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Union Membership with Import Liberalization

Stephen B. Blumenfeld, Aaron Crawford, and Andres G. Victorio

***Abstract*—**New Zealand's product markets experienced a surge in import competition beginning from the late 1970's when its government began to promote a policy of more open markets. This study considers how the trade liberalization aspect of the policy may have influenced unionization and union-organizing success. For describing the trade liberalization, a model shows how the removal of import tariffs can lead to countervailing influences upon the union membership of a domestic firm. The evidence supports the prediction that union membership has been decreased rather than increased. In the context of debates concerning globalization, it can be said that the power of unions has been diminished.

***Keywords*—**Imports, tariffs, unions, wages.

I. Introduction

THERE are many reasons for why import tariffs and union membership can be related to one another. One of the enduring ones is from the Heckscher-Ohlin theorem [1]-[2]. One prediction from the theorem is that domestic wages are likely to fall whenever two countries decide to engage in trade. This fall poses a threat to the viability of unions by reducing a union's ability to extract higher wages and benefits for its members. More specifically, goods produced in foreign markets present a competitive threat to high union wages and comfortable employee benefits. This clearly affects the ability of trade unions to take wages out of competition and explains why trade unions in capital-abundant countries typically support trade protectionism.

More recently, unions are described as wanting to counteract this fall by supporting protectionist trade policies [3]-[4]. Among these policies is the legislation of tariffs upon the imports that compete against the products of employers. That is, protectionist trade legislation is apparently used by unions to limit foreign competition and, in turn, to sustain premium wages and benefits for their members.

This article synthesizes the debate by describing a model for how a relationship between trade liberalization and union membership can be further supported. A model is used to illustrate two mechanisms for how the removal of tariffs can influence membership. One is through a reduction in the revenues that a domestic firm can earn. Another is through a reduction in the firm's demand for workers. In both cases, the influences go through a worker's decision concerning whether or not to join a union.

The evidence is based upon the experience of New Zealand (NZ) for between 1992 to 1998. It suggests that union membership has fallen and that the removal of import tariffs may have been largely responsible for the fall. In the simplified context of the model, this pattern is the result of a domestic firm experiencing a fall in revenues because of import competition. For overall membership to fall, the effect on membership of this fall would have had to be larger than the one exerted by the firm deciding to reduce its demand for labor.

Additionally, the evidence suggests that opportunity costs can have the potential of decreasing membership. These opportunity costs may materialize in the form of overall wages increasing more than union wages, or overall employment demand increasing for all workers.

The theory and the empirical evidence both suggest that the power of unions is reduced by measures aimed at liberalizing imports.

II. Historical Background

Since 1991, organized labor in New Zealand has faced an environment in which international trade has been increasing and institutional protections for trade unions have been decreasing. Within New Zealand manufacturing, the largest decreases in union membership have been in wood products, paper and paper products, and non-seasonal foods (Table 1). Chemicals were the only manufacturing sector not to experience a drop in union membership.

All sectors were highly unionized prior to the enactment, in May of 1991, of a law change that essentially denied trade unions an exclusive right to bargaining with employers - the Employment Contracts Act (ECA).

Some would argue that the ECA was not the only institutional influence upon the decline in membership. Laws first introduced in 1936 had made union membership compulsory. When these laws were dismantled, NZ trade unions were unprepared to formulate new strategies for recruiting members.

The dramatic shift in employment policy introduced by the ECA went hand-in-hand with a shift toward a more open trade policy. The 1979 government budget established specific timetables for reducing import protection among a selection of

Stephen B. Blumenfeld is with the Industrial Research Center at Victoria University of Wellington, Wellington, New Zealand (e-mail: stephen.blumenfeld@vuw.ac.nz).

Aaron Crawford is with the New Zealand Treasury, Wellington, New Zealand (email: aaron.crawford@treasury.govt.nz).

Andres G. Victorio is with the School of Government at Victoria University of Wellington, Wellington, New Zealand and is also a regular visiting professor at the Ateneo University (phone: 644 463 5709 email: antong.victorio@vuw.ac.nz).

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industries. In 1981, import-license controls were reduced by way of a more market-oriented system of tendering. Four years later, the Government announced that tariffs on goods not produced in New Zealand would be reduced to zero [7].

By 1993, import license controls were entirely eliminated. As a consequence of these trade-policy changes, the relative share of domestic shipments accounted for by imports increased for across most of country's manufacturing sector (Table 1).

TABLE I
TRADE UNION MEMBERSHIP AND INTERNATIONAL TRADE IN NEW ZEALAND MANUFACTURING BY INDUSTRY SEGMENT, 1992-1998

Industry	Union Membership			Import Penetration[a]	
	1992	1998	Change 1992-98	.Mean, 1992-98	Annual Change, 1992-98
Chemicals	7,376	7,813	+5.9%	44.9%	+0.3%
Fabricated Metals [b]	67,152	29,763	-55.7%	29.4%	-0.5%
Metal Products	22,384	8,450	-62.2%	37.6%	-3.7%
Nonmetalic Minerals	1,729	1,125	-34.9%	20.1%	-2.0%
Nonseasonal Foods	13,199	6,725	-49.0%	39.5%	+4.8%
Paper & Paper Products	18,544	9,634	-48.0%	44.0%	+3.4%
Seasonal Food	27,942	20,341	-27.2%	49.4%	+2.8%
Textile	14,879	6,185	-58.4%	35.6%	+4.6%
Wood Products	12,446	6,115	-50.9%	32.1%	+3.8%

Notes:
[a]Calculated as the value of imports in the industry subcategory divided by the sum of total industry shipments plus imports for the period 1992 through 1998.
[b]Includes Machinery, Electrical and Transport Equipment Manufacturing.
Sources: Victoria University of Wellington (VUW), Industrial Relations Centre Union Membership Surveys, 1992-99; Statistics New Zealand, *Household Labour Force Survey*, March 1992-98; and Statistics New Zealand, *Exports* & *Imports* data series, June 1992-98.

Support for the traditional industrial relations system also waned as economic protectionism was dismantled. Market competition gathered momentum throughout the country's economy. The two ruling political parties at that time – Labour and National – accepted that the long-term benefits of trade liberalization would outweigh any short-term costs [6]. However, while Labour continued to promote the benefits of long-standing arbitration system, National pushed toward more labor-market deregulation.

III. A BASIC MODEL

A simple model can be used to show how such measures in support of trade-liberalization could have had an impact upon union membership. The model is an augmented version of Naylor and Cripps [7]. The version adds a domestic firm with a product that competes against foreign imports, in accordance with the experience of the sectors shown in Table 1. Then the utility-maximizing decisions of a worker within the firm are analyzed to show how union membership can either rise or fall when a liberalization measure is introduced, in this case, by way of import tariffs being removed.

For purposes of simplicity, other liberalization measures are not considered, other than through their possible effect upon the worker's wages. Also, import volume is not modeled explicitly. But its exclusion is unimportant because the removal of tariffs is well known to increase import volume and the effect of the removal is so regularly corroborated that it is cited as a fundamental benefit to globalization [8].

The domestic firm is described as producing x and earning a profit of π. The price at which x can be sold is the sum of an international price p, and a tariff t that is levied by the government upon competing imports. The wage to be paid each worker is w. The firm demands $L(t)$ workers and this demand is reduced if tariff protection is reduced. The firm is but one of many firms competing against one another in a domestic market for an identical product. And so it is constrained by a zero-profit condition given as follows:

$$\pi = 0 = (p+t)x - wL(t) \tag{1}$$

This constraint makes the wage an implicit function of the firm's revenues $(p+t)x$ and the firm's demand for labor $L(t)$:

$$w = (p+t)x / L(t) \tag{2}$$

From (2), the removal of tariffs can decrease the wage through a fall in the firm's revenues. But it can also increase the wage through a reduction in the firm's demand for labor. Whichever of these two effects is stronger will therefore determine whether the wage will rise or fall.

Turning now to the incentives of a worker for the firm, the worker is assumed to derive utility from take-home wages and from any utility benefits to joining the union, for which there is a membership cost, c. The utility benefits depend upon the proportion of workers u, who join the union. They also depend upon a taste parameter e which describes the worker's willingness to conform to group behavior.

The proportion of workers who join the union is a variable that is intended to capture the benefits to the worker of a greater power in collective bargaining. The utility of the worker is therefore a positive function of u at the same time that it is also a positive function of e.

The worker's total utility is denoted as W and it is assumed to be partly separable among the benefits. The benefits from take-home wages are described by the utility function U whereas the benefits from deciding upon u and e are described by the function V. The separation allows for the two types of benefits to be weighed against one another according to some coefficient that is designated as α.

Following through these, there is for the worker a total utility from joining the union that is not necessarily identical to the total utility from not joining. From subscripting the total utility with j if the worker joins the union and with n if the worker does not, one obtains the following:

$$W_j = U(w-c) + \alpha V(u,e) \quad \text{if the worker joins} \tag{3}$$

$$W_n = U(w) + \alpha V(1-u,e) \quad \text{if the worker does not join} \tag{4}$$

The main difference between (3) and (4) is that the worker incurs a cost of c if it joins the union, for example, in terms of union membership fees, and the worker derives utility from the proportion of workers who do not join the union, (1- u), if a decision is made in that regard.

An equilibrium value for u can be derived by comparing the total utility in (3) against that in (4). Suppose some given values for w, c, u, e and α. If for such values W_j happened to exceed W_n, then union membership is too low relative to its equilibrium value. This being the case, the worker will want to join the union. Many others will follow, as a consequence of which u will increase, W_j will increase and W_n will decrease. This process will continue until the total utilities become equal to each other.

Analogously, if W_n were instead greater than W_j, union membership will fall until such a time as the total utilities have become equal to each other.

It follows that the equilibrium of u is determined by the equality of W_j to W_n. That is, at equilibrium, the worker is just indifferent between joining the union or not.

From substituting (2) into (3) and (4), this equilibrium can be described according to the following equality:

$$\begin{aligned}&[U((p+t)x/L(t)) - U((p+t)x/(L(t)-c))] \\ &= \alpha[V(u,e) - V(1-u,e)]\end{aligned} \tag{5}$$

The left-hand side of this equality is clearly positive for any utility function U that is concave and twice differentiable. The right-hand side can equal the left-hand side for many paired values of u and e. However, for the values of u to remain interesting, one could limit them to those that are greater than 0.5.

For this range of permissible values (of $u > 0.5$), u must decrease whenever e increases. That is, an indifference to joining can only be maintained if a fall in union membership is offset by a greater willingness to conform to group behavior, as in [7].

One can use (5) to examine some comparative-static effects upon equilibrium u. Of primary importance is the sign of the total derivative, du/dt. This total derivative would represent the impact of a tariff reduction upon the equilibrium of union membership:

$$\begin{aligned}&du/dt = \\ &[(L(t)x - (p+t)x(\partial L(t)/\partial t))/L(t)^2] \otimes \\ &[(\partial U(w)/\partial t) - \partial U(w-c)/\partial t] \div \\ &\alpha[(\partial V(u,e)/\partial u) + (\partial V(1-u,e)/\partial u]\end{aligned} \tag{6}$$

Assuming that $u > 0.5$, the sign of du/dt in (6) will be the same as the sign of the expression given by $(L(t)x - (p+t)x(\partial L(t)/\partial t))$. The first component of this expression, $L(t)x$, is a positive effect that describes a downward pressure upon the wage, and also upon union membership, if tariffs were to be removed. The source of this downward pressure is a reduction in the firm's revenues.

The second component, $-(p+t)x(\partial L(t)/\partial t)$, is a negative effect that describes an upward pressure upon the wage, and also upon union membership, if tariffs were to be removed.. The source of this pressure is the firm demanding less labor.

These countervailing pressures imply that the removal of tariffs can either decrease or increase membership. On the one hand, a reduction in firm revenues decreases for a worker the benefit of joining the union. On the other hand, a decrease in the firm's demand for labor increases the benefit, thereby increasing membership. This increased membership from a decreased labor demand can be interpreted as a flight by workers toward job security. It is a hypothesis that is widely believed about why workers join unions [9].

The countervailing pressures are an innovation upon the original model in [7]. The model there did not have a mechanism for profit decisions being made by a firm. In particular, no provision was made for the possibility that firms would demand less labor, and that workers in turn would join unions to protect their jobs.

Of secondary importance in (5) is the comparative static effect of membership costs, du/dc:

$$\begin{aligned}&du/dc = \\ &-[\partial U(w-c)/\partial c] \div \\ &\alpha[(\partial V(u,e)/\partial u) + (\partial V(1-u,e)/\partial u]\end{aligned} \quad < 0 \tag{7}$$

This effect is negative because an increase in membership costs naturally decreases any benefits from joining the union. In a broader sense, membership costs may not just be union fees. Rather they can include foregone opportunities such as the possibility of higher wages for non-union jobs.

The impacts of the remaining other parameters in (5) are consistent with those of the original model in [7]. A decrease in x or in p, will decrease membership by way of an effect upon the wage; and a decrease in α, will require that membership increases in order that an indifference to joining is maintained.

IV. Empirical Foundations

The empirical approach to estimating the comparative static effects is based upon one that was first suggested by Ashenfelter and Pencavel [10] and later developed by Bain and Elsheikh [11]. These authors use regression procedures to associate changes in union membership with macroeconomic factors. According to their approach, trade union growth and decline are generally linked to product market trends such as in consumer prices and employment. As applied in this paper, the regression procedures control for these factors and also for the effects of changes in export intensity, union density, and technology.

With regard to the relationship between exports and union membership, lower trade barriers may lead to an increase in the demand for products that are exported. Because the market for exported goods extends beyond the limit of domestic borders, exporting firms may be able to pay substantially higher wages than their non-exporting counterparts. However, this depends on whether domestic production increases commensurately with any expansion of exports.

An increase in exports is also strongly associated with increases in the relative demand for skilled labor in manufacturing [12]. Provided that union labor is of a higher quality than non-union labor, union labor may benefit more from an expansion of exports. This, in turn, can make unions more attractive to potential members.

Technological change is controlled for by specifying the ratio of total capital depreciation (capital investment) to the sum of total salaries and wages plus operating expenses (total costs). One interpretation is that an increase in this ratio will imply leaner production systems that are also less labor intensive. In turn, this may decrease the use of labor in both unionized and non-unionized markets.

The regressions also control for wages that may be external to what the worker receives. Being external rather than internal, these wages can describe the opportunity costs of joining the union as predicted in (7). They are represented by the average industry wage rate.

Other things constant, an increase in these external wages can represent an increase in the opportunity cost of joining a union. Firms may even decide to offer union members an incentive to resign from their memberships. An increase in industry wages should therefore decrease union membership.

But following through this, any disincentive to join a union may be mitigated by unions themselves seeking commensurate increases in union wages. Thus a control for union saturation had to be included in the regressions. At reasonably low levels of union density, union membership may be increased by the efforts to recruit. But at very high levels, union membership may no longer increase as a consequence of there being fewer non-members left to recruit.

The potential to recruit new members is also likely to be affected by changes in the overall level of employment. As the level of employment increases, the potential for recruiting new members also increases. But as the level of employment decreases, union members are among those that are almost certain to be laid off. Thus, in accordance with the prediction of the model in (6), membership may increase if workers perceive that joining a union can be a source of job security [8].

V. Empirical implementation

Table 2 presents some regression estimates for what would have been the impact of the elimination of tariffs and licenses during the years between 1992 and 1998. The dependent variable is for annual percentage changes in union membership. The primary independent variable is for annual percentage changes in import penetration, defined as the ratio of import values to the corresponding values of all shipments.

Column (a) of Table 2 presents estimated coefficients for an ordinary least squares (OLS) regression while using a measure of short-term price inflation equivalent to one-year. Column (b) presents estimates while using a longer-term measure of price inflation of two years.

Because of the pooled nature of the data, it is reasonable to expect different error variances for the different industry cross-sections. This could have resulted in heteroskedasticity and in inconsistent standard errors. OLS was therefore substituted by the method of panel corrected standard errors (PCSE). This substitution has been shown to be superior to the method of generalized least squares (GLS) whenever the number of groups exceeds the number of time periods [13].

In spite of this substitution, the Cook-Weisberg test results reported in columns (a) and (b) of Table 2 do not suggest heteroskedasticity. In addition, other regression diagnostics on the residuals obtained from these OLS estimations show little evidence of auto-correlation in the errors, by way of either the Durbin-Watson statistics or the Ramsey RESET test statistics.

As shown in Table 2, a one-point increase in import penetration, resulting from the removal of tariffs, would have decreased union membership by between 0.68 and 0.71 points. Though stark, the model's prediction in (6) would have explained this as a consequence of the effect of falling firm revenues being larger than the effect of falling labor demand.

This finding is even more important when one considers that import penetration into all of NZ manufacturing increased each year between 1992 and 1998 by an average of 1.5 percentage points, the equivalent of 9 percentage points over a six-year period. Over the same timeframe, import growth from the removal of tariffs could possibly have decreased manufacturing union membership by as much as 6.5 percentage points independently of the ECA or any other change in labor policy at that time.

The negative effect of employment, though not-statistically significant, also supports the prediction in (6) that a fall in the firm's demand for labor may result in a flight by workers towards job-security. Also, union saturation has the expected effect of gradually diminishing the ability of unions to recruit new members.

While not statistically significant, an increase in the average industrial wage tends to decrease union membership rather than increase it. This may be a sign that the opportunity-cost disincentives to joining a union are more influential than any efforts unions may expend in seeking commensurate increases for unionized wages [14].

The sign of the estimate for export intensity appears to show that exporters prefer to hire non-unionized labor whenever there is an increased demand for their products.

The effect of capital intensity refutes the expectation that union membership will fall as firms move away from labor-intensive production processes towards capital-intensive ones. But it is not inconsistent with the view that union labor may be of a higher quality than non-union labor, in the case of which the hiring of them would complement, rather than compete against, the demands of capital intensity.

TABLE II
VARIABLE DESCRIPTIONS AND OLS-PCSE REGRESSION RESULTS

Industry-level Variables	Mean[g] (St.Deviation)	Estimated Weighted Coefficient[a] (t-statistic)	
		(a)	(b)
Annual % Δ in Union Membership[o]	-8.51 (12.77)	Dependent Variable	
Constant	---	1.30 (0.28)	2.98 (0.47)
Annual %Δ in Import Penetration[b]	1.64 (5.76)	-0.68 (-2.40)	-0.71 (-2.46)
Annual %Δ in Export Intensity[c]	0.90 (10.32)	-0.02 (-0.15)	-0.02 (-0.20)
Annual %Δ in Union Saturation[f]	8.37 (12.79)	-0.48 (-4.37)	-0.47 (-4.32)
Annual %Δ in Capital Intensity[d]	1.06 (8.07)	0.56 (2.52)	0.57 (2.50)
Annual %Δ in the Average Industrial Wage[m]	0.40 (1.41)	-0.52 (-0.83)	-0.24 (-0.42)
Annual %Δ in FTE Employment[e]	0.70 (4.53)	-0.25 (-0.66)	-0.41 (-1.04)
Annual %Δ in the NZ Consumer Price Index[n]	---	-2.56 (-1.23)	---
2-Year %Δ in the NZ Consumer Price Index[n]	---	---	-1.65 (-1.15)
R-squared Statistic:		0.51	0.52
Pooled Durbin-Watson Statistic from OLS Regression[h]		2.04	2.01
Ramsey RESET F-Statistic from OLS Regression[i] (Prob. Value)		0.86 (0.47)	0.95 (0.42)
Cook-Weisberg χ^2 Statistic from OLS Regression[j] (Prob. Value)		1.89 (0.17)	1.82 (0.18)

No. of Observations = 54; Industry Groups = 9; Years = 6.
[a]Estimated with panel-corrected standard errors.
[b]Value of imports[k] divided by the value of the sum of the shipments[l] plus imports[l].
[c]Value of exports[k] divided by total value of shipments[l].
[d]Ratio of total depreciation[l] to the sum of total salaries and wages[l] plus operating expenses[l].
[e]Total full-time employees[m] plus half the total part-time employees[m] (excludes self-employed).
[f]Measured as the inverse of the share of union members[o] in total FTE employees in the previous year[m].
[g]Observations are weighted by full-time equivalent (FTE) industry employment averaged over the period 1992-98.
[h]Tests for first-order serial correlation of the error terms.
[i]Ramsey's Lagrange multiplier test for regression specification error. (Ho: Model has no omitted variables)
[j]Cook and Weisberg's test for heteroskedasticity using fitted values of the dependent variable. (Ho: Constant variance)
Variable Sources (Annual figures for year ending in specified month):
[k]Statistics New Zealand's Annual *Exports* and *Imports* data series, June 1992-98
[l]Statistics New Zealand, *Quarterly Manufacturing Survey* (QMS), March 1992-98
[m]Statistics New Zealand, *Quarterly Employment Survey* (QES), February 1992-98
[n]Statistics New Zealand, *Consumers Price Index-All Groups* (CPI), March 1991-98
[o]Victoria University of Wellington, Industrial Relations Centre, Union Membership Surveys, March 1992-1998

VI. CONCLUSION

This paper focuses on the relationship between trade liberalization and unionization in New Zealand. Special attention is placed upon how the removal of import tariffs may have influenced union membership in manufacturing. The findings add to the larger debate about whether unions are disadvantaged by a liberalization of trade.

The evidence lends some support for the view that unions have been disadvantaged. The estimated effects of import penetration, employment and external wages all suggest diminished union power.

The evidence can also be viewed in the context of a greater globalization of the New Zealand economy. Clearly, the globalization might have had an important and significant impact on union organizing efforts, especially in the manufacturing sector where the consequences of trade typically weigh heavily. One conclusion that can be drawn is that the reduction of trade barriers and the entry of international competitors into NZ domestic markets may have reduced the ability of trade unions to maintain and recruit members.

Future research could investigate the broader question of whether other liberalization measures associated with globalization can likewise diminish the power of unions [8].

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