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Calvin D. Siebert and Mahmood A. Zaidi

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Article abstract

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The authors consider the reasons for the shifts in the unemployment vacancy (UV) relationship in Canada and the United States during the past two decades to see whether these shifts can explain the gap in the unemployment between the two countries which arose about 1980 and may be increasing. We find that changing structural imbalances in the labor markets by themselves cannot explain the shifts in the UV curves or the gap in the unemployment rates in the two countries. We conclude that aggregate economic shocks which create some structural imbalances are required to explain the shifts in the UV curves and the differing unemployment experiences in the two economies.

During the 1980s the unemployment rate in Canada was several percentage points higher than in the U.S. Prior to the 1980s the level and the movements in the unemployment rates in the two countries were quite similar.[1] Reasons for this difference and the sudden change in the relationship in the latter 1970s have been much debated.[2] The focus of the debate has centred on the extent to which the difference results from deficient demand or from worsening structural imbalances in the labor market. The unemployment-vacancy (UV) relationship or Beveridge curve is one method which has been employed

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to separate increases in structural and frictional unemployment from deficient demand unemployment. It is argued that outward shifts in the UV relationship indicate increases in frictional and structural unemployment while increases in deficient demand unemployment result in movements along the UV curve. The data seem to show that there were substantial outward shifts in the UV curve for both Canada and the United States from the 1960s to the 1980s, indicating a large increase in structural and frictional unemployment for both countries. This has led to a number of empirical studies which attempt to identify the factors which caused the UV curve to shift outward.[3]

Since the mid-1980s it appears the U.S. UV curve has shifted downward to its 1960s level (see Figure 1). During the same time period the U.S. unemployment rate has fallen below its levels of the latter 1970s and the first half of the 1980s. The same has not been true for Canada (see Figure 2). The (UV) curve has not shifted down much, and Canada's unemployment rate has remained above the U.S. unemployment rate. In fact the gap between the Canada and U.S. unemployment rate appears to be widening, reaching nearly 4 percentage points by 1992.

FIGURE 1

**The Normalized Help-Wanted Index and Unemployment for the U.S., 1962-1991**

Source: Conference Board's Index of Help-Wanted Advertising in Newspapers divided by Total Civilian Labor Force in millions. The unemployment rate, the civilian labor force and the help-wanted index are from Citibase.

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    3 See for example Abraham (1987), Medoff (1983), Neelin (1987), and Gera, *et al.* (1991).

FIGURE 2

The Normalized Help-Wanted Index and Unemployment for Canada, 1962-1991
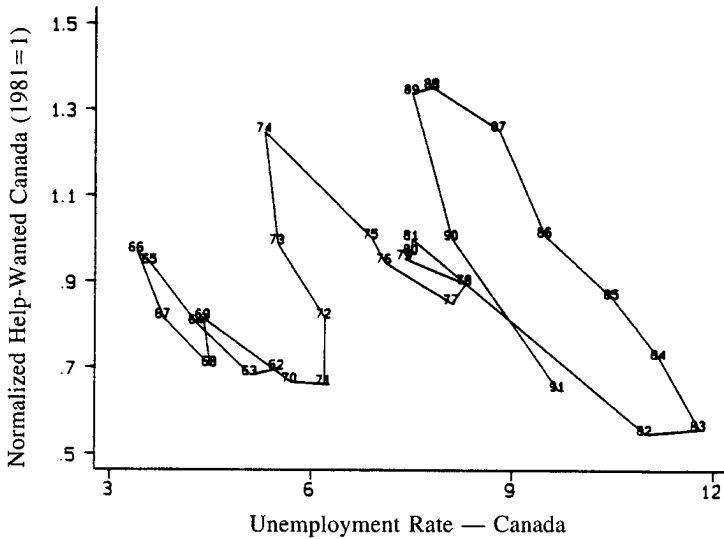
Source: The unemployment rate and employment are from Historical Labour Force
          Statistics, Canada. Help-wanted Index, Statistics Canada.

The focus of this paper is fourfold. First it looks at the theoretical under-pinnings of the UV relationship to consider whether it is valid to identify shifts in the curve with changes in structural imbalances in the labor market and movements along the curve with changes in aggregate demand. Second, the paper looks at the question of the extent to which shifts in the curve may be a statistical artifact of the proxies used to measure the vacancy rates. Third, we critically analyze the empirical studies aimed at identifying the factors which "caused" the UV curve to shift. Finally, we use our analysis to "explain" why the gap between the unemployment rates of Canada and the United States occurred in the 1980s and appears to have widened.

BEVERIDGE CURVE: THEORETICAL UNDERPINNINGS

Theoretical analysis of the UV curve, also known as the Beveridge curve, has been undertaken by several authors. The best known of these analyses was

done by Bent Hansen (1970).[4] He constructs from labor submarkets an aggregate relationship between unemployment (U) and vacancy (V) (see Figure 3). He starts from the supply and demand relationship in a typical labor submarket. In a frictionless homogenous labor submarket with a perfectly flexible wage rate, demand will always equal supply, and there will be no unemployment or vacancies. He points out that such frictionless continuous market clearing markets are not observed empirically. The wage rate will not be at the market clearing level in many submarkets. As a result there will be vacancies (unfilled jobs) in some labor submarket markets and unemployment in other labor submarkets. Further, the submarkets are not frictionless and the labor in the submarkets, unless defined in terms of homogenous labor, will not be homogenous. So even within labor submarkets there will exist at any point in time both vacancies and unemployment. It takes time for a worker to move from job to job within a submarket or for a employer to fill a vacancy. There also will be friction between identifiable submarkets. This means that submarkets will have both unemployed individuals and vacant jobs, and changes in the tightness of the labor market may show itself as changes in both unemployment and vacancies. In terms of supply and demand analysis, actual employment is never on the supply curve (if the wage rate is below equilibrium) or on the demand curve (when above equilibrium).

Under static assumptions concerning demand and supply, Hansen derives an individual market UV curve from his supply and demand curves. Hansen notes these individual submarkets may be aggregated into a macro UV relationship such as shown in Figure 3. The macro relationship would not necessarily be a simple rectangular hyperbola as shown, but he argues empirical evidence seems consistent with that form.

The UV relationship is a derivative of a particular version of what is commonly known as "search" unemployment models. The original formulation was characterized by a reservation-wage approach since its critical decision variable was the reservation wage. Such models usually had active search undertaken by workers with firms being passive respondents to this activity. It is, however, well recognized that firms actively search and that their recruitment efforts have significant procyclical variations. This relationship between the search activities undertaken by the two sides is summarized by the empirical relationship between unfilled vacancies and unemployment. This UV relationship has a strong negative slope implying that times of high unemployment are also times of low unfilled vacancies. Furthermore, empirically the UV curve is known to shift outward or inward. Attempts to explain movements

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4   Dow and Dicks-Mireaux (1959) and Holt and David (1966) give earlier analysis on the UV relationship. More recently Blanchard and Diamond (1989) have developed a more complex analysis of the UV relationship.

along the UV curve and shifts in the curve have depended largely on active search activities undertaken by the two sides in an economic environment with ''trade-frictions''; the end result has been that movements along the curve are attributed to aggregate demand changes while shifts are due to structural or supply side changes.

Considerations such as those above have led investigators using the derived UV or Beveridge curve to argue that it can be used to separate changes in structural and frictional unemployment from deficient demand unemployment. It is argued that increased labor market tightness as a result of increased demand will move the economy as represented in Figure 3 along the UV curve I from a point such as A to point B. On the other hand, if labor market slack occurs as a result of reduced aggregate demand, the economy will move to a point such as C. An increase in structural or frictional unemployment in the economy is denoted as an upward shift in the UV relationship or, terms of Figure 3, as a movement from UV I to UV II or from point A to point D.

FIGURE 3

Unemployment (U) and Vacancy (V) Relationship
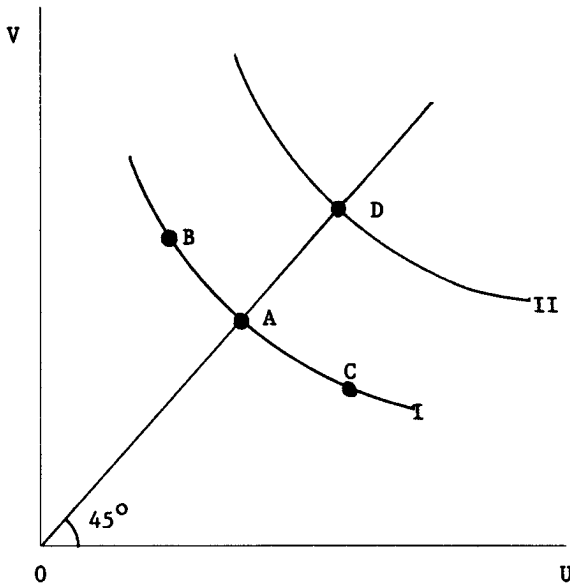
A Simple Matching Model

In order to understand the underlying reasons why the UV may shift upward, it is helpful to develop a simple matching model.[5] Steady-state equilibrium in the labor market requires the condition that the flow of unemployed leaving unemployment per period equals the flow into unemployment per period. The flow out of unemployment per period or the hiring rate will be greater the larger the number of vacancies and the higher the level of unemployment. If vacancies increase at a given unemployment rate, hiring increases because the job matching process becomes easier. This causes an inverse relationship between vacancies and unemployment since the greater the vacancies, the higher the flows out unemployment and the lower the unemployment rate. Alternatively, the higher the number of unemployed people looking for jobs, *ceteris paribus*, the higher the hiring rate will be. If, on the other hand, an increase in the mismatch (mm) between unemployment and vacancies occurs, hirings will decline. Such mismatches could occur if the new jobs created were in different geographical regions and/or had different skill requirements than the jobs which were being eliminated.

Given the above, we can write the following matching or hiring function:

(1) $H = f(g\overset{+}{V}, c\overset{+}{V}, \overline{mm})$

where H is the number of hires per period or the number of unemployed leaving unemployment; g and c are parameters, g denotes the willingness of firms to fill vacancies. For example, if firms become more choosy in their hiring, g would fall. Similarly, the unemployed can differ in their intensity of job search. The greater search intensity of the unemployed and their willingness to accept jobs the higher c will be.

The inflow into unemployment comes from two sources. First, there are the new entrants and/or re-entrants into the labor market, I_1. Second, there are the flows into unemployment from employment, I_2. I_2 can be expressed as a proportion of total employment, $I_2 = sN$, where N is total employment and s is the rate at which the employed leave their jobs, i.e., the turnover rate. The inflow into unemployment is

(2) $I = I_1 + sN$

In steady state it is required that the hiring rate equals the flow into unemployment, i.e., H=I, or

(3) $f(gV, cU, mm) = (I_1 + sN)$

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    5   There are numbers of discussion of matching models in the literature. See, for example, Abraham (1987) and Blanchard and Diamond (1989). Our treatment here follow Gera *et al.* (1991) most closely since their development highlights reasons for the shifts in the UV relationship.

Equation 3 gives the long-run UV curve. From this relationship, it is argued that one can deduce five explanations why an outward shift in the UV relationship may occur (Gera *et al.* 1991):

1) The inflow into unemployment (I) consisting of new entrants and re-entrants rises. This could occur because labor force growth increases.

2) The turnover rate (s) rises, e.g., the quit and/or the layoff rates could increase.

3) Employers become more selective in their hiring. Employers are less willing to fill vacancies, i.e. (g) falls.

4) The intensity of search and willingness of the unemployed to accept employment (c) falls.

5) Mismatches between unemployment and vacancies (mm) increase.

Are the Shifts in the Beveridge Curve Due to Structural Changes or to Changes in Aggregate Demand?

Identifying the movements along the UV curve as caused by changes in aggregate demand and shifts in the curves as associated with changes in structure of the labor market requires a number of strong identifying restrictions. First, it must be assumed that the UV or Beveridge Curve can be approximated by a rectangular hyperbola with the functional form $UV = K$ as was done when drawing Figure 3. Then structural changes occur when the product of U and $V (= K)$ changes. If the further restriction is made that the structural change leaves the U/V ratio constant, and that cyclical changes leave the product of U and V constant, then a structural change would cause a movement along a ray from the origin in the UV space, and cyclical movement would cause a movement along a given Beveridge Curve. A little thought will lead one to realize how restrictive these assumptions are.

Reasons why structural change in the labor market would not effect unemployment and vacancies equally are not hard to find. For example, some writers (Daly and MacCharles 1986; Grubel 1986; 1988) have argued that the structural problems in the labor market in Canada are the result of real wage rigidity. If that is true, the real wage rate could move above the equilibrium level when supply side disturbances occur. If that happens, unemployment would increase while vacancies would fall. Similarly, increases in the minimum wage would tend to decrease vacancies and increase unemployment. Empirically, these adjustments may appear as movements along a given UV curve and not as shifts in the curve.

Similarly, it appears changes in aggregate demand shift the UV relationship. In particular, the data appear to show that cyclical swings (at a given structural situation) result in a counterclockwise moment in the UV space. This

results from a tendency for employment to lag behind demand and output. In a recession, a sudden upturn in demand does not affect unemployment immediately, but it could work immediately on vacancies. At the lower turning point, this means the UV curve could thus move vertically upward. As unemployment subsequently catches up, the curve could bend toward the northwest. At the peak when demand falls, vacancies will fall more quickly than unemployment. Such considerations led Hansen (1970) to build an explicit dynamic model which incorporates these counterclockwise movements.

Finally, structural changes in the labor market which cause shifts in the UV curve may actually result from cyclical movements, or, at the very least, cyclical movements and structural change are interrelated. Pissarides (1987) shows that perfectly anticipated permanent productivity shocks do not affect the rate of unemployment and cause the UV curve to shift with the economy remaining at the same unemployment equilibrium, whereas temporary or perceived temporary shocks shift the curve as well as the level of unemployment, e.g., by raising the search activity on the part of firms which coupled with a search externality raises the trade activity so as to bring down the level of unemployment. Once the temporary shock ends unemployment returns to its original level on the old UV curve. Thus temporary supply side shocks may cause counterclockwise loops around a given UV curve, a phenomena that has been well documented (Dow and Dicks-Mireaux 1958; Jackman, Layard and Pissarides 1984). The shifts in the UV curve may be entirely temporary in nature and might be part of the natural sequence of a business cycle.

In another example of the interrelation between cyclical movements and structural change, Gera *et al.* (1991) point out that the share of long-term unemployment in total unemployment has increased in most industrial countries in the 1980s. The incidence of long-term unemployment in Canada was greater than other countries reaching a high of 10.1 percent in 1985 and remaining high, declining to only 6.6 percent in 1989. They argue that the impact of long-term unemployment on the UV curve operates primarily through its influence on (g), the proportion of vacancies the firms wish to fill in a given time period, and the proportion of the unemployed workers (c) actively seeking employment in the given period, i.e., as the proportion of long-term unemployed increase both g and c could decrease shifting the UV curve outward.

Employers become more choosy in their hiring practices (g decreases) because the longer a worker is unemployed the greater is the deterioration of a worker's human capital. An individual's work skills deteriorate because of lack of use. More important may be the adverse psychological effects such as depression, discouragement, and alienation which lead to alcoholism, etc. Employers will, therefore, use duration of unemployment as a screening device

when hiring. If a worker has been unemployed for a long time employers may think there must be something wrong with him. Thus an increasing proportion of long-term unemployed will make employers more selective in their hiring, lowering g. In addition, as the duration of unemployment increases, a worker's intensity of search will decline because of adverse psychological effects such as discouragement and alienation. This decrease in c, the worker's intensity of search, will shift the UV relationship outward.

The discussion above demonstrates how an increase in long-term unemployment can lead to an outward shift in the UV relationship because of a decrease of g, increased choosiness on the part of employers, or a decrease in c, reduced search intensity on the part of workers. It, however, leaves open the question of what causes a rising incidence of long-term unemployment. Cyclical fluctuations are one important cause of the changing incidence of long-term unemployment. The incidence of long-term unemployment rises during cyclical downturns. The 1981-82 recession was the deepest in United States and Canada since the 1930s. It was deeper in Canada than in the United States. Is it any wonder that the incidence of long-run unemployment rose in both countries in the 1980s but more so in Canada? Gera *et al.* (1991) using regression analysis argue that the major portion of the outward shift in the UV curve between 1976-1988 can be explained by the rising incidence of long-term unemployment. If it is true that the increase in long-term unemployment was caused by the major economic contraction in the early 1980s, would it not be more correct to say deficient aggregate demand caused the outward shift in the UV curve?

UPWARD DRIFT IN THE HELP-WANTED INDEX

Before we discuss the evidence in more detail, we need to consider whether some of the upward shift in the UV curve may be due to the proxy being used in place of vacancy data. Neither Canada since the discontinuation in 1978 of Statistics Canada's Job Vacancy Survey nor the United States has collected data on job vacancies on a regular basis. Therefore, scholars studying the UV relationship have substituted an index based on help-wanted advertising in major metropolitan newspapers. The evidence of growing structural unemployment comes from the fact that the volume of help-wanted advertising associated with any given employment rate has increased markedly since 1970. Whether that is correct depends whether the normalized help-wanted index is a good proxy for the job vacancy rate.

Both the Canadian and U.S. help-wanted indexes are based on the counts of help-wanted advertising placed in the classified sections of large metropolitan area newspapers. The figures are based on the newspapers' own

bookkeeping records. No effort is made to take account of how many jobs are listed in each advertisement; an advertising listing ten of jobs carries the same weight in the ad count as an ad listing only a single position. The monthly help-wanted ad count, after adjustment for the number of weekdays and Sundays across months and a seasonal factor, is normalized to a base period. The resulting figures are aggregated using employment weights to create a national help-wanted index.

There is, however, much evidence that the help-wanted index has drifted upwards relative to the underlying path of job vacancies. Help-wanted ads clearly cover a more restricted population than vacancies in general. Help-wanted ads are used to attract professional, urban white collar employees, some skilled workers, and some service sector employees. Unskilled workers in the manufacturing sector are recruited at the gate or through employment agencies. As a result, shifts in the occupational composition of employment away from blue-collar jobs towards more heavily advertised white collar jobs would cause a upward drift in the help-wanted index relative to vacancies. Fortunately, the extent and reasons for the upward shift in the help-wanted index relative to the vacancies for the U.S. data has been carefully studied by Abraham (1987) who attempted to quantify the three main reasons why the help-wanted index shifts upward relative to vacancies. First, she found little evidence that shifts in occupational composition of employment could have raised the volume of help-wanted advertising except for the period 1970-75. Second, changes in affirmative action and equal employment opportunity laws which required employers to advertise jobs more widely had an impact mainly during the 1970s. Third, Abraham found the decline in newspaper competition because of mergers and bankrupcies was a significant factor in raising the level of help-wanted advertising relative to the level of vacancies throughout the period from 1960-1985.

Combining all three effects, Abraham found that the help-wanted index has shifted upward relative to the vacancy rate over 30 percent in the United States between 1960-1985. As Figure 1 shows, the UV curve for the United States, using the help-wanted index as a proxy for the vacancy rate, shifted outward from the 1960s to the 1980s and has shifted back substantially from 1986 to 1991. We have extrapolated Abraham's adjustment factor to be applied to the help-wanted index through the year 1991 and plotted the adjusted normalized help-wanted index against the civilian unemployment rate. This is shown in Figure 4. Note that the shift in the relationship is less pronounced than in Figure 1. In fact, it appears the relationship has moved back (more than back?) to its 1960s level. However, even using the adjusted help-want index, there still was a significant increase in the help-wanted number associated with any given unemployment rate between 1962 and 1986 and a significant downward shift in relationship during the latter 1980s.

FIGURE 4

The Adjusted Normalized Help-Wanted Index and Unemployment, 1962-1991, for the United States
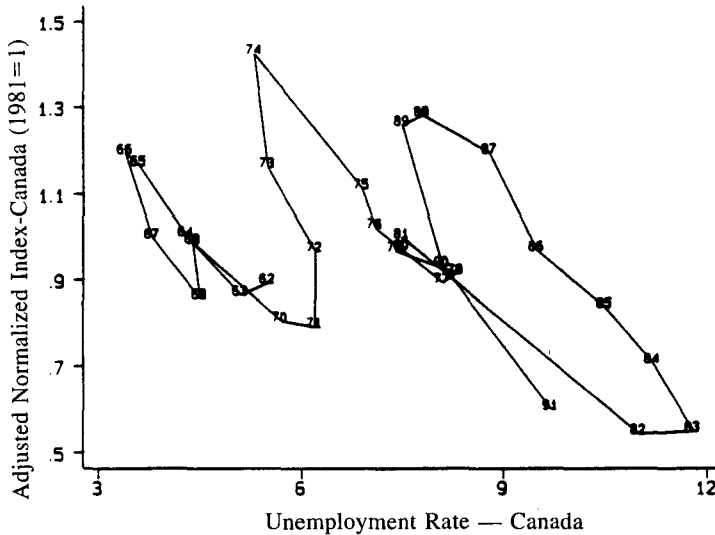

Unemployment Rate — U.S.
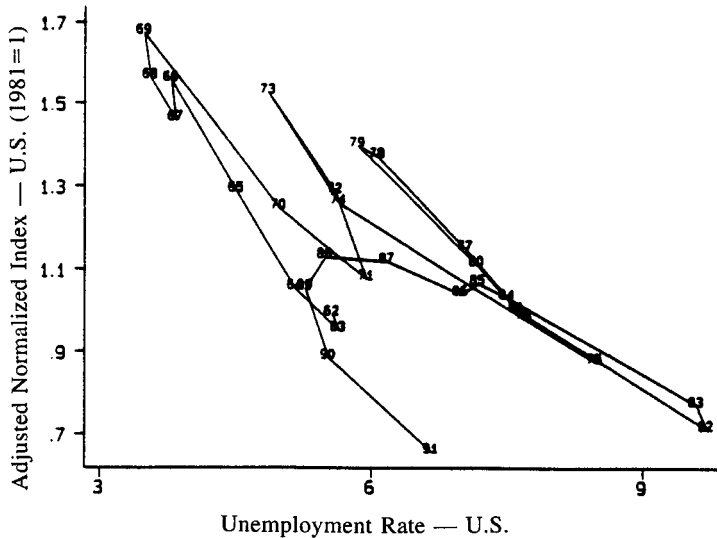
Source: Same as Figure 1 except that the normalized help-wanted index is adjusted by the Abraham's adjustment factor.

Since the same factors which biased the U.S. help-wanted index upward were also at work in Canada, we can apply the same adjustment factors to the Canadian data.[6] In Figure 5 we have plotted the adjusted normalized help-wanted series for 1962-1991 against the civilian unemployment rate. Here we see a similar pattern. The adjusted relationship shifted out between 1960s and the 1980s but does not move entirely back to the 1960's level. This is consistent with the unemployment movements in the two countries. In Canada, the unemployment rate fell to only about 7.5 percent prior to the recent recession, while in the United States the unemployment rate fell to nearly 5 percent.

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6   There is, however, some additional evidence of the upward bias in the Canadian help-wanted index. During the 1971-1978 Statistics Canada collected job vacancy data. A comparison of the job vacancy and the help-wanted index shows they follow the same cyclical pattern with both reaching a peak in the third quarter 1974. However, it appears the help wanted index tended to move above the vacancy index during the latter 1970's when both are plotted on graph using the same scale.

FIGURE 5

**The Adjusted Normalized Help-Wanted Index and Unemployment, 1962-1991,
for Canada**

Source: Same as Figure 2, except that the normalized help-wanted index is adjusted
            by the Abraham's Adjustment factor.

EMPIRICAL REASONS FOR THE SHIFT

As mentioned above, there have been many empirical studies which
attempt to identify the factors which caused the UV curve to shift. In this sec-
tion we look critically at these studies to see if they provide an explanation on
the shifts of the UV relationship in Canada and the U.S.

In order to organize our thinking on this question we repeat equation 3
which gives the steady state relationships between flows out of unemployment
or hiring, H and flow into unemployment, I:

$$(3)\ f(g\overset{+}{V},\ c\overset{+}{V}\ \overline{m}m) = I_1 + sN$$

Flows into Unemployment

The right-hand side of equation (3) denotes the factors which may change
the flow into unemployment and, thus, shift the UV curve. For example, an
increase in the rate of growth of the labor force could increase the net inflow
into unemployment and, thus, cause an upward shift in the UV relationship.

The labor force in both Canada and United States grew very rapidly in the 1970s but not any more rapidly than in the 1960s, and its growth was declining in the 1980s. This factor, therefore, cannot explain the outward shift of the relationship in the 1970s. If it had been an important factor affecting the UV locus, it should have begun to shift inward in the early 1980s.

An increase in the turnover rate (s) could raise both vacancies and unemployment. The increased representation of young people and women in the labor force, it is argued increases the quit rate and raises the turnover rate. There is no evidence of an increase in the turnover rate in Canada (Gera *et al.* 1991). In both Canada and United States the share of youth in the labor force reaches a peak in 1974 and has been declining ever since.

Flows Out of Unemployment or Hiring

From the above evidence it appears that changes in factors which affect the flow into unemployment cannot explain the rise in the UV curve in the U.S. and Canada from 1960s to the 1980s. Gera *et al.* (1991) reach the same conclusion regarding Canada for 1980s. They claim the persistence of high unemployment in Canada in the 1980s has been due mainly to a reduction in the flow out of unemployment.

Outflows from unemployment are affected by the intensity of search and willingness of the unemployed to accept employment (c), the proportion of vacancies (g) that employers are willing to fill per period, and the mismatches (mm) between the unemployed and the vacancies. These factors depend, in turn, on institutional factors such as unemployment insurance benefits, minimum wages and union power. We will consider each of these influences in turn.

As the labor force grew in the 1970s, the proportion of young workers and women in the labor force grew. It has been argued that search intensity of youth and women differ from adult men. If true, this would reduce search intensity (c) and raise the UV. Substitution of a fixed-weight unemployment rate in the estimation of the vacancy-unemployment relationship would correct for this influence. Gera *et al.* (1991) and Reid *et al.* (1990) made this substitution for Canada and Abraham (1987) made the substitution for the U.S. and found it could not explain the shift in the UV curves.

The generosity of the unemployment insurance (U.I.) system can shift the UV curve by reducing workers search intensity (c). With higher unemployment benefits, workers are more likely to wait for recall to their old jobs and increase their willingness to hold out for better jobs. For the United States, however, the U.I. program has become less generous in recent decades, and the coverage has been falling. In 1975, 78 percent received jobless benefits while

about 45 percent received them in 1982. An even lower percentage receives them today.[7] Therefore, the changes in the U.I. program should have shifted the UV curve inward in recent decades in the U.S.

The situation is a little different for Canada. In 1971, Canada substantially increased the generosity of the U.I. system with wider coverage and a lowering of the qualification period. This could have led to an outward shift in the UV curve.[8] However, the generosity of Canada's U.I. system was reduced in the latter 1970s so that generosity of the system is almost back to its pre-1971 level (Gera *et al.* 1991). It should be noted that the coverage remains more comprehensive than it was before 1971 since all employed persons are covered. In any case, the impact of the U.I. system on the UV curve after the 1970s should have been inward, not outward as the curve did, in fact, shift.

Minimum wage requirements can also effect unemployment and vacancies. Unemployment increases because employers will hire fewer workers. Vacancies, however, should decrease as employers will list fewer vacancies. The effect of a change in the minimum wage on the UV relationship is unclear. It may appear as a movement along a given UV relationship rather than a shift in the curve. In any case, the minimum wage in both Canada and the United States has fallen relative to average industrial wages since the mid-1970s. Therefore, the minimum wage could not explain the outward shifts in the UV curve from 1975 onward.

A similar argument can be made about union power. If unions are able to maintain the real wage above equilibrium for long periods of time this will increase the unemployment rate but should reduce the vacancy rate. It is not clear that a wage above equilibrium would shift the UV curve outward. In any case union coverage and power has declined in the U.S. throughout the post-World War II period and has not increased in Canada since the 1970s.

Mismatches and Sectoral Dispersion Explanation

Another cause for structural changes leading to outward shifts in the UV curve could be sector specific shocks to the economy which cause differences in comparative growth rates of different industries or regions. This is the approach that Lilien (1982) popularized using as a basis a search model. Sectoral shifts in employment would lead to a rise in mismatches. As labor

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    7   See Burtless (1986).

    8   Keil and Symons (1990) develop a model of the Canadian labor market and estimate it. They argue that their results show that the rise in the Canadian unemployment rate relative to the U.S. unemployment rate occurred in 1971 with the liberalization of the U.I. system but was masked by a raw-material boom.

demand rises in some sectors and falls in others, unemployment could arise in the sectors losing demand and vacancies would rise in sectors gaining demand. The results will be an outward shift in the UV curve if either the UV is convex or vacancies respond faster to labor demand shocks than unemployment (Abraham 1987). It appears that empirically the convexity holds for regions in Canada (Gera, *et al.* 1991) and for states in the United States (Abraham 1987).

Gera, *et al.* (1991), based on their empirical analysis, argue that both inter- and intra-regional effects played a significant role in shifting the national UV relationship outward with the interregional disparities as the dominant factor.[9] They base their analysis on the fact that the regional dispersion of unemployment rates increased sharply around 1975 and remained high throughout the 1980s. The regional dispersion of employment growth rates appear to follow a more cyclical pattern. Similarly, Abraham (1987) found that the dispersion of state unemployment rates and employment growth rates rose significantly for the United States during the 1970s and stayed at that level into the 1980s.

One thing to note about the dispersion data is their cyclical nature. The dispersion rates appear to decrease during periods of stable growth such as the last half of the 1960s and 1980s. Considerations such as these led Lilien (1982) to argue that increases in unemployment during recessions were caused by sectoral swings in demand rather than changes in the aggregate. His approach was used by Samson (1985) who argued that sectoral shifts in employment demand play a significant role in explaining fluctuations in the aggregate level of unemployment in Canada. This interpretation of the result was criticized by Abraham and Katz (1986) on the grounds of "reverse causality", i.e., that such evidence only reflects the fact that different sectors or regions react differently to aggregate shocks rather than the idea that sector shocks constitute changes in the aggregate unemployment rate.

Abraham and Katz (1986) point out that sectoral dispersion in the unemployment rate and employment growth rates will be correlated with aggregate employment if two conditions hold. First, all sectors do not have the same trend rate of growth. Second, sectors differ in their sensitivity to aggregate demand fluctuations. Both these conditions hold empirically for the United States and Canada. Thus, they argue that under empirically satisfied conditions either

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9   The idea that regional shifts may be at work in shifting the UV curve is not new. Following the procedure suggested by Dow and Dicks-Mireaux and modified by Dow, Zaidi (1970) constructed an index of excess demand and used it to examine the state of demand for Canada covering the period 1953-64. The results were that the UV Curve had shifted upwards between 1953-57 and 1958-64. Furthermore, these shifts varied regionally e.g., the highest shifts were in the Atlantic provinces and the lowest in the Pacific provinces.

pure sector shifts or pure aggregate demand fluctuations can produce a positive correlation between the dispersion of employment growth rates and the unemployment rate.

To distinguish between the two hypotheses empirically, other information is needed. The predicted behavior of the vacancy rate provides such information. Abraham and Katz (1986) note that the sectoral dispersion story predicts a positive correlation between the dispersion of employment growth rates and vacancies while the aggregate demand story predicts a negative relationship. For both the United States and Canada, the correlation between the help wanted index (a proxy for vacancies) and the sector dispersion of employment growth rates is negative. This is contrary to the prediction of the sectoral shift hypothesis and implies that the shifts in aggregate employment are caused by aggregate demand fluctuations rather than sectoral shifts.

Deindustrialization

Betcherman (1986) suggested that deindustrialization is a cause of structural unemployment. Deindustrialization is the decreasing importance of the "goods" industries in the economy. It is argued that structural unemployment can increase because those leaving the "goods" industries cannot find jobs in "service" industries or possess the skills to find comparable jobs in the service sector. In addition, the wage prospects of service jobs tend to be lower than in the "goods" industries. Further, frictional unemployment can increase as a result of the increased share of employment in the service sector where turnover is higher than in the goods sector. Reid et al. (1990) include a deindustrialization variable in their regressions and argue that it is the most important variable in explaining the outward UV curve shift in Canada.

Employment in manufacturing in both Canada and United States has grown less than total employment in the economy from 1964 to 1984. Reid et al. (1990) note that their deindustrialization variable, which represents the percent of the labor force in the "goods" sector, appears to act like a negative time trend and is highly correlated with a time variable. In fact, the time variable becomes insignificant when both variables are included in the regression. However, it does appear that employment in the manufacturing sector is much more cyclically sensitive than employment in the other sectors of the economy. This is particularly true of the United States, where the effects of the 1973-75 recession and the 1980-82 recession can be seen in the data. It is interesting to note that, for the 1984-89 period, employment in Canadian manufacturing grew as rapidly as total employment in the economy while employment in manufacturing grew much slower than total employment for the U.S. During the 1984-89 period the UV curve shifted significantly inward for the U.S., but

less so for Canada. If the deindustrialization hypothesis is true, one would have predicted the opposite result.[10]

From our survey of structural reasons for the outward shift in the UV curves for Canada and the U.S., we have discussed some reasons for the curve's outward shift from the 1960s to the mid-1970s but none to explain its continued outward shift into the 1980s. Rapid growth in the labor force with its resulting increase in turnover rates (s) could explain the shift in the curve until the mid-1970s, but not after labor force growth and the share of youth in the labor force began declining in the mid-1970s. These factors, therefore, should have led to an inward shift in the UV curve for both Canada and United States into the 1980s.

Various institutional changes such as unemployment insurance generosity, minimum wages, and union power have been suggested as factors which have "caused" the outward shift in the UV. Our survey found little evidence that these were important influences in shifting the UV curve except for generosity of the unemployment insurance system in Canada. It was made more generous in 1971 and could explain some of the outward shift in the UV relationship from the 1960s to the 1970s. However, the generosity, although not the coverage, of the U.I. system in Canada was reduced in the latter part of the 1970s and cannot explain much of an outward shift.[11]

There has been some evidence that regional dispersion in unemployment or employment growth can explain the outward shift in the UV curve in both Canada and U.S. However, the recent study by Reid *et al.* (1990), attempting to document the impact on the UV relationship of regional imbalances, could find no empirical evidence for this influence. Moreover, such evidence has been criticized by Abraham and Katz (1986) on the grounds that it could reflect the fact that different sectors or regions react differently to aggregate shocks. For example, employment growth in manufacturing is much more cyclically sensitive than other sectors of the economy.

Gera *et al.* (1991) argue that the increase in long-term unemployment was the most important explanation of the outward shift in the UV relationship for Canada. However, as was pointed out above, long-term unemployment is closely related to cyclical movements in the economy. Thus, a long and deep

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10   It is true, as noted above, that the share of long-term unemployment remained high in Canada throughout the 1980s. This may have helped prevent the Canadian UV curve from shifting inward as much as the U.S. UV. The source of the continued replenishment of the long-run unemployed in Canada is a matter of conjecture. However, one possible source could be laid off workers in manufacturing; during the period of the 1980s total employment in goods producing industries has declined in Canada.

11   In fact Reid, Meltz and Lonti (1990) found a lower impact of U.I. than in their earlier (1979) study.

recession can increase long-term unemployment which, in turn, can influence the UV curve to shift outward. In fact, for Canada the incidence of long-term unemployment reached its peak in 1985 and has been declining since then. If the incidence of long-term unemployment has such an important influence on the UV curve, its influence should have contributed toward an inward shift since 1985.

In summary, our survey of structural causes for the outward shift of the UV relationship in Canada and U.S. has found some reasons for the shift in the curve from the 1960s to the 1970s, but little evidence of structural factors which could explain the continued outward shift in the UV curve into 1980s. In fact, on the basis of most structural factors, one would have predicted that the UV should have shifted inward into the 1980s. This negative finding requires us to look elsewhere for the UV relationship's shifts and the continuing employment gap between the U.S. and Canada.

MONETARY POLICY, THE EXCHANGE RATE AND THE UNEMPLOYMENT GAP

As discussed above, the evidence is consistent with the view that different sectors or regions react differently to aggregate shocks. Aggregate shocks, in this view, lead to higher unemployment and shifts the UV curve not only because of changes in aggregate demand but also because of the differing impact of aggregate shocks on different sectors.

The reasons why aggregate demand shocks during the 1980s had different impacts on different sectors can be explained by their nature. The 1981-82 recessions in Canada and United States were engineered by very restrictive monetary policy in both countries. It was hoped that the high rate of inflation in the two economies could be squeezed out without creating too much unemployment. The inflation was reduced but not without creating the deepest recessions since the 1930s. Unfortunately, a monetary policy's impact on an economy is very uneven.

As a result, the aggregate shock of a tight money policy impacted different sectors differently. In particular, manufacturing and export industries were particularly hard hit while the service sectors' were not affected as much. Because of this, mismatch unemployment increased as employees were laid off in the manufacturing and export sectors. At the same time, because of the depth and length of the recession, the incidence of long-term unemployment increased. This factor contributed to the outward shift in the UV relationship. When the effects of the recession wore off in the mid-1980s the UV curve began to shift inward. Since the recession was deeper in Canada, the adjustment process took longer.

Not only was Canada subject to a much more restrictive monetary policy in the early 1980s than the U.S.; Canadian monetary policy was more variable. The real interest rate in Canada has followed a different pattern than in the United States. It was much more variable than the United States' real interest rate. It fell in 1982 and 1986 and reached peaks in 1981 and 1984 before moving to a record level at the end of 1989.

It is interesting to note the growth of the money supply in Canada mirrored the variation in the real short run interest rate during the 1980s (see Table 1). The very slow growth in the money supply (M1) in 1981, 1984 and 1990 corresponded to peaks in the real short term interest rates. Such large variations in the real short term interest rates and the growth of the money supply would not appear to be conducive to stable economic growth.

TABLE 1

Growth of Canadian Money Supply 1980-1990

	1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*
Percentage change in M1	10.4	1.2	3.1	8.6	0.7	4.1	4.8	13.0	6.0	4.6	−1.9

Source: OECD Economic Surveys, various issues.

In addition, the impact of the tight monetary policy of the early 1980s in Canada continued beyond the period of the restrictive monetary policy through its influence on exchange rates. Canada, being a small open economy without capital controls which does not want to allow its exchange rate to get too far out of line with the United States dollar, has effectively given up control of an independent monetary policy. Despite such efforts the Canadian dollar appears to have been misaligned with the United States dollar to a significant degree twice during the 1980s. In a detailed study, Harris (1992) concluded that according to conventional long-run equilibrium methods, the Canadian dollar was substantially undervalued vis-à-vis the U.S. dollar during the period 1983-86 and was overvalued as much as 20 percent beginning in 1988. Thus, the Canadian real exchange rate varied widely during the 1980s and at the same time the real short-term interest rate fluctuated significantly relative to the U.S. rates. Given the close economic ties Canada has with the United States and the relative size of U.S., such exchange rate and interest rate misalignments can have a substantial impact on the Canadian economy.

Such variability in the Canadian short term real interest rate and the real exchange rate during the 1980s both absolutely and relative to U.S. values has produced a series of macroeconomic economic shocks to the Canadian economy. Some sectors such as manufacturing and the export industries as well as

residential construction and local government expenditures are particularly hard hit while the service and certain non-traded goods sectors are not much affected. As a result, mismatch unemployment is increased as employees are laid off in manufacturing and the export sectors.

Not only does the exchange rate change affect manufacturing overall, it effects industries unevenly. In some industries employment is increased. In other industries employment is reduced, increasing unemployment. In order to get a handle on magnitude of such changes Harris (1992) estimated a labor supply and demand framework for Canada in which the tradable goods industries — export or import oriented — are affected either positively or negatively by exchange-rate changes. He simulated the estimated model for the Canadian dollar appreciation from 1986 to 1989. The results of a dynamic simulation holding the real exchange rate at its 1986 average value over the 1986-89 period with other variables taking their actual value show substantial employment effects of the exchange rate appreciation. For example, wood products employment was 8.3 percent lower than it actually would have been if the Canadian dollar had not appreciated. Some industries actually gained as a result of the appreciation. For example, the electrical equipment industry's employment was 5.75 percent higher as a result of the Canadian dollar's appreciation. In total, 30,022 jobs were generated and 54,277 jobs were eliminated by the exchange-rate change over this period according to the simulated model. Although net job loss represent only 1.253 percent of all jobs in manufacturing, the adjustments across industries were much larger. Given that there are structural reasons why workers who are laid off in one industry cannot transfer to other industries without considerable lags, one readily sees how a macroeconomic shock such as an exchange rate appreciation can lead to significant unemployment.

Starting in 1990 both Canada and the United States entered another recession from which they are only weakly recovering. Again it appears Canada has been more affected by the recession than the United States. While United States unemployment rate only increased about two percentage points, Canada's unemployment rate increased about four percent points. Such a large increase in Canadian unemployment makes it appear that the unemployment gap between Canada and the United States has widened. More likely it is due to a difference in unemployment's response to cyclical changes in the economy. The unemployment gap between the U.S. and Canada increased to over 3.5% in 1984 as the two economies were recovering from the 1981-82 recession, but had fallen to slightly over 2% by 1989.

Table 2 provides some information on the changes in the supply and demand for labor in the two countries. It should be recalled that changes in unemployment rate are determined by the interaction of the two factors: changes in the supply of labor (labor force growth) and changes in the demand

TABLE 2

Relative Rates of Growth Rates of Employment and the Labor Forces in Canada and the United States

	Canada		United States	
	Labor Force	Employment	Labor Force	Employment
1) Percentage Change 1979-92	22.8	17.7	21.0	19.0
2) Percentage Change 1979-84	9.7	5.2	8.1	6.3
3) Percentage Change 1984-89	9.7	14.2	9.1	11.7
4) Percentage Change 1989-92	2.2	-2.0	2.5	.3

Sources: United State: Citibase. Canada: Historical Labour Force Statistics, Statistics Canada, Cat. 71-201 1992.

for labor (employment growth). As noted in Table 2, the rise in the Canadian unemployment rate over the course of the recent recession resulted from a negative growth in employment of about two percent while the labor force grew over two percent. For the United States the employment did not fall nearly as much. In fact, a closer inspection of the data reveal that, as measured by total employment, the United States recovery started earlier than Canada's and appears to be stronger.

For the whole decade of the 1980s through 1992 the Canadian labor force has grown less than two percentage points more than the U.S. At the same time employment in the United States has grown more than one percentage points faster than Canada's. Looking at the various subperiods as denoted in Table 3, the labor force growth has been very steady for both countries while the employment growth (demand for labor) has varied quite significantly.[12] Our argument in this section has been that the explanation of the unemployment gap must concentrate on the demand side shocks and the adjustments of the two economies to these shocks.

SUMMARY AND CONCLUSIONS

The UV relationship in both Canada and the United States shifted outward from the 1960s to the mid-1980s. In the latter 1980s the curve has shifted inward for both countries with the shift more pronounced in the United States. At the same time the unemployment rate while nearly equal in the Canada and United States prior to the 1980s has been consistently greater in Canada than

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[12]   This is not to deny recessions will affect both labor force growth (supply of labor) and employment growth (demand for labor).

in the United States during the 1980s and 1990s. The purpose of this paper was to explain and understand the meaning of these shifts and to see whether they could help explain the unemployment gap which arose beginning in the 1980s.

We looked at the theoretical underpinnings of the UV relationship to see whether it is valid to identify shifts in the curve with changes in structural imbalances in the labor market and movements along the curve with changes in aggregate disturbances and concluded that such dichotomy is possible only if some restrictive assumptions are made. We find it is possible for some structural imbalances in the labor market to shift the UV curve while others may cause movements along a given curve. Similarly, aggregate disturbances can cause movement along a given UV curve, but also may cause shifts in the UV relationship.

In addition, we considered whether using a help-wanted index in place of the desired vacancy rate overstates the upward shifts in the curve which have occurred. We found there are many valid reasons why the help-wanted index trends upward relative to the vacancy rate, but even after correcting the help-wanted index for its upward bias as best we could, the adjusted help wanted index-unemployment relationship still shifts outward.

Third, we surveyed the various structural factors given in the empirical literature as reasons for the outward shifts in the UV curve and found some structural reasons for the shift in the curve from the 1960s to the 1970s, but we could not find structural factors to explain the continued outward shift in the UV curve into the 1980s. In fact, on the basis of most structural factors, one would have predicted that the UV curve should have shifted inward in the 1980s.

Fourth, we argued that aggregate economic shocks which created structural imbalances can explain the differing shifts in the UV curve and the unemployment experiences in the United States and Canada. Both economies experienced a deep recession in the early 1980s caused by restrictive monetary policy. However, Canada's recession was deeper than the U.S. recession. This led to a higher level of long-term unemployment which tended to feed on itself and which increased the natural rate of unemployment in Canada during the 1980s. In addition, the Canadian economy was much more subject to macroeconomic shocks during the 1980s. Its real short-term interest rates varied much more than the U.S. real interest rate. Also the Canadian dollar became overvalued in the latter part of the 1980s. This had uneven impacts on the Canadian economy and led to rising structural unemployment as some sectors were hurt and others were helped by the macroeconomic shocks.

Finally, the recent increase in the unemployment between the United States and Canada to nearly 4 percentage points may make it appear that the unemployment gap between the two countries has widened. We argue that the

widening gap is due to differences in unemployment's response to cyclical changes in the two economies. The unemployment gap between the U.S. and Canada increased to over 3.5 percent, in 1984 as the two economies were recovering from the 1981-82 recession, but had fallen to slightly over 2 percent, by 1989.

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Demande excédentaire et chômage au Canada et aux États-Unis

La relation chômage-vacances d'emploi (C-VE) s'est déplacée vers l'extérieur entre les années 60 et le milieu des années 80 tant au Canada qu'aux États-Unis. À la fin des années 80, cette courbe s'est déplacée vers l'intérieur dans les deux pays, mais d'une façon plus accentuée aux États-Unis. Au même moment, alors que le taux de chômage était presque semblable dans les deux pays avant les années 80, il devenait constamment plus élevé au Canada au cours des années 80 et 90. Le but de cet article est de comprendre et d'expliquer la signification de ces changements et de voir s'ils

peuvent contribuer à expliquer l'écart dans le taux de chômage entre les deux pays depuis les années 80.

Nous examinons d'abord les fondements théoriques de la relation C-VE pour voir s'il est valide d'identifier des changements dans la courbe aux changements dans les déséquilibres structurels du marché du travail et les mouvements le long de la courbe avec les troubles au niveau collectif. Nous concluons que telle dichotomie est possible seulement si nous faisons des hypothèses restrictives. Il est possible que quelques déséquilibres structurels dans le marché du travail déplacent la courbe C-VE alors que d'autres causeront des changements le long de cette courbe. De la même façon, des troubles au niveau collectif peuvent causer des mouvements le long d'une courbe C-VE donnée, mais peuvent aussi amener un déplacement de cette courbe.

Nous avons ensuite vérifié si l'utilisation d'un index « travailleur demandé » au lieu du taux de vacances d'emploi surestimerait les changements à la hausse observés dans la courbe. Nous concluons qu'il y a plusieurs raisons valides pour lesquelles l'indice « travailleur demandé » amène une tendance à la hausse plus élevée que le taux de vacances d'emploi. Cependant, même après avoir corrigé le biais à la hausse de cet indice du mieux que nous pouvions le faire, la relation « travailleur-demandé » chômage continue de se déplacer vers l'extérieur.

En troisième lieu, nous avons inventorié les différents facteurs structurels identifiés dans la littérature empirique comme causant des déplacements vers l'extérieur de la courbe C-VE. Nous avons trouvé des raisons structurelles pour le déplacement de la courbe des années 60 aux années 70. Cependant, nous n'avons trouvé aucun facteur structurel pour expliquer le déplacement continue de la courbe vers l'extérieur durant les années 80. En fait, sur la base des plus importants facteurs structurels, on aurait prédit un déplacement de la courbe vers l'intérieur durant cette dernière période.

Quatrièmement, nous prétendons que les chocs économiques au niveau macro, qui ont créé des déséquilibres structurels peuvent expliquer les changements variables dans la courbe C-VE et les expériences de chômage au Canada et aux États-Unis. Ces deux économies ont connu une récession sérieuse au début des années 80, récession causée par une politique monétaire restrictive. Cependant, la récession fut plus sérieuse au Canada qu'aux États-Unis. Cela a causé un plus haut niveau de chômage de longue durée qui tendait à s'alimenter de lui-même et qui a accru le taux de chômage naturel au Canada durant les années 80. De plus, l'économie canadienne a été beaucoup plus sujette à des chocs macroéconomiques durant cette période. Ses taux réels d'intérêts à court terme ont varié beaucoup plus que les taux américains. Aussi le dollar canadien est devenu surévalué dans la dernière partie des années 80. Cela a eu des effets inégaux sur l'économie canadienne et a mené à un chômage structurel croissant dans un contexte où certains secteurs étaient frappés et d'autres aidés par les chocs macroéconomiques.

Finalement, la croissance récente de presque quatre points de la différence de chômage entre les États-Unis et le Canada peut suggérer que l'écart dans le chômage entre les deux pays s'est accru. Nous prétendons que cet écart croissant est dû à des différences dans la réaction du chômage aux changements cycliques dans les deux économies. L'écart du chômage entre le Canada et les États-Unis s'est accru de plus de 3,5 % en 1984 alors que les deux économies se relevaient de la récession 1981-82. Mais cet écart est tombé à un peu plus de 2 % en 1989.