Canadian International Labour Network

Labour Market Institutions and Outcomes: A Cross-National Study

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The growth and decline of unions in Canada and the United States: A stock-flow analysis.

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Abstract

The behavior of union density in Canada and the U.S. from 1950 to 1995 is described and the size of the union density gap calculated. The components of union density growth: union membership; labor force; and employment in the two countries are compared from 1983 to 1995.

A union membership stock-flow accounting identity is used to trace the sources of union membership growth to either 'recognition' or 'economic' factors in each country. The role of economic structural change is corroborated by evidence from shift-share analysis. Simulations are used to explore the impact of mandatory vote recognition procedures on the Canada-U.S. union density gap and on Canadian union density from 1978 to 1995.

JEL Classification: J5 -Labor Management Relations, Trade Unions and Collective Bargaining
J58-Public Policy
K31-Labor Law

1. Introduction

The United States and Canada, since 1950, have had similar systems of industrial relations characterized by decentralized collective bargaining and an emphasis on business unionism. The countries have close economic ties that have strengthened over time. Between 1968 and 1995 Canadian union density (the percent of the labor force that are union members) has remained stable at approximately 26 percent while union density in the U.S. has declined continuously to approximately 12 percent. Why has this gap emerged?

Researchers have provided many different answers to this question.[1] In this paper I focus on two explanations that have emerged as potentially empirically important: (1) economic factors ;and (2) legal factors. Economic factors include structural differences in industry composition and labor force of the two economies - particularly the larger role of the public sector in Canada. Some empirical studies attribute a very significant portion of the density gap to structural factors (Troy (1990, 1992)), while others find structural factors play only a minor role (Riddell (1993), Freeman (1988) and Lipset (1986)). A number of researchers (Weiler (1983), Meltz (1985), Gunderson and Meltz (1986), Blanchflower and Freeman (1992) and Riddell (1993)) suggest differences in legal regimes may be important.[2] One important difference between legal environments in the two countries is union

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[1] Kumar (1993) provides a summary of this literature.

[2] Riddell (1993) presents evidence that a Canadian worker with a given set of characteristics (gender, age, industry, occupation, public or private sector employment and education) is approximately twice as likely to be unionized when compared to a U.S. worker with similar characteristics. He finds no empirical evidence that a difference exists in social attitudes towards unions between the two countries. He discovers that structural differences explain only 15 percent of the gap in 1984 (7 percent is explained by the greater role of the public sector in Canada). He also shows the impact of unions on wages in the private sector in each country is similar and thus cannot account for differences in the amount of overt management opposition to unions. He then concludes that "much of the difference in the Canada-U.S. unionization gap can be attributed to intercountry differences in legal

recognition procedures. In the U.S. a representation vote is required in almost all certification bids. In Canada, up to 1976, all jurisdictions had card-check procedures.[3] Over the period studied, 1978 to 1995, most of the labor force in Canada continued to be covered by card-check legislation. Weiler (1983), Meltz (1985),Gunderson and Meltz (1986) and Blanchflower and Freeman (1992) all argue that this difference in recognition procedures plays a role in the density gap. Empirical evidence to support these earlier studies consists only of descriptive statistics. Johnson (1999), using cross-section time-series analysis for nine Canadian jurisdictions from 1978 to 1995, estimates that mandatory votes reduce certification success rates by 6 to 9 percentage points compared to card-check procedures.[4]

This paper begins by describing union density in Canada and the U.S. from 1951 to 1995 and establishes the size of the union density gap. The components of union density growth: union membership; labor force; and employment in the two countries are compared from 1984 to 1995. Next a union membership stock-flow accounting identity is used to examine the sources of union membership growth in Canada and the U.S. private sector. The analysis decomposes union

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regime pertaining to unions and collective bargaining and to differences in overt management opposition to unions (itself a possible consequence of differences in collective bargaining laws and their administration." (p. 143).

[3]Under card-check, if a threshold percentage of the bargaining unit signs cards indicating support for the union, the union is recognized without a secret ballot. Since 1976 mandatory votes have been introduced in some, but not all, Canadian jurisdictions. Over the period studied, 1978 to 1995, at most 25 percent of the labor force was covered by mandatory vote legislation. See Figure 14 for more detail.

[4]Indirect anecdotal evidence in favor of the view that mandatory votes discourage unionization is found in the opposition of unions in the U.K. to the possible introduction of a mandatory vote rather than card-check when new union recognition procedures were proposed in May 1998. In the recent (September and October 1999) round of collective bargaining in the North American auto industry the unions (UAW and CAW) tried to negotiate the voluntary recognition of unions at the auto-makers' suppliers' plants if the union could demonstrate majority support of the bargaining unit based on signed membership cards (card-check criterion). This was an attempt by the unions to circumvent the existing mandatory vote procedures in effect in the U.S. and Ontario. They did not succeed. They did induce both Ford and DaimlerChrysler to sign a 'neutrality letter' in which the automakers urge management at supplier companies to remain neutral during union organizing drives.

membership growth into changes attributed to 'recognition' (the net flow of newly certified workers) and to changes attributed to 'economic' factors. A shift-share analysis is used to contribute additional evidence concerning the role of economic structural factors in each country. Finally simulations are performed to measure the impact of mandatory vote union recognition procedures on the Canada-U.S. union density gap and on Canadian union density from 1978 to 1995. The analysis combines the stock-flow growth accounting identity with the results from Johnson (1999) to perform two counterfactual experiments. The first experiment simulates Canadian union density as if mandatory votes had been in force in all jurisdictions from 1978 to 1995. Comparing this simulation to actual union density in Canada is a measure of the role of mandatory votes in explaining the gap between U.S. and Canadian union densities. The second experiment simulates Canadian union density as if card-check procedures had remained in force in all Canadian jurisdictions from 1978 to 1995. Comparing this simulation to actual Canadian union density is a measure of the effect of the increasing use of mandatory votes in Canada on Canadian union density.

This paper makes a number of contributions. It provides insight into the density gap based on a comparison of union membership growth and labor force growth in the two countries. It presents the first detailed stock-flow accounting of union membership growth for Canada. The paper updates the stock-flow growth accounting results from Dickens and Leonard (1985) for the U.S. private sector to include the period from 1983 to 1997. The simulations provide the first empirical estimates of the role of mandatory votes in the Canada-U.S. density gap and the first empirical estimates of how the move from card-check to mandatory votes in Canada has affected Canadian union density.

2. An Overview of Union Density in Canada and the United States.

Figure 1 describes Canadian and U.S. union density over time and establishes the size of the union density gap. The description begins in 1951 because by then all jurisdictions in Canada had enacted legislation protecting collective bargaining rights similar to that of the U.S. The description ends in 1995 because of problems obtaining comparable Canadian union membership data after that year. The definition of union density is:

$$(1) \qquad \text{union density}(t) = \frac{\text{union members}(t)}{\text{civilian labor force}(t)} \times 100$$

(Where 't' is the time index.) [5] From 1951 to 1962 Canadian union density slightly lags U.S. union density but the unionization patterns are roughly similar. After 1963 union densities in the two countries diverge. Canadian union density remains stable after 1968, hovering between 25 and 27 percent. U.S. union density declines continuously from 24 percent in 1968 to 12 percent in 1995. By 1995 Canadian union density is 14 percentage points higher than in the U.S.

The behavior of union density in each country over time depends on the relative growth of its union membership to its labor force. A comparison of these growth rates across countries from 1984 to 1995 provides insight into the union density gap. The shorter period is chosen because data on union membership is most consistent and comparable across the two countries over this period.[6] Figure 2

[5] From 1951 ro 1995 data on union membership are neither consistent within each country nor between countries. For more details concerning the choice of union density definition, data sources and data issues please see the Data Appendix.

[6] Please see the Data Appendix for details.

shows that from 1984 to 1992 union membership growth rates in the two countries appear to converge. In 1993 and 1994 union membership growth in the U.S. is higher than in Canada. Figures 3 (a) and 3(b) show that labor force growth and employment growth has often been higher in the U.S. than in Canada. Over this period the density gap widens from 11 to 14 percentage points. In Canada, despite stagnating or declining union membership growth, union density has remained stable partly because poorer economic performance has resulted in slower labor force growth. In the U.S., increased (less negative and in some years positive) union membership growth has not resulted in an increase in density and a narrowing of the density gap. The robust performance of the U.S. economy has attracted many new workers into the labor force and these workers disproportionately enter into non-union sectors of the economy. Farber and Western (2000) examine the growth rates in U.S. private sector union and non-union employment from 1973 to 1998 and find that union employment shrunk by an average of 2.9 percentage points per year and non-union employment grew by an average of 2.8 percentage points per year. This description suggests one reason for the persistence of the density gap in recent years is the differing economic performance of the U.S. and Canadian economies.

3. Sources of change in Canadian and U.S. union membership growth.

The Basic Framework

A stock-flow growth accounting identity of union membership is used to examine the sources of change in union membership in Canada and in the U.S. private sector. The accounting identity:

(2) union members (t) - union members (t-1) = newly certified union members (t)

-newly decertified members (t) + residual (t)

presents three sources of growth (or decline) in union membership: (1) flows into the stock of union members from newly certified bargaining units; (2) flows out of the stock of union members from newly decertified bargaining units; and (3) a residual. Legal and institutional factors have a major influence on the net flow of union members due to certification and decertification. Procedures concerning certification and decertification directly influence this flow. I will label the net flow due to certifications and decertifications as 'recognition'. The residual captures the expansion and contraction of existing bargaining units due to layoffs, new hires, plant closures and plant expansions. These adjustments could be associated with either cyclical or structural economic factors. Following Dickens and Leonard (1985) the residual is labeled as 'economic' factors. Dividing through the union membership accounting identity (2) by lagged union membership allows union membership growth to be decomposed into the percent growth due to 'recognition' and the percent growth due to 'economic' factors.

The accounting identity (2) is implemented using union membership data for each country. The data provide considerable detail on the flows of certifications and decertifications and allow these flows to be broken down into their component parts .

Union Membership Growth in Canada

For Canada the union membership accounting identity (2) can be written as:

(3) $$u(t) - u(t-1) = [\, apprate(t) * certsize(t) * certrate(t) * nu(t)] - [\, dapprate(t) * dcertsize(t) * dcertrate(t) * u(t)] + [residual(t)]$$

where:

u (t) = union members at time t

nu (non-union members of labor force) = labor force - union members

apprate (organization rate) = $\frac{\text{certification applications processed}}{\text{non-union labor force}}$

certsize (size of bargaining unit certified) = $\frac{\text{newly certified employees}}{\text{certifications granted}}$

certrate (certification success rate) = $\frac{\text{certifications granted}}{\text{certification applications processed}}$

dapprate(decertification organization rate)= $\frac{\text{decertification applications processed}}{\text{union members}}$

dcertsize(size of unit decertified) = $\frac{\text{newly decertified employees}}{\text{decertifications granted}}$

dcertrate (decertification success rate) = $\frac{\text{decertifications granted}}{\text{decertification applications processed}}$

residual = the same variable as in (2).

The left hand side of the expression is the change in union membership from (t-1) to (t). The first term on the right hand side is the number of newly certified employees, the second term is the number of newly decertified employees and the last term is the residual that ensures the identity holds.[7] When equation (3) is divided by lagged union membership the sources of growth can be split into 'recognition' and 'economic' components.

[7]When a union is certified all employees in the bargaining unit are covered by the union whether or not they choose to become union members. The left hand side of this expression measures union members. Certification and decertification flows measure coverage. Equality is maintained through the residual. Data that would allow the identity to be defined solely in terms of union members or in terms of covered employees are not available. Galarneau (1996) indicates that coverage is only 4 to 5 percentage points higher than membership in Canada.

The stock-flow accounting analysis is implemented for Canada using data from 1978 to 1995.[8] Three data sources are used. First, labor force numbers are from The Labour Force, Annual Averages. Second, the union membership numbers are from the Corporations and Labour Unions Returns Act (CALURA). The CALURA definition of union member changes in 1983 to include employees that are members of employee associations. The break in the data is evident in the union membership series and is marked by a vertical line in plots. Third, the data on certifications and decertifications are from Martinello (1996) with updates to 1995 kindly provided by Professor Martinello. These data are compiled from the annual reports of the private sector provincial and federal Labor Relations Boards (LRB). Most para-public and some public employees are covered by the private sector LRBs (actual coverage varies by jurisdiction). There are no data available for Prince Edward Island nor for union members that are not under the jurisdiction of the private sector LRBs. This means that a small part of the residual includes these omitted groups.

Figures 4, 5 and 6 plot percent growth rates of union membership (Figure 4);and its two components - net growth due to 'recognition' (Figure 5) ; and net growth due to 'economic' factors (Figure 6). Each growth rate is regressed on a constant and a time trend. The coefficient on the time trend and its standard error are included in each plot.[9]

Figure 4 shows the percent growth of Canadian union membership. The most striking feature of

[8]The period studied is determined by data availability and consistency with the sample used in Johnson (1999) to generate the empirical results used in the simulations. For more details concerning the time period selected and other data issues please see the Data Appendix.

[9]In cases where the CALURA data break is evident (discussed below) a dummy variable for 1983 is included in the regression.

the plot is the spike in 1983 when the CALURA definition of union membership changes to include employee associations. Does this change only affect growth rates in 1983? Various regressions (reported in Appendix 1) reveal that: (1)1983 is an aberration, the mean growth rate from 1984 to 1995 is not significantly different from the mean growth rate from 1978 to 1982; (2) there is no significant change in the trend of the growth rate after 1983 and; (3) cyclical responses after 1983 are somewhat smaller (this might be explained by the fact that most employee associations are in the public sector and therefore may not be as sensitive to the business cycle). There has been a decline in union membership growth over the period but, after controlling for 1983 with a dummy variable, the coefficient on the trend is not significant.

Figure 5 plots one component of union membership growth: net growth due to 'recognition'. It is clear from the coefficient reported in this figure that the contribution of 'recognition' to union membership is falling and this decrease is statistically significant. It is instructive to trace the sources of this decline. Figure 7 shows the number of workers involved in certifications and decertifications. The number of newly decertified workers is very small compared to the number of newly certified workers. Figure 8(a) plots the 'organization rate' (*apprate* times *certsize*). This measures the intensity of union organizing efforts.[10] The plot shows that the organization rate has fallen only slightly over the period. Figure 8(b) reveals a statistically significant decline in the number of certification applications. Figure

[10]When the average size of the bargaining unit *(certsize)* is multiplied by the total number of certification applications processed the result estimates the number of workers involved in certification attempts. When divided by the non-union labor force the quotient provides a measure of the intensity of union organizing efforts. (This is true so long as bargaining units that are successfully certified are not systematically larger or smaller than those that are not successful. This may not be the case Farber (1999) suggests that smaller units are likely to be more successful. If so, the 'organization rate' underestimates union organization efforts.)

8(c) shows an increase in average bargaining unit size but this increase is only significant at the 10 percent level. Figure 9 plots the certification success rate (*certrate)*. This variable measures the percentage of unions that apply for certification that succeed in obtaining certification. The plot shows a substantial downward trend in the certification success rate that is significant at the 1 percent level. Figures 10(a), 10(b), 10(c) and 11 plot analogous measures for decertification activity. The decertification organization rate (*dapprate* times *dcertsize*), Figure 10(a), has a slight upward trend that is only significant at the 10 percent level. Decertification applications (Figure 10(b)) increased to 1988 but since that time have declined. There has been no significant trend in the average size of bargaining unit that is decertified (Figure 10(c)). Decertification success rates show a positive but not significant trend over the period (Figure 11). In summary 'recognition' has contributed to a decline in union membership growth that can be traced to: (1) a reduction in the number of attempts to organize (counteracted, but not significantly so, by a small increase in bargaining unit size); and (2) a reduction in the certification success rate. Decertification activity is not quantitatively important.

Net growth in union membership due to 'economic' factors shows no significant trend over the period (Figure 6). In some periods the growth rate associated with the residual is positive, in others it is negative. The influence of the business cycle on union membership is evident- net growth due to 'economic' factors falls in the recessions of the early 1980s and early 1990s. Dickens and Leonard ((1985) henceforth DL) use the information on the net growth due to 'economic' factors to construct an indirect rest for the role of structural change on union membership growth. They regress the net growth due to 'economic' factors on a constant, the growth in real GDP, lagged growth in real GDP and a time trend. The GDP variables control for the effect of the business cycle. According to DL if the

coefficient on the trend is significant this indicates that changes in economic structure play a role in the growth of union membership. DL interpret structural change as an accelerated change in union membership growth. Structural change could also be interpreted as a constant rate of union membership growth each year. This type of structural change would be indicated by a statistically significant constant in the DL regression. Table 1 presents the results of two specifications of the DL regression for Canada from 1978 to 1995. The first specification is identical to that of DL except that it includes a dummy variable for 1983 to control for the change in the CALURA definition. The second specification drops lagged growth of real GDP (since it is not significant) and adds real GDP growth interacted with the dummy for the 1984 to 1995 period to capture the change in the cyclical sensitivity due to the change in the CALURA definition. The coefficient on the constant is negative in both specifications. It is not significant in the first specification and only marginally significant in the second specification. When combined with evidence that the growth due to 'economic' factors is negative in some years and positive in others (Figure 6) the results provide only very weak evidence for the existence of structural change that reduces union membership growth by a constant amount each year. The trend variable is not significant in either specification. There is no evidence for the existence of structural change of the type described by DL. The coefficient on real GDP growth is positive and statistically significant in both specifications, cyclical factors play an important role in the growth of union membership.

The evidence from the regression analysis suggests that structural change has not been an important factor in union membership growth in Canada. In order to corroborate this result I conduct a shift-share analysis. An index is created using the unionization rates in nine different industries (i) in 1983

(union (i,83)) and the employment share (emp (i,t)) in those same industries from 1978 to 1997[11]:

$$(4) \quad \text{Index}(t) = \frac{\sum_i \text{emp}(i,t) * \text{union}(i,83)}{\sum_i \text{emp}(i,83) * \text{union}(i,83)} \times 100$$

This index shows how much union density would have changed if industry structure changed over the period and unionization rates by industry remained fixed at their 1983 values. Table 2 presents the values of this index from 1978 to 1997. The index falls from 101.4 in 1978 to 98.8 in 1995. The decline in the index over the period is not monotonic - there are years where the index rises. This evidence suggests that economic structural change has had negligible effect on Canadian union density and provides support for the results of the regression analysis.

In conclusion, from 1978 to 1995 stagnating or declining union membership growth in Canada is primarily attributed to 'recognition' and can be traced to a reduction in certification attempts and in certification success rates. 'Economic' factors appear to be less important. There is little evidence that structural change has played an important role. Cyclical factors influence union membership growth in the short-run. The fact that labor force growth has declined along with union membership growth helps to explain why Canadian union density has remained stable over this period.

Union membership growth in the United States.

[11] It is possible to construct the index for a longer time period because only employment share data are required and these data are available after 1995. This is done to make the index comparable to the U.S. index presented later in the paper. The base year of 1983 is also chosen for this reason.

Dickens and Leonard (1985) provide a detailed accounting analysis of the growth of U.S. private sector, non-agricultural, non-construction union membership from 1950 to 1980. This section of the paper updates the DL results for 1983 to 1997 using, where possible, the same variable definitions and data sources. The results are not directly comparable to the Canadian analysis since the Canadian data include substantial portions of the public sector.[12] Nevertheless it is possible to compare the results of the U.S. stock-flow analysis done in this paper for 1983 to 1997 to those of DL for 1950 to 1980 to examine the sources of change in union membership growth in the U.S. over the period.

The stock-flow growth accounting identity that underlies the DL analysis is:

$$
\begin{aligned}
(4)\qquad u(t) - u(t-1) = {} & \left[\frac{\text{workers eligible to vote in certification elections (t)}}{\text{non-union workers(t)}} * \right. \\
& \left. \left(\frac{\text{eligible voters in units that certify (t)}}{\text{workers eligible to vote in certification elections(t)}} \right) * \text{non-union workers (t)} \right] \\
& - \left[\frac{\text{workers eligible to vote in decertification elections (t)}}{\text{union members(t)}} * \right. \\
& \left. \frac{\text{eligible voters in units that decertify (t)}}{\text{workers eligible to vote in decertification elections (t)}} * \text{union members (t)} \right] \\
& + \left[\text{residual (t)} \right]
\end{aligned}
$$

[12]Data are not available that make it possible to frame the stock-flow analysis in Canada so it is comparable to that of the U.S. The public and para-public sectors cannot be excluded from the Canadian data. Incorporating the U.S. public sector into the U.S. stock-flow accounting analysis would require that data be collected from the reports on public sector organizing activity from labor relations boards for all the states in the U.S. Even if this were done the data for the U.S. would not cover exactly the same group of workers as that in Canada.

Again the last element of (4), the residual, is union membership change due to 'economic' factors, the other two elements represent the net change in union membership due to representation elections, that I refer to as 'recognition'.[13]

The stock-flow accounting identity (4) is implemented for the U.S. using data from 1983 to 1997. DL present the results of their analysis in a table showing five-year averages for each of the relevant variables. Table 3 reports their results for 1950 to 1980 and adds five year averages for 1981 to 1997 provided by this study.

Column (7) of Table 3 reveals that private sector union membership growth has been negative since 1975. Growth due to 'recognition', in column (8), is positive but less than one percent and fairly stable for the period from 1975 to 1997. The other component, growth due to 'economic' factors , in column (9), is always negative after 1970 and is two to three times the size of the growth due to 'recognition' in absolute value.

Why has net growth due to 'recognition' been so low? Table 3 provides information on how its components have behaved over time. The percent of non-union wage and salary workers in the private sector that unions try to organize declines from a high of 2.59 percent in the early 1950s to .97 percent at the end of the 1970s, plummets to .31 percent in the early 1980s, and continues to fall to .23 percent in the 1995-97 period. The certification success rate falls from a high of 76 percent in the early 1950s to 37 percent in the late 1970s and then remains fairly constant.[14] The fraction of union

[13]DL refer to 'recognition' as "net growth due to representation elections".

[14]It is interesting to note that over this period there has been no change in U.S. labor legislation concerning union recognition. In Canada, in the last twenty years, certification success rates have declined significantly. Over this same period there have been changes to Canadian labor legislation concerning union recognition - an increasing

employees involved in decertification attempts increases over time from a low of .07 percent in the early 1950s to a high of .35 percent in the early 1980s and levels off or declines slightly in recent years. The decertification success rate remains between 40 and 50 percent throughout. In summary this analysis reveals that the decline in union attempts to organize new workplaces and low certification success rates explain why the 'recognition' component of union membership growth is so low. Decertification activity, although rising, is too small in magnitude to make much difference to union membership growth.

Net growth due to 'economic ' factors is the main reason that U.S. private sector union membership growth has been negative since the late 1970s. As in the Canadian analysis and in DL, the 'economic' component of union growth is regressed on a constant, a trend and two variables that capture the business cycle - current and lagged U.S. real GDP growth - for the period from 1983 to 1997. The results are presented in Table 4. The coefficients on U.S. real GDP growth are significant - union membership growth is influenced by the business cycle. The coefficient on the constant is negative and significant. Figure 12 plots net growth due to 'economic' causes from 1984 to 1997. It is negative in every year. This is different from the behavior of this variable from 1950 to 1980 that DL describe as negative in some periods and positive in others. The empirical evidence suggests that economic structural factors reduce union membership growth by a constant amount of, on average, 3 percent per year from 1983 to 1997. The coefficient on the trend variable is not significant - there has been no long-run acceleration in union membership due to economic structural causes.

Other evidence concerning the influence of structural change is provided by conducting a shift-

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number of Canadian jurisdictions adopted mandatory vote procedures similar to those used in the U.S.

share analysis for the U.S. As in the Canadian analysis the base year is 1983. One shift-share index is calculated using only the industries included by DL ("DL Index"). The other is calculated for all industries ("All Industries Index"). Table 5 presents the values of these two indices from 1983 to 1997. Both indices decline continuously over the period. The DL index declines by 10.6 percent while the index of all industries falls by 7.3 percent. This evidence shows that structural factors have played a role in reducing union density in the U.S.[15] This suggests that the interpretation of the negative and significant constant in the U.S. as structural change is correct.

The analysis above only provides information on the U.S. private sector. What can be said about the U.S. public sector? From 1983 to 1997 the percent of total union membership that were members of public sector unions rose from 32 to 42 percent. Figure 13 plots private, public and total union membership growth in the U.S. over this period. Despite positive growth in public sector union membership from 1984 to 1994 total union membership is usually negative because private sector union growth is negative. From 1995 to 1997 both public and private sector union growth are negative.

To summarize, in sharp contrast to the Canadian results, the contribution of 'recognition' to union membership growth in the U.S. private sector from 1983 to 1997 while positive is very small relative to the influence of 'economic' factors. Union organizing attempts have declined in recent years while certification success rates have remained relatively constant. 'Economic' factors - both cyclical and structural have influenced union membership growth. The results concerning the U.S. private

[15]It is possible to compare the 'all industries index' for the U.S. to the shift-share index calculated for Canada. From 1983 to 1997 the Canadian index falls by 1.2 percent. This decline is much smaller than that of the U.S. Unlike the U.S. the decline in Canada is not continuous. This comparison suggests that while structural factors have not had an important influence on union density in Canada they have played a role in the U.S.

sector complement and confirm those of recent research by Farber and Western (2000). Farber and Western, using a different decomposition of the union membership rate in the U.S. private sector from 1973 to 1998, find that most of the decline in the union membership rate is due to differential employment growth rates in union and non-union sectors and that changes in union organizing activity had little effect. The continuous decline in union density over this period is the result of a combination of very low or negative rates of union membership growth and high labor force growth associated with a healthy, growing economy.

4. Simulations to explore the impact of union recognition procedures on union density.

The accounting analysis, above, of Canadian union density suggests the decline in union membership growth in Canada is linked to 'recognition', specifically, decreases in attempts to organize workers and in certification success. Why has this happened? One reason may be the increasing use of mandatory vote union recognition procedures in Canada. Figure 14 shows the percent of the Canadian labor force covered by mandatory vote legislation from 1976 to 1998. From the 1950s until 1976 all jurisdictions in Canada used card-check recognition procedures. Since that time many jurisdictions have introduced mandatory votes. From 1978 to 1995, the period covered by the simulation experiments, at most 25 percent of the labor force is covered by mandatory vote legislation. By 1998 57 percent of the Canadian labor force live in jurisdictions with mandatory votes. In contrast the U.S., since 1935, has relied almost exclusively on mandatory votes. A number of researchers

suggest that mandatory votes have a negative effect on unionization and have contributed to the union density gap (Weiler (1983), Meltz (1985) Gunderson and Meltz (1986), Blanchflower and Freeman(1992)). Johnson (1999) shows that mandatory votes have a substantial, statistically significant, negative effect on certification success rates in Canada. Therefore mandatory votes affect union membership and can affect union density. The simulations below provide information on : (1) how important mandatory votes are in explaining the gap between U.S. and Canadian union densities and; (2) how the move away from card-check toward mandatory votes has affected union density in Canada.

Simulation Methodology

Two counterfactual experiments are performed. The first creates a measure of Canadian union density assuming mandatory votes were required in all jurisdictions from 1978 to 1995. The second creates a measure of Canadian union density assuming card-check procedures were used in all jurisdictions over this period. The simulations are based on the union membership stock-flow growth accounting identity (2). In order to use the empirical results from Johnson (1999) and to simplify the calculations the identity is changed slightly to:

(4) $u(t) = u(t-1) + [apprate2(t) * certsize(t) * certrate(t) * firms(t)] - [dgranted(t) * dcertsize(t)] + [residual(t)]$

where:

apprate2 = certification applications processed [16]
number of firms

firms = number of business establishments[17]

dgranted = decertifications granted

and u(t), u(t-1), *certsize*, *certrate*, and *dcertsize* are defined as they were earlier in the paper. The experiments are performed by changing the certification success rate (*certrate* = certifications granted/certifications processed) and the application rate (*apprate2* = certifications processed/firms) to reflect the presence of a specific certification procedure in each jurisdiction and then simulating union membership over the period. The residual and decertification activity are assumed to be left unaffected by the type of union recognition procedure in force. Actual decertification activity and the actual residual are used in all the experiments. Simulated union membership is divided by the actual labor force and the results are presented in terms of union density.

Empirical results from Johnson (1999) are used to adjust the certification success rate. Johnson (1999) uses cross-section time-series analysis of nine Canadian jurisdictions from 1978 to 1996 to examine the impact of mandatory votes on certification success. The results from four different specifications show that mandatory votes reduce the certification success rate 6 to 9 percentage points below what it would be under card-check. The results are significant at less than the one percent level

[16]Ideally the denominator of this expression would be non-union firms. This is not possible because data are not available.

[17]Data on the number of establishments is provided by Statistics Canada. These data begin in 1978 and determine the starting period for the simulations.

for all four specifications. Since mandatory votes reduce certification success it is likely they discourage unions from applying for certification. To test this hypothesis the same four specifications are run using the application rate (*apprate2*) as the dependent variable. The coefficient on the mandatory vote dummy is negative and significant at less than the 1 percent level in each specification. Table 6 presents the coefficient estimates on the mandatory vote dummy for the four specifications for each dependent variable.

The certification success rate and the application rate are adjusted using the relevant coefficient estimate on the mandatory vote dummy and a set of weights. For the experiment that examines union density as if mandatory votes (card-check) had been in effect in all jurisdictions, the mandatory vote coefficients from the certification success rate and application rate regressions are weighted by the percentage of the non-union labor force that is <u>not</u> covered by mandatory vote legislation (card-check) in each year and then added to (subtracted from) the actual certification success rate and application rate in each year. The adjusted certification success rates and application rates are then used in the union membership identity to generate the simulation results.

As mentioned earlier PEI and the federal sector are not included in the analysis Johnson (1999) also excludes these sectors. The labor force and union membership numbers are adjusted to take this into account.[18] The 'baseline' Canadian union density, shown in the simulations, uses this sample. Figure 15 shows 'baseline' Canadian union density is almost identical to total Canadian union

[18]It is possible to remove PEI from the union membership and labor force data. It is not possible to completely remove the federal sector from these two series. Union membership and labor force of the Yukon and North-west Territories (then part of the federal sector) are excluded but it is not possible to remove the part of the federal sector that is spread across the provinces. The part of the federal sector that remains in the union membership numbers is picked up in the residual of the union membership stock-flow accounting identity.

density.

Experiment #1: Canadian Union Density if Mandatory Votes had prevailed in all years.

The impact of mandatory votes on the gap between U.S. and Canadian union densities is examined by simulating what union density in Canada would be if mandatory votes had been used in all jurisdictions over the period. A comparison of Canadian 'baseline' union density to the simulated union density provides information on the portion of the union density differential between the U.S. and Canada that can be attributed to the absence of mandatory votes in many Canadian jurisdictions. The results of this experiment are shown in Figure 16. Sensitivity analysis is performed by using the coefficient estimates from the four specifications in Table 5. If mandatory votes had existed in all Canadian jurisdictions from 1978 to 1995, by 1995 Canadian union density would have been 2 to 3 percentage points lower than actually prevailed. In 1995 the Canada-U.S. density gap is 14 percentage points. The simulations suggest that 17 to 26 percent of the gap can be attributed to the different recognition procedures used in the two countries.

This is a very conservative estimate of the role of mandatory votes in explaining the gap between Canadian and U.S. union densities. First, Canadian mandatory vote procedures though similar to those of the U.S. are not identical. Mandatory votes in Canada must take place a short period of time (5 to 7 days depending on the jurisdiction) after the application for certification is filed. In the U.S. there is no time limit between application and vote and usually several months elapse before the vote occurs. Thus the window of opportunity for the employer to influence the workers concerning the union, using legal or illegal means, is much longer in the U.S. Further, when unfair labor practices

occur differences in procedure and the role of the courts in the two countries mean it is faster and less expensive to process complaints in Canada than in the U.S. These differences suggest that Canadian mandatory vote procedures are more conducive to certification success than U.S. procedures. The coefficient estimates based on Canadian data reflect the impact of Canadian mandatory vote procedures. These estimates likely underestimate the impact that a U.S. style mandatory vote system would have in Canada and therefore underestimate the role of mandatory votes in explaining the density gap. Second, U.S. and Canadian union recognition procedures have differed since the 1950s. The simulation covers only the period from 1978 to 1995 so the full impact of the difference in union recognition procedures is underestimated.[19]

Experiment #2: Canadian Union Density as if Card-Check prevailed in all years.

The move from card-check procedures to mandatory votes in Canada and its impact on Canadian union density is explored by simulating what Canadian union density would have been if card-check had existed in all years and jurisdictions from 1978 to 1995 and comparing this to the 'baseline' density. The results of this experiment are presented in Figure 17. Sensitivity analysis is conducted as described earlier. The simulations show that by 1995 the increasing use of mandatory votes reduce union density in Canada by less than 1 percentage point Though the use of mandatory votes increased over time, the legislation, over the period studied, has applied to only a small percentage of the Canadian labor force (Figure 14). In recent years this has changed. Ontario, the most densely

[19]The shorter period is chosen for the simulations because this is the same period used in Johnson (1999) to conduct the cross-section time-series analysis and because data on the number of firms by province are only available since 1978.

populated province in Canada, adopted mandatory votes in November 1995. Manitoba adopted this legislation in February 1997. As a result the percent of the labor force covered by mandatory votes has increased dramatically from 18 percent in 1995 to 57 percent in 1998. In the future the impact of mandatory votes on Canadian union density is likely to increase.

5. Conclusions.

Over the last thirty years Canadian union density has remained relatively stable at 26 percent while that of the U.S. has declined continuously from 24 percent in 1968 to12 percent in 1995. From 1984 to 1995 union membership growth in the two countries converges nevertheless the density gap persists and even widens slightly because labor force and employment growth are higher in the U.S. This suggests that the persistence of the gap can be explained, in part, by the robust performance of the U.S. economy relative to the Canadian economy over this period.

Union membership growth in each country is explored in detail using a stock-flow accounting framework that traces the sources of union membership growth to 'recognition' or 'economic' factors. Stagnating or declining union membership growth in Canada from 1978 to 1995 is associated with 'recognition' and can be linked to a reduction in certification attempts and certification success rates. 'Economic' factors are less important and there is little evidence that structural change has played a role. Declining union membership growth in the U.S. private sector from 1980 to 1997 is associated with 'economic' factors. There is evidence that economic structural change has influenced union membership growth. 'Recognition' has had only a small influence on private sector union membership growth in the U.S. relative to 'economic' factors.

Simulations explore the impact of mandatory vote union recognition procedures on the Canada-U.S. union density gap and on union density in Canada from 1978 to 1995. The first simulation shows that if Canada had mandatory votes in all jurisdictions over this period Canadian union density would have been 2 to 3 percentage points lower in 1995. This suggests that 17 to 26 percent of the union density gap in 1995 can be attributed to mandatory votes. The second simulation shows that by 1995 the increasing use of mandatory votes across Canadian jurisdictions reduced Canadian union density by less than one percent. From 1995 to 1998 the percentage of the Canadian labor force covered by mandatory vote legislation increased from 18 percent to 57 percent. In the future the negative impact of mandatory votes on union density in Canada will likely increase.

Table 1: Net Economic Growth Regressions for Canada (1978-1995)		
Variable	Specification #1	Specification #2
constant	-2.38 (1.38)	-2.57 (1.04)
trend	.003 (0.08)	-0.06 (0.13)
1983 dummy	10.19 (2.26)	9.40 (1.54)
Real GDP growth	.40 (0.17)	0.79 (0.22)
Lagged GDP growth	.07 (0.22)	
1984-95 Dummy		2.07 (1.70)
84-95 Dummy interacted with GDP		-0.69 (0.28)
Diagnostics:		
Adjusted R-squared	0.71	0.79
D.W. Statistic	1.72	1.76

The number in parentheses is the standard error of the coefficient.

Table 2: Shift-Share Index for Canada 1978 to 1997	
Year	Index
1978	101.4
1979	101.2
1980	100.9
1981	101.1
1982	100.4
1983	100.0
1984	99.5
1985	99.5
1986	99.2
1987	99.4
1988	99.6
1989	100.4
1990	99.6
1991	98.9
1992	98.9
1993	98.9
1994	99.2
1995	98.8
1996	98.5
1997	98.8

Table 3: Components of Union Growth: Five year averages, 1950 -1997

Period	Density (1)	Certification organization rate (2)	Certification Success Rate (3)	Decertificat'n Organization Rate (4)	Decrtificat'n Success Rate (5)	Labor Force Growth Rate (6)	Union Membership Growth Rate (7)	Net Growth due to "Recognition" (8)	Net Growth due to "Economic" Causes (9)
1950-54	34.4	2.59	76	.07	52	2.1	3.7	3.6	0.1
1955-59	34.6	1.53	62	.09	49	1.3	0.0	1.6	-1.59
1960-64	31.2	1.56	55	.12	49	1.6	-0.7	1.6	-2.3
1965-69	29.0	1.46	55	.10	42	3.7	2.2	1.8	0.4
1970-74	27.2	1.25	46	.14	48	1.9	0.6	1.3	-0.7
1975-79	23.8	.97	37	.23	54	3.0	-1.0	0.9	-1.9
1980-84	14.9	.31	44	.35	42	2.0	-2.2	0.7	-2.9
1985-89	12.2	.31	38	.34	40	1.7	-2.4	0.7	-3.1
1990-94	10.3	.26	39	.31	46	1.2	-1.5	0.7	-2.2
1995-97	8.9	.23	40	.26	46	1.3	-1.6	0.8	-1.4

1. Density is defined in DL as percent of all private sector non-agricultural, non-construction employees who are members of unions. If density is defined as the percent of the private sector, non-agricultural, non-agricultural labor force the averages from 1980 to 1997 are 12.1, 10.4, 8.8, and 8.0.
2. All numbers for 1950 through to 1979 are from Dickens and Leonard (1985) Table 1, pp.326.
3. The averages for density, the certification organization rate, and the decertification organization rate for 1980 to 1984 are based on data from 1983 and 1984 only. The averages for the union membership growth rate, the net flow due to certification elections, and the net flow due to economic causes for 1980 to 1984 are the 1984 values of these series.

Table 4: Net Economic Growth Regression for the U.S. (1983-1997)	
Variable	Coefficient (standard error)
constant	-3.00 (0.79)
trend	0.09 (0.05)
Real GDP growth	0.23 (0.13)
Lagged GDP growth	-0.32 (0.14)
<u>Diagnostics:</u> Adjusted R-squared D.W. Statistic	 0.43 2.53

Table 5: Shift-Share Indices for the U.S. 1983 to 1997.		
Year	DL Index	All Industries Index
1983	100.0	100.0
1984	99.9	99.6
1985	98.3	98.8
1986	96.6	97.8
1987	95.6	97.1
1988	95.0	96.6
1989	94.2	96.1
1990	93.6	96.0
1991	92.9	95.5
1992	92.1	95.1
1993	91.4	94.7
1994	90.9	94.1
1995	90.4	93.5

1996	89.8	93.0
1997	89.4	92.7

Table 6. Coefficients on the Mandatory Vote Dummy for Simulations.		
Dependent Variable	Application Rate (*apprate2*)	Certification Success Rate
Specification #1	-0.11 (.034)	-7.79 (1.84)
Specification #2	-0.18 (.034)	-5.76 (2.16)
Specification #3	-0.09 (.027)	-9.22 (0.94)
Specification #4	-0.15 (.027)	-8.79 (1.07)

Notes

1. The number in parentheses is the standard error of the coefficient.

2. The mandatory vote variable is defined as 1 in years where mandatory vote legislation is in force and 0 when card-check legislation is in force. In the year the legislation is introduced the variable is equal to the portion of the year the mandatory vote legislation is in effect. The regressions are estimated using cross-section time-series analysis. Data covers nine Canadian jurisdictions (PEI and the federal sector are the omitted jurisdictions) from 1978 to 1996.

3. Specification #1 is estimated using OLS. The independent variables include: industry mix; percent female employment; percent part-time employment; union density' the unemployment rate; the inflation rate; dummies to control for the effect of first agreement arbitration legislation, dues checkoff legislation and province fixed effects.

4. Specification #2 is estimated using OLS. The independent variables are the same as those included in Specification #1 plus province specific linear time trends.

5. Specification #3 is estimated using Feasible Generalized Least Squares. The independent variables are the same as those used in Specification #1.

6. Specification #4 is estimated using Feasible Generalized Least Squares. The independent variables are the same as those used in Specification #2.

7. The coefficients are expressed as decimals in the simulations so they are consistent with the units used in the analysis.

Figure 1. Union Density - Canada and the U.S. 1951 to 1995

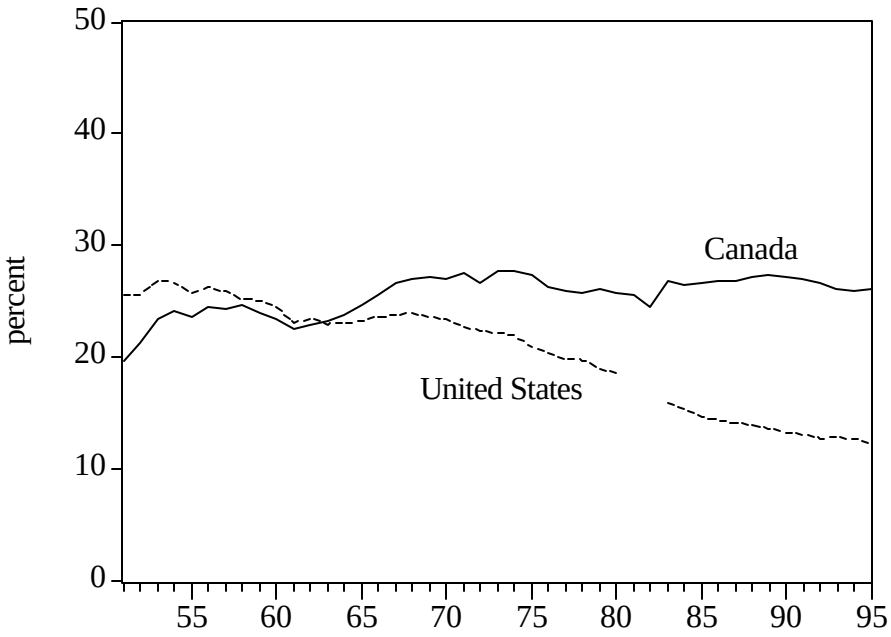


Figure 2. A Comparison of U.S. and Canadian Union Membership Growth Rates.

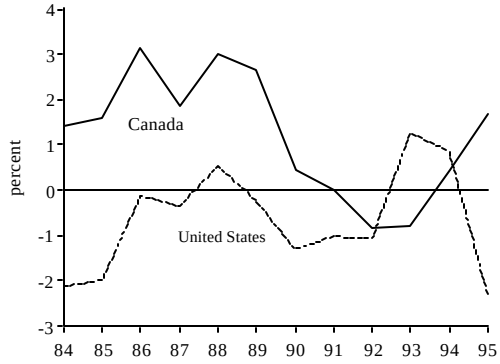


Figure 3a. Canadian and U.S. Labour Force Growth.

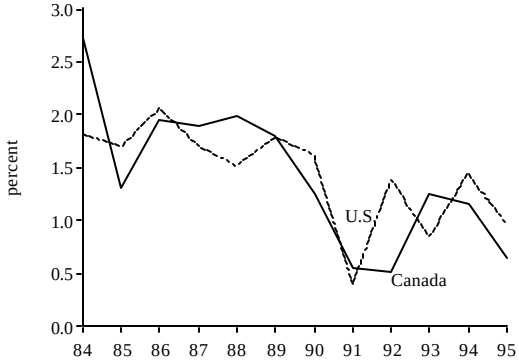


Figure 3b. Canadian and U.S. Employment Growth.

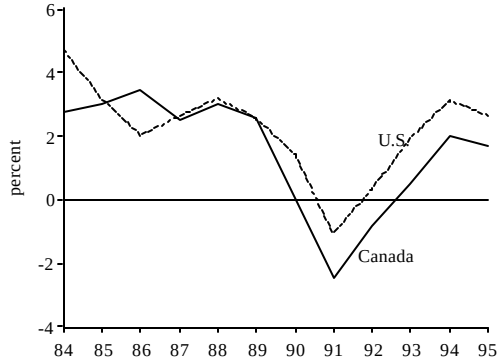


Figure 4. Growth of Canadian Union Membership

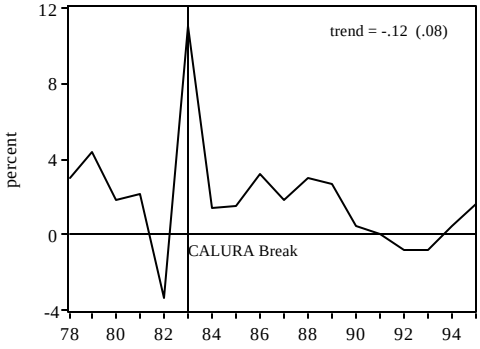


Figure 5. Net Growth due to 'Recognition' in Canada.

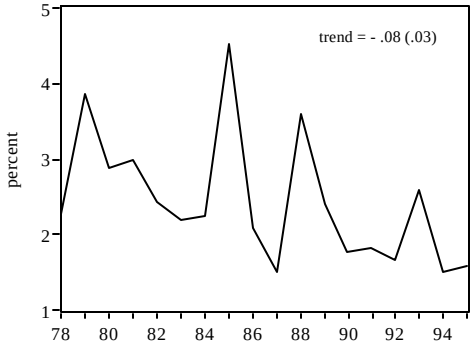


Figure 6. Net Growth due to 'Economic' Factors in Canada.

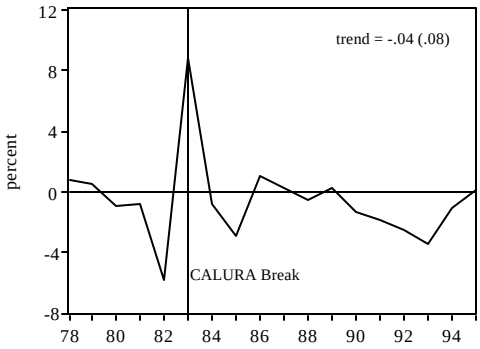


Figure 7. Flows of newly certified and newly decertified workers in Canada.

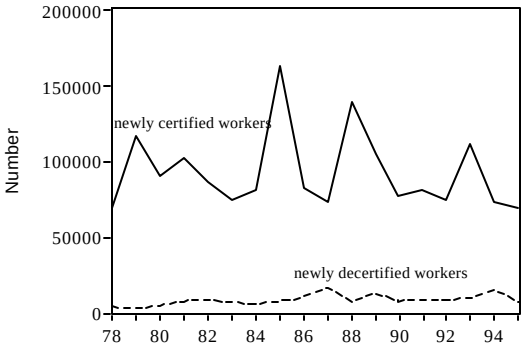


Figure 8a. Organization Rate in Canada

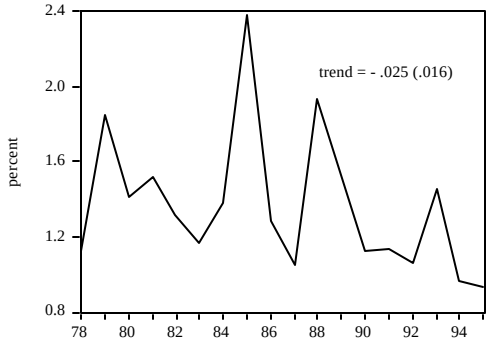


Figure 8b. Certification Applications processed in Canada.

Figure 8c. Mean Size of Bargaining Unit Certified in Canada.

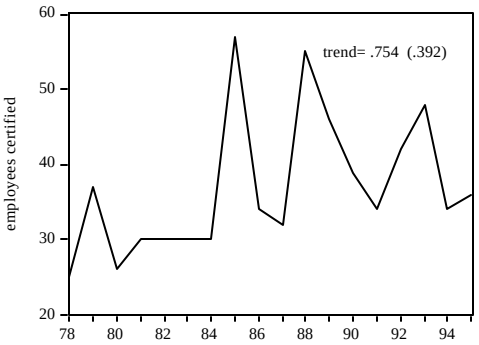


Figure 9. Certification Success Rate in Canada.

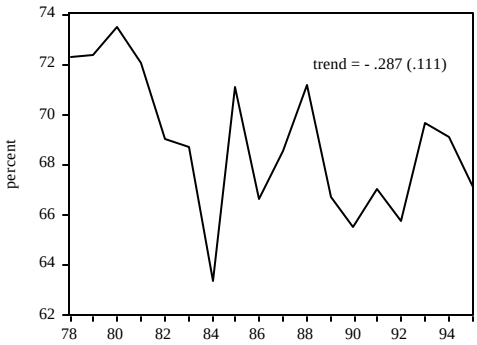


Figure 10a. Decertification Organization Rate in Canada.

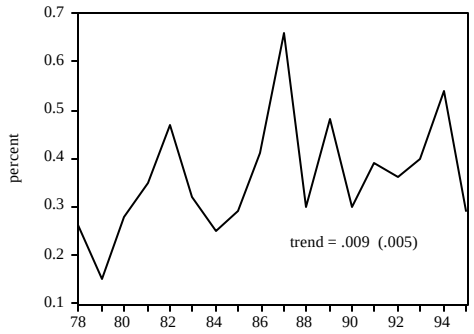


Figure 10b. Decertification Applications Processed in Canada.

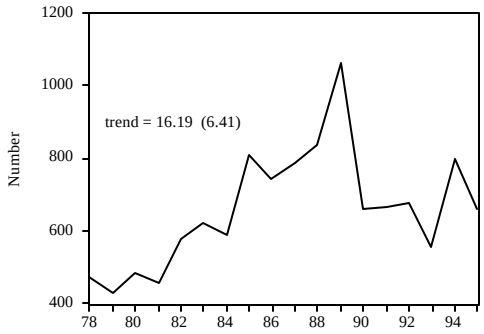


Figure 10c. Mean Size of Bargaining Unit Decertified in Canada.

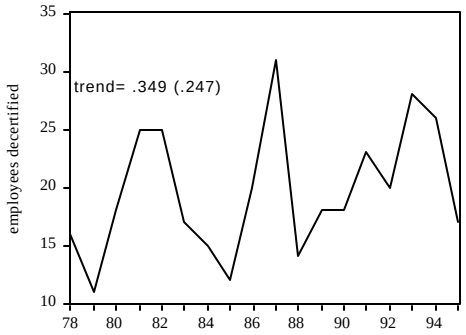


Figure 11. Decertification Success Rate in Canada.

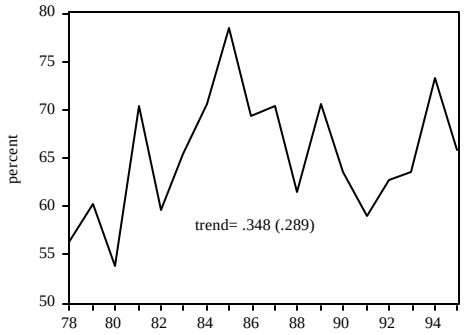


Figure 12. Union Membership Growth due to 'Economic'Factors in the U.S.

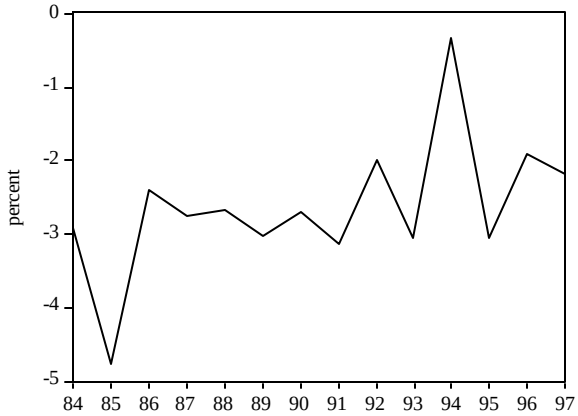


Figure 13. Growth in U.S. private, public and total union membership.

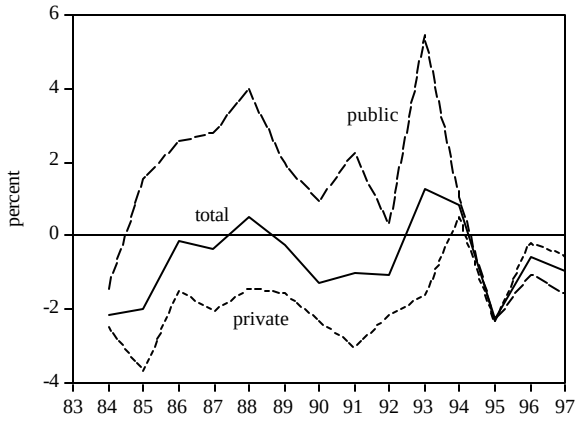
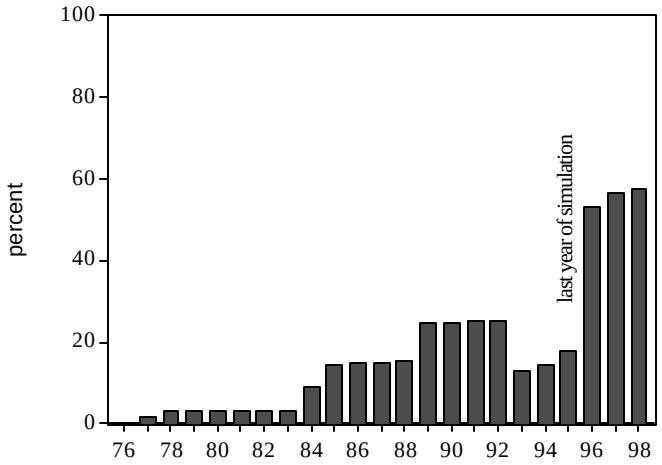


Figure 14. Percent of Canadian Labour Force covered by Mandatory Vote Legislation.



Note: For each year provincial labour force numbers are weighted by the proportion of the year mandatory votes were in effect and summed over the provinces.

Figure 15. Compare Actual Canadian Density to the Baseline Simulation Density

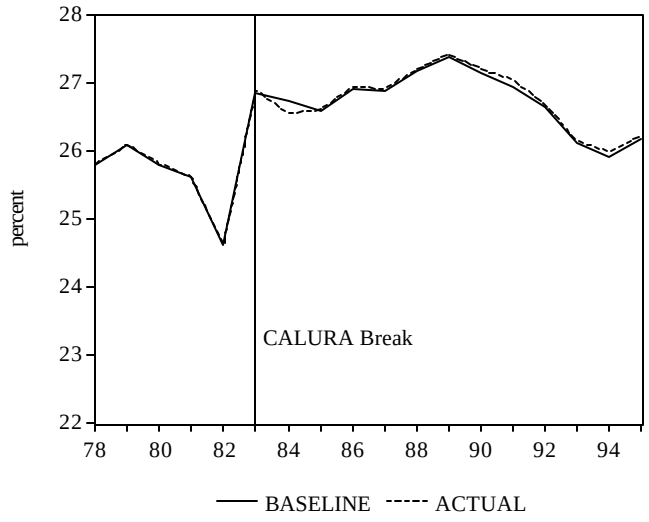


Figure 16. Union Density in Canada as if Mandatory Votes exist in all years.

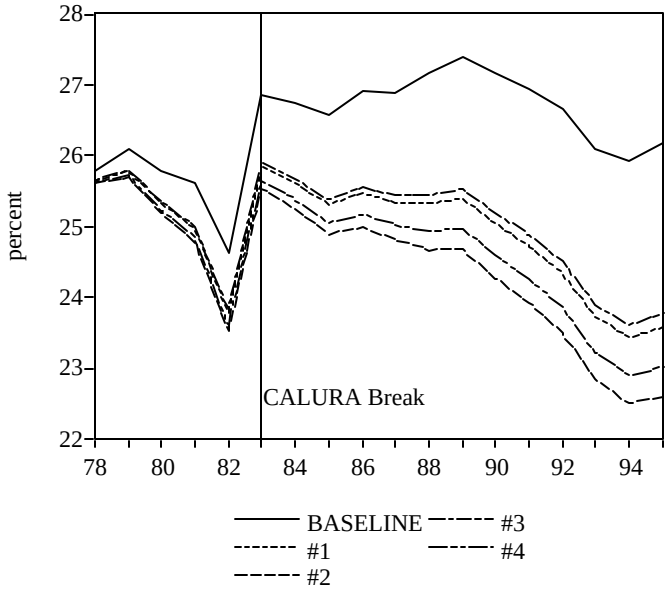
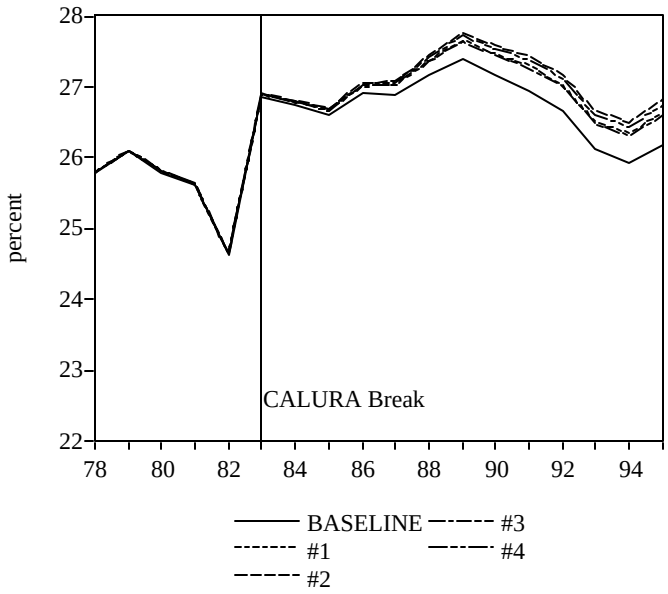


Figure 17. Canadian Union Density as if Card-Check Procedures exist in all years.



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APPENDIX ONE: Regressions that examine the CALURA Break.

CALURA was amended July 1981. In 1983 two groups of unions were required to report for the first time: unitary organizations - these are employee associations that do not have locals and; professional associations (e.g. Teachers federations, nurses associations etc) This change results in an increase in union membership in 1983 that is very evident in the data. In order to test to see if this change in definition affects the growth process of union membership a number of regressions are estimated. A number of explanatory variables are used in the regressions: (1) a dummy that takes the value one in 1983 and zero otherwise (D83); (2) a dummy that takes the value zero in 1978 to 1983 and one from 1984 to 1995 (D8495); (3) the interaction of D8495 with the growth in real GDP (D8495*GDPDOT) and; (4) the interaction of D8495 with a trend (D8495*year). The results are shown in Table A1.

TABLE A1: **Regressions that examine the CALURA Break.**
Dependent Variable - union membership growth.

Variable	Specification #1	Specification#2	Specification#3
constant	3.09 (1.05)	.68 (0.91)	5.59 (2.68)
D83	10.27 (1.95)	8.93 (1.34)	11.81 (2.10)
D8495	2.36 (1.63)	2.09 (1.48)	-4.06 (2.66)
year	-.29 (0.14)	-.14 (0.11)	- .94 (0.48)
GDPDOT		0.83 (0.19)	.36 (0.17)
D8495*GDPDOT		-.63 (0.24)	
D8495*year			.85 (0.47)

The coefficient on the 1983 dummy is positive and highly significant. It is clear that the mean of the growth of union membership changes in 1983. The coefficient on the 1984 to 1996 dummy is never significant. This indicates that the mean rate of union growth is not affected by the CALURA break in the later period. In order to test if the trend changes after the CALURA break the 1984 to 1996 dummy is interacted with a trend variable. The coefficient on this variable is not significantly different from zero indicating that the trend in union membership growth is not affected by the change in definition of union membership. Finally the cyclical variable is interacted with GDP growth to see if the response of union membership growth to the business cycle is different after 1983. The coefficient on this interaction variable is negative and statistically significant. Union membership growth is less sensitive to the business cycle after the change in union definition. After 1983 the measure of union membership contains many more para-public employees and these workers may be more sheltered from the business cycle.

DATA APPENDIX

In research that relies on an accounting framework it is particularly important to understand the data. The purpose of this appendix is to provide information on data definitions, sources and issues.

Union Density

Definition

Union density provides information on the union presence in an economy. There are a number of ways that union density can be defined. The one used in this paper is:

$$\text{union density (t)} = \frac{\text{union members}}{\text{civilian labor force}} \times 100$$

Some definitions use 'union coverage' in the numerator. When a union is granted bargaining rights in Canada or the United States all members of the bargaining unit are represented (covered) by the union whether they choose to be union members or not. Data on coverage is available on a very limited basis in Canada (from the Survey of Union Membership for 1984, the Labor Market Activity Survey from 1986 to 1990, and the Labor Force Survey from 1997 to the present). Data on coverage is available in the U.S. from the Current Population Survey from 1978. Membership data are available over a longer time period. Therefore membership is used in the numerator rather than coverage. The denominator should capture total potential union members. Various measures have been used as the denominator including; the civilian labor force; the non-agricultural labor force; the paid labor force; and employment. The civilian labor force is used in this paper because data on this variable are most consistent and comparable within each country and across the two countries over time.

Data

Union membership data are neither consistent within each country nor between countries from 1951 to 1997.

Canadian Union Membership Data

The Directory of Labour Organizations provides a long time series on Canadian union membership. Data from this source are compiled from a survey that is voluntarily completed by unions. This source is used for 1951 to 1961, although available, it is not used for later years. Data from the Corporations and Labour Unions Returns Act (CALURA) are used for 1962 to 1995.[20] Under CALURA unions (with over 100 members) were required by law to report membership and other information to Statistics Canada. Union members include retired and unemployed members. From

[20]CALURA was discontinued in 1992 but Statistics Canada continued to collect the data until 1995. The data from 1993 to 1995 are available in Statistics Canada, Unionization in Canada: A Retrospective (1999).

1983 the data include employee association members (this change in the data is examined in some detail in the paper). In order to extend the Canadian union membership series further it is necessary to piece together data from two very different sources: 1996 data are available only from the Directory of Labour Organizations; data for 1997 (to the present) are available from the Labour Force Survey. These data sources do not provide union membership data that is comparable to each other or to CALURA. CALURA data on union membership are used because they are considered to be the most reliable data on union membership in Canada and because Johnson (1999) uses CALURA data to generate the estimation results that form the basis for the simulations presented later in the paper.[21]

U.S. Union Membership Data

From 1951 to 1979 data on union membership are from the Directory of National Unions and Employee Associations. The data exclude employee associations. These data are based on a biennial questionnaire. The responding organization provided, through their own determination, the average number of dues paying members. The numbers may include union members who are unemployed, laid off, on strike or retired. Data for1980 and 1983 to 1997 are from the Current Population Survey (CPS). There are no data available for 1981 and 1982. The CPS includes members of unions and employee associations if they are employed. Data from 1983 to 1997 are based on annual averages and are not strictly comparable to the 1980 data based on the month of May. A redesign of the CPS in 1994 means that data after this date are not strictly comparable to the earlier CPS data. Card (1996) discovered that data on union membership from the CPS are subject to classification error of 2.5 to 3 percent. This means that 2.5 to 3 percent of workers that are not union members report that they are and 2.5 to 3 percent of workers that are union members report that they are not. Since there are more workers who are not union members that there are workers who are union members the presence of classification error biases union density measures based on the CPS up. I do not adjust the CPS data for this classification error.

Labor Force Data

Canadian labor force data from 1951 to 1975 are from Canadian Historical Statistics (Series D128 and D138). For the period from 1976 to 1995 data are from the Labour Force, Annual Averages (CANSIM Series D984598). U.S. labor force data are downloaded from the Bureau of Labor Statistics' website.

Stock-Flow Accounting Analysis for Canada.

Data on union membership are from CALURA and are described in the section on "Union Density" (above). Data on certifications and decertifications from 1978 to 1993 are from Martinello, Certification and Decertification Activity in Canadian Jurisdictions (1996) with updates to 1995 kindly provided by Professor Martinello. These data are compiled from the Annual Reports of the private

[21]Johnson (1999) uses CALURA data because this is the only source of information on union membership by province prior to 1997.

sector provincial and federal Labour Relations Boards (LRB).[22] All private sector and most public and para-public employees are covered by these LRBs (the actual coverage varies by jurisdiction). There are no data on certifications and decertifications for Prince Edward Island (the smallest province in Canada with a population of approximately 100,000) or for activity outside the jurisdiction of the private sector LRBs.

Martinello (1996) provides information on certifications disposed (processed) and certifications granted and the analogous information on decertifications. The data do not distinguish between certifications involving previously unorganized workers and those involving already organized workers ("raids"). Many unions replaced are decertified so the net change in 'recognition' is not greatly affected. Bargaining unit size (*certsize, dcertsize*) is constructed using data on newly certified (covered) and newly decertified (uncovered) employees and certifications and decertifications granted. Data available on the number of newly certified employees and newly decertified employees are available on a limited basis across jurisdictions. Data on newly certified employees are available from 1978 to 1995 for B.C., Alberta, Saskatchewan, Manitoba, Ontario Newfoundland and the federal jurisdictions and for 1978 to 1988 for Quebec. Data on newly decertified employees are available for 1978 to 1995 for Saskatchewan, 1980 to 1995 for Ontario and 1980, 1981 1989 and 1990 for the federal jurisdiction. All available data are used. The average size of bargaining unit certified (decertified) in Canada is constructed by dividing the number of employees covered (uncovered) by the number of certifications (decertifications) granted in each jurisdiction where the data are available and taking a simple average of the values across jurisdictions for each year.

Shift-Share Analysis for Canada.

The shift-share analysis uses union density numbers by industry in 1983 from CALURA. Employment figures are from the Labour Force, Annual Averages (CANSIM numbers for each employment series follow). The industries included are: agriculture (D984730); fishing, trapping, mining, quarries and oil (D984731); manufacturing (D984736); construction (D984739); transportation, communications and utilities (D984741 and D984735); trade (D984742); finance (D984745); services (D984746) and public administration (D984751).

Stock-Flow Accounting Analysis for the U.S.

The purpose of this analysis is to update earlier work by Dickens and Leonard (1985) therefore wherever possible the same data sources are used. The Annual Report of the National Labor Relations Board provides data on certifications and decertifications in the private sector. This is the same data source used by DL. Total union membership numbers are from the Current Population Survey. This source for union membership data is different from that used by DL who use data from the Directory of National Unions and Employee Associations available only until 1979. Data on public sector union membership are compiled from the CPS and are from the Bureau of National Affairs, Union

[22]In most, but not all, Canadian jurisdictions the administrative body responsible for administering collective bargaining legislation is called the Labor Relations Board. In this paper all of these bodies will be referred to as Labor Relations Boards.

Membership and Earnings Data Book. DL use data on public sector union membership published in AFL-CIO convention proceedings. Data on construction union membership are created by combining the CPS series on 'percent of wage and salary workers in the construction industry who are union members' with the CPS series on the 'number of wage and salary workers in the construction industry'. Subtracting public sector union members and construction union members from total union members yields private sector non-construction union membership. The data on employment and labor force are from the Economic Report of the President. Employment data are for non-agricultural, non-construction, wage and salary workers in the private sector. The labor force is the private, non-agricultural, non-construction labor force.

Shift-share analysis for the U.S.

Data on employment are from the Economic Report of the President (1999). Data on unionization rates are from the Current Population Survey. The 'DL index' is based on the sample of industries used by DL. These industries include: mining; manufacturing-durable; manufacturing-nondurable; transportation and utilities; wholesale trade; retail trade; finance, insurance and real estate; and services. The 'All Industries index' incorporates all of the industry groups used in the DL index plus agriculture, construction and government.

Time Periods for Comparisons.

Data availability and comparability influence the time period chosen to accomplish the various objectives in the paper. To establish the existence of the union density gap between the U.S. and Canada a long time series from 1951 to 1995 is used. The Canadian stock-flow analysis and simulations are based on a shorter period - 1978 to 1995 because there are very limited data on bargaining unit size and no data on number of firms by province (required for the simulations) prior to 1978 and consistent union membership data are not available after 1995. The U.S. stock-flow analysis focuses on the period from 1983 to 1997 because Dickens and Leonard (1985) have already done the analysis to 1980 and no data on union membership are available in 1981 and 1982. Comparisons between Canada and the U.S. focus on the 1983 to 1995 period (therefore growth rate comparisons focus on 1984 to 1995) because this is when the most consistent and comparable data are available in the two countries. The shift-share analysis for 'All industries' can be compared from 1983 to 1997.