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HOW TO VALUE THE POORER PROSPECTS OF YOUTH IN THE EARLY 1990s?

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Young workers in the 1990s can expect greater economic insecurity, as well as lower average earnings, compared to older workers, or compared to the youth of previous decades. The cost of greater insecurity depends upon an individual's probability of unemployment, marginal utility of income gains/losses and the extent to which individuals can smooth consumption over time by borrowing and drawing down assets. Since unemployment insurance cutbacks and higher unemployment have increased the risk exposure of youth, changes in the expected value of their income may understate utility losses as measured by the change in certainty equivalent income.

This paper uses a behavioural microsimulation model to compare the impacts of 1971 and 1994 unemployment insurance legislation and unemployment rates in Canada. It calculates both the expected value of income changes and, using a Stone-Geary utility function, the change in inequality of well-being (as measured by certainty equivalent income) for youth and for prime age workers. Both calculations reveal that youth were disproportionately affected by Canada's changing labour market environment. Very few youth have enough assets to finance consumption during spells of unemployment.

The widespread increase in inequality of income distribution in the 1980s has prompted an international explosion of research on the distribution of income. In Canada, there has been a particular concern with the declining relative average income of young workers. However, interest in the distribution of income is usually motivated by an underlying concern with the distribution of economic well-being, and it has long been recognized that income flows are an imperfect indicator of economic well-being. In addition to declining relative average incomes, one of the most important ways in which the economic well-being of today's youth differs from that of older cohorts is that the cohort born between 1960 and 1975 face greater economic *insecurity*.

If greater economic insecurity is defined as increased dispersion in the distribution of prior probabilities of future income, it is clear that rising economic insecurity in the 1990s comes partly from trends in the labour market and partly from changes in social policy and labour market institutions. In the Canadian case, the increased insecurity associated with higher unemployment and with changes in unemployment insurance are particularly important, and this paper focusses on the consequences of these changes for the distribution of well-being in Canada. However, the general issue of greater insecurity is important in many contexts.

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In Canada, the "baby boom" cohort entered the labour market in the 1960s and 1970s when unemployment averaged 5.0 percent (1960s) and 6.7 (1970s). New graduates faced the problem of which job to choose, but it was largely taken for granted that a "job" was a full-time, full-year, continuing employment relationship, often protected by a collective agreement or some contractual guarantee of "permanent" status. The welfare state was expanding, and the introduction of medicare, public pension plans and a more generous unemployment insurance system progressively removed much of the economic risk associated with illness, old age and unemployment.

Since the young workers of the 1960s are the senior employees of the 1990s, this cohort initially enjoyed the implicit security offered by the ready availability of alternative employment in a strong labour market, and most now enjoy the explicit security of seniority protections against layoffs in a slack labour market. The 1960s cohort who entered primary sector employment and acquired pension entitlements can generally look forward to a secure old age, following a working life of secure employment.[1]

By contrast, labour market entrants in Canada in the 1980s faced an average 9.5 percent unemployment rate, while unemployment in the 1990–96 period has averaged 10.1 percent, and is projected to decline only slowly by the end of the decade. (See Informetrica, 1994 and Appendix A). High unemployment has depressed the wages of entry level workers, and the differential between the average wages of younger and older workers widened over the 1980s and 1990s (see Morissette, Myles and Picot, 1993). Jobs of any description are harder to find and the nature of the employment relationship has changed substantially. As the Economic Council of Canada (1991:81) noted, 44 percent of all employment growth in Canada in the 1980s was in non-standard employment forms—part-time, short-term and temporary employment contracts, temporary help agency employment and "own account" self-employment. From 1990 to early 1997, *all* the net growth of Canadian employment has been "self-employment." The common characteristic of these employment forms is their contingent and insecure status, as individual workers are hired and released in response to short-term demand fluctuations facing firms. (See also Abraham, 1990.) As Morrissette, Myles and Picot (1993) have pointed out, rising inequality in earnings is due, in part, to a widening of the dispersion of hourly wage rates, and in part to an increased inequality in hours worked per year.

Young workers, in the 1990s, face increased uncertainty in the availability and continuity of employment hours, and those employment hours carry with them fewer pledges of protection against future income loss. As self-employment and subcontracting relationships have occupied an increasing fraction of employment hours, the coverage of unemployment insurance protection has also shrunk.[2]

[1]Although seniority has shielded most older workers from lay-off, an important minority have experienced plant closings and corporate down-sizing. The severance packages that accompany such losses can have a razor's edge quality where (for example) a 51 year-old with 30 years service qualifies for a lifetime pension while a 49 year-old with 28 years qualifies only for prolonged unemployment.

[2]The percentage of all jobs covered by UI fell from 80.7 percent in 1986 to 78.7 percent in 1990, due to expansion of self-employment and jobs with 15 hours per week or less. In the 1990s, a series of reforms have tightened eligibility requirements considerably—by April 1997 only 38 percent of the unemployed received benefits.

Moreover, neither "self-employment" nor temporary or short-term employment relationships typically provide supplemental medical insurance coverage or employer sponsored pension plans. The erosion of the percentage of the labour force unionized during the 1980s has also increased the potential exposure of workers to arbitrary dismissal or unilateral change in terms of employment. Over and above the increased insecurity of private labour market outcomes, public policy in Canada has, over the last decade, systematically decreased the generosity of unemployment insurance.

In short, a number of trends have combined to decrease the expected income and increase the relative insecurity, *on average*, of the youth cohort. At the same time, intra-cohort inequalities are also significant. Some older workers are being displaced from steady jobs into long duration unemployment and/or intermittent employment. Some younger workers continue to be hired directly into secure jobs. How should one assess the impact of changes in both the expected value of income and the uncertainty of income (i.e. insecurity) on the distribution of economic well-being? How should one assess the relative well-being of different generations when there is an increase in inequality of incomes and in economic insecurity, both between *and* within cohorts?

Assessment of the impact of these issues is tricky, since changes in economic outcomes stem from both labour market trends and public policy responses and involve both assessment of the cost of risk/uncertainty in income at each point in time and the evaluation of a stream of realized income flows over time. Individuals can also be expected to change their behaviour in response to labour market trends and public policy changes. [For example, increased uncertainty may, in the long run, prompt households to save more in order to use personal savings (if available) to smooth consumption patterns over time.] As the vast literature on unemployment insurance attests, changes in social insurance which change the risk exposure of individuals can also change individual labour market behaviours and realized outcomes.

This paper uses a behavioural microsimulation model to assess the relative impacts on different birth cohorts of Canadians of the labour market and policy environment of the early 1990s, compared to the 1970s.[3] Section 2.1 outlines our approach to assessment of the joint impact of changes in *both* expected incomes and the riskiness of income flows. Although there are a large number of trends which have affected relative incomes and economic security, we concentrate our attention in this paper on two sets of changes to income flows—those stemming from the decreased coverage of the unemployment insurance system and those arising from higher aggregate unemployment.

Section 2.2 introduces the microsimulation model which models individual behavioural response to changes in aggregate labour market conditions and unemployment insurance parameters. In general, cuts in unemployment insurance which produce diminished protection from the risks of income loss can be expected to have a relatively greater impact on those cohorts more exposed to unemployment,

[3]In 1996, a package of reform measures was adopted (including a change of name to "Employment Insurance"). Overall, the expected cut UI in benefits when fully implemented was 11 percent. This paper models the system in place in 1994, since its structure is similar to that of the 1971 UI scheme.

but UI has a number of dimensions (the benefit/wage replacement ratio, duration of benefits, etc.). It is an empirical question whether the impact of specific historic changes to unemployment insurance legislation had a greater impact on younger workers or older workers, given the higher incidence, but shorter average duration, of unemployment which is characteristic of young workers.

This paper first looks at the impact of public policy, within a given historical macro-economic environment (the business cycle of 1981 to 1989). Section 3.1 examines UI changes and their differential impacts on younger and older workers. It compares the impact on inequality of economic well-being, within and between younger and older workers, of the 1971 to 1994 revisions to Canadian Unemployment Insurance Legislation, evaluated over a business cycle.

Section 3.2 then examines the joint impact of less generous unemployment insurance *and* higher unemployment on different cohorts of workers. It compares the relative economic well-being of youth who enter a labour market with 1971 unemployment insurance legislation and 1970s unemployment rates, with the well-being of youth entering the 1990s labour market, subject to 1994 unemployment insurance legislation. Section 3.3 provides a brief note on assets and their potential role in smoothing consumption. Section 4 is a conclusion.

2.1. *Theoretical Framework*

The increased insecurity of the present cohort of young workers is due partly to an increase in market risk, because of higher unemployment and fewer guarantees of employment continuity, and partly to decreased protection against income loss through unemployment insurance. It is convenient to consider first the role played by unemployment insurance, at a given phase of the business cycle. To fix ideas, Figure 1 outlines the position of a risk averse individual (decreasing marginal utility of income) who faces some risk of income loss. It contrasts the situation of the individual in two unemployment insurance regimes—Regime A (high benefit/high premium) and Regime B (low benefit/low premium), which are presented by aa' and bb' respectively. If the individual remains fully employed, a net income of Y'_b is received, when the low benefit unemployment insurance scheme is in operation. However, since greater generosity of unemployment insurance benefits requires higher unemployment insurance premiums, Y'_a is the individual's income in the absence of unemployment when the more generous UI scheme is in operation. If the individual experiences unemployment, total income from labour earnings and unemployment insurance benefits is Y_a if the more generous UI scheme is in operation, and Y_b under the less generous UI regime.

The expected income of each individual is determined by their relative probability and duration of unemployment. In Figure 1, Y_α is the expected income under regime A, where point α is defined by $[\alpha a'/aa' = \text{probability of unemployment}]$. Similarly, Y_β is the expected value of income in the less generous UI regime, and $\beta b'/bb' = \text{probability of unemployment under regime B}$. Usually, $\beta b'/bb' \neq \alpha a'/aa'$. The duration of unemployment (which, together with the level of UI benefits, determines Y_a and Y_b) is also unlikely to be the same in different UI regimes. Although it is these changes in the probability and duration of unemployment that are the focus of much of the literature on UI, one can argue that the focus *should* be the impact of UI on economic well being $(U_A - U_B)$.

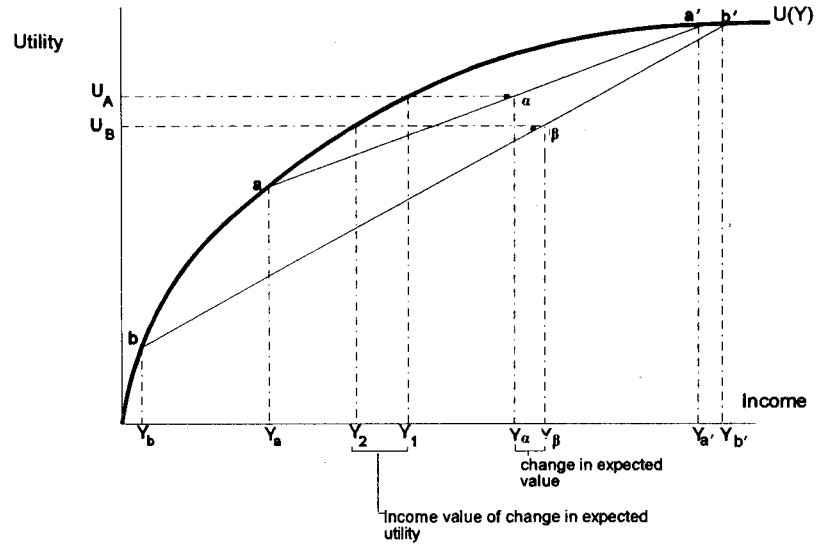

Figure 1

There is no reason to believe that the probability or duration of unemployment is the same under different unemployment insurance regimes—indeed the extensive literature on UI is mostly about the possible impacts of the implicit incentives of unemployment insurance on the probability and duration of unemployment (e.g. see Atkinson and Micklewright, 1991). The simulation model which we discuss in Section 2.2 is built up from a series of estimated behavioural equations which embody the response of individuals to changes in the specific parameters of unemployment insurance in Canada—hence changes in UI regimes affect the probability and duration of unemployment.

Given these behavioural responses of individuals to changes in unemployment insurance, the relative probability of unemployment corresponding to each unemployment insurance scheme implies that the expected value of income under the less generous unemployment insurance scheme is Y_β and under the more generous scheme is Y_α. The levels of utility associated with these uncertain income streams are graphed on the vertical axis as U_A and U_B.

One can define "certainty equivalent income" as that certain income which would generate, for risk averse individuals, the same level of utility as they would get from an uncertain lottery with higher expected value. In Figure 1, Y_1 is the certainty equivalent income which produces the same level of utility as the expected value of income (Y_α) which the individual would receive under the more generous unemployment insurance scheme. In Figure 1, Y_α minus Y_1 represents the risk premium—the amount which the individual would be willing to pay to rid themselves entirely of the income risk of unemployment (i.e. receive a certain income rather than the uncertain prospect of income Y'_a if no unemployment and Y_a if unemployed). Similarly, Y_2 is the certain income which would generate the utility level U_B, the same level of utility as generated by the uncertain prospect of Y'_b if

not unemployed and Y_b if unemployed under the less generous UI scheme. The change in utility associated with the change in unemployment insurance regimes is $U_A - U_B$ and the money equivalent of that loss in utility (the change in certainty equivalent income) is $Y_1 - Y_2$.

Note that the change in certainty equivalent income arises from changes in *both* the expected value *and* the riskiness of income flows. Both the expected value and the riskiness of income flows are influenced by the labour market environment, public policy and the individual's behavioural response to each. One should *not* measure the impact of changes in unemployment insurance legislation on the distribution of income solely by calculation of changes in the expected value of income. In Figure 1, shifting from a more generous to a less generous unemployment insurance scheme *increases* the expected value of income (from Y_α to Y_β). However, the decrease in income security which this entails produces a *decrease* in net utility (from U_A to U_B), the income value of which is given by $Y_1 - Y_2$.[4]

The contrast in Figure 1 between social insurance revisions which produce a *gain* in expected income and a *loss* in certainty equivalent income deserves some emphasis. In previous work (Erksoy, Osberg and Phipps, 1994a and 1994c) we have calculated the change in realized income flows associated with the 1971 to 1994 revisions to UI—since cuts to UI disproportionately affected lower quintiles of the income distribution, one could conclude unambiguously that the 1971 to 1994 UI revisions were disequalizing. However, such calculations are equivalent to looking only at the changes in *expected income*, by quintile, associated with UI revisions. The lesson of Figure 1 is that even the upper income quintiles who realized increases in expected income may have experienced losses in utility, while the utility losses of lower income groups are *understated* by their losses in expected income.

Section 3.1 will examine the differential impact on demographic groups of revisions to UI, considered over the same business cycle (that of 1981 to 1989). However, the 1971 cohort of youth and the 1991 cohort faced fundamentally different labour markets, as well as different levels of UI generosity. With much higher unemployment *and* less generous UI, the 1991 cohort can expect lower money income, changes in non-labour time *and* greater riskiness of income flows. How does this combination affect well-being?

If changes to social insurance have only small impacts on income riskiness, while producing the same expected value of income flows, then the Arrow–Pratt risk premium can be estimated directly from data on absolute risk aversion, without explicit representation of the underlying utility function of individuals. However, the changes in unemployment levels and revisions to unemployment insurance in Canada between 1971 and 1994 are not like that. Since these changes had relatively large impacts on both income riskiness *and* the expected value of

[4]Similarly, a legislative change which deprived individuals of protection against financial loss due to home burglary by prohibiting the sale of such insurance could be expected to eliminate fraudulent theft claims and decrease the actual incidence of home burglary (as individuals purchased burglar alarms, etc. to decrease the risk of burglary). Outlawing such insurance coverage would also increase the net cash income of individuals, in aggregate (since premiums paid to burglary insurers exceed claims paid out by the amount of administration expenses and industry profits) *but* such a change would decrease the utility of all those who previously purchased insurance. [Figure 1 is really a generic diagram of the implications, in general, of higher or lower levels of insurance coverage.]

some individual's incomes, calculation of their impact on certainty equivalent income requires the specification of some underlying utility function.

Economists typically use the idea of utility maximization to drive their theories of individual behaviour, and most find it easy to agree that individual utility should be a positive function of income, but exhibit declining marginal utility of income and wealth. Beyond that, there is little consensus. Indeed, although empirical economists have estimated many models of individual behaviour (such as labour supply) whose empirical specification implicitly also implies an underlying individual utility function, the characteristics of these implicit utility functions have often not been carefully examined (as Stern [1986] has emphasized).

In this paper, we recover the utility function implicit in some recent estimates of Canadian labour supply behaviour and use this underlying utility function to estimate the utility value of income flows associated with (1) 1971 and 1994 unemployment insurance regimes, over the 1981–89 business cycle and (2) 1971 and 1994 UI regimes, over the 1971–79 and 1991–99 period, respectively.

In each case, we calculate the present discounted value of yearly flows of utility over the entire period, using a discount rate of 5.5 percent per annum (the average real interest rate on home mortgage indebtedness in Canada from 1981 to 1989 and, coincidentally, the real rate of return on Canada Savings Bonds in 1994). The change in well-being is the difference between the present discounted value of utility, under the alternative UI and labour market regimes. To put a money value on this change in utility, we calculate the certainty equivalent income which corresponds to the average annual level of utility under each UI regime, at average annual levels of labour supply.

In Table 1, $\Delta Y\%$ is the percentage change in certainty equivalent annual income—i.e. the percentage difference between Y^*_{71}, the certainty equivalent income corresponding to the 1971 UI regime and Y^*_{94}, the certainty equivalent annual income corresponding to the 1994 UI regime, both evaluated over the 1981 to 1989 cycle. In Table 2, $\Delta Y\%$ is the percentage difference between Y^*_{70s} (the certainty equivalent annual income corresponding to the 1971 UI regime with 1971–79 unemployment rates) and Y^*_{90s} (corresponding to the 1994 UI regime with 1991 to 1999 unemployment rates.)[5]

The calculation of Y^*_{71} and Y^*_{94} is:

Y_{it} = income from earnings and UI under 1971 legislation, unemployment rates = 1981–89 levels

Y'_{it} = income from earnings and UI under 1994 legislation, unemployment rates = 1981–89 levels

L_{it} = non-labour time under 1971 legislation, employment rates = 1981–89 levels

L'_{it} = non-labour time under 1994 legislation, employment rates = 1981–89 levels

i = individual

t = year (1981 to 1989)

[5]See Appendix A for the relevant UI parameters for 1971 and 1994 and the aggregate unemployment rates used in the simulations.

$$\bar{L}_i = \sum_{t=0}^{t} L_i/9$$

$U_{it} = U(Y_{it}, L_{it})$ = utility of individual i in period t, given 1971 UI regime

$U'_{it} = U(Y'_{it}, L'_{it})$ = utility of individual i in period t, given 1994 UI regime

$$\hat{U}_i = \sum_{t=0}^{8} \frac{U_{it}}{(1+0.055)^t} = \text{present value of utility of individual under 1971 legislation}$$

$$\hat{U}'_i = \sum_{t=0}^{8} \frac{U'_{it}}{(1+0.055)^t} = \text{present value of utility under 1994 legislation}$$

$$Y^*_{71} = U^{-1}(\hat{U}_i/9 | L_{it} = \bar{L}_i)$$

$$Y^*_{94} = U^{-1}(\hat{U}'_i/9 | L_{it} = \bar{L}_i).$$

The calculation of Y^*_{70a} and Y^*_{90a} is similar, the difference being that Y^*_{70s} corresponds to 1971 UI and 1971–79 unemployment rates while Y^*_{90s} corresponds to 1994 UI and 1990s unemployment rates.

In evaluating the labour supply responses of Canadian households to UI reforms, Phipps (1990, 1991a, 1991b) used the Stone-Geary functional form.

$$U_{it} = B[Y_{it} - \gamma_0]^{1-\theta}[L_{it} - \gamma_1]^{\theta}$$

where Y_{it} = earnings and UI receipts of individual i in period t, L_{it} = non-labour time.

The Stone-Geary functional form has the convenient feature that Phipps (1990, 1991a, 1991b) has already provided estimates of its parameters in the explicit context of the influence of UI on labour supply.[6] Its disadvantages include the fact that all goods must be substitutes, Engel curves are constrained to be linear and the labour supply function is constrained to be monotonic with respect to wages.[7] Furthermore, utility is assumed to always increase with non-labour time and the degree of curvature in income implies significant risk aversion only at low incomes.

2.2. *Microsimulation of Income and Labour Market Outcomes*

In a series of papers and reports (e.g. Erksoy, Osberg and Phipps 1994a, 1994b, 1995) we have outlined the methodology of our microsimulation model, presented explicitly the estimated behavioural equations which drive the model and demonstrated its sensitivity to alternative assumptions (e.g. the importance

[6]In Phipps (1990, 1991a, 1991b) individual utility is dependent on consumption of goods plus non-labour time, allowing for the possibility that time spent unemployed was not a utility-maximizing choice—that some unemployed individuals faced demand-side constraints. Implicitly, writing utility as a function of *income* assumes that individuals are liquidity constrained (i.e. consumption equals income).

[7]In practice, annual hours of female labour supply in Canada are a positive function of the wage for low-wage workers but a negative function of the wage (i.e. the "income effect" dominates the "substitution effect") for above average wages—see Osberg and Phipps (1993). In this paper we use the Stone-Geary parameters reported in Phipps (1991b:202).

of past labour market outcomes). We also refer interested readers to our other work (e.g. Osberg and Phipps, 1995) for further details.

The model is based on estimation (using microdata from the Labour Market Activity Survey 1986/87) of the probability and duration of unemployment and labour force participation, and the probability of constraint in obtaining additional weeks of unemployment, using personal characteristics and lagged labour market outcomes as predictors and partitioning unexplained variance into its permanent and temporary components. Aggregate unemployment weeks (which are assumed to decrease when UI generosity declines) are assigned to individuals in order of their probability of unemployment. For present purposes, the key thing about our microsimulation model is that it generates, for each of the 19,488 respondents to Statistics Canada's 1983 Survey of Assets and Debts, a predicted vector of labour earnings, unemployment insurance receipts, weeks unemployed, weeks employed and weeks not in the labour force for each year of the business cycle. We first model individual outcomes under the unemployment insurance regime corresponding to 1971 legislation and that corresponding to 1994 legislation, in the macro-economic environment of 1981 to 1989, incorporating both the impact of unemployment insurance legislation and behavioural responses to the incentives implicit in unemployment insurance legislation. We then model individual outcomes comparing the 1971 UI regime, in the 1971–79 labour market environment and the 1994 UI regime, in the 1991 to 1999 environment.

3.1. *Distributional Impacts of 1971 to 1994 Unemployment Insurance Revisions*

Table 1 presents the percentage change in average annual certainty equivalent income and the percentage change in average annual expected value of income, for men and women aged 16 to 24, and 25 to 54 and for each decile of the income distribution under the 1971 and 1994 unemployment insurance regimes, as they would have impacted individuals over the business cycle from 1981 to 1989. It is clear that revisions to the social insurance role of the welfare state have very different impacts on males and females, and on younger and older workers.

For males, there is a very significant decrease in income associated with unemployment insurance cutbacks, which is unambiguously much larger, in percentage terms, for the poorer deciles of the income distribution and for youth, compared to older workers. For males, it is also clear that the 1971 to 1994 revisions to unemployment insurance in Canada increase the inequality of the distribution of economic well-being—with greater increases in inequality among young men. Both the calculations of Stone-Geary certainty equivalent annual income and expected value of annual income calculations give very similar results. For females, there is the same similarity of results between the Stone-Geary and expected value calculations, but distributional impacts are smaller and less clearly concentrated on poorer deciles of the income distribution.[8]

[8]Notice that to be affected by changes in unemployment insurance, one must have been covered by UI in the first place. We conjecture that many women in the lower deciles, while having had positive earnings and UI in 1981, did not maintain eligibility for UI (which requires achievement of threshold weeks per year, and weekly wage) throughout the 1981–89 period.

TABLE 1

IMPACT OF 1971 TO 1994 UI REVISIONS ON AVERAGE ANNUAL "INCOME" BY DECILES OVER THE 1981–89 BUSINESS CYCLE

Change in Certainty Equivalent Income ($\Delta Y^*\%$) and Change in Expected Income ($\Delta Y\%$)

	Aged 16 to 24				Ages 25 to 54			
	Males		Females		Males		Females	
Decile	$\Delta Y^*\%$	$\Delta Y\%$	$\Delta Y^*\%$	$\Delta Y\%$	$\Delta Y^*\%$	$\Delta Y\%$	$\Delta Y^*\%$	$\Delta Y\%$
1	22.7	13.9	−0.8	0.3	9.8	9.5	10.3	10.4
2	18.1	15.4	2.3	2.7	6.9	6.4	5.8	5.0
3	7.6	8.3	0.1	0.2	6.6	5.5	3.0	2.7
4	8.5	6.2	4.8	5.3	6.1	5.3	3.2	2.8
5	4.4	5.8	6.0	5.5	4.5	4.8	4.4	4.6
6	4.7	5.0	4.9	6.7	4.1	4.1	5.3	5.2
7	5.4	6.7	5.6	4.9	3.7	3.7	4.8	4.7
8	5.3	4.8	3.2	3.8	3.5	3.6	4.0	3.9
9	2.8	4.7	3.2	3.3	2.5	2.5	3.6	3.4
10	1.6	2.0	1.4	1.8	1.8	1.7	2.0	2.0
Overall Average	8.11	7.28	3.07	3.45	4.95	4.71	4.64	4.47
Gini	−4.0	−3.6	−0.6	−0.6	−2.6	−2.4	−0.8	−1.1
Theil	−6.3	−5.4	−1.1	−1.4	−4.5	−4.7	−2.2	−2.3
C.V.	−4.4	−4.2	−1.3	−1.3	−2.6	−2.4	−1.7	−1.5

Note: "Income" includes labour earnings and UI receipts only, 1981 $, for 1981 Labour Market Participants.

$$\Delta Y^*\% = (Y^*_{71} - Y^*_{94})/Y^*_{71} \text{ and } \Delta Y\% = (Y_{71} - Y_{94})/Y_{71}.$$

TABLE 2

1970s UNEMPLOYMENT AND UI AS COMPARED TO 1990s UNEMPLOYMENT AND UI

Change in Certainty Equivalent Income ($\Delta Y^*\%$) and Change in Expected Income ($\Delta Y\%$)

	Ages 16 to 24				Ages 25 to 54			
	Males		Females		Males		Females	
Decile	$\Delta Y^*\%$	$\Delta Y\%$	$\Delta Y^*\%$	$\Delta Y\%$	$\Delta Y^*\%$	$\Delta Y\%$	$\Delta Y^*\%$	$\Delta Y\%$
1	29.9	31.0	20.5	33.8	28.9	30.3	34.8	42.0
2	29.1	27.3	11.4	18.6	20.0	19.6	16.9	16.8
3	17.6	20.9	5.9	6.9	14.9	15.3	6.5	6.0
4	15.9	16.7	13.0	13.8	12.0	12.0	5.9	6.0
5	10.2	14.2	10.5	12.8	8.6	9.3	11.3	11.4
6	9.7	10.3	14.6	16.9	7.4	7.6	11.3	11.6
7	8.0	12.8	11.3	11.9	6.1	6.1	9.2	9.6
8	8.8	10.9	6.5	8.6	5.0	5.2	6.9	6.8
9	6.2	8.0	5.6	7.2	3.6	3.6	4.9	4.8
10	12.4	14.3	2.8	3.3	2.4	2.4	2.8	2.9
Overall Average	14.8	16.6	10.2	13.4	10.9	11.1	11.1	11.8
Gini	−3.6	−3.8	−3.7	−5.1	−8.1	−8.6	−4.3	−4.8
Theil	4.3	4.6	−7.5	−11.3	−15.8	−17.0	−9.4	−10.4
C.V.	15.6	16.3	−4.9	−6.4	−7.5	−7.9	−5.2	−5.6

Note: Labour Earnings and UI receipts only, 1981 $, for 1981 Labour Market Participants.

$$\Delta Y^*\% = (Y^*_{70s} - Y^*_{90s})/Y^*_{70s} \quad \text{and} \quad \Delta Y\% = (Y_{70s} - Y_{90s})/Y_{70s}.$$

3.2. *Distributional Implications of 1971 to 1994 Unemployment Insurance Revisions and Higher Unemployment*

Table 2 goes one step further in comparing the fortunes of demographic groups, by comparing the earnings plus UI of youth and prime age workers (a) as they would have been with 1970s unemployment rates and the 1971 UI regime and (b) as implied by actual and projected 1990s unemployment rates and the 1994 UI regime. These results can be used to compare the impacts of the changing labour market and policy environment on males and females, or to make cross-sectional comparisons of younger and older workers. As well, since the 16 to 24 year-olds of the 1970s are the 36 to 44 year-olds of the 1990s, one can follow the fortunes of that birth cohort as labour markets and public policies changed.

It is clear that our simulation model predicts very different outcomes for men and for women—but we should caution that we have not modelled here changes in such demographic characteristics as marital status and the number of children of each respondent. Although this is defensible on the grounds that we want to measure labour market and policy impacts, the close connection between marital status, number of children and female labour force participation lead us to give primary emphasis to the male results—in future work we intend to examine more closely the demographic modelling of these transitions.

In looking at the male results, it is notable that among the upper deciles of older males, Table 1 indicated that UI revisions had very little impact and Table 2 indicates that these people were also largely unaffected by the higher unemployment of the 1990s. Although older, upper income males are the people who actually make the macroeconomic and social policy decisions of our society, their reality is very different from the situation of youth or the lower deciles of older workers, who have experienced quite dramatic losses. Notably, since all deciles of male youth have quite large losses, the evidence on inequality *among youth* is ambiguous, with the Gini indicating greater inequality and the Theil and coefficient of variation showing decreased inequality (*among* youth). However, since the increased unemployment of the 1990s adds quite a lot to the income losses of poor older males (over and above the impacts of UI cutbacks) but has little impact on the upper deciles, inequality among older males increases quite strongly.

Several caveats are, however, in order. Firstly, the income concept used in this paper is that of annual labour earnings plus annual receipts of unemployment insurance payments. Capital income and (more importantly) pension income and social assistance receipts are excluded. The relatively low annual earnings and unemployment insurance receipts of poorer deciles reflects in part a tendency of those with long duration unemployment spells to withdraw entirely from labour force participation—a tendency which is particularly important for women and for 55 to 64 year-olds. Since our objective is to model the distributional impacts of a particular program (unemployment insurance), we do not build into this paper any assumption of automatic receipt of social assistance by individuals with low annual income or automatic receipt of pension income by retirees.[9] Clearly, however, unemployment insurance is part of the larger welfare state of public and

[9]Osberg and Phipps (1995) addresses the social assistance issue.

private social transfers, and the extent to which other transfers will kick in to offset cutbacks in unemployment insurance is a crucially important issue.

Furthermore, one must emphasize that Tables 1 and 2 refer to the population of *individuals* who participated in the labour market in 1981 (some of whom may have withdrawn from the labour force from 1982–89), and contain no consideration of household income or household size. The Stone-Geary utility function underlying the calculations of certainty equivalent annual income is that for single males and females. Our judgement is that this paper is complex enough already without modelling the interdependence of labour market decisions within households. Evaluating the distribution of utility across *households* also raises complex issues of equivalence of incomes among households of different sizes (see Phipps, 1990) and of the division of resources within households (see Phipps and Burton, 1994), which we hope to address more fully in future work.

Finally, one should emphasize that revisions to a large and complex program such as unemployment insurance have highly uneven impacts *within* income deciles. Our simulation model considers the impact on individual labour market behaviour of a number of unemployment insurance parameters—the benefit/wage replacement ratio, the entrance requirement for unemployment insurance, the formula for determination of benefit entitlement weeks and the maximum duration of unemployment insurance benefits. In Canadian unemployment insurance, entrance requirements and benefit duration vary over time and across economic regions in response to variations in local unemployment rates. The 1971 to 1994 revisions affected all these dimensions of unemployment insurance, with highly uneven impacts on individuals. In our microsimulation model, some individuals may benefit financially from a revision to unemployment insurance which creates substantial financial losses for other individuals with a similar annual income, because their particular combination of personal characteristics and the changes in unemployment insurance parameters relevant to them increase their *relative* probability of finding employment. Unemployment insurance revisions therefore imply substantial re-ranking of individuals within the income distribution.

Tables 1 and 2 are based on deciles of incomes, as ordered by 1971 and 1994 income respectively. Since UI revisions imply that some individuals experience gains, while others experience losses, the individuals in each decile of 1971 and 1994 income are not all the same. If one calculates the distribution of the percentage change in certainty equivalent income, by decile of *original income* under the 1971 UI regime, the percentage of individuals who are essentially unaffected by revisions to unemployment insurance rises with income—over 90 percent of the top income decile are essentially unaffected by unemployment insurance revisions, while only 20 percent of the males (60 percent of the females) in the bottom income decile are similarly unaffected. Within the lower deciles of the income distribution, there is a very significant minority who experience very large percentage losses in annual income, and a very much smaller proportion who experience gains.

3.3. *A Note on Assets and Dissaving*

So far, this paper has focussed on the utility gains and losses associated with the risk of *income* fluctuations, but economists normally think of utility as being

derived not from *income*, but from the *consumption* which income enables. However, in order to go from a discussion of variations in income flows to an analysis of consumption flows, one needs to discuss saving and dissaving behaviour. Up to this point, we have left it implicit that intertemporal utility maximization is based on a time separable utility function and a discount rate of 5.5 percent. Savings behaviour depends, however, on more than that. A comprehensive model of savings requires a theory of how individuals initially form income expectations and choose desired consumption levels and how those expectations and choices are revised over time in the light of experience. Assets also differ in liquidity and risk, and the composition of a household's portfolio of assets (especially the percentage of assets tied up in consumer durables, autos and housing equity) determines the extent to which such assets can be used to smooth consumption over time. Hence, for a full discussion, a theory of portfolio management is also required.

A full resolution of these issues lies beyond the scope of this paper. Furthermore, Canada does not now have longitudinal panel data which would enable one to assess directly the impact of income fluctuations over time on individual consumption patterns.[10] Table 3 therefore simply asks what percentage of the youth population in fact may have access to enough assets to smooth consumption to any significant degree—i.e. we use cross-sectional evidence on net household assets to assess the relative importance of liquidity constraints (i.e. the percentage of individuals who are members of households whose assets or access to credit are insufficient to smooth consumption, so that $Y_{it} \simeq C_{it}$ necessarily). Columns 1 and 3 present the percentage of young persons, by decile, living in households where liquid assets are greater than $3,020 (the cash required to finance an average duration unemployment spell at the single person poverty line level of consumption) while Columns 2 and 4 add to those liquid assets the credit limit on available home equity loans.[11,12] It is clear that *very* few youth live in households whose liquid assets would outlast an average duration spell of unemployment.

5. Conclusions

The innovation of this paper is its attempt to evaluate the impacts on the distribution of economic well-being among and between age cohorts of (1) revisions to the social insurance role of the welfare state and (2) changed labour market conditions, by combining microsimulation of behavioural responses to policy changes with an explicit specification of the utility functions of individuals. We started from the perception that economic insecurity dominates the lives of

[10]Statistics Canada is now pretesting the Survey of Labour and Income Dynamics, which will, when completed and available, provide a 6-year panel of income and labour dynamics. The Labour Market Activity Survey of 1986/87 and 1988/90 is now available but contains no consumption or asset information.

[11]The Labour Force Survey of 1984 recorded the average (interrupted) duration of an unemployment spell at 21.6 weeks, and the single persion (1978 Base) Statistics Canada, Low Income Cutoff in 1981 dollars was $7,268 per year—hence $3,020 is the cash required to finance an average duration unemployment spell, at a poverty line standard of living.

[12]A survey of local banks provided the following rule-of-thumb formula for second mortgage credit limits: credit limit = 75 percent of market value of house − balance outstanding on first mortgage.

TABLE 3

INCOME DECILES AND NET LIQUID ASSETS
Percentage who are Members of Households with >$3,020

Deciles	Males under 25 years		Females under 25 years	
	(a) Net Liquid Assets	(a)+ Available Home Equity	(a) Net Liquid Assets	(a)+ Available Home Equity
Poorest 10%				
11–20	1.52	9.09	8.11	25.23
21–30	3.51	14.04	14.55	30.91
31–40	10.61	12.12	19.39	31.63
41–50	12.31	20.00	5.61	16.82
51–60	10.26	19.23	7.00	18.00
61–70	6.25	17.19	7.00	14.00
71–80	13.43	23.88	13.89	24.07
81–90	11.11	28.57	17.00	28.00
Top 10%	16.39	36.07	15.31	30.61
	14.06	25.00	19.27	29.36
Overall Average	9.95	20.5	12.71	24.86

Note: $3,020 = 1981 single person poverty line for 21.6 weeks (the average interrupted duration of a spell of unemployment in 1984.)

young workers in the 1990s. We have argued that reforms to the welfare state can be expected to alter individual labour market behaviours and that individuals care about both the expected value of their income and the riskiness of that income—hence it is necessary to evaluate jointly the expected value of future income, the uncertainty of income flows and the behavioural responses of individuals.

Much more needs to be done to improve our analysis. We are in the process of revising our microsimulation model to incorporate demographic transitions and some consideration of household influences on labour market behaviour. We need to know more about savings/dissavings and the ability of households to smooth consumption flows over time, despite variations in income flows. We want to experiment further with alternative specifications of the functional form of utility functions and the appropriate specification of utility for individuals within households, and we want to investigate the sensitivity of the importance of income risk to alternative parameter values for individual utility functions.

We are especially concerned that the Stone-Geary specification may not exhibit enough risk aversion to income changes and imposes a common (positive) valuation on non-labour time.

For the Stone-Geary utility function, evaluated for males at an income of $30,000 and two weeks leisure, the Arrow–Pratt coefficient of relative risk aversion is 0.28—far below other estimates of risk aversion. The logarithmic utility function is popular in the financial literature [see Rubinstein (1977)] and is somewhat more consistent than the Stone-Geary with observed risk aversion behaviour in financial portfolios, but the Arrow–Pratt coefficient of relative risk aversion is still only 1. Friend and Blume (1975) concluded that the coefficient of relative risk aversion

is at least 2. We should stress that in this paper we have used *assumed* utility functions with relatively low levels of risk aversion, and since our assumed utility function embodies relatively low levels of risk aversion, our calculations will tend to understand the utility benefits of greater income security.

The current specification of the utility function also imposes the assumption that all non-labour time is positively valued. Even when unemployment is relatively high (e.g. 10 percent), the vast majority of the labour force (90 percent) are employed, and it seems reasonable when the employed have relatively little non-labour time, such time is positively valued, at the margin. However, unemployment is a different phenomenon. Both because unemployment is socially alienating and because it often involves an excess of non-labour time, we are convinced by such authors as Clark and Oswald (1994) that unemployment reduces utility. In future work we hope to experiment with functional forms which allow the utility value of non-labour time to vary with the duration and nature of non-labour time.

Meanwhile, since in the current Stone-Geary specification, (1) the assumption of a positive value to increased non-labour time in the 1990s partly offsets lower money income and (2) the assumption of low risk aversion understates the importance of income risk, a more satisfactory treatment of these two issues would strengthen the conclusions of this paper.

In doing all this, we are well aware that calculation of the value of a Stone-Geary utility function under alternative unemployment insurance and unemployment scenarios is a rather bloodless exercise. In the real world, people stay up late at night worrying about how they are going to make ends meet and what they will do if they lose their jobs. When real people have economic worries, they become tense and irritable and some of them may lash out at their families or try to drown their anxieties in alcohol or drugs. Our model does not capture the sense of anxiety and powerlessness that comes from the increasing withdrawal of the Canadian state from its social insurance role and its denial of responsibility for macroeconomic outcomes.[13]

However, although there are many technically complex steps to our argument, the basic conclusion is fairly direct. The 1971–94 revisions to unemployment insurance in Canada substantially decreased the generosity of the Canadian Unemployment Insurance system, and produced decreases in economic well-being for all deciles of the income distribution. Declines in economic well-being were especially large in percentage terms for youth and for the poorest deciles of the distribution, hence unemployment insurance revisions increased the inequality of the distribution of economic well-being, in addition to decreasing average economic well-being. Although we began this paper emphasizing the importance of

[13]EKOS Research Associates has repeatedly asked a sample of Canadians to agree or disagree with the statement "I feel I have lost all control over my economic future." Although this must be considered a toughly worded statement, the percentage agreeing was 52 percent in October 1993, 43 percent in February 1994, 47 percent in November 1994 and 48 percent in August 1995. In April 1996 42 percent agreed. (A further 16 percent neither agreed nor disagreed in April of 1996, leaving only 42 percent of Canadians who were willing to say that they felt they had control at all over their economic future.) The percentage agreeing with the statement, "I think there's a good chance I could lose my job in the next couple of years" was, at the last four dates, 41 percent, 42 percent, 44 percent and 44 percent. EKOS Research Associates (1996 : 82, 84).

income security for all deciles of the income distribution, it is notable that our calculations of the distribution of certainty equivalent income and expected income give approximately equivalent answers. Furthermore, as we have noted in other work (Erksoy, Osberg and Phipps, 1994b) although the level of inequality of the present value of income over the business cycle differs from the level of inequality of annual income, UI revisions have the same qualitative impact on the distribution of income, whether measured by annual income or the present value of income over the business cycle.

When we compare the prospects of youth entering a labour market with 1970s unemployment and 1971 UI and youth entering the labour market and UI environment of the 1990s, there are very large declines in the certainty equivalent and expected annual income of poorer young workers, but the impacts are quite large across upper income youth deciles as well. The 1990s labour market also had big impacts on low income older males, but the upper deciles of older workers escaped largely unscathed. Overall, public policy and unemployment trends increased inequality among older males and between them and youth.

Furthermore, since we get essentially the same result from examination of the distribution of certainty equivalent income, the present value of income flows over the business cycle or annual money incomes, we suspect that our results are fairly robust. The youth of the 1990s have lower and more unequal economic well-being, because they have less income *and* less security.

APPENDIX A

	1971 UI System	1994 UI System
Benefit Wage Ratio	(a) 75% of insured earnings for claimants with less than or equal to 1/3 of maximum insurable earnings and with dependents (b) 66% for all other claimants	(a) 60% of insured earnings for claimants with less than or equal to 1/2 of maximum insurable earning and with dependents (b) 55% for all other claimants
Maximum Insurable Earnings	From $315/week in 1981 to $460/week in 1989	From $315/week in 1981 to $460/week in 1989
Minimum Insurable Earnings	20% of Maximum Insurable Earnings	20% of Maximum Insurable Earnings
Minimum Employment Weeks to Qualify	8 weeks	From 12 weeks to 20 weeks depending on regional unemployment rates
Maximum Annual Benefit Period	50 weeks	50 weeks
Benefit Period Determination	(1) Up to 15 weeks of benefits for the first 20 weeks of work (2) Additional 10 weeks for the unemployed at the end of phase 1 (3) Up to 18 weeks of extended benefits for insurable employment beyond 20 weeks (4) If national unemployment rate 4–5% then additional 4 weeks of benefits, if national unemployment rate above 5% then additional 8 weeks of benefits	(1) Up to 20 weeks of benefits, based on one week of benefits for every two weeks of work for the first 40 insured weeks of work (2) Up to 12 weeks of benefits, based on one week of benefits for each week of work beyond the first 40 weeks (3) Up to 26 weeks, based on two weeks of benefits for every percentage point by which the regional unemployment rate is above 4%

TABLE A1

Experiment 1
1981–89 Unemployment with 1971 and 1994 UI

	Scenario A 1971 UI Regime			Scenario B 1994 UI Regime	
Year	Male U Rate	Female U Rate	Year	Male U Rate	Female U Rate
1981	7.0	8.3	1981	6.9	8.2
1982	11.0	10.9	1982	10.9	10.8
1983	12.0	11.6	1983	11.9	11.5
1984	11.2	11.3	1984	11.1	11.2
1985	10.3	10.7	1985	10.2	10.6
1986	9.3	9.8	1986	9.2	9.7
1987	8.5	9.3	1987	8.4	9.2
1988	7.4	8.3	1988	7.3	8.2
1989	7.3	7.9	1989	7.2	7.8

Experiment 2
1970s Unemployment and UI Compared to 1990s Unemployment and UI

	Scenario A 1971 UI and 1970s Unemployment			Scenario B 1971 UI and 1990s Unemployment	
Year	Male U Rate	Female U Rate	Year	Male U Rate	Female U Rate
1971	6.2	6.2	1991	10.3	10.3
1972	6.2	6.2	1992	11.3	11.3
1973	5.5	5.5	1993	11.2	11.2
1974	5.3	5.3	1994*	11.3	11.3
1975	6.9	6.9	1995*	11.2	11.2
1976	7.1	7.1	1996*	10.9	10.9
1977	8.1	8.1	1997*	10.6	10.6
1978	8.3	8.3	1998*	10.3	10.3
1979	7.4	7.4	1999*	10.8	10.8

Note: Forecast unemployment rates from Informetrica (1994).

In Experiment 1, each individual's behaviour is simulated assuming 1971 UI parametesr and aggregate unemployment as per Scenario A (the actual historic 1980s rates) and is compared to their behaviour assuming 1994 UI parameters and unemployment rates as per Scenario B (which are lower because of assumed behavioural response to UI).

In Experiment 2 each individual's behaviour is simulated assuming 1971 UI parameters and historic 1971 to 1979 aggregate unemployment (Scenario A) and is compared to that individual's outcomes under 1994 legislation and 1990s unemployment (Scenario B).

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