)	(14.20)	(15.40)	(12.60)
20	0.07	0.11	0.13	0.12	0.07	0.13	0.09	0.04	0.06	0.09	0.13	0.14	0.18	0.14
	(4.06)	(6.76)	(7.52)	(7.12)	(4.13)	(6.89)	(4.31)	(2.28)	(3.26)	(4.32)	(5.59)	(5.53)	(6.90)	(4.98)
21	0.16	0.24	0.36	0.23	0.29	0.29	0.36	0.12	0.23	0.47	0.18	0.19	0.27	0.18
	(2.45)	(3.30)	(5.29)	(3.18)	(4.21)	(3.92)	(4.23)	(1.23)	(2.68)	(5.60)	(2.19)	(2.03)	(2.33)	(1.40)

22	0.05	0.06	0.04	0.07	0.05	0.06	0.04	0.03	0.01	0.02	0.07	0.02	0.03	0.03
	(3.42)	(3.90)	(2.55)	(4.27)	(2.97)	(3.17)	(2.10)	(1.35)	(0.30)	(0.70)	(2.76)	(0.82)	(1.10)	(0.95)
23	0.17	0.19	0.20	0.21	0.13	0.14	0.13	0.16	0.11	0.19	0.11	0.08	0.12	0.11
	(8.77)	(9.93)	(9.68)	(9.62)	(6.40)	(6.59)	(5.47)	(6.95)	(4.45)	(6.91)	(4.15)	(2.77)	(4.10)	(3.34)
24	0.16	0.17	0.17	0.17	0.16	0.13	0.15	0.14	0.13	0.11	0.11	0.16	0.12	0.14
	(8.21)	(8.14)	(8.48)	(8.40)	(8.10)	(6.43)	(7.11)	(6.39)	(5.80)	(5.09)	(4.96)	(6.49)	(4.52)	(5.03)
25	0.27	0.30	0.32	0.29	0.27	0.29	0.26	0.28	0.23	0.26	0.25	0.25	0.27	0.19
	(14.60)	(15.60)	(16.10)	(14.50)	(13.40)	(13.40)	(11.50)	(12.70)	(10.10)	(11.10)	(9.86)	(9.03)	(9.09)	(5.87)
26	0.16	0.09	0.18	0.15	0.12	0.11	0.14	0.10	0.16	0.15	0.12	0.22	0.18	0.18
	(4.97)	(2.67)	(5.36)	(4.19)	(3.31)	(3.07)	(3.60)	(2.45)	(3.74)	(3.61)	(2.57)	(4.84)	(3.81)	(3.40)
27	0.11	0.07	0.08	0.20	0.19	0.13	0.05	0.10	0.07	0.06	0.10	0.15	0.08	0.01
	(3.66)	(2.49)	(2.50)	(5.83)	(6.31)	(3.69)	(1.41)	(2.75)	(2.02)	(1.56)	(2.67)	(3.58)	(2.04)	(0.16)
28	0.23	0.21	0.10	0.14	0.09	0.14	0.05	0.08	0.09	0.09	0.08	0.24	0.10	0.15
	(5.42)	(5.21)	(2.47)	(3.52)	(2.18)	(3.29)	(1.19)	(1.85)	(1.92)	(1.93)	(1.70)	(4.73)	(1.79)	(2.83)
29	0.20	0.16	0.17	0.22	0.18	0.15	0.18	0.13	0.14	0.19	0.17	0.10	0.09	0.15
	(7.45)	(5.63)	(5.74)	(7.38)	(5.74)	(4.55)	(5.5)	(4.12)	(3.96)	(5.49)	(4.47)	(2.36)	(2.23)	(3.34)
30	-0.04	0.00	0.05	0.08	0.06	0.04	0.00	0.06	0.01	0.08	0.06	0.09	0.16	0.12
	(-1.40)	(-0.10)	(1.72)	(2.45)	(1.77)	(1.06)	(-0.10)	(1.74)	(0.18)	(2.12)	(1.22)	(2.02)	(3.29)	(2.14)
31	0.08	0.10	0.17	0.10	0.10	0.20	0.10	0.18	0.11	0.13	0.11	0.12	0.13	0.10
	(2.53)	(3.15)	(4.52)	(2.88)	(2.83)	(5.13)	(2.55)	(4.64)	(2.78)	(2.50)	(2.60)	(2.60)	(2.59)	(1.96)
N*	34446	36011	36234	35593	35100	33224	33668	34489	32601	31230	30064	28765	28299	24481

Note: T-ratios in parenthesis

*: Number of observations in CPS MORG

Table 3. Inter-Industry Union Wage Differentials among Unskilled Labor

Industry	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	0.334	0.239	0.233	0.273	0.255	0.227	0.274	0.249	0.209	0.191	0.182	0.375	0.232	0.233
2	0.31	0.327	0.276	0.264	0.263	0.291	0.219	0.192	0.213	0.233	0.136	0.241	0.228	0.289
3	0.19	0.268	0.186	0.262	0.245	0.242	0.262	0.185	0.216	0.136	0.201	0.267	0.196	0.242
4	0.031	-0	0.02	0.045	0.127	0.084	0.029	0.101	0.079	0.104	0.079	0.153	0.065	0.111
5	-0.08	0.132	0.023	-0.05	-0	0.059	0.039	0.108	-0.04	-0.13	0.053	-0.03	0.031	0.036
6	0.118	0.108	0.113	0.036	0.166	0.099	0.104	0.138	0.186	0.224	0.089	0.178	0.059	0.023
7	-0.01	-0.06	0.068	-0.01	0.149	-0.01	-0.06	0.211	0.096	0.158	-0.01	0.057	-0.05	0.14
8	0.069	0.073	0.071	0.107	0.011	0.099	0.12	-0.03	0.055	0.133	0.088	0.187	0.08	-0.1
9	0.118	0.097	0.14	0.121	0.142	0.136	0.104	0.095	0.081	0.075	0.082	0.153	0.094	0.143
10	0.147	0.136	0.104	0.061	0.145	0.028	0.11	0.067	0.041	0.074	0.068	0.152	0.126	0.113
11	0.164	0.197	0.207	0.225	0.174	0.141	0.141	0.112	0.143	0.116	0.175	0.164	0.137	0.151
12	0.258	0.242	0.187	0.305	0.293	0.219	0.25	0.259	0.29	0.308	0.26	0.217	0.375	0.285
13	0.152	0.098	0.157	0.177	0.083	0.238	0.189	0.122	0.139	0.128	0.168	0.174	0.31	0.254
14	-0.01	0.053	0.029	-0.03	-0.02	0.218	-0.02	0.058	-0.01	-0.02	0.069	0.175	0.04	-0.01
15	0.131	0.12	0.106	0.115	0.131	0.106	0.086	0.131	0.117	0.107	0.07	0.143	0.094	0.083
16	0.145	0.135	0.11	0.141	0.144	0.154	0.158	0.086	0.166	0.226	0.157	0.274	0.183	0.135
17	0.192	0.156	0.122	0.204	0.127	0.177	0.115	-0	0.152	0.1	0.159	0.26	0.12	0.195
18	0.116	0.172	0.148	0.129	0.134	0.113	0.173	0.139	0.118	0.14	0.157	0.184	0.169	0.092
19	0.203	0.183	0.217	0.257	0.238	0.27	0.245	0.269	0.264	0.273	0.305	0.296	0.325	0.29
20	0.127	0.153	0.177	0.164	0.112	0.146	0.139	0.086	0.128	0.149	0.173	0.196	0.26	0.234
21	0.215	0.226	0.4	0.264	0.288	0.257	0.224	0.213	0.264	0.511	0.067	0.108	0.186	0.051
22	0.078	0.083	0.061	0.099	0.082	0.074	0.072	0.037	0.041	0.044	0.092	0.054	0.036	0.066
23	0.17	0.187	0.208	0.206	0.148	0.151	0.123	0.175	0.117	0.189	0.117	0.101	0.125	0.115
24	0.169	0.171	0.154	0.166	0.189	0.15	0.165	0.183	0.159	0.114	0.138	0.174	0.16	0.192
25	0.216	0.228	0.238	0.22	0.212	0.228	0.195	0.25	0.157	0.251	0.222	0.181	0.207	0.145
26	0.189	0.083	0.209	0.181	0.093	0.109	0.141	0.091	0.157	0.14	0.123	0.211	0.175	0.172
27	0.122	0.121	0.104	0.222	0.23	0.148	0.053	0.144	0.105	0.072	0.111	0.164	0.121	0.031
28	0.242	0.174	0.117	0.125	0.092	0.166	0.108	0.146	0.114	0.064	0.108	0.215	0.116	0.173
29	0.214	0.173	0.179	0.24	0.217	0.16	0.176	0.14	0.153	0.187	0.144	0.071	0.095	0.168
30	-0.06	-0.01	0.096	0.096	0.07	0.082	0.066	0.098	0.022	0.103	0.11	0.099	0.164	0.124
31	0.154	0.149	0.205	0.157	0.149	0.227	0.157	0.228	0.134	0.141	0.131	0.141	0.177	0.163

Table 4 Inter-Industry Union Wage Differentials among Skilled Labor

Industry	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	0.202	0.183	0.209	0.253	0.299	0.265	0.179	0.164	0.203	0.145	0.096	0.288	0.149	0.228
2	0.077	0.21	0.102	0.101	0.18	0.085	-0.072	-0.003	0.117	-0.023	-0.162	0.128	-0.069	0.152
3	0.155	0.359	0.079	0.181	0.151	0.177	0.171	0.031	0.13	-0.048	0.018	0.164	0.085	0.306
4	-0.029	-0.092	-0.021	-0.047	-0.021	-0.037	-0.07	0.009	-0.009	0.012	-0.026	0.009	-0.055	-0.007
5	-0.038	-0.022	0.053	0.037	-0.229	-0.006	-0.163	-0.052	-0.168	-0.075	-0.059	-0.086	0.051	-0.202
6	-0.215	0.006	-0.011	0.026	-0.022	-0.074	0.09	0.032	0.204	0.171	-0.07	0.194	-0.28	-0.511
7	-0.235	-0.281	-0.074	-0.077	-0.234	0.196	-0.342	-0.254	-0.234	0.293	-0.036	0.065	0.133	-0.227
8	-0.432	-0.333	-0.156	0.093	-0.19	-0.049	0.275	-0.196	-0.316	-0.364	0.055	0.304	-0.118	-0.171
9	-0.016	0.032	-0.008	0.021	0.011	0.03	-0.051	-0.017	0.024	-0.023	0.001	0.083	-0.045	0.115
10	0.041	0.101	-0.03	0.019	0.002	-0.126	-0.046	-0.064	0.031	0.037	-0.052	0.031	0.049	0.18
11	0.136	0.115	0.169	0.15	0.134	0.132	0.124	0.091	0.06	0.098	0.155	0.153	0.064	0.143
12	0.175	0.231	0.035	0.289	0.347	0.123	0.143	-0.004	0.193	0.515	0.219	0.277	0.203	0.22
13	0.053	0.007	0.093	0.244	0.062	0.122	0.22	0.037	0.098	0.121	0.221	0.204	0.23	0.164
14	-0.103	-0.014	-0.033	0.041	-0.044	0.179	-0.15	0.047	-0.257	-0.123	-0.046	0.367	-0.098	0.065
15	0.06	0.056	0.071	0.073	0.081	0.072	0.041	0.103	0.084	-0.012	0.034	0.101	0.032	0.079
16	0.109	0.088	0.108	0.045	0.093	0.033	0.111	0.05	0.059	0.212	0.126	0.257	0.258	0.131
17	0.076	0.056	0.091	0.17	0.087	0.174	0.075	0.045	0.141	0.043	0.117	0.225	0.212	0.304
18	0.08	0.135	0.115	0.102	0.11	0.103	0.166	0.114	0.095	0.137	0.07	0.172	0.199	0.14
19	0.048	0.078	0.058	0.105	0.069	0.094	0.136	0.037	0.181	0.139	0.167	0.234	0.238	0.202
20	0.074	0.108	0.118	0.08	0.053	0.054	0.081	0.048	0.061	0.081	0.147	0.097	0.214	0.205
21	0.334	0.033	0.373	0.445	0.254	0.288	0.363	0.002	0.456	0.411	-0.102	-0.046	0.282	0.021
22	0.083	0.065	-0.033	0.077	0.035	0.02	0.022	-0.017	-0.048	-0.069	0.019	0.014	0.03	0.032
23	0.079	0.188	0.161	0.105	0.123	0.09	0.125	0.148	0.187	0.17	0.222	0.12	0.22	0.104
24	0.033	0.02	0.049	0.041	0.106	0.013	0.042	0.071	0.033	0.003	0.082	0.159	0.093	-0.07
25	0.059	0.147	0.163	0.175	0.108	0.04	0.144	0.199	0.067	0.058	0.066	0.018	0.102	0.099
26	-0.002	0.006	0.118	0.009	-0.174	-0.17	0.066	0.035	0.002	0.007	-0.061	-0.047	-0.021	0.079
27	0.071	0.018	0.046	0.11	0.102	0.074	0.019	0.088	0.093	0.03	0.058	0.102	0.042	-0.01
28	0.199	0.216	0.161	-0.075	0.082	-0.022	-0.108	0.118	0.117	-0.078	0.043	0.164	0.025	0.075
29	0.284	0.142	0.129	0.205	0.118	0.095	0.121	0.145	0.162	0.073	0.059	0.013	0.15	0.026
30	-0.076	-0.005	0.072	0.103	0.042	0.123	-0.007	0.029	-0.068	0.031	0.041	0.126	0.296	0.011
31	0.125	0.112	0.299	0.139	0.092	0.134	0.133	0.337	0.045	0.113	0.049	0.212	0.196	0.04

Table 5. Trend of FDI measured by employment share among 31 manufacturing industries in the U.S.

Industry	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	0.237	0.197	0.226	0.247	0.239	0.232	0.187	0.185	0.18	0.18	0.202	0.228	0.19	0.174
2	0.225	0.21	0.169	0.177	0.152	0.158	0.184	0.192	0.207	0.251	0.279	0.342	0.257	0.245
3	0.288	0.306	0.292	0.291	0.284	0.205	0.273	0.316	0.353	0.365	0.385	0.37	0.373	0.384
4	0.266	0.266	0.274	0.274	0.275	0.281	0.276	0.268	0.268	0.265	0.258	0.282	0.28	0.299
5	0.496	0.492	0.507	0.504	0.505	0.5	0.454	0.48	0.484	0.476	0.455	0.445	0.454	0.463
6	0.468	0.463	0.472	0.488	0.486	0.473	0.492	0.509	0.53	0.535	0.54	0.547	0.545	0.553
7	0.192	0.178	0.184	0.207	0.209	0.207	0.184	0.171	0.164	0.16	0.149	0.2	0.226	0.182
8	0.277	0.273	0.271	0.264	0.248	0.251	0.274	0.261	0.264	0.28	0.266	0.278	0.272	0.293
9	0.043	0.043	0.046	0.045	0.039	0.027	0.02	0.02	0.02	0.016	0.018	0.03	0.034	0.035
10	0.076	0.074	0.082	0.085	0.078	0.074	0.078	0.108	0.104	0.103	0.115	0.115	0.104	0.111
11	0.096	0.093	0.092	0.093	0.09	0.088	0.09	0.089	0.087	0.084	0.081	0.075	0.073	0.094
12	0.236	0.225	0.237	0.283	0.242	0.216	0.218	0.206	0.118	0.147	0.126	0.139	0.122	0.129
13	0.24	0.232	0.242	0.26	0.289	0.265	0.259	0.261	0.257	0.223	0.207	0.237	0.224	0.248
14	0.28	0.298	0.311	0.331	0.338	0.345	0.445	0.476	0.477	0.473	0.468	0.477	0.483	0.482
15	0.111	0.11	0.106	0.112	0.104	0.1	0.113	0.108	0.112	0.113	0.108	0.11	0.105	0.11
16	0.314	0.278	0.307	0.37	0.417	0.345	0.398	0.412	0.387	0.4	0.396	0.336	0.318	0.328
17	0.186	0.183	0.169	0.08	0.068	0.057	0.112	0.125	0.121	0.122	0.128	0.265	0.307	0.249
18	0.235	0.233	0.231	0.233	0.226	0.23	0.231	0.258	0.268	0.265	0.262	0.326	0.325	0.301
19	0.447	0.422	0.43	0.428	0.404	0.421	0.437	0.444	0.461	0.421	0.405	0.399	0.395	0.415
20	0.029	0.029	0.028	0.032	0.029	0.03	0.031	0.031	0.032	0.027	0.028	0.034	0.037	0.042
21	0.426	0.423	0.411	0.402	0.423	0.442	0.484	0.519	0.529	0.572	0.597	0.61	0.653	0.64
22	0.035	0.036	0.038	0.041	0.038	0.039	0.047	0.048	0.052	0.058	0.055	0.055	0.058	0.066
23	0.022	0.019	0.02	0.016	0.014	0.015	0.03	0.038	0.037	0.039	0.043	0.048	0.047	0.053
24	0.135	0.137	0.135	0.131	0.134	0.146	0.17	0.183	0.174	0.173	0.157	0.159	0.167	0.162
25	0.022	0.024	0.022	0.02	0.019	0.02	0.021	0.018	0.019	0.019	0.022	0.027	0.026	0.029
26	0.351	0.354	0.354	0.367	0.347	0.337	0.275	0.273	0.262	0.241	0.239	0.245	0.23	0.242
27	0.071	0.068	0.069	0.075	0.072	0.072	0.065	0.072	0.069	0.067	0.071	0.066	0.069	0.072
28	0.158	0.162	0.154	0.162	0.145	0.155	0.17	0.179	0.17	0.15	0.162	0.14	0.148	0.158
29	0.087	0.082	0.085	0.089	0.08	0.082	0.087	0.083	0.086	0.079	0.077	0.082	0.078	0.075
30	0.184	0.183	0.185	0.187	0.198	0.203	0.142	0.15	0.156	0.152	0.152	0.15	0.164	0.168
31	0.16	0.177	0.166	0.165	0.123	0.121	0.091	0.109	0.108	0.129	0.115	0.128	0.125	0.138

Table 6. Wage Premium Regressions Results

Dependent Variable	Union wage premium I[a]		Union Wage Premium II[b]		Inter-Industry Wage Premium
	OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)
Share of the U.S. foreign direct investment abroad	-0.148**	-0.296**	-0.278**	-0.364**	0.183
	(0.064)	(0.115)	(0.072)	(0.114)	(0.038)
Imports	-0.011	-0.054	0.006	-0.019	-0.045**
	(0.036)	(0.051)	(0.041)	(0.050)	(0.022)
Technology	0.208	0.098	0.240	0.176	0.062
	(0.156)	(0.203)	(0.177)	(0.199)	(0.094)
Unionization	0.229**	1.367**	0.208**	0.867	0.157**
	(0.080)	(0.660)	(0.092)	(0.648)	(0.049)
Rent	0.0004	0.0006	-0.0001	0.0001	0.0003
	(0.0007)	(0.0008)	(0.0407)	(0.0008)	(0.0004)
Capital/labor ratio	-0.003	-0.010	-0.009	-0.014	-0.002
	(0.018)	(0.022)	(0.020)	(0.022)	(0.011)
Unskilled labor share	-0.441**	-0.547**	-0.098	-0.159	-0.280**
	(0.131)	(0.172)	(0.149)	(0.169)	(0.097)
Schooling	0.005	0.053	-0.032**	-0.004	0.022**
	(0.014)	(0.033)	(0.016)	(0.032)	(0.008)
Average establishment size	-0.0003**	-0.0007**	-0.0005**	-0.0007*	0.000
	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.000)
Intercept	-0.014	-0.905	0.0637	0.121	-0.178
	(0.211)	(0.573)	(0.240)	(0.562)	(0.153)
R^2	0.87	0.81	0.74	0.70	0.93

Note

[a] inter-industry wage differentials among union members.

[b] Coefficients of interaction terms between industry dummies and union status dummy in log wage equations.

1. Estimated by two-way-fixed effect model (i.e with both group and period effect)

2. Coefficients with * and **arestatistically significant atthe 10% and 5% level respectively. Standard errors are in parentheses.

Table 7. Wage Premium among different groups

Dependent Variable	Pooled sample			Union sample[a]		
	All	0-12 Years Schooling	12+ Schooling	All	0-12 Years Schooling	12+ Schooling
Share of the U.S. foreign direct investment abroad	0.183	0.030	0.041	-0.296**	-0.439**	0.006
	(0.038)	(0.048)	(0.053)	(0.115)	(0.176)	(0.223)
Imports	-0.045**	-0.092**	-0.033	-0.054	-0.239**	0.049
	(0.022)	(0.027)	(0.030)	(0.051)	(0.085)	(0.109)
Technology	0.062	0.038	0.272**	0.098	0.364	0.190
	(0.094)	(0.117)	(0.128)	(0.203)	(0.281)	(0.356)
Unionization	0.157**	0.063	-0.003	1.367**	2.447**	-0.972
	(0.049)	(0.059)	(0.065)	(0.660)	(1.107)	(1.407)
Rent	0.0003	-0.0004	0.001**	0.0006	-0.0002	0.003*
	(0.0004)	(0.0005)	(0.0005)	(0.0008)	(0.001)	(0.0016)
Capital/labor ratio	-0.002	-0.004	0.009	-0.010	-0.035	0.01
	(0.011)	(0.014)	(0.015)	(0.022)	(0.039)	(0.043)
Unskilled labor share	-0.280**	-	-	-0.547**	-	-
	(0.097)			(0.172)		
Schooling	0.022**	-	-	0.053	-	-
	(0.008)			(0.033)		
Average establishment size	0.000	0.000	0.000	-0.0007**	-0.001**	-0.0003*
	(0.000)	(0.000)	(0.000)	(0.0003)	(0.0005)	(0.0006)
Intercept	-0.178	-0.117	-0.158*	-0.905	0.544	-0.250
	(0.153)	(0.193)	(0.093)	(0.573)	(0.371)	(0.471)
R^2	0.93	0.88	0.47	0.81	0.60	0.56

Note:
[a] IV method used for union sample.
1. Estimated by two-way-fixed effect model (i.e with both group and period effect)
2. Coefficients with * and **arestatistically significant atthe 10% and 5% level respectively. Standard errors are in parentheses.

Table 8 Regression of Change in outward FDI on union wage premium growth

Dependent Variable	Change in FDI		
Union Wage Premium Growth	-0.027		-0.026
	(0.020)		(0.020)
Initial Union Wage Premiums		0.028	0.027
		(0.019)	(0.019)
Constant	-0.010	-0.010	-0.010
	(0.007)	(0.007)	(0.007)
R-Squared	0.11	0.12	0.12
Observations	403	403	403

Note: Industry and year dummies are included in all specifications.
Standard errors are in parenthesis.