ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 11, Issue 4, pp: (80-84), Month: October - December 2023, Available at: www.researchpublish.com

The Impact of Trade Agreements on Unionization Rates

Brian Towell

University of Tennessee at Martin

Martin, TN 38238

JEL Codes: F16, F66, J51

DOI: https://doi.org/10.5281/zenodo.10002570

Published Date: 14-October-2023

Abstract: **This paper investigates whether free trade agreements affect unionization rates. Union leaders have often been amongst the most vocal opponents of free trade agreements, arguing that expansion of access to international markets gives employers a reduced incentive to acquiesce to union demands, as firms can simply import the goods they need rather than paying arbitrarily high prices through the labor market. In this paper, I find evidence that unionization rates are not negatively impacted as a result of free trade agreements in the U.S., suggesting that foreign competition in the labor market impacts unions through other channels. Most notably, I predict that unions will instead lower their wage demands in response to free trade agreements, which makes union members more employable.**

Keywords: **unions, international trade, trade agreements.**

1. INTRODUCTION AND LITERATURE REVIEW

While determining factors of unionization rates and characteristics of union members have been studied fairly extensively, the impact of international trade has yet to be sufficiently incorporated as such a determinant. Hirsch (1980) looks at the impact of a number of demographic indicators on unionization rates. Booth and Chatterji (1995) incorporate measures of union bargaining power into the determination and find the expected positive relationship between the power of the union and union density. It is logical to consider reduced barriers to international trade as being a deterrent of union power, as this adds a large body of workers who can potentially undercut union demands.

Schnabel and Wagner (2003) suggest the wage differential as the primary theoretical driver of unionization rates, while noting the empirical difficulty of observing the actual differential, resorting instead to a number of proxies. This approach is explored in more detail in the model and empirical sections. I contend that unionization rates are not necessarily an increasing function of the wage premium, as high wage premiums can have an effect on employment.

2. THE MODEL

The domestic country has a mass of workers within a given industry equal to 1. These workers may join or quit a union freely, and they seek to maximize their expected wages. Denote the proportion of workers who unionize as U. Non-union workers receive a wage of 1 when employed. The union chooses a multiplicative premium $W > 1$ that its workers receive when employed. The union objective is to maximize the total wages of its constituency. All workers receive 0 when unemployed. It is initially assumed that tariffs are sufficiently high to bar any international trade.

The good is produced using only one unit of labor. Price of the good is equal to the marginal cost of production, hence a good produced by a non-union worker costs 1, while a good produced by a union workers costs W. Demand for the good is

ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 11, Issue 4, pp: (80-84), Month: October - December 2023, Available at: www.researchpublish.com

linear with slope L. Denote the quantity at which marginal value equals zero as Q^*. Thus $Q^d(P) = Q^* - LP$. It is assumed that $Q^d(1) < 1$, which guarantees that the industry faces unemployment even in the absence of unions.

The number of jobs available to union workers can be expressed as $Q^d(W) - (1 - U)$. For the labor market to reach equilibrium, it must be the case that expected wages are equal between union and non-union workers. $Q^d(1) < 1$ and $W > 1$ ensures that non-union members are always employed, thus their expected wage is simply 1. The probability of a union worker being employed is the number of union jobs divided by the number of union workers, thus the labor market equilibrium condition is $\frac{W[Q^d(W)-(1-U)]}{U} = 1$. Inserting $Q^d(W) = Q^* - LW$ and solving for U yields the equilibrium unionization rate $U = \frac{W(Q^*-LW-1)}{1-W}$. $U > 0$ is seen by noting that $\frac{W}{1-W}$ is negative since $W > 1$, and

$Q^* - LW - 1 < 0$ since $Q^* - LW - 1 = Q^* - [Q^* - Q^d(W)] - 1 = Q^d(W) - 1 < 0$ as $Q^d(1) < 1$ and $Q^d(W) < Q^d(1)$ for

$W > 1$.

The union objective function is $W[Q^* - LW - (1 - U)]$. Inserting the labor market equilibrium condition yields the union problem:

$$\max_W \; W[Q^* - LW - (1 - \frac{W(Q^*-LW-1)}{1-W})] \text{ with } \frac{\partial}{\partial W} = \frac{L(W-2)W+Q-1}{(W-1)^2} \text{ and } \frac{\partial^2}{\partial W^2} = \frac{2(L-Q^*+1)}{(1-W)^3} < 0$$

Setting the numerator of the first derivative equal to 0 yields $W = \frac{L \pm \sqrt{L^2+L-LQ^*}}{L}$. The smaller root is obviously less than 1, which would violate the union wage constraint, so the union wage is set as $W^* = 1 + \frac{\sqrt{L^2+L-LQ^*}}{L}$. Letting

$C \equiv \frac{\sqrt{L^2+L-LQ^*}}{L}$, the optimal wage is inserted into U to obtain the parameterized unionization rate, $U^* = -\frac{(C+1)(Q^*-(C+1)L-1)}{C}$.

Now consider the implementation of a free trade agreement, reducing the tariffs to a point where importing is now viable. There is a mass of foreign workers equal to F, who require the same inputs as domestic workers to produce one unit of the good. Foreign workers are paid a wage of W_F. The cost of a good produced in a foreign market is the wage paid to foreign workers multiplied by an ad-valorem tariff, τW_F, with $\tau \geq 1$, $\tau W_F \geq 1$. It is assumed that consumers prefer domestically produced goods if prices are equal.

Assume that $\tau W_F < W^*$, as otherwise the union is unconstrained by the presence of the international labor market. There are two general cases to consider. If $(1-U^*) + F < Q^d(W^*)$, the union may still keep wages at W^* with a decreased probability of employment due to the job opportunities displaced by foreign workers, or they can reduce their wage demands in order to create more jobs for union workers. If $(1-U^*) + F \geq Q^d(W^*)$, there is no residual demand for goods produced by union members, thus keeping wages at W^* simply results in total union wages of zero. Thus, the union must drop its wage premium in order to maximize their objective function.

For the case of $(1-U^*) + F < Q^d(W^*)$, the number of union jobs available is $Q^d(W) - F - (1 - U)$ for $W > \tau W_F$, or

$Q^d(W) - (1-U)$ for $W \leq \tau W_F$. Treating the autarkic problem as a constrained optimization problem with the non-binding constraint $W \leq \tau W_F$, the case with trade is the same problem with a shock applied that forces the constraint to bind, hence in the latter case $W = \tau W_F < W^*$ is the best solution within this set. The effect on the unionization rate is found by differentiating the initial labor market equilibrium rate, yielding $\frac{\partial U}{\partial W} = \frac{Q^*-2LW+LW^2-1}{(1-W)^2}$.

This cannot be signed in general. Depending on the market structure, the reduced union premium might be offset by the increased probability of finding employment that arises from a price decrease. Even if the change in unionization rate is positive, however, it is clear that the wage effects must dominate, as the union cannot obtain a higher value for its objective function in a constrained setting if they were maximizing in the autarkic case. For $W > \tau W_F$, the optimal wage is simply W^*, but union members have a lesser probability of employment, which again results in the union seeing a decrease in utility. The case where $(1-U^*) + F \geq Q^d(W^*)$ is identical to the $W \leq \tau W_F$ case from the previous example.

ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 11, Issue 4, pp: (80-84), Month: October - December 2023, Available at: www.researchpublish.com

3. EMPIRICAL STRATEGY AND RESULTS

The simplest estimating equation is given by:

$$UR_{it} = \beta_{0i} + \beta_1 FTA_t + \beta_2 U_{it} + \beta_3 Premium_{it} + \beta_4 GDP\%_{it} + \beta_5 X_t$$

FTA_t is a dummy set equal to one if the relevant free trade agreement is in place, 0 otherwise. U_{it} is the industry specific unemployment rate for year t. $Premium_{it}$ is the multiplicative wage premium that union members within industry i are paid in year t. X_t is a vector of characteristics of the national labor force during year t. This simple specification runs into two primary problems. First, there is a likely simultaneity issue between union premiums and unionization rates; higher union premiums should entice more workers to unionize, while higher unionization rates will give unions more bargaining power. Additionally, if there are time trends in the unionization rates that are not captured by the model, the coefficient on FTA will likely assign a value to the impact of the free trade agreement that is due in part to the progression of time. Addressing the former problem is done by replacing the union premium with earnings, an approach that is consistent with the literature on unionization rate determination (see Hirsch 1980). The latter problem is addressed using simple linear and quadratic time effects. Thus the estimating equation becomes:

$$UR_{it} = \beta_{0i} + \beta_1 FTA_t + \beta_2 U_{it} + \beta_3 Earnings_{it} + \beta_4 GDP\%_{it} + \beta_5 Time + \beta_6 Time^2 + \beta_7 X_t$$

The data used is unionization rates within the U.S. for selected industries from 1987-2000, a time span which centers around the implementation of the North American Free Trade Agreement (NAFTA). The years were chosen both to match available data and to avoid other sizable shocks to the unionization rate, namely China's ascension to the WTO and the introduction of Right to Work laws by states. While it is true that free trade agreements could also lead to an increase in exports by the country in question, the choice of using data on the U.S. within NAFTA helps to mitigate this concern, as the U.S. has consistently run large trade deficits within NAFTA. Unionization rates are obtained from the Current Population Survey, with statistics compiled by Hirsch and Macpherson. Unemployment statistics were retrieved from the BLS Employment and Earnings series. Average earnings by industry were taken from the U.S. Census Statistical Abstract of the United States. Union premiums are from Bratsberg and Ragan (2002), and GDP percentage is from Yuskavage and Pho (2004).

To identify the portion of the results that can be attributed to the presence of NAFTA, I compare between industries based on their vulnerability to import competition. Primarily, I treat construction and transportation as industries that should not feel any significant impact from the implementation of NAFTA, and compare results in these industries with those found in mining and manufacturing, the latter of which is split into durable goods and non-durable goods.

TABLE 1: NAFTA and Unionization Rates

	Mining		Non-Durables		Durables	
Unemployment:	-0.33927	-0.07694	-1.09679***	0.030438	1.203336***	0.405425
Industry	(.2091)	(.2721)	(.2653)	(.531)	(.2026)	(1.311)
GDP Share	5.676194**	13.31927*	4.959787***	1.817949	4.129608***	3.99635
	(1.997)	(6.123)	(.8329)	(1.344)	(.3472)	(2.607)
Premium	0.156056***	0.139144*	0.131592	-0.10871	0.347349**	0.106479
	(.0402)	(0.0601)	(.1055)	(.0969)	(.1058)	(.5641)
PostNAFTA	-0.02032**	-0.00246	-0.0272***	0.004144	-0.00991*	-0.02534
	(.0084)	(.0157)	(.0056)	(.0099)	(.0053)	(.0273)
Unemployment:		0.333532		-0.34321		0.859842
National		(.4342)		(.3572)		(1.912)
%Male		1.39772		1.996599		-3.65154
		(3.246)		(1.641)		(5.963)
%Black		-8.99625		-2.89557		0.163941
		(4.383)		(2.01)		(1.357)
HS Rate		1.636365		0.104945		-0.78388
		(1.405)		(.3215)		(.9656)
R^2	.907	.9536	.9519	.9799	.9815	.9845

* p<0.1; ** p<0.05; *** p<0.01

Robust standard errors in parentheses. Dependent variable is the unionization rate in the specified industry.

ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 11, Issue 4, pp: (80-84), Month: October - December 2023, Available at: www.researchpublish.com

Under the simplistic specification, a negative relationship between NAFTA and unionization rates is observed in most cases, though the results are not significant when incorporating the labor force control variables. In the next specification, the union wage premium is replaced with log earnings by industry. For each industry, column (1) runs this regression with no additional controls. Column (2) adds linear and quadratic time effects. Column (3) further adds labor force characteristics.

TABLE 2: NAFTA and Unionization Rates with Linear and Quadratic Trends

	Mining			Non-Durables			Durables		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Unemployment:	-0.13729	-0.20523	0.019823	-0.48342	-0.66229	0.116457	0.551593	1.235604	2.849162
Industry	(.2257)	(.1416)	(.2273)	(.3052)	(.406)	(.7268)	(.3764)	(.8094)	(2.371)
GDP Share	4.894603*	3.631205*	6.596424	2.562657*	0.95171	1.173512	1.142814	2.588363	-0.08106
	(2.076)	(3.631)	(4.263)	(1.298)	(1.462)	(2.0885)	(1.873)	(1.9175)	(2.429)
Earnings	-0.06191	0.07902	0.180908	-0.0551**	-0.03435	0.036055	-0.08837	-0.082*	-0.16099
	(.0391)	(.0525)	(.087)	(.0195)	(.0287)	(.0653)	(.0573)	(.0344)	(.086)
PostNAFTA	-0.0036	0.010419	0.019128	-0.01276*	-0.0119	0.00768	-0.0032	-0.00386	0.030886
	(.0111)	(.0104)	(.0083)	(.0056)	(.0068)	(.0152)	(.0087)	(.0068)	(.0411)
Time: Linear		-0.00899	0.004735		0.035577	-0.17054		0.455602	1.25536
		(.0049)	(.0084)		(.1146)	(.1184)		(.2681)	(1.0093)
Time: Quadratic		-2.9E-05	-0.0009*		-0.00023	-0.00012		0.000134	0.000244
		(.0002)	(.0002)		(.0002)	(.0003)		(.0002)	(.0003)
Unemployment: National			-1.36254			-0.6649			-2.30276
			(.6614)			(.4867)			(2.58)
%Male			4.946041			2.822215			7.828613
			(2.63)			(2.294)			(9.0665)
%Black			-6.13302			-3.37179			1.670383
			(3.453)			(1.6)			(1.9307)
HS Rate			0.547045			0.158058			1.203519
			(1.179)			(.6351)			(1.6684)
R^2	.8533	.9468	.9916	.9621	.9688	.9816	.9713	.989	.9927

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Robust standard errors in parentheses. Dependent variable is the unionization rate in the specified industry.

In every case, a predicted negative correlation between NAFTA and unionization rates turns positive when accounting for labor force characteristics and time trends. However, the possibility remains that unionization trends as a whole strengthened in the years following NAFTA's implementation, and that the above sectors would have seen their unionization rate change increase by even more if NAFTA had not been adopted. NAFTA should not have had any impact on construction unions or transportation unions; Table 3 displays the differences between the PostNAFTA coefficient on both of these industries compared with mining and manufacturing industries when utilizing specification (3) from Table 2.

TABLE 3: Comparison with Other industries

	Mining	**Non-Durables**	**Durables**
Construction	.0322854	.0208374	.0440234
Transportation	.0198157	.0083677	.0315537

4. SUMMARY

I find no evidence that unionization rates in the U.S. have been negatively impacted by NAFTA. While theory suggests that the unions should be worse off overall as a result of free trade agreements, the data advocates that any harm unions experience is occurring through channels other than declining rates of membership. As indicated in the model, one possible explanation is that unions have lowered their demands in the wake of NAFTA, which has in turn made the union members easier to employ, causing NAFTA to actually have a net positive impact on unionization rates.

REFERENCES

[1] Booth, Alison L., and Monojit Chatterji. "Union Membership and Wage Bargaining When Membership Is Not Compulsory." *The Economic Journal* 105.429 (1995): 345-60

[2] Bratsberg, Bernt, and James F. Ragan. "Changes in the Union Wage Premium byIndustry." *Industrial and Labor Relations Review* 56.1 (2002): 65-83

[3] Hirsch, Barry T. "The Determinants of Unionization: An Analysis of Interarea Differences." *Industrial and Labor Relations Review* 33.2 (1980): 147-61

[4] Hirsch, Barry T., and David A. Macpherson. www.unionstats.com

[5] Schnabel, Claus; Wagner, Joachim (2003): Determinants of Trade Union Membership in Western Germany: Evidence from Micro Data, 1980-2000, IZA Discussion paper series, No. 708

[6] Yuskavage, Robert E., and Yvon H. Pho. *Gross Domestic Product by Industry for 1987-2000* Bureau of Economic Analysis, 2004