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Labor Market Adjustment in Canada and the United States

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Abstract

This paper provides a quantitative assessment of the relative importance of different labor market adjustment mechanisms in Canada and the United States and also examines the effects of the unemployment insurance (UI) system on labor market adjustment. At the aggregate level, employment growth shocks result in similar unemployment rate responses but smaller wage responses in Canada relative to the United States. Although overall UI generosity has increased aggregate unemployment persistence in Canada, the endogenous component of UI has affected unemployment persistence only marginally. The lower degree of aggregate real wage flexibility in Canada has not been an important determinant of unemployment persistence.

JEL Classification Numbers:
E24, J65, E32

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Contents

Summary

Since the early 1980s, the aggregate unemployment rate in Canada has been persistently higher than that in the United States. However, existing research has failed to identify conclusively the proximate determinant for the persistent unemployment gap between these two countries. This paper takes a different approach from previous literature by providing a quantitative assessment of the relative importance of various labor market adjustment mechanisms in Canada and the United States. The paper also directly examines the effects of the unemployment insurance (UI) system on labor market adjustment. This analysis is designed to shed some light on why similar shocks in the two countries could potentially result in dissimilar labor market outcomes, both in the short run and in the long run. In addition, the relative importance of different labor market adjustment mechanisms could have implications for designing effective policies to address the unemployment problem in Canada.

The results indicate some similarities but also a few interesting differences between the two countries in the relative importance of different channels of labor market adjustment in response to employment growth shocks. The responses of unemployment rates are quite similar in the two countries, although there are some differences in the long-run responses of employment levels and the participation rate. The real wage response to an employment growth shock is more muted in Canada than in the United States, suggesting a lower degree of real wage flexibility in Canada. However, it does not appear that differences in real wage flexibility can account for much of the discrepancy in unemployment persistence across the two countries in recent years. Although the overall generosity of the UI system is found to have increased aggregate unemployment persistence in Canada, this paper concludes that the endogenous component of UI has not had a significant effect on unemployment persistence.

I. INTRODUCTION

A number of explanations have been advanced for the unemployment gap between Canada and the United States that opened up in the early 1980s and has persisted since then. As the other papers in this conference volume show, few of these explanations are able to account for a substantial fraction of the unemployment gap by themselves although, taken together, they may well explain much of the gap.

In this paper, we take a different approach than in previous literature by providing a quantitative assessment of the relative importance of various labor market adjustment mechanisms in Canada and the United States. This analysis is designed to shed some light on why similar shocks in the two countries could result in dissimilar labor market outcomes, both in the short run and the long run. Although Canada is a more resource-based economy, both Canada and the United States are closely integrated and, over the last two decades, have been subject to fairly similar exogenous macroeconomic shocks. Thus, a comparative analysis of labor market adjustment in these two countries could help to delineate institutional or other factors that might account for Canada's persistently higher unemployment rate since the beginning of the last decade. In addition, the relative importance of different labor market adjustment mechanisms could also have implications for designing effective policies to address the unemployment problem.

The principal mechanisms involved in equilibrating the labor market in response to exogenous shocks include real wage adjustment, changes in employment levels, and changes in unemployment and labor force participation rates. To study the relative importance of various adjustment mechanisms at different time horizons, we employ vector autoregression techniques to jointly estimate the effects of labor market shocks on employment, unemployment, real wages, and the participation rate.[1] The methodology developed in this paper is used to analyze the role of the unemployment insurance (UI) system in affecting the persistence of unemployment following shocks to employment growth. The structure of the UI system has often been cited as the proximate cause for the ratcheting up of Canada's unemployment rate during the last two decades (see, e.g., Milbourne, Purvis, and Scoones (1991); Card and Riddell (1993); and Fortin, Keil, and Symons (1995)). In particular, the regional extended benefits system is believed to have introduced a strong endogenous component to UI generosity in Canada. To facilitate a comparison of the effects of the UI systems across the two countries, we construct an index of UI generosity for the United States that is similar to Sargent's (1995) UI index for Canada.

We find some similarities as well as a few interesting differences across the two countries in the relative importance of different channels of labor market adjustment in response to employment growth shocks. The responses of unemployment rates are quite

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[1]Blanchard and Katz (1992) use similar techniques for analyzing state-level labor market adjustment in the United States.

similar in the two countries, although there are some differences in the long-run responses of employment levels and the participation rate. The real wage response to an employment growth shock is more muted in Canada than in the United States, suggesting a lower degree of real wage flexibility in Canada. However, it does not appear that differences in real wage flexibility account for much of the discrepancy in unemployment persistence across the two countries in recent years. In addition, we do not find much evidence that the endogenous component of the UI system has had a significant influence on unemployment persistence in Canada.

The remainder of the paper is organized as follows. The next section describes the dataset and the following section describes the econometric methodology. Section 4 presents the main results of the paper. Section 5 summarizes our main findings, discusses their implications, and suggests avenues for further research.

II. Dataset

This section describes the dataset used in the analysis. Annual aggregate data were obtained covering the period 1966–93 for Canada and 1961–93 for the United States. For Canada, data on total employment, total hours worked, the unemployment rate, and the participation rate were obtained from the Labor Force Survey. The aggregate wages and salaries variable was obtained from Revenue Canada. For the United States, total employment, the unemployment rate, and the participation rate were obtained from the Current Population Survey and data on total hours worked were obtained from the Establishment Survey. Other macroeconomic data series for both countries, such as the CPI, were taken from the DRI databank.

For Canada, the real wage is derived by dividing aggregate wages and salaries by total hours worked and deflating this ratio by the CPI.[2] Labor productivity is derived by dividing real GDP by total hours worked. For the United States, the average real wage is defined as compensation per hour in the nonfarm business sector deflated by the aggregate CPI.[3] Labor productivity is derived by dividing real GDP in the nonfarm business sector by total hours worked.

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[2]In January 1995, the Labor Force Survey estimates of total employment, the labor force, and the population were revised back to 1976. However, the wages and salaries series was not concomitantly revised by Revenue Canada. We assume that the change in the post-1976 estimates from the Labor Force Survey constitutes a level adjustment and control for this level change in our empirical work.

[3]The Canadian and U.S. aggregate wage variables used in this paper have been used quite widely in the literature. See, e.g., Huh and Trehan (1995).

One important issue for our empirical analysis is the choice of the appropriate measure of UI generosity in the two countries. Changes in the benefit replacement rate as well as other aspects of UI such as eligibility requirements and benefit periods could affect labor market dynamics. This is of particular importance in the case of Canada where the UI system has undergone substantial changes over the last two decades. For Canada, we use an index of UI generosity constructed by Sargent (1995), who calculates an efficient income-unemployment frontier and analyzes individual behavior at kink points. This index is a non-linear function of the minimum number of weeks needed to qualify for unemployment benefits, the duration of benefits for individuals who have satisfied the minimum eligibility requirement, and the replacement rate.

Figure 1 plots the UI index and the aggregate unemployment rate for Canada (top panel). The two variables appear to have a positive but weak association. This figure vividly shows the sharp increase in UI generosity in 1971–72. One of the often cited explanations for the recent persistence of a high Canadian unemployment rate is the regional extended benefits component of UI, which is believed to have introduced a substantial endogenous component to the UI system. The decline in the UI index in the latter half of the 1970s followed by another increase during the recession in the early 1980s are suggestive of this cyclical element of UI generosity.[4]

To facilitate the comparison of UI effects across the two countries, we constructed a UI index for the United States that closely parallels Sargent's index for Canada. The procedure for constructing this index is described in detail in Appendix 1. The lower panel of Figure 1 plots this UI index and the aggregate unemployment rate for the United States. There appears to be a relatively strong positive association between the two variables although, relative to the base year of 1970, there has been much less of an increase in this index in the United States compared to Canada. As in Canada, there is an endogenous element to this index attributable to the system of regional extended benefits. The sharp rise in the index in 1992 reflects the introduction of the Emergency Unemployment Compensation program, a temporary benefits program that was enacted by Congress in November 1991 and remained in force until February 1994 (see McMurrer and Chasanov (1995)).

III. ECONOMETRIC FRAMEWORK

In order to derive a reduced-form model for labor market adjustment, we make the identifying assumption that short-run labor market fluctuations are primarily attributable to labor demand shocks. In this framework, innovations to labor demand are allowed to have permanent effects on the levels of both employment and real wages. However, the unemployment effects of labor demand shocks are constrained to be zero in the long run. In practical terms, however, the persistence of an increase in the unemployment rate could

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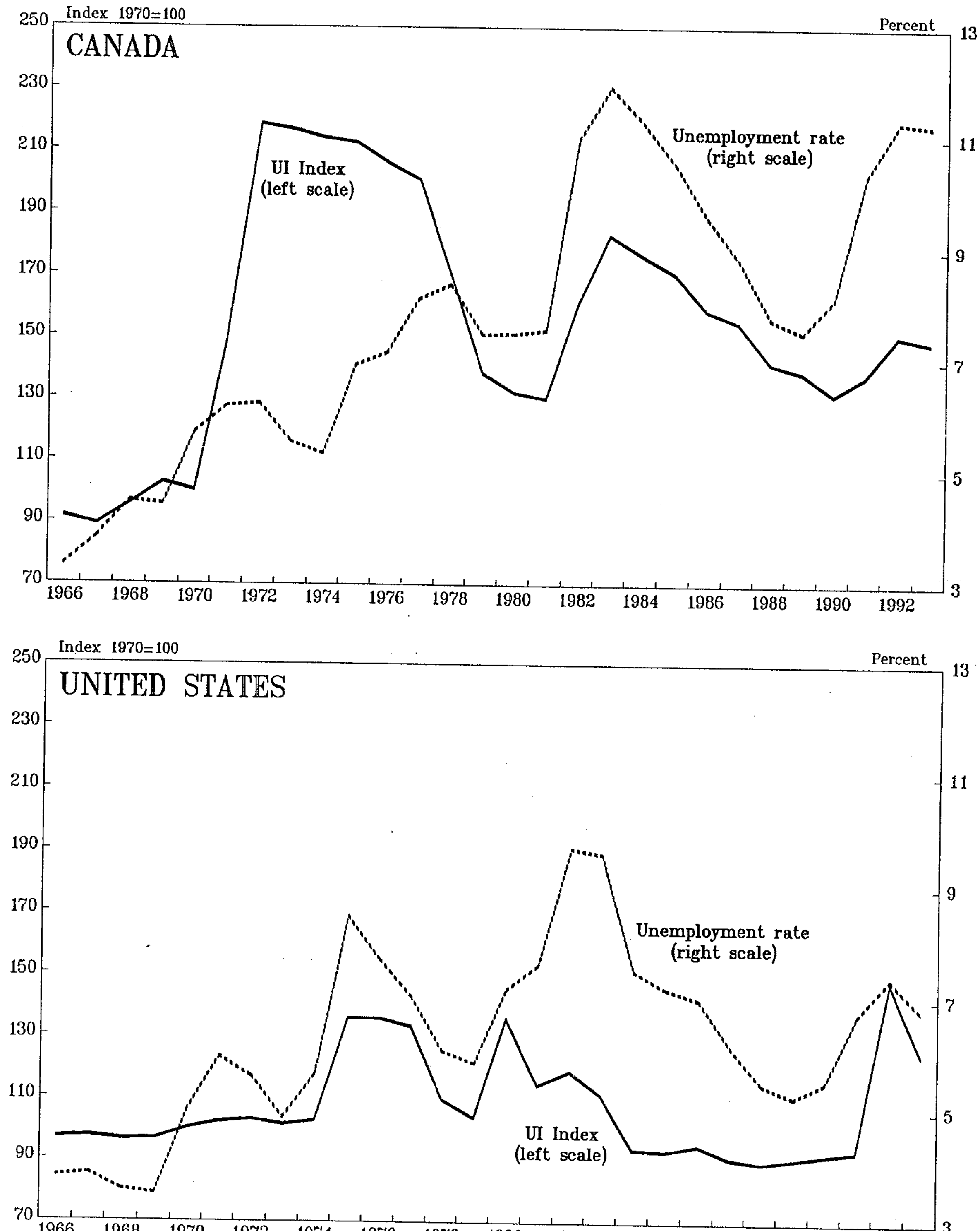
[4]Recent reforms to the UI system have resulted in a decline in this index since 1993.

Figure 1
Unemployment Insurance Index and the Unemployment Rate



Sources: For Canada, Labor Force Survey and Sargent (1995); the UI Index Mean = 135.2 and Std. Dev. = 38.9. For the U.S., Current Population Survey and authors' calculations; the UI Index Mean = 113.4 and Std. Dev. 17.8.

stretch out over many years. The speed with which the unemployment rate declines would depend on, among other things, the generosity of the UI system and on how quickly employment and real wages adjust. Thus, a sequence of negative labor demand shocks even at intervals of a few years could result in a ratcheting up of the unemployment rate.

An appropriate reduced-form specification would need to capture labor market adjustment in the different dimensions discussed above. However, making the reasonable assumption that the level of the aggregate working-age population is exogenous, a labor market identity ties down the participation rate, given the employment level and the unemployment rate.[5] Thus, we can estimate only two independent equations for these three labor market quantities, in addition to a separate wage equation.

Our empirical strategy is to use vector autoregression techniques to perform a multivariate analysis of aggregate labor market adjustment separately for Canada and the United States. The methodology is similar to that employed by Blanchard and Katz (1992) who study state-level labor market dynamics in the United States. Since the econometric specifications in our analysis are contingent on the univariate time series properties of the variables, we conducted stationarity tests to identify the order of integration of the variables in our analysis. We ran standard Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) regressions for each variable. To conserve space, we only summarize the main results here. Employment and real wages are found to be stationary in (logarithmic) first differences. The unemployment rate is borderline nonstationary in levels. Based on our priors, we choose to enter this variable in levels in our estimated equations for two reasons. First, as noted by many authors, it is difficult to accept that a variable such as the unemployment rate, which is by definition bounded between zero and unity, can truly be unit root nonstationary. Second, removing the low frequency component of unemployment by differencing would remove much of the relevance of this analysis for explaining long-term unemployment persistence.[6]

In order to make our empirical framework tractable, we employ an identifying assumption similar to that employed by Blanchard and Katz. We assume that employment growth shocks represent exogenous shocks to labor demand. This implies that short-run variation in aggregate labor market quantities and prices is primarily determined by labor demand shocks. Under this assumption, employment growth shocks affect real wage growth and the unemployment rate contemporaneously but the feedback effects from any of these variables to employment growth can occur only with a lag. The interpretation of employment

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[5]Note that, although we motivate our reduced-form specification as being sufficient to model the effects of labor demand shocks, it can accommodate a broader set of shocks. For instance, the labor supply effects of an exogenous increase in the UI index would be accommodated through the endogenous response of the participation rate.

[6]We recognize that this is a controversial issue. To address this concern, as described in the next section, we also estimate all our regressions using the detrended unemployment rate.

growth shocks as labor demand shocks is consistent with the concomitant unemployment and wage movements that we find in the data. It is also consistent with Abraham and Haltiwanger's (1995) conclusion that labor demand shocks have played the major role in accounting for the positive cyclical comovement in real wages and employment in the United States since the early 1970s.

We analyze the relationship between employment growth, wage growth and the unemployment rate using the following system of three equations:

$$\Delta e_t = \alpha_{10} + \alpha_{11}(L)\,\Delta e_{t-1} + \alpha_{12}(L)\,\Delta w_{t-1} + \epsilon_{1t} \tag{1}$$

$$\Delta w_t = \alpha_{20} + \alpha_{21}(L)\,\Delta e_t + \alpha_{22}(L)\,\Delta w_{t-1} + \alpha_{23}(L)\,ur_{t-1} + \alpha_{24}(L)\,\Delta prod_t + \epsilon_{2t} \tag{2}$$

$$ur_t = \alpha_{30} + \alpha_{31}(L)\,\Delta e_t + \alpha_{32}(L)\,\Delta w_{t-1} + \alpha_{33}(L)\,ur_{t-1} + \alpha_{34}(L)\,ui_{t-1} + \epsilon_{3t} \tag{3}$$

where Δe is the aggregate employment growth rate; Δw denotes average real wage growth; $\Delta prod$ is labor productivity growth; ur is the aggregate unemployment rate; ui is the unemployment insurance index; and t is the index for time. To control for supply effects, we include labor productivity growth as a determinant of wage growth in equation (2). In the employment equation, we net out the labor productivity component of wages by using the estimated wage growth net of labor productivity growth as an instrument for actual wage growth.

To capture the effects of the UI system on unemployment dynamics, the unemployment rate equation includes the UI index. Only lagged values of the index are included in the specification, thereby obviating potential endogeneity problems. In order to allow for the possibility of feedback effects between the unemployment rate and the UI index, we include in our system of estimated equations a separate equation for the UI index:

$$ui_t = \alpha_{40} + \alpha_{41}(L)\,ui_{t-1} + \alpha_{42}(L)\,ur_t + \epsilon_{4t} \tag{4}$$

Thus, our framework lets us examine the effects of the UI system on unemployment persistence, while allowing for feedback effects between the level of the unemployment rate and the level of the index. Note that the contemporaneous unemployment rate is included in equation (4) in order to capture the regional extended benefits component of UI in both countries. This introduces a potential problem of endogeneity in the specification which we deal with by using instrumental variables rather than OLS estimation for this equation.[7]

IV. Results

We use the econometric framework described above to separately analyze labor market adjustment in Canada and the United States. The system of reduced-form VARs was estimated with two lags.[8] The aggregate results are reported in Table 1. In the employment regression, the coefficients on lagged employment growth indicate some persistence of this variable in both countries although in the United States much of the added impetus to employment growth after one period is reversed in the following period. In Canada, employment growth shocks are more persistent. In both countries, the effect of lagged changes in wages on employment growth is negative but statistically insignificant. Turning to the wage equation, it is apparent that real wage growth is not very persistent in either country, as indicated by the coefficients on lagged wage growth. Increases in employment growth are strongly associated with increases in real wage growth in the United States but not in Canada. As expected, there is a negative relationship between unemployment and wage growth in both countries, but this effect is not statistically significant.

Estimates of the unemployment rate equation are quite interesting. In both countries, an innovation in employment growth reduces unemployment but part of this effect is reversed in the subsequent period. The coefficients on the lagged dependent variable indicate that the unemployment rate is quite persistent in both countries. Of particular interest is the coefficient on the lagged UI index. The coefficient on the lagged UI index is significantly positive for Canada, indicating a positive relationship between the level of the UI index and the level of the unemployment rate. The point estimates indicate that, for Canada, a one standard deviation increase in the index (38.9 points) would, ceteris paribus, result in an increase of 0.23 percentage points in the unemployment rate. Thus, the increase in the index of about 120 points from 1970 to 1972 would be expected to have eventually resulted in a 0.7 percentage point increase in the unemployment rate. For the United States, the coefficient on the second lag of the UI index is significantly positive and bigger than in the case of Canada. However, it should be noted that this index for the United States has not risen as much since 1970 and has also been far less variable than the UI index for Canada.

Finally, estimates of the equation for the UI index show that in the United States there is an endogenous element to this index as indicated by the strong positive coefficient on the

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[7]The set of instruments included two lags of the UI index, the unemployment rate, and the employment growth rate.

[8]The choice of lag length was based on the Schwarz-Bayes information criterion which indicated an optimal lag length of 2 for both countries.

Table 1
Multivariate analysis of aggregate labor market adjustment in Canada and the United States

	CANADA				UNITED STATES			
Dep. Variable:	Employment	Real wage	Unemp. rate	UI index	Employment	Real wage	Unemp. rate	UI index
DE		−0.052 (0.212)	−0.583 ** (0.027)			0.484 * (0.289)	−0.632 ** (0.080)	
DE (−1)	0.337 * (0.206)	0.155 (0.514)	0.296 ** (0.082)		0.515 ** (0.218)	0.199 (0.463)	0.246 (0.180)	
DE (−2)	0.139 (0.275)	−0.264 (0.248)	−0.005 (0.034)		−0.324 * (0.201)	0.063 (0.209)	0.040 (0.074)	
DW (−1)	−0.469 (0.358)	0.253 (0.241)	0.090 ** (0.031)		−0.509 (0.374)	0.094 (0.235)	0.027 (0.078)	
DW (−2)	−0.282 (0.273)	−0.325 (0.247)	−0.114 ** (0.034)		0.305 (0.387)	−0.444 * (0.248)	0.018 (0.082)	
UR				0.503 (0.347)				0.841 ** (0.312)
UR (−1)		−0.849 (1.031)	1.429 ** (0.134)	−0.627 * (0.340)		−0.308 (0.557)	1.276 ** (0.239)	−0.613 ** (0.310)
UR (−2)		0.378 (0.754)	−0.608 ** (0.107)			−0.461 (0.589)	−0.464 ** (0.211)	
UI (−1)			0.059 ** (0.028)	1.258 ** (0.175)			−0.049 (0.065)	0.669 ** (0.257)
UI (−2)			0.009 (0.031)	−0.544 ** (0.158)			0.201 ** (0.076)	0.082 (0.318)
DPROD		0.785 ** (0.384)				0.737 ** (0.163)		
DPROD(−1)		−0.016 (0.350)				0.127 (0.276)		
DPROD(−2)		−0.094 (0.324)				0.304 (0.208)		
Adj. Rsqrd. DW Statistic	0.19 1.77	0.67 2.28	0.99 2.90	0.78 2.08	0.11 2.02	0.59 1.84	0.94 2.13	0.28 1.97

Notes: All regressions include a constant and were estimated using annual data from 1966 to 1993 for Canada and from 1961 to 1993 for the United States. Standard errors are reported in parentheses below the coefficient estimates. A double asterisk (**) indicates significance at the 5 per cent level; a single asterisk (*) denotes the 10 per cent level. The variable mnemonics are as follows: DE: employment growth; DW: real wage growth; UR: unemployment rate; UI: unemploymen insurance index; and DPROD: labor productivity growth. The UI index was divided by 1000 to facilitate the interpretation of the estimated coefficients. All equations were estimated by OLS except for the UI equations which were estimated by instrumental variables.

contemporaneous unemployment rate. Somewhat surprisingly, this coefficient is positive but insignificant for Canada. Over the full sample period, it appears that there is a stronger cyclical element to the UI index in the United States than in Canada. When we re-estimated the UI equation for the 1978–95 subsample for Canada, the coefficient on the unemployment rate turned significantly positive, although the size of the coefficient did not change much. Thus, the regional extended benefits system did introduce an endogenous element to the UI system in Canada after 1978 but the quantitative effects of this relative to the full sample results are not large. The coefficient on the lagged UI index is strongly positive in both countries but much larger in absolute magnitude in Canada, indicating strong persistence of this index, although the second lag is negative and counteracts some of this persistence.

The coefficients in Table 1 suggest a roughly similar pattern of labor market dynamics in Canada and the United States, although there are some important differences. To formally test for differences in the estimated equations across the two countries, we conducted likelihood ratio tests for each equation. The results are presented in Table 2. At the 5 percent significance level, we reject the null hypothesis of equal coefficients for both countries for the employment growth, unemployment rate, and UI index equations. At the 10 percent level, we marginally reject the restriction of the equality of coefficients for the wage equation.[9] Thus, these tests indicate statistically significant differences in the dynamic equations that describe labor market adjustment in Canada and the United States.[10] However, the quantitative significance of these differences remains to be examined. We now turn our attention to this issue.

To trace the dynamic path of the variables discussed above, it is useful to examine impulse response functions computed using the coefficient estimates for both countries. Figure 2 shows the impulse response functions for Canada and the United States for the levels of employment, average real wages, and the unemployment and participation rates in response

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[9]The test for the wage equation was limited to the coefficients other than those on the productivity terms, which were nearly identical across the two countries. Including the productivity coefficients in the test yielded similar results.

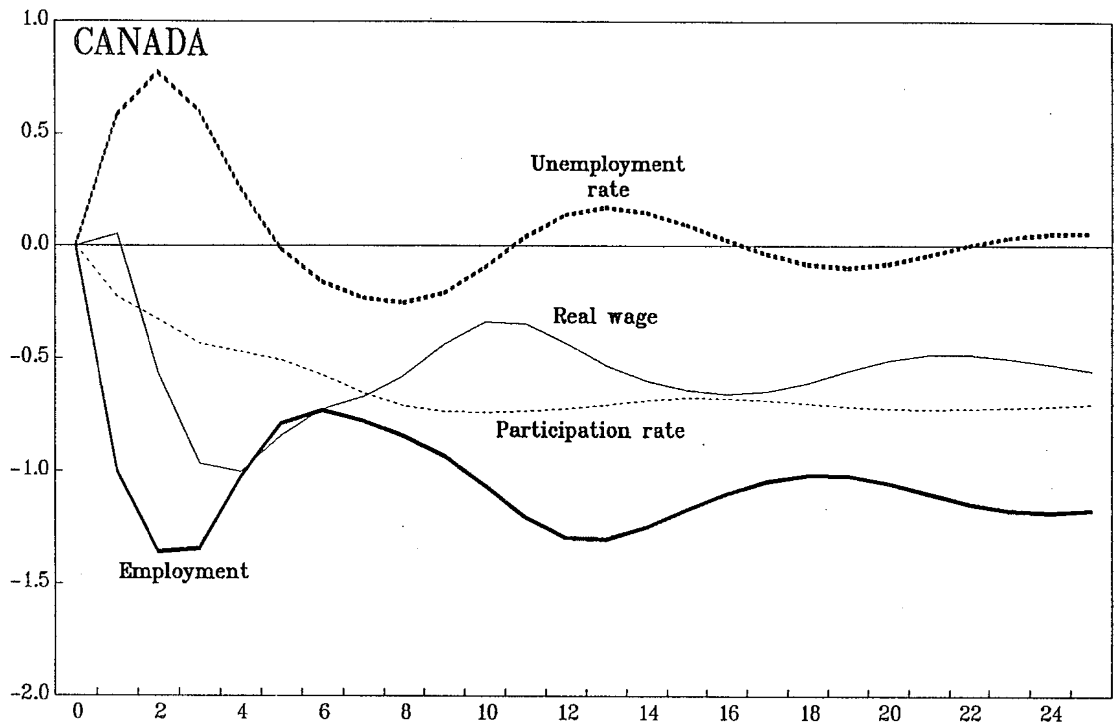
[10]It would also be of interest to split the sample and test for structural change in the coefficients, particularly for Canada. Unfortunately, since we use annual data, splitting the sample left us with too few degrees of freedom for structural break tests to have any reasonable power.

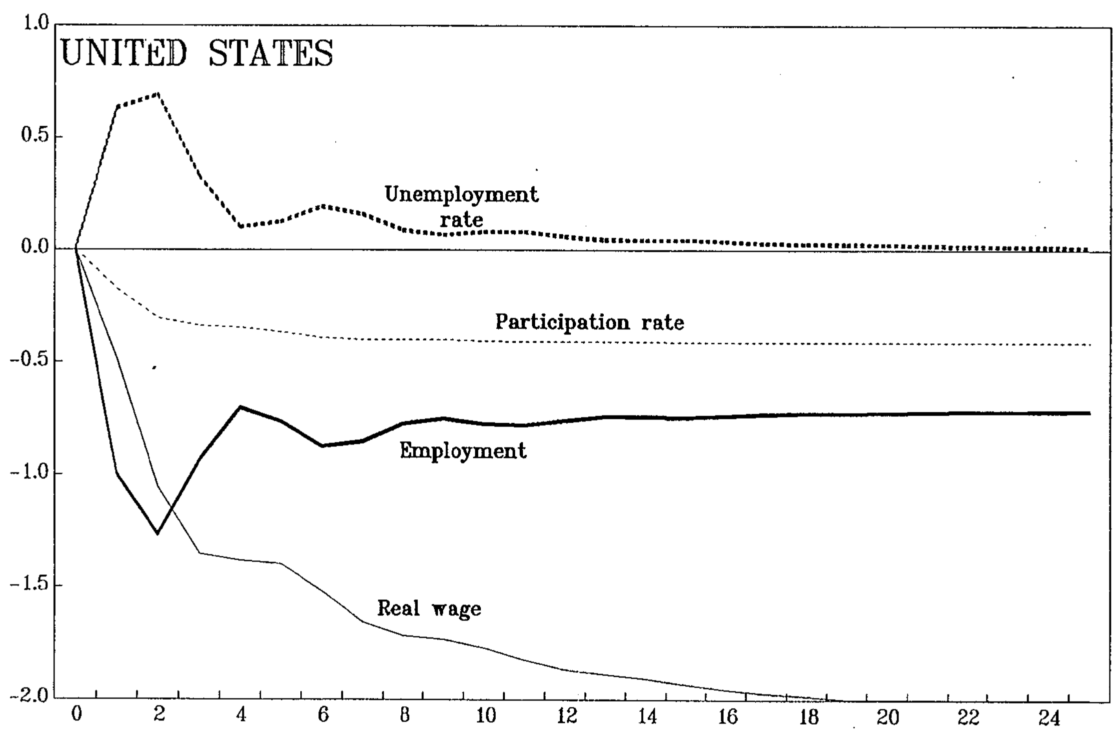
Table 2
Tests for the equality of coefficient estimates between Canada and United States

Equation	Degrees of freedom	Test statistic	p value
Employment	4	10.55	0.03
Real wage	7	11.93	0.10
Unemployment rate	9	25.27	0.00
UI index	4	10.03	0.04

Notes: The tests were conducted on the slope coefficient estimates for the baseline specification described in the text.

Figure 2
Impulse Responses to Aggregate Employment Growth Shock 1/





1/ The real wage and employment impulse responses represent percentage deviations from baseline. The unemployment and participation rate responses are expressed as percentage point deviations from baseline.

to a one percent negative aggregate shock to employment growth.[11] Although the shock to employment growth is temporary, it has (by construction) a permanent effect on the level of aggregate employment. In Canada, unemployment rises sharply in the first year after the shock and shares the brunt of the adjustment with the participation rate since real wages remain essentially unchanged. The contemporaneous wage response is sharper in the United States, tempering the unemployment and participation rate responses. In the second year after the shock, the real wage declines in Canada but the unemployment rate continues to rise because the continued fall in the employment level outweighs the decline in the participation rate. In the third year after the shock, the unemployment rate begins to decline in both countries. The rate of decline of the unemployment rate response towards zero is similar in the two countries.[12] However, the long-run effects of a similar employment growth shock on both the level of employment and the participation rate are larger for Canada than for the United States.

Another important feature of these impulse responses is that, following a negative shock to employment growth, the magnitude of the short-run decline in real wages in Canada is much smaller than in the United States. The long-run real wage decline is also smaller than in the United States, suggesting that real wages are relatively less flexible in Canada than in the United States. To investigate the effects of this apparent lower wage flexibility in Canada on labor market dynamics, we simulated an impulse response profile for Canada using coefficient estimates from the U.S. wage equation but found only small differences in the resulting impulse responses for Canada. This implies that a significant portion of the higher persistence in Canada's employment level and, by extension, in the unemployment rate, can not be explained by differences in wage flexibility across the two countries.[13]

As discussed earlier, one concern regarding our econometric specification may be that we include the unemployment rate in levels. To address this concern, we re-estimated

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[11]For variables that enter the specification in first differences, the impulse responses of the corresponding (log) levels are obtained by cumulating the impulse responses for the (log) differences. Since all of the models that we estimate are linear, the responses to a one percent positive shock to employment growth would be of the opposite sign and symmetric. The impulse response for the participation rate was computed assuming fixed N and the labor market identity $e + p*N*ur = p*N$, where e is the employment level, p is the labor force participation rate, N is the working-age population and ur is the unemployment rate.

[12]Although the unemployment rate response for the United States takes much longer to return to zero, it should be noted that the standard error bands (not shown here) for these impulse responses are quite large and the one standard error bands include zero after the fourth year for both countries.

[13]These impulse response figures are not presented here in order to conserve space. They are available from the authors.

equations (1)–(4) above using the detrended unemployment rate in place of the unemployment rate level.[14] The impulse responses using this variable are shown as Figure 2A. The main elements of the dynamics are essentially unchanged, although the unemployment rate and employment responses in Canada are more muted than in Figure 2. Again, the major difference between the impulse responses across the two countries is the sharper real wage adjustment in the United States compared to Canada. Thus, we conclude that our main results are not driven by the use of unemployment levels in the baseline specification.

Another relevant issue is that the greater persistence of employment in Canada may reflect the preference of firms to adjust hours rather than employment. To examine this possibility, we substituted total hours worked for the total number of employees in the analysis. Impulse response profiles for Canada and the United States using the respective total hours variables are shown in Figure 3. For comparison, the employment impulse responses are also included in the figure. These impulse responses indicate that, in both countries, the long-run effect on total hours is less than for total employment. However, the long-run level difference between the total hours impulse responses for Canada and the United States is very similar to the difference between their respective employment responses. Hence, we conclude that, although there is a significant degree of labor input variation at the intensive margin of weekly hours worked in both countries, the differences in hours variation are not sufficient to explain the differences between Canada and the United States in the persistence of the effects of employment growth shocks.

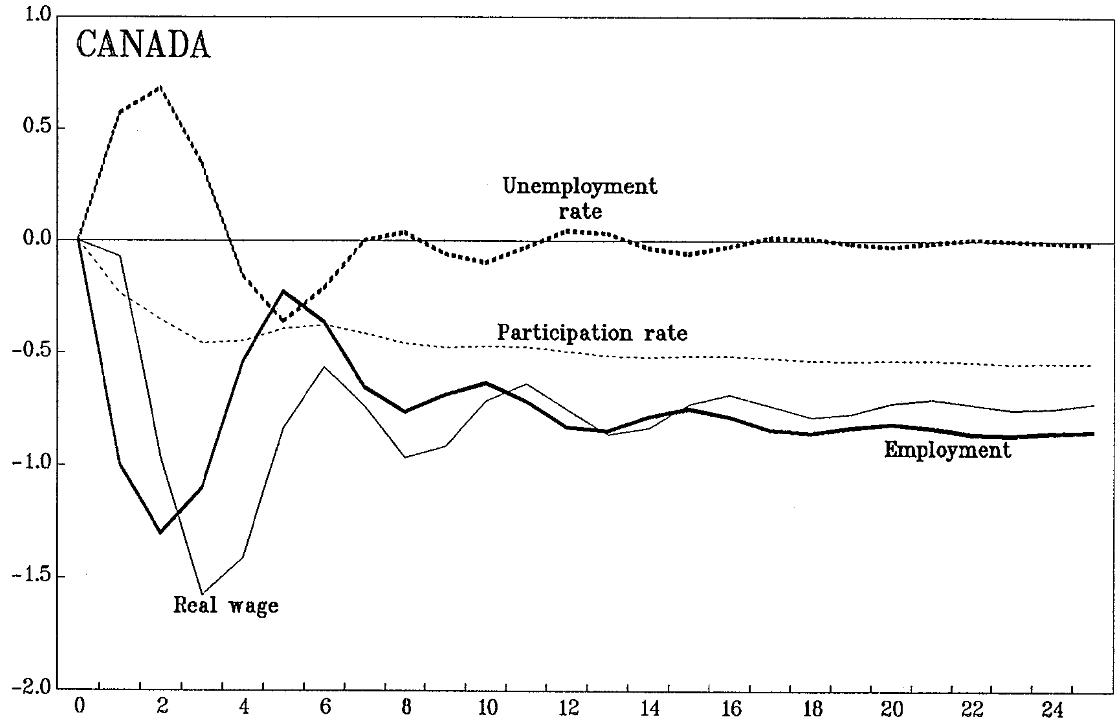
Having established various features of the baseline specification, we now take a closer look at the effects of the UI index on aggregate unemployment persistence. In particular, we are interested in examining whether the endogenous component of the UI system has had a significant impact on labor market dynamics in the two countries. To address this issue, we re-compute the impulse response figures using equations (1)–(3) and ignoring the endogenous response of the UI as calculated in equation (4). These impulse responses are presented in Figure 4.

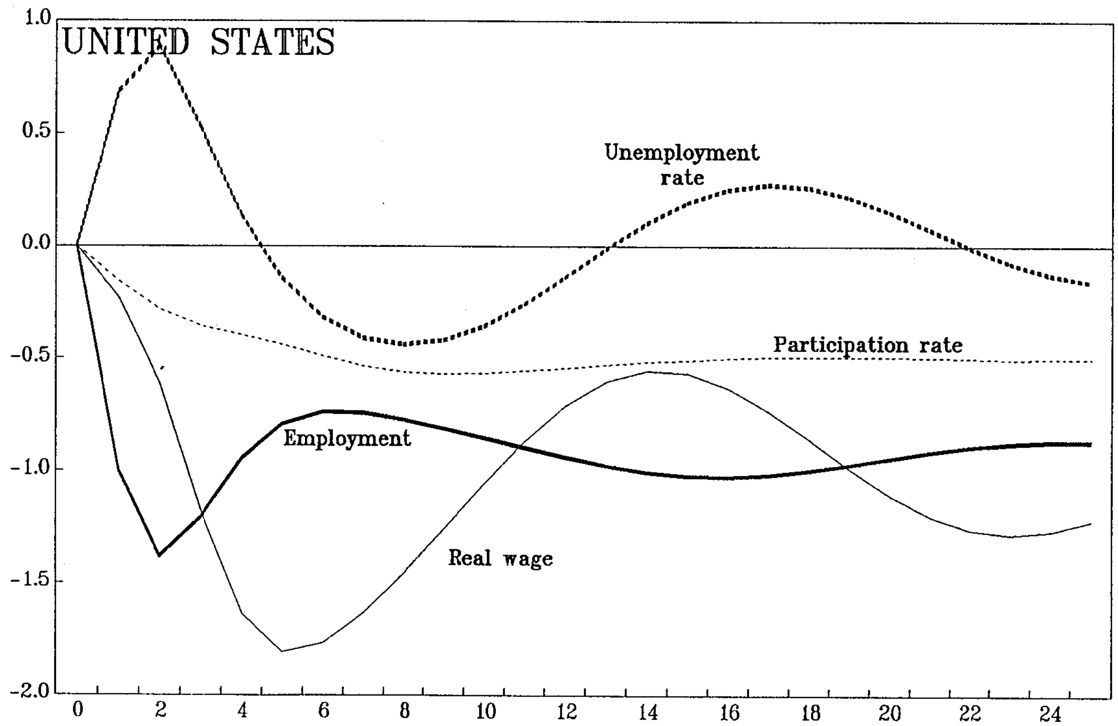
The profiles of the unemployment rate responses in Canada appear quite similar when comparing the upper panels of Figures 2 and 4. The U.S. impulse responses, presented in the lower panels of these two figures, are also similar. This is in part because the endogenous response of the UI index to changes in the unemployment rate is largely reversed after one year in both countries (see Table 1). It appears, therefore, that the endogenous component of the UI system does not have a significant impact on the dynamics of labor market adjustment. In addition, as noted earlier, when the UI equation was re-estimated over the period 1978–95

[14]That is, we regressed the unemployment rate on a constant and a time trend and used the residuals from this regression. ADF tests showed that, over our sample period, the null hypothesis of unit root nonstationarity could be rejected against the alternative of stationarity around a deterministic linear time trend.

Figure 2a

Impulse Responses to Aggregate Employment Growth Shock 1/

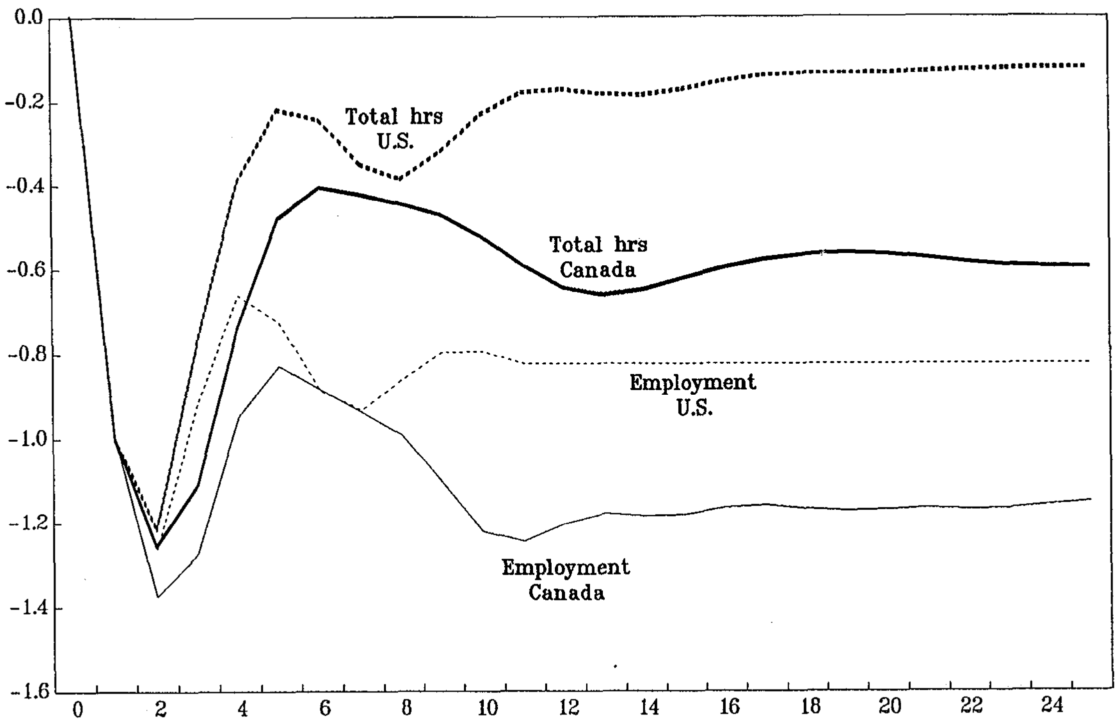




1/ The employment and real wage impulse responses represent percentage deviations from baseline. The unemployment and participation rate responses are expressed as percentage point deviations from baseline.

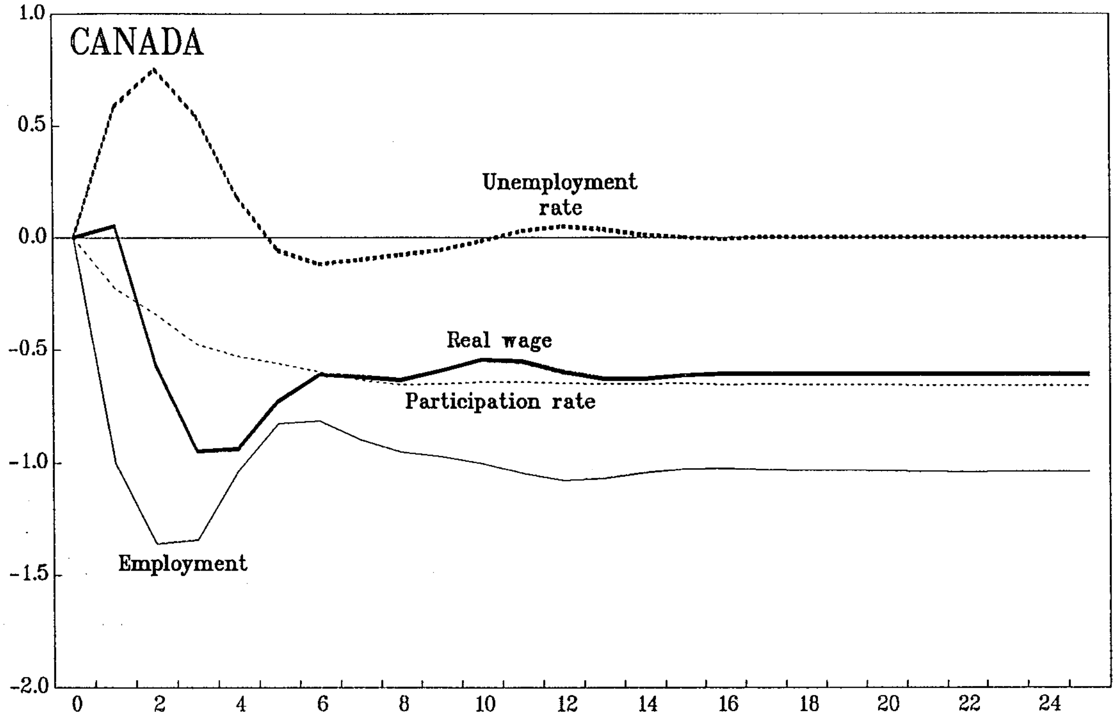
Figure 3

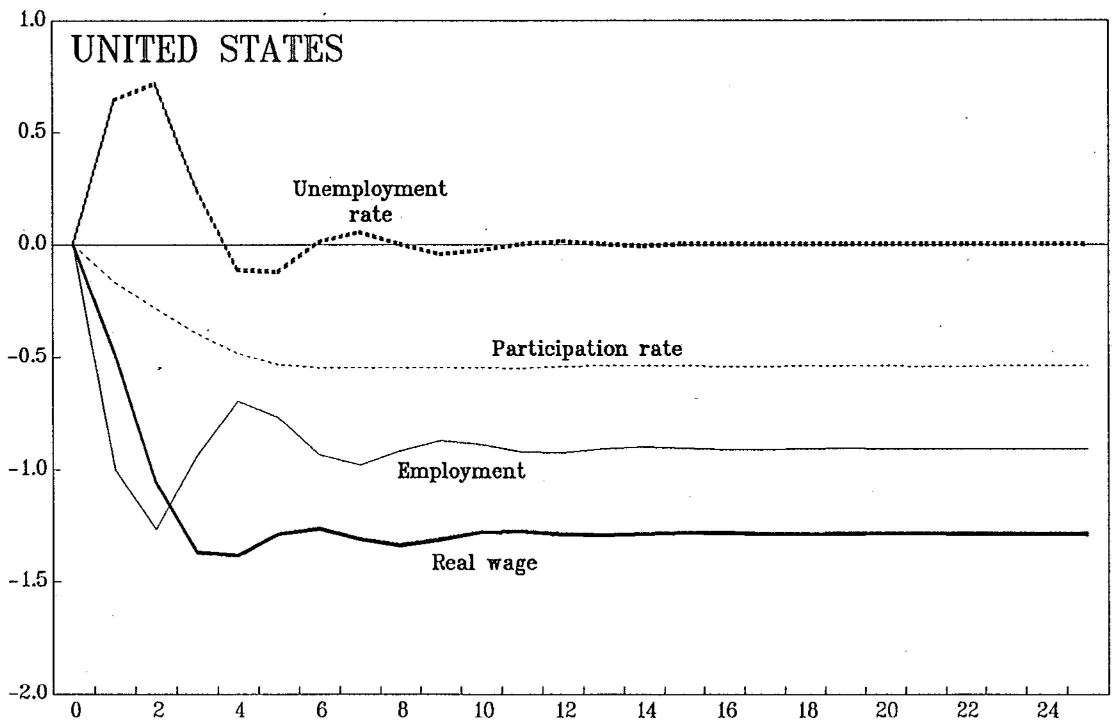
Impulse Responses of Canadian and U.S Employment and Total hours 1/



1/ The employment and total hours impulse responses represent percentage deviations from baseline.

Figure 4
Impulse Responses to Aggregate Employment Growth Shock 1/





1/ The employment and real wage impulse responses represent percentage deviations from baseline. The unemployment and participation rate responses are expressed as percentage point deviations from baseline.

for Canada, the coefficient on the contemporaneous unemployment rate was significant but not very different in magnitude from the full sample results. Hence, the impulse response functions for Canada using these subsample coefficients for the UI equation did not look very different. We interpret these results as evidence that the effects of the endogenous component of the UI system are considerably weaker than the effects of the noncyclical component.[15]

However, the level of the UI variable, comprising both the cyclical and noncyclical components, is clearly a significant determinant of the unemployment rate and the persistence of unemployment in both countries. The UI indexes in both countries fell in 1978, rose briefly in the early 1980s, and then declined gradually through the end of the 1980s (see Figure 1). The recession in the early 1990s led to an increase in the UI indexes in both countries. Although the broad patterns of variation in the UI index are similar in Canada and the United States, there are some important differences. For instance, the UI index rose by about 31 percent in the United States in 1980 (from 103.6 in 1979 to 135.8), but by 1984 had declined to a lower level than in 1980. In Canada, the increase was larger, about 39 percent over the period 1981–83 (from 132.0 to 182.8), and the subsequent decline was also much more gradual. However, the point estimates in the unemployment rate equations on the UI variables are larger for the United States than for Canada (the two lagged coefficients sum to 0.068 for Canada and 0.152 for the United States). Thus, the net effect of the UI variables on the respective unemployment rates is not large enough to explain the divergence between Canadian and U.S. aggregate unemployment rates in the 1980s. We conclude that, although there is clear evidence that the UI system has contributed to increases in unemployment and in unemployment persistence in both countries, it is not evident that it is the proximate cause for the greater increase in the level and persistence of unemployment in Canada during the 1980s.

V. Conclusions

In this paper, we have conducted a multivariate analysis of aggregate labor market adjustment in Canada and the United States. Employment growth shocks were found to have a larger and more persistent effect on both employment levels and participation rates in Canada than in the United States. Further, the results show that the response of the average real wage to an aggregate employment growth shock is much smaller in Canada than in the United States, both in the short run and the long run. However, we conclude that a significant portion of the higher persistence in Canada's employment level in response to employment growth shocks and, by implication, differences in the persistence of the unemployment rate, cannot be explained simply by differences in wage flexibility across the two countries.

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[15]Using administrative data associated with the UI program, Corak and Jones (1995) reach a similar conclusion, that regional extended benefits were of relatively little importance in explaining the increased level and persistence of Canadian unemployment during the 1980s.

We constructed and implemented an econometric framework that accommodated the endogenous relationships between the unemployment rate and the UI index. However, even in the presence of a feedback relationship between these two variables, it appears that the quantitative impact of the endogenous component of the UI system in affecting aggregate unemployment persistence is not very large either in Canada or the United States. The noncyclical component of UI, on the other hand, has played an important role in increasing unemployment persistence in both countries although it does not appear to account for a significant fraction of the greater persistence of Canadian unemployment and the divergence between Canadian and U.S. unemployment rates since the late 1970s. We are led to the conclusion that labor market adjustment mechanisms operate in fairly similar fashion across the two countries. Explanations for the greater persistence of unemployment variation in Canada may, therefore, have to include other institutional features of the labor market and also more basic macroeconomic factors.[16]

The results presented in this paper have shed light on some aspects of the relationship between the UI system and labor market dynamics. However, the reduced-form econometric framework constructed in this paper represents only a preliminary step towards a more fully specified structural model that incorporates other relevant relationships, such as the effect of changes in the UI system on labor supply decisions, in a more complete manner.[17] Using more disaggregated data and examining labor market dynamics at the provincial level would also be a promising avenue for further research.[18]

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[16]For instance, Keil (1996) argues that higher real interest rates in Canada relative to the United States since the late 1980s account for the persistently higher unemployment rate in Canada.

[17]Recent work by Andalfatto, Gomme, and Storer (1996) moves in this direction.

[18]See, e.g., Prasad and Thomas (1996).

APPENDIX I

This appendix describes the methodology for calculating the UI index for the United States. The methodology closely parallels that of Sargent (1995), who constructs the UI index for Canada using the following formula:

$$UI^{*} = \frac{D+A}{D+A+M}\left[1-\left(\frac{1-\rho D/(D+A)}{1+\rho D/M}\right)\right]^{\theta}$$

where M is the minimum number of weeks needed to qualify for UI benefits, D is the length of the benefits period (in weeks) for a claimant who has worked the minimum number of weeks required for eligibility, A is the waiting period before benefits are received, ρ is the estimated replacement ratio and θ is the scale parameter of the taste for leisure which is assumed to follow a Pareto distribution.

For the United States, the various components of the index were obtained from annual publications of "Significant Provisions of State Unemployment Insurance Laws" published by the U.S. Department of Labor. The publication includes for each state, the qualifying wage or number of weeks of work required to be eligible for unemployment insurance, the number of weeks needed to wait before receiving benefits, and the maximum number of weeks of benefits available to each claimant.

Eligibility requirements for a number of states are in terms of the number of weeks of work required. However, the eligibility requirement in some states is that annual wages need to be equal to at least 1¼ and 1½ times the highest quarterly wage in the previous year. These requirements were converted into work weeks by multiplying 1.25 and 1.5 by 13 weeks to give 16 and 20 weeks of work respectively. Some state eligibility rules require multiples of the weekly base wage, defined approximately as half of the weekly wage in the quarter with the highest earnings. These eligibility requirements were converted into weeks of work by dividing the multiple by 2.

For most states, the maximum duration of benefits is 26 weeks. This duration was extended in 1972, 1975–78 and 1980–81 when national extended benefit triggers were in place. In 1992, a new extended benefit program called the Emergency Unemployment Compensation (EUC) program was introduced. This was a temporary benefits program enacted by Congress in November 1991, which expired in February 1994. A number of states also had their own individual extended benefit programs over this period.

The replacement rate was also obtained from the Department of Labor and the scale parameter was assumed to equal 0.2 as in Sargent's work. National estimates for all the parameters were based on employment-weighted averages across states.

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