5 Unemployment, unemployment insurance and the distribution of income in Canada in the 1980s

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1   Introduction

This chapter examines changes in the distribution of income in Canada in the 1980s and focuses on (1) the accounting period used for analysis and (2) the consideration given to behavioural response for the perceived redistributional incidence of social transfers, especially unemployment insurance. We describe trends in the distribution of income in Canada, outline the reasons why unemployment has had a major impact on inequality and discuss why estimates of the impact of unemployment and unemployment insurance on the distribution of annual income may be misleading. We describe a microsimulation methodology for analysing redistributional impact over the course of a business cycle and present the results of such an analysis.

Section 2.1 argues that unemployment insurance played an important role in stabilising the level of income inequality in Canada in the 1980s despite increasing inequality in individual earnings. Section 2.2 outlines the methodology employed in this chapter to assess the distributional input of Canadian unemployment insurance. Section 3 describes our behavioural microsimulation model. Section 4 presents the main results and compares the distribution of income in a hypothetical steady state growth path and in the actual business cycle of the early 1980s. It compares the distribution of income with and without unemployment insurance and under alternative assumptions about the macroeconomic consequences of unemployment insurance. Section 5 presents conclusions.

2   Unemployment, unemployment insurance and the distribution of income

2.1   Unemployment, wages and the sources of change in inequality

The increase in concern of the 1990s with economic inequality has, in many countries, been a reflection of an actual increase in inequality in the 1980s.

As Levy and Murnane (1992) point out, when average real wages stagnate and there is a trend towards increased inequality in the distribution of earnings (as in the US since the early 1970s), low-income earners become absolutely worse off. As a result, there has been a surge of interest in the US in understanding the reasons for greater polarisation in the distribution of earnings.

As the chapters in this volume indicate, however, such trends are not unique to the US. As well as experiencing increases in inequality, many countries experienced historically high post-war unemployment during the 1980s. To what extent has the rising inequality of the 1980s reflected poor macroeconomic performance and misguided macroeconomic policy? Alternatively, does increasing inequality of earnings represent a structural, rather than a cyclical, change in labour markets?

We argue that much of the 1980s changes in Canadian earnings inequality can be explained by the macroeconomic business cycle and its labour market impact, but that these changes in earnings were offset by changes in unemployment insurance receipts, leaving the distribution of income less affected. Although much of the international debate on the polarisation of earnings in the 1980s has stressed the role played by structural change, Canada has been undergoing substantial structural change for at least the last 50 years. (See table 5.1 for trends in urbanisation and in labour force participation, especially for married women.)

However, over the last quarter century the Canadian labour market has been dominated by two major developments: the abrupt end of growth in average real wages in the mid 1970s, and a trend towards rising unemployment (averaging 9.5 per cent in the 1980s),[1] with increasingly severe cyclical fluctuations. Both represent a sharp switch from the earlier decades, when the Canadian economy produced low national unemployment and substantial increases in average real wages – a 35.9 per cent increase in average weekly wages in the 1950s and a 36.4 per cent increase in the 1960s in constant dollars (Rashid 1993).

Table 5.2 presents the quintile distribution of income among families and unattached individuals in the 1980s. During the period 1980–92, there is rather limited support for the 'polarisation' hypothesis, in that the income share of the middle quintile of Canadian families and unattached individuals fell from 17.8 per cent in 1980 to 16.7 per cent in 1992. However, cyclical factors may also have played a role. Most of the decline in the middle quintile's income share occurred during the recession of 1980–3 (a decline from 17.8 per cent to 17.1 per cent), followed by an essentially constant income share in the recovery years 1983–90, and a further decline with the renewed onset of recession in 1990/1. The share of the top 20 per cent rose from 42.1 per cent to 43.2 per cent during the 1980–3 recession, remained

Table 5.1 *Long-term trends in the income distribution and economic structure of Canada*

Family[a] income quintile	1951	1961	1971	1981	1986	1991
Per cent share of						
poorest 20 per cent 1	4.4	4.2	3.6	4.6	4.7	4.7
2	11.2	11.9	10.6	10.9	10.4	10.3
3	18.3	18.3	17.6	17.6	17.0	16.6
4	23.3	24.5	24.9	25.2	24.9	24.7
richest 20 per cent 5	42.8	41.1	43.3	41.7	43.0	43.8
Mean family[a] income, 1992 $	21,483	28,531	41,659	52,518	52,815	53,940
Mean unattached individual's income, 1992 $	8,289	11,391	17,462	23,058	22,498	22,857
Per cent urban labour force[b]	33.6	53.2	58.9	59.8	61.7	62.0
Per cent labour force in agriculture	15.7	9.9	5.8	4.3	3.9	3.5
Participation rate (aged 15–64)						
All men	84.4	81.1	77.3	78.4	76.6	74.8
All woman	24.1	29.5	39.4	51.7	55.1	58.2
Married women	11.2	22.0	37.0	50.5	56.1	61.4
Per cent of employment which is part-time	4.0	7.8	12.0	13.5	15.5	16.4
Per cent unemployment	2.4	7.2	6.3	7.5	9.5	10.3

Notes:

[a] Refers to economic families.

[b] 25 urban areas were defined as Census Metropolitan Areas in 1991. The total urban labour force is the sum of these Metropolitan labour forces in each census year.

Sources: Osberg, Lars and Phipps, Shelley (1992), 'A Social Charter for Canada' in McCullum, John (ed.), *A Social Charter for Canada? Perspectives on the Constitutional Entrenchment of Social Rights.* Toronto: C.D. Howe Institute, p. 5.
Statistics Canada (1992), *Historical Labour Force Statistics.* Cat. No. 71–201, annual.
Statistics Canada, *Income Distributions by Size*, 1990. Cat. No. 13–207, various issues.
Census of Canada, 1951, 1961, 1971, 1981, 1986, 1991.

Table 5.2 *Quintile shares of total income among all families and unattached individuals*

	Poorest 20 per cent				Richest 20 per cent	Total
1980	4.2	10.7	17.8	25.2	42.1	100.0
1981	4.6	10.9	17.6	25.2	41.7	100.0
1982	4.6	10.8	17.4	24.9	42.4	100.0
1983	4.3	10.3	17.1	25.0	43.2	100.0
1984	4.5	10.4	17.2	25.0	43.0	100.0
1985	4.6	10.4	17.0	24.9	43.0	100.0
1986	4.7	10.4	17.0	24.9	43.0	100.0
1987	4.7	10.4	16.9	24.8	43.2	100.0
1988	4.6	10.4	16.9	24.9	43.2	100.0
1989	4.8	10.5	16.9	24.6	43.2	100.0
1990	4.7	10.4	16.9	24.8	43.3	100.0
1991	4.7	10.3	16.6	24.7	43.8	100.0
1992	4.6	10.3	16.7	24.8	43.6	100.0

much the same in the 1983–90 recovery and rose again in the recession of 1991/2. The period as a whole saw essentially no change in the income share of the bottom 20 per cent after 1981.

The size distribution of family income is affected by the size and targeting of transfer payments, the distribution and rate of return of capital, and the demography of family composition and labour force participation. However, much of the recent debate on inequality has emphasised trends in the labour market. Table 5.3 therefore focuses on the labour forced and presents the quintile shares of individuals with positive incomes whose major source of income was wages and salaries. Overall, it is hard to find an aggregate trend in table 5.3. There are fluctuations from year to year, but for the period 1980–92 the middle quintile has much the same income share at the end (18.0 per cent) as at the beginning (17.9 per cent), and the same is true of the top quintile (42.7 per cent compared with 42.5 per cent). In relative terms, it is the bottom 20 per cent who advanced the most during these years.

Aggregate data on quintile income shares hide the trend towards greater inequality of earnings in Canada. Beach and Slotsve (1994) report that male workers with earnings beyond 75 per cent of the median rose from 26 per cent to 38 per cent between 1967 and 1984; and the decile mean ratio increased from 31 to 46.[2] (Polarisation of women's earnings was much less marked as the trend towards increased participation dominated change in

Table 5.3 *Quintile shares of income of individuals with income, whose major income source was wages and salaries*

	Poorest 20 per cent				Richest 20 per cent	Total
1980	2.8	10.6	17.9	26.0	42.7	100.0
1981	3.2	10.8	18.0	25.8	42.2	100.0
1982	3.1	10.8	18.0	25.8	42.3	100.0
1983	2.8	10.2	17.7	25.8	43.5	100.0
1984	2.9	10.5	17.8	25.9	42.9	100.0
1985	3.0	10.3	17.5	25.7	43.5	100.0
1986	3.1	10.5	17.7	25.8	42.8	100.0
1987	3.0	10.4	17.6	25.7	43.2	100.0
1988	3.1	10.3	17.4	25.8	43.4	100.0
1989	3.5	11.0	17.6	25.3	42.6	100.0
1990	3.5	10.9	17.7	25.1	42.9	100.0
1991	3.4	10.9	17.8	25.2	42.7	100.0
1992	3.2	10.9	18.0	25.4	42.5	100.0

Source: Statistics Canada, *Income Distributions by Size*, 1990, Cat. No. 13–207, p. 147.

rates of compensation.) However, if earnings losses are balanced by greater transfer payments, stability of the distribution of income is possible, as indicated in table 5.3.

In Canada, changes in the inequality of earnings during the 1980s were dominated by changes in the inequality of hours worked, not by changes in the inequality of hourly wages. Decomposing changes in the variance of the logarithm of annual earnings into changes in the variance of ln (annual hours) and ln (hourly wages), plus the co-variance of ln (hours) and ln (wages), MacPhail (1993) demonstrates that less than 10 per cent of the 1981–6 increase in the inequality of annual earnings of males can be ascribed directly to increased inequality in ln (hourly wages), while 50 per cent can be ascribed to increased inequality in ln (annual hours) and 41 per cent to the co-variance between ln (annual hours) and ln (hourly wages). The decline in earnings inequality between 1986 and 1989 appears to have been driven largely by the decline during that period in national unemployment rates, from 9.5 per cent to 7.5 per cent.

Morissette, Myles and Picot (1993) have in addition emphasised the role of increased dispersion in weekly hours of work in Canada – more people working very long hours and more people working part time. Unlike the US, Canada has not experienced an increase in the university/high school earnings differential. Although demand for highly educated labour surged

in Canada in the 1980s, so did the supply (a 26.6 per cent increase between 1986 and 1991), and the result is a nearly constant return to education (see also Bar-Or *et al.* 1995 and Osberg 1994). Indeed, unlike in the US, there has been no aggregate increase in hourly wage inequality – a tendency to increased age/wage differentials being offset by the changing age composition of the population and decreased dispersion in hourly wages within age cohorts. In Canada, the trend towards increased earnings inequality has been driven by quantity, not price, changes, i.e., by growing polarisation in hours worked per week and hours worked per year.

Increased polarisation in earnings in Canada during the past 25 years can be directly related to increased unemployment. There are relatively few data points available in time series data, but a regression of the change in earnings polarisation on the change in unemployment indicates a clear relationship between changes in earnings polarisation and changes in the unemployment rate, particularly for Canadian men (Phipps 1994). Beyond any long-run structural trends affecting inequality in the distribution of individual earnings, the macroeconomic business cycle plays a major role in the determination of earnings inequality in Canada.[3]

From a welfare perspective, the broader issue is the distribution of total income among households. Trends in household formation, divorce and demographic structure have been broadly similar in Canada and in other affluent capitalist nations, but Canada appears to be one of the few advanced countries that did not exhibit a marked increase in inequality of income among households during the early 1980s. Fritzell (1992) used the Luxembourg Income Study (LIS) to examine trends in inequality in total household income during the early 1980s. Apparently Canada was an anomaly in that there was essentially no change in the inequality of household income, while there was a strong trend towards greater inequality in Sweden, the UK and the US and a weak trend towards greater inequality in Germany. Since there was an observed trend in Canada during this period towards greater inequality in the distribution of annual earnings, and since earnings inequality in Canada is strongly affected by changes in unemployment, it seems natural to ask whether the greater relative importance of unemployment insurance payments in Canada helped to stabilise the level of inequality in the distribution of income.

2.2   *Unemployment insurance and the distribution of income*

Table 5.4 uses the year when Canadian unemployment reached its post-war maximum (13.3 per cent, in March 1983) to make the point that, although total Canadian spending on social security transfers is on the low side by international standards, unemployment insurance in Canada has accounted for a relatively high percentage of that spending and a relatively high percent-

Table 5.4 *Unemployment insurance and social security expenditures, 1983*

	Social security expenditures as per cent of GDP	Unemployment insurance expenditures	
		as per cent of social security	as per cent of GDP
Canada	16.5	21.3	3.51
Germany	24.3	11.7	2.84
Sweden	33.3	3.5	1.17
UK	20.5	10.6	2.17
US	13.8	10.7	1.48

Source: Luxembourg Income Study Institutional Data Base.

age of total output. Given the automatic targeting of unemployment insurance on many of those adversely affected by rising unemployment, it is at least plausible that unemployment insurance in Canada functions to maintain the stability of the aggregate income distribution, offsetting the rise in the inequality of individual earnings that recessionary downturns produce.

Between 1981 and 1989, approximately 90.1 per cent of the Canadian labour force was covered by the unemployment insurance programme.[4] The redistributional impact of unemployment insurance in Canada has been studied by Kapsalis (1978), Cloutier and Smith (1980) and LeBlanc (1988). All these studies examine the unemployment insurance benefits (net of taxes and premiums) received by each quintile of the distribution of original income in particular years and conclude that unemployment insurance expenditures are not particularly pro-poor, because unemployment insurance is received by many households whose original income was relatively high.

However, unemployment insurance is a social transfer whose receipt depends on the occurrence of an event of uncertain duration. Spells of unemployment, like spells of dependence on social assistance or worker's compensation, occur in continuous time. Measurement of the redistributional impact of welfare state programmes is commonly done in discrete annual intervals, but the calendar year is an arbitrary accounting period within which to assess income distributional impact. Spells of unemployment can easily run over the beginning or end of the accounting period, and the apparent income distributional impact of unemployment insurance can depend heavily on the timing of the onset of an unemployment spell.

Figure 5.1 presents a schematic diagram illustrating this point. In 1990, the poorest quintile of families and unattached individuals in Canada was composed of those earning less than approximately $16,000, while the second quintile earned between $17,000 and $29,000, the third quintile
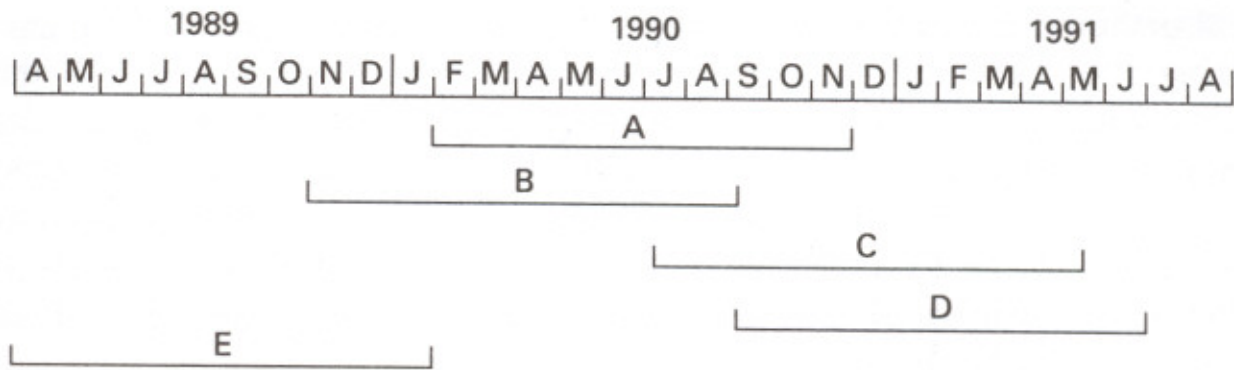
Figure 5.1 Unemployed spells

$30,000–$44,000, the fourth quintile $45,000–$64,000 and the fifth (richest) quintile more than $65,000 (Statistics Canada S.C. 13–207, p. 137).

To see how the choice of an annual time period for the measurement of income distribution can affect our understanding of the income-distributional effects of unemployment insurance, consider the following example. Suppose that five individuals had an identical monthly rate of pay of $6,000 but lost their jobs at different times. Assume they all have identical duration of unemployment of ten months before finding another job at the same rate of pay. Individual A in figure 5.I had an unemployment spell lasting from 1 February to 30 November, implying that labour market earnings from her two months of employment in 1990 were $12,000, placing her in the bottom quintile of the 1990 income distribution. Individual B started his spell of unemployment on 1 November 1989 and found a job starting 1 September 1990 – $24,000 of earnings put him in the second quintile of 1990 income. Individual C lost her job on 1 July 1990, but earning $6,000 per month for the first six months of 1990 would place her in the third quintile. Individual D started unemployment on 1 September, meaning that earnings for the first eight months of the year totalled $48,000, placing him in the fourth quintile, while individual E started unemployment the previous April, and her earnings for 11 months of 1990 placed her in the top quintile of the income distribution.

Since spells of unemployment occur in continuous time, an annual accounting framework means that observed spells of unemployment in income distribution data are often interrupted spells.[5] Since it is arithmetic that longer unemployment within a given year means shorter employment and lower earnings, a calendar year accounting framework means that the timing of the onset of unemployment can significantly affect the perceived redistributional incidence of transfer payments. In the example given above, unemployment insurance payments could be counted as going to any of the quintiles of the Canadian income distribution, depending entirely on the timing of the onset of unemployment.

Furthermore, we would stress that the issue is not solely one of measuring the distributional impact of unemployment insurance. For the population of working age, many of the transfer programmes of the modern welfare state are 'spell dependent'. Transitions on to and off social assistance, in and out of worker's compensation or between marital statuses occur in continuous time – the magnitude of the transfer payments which they trigger within a given year depends heavily on the timing of these transitions within the given year.

A second issue is the extent to which these transitions are influenced by the incentives embedded in social transfer programmes. There is a large literature on the impact unemployment insurance might or might not have on the length of unemployment spells (for surveys, see Atkinson and Micklewright 1991 or, for the Canadian context, Osberg 1993b).[6] Analysis of the redistributional impact of unemployment insurance which proceeds by simply subtracting insurance payments from total income implicitly assumes that the influence of unemployment insurance on individual behaviour is zero – surely an extreme assumption.

If the real world were characterised by steady state growth and a constant unemployment rate, presumably there would be a constant degree of error introduced into distributional measurement by ignoring the interrupted nature of unemployment spells and the influence which unemployment insurance payments might have on the length of those spells. In a steady state world, one could ignore this error in making comparisons over time and across countries, because the annual accounting framework and the omission of behavioural response would not imply year to year changes in the measurement of inequality. However, the real world exhibits substantial swings in aggregate unemployment over the business cycle, and there is evidence that unemployed persons change their job search behaviour as aggregate unemployment changes (Osberg 1993a). Hence, the existence of the macroeconomic business cycle means a varying degree of error is introduced into inequality measurement if an annual accounting framework is used and if behavioural response is ignored.

This study takes the view that the business cycle is a more appropriate time period over which to measure the redistributional impact of unemployment insurance.[7] In the Canadian case, the national unemployment rate was 7.5 per cent in 1981, rising to 11.8 per cent in 1983 and declining gradually to 7.5 per cent again by 1989. Hence, we measure the distributional impact of unemployment insurance over this eight-year period for the population aged 16–64 in 1981. Measuring the impact of unemployment insurance over the business cycle does not eliminate the problem of truncation of unemployment spells, but it does minimise the impact, because only spells in progress in January 1981 and continuing past

December 1989 are truncated, and the measurement error is small as a percentage of total 1981–9 income. As well, one of the major rationales for the existence of unemployment insurance is protection of individual incomes from the fluctuations of the business cycle, which suggests that the business cycle is an appropriate time frame.

3   Microsimulation methodology

This chapter uses microsimulation methodology to address jointly the issues of behavioural response and accounting framework. The rationale underlying microsimulation is the idea that if we are to understand how the economy would have functioned under different external circumstances or different internal incentives, we have to take full account of the heterogeneity of individual characteristics, the interdependence of economic processes and the endogeneity of individual characteristics over time. The origins of microsimulation lie in the work of Orcutt and his colleagues (e.g., 1986). The basic idea is to take microdata on a representative panel sample of individual households and simulate the impact of alternative policy or environmental scenarios on each individual member of the panel.

This chapter builds on the model developed in Erksoy (1992) which embeds a behavioural microsimulation model in a time-varying macroeconomic environment. Since the time path of aggregate labour force totals, such as total employment, can be specified *a priori*, the microeconomic behaviour of individuals can be constrained to mimic in aggregate the actual historical evolution of the economy, and historical data can be used to calibrate model performance.

Using microsimulation, it is possible to explore the distributional implications of alternative assumptions about the macroeconomic consequences of social transfers. At the microlevel, it may be the case that more generous unemployment insurance incentives increase the reservation wage of individual unemployed persons. If so, one would expect that the abolition of unemployment insurance would have a bigger effect on the reservation wage of those with a high benefit/wage replacement rate than on those with a low benefit/wage replacement rate. But what are the macroeconomic implications of such changes in microbehaviour?

Would changes in incentives (such as the abolition of unemployment insurance) cause changes in the relative incidence of unemployment or changes in the absolute level of unemployment? If individual A (who had a relatively high benefit/wage ratio) drastically cuts her reservation wage, would this simply mean that the job she now accepts can no longer be offered to individual B? If the number of available jobs is set from the demand side of labour markets, then changes in unemployment insurance

incentives can only affect the relative positions of individuals in the queue of the unemployed, not the aggregate rate of employment. We refer to this as the 'queue' scenario and distinguish it from the 'new classical' scenario in which unemployment comes entirely from the supply side of the labour market. If increases in the speed with which each individual finds a job have zero impact on the job finding chances of all other individuals, one can get the change in total unemployment by summing up the change in individual unemployment durations associated with a change in unemployment insurance incentives. We explore the distributional implications of unemployment insurance under both scenarios, using estimates of the impact of unemployment insurance on the aggregate unemployment rate available from the macro literature for the second (new classical) case.

Microsimulation enables us to model the likelihood that unemployment or labour force withdrawal will increase the future probability or duration of unemployment or the probability of future labour force withdrawal. This chapter uses the Labour Market Activity Survey of 1986/7 to estimate the structural determinants of labour force participation, unemployment incidence and unemployment duration.[8] However, since the public use sample of the 1986/7 LMAS does not link the behaviour of individuals within households, it is not possible to model accurately the interdependence of labour market behaviour within families. Because of this, and because an upward trend in the inequality of male earnings and male unemployment rates was especially marked during the early 1980s, the present chapter focuses on the impact of unemployment and unemployment insurance on the distribution of income of male Canadians aged 16–64 in 1981[9] who responded to the Asset and Debts Survey of 1983.

All nominal dollar amounts are deflated to 1981 dollars using the consumer price index. In the simulation scenarios involving the historical unemployment rate, the real weekly earnings of each individual are adjusted each year by the average change in real weekly earnings actually observed 1981–9. In the hypothetical scenario of steady state growth, real weekly earnings are adjusted by 0.56 per cent each year (the average rate of productivity growth 1977–81).

In the simulation model, as in real life, there is a positive probability that an individual will not participate in the labour force in any given year and a positive probability that an individual will not find any work even if a labour force participant for some or all of the year. Hence, although we start from a sample of men aged 16–64 with observed earnings (i.e., between $50 and $3,000 weekly), the model generates each year a fraction of the population with zero earnings. To reproduce 1981 aggregates, the model is 'run in' for the preceding two years (at assumed constant unemployment of 7.0 per cent) to generate 1981 estimates. Since individuals may move into or out of

the labour force, and earnings may be zero in one year (perhaps with receipt of unemployment insurance from a previous year's entitlement) but positive in subsequent years, distributional statistics in this chapter are calculated for the sample as a whole, i.e., all males aged 16–64 (excluding wage outliers).

The simulation model works by first assigning each individual a particular number of weeks outside the labour force, based on demographic characteristics, labour market history, the regional unemployment rate and the weeks required to qualify for unemployment insurance in that local area. Notice that weeks outside the labour force are effectively aggregated into a single 'spell'. Equation 1 summarises an accelerated failure time model of labour force participation corrected for interval censoring,[10] which is used to predict expected weeks of labour force withdrawal for each individual. A random error term drawn from a distribution with variance consistent with the observed unexplained variance (G_i) in equation 1 is added to the conditional expectation of weeks of withdrawal to preserve the underlying stochastic element in labour force participation.

$$WKSNLF_{it} = F_1(X_{it}, WKSUN_{i,t-1}, LM_t, UI_t) + e_{1i} \tag{1}$$
$$(P_{it}WKSNLF_{it} < 52) = F_2(X_{it}, WKSUN_{i,t-1}, LM_t) + e_{2i} \tag{2}$$
$$(WKSUN_{it}P_{it} = 1) = F_3(X_{it}, WKSUN_{i,t-1}, LM_t, UI_t) + e_{3i} \tag{3}$$
$$WKSEMP_{it} = 52 - WKSNLF_{it} - WKSUN_{it} \tag{4}$$

F_1, F_2, F_3 – estimated structural relationships (interval censored, Logit and Weibull)

e_{1i}, e_{2i}, e_{3i} – random error term from corresponding structural equation

    i = individual

    t, t-1 = period

X_{it} – personal characteristics

$WKSUN_{it}$ – weeks unemployed

$WKSNLF_{it}$ – weeks not in labour force

P_{it} – probability of unemployment

UI_t – parameters of *UI* system

LM_t – local labour market condition

$WKSEMP_{it}$ – weeks employed

Given participation in the paid labour force, a Logit model is used to predict the probability that an individual will experience unemployment in a given year, as summarised in equation 2. For those individuals who experience unemployment, an accelerated failure time model of annual unemployment experience is estimated,[11] correcting for the bias which would otherwise arise as a result of the right-censoring of unemployment.

Adding a stochastic term, as in equation 3, gives a predicted annual experience of unemployment, conditional on experiencing unemployment, for each individual in the sample. Weeks of employment are obtained as a residual, as in equation 4.

The microsimulation model is embedded within a changing macroeconomic environment by allowing the macroeconomic unemployment rate to change over time and calculating the associated aggregate weeks of unemployment. Individuals are ordered in descending order of the probability (P_{it}) of experiencing unemployment in a given year and the cumulative sum of unemployment weeks is calculated (by summing $WKSUN_{it}$ across individuals). Unemployment is assigned to those with the highest probability of experiencing unemployment, up to the point where the total number of unemployment weeks experienced equals the aggregate unemployment experience for the year. The maintenance of a stochastic element (l_{1i}, l_{2i}, l_{3i}) in each equation serves to ensure that the simulation model retains some of the dynamic change of real world labour markets, while the deterministic component of the structural equations and the inclusion of lagged labour market experience as a determinant of current labour market outcomes serves to introduce the period-to-period correlation of outcomes which is also characteristic of the real world.

4   Results

The debate on polarisation of incomes has often focused on the distribution of male earnings, usually measured before tax, so this chapter examines the impact of unemployment insurance on the distribution of pre-tax income among Canadian males, aged 16–64.[12] Tables 5.5 to 5.6 each use a different income concept, while the columns of each table compare the simulated distribution of income under alternative scenarios.

Table 5.5 looks at inequality in the distribution of the discounted value of total earnings (plus unemployment insurance payments where applicable) over the period 1981–9. Income flows are discounted to 1981 at 5.5 per cent per annum, the average real cost of home mortgage indebtedness faced by Canadians over this period (i.e., 5.5 per cent is a reasonable proxy for the trade-off between present and future consumption faced by many Canadians). Since a spell of unemployment in a particular year is, in table 5.5, averaged in with other years of full earnings, the distribution of the discounted value of the 1981–9 income is more equal than the distribution of income in any given year, and the impact of unemployment on inequality is also smaller. Table 5.6 presents measures of the inequality in annual income flows in the year of peak unemployment (1983).

It is desirable to disentangle the impact of unemployment insurance

Table 5.5 *The distribution of the present value of earnings (including unemployment insurance): Canadian males 16–64, 1981/9*

		A Base: unemployment constant	B Shock: historical unemployment	C Shock minus unemployment insurance (incidence)	D Queue model (historical unemp.)	E New classical (historic −3.5 per cent)
Per cent share						
bottom	30 per cent	0.110	0.110	0.102	0.110	0.114
	40 per cent	0.356	0.356	0.352	0.355	0.358
top	30 per cent	0.524	0.524	0.535	0.529	0.519
Average income (real 81)						
bottom	30 per cent	52,117	49,826	44,862	49,252	53,234
	40 per cent	127,340	121,723	116,886	125,291	126,399
top	30 per cent	250,629	239,823	238,178	250,676	245,810
Gini		0.344	0.347	0.360	0.353	0.345
CV		0.669	0.689	0.699	0.688	0.670
Mean earnings and *UI* 1981–9		141,794	135,616	131,699	140,117	140,295

from the impact of the rise of unemployment which triggered unemployment insurance payments. Columns A and B of each table contrast the distribution of individual male income (annual earnings plus unemployment insurance benefits) under the alternative hypothesis of steady state growth (column A) which implies a constant unemployment rate and the actual historical experience of the business cycle of the 1980s (column B).[13] Column C presents the distribution of earnings alone under underlying 'incidence' analysis which assumes that unemployment insurance has no effect on behaviour whatsoever, i.e., it simply omits unemployment insurance benefits from the historical shock scenario of column B.

Columns D and E both presume that the microbehaviour of individuals is affected by the incentives of unemployment insurance. The distribution of income is calculated, in both cases, on the presumption that the influence of unemployment insurance on individual behaviour is captured by the unemployment insurance variables contained in equations 1, 2 and 3. To model the hypothetical abolition of unemployment insurance, unemployment insurance variables are simply set to zero in the calculation of individual probabilities of labour force withdrawal, unemployment experience and unemployment duration.[14]

Columns D and E differ, however, in their assumptions as to the implications of changed individual behaviour for aggregate unemployment. Column D (the queue model) presumes that the total amount of unemployment is set from the demand side of the economy, hence the elimination of unemployment insurance causes a change in the relative incidence of unemployment but no change in aggregate unemployment.

The impact of unemployment insurance on aggregate unemployment remains a hotly contested empirical issue in Canada (Myatt 1993). Column D is consistent with those macroeconomic studies which find no statistically significant impact of unemployment insurance variables on aggregate unemployment; its interest lies in its indication that changes in the relative incidence of unemployment do have distributional implications, even though the aggregate rate of unemployment is constrained to be identical in columns B and D.

Since the thought experiment of columns D and E is the abolition of unemployment insurance, unemployment insurance would not be part of anyone's income. Hence, both D and E report the distribution of earnings for the population of all Canadian males aged 16–64. However, column E reports the distribution of earnings under the assumption that the abolition of unemployment insurance coincides with a drastic decline in aggregate unemployment. The outside estimate cited by Myatt (1993) is that unemployment insurance could be responsible for as much as 3.5 percentage points of unemployment. Hence, the thought experiment of column E

is that aggregate unemployment declines in 1982 and subsequent years by 3.5 percentage points from its historical levels. Column E therefore mingles two issues: the elimination of a substantial transfer programme and a simultaneous drastic decline in aggregate unemployment. Those who dislike the supply-side interpretation of economic events which links these two phenomena causally are invited to consider the possibility of Keynesian demand stimulation partially financed by the abolition of social programmes.

Our hypothesis is that the size of the Canadian unemployment insurance system and the automatic targeting of its payments to those adversely affected by unemployment constitute an important source of stability in the Canadian income distribution. This hypothesis receives strong support in table 5.5. Column A reports summary measures of aggregate inequality in the distribution of the present value of income (earnings plus unemployment insurance payments) under the alternative scenarios of steady growth (column A) and the actual historical pattern of unemployment (column B). As can be seen, the high unemployment of the 1981–9 period produces declines in average incomes, but the degree of inequality in the distribution of income is essentially constant.[15] Column C reports the distribution of the present value of earnings alone under the shock scenario of historical unemployment rates (but under the maintained hypothesis that individual behaviour continues to be as it was when influenced by the incentives of unemployment insurance), and it can be noted that the removal of unemployment insurance (with unchanged behaviour) produces a significant increase in the level of inequality.

Column D (the queue model) reports the distribution of earnings under the hypothesis that 1) individuals would change their labour market behaviour as equations 1, 2 and 3 predict if unemployment insurance did not exist and 2) aggregate unemployment remains unchanged.[16] Note that setting the unemployment insurance variables to zero will have both direct and indirect effects on simulated labour market behaviour. First, there will be the direct effects on weeks of participation and duration of unemployment (e.g,. reducing the maximum duration of unemployment insurance benefits will reduce the duration of unemployment in the first and each subsequent year). A shorter duration of unemployment in the first year will, in itself, reduce the probability of being unemployed and the duration of unemployment in the second year. This effect will cumulate throughout the simulation period – effectively a reversal of the 'scarring' effects of unemployment.

The main message of column D is that behavioural changes can affect the distribution of income, even if all they do is change the relative impact of unemployment experience. The distribution of earnings reported in column D is not as equal as the distribution of income with unemployment insur-

ance payments (column B), but it is more equal than the distribution of earnings presented in column C. The implication is that the elimination of the unemployment insurance system in Canada would produce behavioural responses resulting in greater relative declines in the unemployment of lower-income groups than of higher-income groups, serving to partially offset the increase in inequality which would otherwise be produced by their loss of transfer payments.[17]

The results presented in column E can be read as indicating the importance of the aggregate unemployment rate for inequality in the distribution of human wealth. In columns D and E, the relative probability of individuals' not being in the labour force, their relative probability of experiencing unemployment and their duration of unemployment are the same. In both cases, behaviour is influenced by the incentives of unemployment insurance, the only difference being the aggregate level of unemployment. Lower unemployment levels have their biggest impact on lower-income groups. Column E represents an income distribution which is unambiguously more equal than column D, but it is interesting that the summary measures of income inequality (the Gini, Theil and coefficient of variation) indicate a level of inequality which is approximately similar to the base case of steady growth with unemployment insurance.

However, as a comparison of table 5.6 with table 5.5 indicates, the inequality of income in a given year (1983) is considerably greater than the inequality in the distribution of the present value of income 1981–9. As well, if one compares columns B and C, which measure inequality in the distribution of individual male incomes with and without unemployment insurance payments under the historical scenario of cyclical unemployment, one can note that the change in inequality measures is greater in table 5.6 (which measures inequality in annual income) than in table 5.5 (which looks at the present value of income 1981–9). The conclusion we draw is that measures of the distributional incidence of unemployment insurance in a single year will show a greater inequality reducing impact than is apparent over the course of the business cycle as a whole.

Comparing the columns of table 5.6, one observes that in any given year unemployment insurance only partly counterbalances the increase in inequality produced by the economic recession of the early 1980s and the subsequent slow recovery. But simply subtracting unemployment insurance payments from total income produces an income distribution which is considerably more unequal than that associated with steady growth. However, a defect of models of the annual incidence of programmes without behavioural response (such as reported in column C) is that they involve a thought experiment in which one takes away the income associated with the social programme but leaves in place the behaviour which was

Table 5.6 *The distribution of annual earnings (including unemployment insurance): all Canadian men aged 16–64, 1983*

	A Base: unemployment constant	B Shock: historical unemployment	C Shock minus unemployment insurance (incidence)	D Queue model (historical unemployment)	E New classical (historic −3.5 per cent)
Per cent share					
bottom 30 per cent	0.070	0.062	0.045	0.057	0.064
40 per cent	0.370	0.368	0.366	0.367	0.372
top 30 per cent	0.551	0.559	0.577	0.568	0.557
Average income (real 81)					
bottom 30 per cent	4,354	3,787	2,627	3,467	3,974
40 per cent	17,606	16,865	16,154	16,733	17,507
top 30 per cent	35,158	34,367	34,194	34,676	35,117
Gini	0.398	0.410	0.437	0.420	0.410
CV	0.757	0.774	0.823	0.799	0.771
Mean ($)	18,900	18,194	17,512	18,143	18,733

partially motivated by that income. Column D reports the results of a thought experiment in which both unemployment insurance payments and the behaviour which is induced by unemployment insurance are simultaneously removed. It appears that behavioural change does matter, even if its only impact is to change the relative incidence of unemployment experience rather than the aggregate rate of unemployment.

Of course, the thought experiment conducted is an extreme one – politically, economically and statistically. Politically, it is not really feasible simply to abolish unemployment insurance in Canada without a replacement programme. As argued earlier in the text, unemployment insurance is an extremely important Canadian transfer programme. From an economist's perspective, it is also not really valid to assume that the structure of behavioural responses would be unaffected by a non-marginal change in the institutional environment. Finally, from a statistical perspective, it is of course inappropriate to forecast 'out of sample', and there is no historical evidence to judge the impact of, for example, a change in the benefit/wage ratio from 0.66 to 0. Thus, it would be more reasonable to simulate the distributional implications of marginal changes in unemployment insurance programme parameters. We conduct the more extreme thought experiment of abolishing unemployment insurance only for the purpose of comparing with traditional incidence studies.

5   Conclusions

Discussions of trends in earnings inequality should not simply exclude those individuals who have had their earnings reduced to zero because they have withdrawn from the labour force or experienced an entire year's unemployment. Hence, this study calculates income distributional statistics for the population of all Canadian men aged 16–64. We think it is a desirable feature of our model that some people receive zero earnings in some years and that this proportion varies with the rate of unemployment and increases with age.

The issue is empirically important because it affects the number of men whom we estimate to have zero earnings, which has, in turn, a major impact on measures of inequality. Although men with zero earnings have disappeared entirely from the empirical analysis underlying the debate on the polarisation of earnings (see, for example, Levy and Murnane 1992), their numbers are significant. Older men withdrew from the paid labour force in substantial numbers in the late 1970s and early 1980s. Osberg (1993c) uses the 1986/7 LMAS to argue that constraints on available work are empirically significant for older workers and that a significant fraction of 'retirement' decisions are influenced by the belief that there are 'no jobs available'.

In discussions of the impact of unemployment and unemployment insurance, those with zero earnings should not just be dropped from consideration. Particularly in the modelling of labour force participation, there are important unresolved issues as to how best to model something as drastic as the abolition of unemployment insurance.[18] We would reiterate that this chapter is only considering the thought experiment of unemployment insurance abolition to make a clear comparison with the types of decomposition of income inequality or the standard incidence analysis of transfer programmes, both of which implicitly assume zero behavioural response.

Nevertheless, at this stage in our research programme we conclude the following.

1 In the 1980s, Canada achieved some stability in the distribution of income, despite rising inequality of earnings, because the source of greater earnings inequality was greater inequality of hours worked, and the impact of unemployment on earnings was mitigated by unemployment insurance transfers.

2 An annual accounting period will not reliably capture the distributional incidence of a social programme whose payments depend on the onset and duration of a spell which occurs in continuous time.

3 Even if unemployment insurance incentives affect only the relative incidence of unemployment experience, the incentives of unemployment insurance can affect the inequality of the income distribution. Incidence models which assume that behavioural response to the unemployment insurance system is zero may overstate the inequality reducing impact of social transfers such as unemployment insurance.

Notes

1 In the 1950s, unemployment averaged 4.2 per cent, in the 1960s 5.0 per cent and in the 1970s 6.7 per cent.

2 These results for men in Canada are qualitatively similar to those for the US but quantitatively much less dramatic (Beach and Slotsve 1994).

3 Osberg and Phipps (1993) ask the question 'How would inequality in labour market earnings be affected by the removal of underemployment constraints, holding wage rates constant?' Using Atkinson indices ($r = -0.5$), earnings inequality for men falls from 0.355 to 0.248 if underemployment constraints are relaxed. For women, earnings inequality falls from 0.517 to 0.353.

4 In the 1980s, unemployment insurance replaced 60 per cent of insurable earnings for up to 50 weeks, and maximum insurable earnings are set each year at

the average weekly earnings of the previous year. Phipps (1990) discusses the changes implemented in 1990. More recently, a change was made to finance unemployment insurance entirely from premiums. Also, it might be noted that unemployment insurance benefits are taxable income in Canada and that high-income recipients must repay a sizeable portion of any benefits received.

5 The interruption of unemployment spells has been well examined in the litera-ture on measuring the duration of unemployment. For Canadian examples, see Ham and Rea (1987) or Corak (1992).

6 Both surveys emphasise the ambiguity of the effects of unemployment insur-ance on unemployment duration and the complexity of the unemployment insurance incentive structure. For this reason, in the present study we are careful to model many of the institutional characteristics of the Canadian unemploy-ment insurance system.

7 Ruggles and Williams (1989) find much more short-run variation in the experi-ence of poverty within a year than is indicated by annual incomes. Their research explores the implications of choosing a time interval which is less than a year while ours extends the time horizon beyond the year.

8 For details, see our Dalhousie University Working Paper (No. 93–07).

9 We consider the experience of women in other work (Erksoy, Osberg and Phipps 1993).

10 That is, within a year no one can be outside the labour market for more than 52 or less than zero weeks. We use the SAS LIFEREG procedure.

11 Again, all weeks of unemployment are aggregated into a single 'spell' which we call 'annual unemployment experience'.

12 In Canada, people older than 65 are ineligible for unemployment insurance. We consider the experience of women in other work (Erksoy, Osberg and Phipps 1993).

13 The aggregate unemployment rate in 1981 was 7.5 per cent, increasing sharply to 11.8 per cent in 1983 before declining gradually to 7.5 per cent in 1989. We stick with the period 1981–9 as indicating the swing of the business cycle as a whole, but our simulation uses the historical unemployment rates experienced by males, aged 15 and over, between 1981 and 1989, i.e., 7.0 per cent, 11 per cent, 12 per cent, 11.2 per cent, 10.3 per cent, 9.3 per cent, 8.5 per cent, 7.4 per cent and 7.3 per cent.

14 Although this is not very 'realistic', it is implicitly the scenario assumed in inci-dence studies which subtract the payments of unemployment insurance from individuals' incomes in order to assess distributional consequences.

15 The percentage income shares reported in columns A and B of table 5.5 are not in fact exactly identical, but they do round to the same numbers.

16 At this stage there are no wage effects built into the model. The elimination of unemployment insurance in this simulation is assumed to affect the relative ordering of individuals in terms of the probability and duration of unemploy-ment. Any weeks of employment assigned to an individual are assumed to be paid at that individual's wage rate. No process of 'underbidding' another worker by offering to take a job at a lower wage is, as yet, modelled.

17 This finding should be qualified as preliminary; it may diminish or even disappear when we take account of demand-side limitations on the ability of the unemployed to obtain weeks of employment and when we calibrate the model to regional rather than national unemployment rates.

18 Should we, for example, model the abolition of unemployment insurance by setting the influence of unemployment insurance variables to zero (as done in this chapter) or by setting unemployment insurance parameters such as the minimum weeks to qualify in equation 2.1 to impossibly high levels?

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