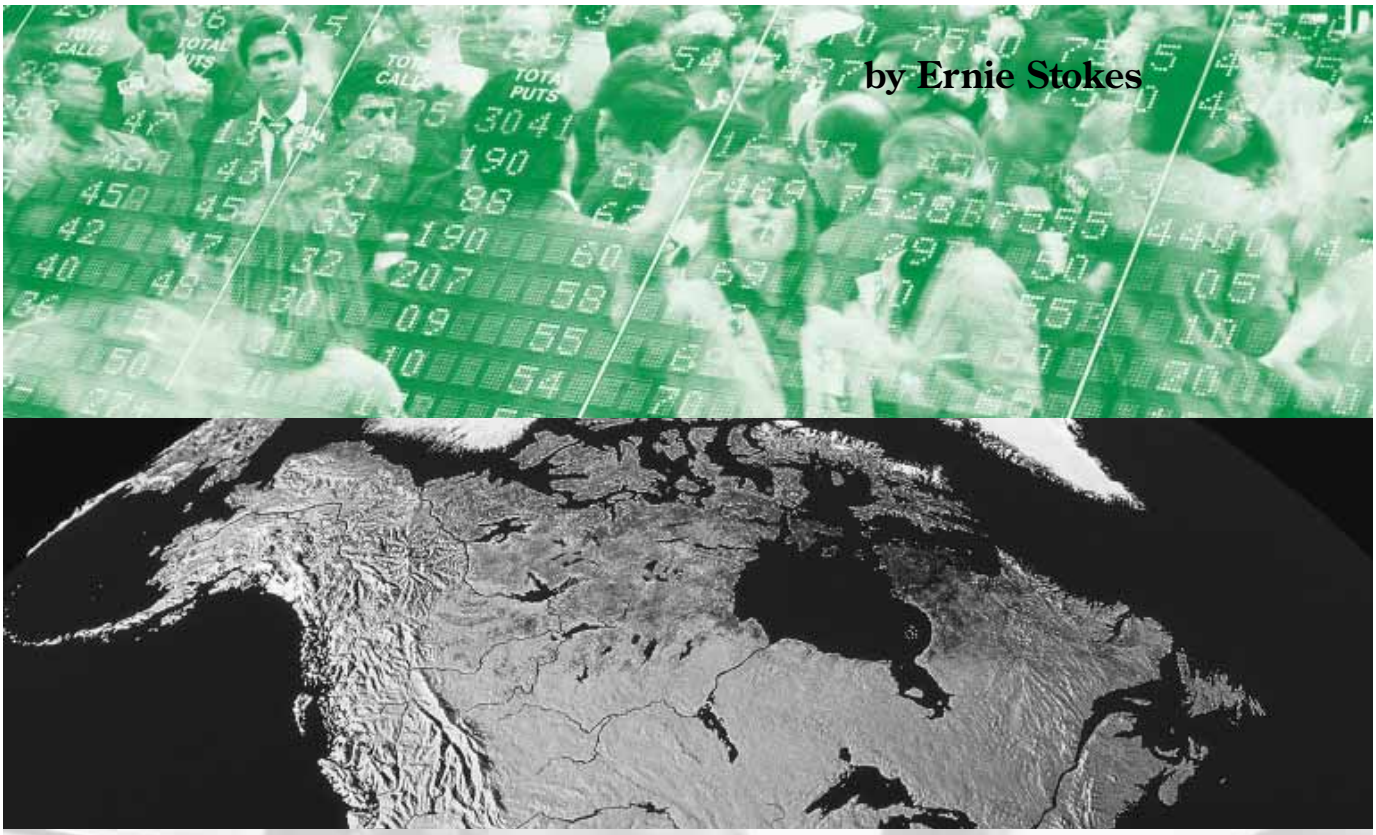
UI

Canada's Unemployment Insurance Program as an Economic Stabilizer



by Ernie Stokes

Human Resources Development Canada
Développement des ressources humaines Canada

UI Macroeconomic Stabilization

Canada

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Canada's Unemployment Insurance Program as an Economic Stabilizer

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WEFA Canada

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Unemployment Insurance Evaluation Series

Human Resources Development Canada (HRDC), in its policies and programs, is committed to assisting all Canadians in their efforts to live contributing and rewarding lives and to promote a fair and safe workplace, a competitive labour market with equitable access to work, and a strong learning culture.

To ensure that public money is well spent in pursuit of this mission, HRDC rigorously evaluates the extent to which its programs are achieving their objectives. To do this, the Department systematically collects information to evaluate the continuing rationale, net impacts and effects, and alternatives for publicly-funded activities. Such knowledge provides a basis for measuring performance and the retrospective lessons learned for strategic policy and planning purposes.

As part of this program of evaluative research, the Department has developed a major series of studies contributing to an overall evaluation of UI Regular Benefits. These studies involved the best available subject-matter experts from seven Canadian universities, the private sector and Departmental evaluation staff. Although each study represented a stand alone analysis examining specific UI topics, they are all rooted in a common analytical framework. The collective wisdom provides the single most important source of evaluation research on unemployment insurance ever undertaken in Canada and constitutes a major reference.

The Unemployment Insurance Evaluation Series makes the findings of these studies available to inform public discussion on an important part of Canada's social security system.

I.H. Midgley
Director General
Evaluation Branch

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Director
Insurance Programs

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Abstract

The purpose of this study is to examine the role that Canada's unemployment insurance (UI) program has played as an economic stabilizer over the past 15 years. The study considers what the performance of the Canadian economy might have been during this period if the UI program had not responded to cyclical changes in the level of economic activity. More specifically, the WEFA Canada Canadian Macro (WCCM) model of the economy is utilized to simulate an economic scenario based on the assumption that the revenues and expenditures associated with the UI program had been held at levels consistent with an economy operating at its trend level of gross domestic product (GDP). This simulated performance is then compared with actual performance to see whether and by how much the UI program acted to reduce income in economic peaks, and increase income in recessions.

The results of this study suggest that the UI program has had an impact as a stabilizer, but that changes to the program over time have altered that impact.

While the changes to the UI program in the late 1970's had a small de-stabilizing impact on GDP during this period, the program did act as a stabilizer during the 1981-1982 and 1990-1991 recessions, as well as during the boom of the second half of the 1980's. Real GDP was raised by about 0.5 per cent during the 1981-1982 recession and by slightly less in the 1990-1991 recession. During the boom of the 1980's, the program reduced real GDP by about 0.3 per cent. The GDP gaps represent the percentage difference between actual and potential, (or trend) GDP. The average reductions in the GDP gaps in the 1980's were approximately 8, 11, and 4 per cent for the 1981-1985, 1987-1990, and 1991-1993 periods respectively. In the 1978-1980 period, the UI program increased the GDP gap by almost 2 percentage points.

Concurrently with its stabilizing impact on GDP, the program increased employment during the last two recessions and reduced it during the boom of the 1980's. The two main aspects of the UI program that affect its behaviour as an economic stabilizer are its revenues and expenditures. Since the mid-1970's, the expenditures side has consistently acted in a countercyclical fashion, despite changes that have modified eligibility requirements and weekly benefits. The main factor that has led to a sharp reduction in the stabilizing power of the UI program is the revenues side. This has become particularly evident as the federal government has moved out of the financing side of the program. Because the UI account must balance over time, increases in contribution rates now follow close on the heels of increases in expenditures. This draws income out of the economy and offsets the stimulating impact of the expenditures side of the program.

These results imply, therefore, that in order to reinforce the stabilizing properties of the UI program, the focus should be on the revenues side. It is changes in contribution rates to finance the program that have reduced its stabilizing effects.

Introduction

The study considers what the performance of the Canadian economy might have been if the UI program had not responded to changes in economic conditions.

The existence of business cycles is worrisome to policy-makers. These fluctuations reduce economic efficiency and prevent society from achieving its equity goals. Economic booms tend to generate high inflation, while recessions tend to foster high unemployment. As neither of these outcomes is desirable, governments have implemented policies that attempt to stabilize the economy near its potential — or "trend" — level of production, where the costs of inflation and unemployment are minimized. Some of these stabilization policies are built into the economy, such as progressive income taxation and unemployment insurance programs. Others are discretionary, such as, for example, changes in government spending and taxation as part of the budget-making process.

Built-in economic stabilizers work by moderating the impact of business cycles within a market system. As the economy goes into a recession, these stabilizers begin to inject income into the economy in order to cushion the impact of the recession. This moderates the impact of other equilibrating factors, such as interest rates and inflation, that lead to the end of the recession and to recovery. During an economic expansion, the stabilizers draw income out of the economy, thereby reducing the inflationary pressures that develop during this phase of the cycle. In both cases, the built-in stabilizers tend to dampen the amplitude of the cycles.

The purpose of this study is to examine the role that Canada's unemployment insurance (UI) program has played as an economic stabilizer over the past 15 years. The study considers what the performance of the Canadian economy might have been during this period if the UI program had not responded to changes in economic conditions. More specifically, the WEFA Canada Canadian Macro (WCCM) model of the economy is utilized to simulate what that performance might have been if the revenues and expenditures associated with the UI program had been held at levels consistent with an economy operating at its trend level of gross domestic product (GDP). This simulated performance is then compared with actual performance to see whether and by how much the UI program acted to reduce income in economic peaks and increase income in recessions.

Section 1 of the study outlines the methodology employed to conduct the analysis and describes briefly the relevant economic background. Section 2 discusses the nature of the UI program and its impact on economic performance, that is, its impact as an economic stabilizer. In Section 3, the WCCM model — WEFA Canada Canadian Macro Model — is used to examine the nature and magnitude of the impact the UI program has had on the economy over the past two economic cycles. The paper concludes with a summary of the results and draws some conclusions. The broad outlines of the WCCM model are described in the Appendix.

1. Methodology and Economic Background

To assess the stabilization properties of the UI program, one must observe how the program has responded to changes in economic activity over the economic cycle and how this response has fed back into the economy to influence its performance.

How can the income stabilization properties of the UI program be assessed? To answer this question, it is important to identify the fluctuations that have taken place in the economy — that is, its cyclical performance — over the past two decades. In particular, employment and labour force trends are examined because these variables are the most important drivers of the UI program.

Methodology

To assess the stabilization properties of the UI program, one must observe how the program has responded to changes in economic activity over the economic cycle and how this response has fed back into the economy to influence its performance. Because so many things change over an economic cycle, it is difficult to sort out the role played by any one factor. To isolate changes in the economy that are solely the result of the UI program, one must, therefore, use a macroeconomic model that makes it possible to examine the program's impact while holding constant the other factors in the economy that can influence its performance.

The use of macroeconomic models to examine the impact of certain factors on the economy normally involves a comparison between the performance of the economy before and after the variables of interest have been changed. In this case, there is always a "base case", representing the performance of the economy before the changes have been made; and a "shock case", simulating the performance of the economy after changes have been made. In the present analysis, the base case is history: actual events which occurred with respect to the economy in the past. The shock case is the situation where the UI program is not allowed to respond to cyclical changes in the economy. The difference between the two cases isolates the cyclical impact of the program.

The shock case is constructed by determining what the performance of the UI program would be in terms of its revenues and expenditures, if the economy remained at its trend performance over the period of analysis — that is, if there were no economic cycles. These revenues and expenditures are then fed into the macroeconomic model to see what impact they would have on the performance of the economy, in contrast to the actual expenditures and revenues.

An important step in this approach is identifying the trend performance of the variables relevant to the UI program. Since unemployment is the most important of those variables, the focus is on identifying trend employment and labour force. The difference between these two variables provides an estimate of trend unemployment. Any other aspects of the UI program that have cyclical components must also be adjusted. Since it is income stabilization that is of relevance in this study, it is also necessary to identify the trend performance of real GDP for reference purposes. The method adopted to decompose these series into their trend and cyclical components is "simple trend analysis."

The period of analysis adopted for the study is from 1978 to the second quarter of 1993. This period contains one complete economic cycle — from 1978 to 1985 — and the expansion, recession, and part of the recovery of the cycle observed since 1986. The two cycles are analyzed together below. However, they

are considered separately for use with the macroeconomic model. The period of analysis was restricted by the availability of the data needed to employ the model.

The model used to conduct the analysis — the WCCM model — is a medium-sized, quarterly econometric model. It is rooted in the neo-classical tradition of economic theory with respect to the assumption of adaptive expectations for key economic variables. This gives it what are generally considered to be Keynesian properties in the short run but neo-classical properties over the long run.

Cyclical Performance of the Canadian Economy

As mentioned above, to assess the stabilization properties of the UI program, it is necessary to disaggregate the performance of key variables of the Canadian economy into its trend and cyclical components. In the case of real GDP, a measure of its long-run trend is constructed to examine economic cycles since the early 1970's. For employment and the labour force, simple trend analysis is used to measure employment/population ratios and participation rates. Trend unemployment is computed as the difference between trend labour force and employment.

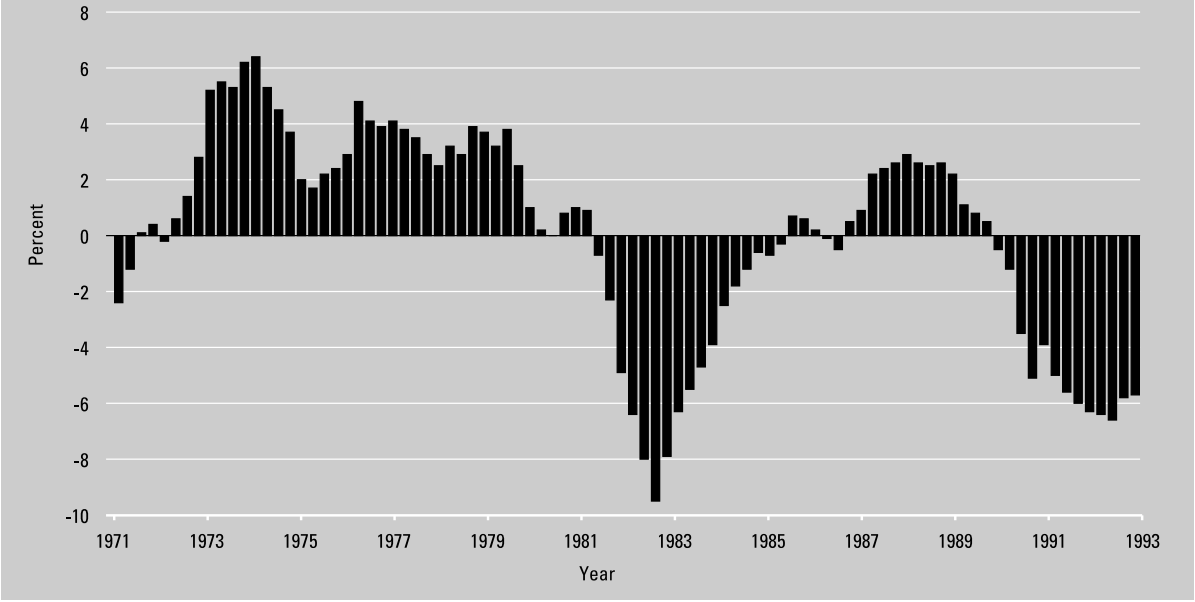
Trend GDP is derived using the same methodology as that adopted for the WCCM model. This is a supply-side concept that employs a Cobb-Douglas constant-returns-to-scale production function for the economy as a whole. Inputs into this production function include trend employment, the capital stock, the trend capital-utilization rate, and total factor productivity.

It should be noted that this approach differs from those employing a measure of the natural rate of unemployment or a non-accelerating-inflation rate of unemployment (NAIRU). Both of these latter variables are difficult to measure, and estimates tend to vary widely. The trend approach is adopted because it is less controversial and essentially takes past economic performance as given. This approach is not without its problems, however, in that the choice of the appropriate "de-trending" method is also subject to some uncertainty. Thus there is a certain amount of judgment involved in both approaches.

The real GDP gaps produced through this methodology are shown in Figure 1. The gaps represent the percentage difference between actual and trend GDP measurements. It can be seen from this figure that, beginning with the slowdown recorded in the early 1970's, the economy performed above trend until 1980. The 1970's were a period of high inflation, resulting both from commodity price shocks and from a shortfall of capacity relative to demand. The economy suffered a serious recession in 1981 and 1982, with a reduction in real GDP relative to trend of about 10 per cent. It then entered a period of recovery over the next few years, reaching its potential growth around 1985 and 1986. The economy moved sharply above trend until 1990, when it went into recession. In terms of potential, the recovery started in late 1992.

There are two important elements to notice about the two recessions: their amplitude and their duration. The 1981-1982 recession was much deeper than that of 1990-1991, but recovery was also quicker. This can be seen from the output gap, which closed more rapidly following the first recession. Real GDP grew in excess of 3 per cent in 1983, the first year of recovery of the early recession,

Figure 1
Real GDP Gap (% of Potential)



whereas growth was less than 1 per cent in 1992, the first year of recovery in the current cycle. While the GDP gap continued to rise in the current cycle over the first year of positive GDP growth, it fell sharply during the corresponding period of the previous cycle.

Trend employment is a key input in estimating potential GDP. That measure is obtained by computing the trend in employment/population ratios for males and females and then multiplying the result by their respective populations. The trends are estimated by using either least-squares time-trend regressions or simple moving averages of the ratios.

The trend and actual values for employment/population ratios are shown in Figures 2 and 3. They show that ratios for males have been trending downward for some time, while those for women have been trending upward. At the same time, the upward trend for women slowed down significantly during the 1980's. Figure 4 shows actual total employment as a percentage of trend employment, which is simply the sum of trend male and female employment. The figure shows that the percentage deviation of employment in the latest recession is only somewhat less than that observed during the 1981-1982 recession. This, together with the observation that the current recession was not as deep in terms of GDP, would seem to suggest a worsening employment situation.

The values for trend labour force were computed by the same method as employment — that is, by estimating the participation rates for men and women and multiplying them by their respective populations (see Figures 5 and 6). The pattern displayed by these rates is similar to that for employment, but as one would

Figure 2
Female Employment/Population Ratio (%)

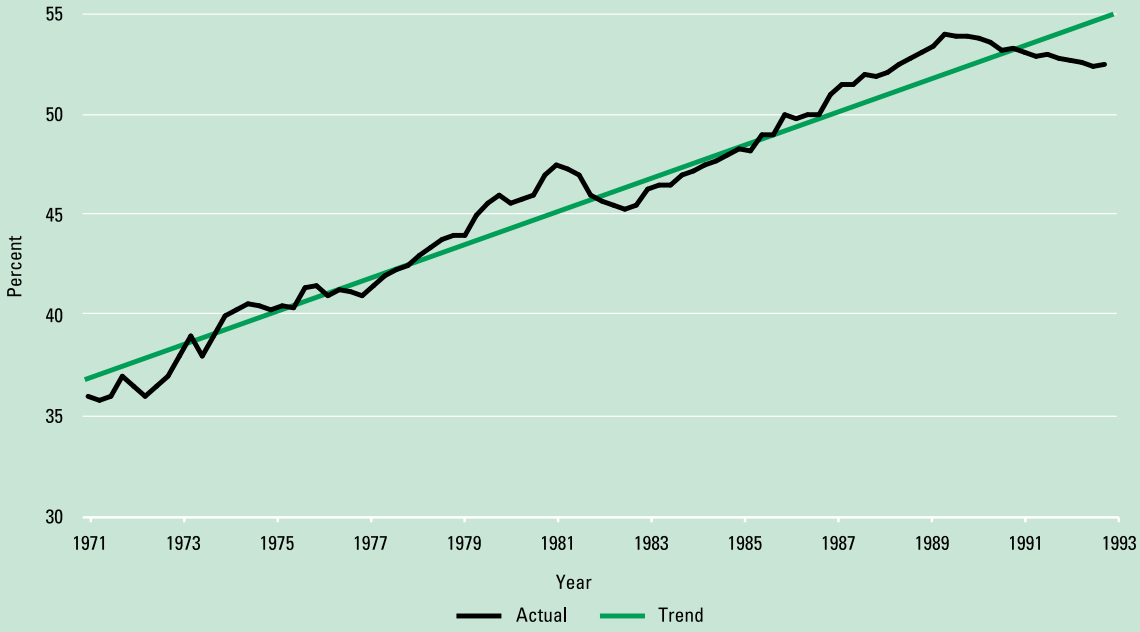


Figure 3
Male Employment/Population Ratio (%)

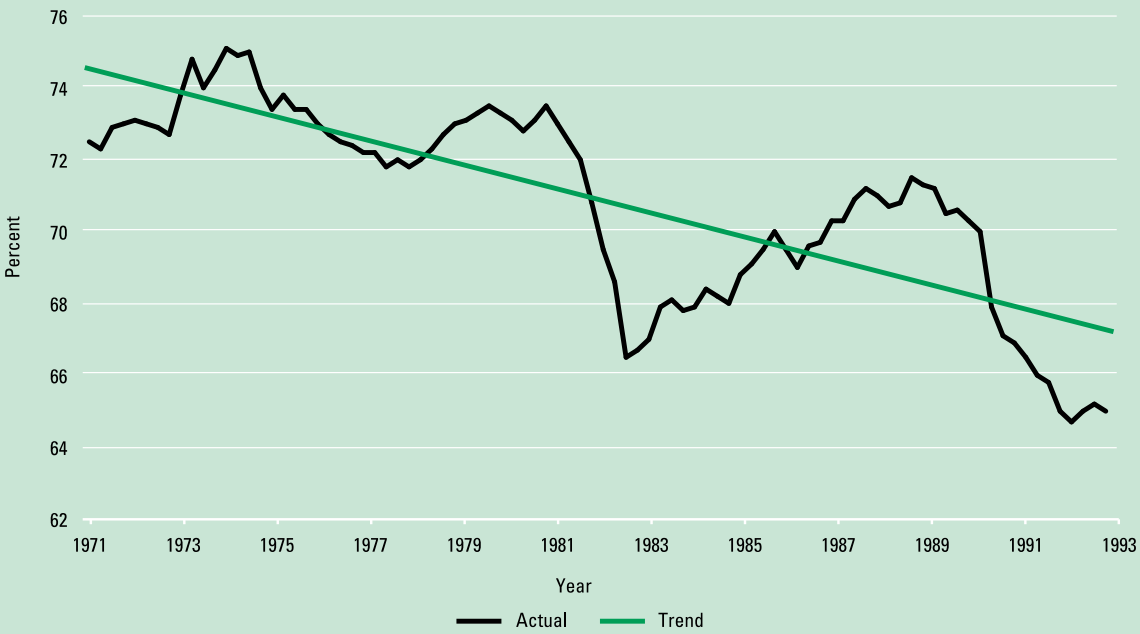


Figure 4
Employment Gap (% of Trend)

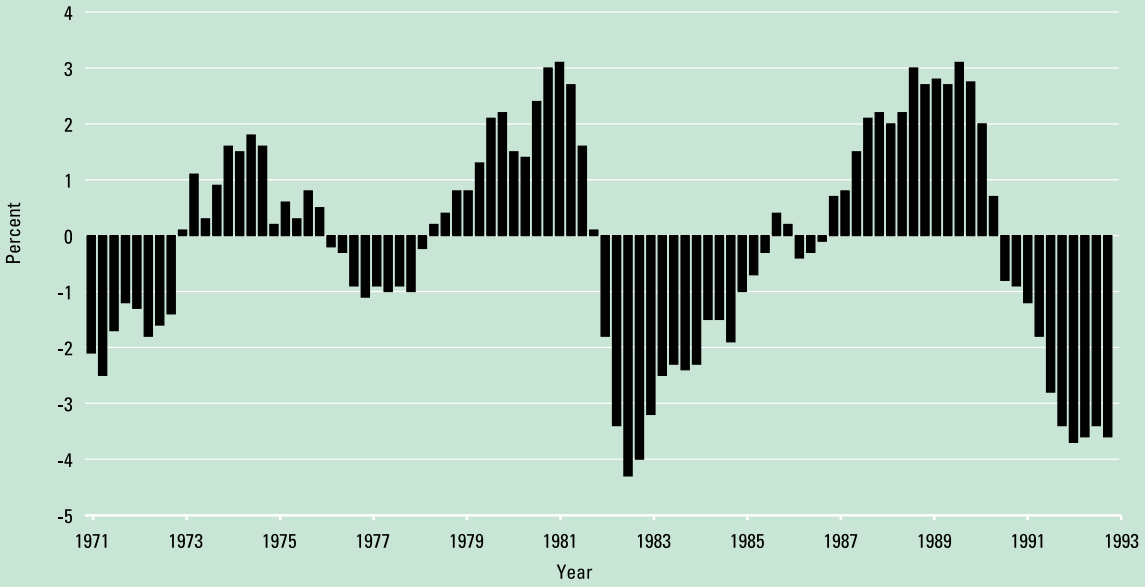


Figure 5
Female Participation Rate (%)

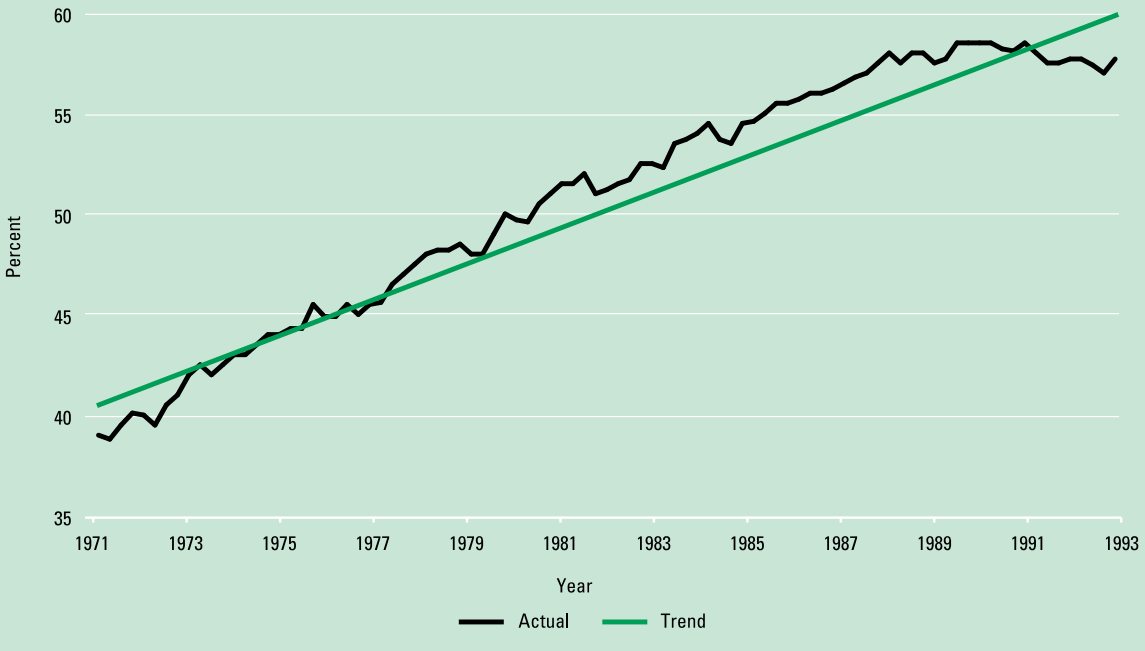


Figure 6
Male Participation Rate (%)

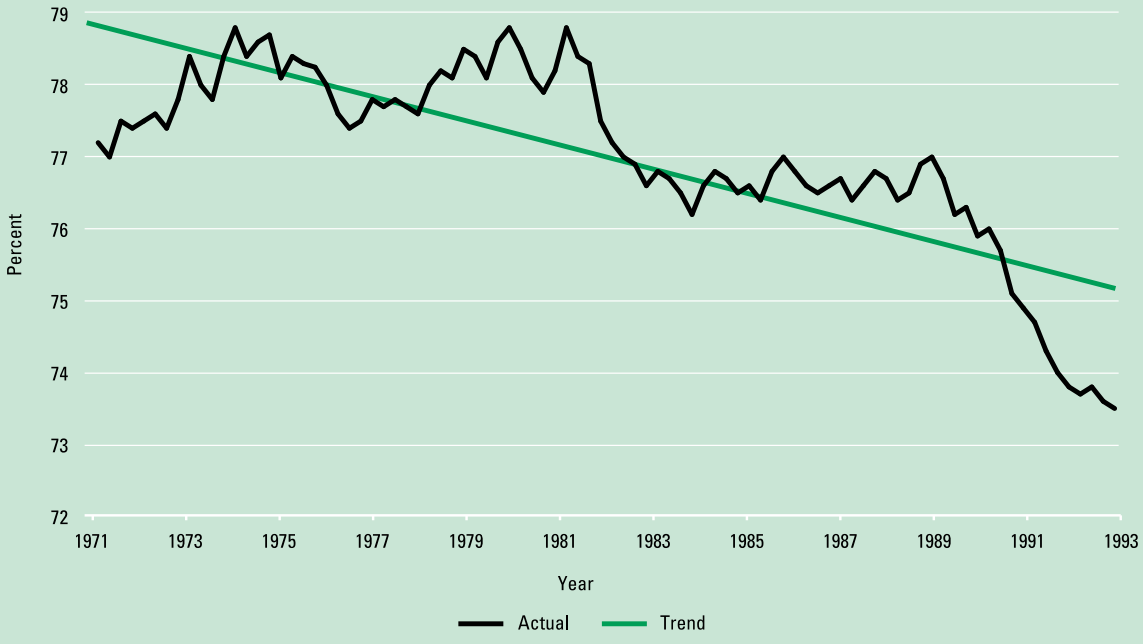
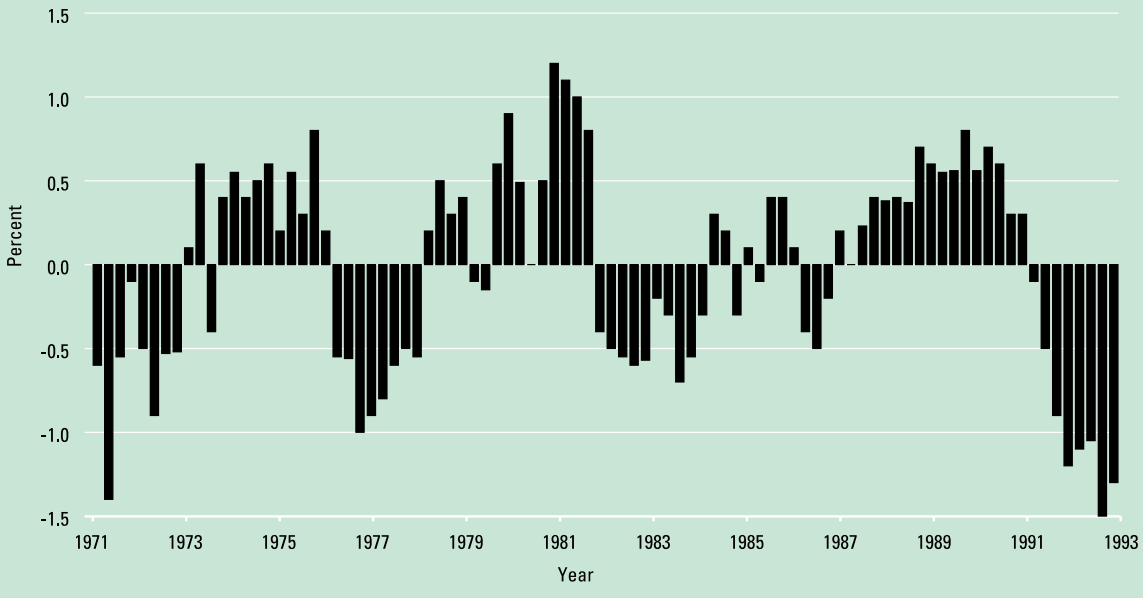


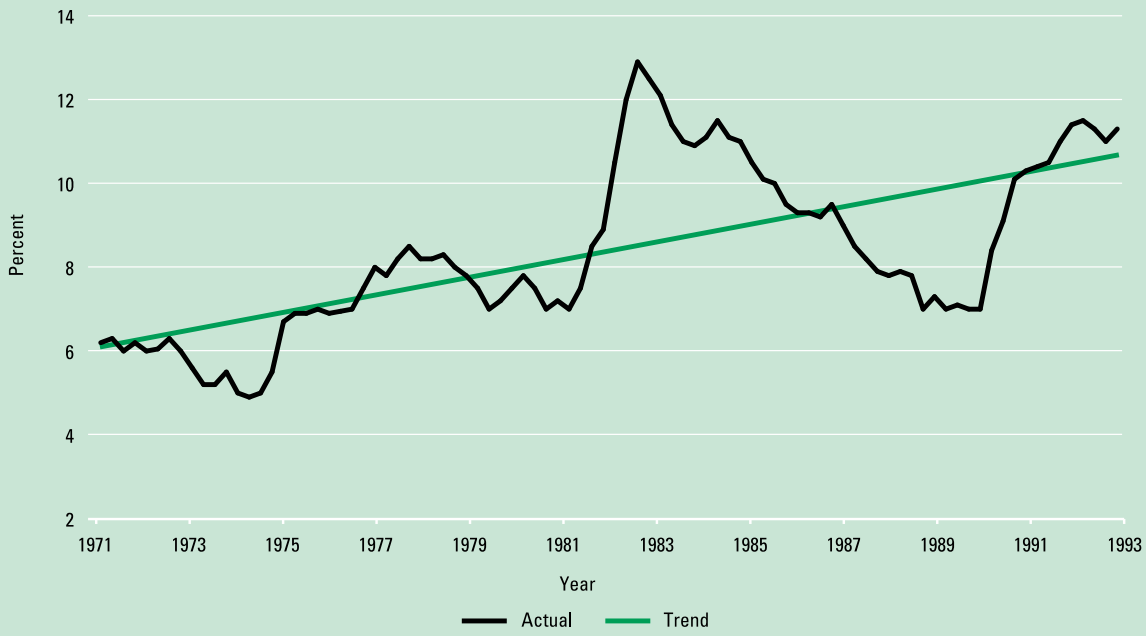
Figure 7
Labour Force Gap (% of Trend)



expect, it is less volatile. The actual level of the labour force as a percentage of its trend level is shown in Figure 7.

The trend value of unemployment and the unemployment rate are calculated by using the trend values of employment and labour force. Actual and trend unemployment rates are tracked in Figure 8, which shows that the trend unemployment rate moved upward from the early 1970's to the early 1980's but has since moved downward, although at a very moderate pace. This movement is consistent with

Figure 8
Actual and Trend Unemployment Rate (%)



previous analyses regarding the movement of the natural unemployment rate or the NAIRU.

As would be expected, the cycles in the unemployment rate around its trend value are similar to the movements in real GDP around potential GDP. The swings in the unemployment rate increased in amplitude during the 1980's relative to the 1970's. The rate rose to a greater extent during the 1981-1982 recession relative to the more recent slowdown, in part because of the larger drop in real GDP during the former recession. An additional factor is the sharper cyclical reduction in the labour force during the current cycle, which is evident in Figures 6 and 7. The slower recovery from the recent recession is expected to keep unemployment rates at a higher level for a longer period of time relative to the previous cycle, thereby putting additional demands on the UI program.

2. Income-Stabilizing Features of the UI Program

The role played by the UI program as a built-in stabilizer is determined by the nature of the program. To have an appropriate and significant impact, an economic stabilizer must be sensitive to changes in economic conditions, operate at the correct points in the cycle, and generate significant income flows. Since the UI program links its flows of revenues and expenditures to job losses and gains, it satisfies these criteria, at least conceptually. There have been significant changes to the program over time, however, and these changes would be expected to affect its stabilization properties. Both the current and past aspects of the program, therefore, must be considered when examining its performance.[1] There are two main aspects of the UI program that must be considered in examining its role as an economic stabilizer: the expenditure- and revenue-generation processes associated with the program.

To have an appropriate and significant impact, an economic stabilizer must be sensitive to changes in economic conditions, operate at the correct points in the cycle, and generate significant income flows.

Expenditures

The UI program injects income into the economy during recessions and withdraws income during expansions through changes in program expenditures. Based on certain eligibility requirements, UI benefits are paid to workers to protect them against the loss of income resulting from unemployment. During recessions, when unemployment is rising, UI expenditures increase. During expansions, when unemployment is falling, expenditures decrease.

The UI program injects income into the economy during recessions and withdraws income during expansions through changes in program expenditures.

The cyclical behaviour of UI program expenditures since the early 1970's is tracked in Figure 9, where actual UI expenditures are shown as a percentage of those which would occur if unemployment were at its trend level. Trend UI expenditures are computed by multiplying trend unemployment by actual UI expenditures per unemployed person. In this case, it is assumed that expenditures per unemployed person do not have a significant cyclical aspect.

Figure 9 shows that, relative to trend, UI expenditures fell during the boom of the late 1970's and rose during the recession of 1981-1982. Similarly, the economic boom of the late 1980's resulted in rapidly declining UI expenditures, while the recession of 1990-1991 led to an increase in expenditures. The swings in UI expenditures were greater during the 1980's relative to the 1970's, largely because the economic cycle had a larger amplitude during the 1980's (see Section 1). These swings also reflect changes to the program.

The amount of income injected into, or withdrawn from, the economy through UI expenditures in relation to overall income or GDP is shown in Figure 10. It can be seen from this figure that UI expenditures as a share of GDP have been trending upward since the early 1970's. The figure also suggests that while UI expenditures peaked during the 1981-1982 recession, they have been higher, on average, in the current cycle than in the previous one. In the 1990-1991 recession and recovery,

1 It should be noted at the outset that the purpose of this section is not to describe in detail the various aspects of the UI program. Only those aspects associated with the program's role as an income stabilizer are discussed. For a more detailed account of the UI program, see Ging Wong and Arun Roy, *Pre-Evaluation Assessment of the Unemployment Insurance Regular Benefits Program*, Insurance Programs Directorate, Program Evaluation Branch, Strategic Policy and Planning, Employment and Immigration Canada, 1992.

UI expenditures fell quite sharply as a share of GDP, in part because of a more rapid recovery. In the current cycle, the recovery has been quite weak. As a result, UI expenditures continue to account for a large share of GDP.

Figure 9
UI Benefit Gap (%)

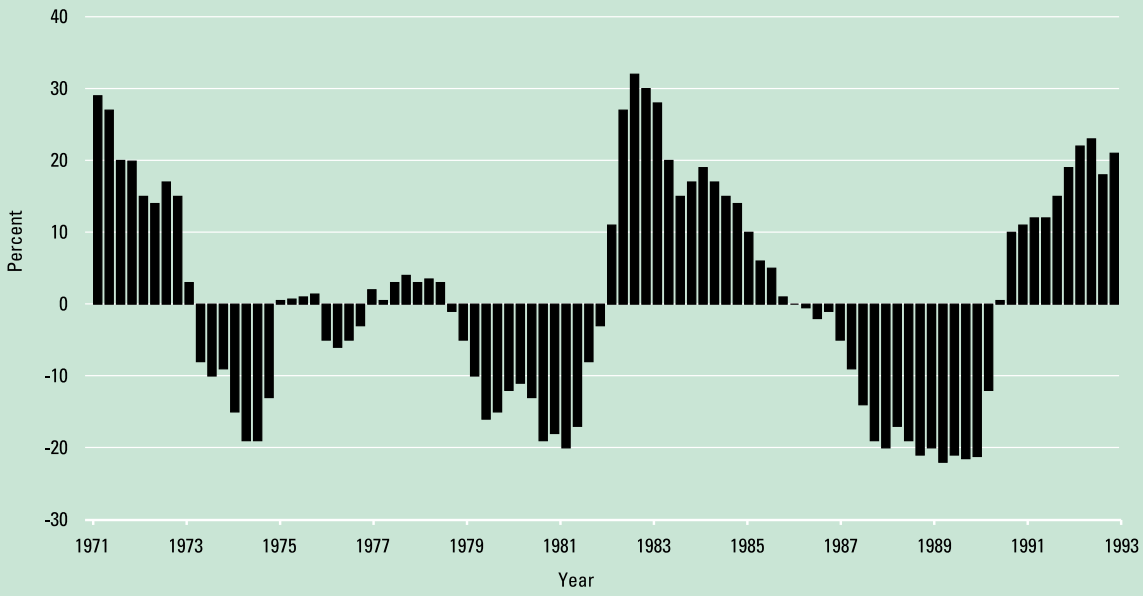
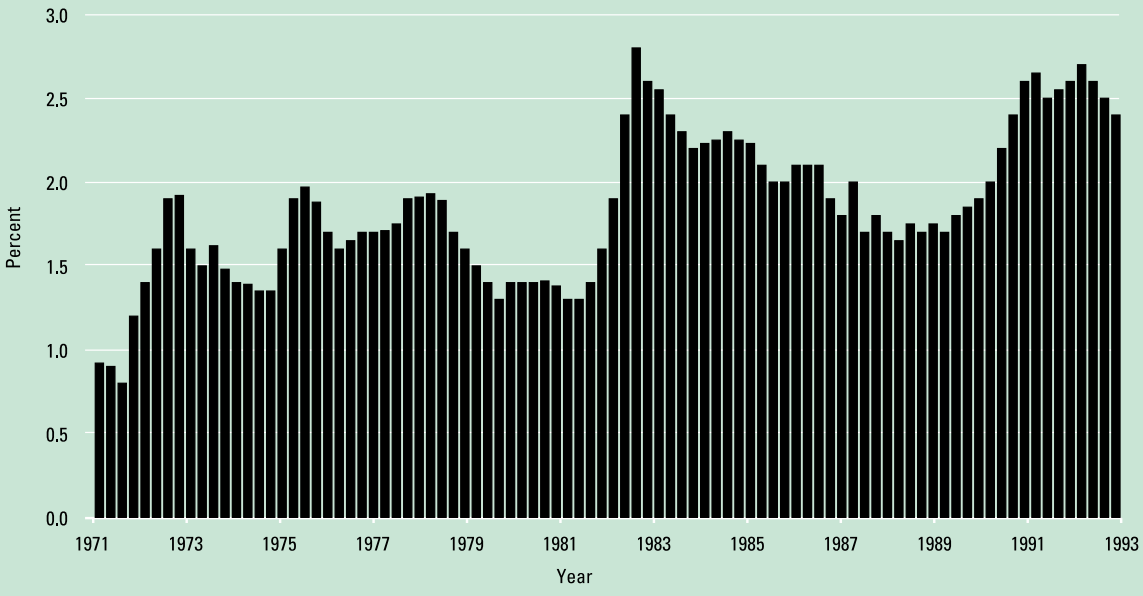
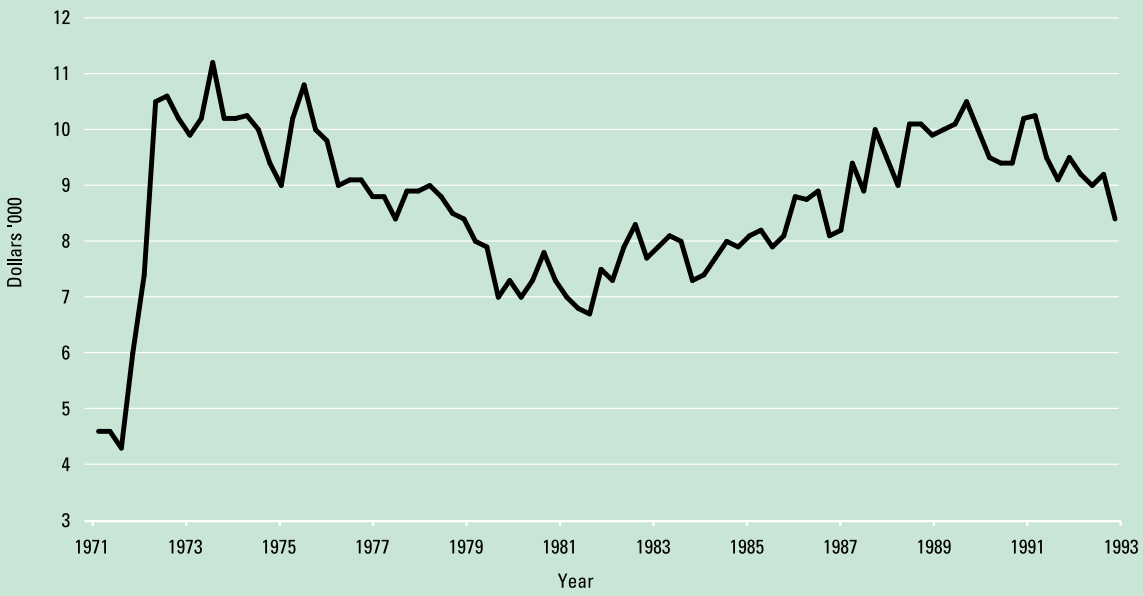


Figure 10
UI Expenditures as a Percentage of GDP



The change in the GDP share of UI expenditures also depends on the nature of the insurance program. The larger the percentage of the unemployed that can obtain UI benefits and the more generous the benefits, the greater will be UI expenditures. Figure 11 shows real UI expenditures per unemployed person since the early 1970's. In 1971, such expenditures rose sharply, thanks to major changes in the UI program. They remained high during the early 1970's, and then, with further changes to the program during the second half of the 1970's, they declined until the early 1980's. From this point to 1990, per person expenditures rose back to their relatively high levels of the early 1970's. Since 1990, when additional changes were made to the program, expenditures have declined again.

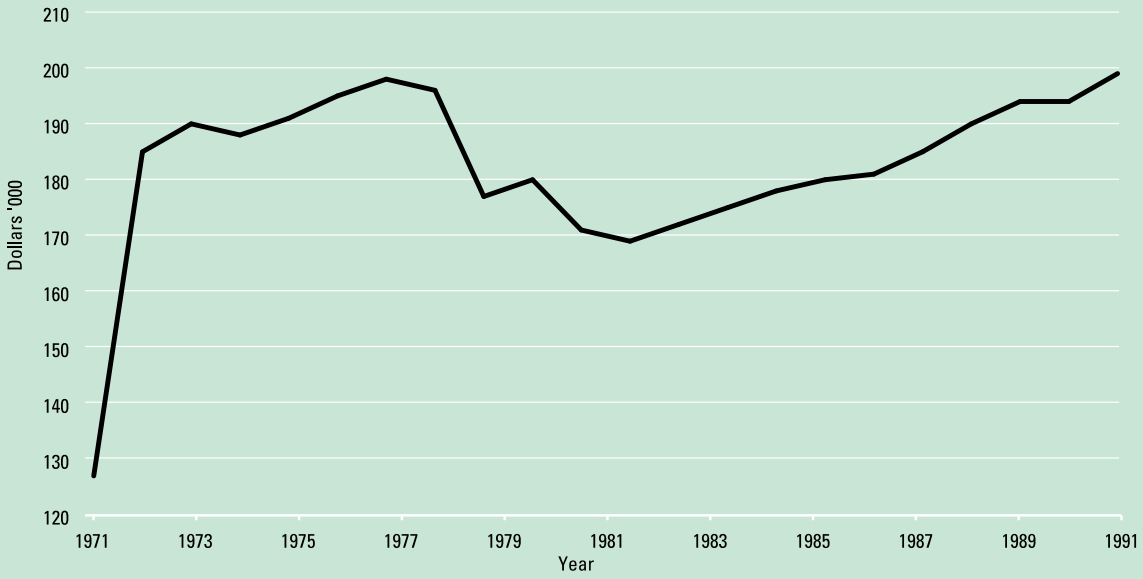
Figure 11
Real UI Expenditures Per Unemployed Person (Thousands of 1986 Dollars)



The key parameters of the UI program include: maximum weekly benefits, the minimum number of weeks needed to qualify for benefits, and the maximum number of weeks of benefits for a minimally qualified claimant. Figure 12 shows average weekly UI benefits adjusted for consumer price index (CPI) inflation. It can be seen that the 1971 changes to the UI program sharply increased its generosity. In the late 1970's, after further changes were made to the program, average weekly benefits grew at a slower rate than inflation, and real benefits fell until the early 1980's. Thereafter, real benefits continued to increase, but at a slower rate during the early 1990's. The latter slowdown reflected changes to the program and the inflationary impact of the Goods and Services Tax.

The changes in real UI expenditures per unemployed person have also resulted from changes, made in the late 1970's and again in the early 1990's, to the minimum number of weeks of work required to qualify for UI benefits. In 1971, the minimum

Figure 12
Real Average Weekly Benefits (1986 Dollars)



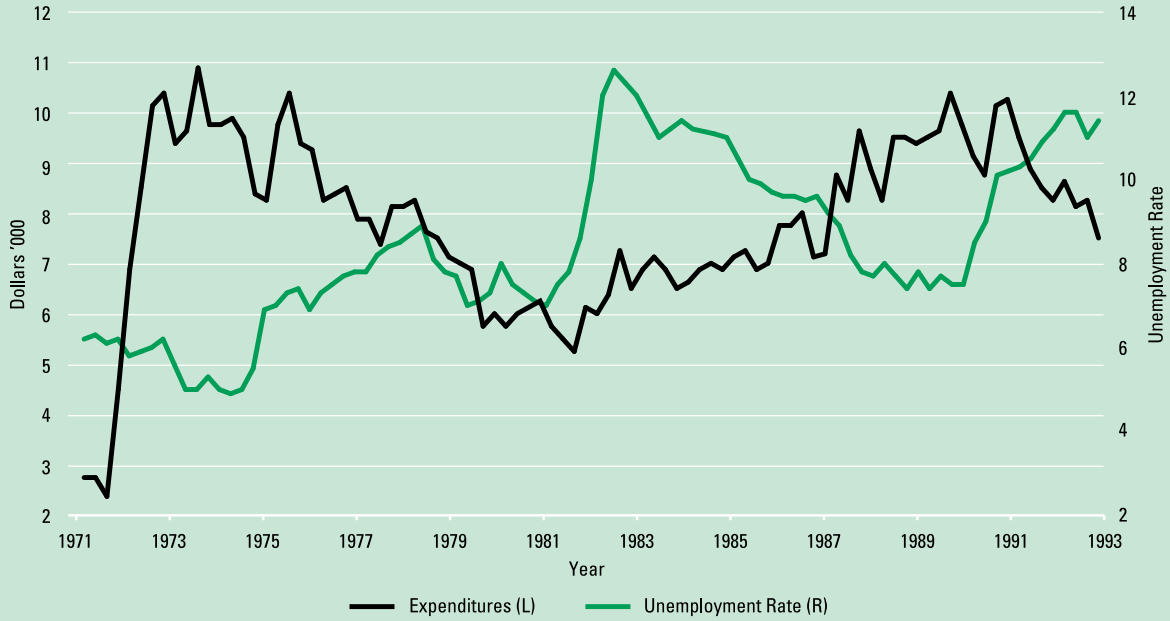
number of qualifying weeks was lowered from 30 to eight weeks, and the maximum number of benefit weeks essentially doubled. In 1978, the minimum number of qualifying weeks was increased and the maximum number of weeks of benefits was lowered. In 1990, changes were made to raise anew the minimum number of qualifying weeks. These changes tightened up the program, thereby lowering expenditures per unemployed person. While the changes to the UI program are structural in nature, it would appear from Figure 11 that there has been a procyclical aspect to these changes from the late 1970's to the present. Figure 13 plots real expenditures per unemployed person, together with the unemployment rate. Real benefits per unemployed person seemed to follow the unemployment cycle in an inverse manner. They fell into the 1981-1982 recession and then rise to peak during the boom of the late 1980's. They declined again with the changes made to the program in 1990.

While it is assumed in the remainder of this paper that there is no cyclical component to the structural parameters of the UI program on the expenditures side, it would appear that the changes to the program may have acted to intensify the economic recession of the early 1980's, the boom of the late 1980's, and the recession of 1990-1991. Naturally, the procyclical nature of the changes reverses, to some extent, the income-stabilization properties of the program during the period of analysis.

Revenues

The other important aspect of the income-stabilizing properties of the UI program is the revenues, obtained from both employees and employers, that the program

Figure 13
Real Expenditures Per Unemployed Person and Unemployment Rate



removes from the economy. The number of employees and the premium rate determine the revenues for the program. The rate paid by employers is currently 1.4 times that paid by employees.

Because the revenues of the program are related to the level of employment, they act as an income stabilizer. In recessions, when employment falls, revenues also decline, thus reducing payments by both employees and employers. In recoveries, revenues will rise as employment rises. This takes money out of the economy.

The cyclical performance of UI revenues can be seen from Figure 14, which shows actual UI revenues as a percentage of those computed at trend employment. As in the case of expenditures, the figure assumes that the contribution rate does not contain a cyclical component. As can be seen from this figure, UI revenues fall during recessions and rise during recoveries, following the movements of employment relative to trend.

The key assumption behind Figure 14 is that the UI contribution rate is not cyclical. Figure 15 shows UI contributions per employee — the effective contribution rates — as a percentage of their trend values, and unemployment as a percentage of trend unemployment. With the exception of the early 1970's, the effective contribution rate tends to lag unemployment in a cyclical fashion. When unemployment is above trend, the contribution rate is also above its trend, but it lags unemployment. While the change in the actual or legislated contribution rate is not identical to the effective rate, it is very similar. The type of cyclical behaviour

Figure 14
UI Revenue Gap (%)

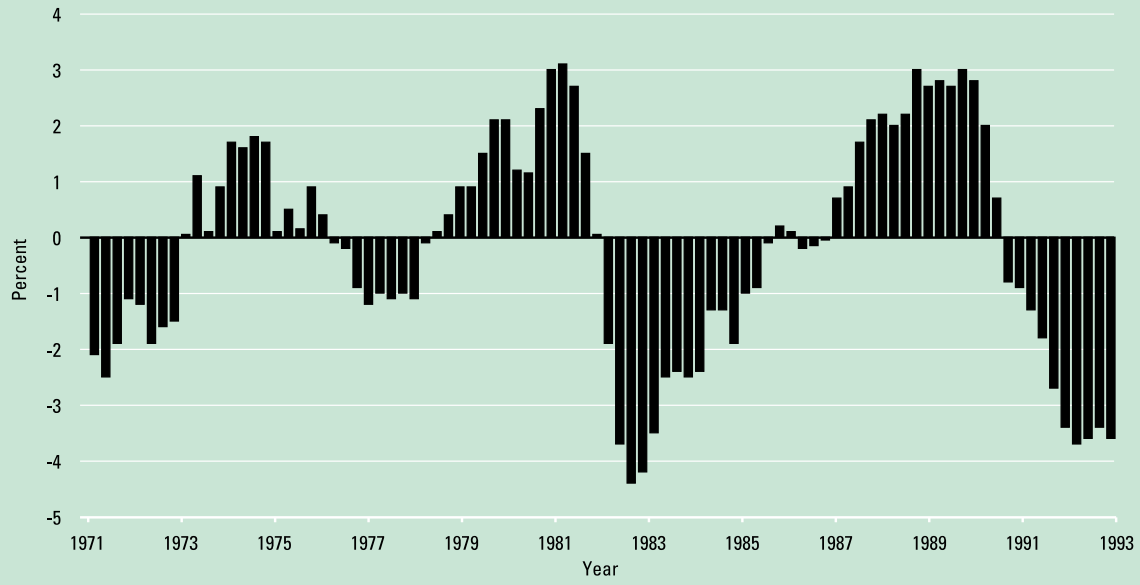
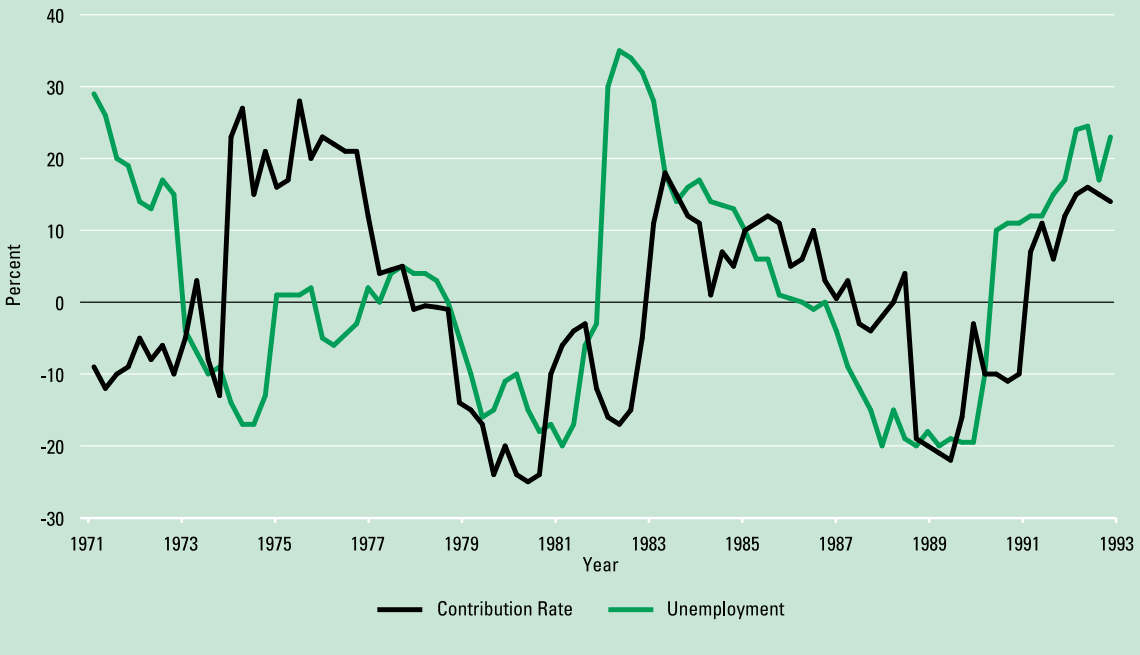


Figure 15
Contribution Rate and Unemployment Gaps (%)



observed for the contribution rate and for unemployment makes sense, given the nature of the program.

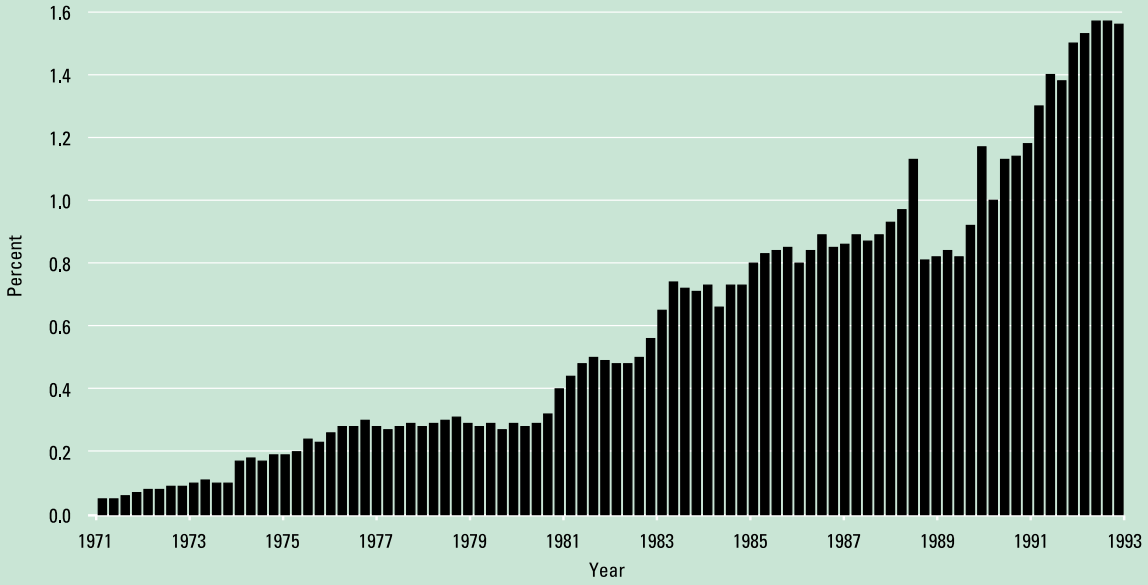
Section 48 of the *Unemployment Insurance Act* requires the Unemployment Insurance Commission to review the status of the UI account and, with the approval of the minister of Finance and the Governor-in-council, to fix premium rates annually.[2] At present, the rates are set so as to remove or reduce the cumulative deficit or surplus that would otherwise be expected for the end of the next year. Obviously, if unemployment is rising, UI expenditures will also rise and employment-related UI revenues will decline. The UI account will then begin to run a deficit, and it will be necessary to raise contribution rates to balance the account.

Figure 16 shows the gap in UI revenue that occurs when the effective contribution rate is adjusted for its cyclical behaviour by using the trend rate together with trend employment to determine revenues. The cyclical adjustment of the contribution rate clearly changes the cyclical nature of UI revenues. In the late 1970's and the 1980's, revenues were lowered through reductions in contribution rates when the economy was nearing its peak performance. During the first year of the last two recoveries, the contribution rates were raised sharply, thereby raising UI revenues. It should be noted that the magnitude of rate increases is not necessarily set automatically. In other words, there is a certain amount of discretion built into the setting of rates. For example, in 1991, the last year of the latest recession, the federal government raised the contribution rate by 25 per cent. This clearly cannot

Figure 16
Total Revenue Gap Versus Employment (%)

2 Ging Wong and Arun Roy, *op. cit.*

Figure 17
UI Effective Contribution Rate



The shorter the period over which the UI account must be balanced, the more the UI program simply acts as a tool for redistributing income from employees and firms to the unemployed. Any stimulus would be expected to be short-lived and would quickly be matched, with a deficit in one year being offset by a surplus in the next year.

be interpreted as being consistent with the use of UI as an automatic stabilizer. The effective contribution rate is shown in Figure 17.

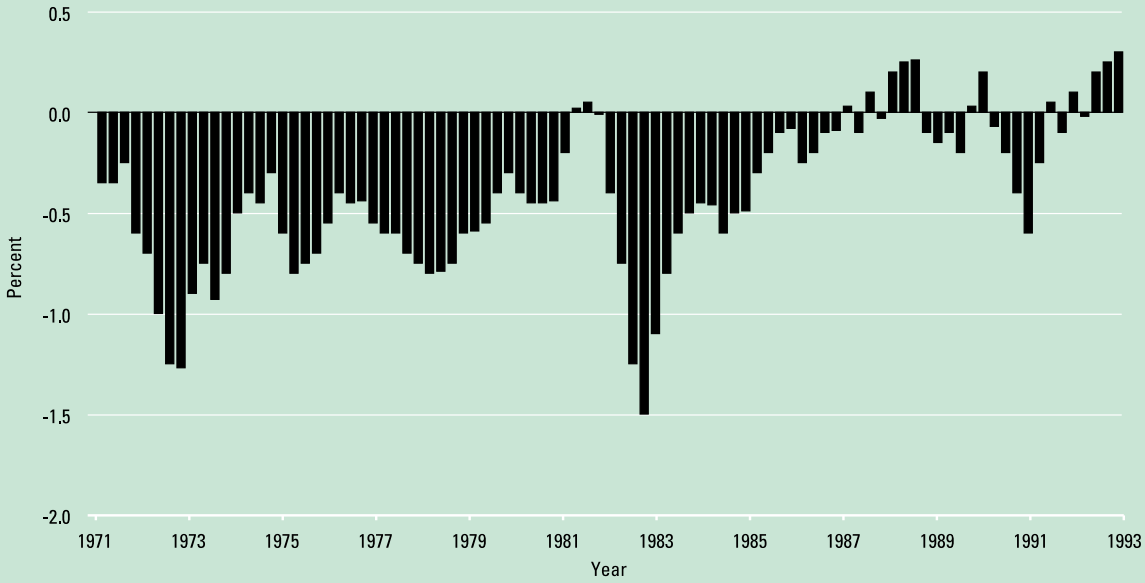
UI Balance

The difference between UI revenues and expenditures as a percentage of GDP is shown in Figure 18. That difference represents the net amount of funds injected into, or withdrawn from, the economy over the past two decades. It can be seen from this figure that net UI contributions have declined noticeably in the recent past. During the 1970's, the UI balance remained in deficit, averaging about 0.5 per cent of GDP. After being roughly balanced in 1980 and 1981, the balance went into deficit again during the 1981-1982 recession. Around 1987, the balance returned to a surplus, and then to a deficit during the 1990-1991 recession. At present, the balance is in surplus.

The changing contribution of the UI balance to the economy, to a large extent, is the result of changes in the federal government's contribution to UI revenues. In the early 1970's, that contribution accounted for about 50 per cent of revenues. It was subsequently lowered, representing just under 30 per cent of revenues in 1982. In 1990, the government completely withdrew its contribution, and the program is now financed entirely by employee and employer contributions. This move towards increased self-financing explains the tighter relationship observed between contribution rates and unemployment since the late 1970's, seen in Figure 15.

The reduced net contribution of the UI program to GDP would certainly be expected to reduce its stabilizing impact on the economy. The shorter the period over which the UI account must be balanced, the more the UI program simply acts as a tool for redistributing income from employees and firms to the unem-

Figure 18
UI Balance (% of GDP)



ployed. Any stimulus would be expected to be short-lived and would quickly be matched, with a deficit in one year being offset by a surplus in the next year. The only stimulus that might be expected would come from differential impacts of the program on the participants involved.

Cyclical Macroeconomic Impacts of the UI Program

The two sets of economic agents that are influenced by the UI program are households and firms. Households make contributions and receive benefits, while firms make contributions. The program's income-stabilizing impact will depend on how households and firms react to the program. As mentioned in Section 1, the discussion here focuses on the cyclical aspects of behaviour. Factors that affect the trend performance of households and firms are not part of the discussion.

Increased UI expenditures provide households with some of the income lost from unemployment, and thus supports a higher level of household spending than would otherwise occur. Higher contributions from households will have the opposite effect. It is the net amount of UI expenditures received by the household sector that is relevant to the impact on household spending in any one year. If the UI balance is in deficit, then this clearly would be expected to raise household spending, other things being equal. Even when the balance is in a surplus position, if the net amount going to households is positive, then their spending will be higher.

Under the permanent-income or life-cycle theories of consumption behaviour, overall household consumption is said to be relatively insensitive to changes in

current income, while household expenditures, by contrast, are found to be sensitive to such changes. This is explained by the fact that some households tend to have a lower level of liquidity and some types of consumer spending represent investment rather than consumption. For example, while the consumption of services from an automobile may not be affected by a reduction in current income, the purchase of automobiles may be sensitive to such a change. Some households do not have easy access to credit and thus will be affected by short-term changes in income with respect to both investment and consumption. As a result, household expenditures would be expected to fluctuate over an economic cycle and to be sensitive to changes in net UI expenditures. That is the assumption used in the WCCM model.

It is not immediately clear how firms will react to short-run changes in UI contributions. Higher UI contributions increase the cost of labour and thus, other things being equal, will lead to a reduction in employment. If firms make hiring decisions on the basis of a longer-term time horizon, however, then cyclical changes in UI contributions can be expected to have only a small impact on employment decisions, if any. What will be affected, however, are the firm's profits and prices. If firms do not lay off or hire employees when the contribution rates are changed in response to cyclical factors, then profits will fluctuate accordingly. Firms may attempt to moderate the impact on profits by trying to pass the higher labour costs along to customers in the form of higher prices.

If cash flow is an important aspect of the timing of investment decisions, then changes in contribution rates could lead to changes in the timing of investment expenditures. In the WCCM model, employment decisions are based on averages of labour costs over time. Thus changes in UI contribution rates will affect profits and employment over economic cycles. Because prices are essentially a markup on costs in the WCCM model, changes in rates will affect prices. In addition, profits affect the timing of investment decisions in the model.

3. Cyclical Impact of the UI Program

The program's countercyclical impacts have operated on real GDP but have been substantially offset by the revenues side of the program, solely as a result of changes in contribution rates.

Having examined the cyclical behaviour of the UI program over the past 20 years, we may now use the results of that analysis to examine how the program has affected the cyclical performance of the Canadian economy as a whole during the last two economic cycles. This analysis will illustrate the program's stabilizing properties over those cycles.

The methodology behind the analysis was described earlier. Essentially, it involves simulating the WCCM model to establish how the economy would perform if the UI program were not operating. The results are then compared with the actual performance of the economy over the period of analysis. After outlining the major assumptions behind the analysis, we present the impact of the UI program as estimated with this methodology.

Assumptions

The major assumptions behind the present analysis of the UI program concern the nature of the WCCM model (discussed earlier) and the policy response to changes in economic performance.

An important assumption behind the analysis is the response of monetary policy, specifically the "non-accommodative monetary policy". Here, it is assumed that the Bank of Canada sets interest rates in such a manner as to keep the money supply at its base-case level. Under this assumption, interest rates fall or rise as nominal GDP moves downward or upward from its base-case levels. Weaker economic growth will imply lower interest rates, and vice versa. This assumption is consistent with attempts by the Bank of Canada to keep the inflation rate near its base-case levels.

Another key assumption is that fiscal policy remains unchanged in response to changes in economic performance. If the unemployment rate changes or government deficits rise, it is assumed that governments at all levels do not respond with changes in economic policies. Thus the actual response of the UI program to changes in economic conditions is overlooked in this analysis, which also assumes that there are no other changes in exogenous variables (such as foreign economic variables or net immigration) in the WCCM model.

The period of analysis ranges from 1978 to the second quarter of 1993. As mentioned above, this period includes two economic cycles — from 1978 to 1985, and from 1988 to 1993 — which are considered separately in the analysis. The former cycle is complete in the analysis, while the latter is not.

To keep the cyclical analysis identical for both cycles, the WCCM model is not simulated over the entire period at once, but rather over each subperiod in turn. The importance of the latter procedure has to do with the starting assumptions in the analysis. The starting-point values for the first cycle are historical values, including the levels of productive capacity, labour force, and interest rates. If the model were simulated over the entire period on the basis of those 1978 values, however, the starting-point values for the second subperiod (beginning in 1987)

would be different than what they were in reality. In the presentation of the results, therefore, there is a break in 1986.

In addition to measuring the total impact of the UI program on the economy, the analysis also decomposes that impact into two parts: the effect of the revenue measures, and that of the expenditure measures. In the last section, it was seen how these two aspects of the program behaved quite differently. The present approach illustrates how the two sides of the program have affected its stabilization properties.

Impacts

The results of the simulations for key economic indicators are shown in Table 1 and in a number of figures below. Unless indicated otherwise, they are expressed as percentage differences of an indicator relative to its value in the shock case. In this form, the results are interpreted as the impact of the UI program on the indicators. For example, in 1982 the UI program raised real GDP by 0.4 per cent from what it would have been if the program had not been operating.

The indicators in the figures are interpreted in the same manner as are those in Table 1, but two lines are added in the figures to represent the impacts of expenditures and revenues separately. These two impacts sum to the total impact.

GDP

The impact of the UI program on real GDP is shown in Figure 19. The results of the analysis suggest that the program had only a small countercyclical impact on GDP as the economy entered the 1981-1982 recession. The impact was small solely because of the revenues side of the program, as the expenditures side operated as expected. The program did help to offset the impact of the recession, but again the revenues side acted quickly to diminish the countercyclical impact of increased benefit payments.

The program appears to have been more countercyclical during the boom of the late 1980's than it was during that of the late 1970's. The revenues side, however, acted to stimulate the economy at the end of the boom as the contribution rate was sharply reduced in 1989. The program was countercyclical in the recent recession, but the sharp increases in contribution rates significantly offset the impacts from the expenditures side.

It would appear that the UI program is making a bigger contribution to the recession-and-recovery part of the current cycle than it did in the early 1980's. While the peak of the impact of the program was greater in the 1981-1982 (Table 2) recession, the weak recovery in the current cycle has failed to turn around the UI impact. This is consistent with the larger share of GDP accounted for by UI expenditures in the current cycle, discussed in Section 2.

The impact of the UI program as an economic stabilizer is also indicated in Table 3. It shows the average GDP gap with and without the operation of the UI program, the amount by which the program reduced the GDP gap, and the percentage by which the program reduced the gap over four periods, each period being bounded by the beginning and the end of deviations of actual GDP from its trend. For example, in the third quarter of 1981 (81:3), GDP slipped below trend,

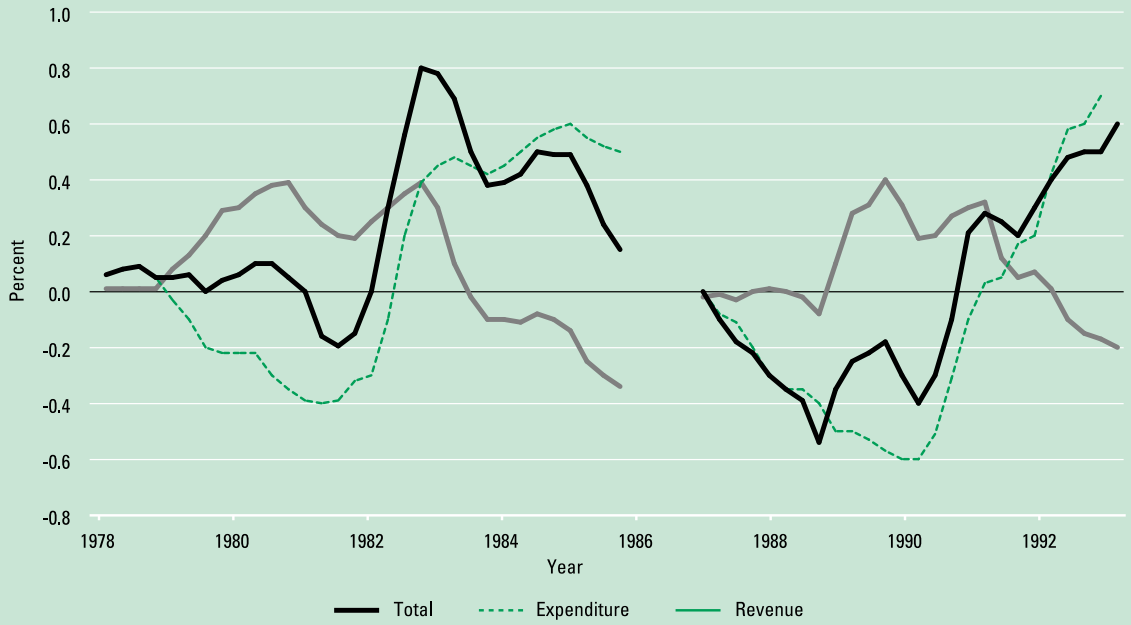
Table 1
Impact of the UI Program
1978-1985

	1978	1979	1980	1981	1982	1983	1984	1985
Real GDP (in 1986 $)								
UI	402,737	418,328	424,537	440,127	425,970	439,448	466,167	489,437
No UI	402,483	418,203	424,170	440,646	424,264	436,919	465,007	487,874
% Difference	0.1	0.0	0.1	-0.1	0.4	0.6	0.5	0.3
Consumer Expenditures								
UI	240,249	246,546	252,322	257,869	251,569	259,854	271,424	285,071
No UI	240,051	246,551	252,212	258,196	250,356	257,241	268,592	282,860
% Difference	0.1	0.0	0.0	-0.01	0.5	1.0	1.1	0.8
Residential Construction								
UI	402,737	418,328	424,537	440,127	425,970	439,448	466,167	489,437
No UI	402,483	418,203	424,170	440,646	424,264	436,919	465,007	487,874
% Difference	0.1	0.0	0.1	-0.1	0.4	0.6	0.5	0.3
Plant and Equipment								
UI	40,685	46,736	53,904	60,894	53,959	50,487	51,339	55,823
No UI	40,674	46,698	53,810	60,845	53,986	50,226	51,251	55,663
% Difference	0.0	0.1	0.2	0.1	0.0	0.5	0.2	0.3
Exports								
UI	91,218	96,010	98,643	102,868	100,131	106,254	124,794	132,042
No UI	91,237	96,046	98,657	102,785	99,985	106,576	125,247	132,552
% Difference	0.0	0.0	0.0	0.1	0.1	-0.3	-0.4	-0.4
Imports								
UI	85,613	94,252	98,851	106,632	90,856	98,543	114,709	124,088
No UI	85,606	94,255	98,843	106,627	90,719	98,380	114,475	123,679
% Difference	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.3
Employment ('000s)								
UI	9,986	10,395	10,709	11,002	10,621	10,675	10,932	11,221
No UI	9,984	10,391	10,697	10,989	10,600	10,631	10,890	11,190
Difference	2	4	11	13	21	44	42	31
% Difference	0.0	0.0	0.1	0.1	0.2	0.4	0.4	0.2
Unemployment Rate (Level)								
UI	8.3	7.4	7.5	7.5	11.0	11.8	11.2	10.5
No UI	8.3	7.4	7.5	7.6	11.1	12.0	11.5	10.6
% Difference	0.0	0.0	0.0	-0.1	-0.1	-0.2	-0.2	-0.2
GDP Deflator								
UI	0.600	0.660	0.730	0.809	0.879	0.923	0.952	0.977
No UI	0.600	0.660	0.731	0.809	0.881	0.923	0.951	0.974
% Difference	0.0	0.0	-0.1	0.0	-0.2	0.0	0.1	0.3
CPI								
UI	0.558	0.610	0.672	0.755	0.837	0.885	0.924	0.960
No UI	0.559	0.610	0.672	0.756	0.837	0.886	0.923	0.958
% Difference	0.0	0.0	-0.1	-0.1	-0.1	-0.1	0.1	0.2
Wage Rate								
UI	13.51	14.59	16.00	17.99	19.93	20.77	21.85	22.95
No UI	13.51	14.62	16.06	18.01	19.99	20.72	21.76	22.82
% Difference	0.0	-0.2	-0.3	-0.1	-0.3	0.3	0.4	0.6
3 Month T-Bill Rate (Level)								
UI	8.7	11.7	12.8	17.7	13.7	9.3	11.1	9.4
No UI	8.7	11.7	12.8	17.8	13.6	9.1	10.9	9.2
% Difference	0.0	0.0	0.0	-0.1	0.1	0.2	0.2	0.2
Exchange Rate ($C/US Level)								
UI	1.141	1.171	1.169	1.199	1.234	1.232	1.295	1.366
No UI	1.141	1.172	1.170	1.200	1.235	1.236	1.299	1.370
% Difference	0.0	0.0	0.0	-0.1	-0.1	-0.3	-0.3	-0.3
Federal Balance (Level)								
UI	-10,854	-9,383	-10,663	-7,315	-20,281	-24,993	-30,024	-31,424
No UI	-10,755	-9,353	-10,511	-7,781	-18,500	-23,550	28,640	-30,565
% Difference	-99	-30	-152	466	-1,775	-1,443	-1,384	-859

Table 2
Impact of the UI Program
1987-1992

	1987	1988	1989	1990	1991	1992
Real GDP (in 1986 $)						
UI	526,730	552,958	566,486	565,576	556,029	560,048
No UI	527,360	555,094	567,978	567,128	554,877	557,735
% Difference	-0.1	-0.4	-0.3	-0.3	0.2	0.4
Consumer Expenditures						
UI	310,453	324,301	335,284	338,672	332,056	335,725
No UI	310,960	326,289	337,553	340,718	331,676	333,582
% Difference	-0.2	-0.6	-0.7	-0.6	0.1	0.6
Residential Construction						
UI	35,843	36,855	38,610	35,158	30,843	32,774
No UI	35,897	37,010	38,752	35,342	30,846	32,647
% Difference	-0.2	-0.4	-0.4	-0.5	0.0	0.4
Plant and Equipment						
UI	63,850	73,939	78,543	76,474	77,472	73,288
No UI	63,875	74,083	78,749	76,536	77,538	73,276
% Difference	0.0	-0.2	-0.3	-0.1	-0.1	0.0
Exports						
UI	142,942	156,258	157,799	164,744	165,987	179,175
No UI	142,906	156,252	157,266	164,195	165,599	179,312
% Difference	0.0	0.2	0.3	0.3	0.2	-0.1
Imports						
UI	142,678	162,385	172,584	175,469	180,258	189,140
No UI	142,698	162,448	172,653	175,740	180,592	189,567
% Difference	0.0	0.0	0.0	-0.2	-0.2	-0.2
Employment ('000s)						
UI	11,861	12,244	12,484	12,570	12,339	12,240
No UI	11,864	12,261	12,596	12,583	12,326	12,219
Difference	-3	017	-22	013	13	30
% Difference	0.0	-0.1	-0.2	-0.1	0.1	0.2
Unemployment Rate (Level)						
UI	8,8	7,8	7.5	8.1	10.3	11.3
No UI	8.8	7.7	7.5	8.1	10.3	11.4
% Difference	0.0	0.1	0.1	0.1	0.0	-0.1
GDP Deflator						
UI	1.047	1.096	1.149	1.186	1.216	1.229
No UI	1.047	1.096	1.151	1.189	1.220	1.232
% Difference	0.0	0.0	-0.2	-0.2	-0.3	-0.2
CPI						
UI	1.044	1.086	1.140	1.195	1.262	1.281
No UI	1.044	1.086	1.141	1.197	1.265	1.283
% Difference	0.0	0.0	0.0	-0.2	-0.2	-0.2
Wage Rate						
UI	25.19	26.77	28.33	29.61	30.87	32.06
No UI	25.19	26.79	28.51	29.76	30.99	32.04
% Difference	0.0	-0.1	-0.6	-0.5	-0.4	0.1
3 Month T-Bill Rate (Level)						
UI	8.1	9.5	12.1	12.8	8.7	6.6
No UI	8.2	9.6	12.2	13.0	8.8	6.5
% Difference	0.0	-0.1	-0.2	-0.2	-0.1	0.1
Exchange Rate ($C/US Level)						
UI	1.326	1.231	1.184	1.167	1.146	1.209
No UI	1.326	1.230	1.182	1.165	1.145	1.211
% Difference	0.0	0.1	0.2	0.2	0.1	-0.2
Federal Balance (Level)						
UI	-20,704	-19,166	-21,055	-25,412	-30,737	-26,403
No UI	-21,473	-21,407	-21,764	-26,789	-29,988	-25,941
% Difference	769	2241	709	1,377	-749	-462

Figure 19
UI Impact: Real GDP (%)



and this movement continued until the third quarter of 1985 (85:3), when GDP returned to its trend level. The movements of GDP relative to trend are shown in Figure 19.

Table 3
UI/GDP Gap and Employment Gap Reduction

	78:1-81:2	81:3-85:3	87:1-90:1	90:2-93:2
GDP				
UI/GDP Gap	9,520	-19,525	11,845	-29,235
No UI Gap	9,365	-21,280	13,275	-30,415
Reduction	155	1,755	-1,430	1,180
% Reduction	1.7	-8.3	-10.8	-3.9
	78:1-81:4	**82:1-85:4**	**87:1-90:4**	**91:1-93:2**
Employment				
UI Gap	210	-230	240	-320
No UI Gap	200	-265	255	-345
Reduction	10	35	-15	25
% Reduction	5.0	-13.2	-5.9	-7.2

For the 1981-1982 recession/recovery period, the average GDP gap is estimated to have been about $19.5 billion with the UI program operating and $21.3 billion without the UI program. Thus the UI program reduced the GDP gap by about $1.8 billion, or 8.3 per cent. The sign of the gap reduction should be negative if the program operates countercyclically. As Table 3 shows, the UI program increased the gap during the 78:1-81:2 period and thus had a destabilizing effect. That is, it was increasing real GDP when it should have been reducing it. In all other periods considered here, the program had a stabilizing effect. Note, however, that the last period in the table does not represent the full trend/recession/recovery phase of the cycle. It thus cannot be compared fully with the 1982-1985 period.

The results of this analysis suggest that the program's countercyclical impacts have operated on real GDP but have been substantially offset by the revenues side of the program, solely as a result of changes in contribution rates. This can be seen in Figure 20, which shows the impact of revenues along with the impact on employment. The employment side is operating as would be expected. That is, in recoveries revenues rise as employment rises, and vice versa. Changes to the contribution rates have overwhelmed the employment effects.

Employment and Unemployment

The impacts of the UI program on employment and unemployment are shown in Figures 21 and 22, respectively. Its impact on the employment gap is shown in Table 3, which is subject to the same interpretation as for the GDP gap discussed

Figure 20
UI Revenue Impact: Real GDP (%)

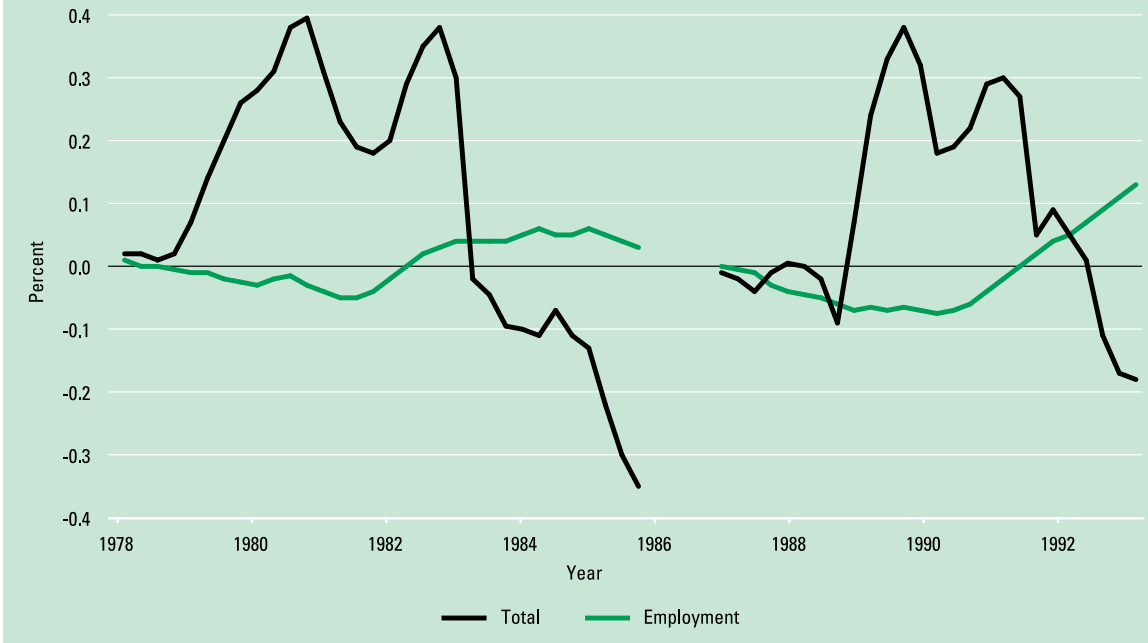
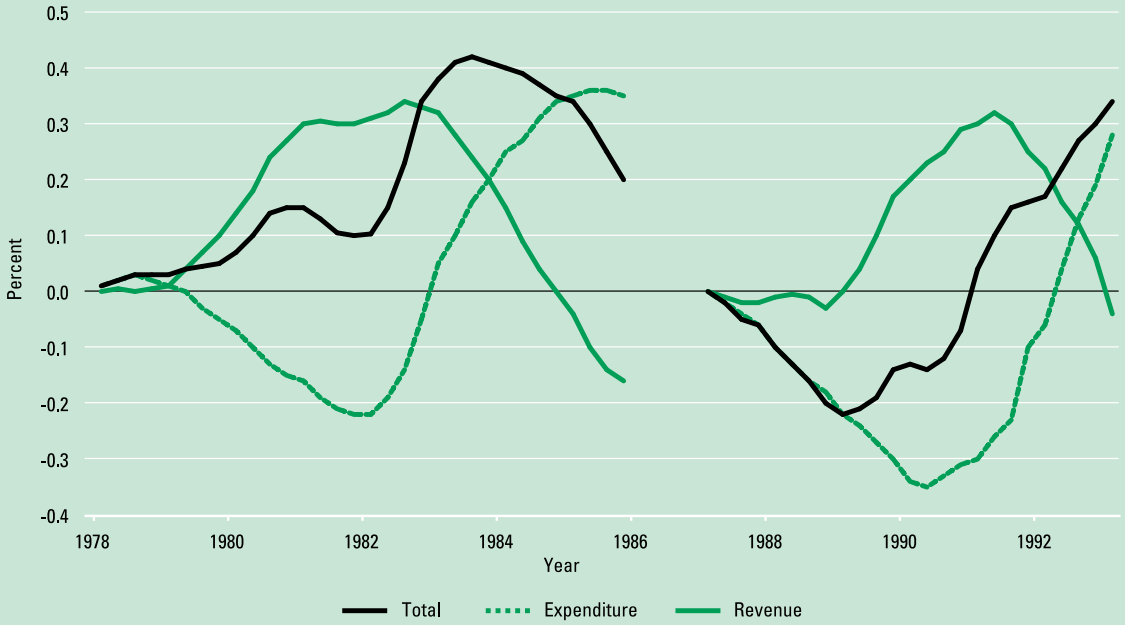


Figure 21
UI Impact: Employment (%)



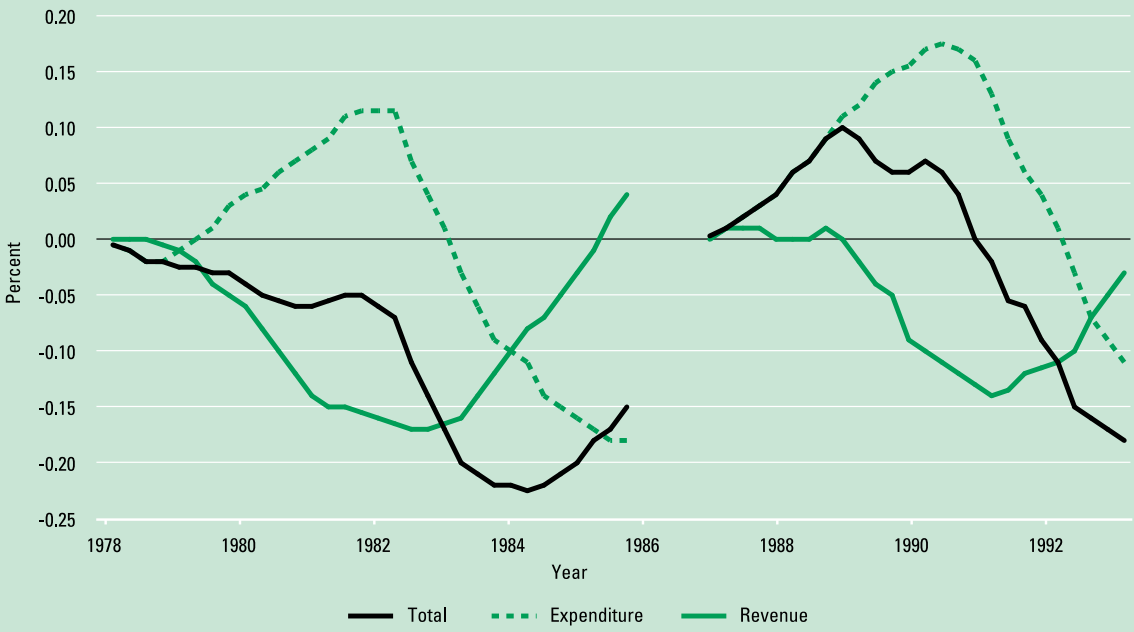
above. It should be remembered in examining these impacts that employment normally lags GDP on a cyclical basis, and thus the employment and unemployment impacts will follow behind those for GDP. As a result, the periods shown below for those two indicators are somewhat different from those pertaining to GDP.

During the boom of the late 1970's, the revenues side of the UI program was responsible for the program stimulating employment rather than reducing it, as one might expect from an appropriate income-stabilization program. This result shows up in the unemployment rate being lower during the boom because of the program. The revenues side also acted to offset the countercyclical impacts of the program on employment and unemployment in both recessions, as was the case for GDP. From the point of view of employment and unemployment, however, the program as a whole had a countercyclical behaviour during the last two recessions.

It can be seen from Table 3 that, as in the case of the GDP gap, the UI program had a destabilizing impact on employment during the 78:1-81:4 period. The program reduced the average employment gap by about 13 per cent during the 1981-1982 recession and by roughly half that amount during the current phase of the cycle.

The program's impact on the unemployment rate is less than that on employment because of the program's impact on the labour force. A typical characteristic of recessions and recoveries is that weaker or stronger employment growth causes the

Figure 22
UI Impact: Unemployment Rate (Difference)



discouraged-worker effect to lower or raise the participation rate. Thus the latter's cyclical responsiveness attenuates the rise in unemployment during recessions and its decline during recoveries.

Prices and Interest Rates

The impacts of the UI program on the consumer price index (CPI) and on interest rates are shown in Figures 23 and 24. As in the case of employment, a lag is expected between changes in UI program measures and prices and interest rates. The stimulus created by the UI measures increases or decreases real GDP. This changes capacity utilization rates, and, in turn, prices and interest rates. As may be seen from the figures, the UI program has acted to reduce prices and interest rates during booms and raise them during recessions.

UI contribution rates are a component of business costs. As a result, there is a close relationship between changes in the revenues side and prices and interest rates. This is seen in Figure 23.

Government Deficits

The UI program's impact on the federal government deficit can be seen in Figure 25, where the deficit is shown as a percentage of GDP. During the late 1970's, the revenues side of the program prevented the latter from lowering the deficit. Only in 1981, near the decline in the economy, did the program work as expected. Over the 1980's, the impact of the expenditures side dominated the program's impact on

Figure 23
UI Impact: Consumer Price Index (%)

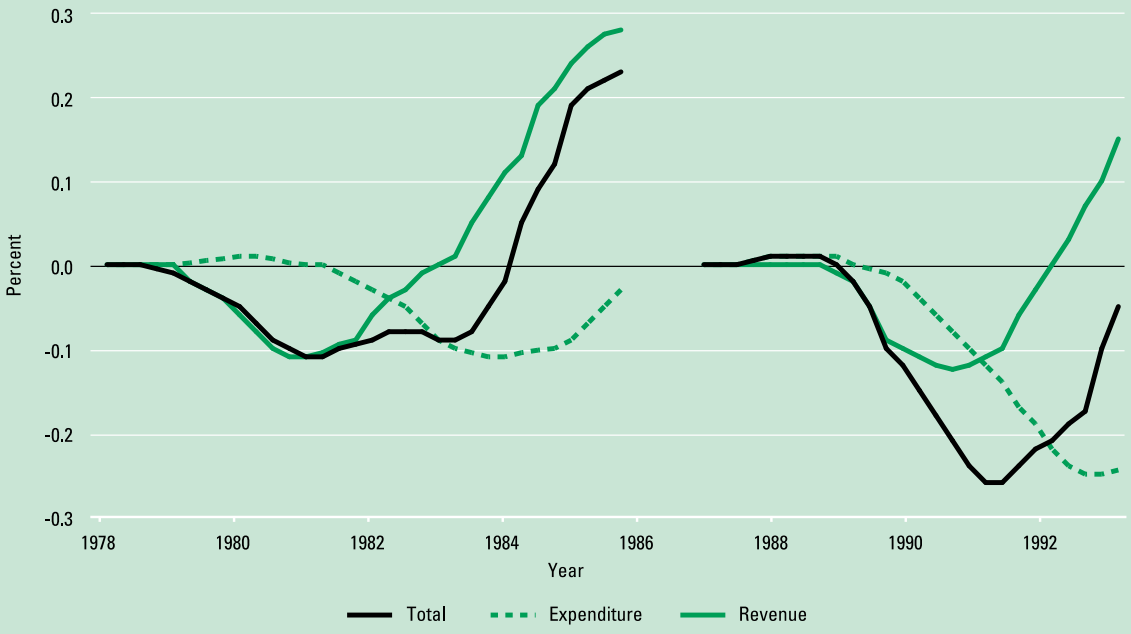
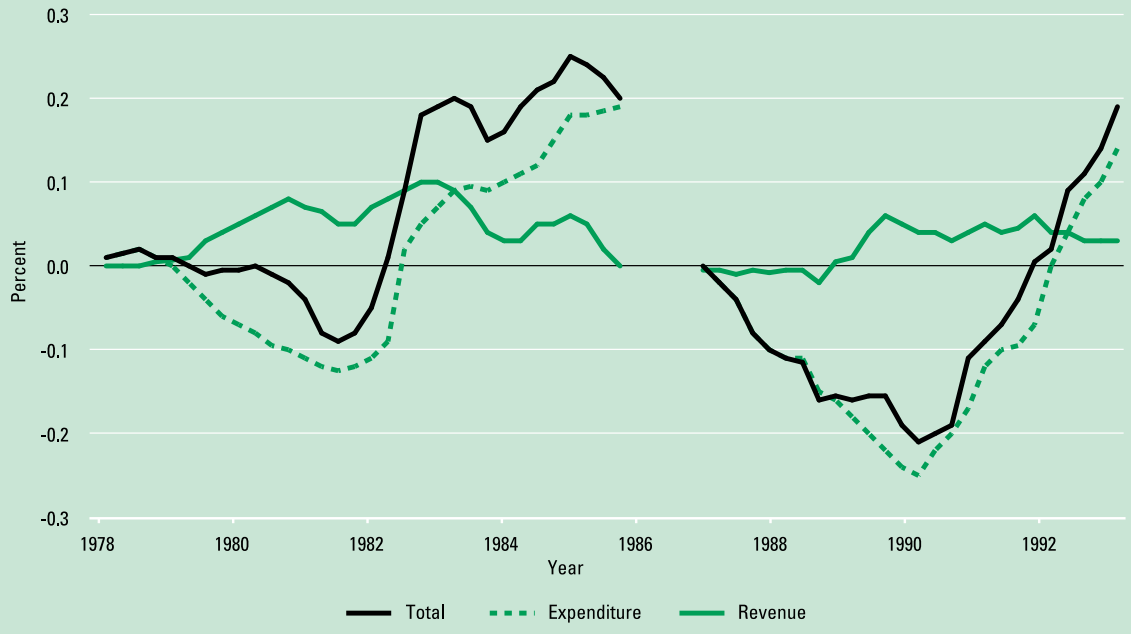


Figure 24
UI Impact: 3-month Treasury Bill Rate (Difference)



the federal deficit, with the reduction in contribution rates in 1989 having a procyclical effect. The program appears to have had little impact on the federal deficit during the recent recession. This is consistent with the government withdrawing from the program in 1990.

Corporate Profits

In Section 2, it was mentioned that corporate profits would be significantly affected by changes to contribution rates. This impact on profits was a result of the reluctance to lay off workers in the face of higher UI rates. Figure 26 shows the impact of the UI program on pre-tax corporate profits. While the expenditures side of the UI program does produce a countercyclical impact on before-tax profits, the revenues side dominates the total impact. The increase in rates in 1991 is a good example of this situation. The entire positive expenditures side impact is offset by the increase in contribution rates.

Figure 25
UI Impact: Federal Balance/GDP (Difference)

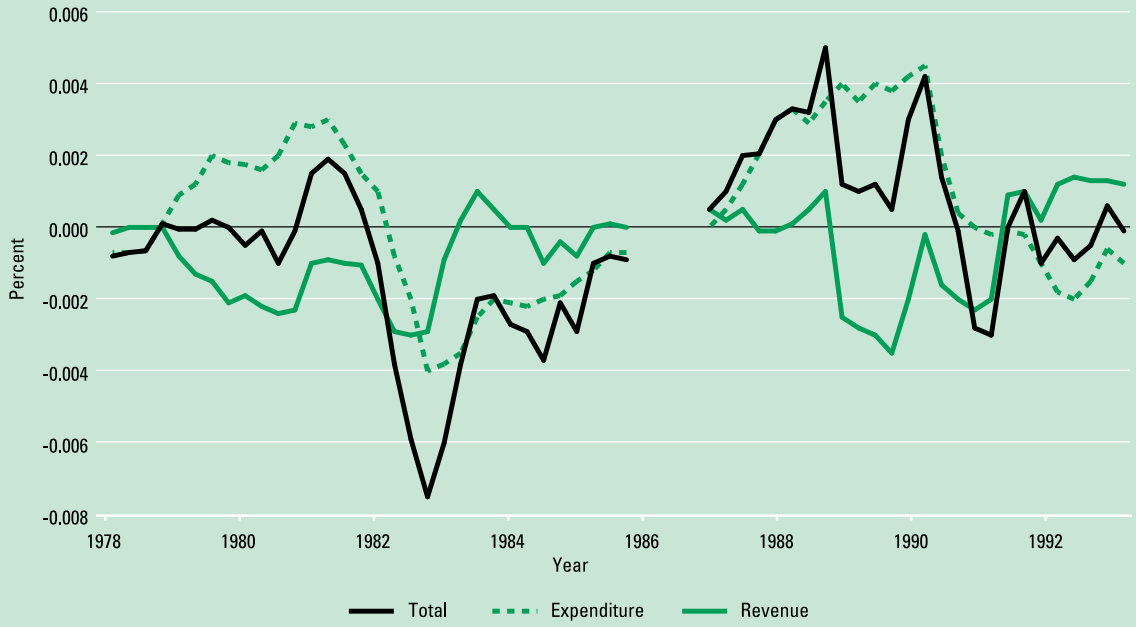
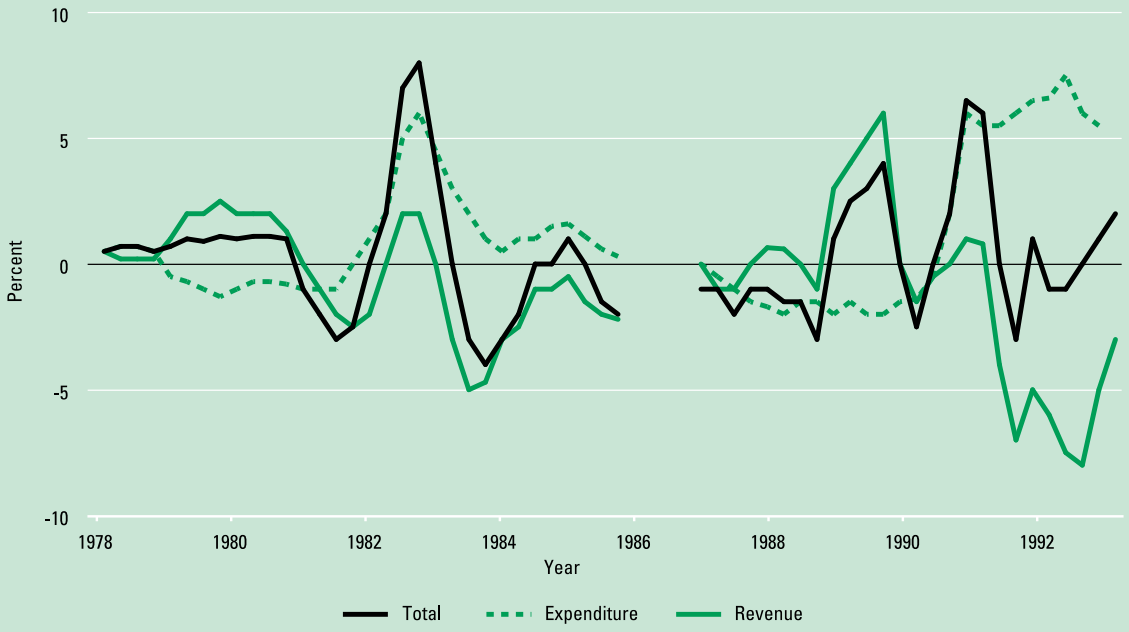
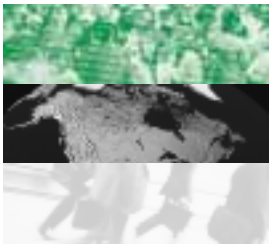


Figure 26
UI Impact: Pre-Tax Corporate Profits (%)





4. Conclusion

An examination of the behaviour of real UI expenditures per unemployed person reveals that they have had a procyclical pattern since the late 1970's.

The results of this study of the role of Canada's unemployment insurance program as an economic stabilizer suggest that the UI program has had a stabilizing impact, but that changes to the program over time have significantly altered that impact.

The changes to the UI program implemented in the late 1970's resulted in its having a small de-stabilizing impact on GDP during this period. However, the program did act as a stabilizer during the 1981-1982 and 1990-1991 recessions and during the boom of the second half of the 1980's. Real GDP was raised by about 0.5 per cent during the 1981-1982 recession, and by slightly less in the last recession. The program reduced real GDP by about 0.3 per cent during the boom period of the 1980's. The gaps represent the percentage difference between actual and potential (or trend) GDP. The average reductions in the GDP gaps in the 1980's were approximately 8, 11, and 4 per cent for the 1981-1985, 1987-1990, and 1991-1993 periods, respectively. In the 1978-1980 period, the UI program increased the GDP gap by almost 2 percentage points.

Concurrently with its stabilizing impact on GDP, the program increased employment during the last two recessions and reduced it during the boom of the 1980's. These countercyclical effects also contributed to a rise in participation rates, thereby reducing the stabilizing impact on the unemployment rate. The UI program's impact on other economic indicators was similar to that on employment and GDP. Because of lags between GDP and these indicators, however, the impacts on these variables occurred somewhat later.

The two main aspects of the UI program that affect its behaviour as an economic stabilizer are its revenues and expenditures sides. Since the mid-1970's, the expenditures side has consistently acted in a countercyclical fashion, despite changes that have modified eligibility requirements and weekly benefits. An examination of the behaviour of real UI expenditures per unemployed person reveals that they have had a procyclical pattern since the late 1970's. This behaviour has lowered UI benefits during the past two recessions and raised them sharply during the boom of the second half of the 1980's. The program changes have thus partially offset its stabilizing impact during this period.

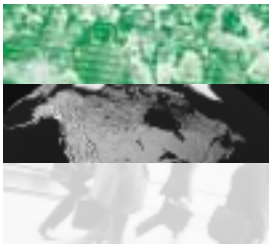
The revenues side of the UI program has been the main factor behind a sharp reduction in the program's stabilizing power. This has become particularly evident as the federal government has moved out of the financing side of the program. Because the UI account must balance over time, increases in contribution rates now follow close on the heels of increases in expenditures. This draws income out of the economy and offsets the stimulating impact of the expenditures side of the program.

During the recent recession, the increase in contribution rates has led to a relatively small increase in the UI deficit, compared with those observed in the past. The program has become essentially one of income redistribution; and the differential impacts of revenues and expenditures on business and households

have enabled the program to act as a stabilizer. Increased spending by households has more than offset the negative impacts of contribution rate increases on corporate profits.

These results imply, therefore, that in order to reinforce the stabilizing properties of the UI program, the focus should be on the revenues side. It is changes in contribution rates to finance the program that have reduced its stabilizing effects. Raising the rates more slowly during a recovery, or not dropping them so much during an expansion, would enhance the stabilizing power of the program. However, this would raise the program's costs to the federal government if the latter had to provide significant interim financing for the program's increased deficits.

In order to reinforce the stabilizing properties of the UI program, the focus should be on the revenues side.



Appendix A: The WEFA Canada Canadian Macro Model: An Overview

The WEFA Canada Canadian Macro (WCCM) Model describes a small open economy that produces and consumes domestic products, and consumes foreign products. Because of the great diversity of Canadian products, an element of both price-taking and price-making behaviour is assumed for domestic producers. Foreign products are assumed to be imperfect substitutes for domestic ones. While there is significant detail in the Model, its properties are essentially those of one-sector models discussed in macroeconomic theory. The description of the Model that follows is provided in the context of the latter theory.

The Model's economy is organized into four broad sectors. Firms employ capital and labour to produce a profit-maximizing output under a Cobb-Douglas constant-returns-to-scale technology,[3] and they supply financial instruments. Under the assumption of utility maximization, households consume domestic and foreign products, supply labour, and demand financial assets. Governments collect taxes, purchase domestic and foreign products, produce output, and supply financial instruments. Foreigners purchase domestic products, supply products of their own, and demand and supply financial instruments.

There are three main markets in the Model: the market for domestic and foreign products, the labour market, and financial markets. Each of these markets is concerned with the determination of demands, supplies, and prices. The markets and their operations are described below.

Product Market

Domestic and foreign products are put to a number of different uses in the Model. These goods can be consumed, used for investment in residential and non-residential forms, held as inventories, or purchased by governments and foreigners. The demand for products comes from these uses. The supply of products originates from production, imports, and inventory change. Market-clearing in the Model comes via both quantity and price adjustments. In the short run, however, quantity adjustment plays the more important role in this regard.

Demand

Consumer demand is derived from a modified version of the life-cycle Model. The modifications include allowances for short-run disequilibrium effects, resulting from imperfect information and liquidity constraints, and changes in consumer confidence. A distinction is made in the model between durable and other types of consumer expenditures. Expenditures on durable goods are considered in a stock-adjustment framework. Desired consumption of a particular consumption category depends on real wealth, normal (or permanent) labour and transfer income, real interest rates, and the category's relative price. Disequilibrium effects are included through the use of a transitory income variable and a mea-

3 This type of model is outlined in J.F. Helliwell and A. Chung, "Aggregate Output with Operating Rates and Inventories as Buffers Between Variable Final Demand and Quasi-Fixed Factors," preliminary draft, December 1984. Also see J.F. Helliwell, "Supply-Side Macroeconomics," presidential address, annual meeting of the Canadian Economics Association, Winnipeg, May 1986.

sure of inflation variability. The impact of consumer confidence is modelled via the unemployment rate as well as inflation variability.

Residential investment demand is derived from the stock/flow model of the housing market. The desired stock of housing depends on factors which determine the consumption of housing services, which are essentially the same as those discussed above for consumption. Demand and a fixed supply of existing housing interact to determine prices and rents. Housing starts are then determined from a supply function for starts that depends on housing prices and costs. New residential investment expenditures are derived from housing starts, while additions, alterations, conversions, and real estate commissions are assumed to be determined by variables similar to those affecting consumer expenditures.

Non-residential investment demand is based on firms' factor demands. The demand for capital and thus investment is derived from profit maximization. The long-run desired capital stock depends on expected output, the expected price of the product, and the expected user-cost of capital. The expected level of these variables is represented by a distributed lag of past levels. The movement of capital stock towards its desired level — investment — is assumed to follow a stock-adjustment process.

Government demand is essentially exogenous. For certain types of expenditures, it also depends on population growth.

Exports are largely demand-determined in the Model. With an increase in foreign demand, the relative price of foreign goods, or the profitability of exporting, comes and increase in exports. Foreign demand is represented by industrial production or other final demand measures for Canada's major trading partners. The currency exchange rate plays an important role in the performance of exports through its impact on profitability or the relative price of foreign and domestic goods in a common currency.

The demand for the domestic products is based on the above demands and on that for imports, which is a function of domestic economic activity and the relative cost of domestic and foreign products.

Supply

The WEFA Model has a fully integrated supply side. In other words, there is a consistent integration of output, factor demands, output prices, and factor prices. A production function is specified, and corresponding factor demands are implied under an assumption of profit-maximizing behaviour on the part of firms. These factor demands respond to output and factor prices. Factor supplies and the production function, together with demand, determine output.

A key assumption regarding the supply side of the Model is that factors of production are nearly fixed in nature due to adjustment costs (as a result of such things as career markets for labour) and the passage of time. Firms are assumed to maximize profits, subject to the production function. This production structure is expected to hold on average and not on a period-to-period basis.[3] In addition, the marginal conditions associated with profit maximization are expected to hold on average and not in each period.

With quasi-fixed factors of production, firms are assumed to design their production process so as to enable them to operate over a range of feasible operating rates. They will then choose factor demands and operating rates so as to maximize profits over the expected pattern of operating rates.

The values of output computed from the production function are defined as capacity or normal output in the Model. This represents the level of output that firms would produce if they were operating on their production function at a normal level of capacity utilization. The supply of the domestic products comes through the variation in capacity utilization by firms. This variation is determined by changes in demand relative to expected demand, profitability relative to normal profitability, and desired inventory stock relative to actual stock. This formulation is similar in many respects to the so-called Lucas supply function.

As mentioned above, the demand for employment and capital stock are derived from profit-maximizing behaviour on the part of firms, given the production technology. Employment and capital adjust to desired demand levels in a partial adjustment framework. The determinants of capital stock were described above. Desired employment is dependent on the expected level of output and the product wage.

Price adjustment in the product market is consistent with factor costs and recognizes that many of Canada's products have prices that are determined on world markets. In the long run, the price of domestic products is a weighted average of factor costs and foreign prices. In the short run, the price may deviate from the long-run price in response to deviations in demand pressures. The prices for the various components of demand in the Model depend on the proportion of foreign and domestic products comprising the respective components and on indirect taxes.

Inventory change is derived as a residual from flow supply and demand for domestic products, reflecting the buffering role that inventories play in the model. The desired level of inventory stocks depends on expected sales, which are extrapolated from past sales, and a desired stock-to-sales ratio, defined as the trend value of the actual stock-to-sales ratio.

Changes in demand in the Model are met by changes in inventories, output, and prices, with almost all of the adjustment coming through quantities rather than prices in the short run.

Labour Market

The determinants of the supply of labour in the Model include population, real wages, government policy, and other exogenous socio-economic factors. The demand for labour comes from firms producing domestic goods. As mentioned above, this demand is based on profit-maximization decisions.

The labour force, which is the measure of labour supply in the Model, is determined from source population and the participation rate. While population is an exogenous variable, the participation rate is derived from an equation relating this rate to the real after-tax wage rate, the employment/population ratio, and a time trend that reflects changing socio-economic factors.

Wages are determined as a disequilibrium process based on a reduced-form equation obtained from the supply-and-demand equations described above. They are modelled as a function of expected consumer prices, the level of per capita nominal output, and a time trend that represents long-term labour supply growth.

Unemployment is determined as a residual from labour force and employment. Male and female employment, labour force, and unemployment are considered in the model.

Financial Markets

There are essentially four types of financial assets in the Model: non-interest-bearing money, interest-bearing government bonds, equities, and net claims on foreigners. Some additional detail is included for government bonds where a distinction is made between short- and long-term instruments, and for money where the monetary base (M1 and M2) is considered. Some credit aggregates are also included in the model.

The interaction of the supply and demand for financial assets for various groups of economic agents in the model serves to determine the yields on these assets, including the price of foreign exchange.

The money market plays a very important role in the Model. It serves to determine the yield on short-term government bonds. The supply of money is assumed to be determined exogenously by the Bank of Canada. The demand for real money balances is assumed to be a function of real GDP and of the yield on short-term government bonds. Equilibrium between demand and supply in this market determines the market-clearing yield for short-term government bonds. The yield on long-term government bonds is determined through an international term-structure equation.

The market for government bonds plays two important roles in the Model. First, it determines the supply of those bonds. Secondly, it determines the exchange rate. The supply of bonds is determined from government financing requirements, which are based on the size of public deficits. Equilibrium is assumed in the market for government bonds and reflects the imposition of nominal interest parity. Under this assumption, the yield on short-term government bonds must be equal to that in the United States, adjusted for the expected depreciation in the Canada-U.S. exchange rate and a normal risk premium. Since the yield on government bonds is determined in the money market, the interest parity condition associated with the market for government bonds is imposed by making the exchange rate the residual in this condition.

The exchange rate is thus determined by the differential between Canadian and U.S. short-term interest rates, a risk premium, and the expected value of the exchange rate. The latter is measured by a purchasing-power-parity type equation. It uses relative unit labour costs in the manufacturing sector in Canada and the United States to derive an estimate of the purchasing-power-parity exchange rate.

The major function of the market regarding the net claims on foreigners is to determine net capital inflows. The demand for net foreign savings is determined by the balance of payments, which includes net exports of goods and services

and net investment income flows. Equilibrium between the demand and supply of net foreign savings is assumed, and thus net capital inflows are determined as a residual from the balance of payments identity. The net capital flows determine Canada's net international investment position. The latter, together with interest rates and the exchange rate, is used to compute the net investment income payments on this position.

Government Sector

This sector of the model attempts to incorporate the impact of governments on the economy. The major categories of revenues and expenditures are modelled for two levels of government and for pensions. The two levels of government are the federal government and the provincial-local-hospital sector.

The Model considers three major sources of government revenues: direct taxes, indirect taxes, and other revenues (mainly investment income). Direct taxes are further separated into those paid by persons, businesses, and non-residents.

Direct and indirect taxes are modelled using a synthetic tax base and an implicitly calculated tax rate for each type of tax. While some of these rates are exogenous, others are determined endogenously as part of a fiscal-policy reaction function that attempts to maintain on average a zero budget deficit. Other revenues are computed using an equation relating such revenues to economic variables.

Expenditures are divided into those for goods and services and capital formation, transfers to persons, transfers to non-residents, subsidies, capital assistance, and interest on the public debt.

Expenditures on goods and services and capital formation, together with transfers to non-residents, are determined in the model in real terms through an exogenous growth rate. Subsidies and capital assistance are computed using a synthetic base and an implicitly defined exogenous rate. Transfers to persons are determined in real per capita terms via an exogenous growth rate. Interest on the public debt is determined by using an equation that includes the stock of government bonds and the average yield on these bonds.