An Index of Economic Well-Being for Canada and the Provinces

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Abstract

This objective of this paper is to develop an index of economic well-being for the Canada and the provinces, for the period 1971 to 1999 using a framework originally laid out by Osberg (1985). Although the economic well-being of a society depends on the level of average consumption flows, aggregate accumulation of productive stocks, equality in the distribution of individual incomes and security from the risks imposed by uncertain future outcomes, the weights attached to each component will vary, depending on the values of different observers. It is argued that public debate would be improved if there is explicit consideration of the aspects of economic well-being obscured by average income trends and if the weights attached to these aspects were explicitly open for discussion.

The four components of economic well-being are:

(1) effective per capita consumption flows, which includes consumption of marketed goods and services, and effective per capita flows of household production and other unmarketed goods and services;

(2) net societal accumulation of stocks of productive resources, including net accumulation of tangible capital and housing stocks, net accumulation of human capital and R&D investment, net changes in the value of natural resources stocks and net change in the level of foreign indebtedness;

(3) the absence of inequality and poverty, as measured by the Gini index of inequality and both the depth and incidence of poverty; and

(4) indicators of security, particularly economic security from unemployment, ill health, single parent poverty and poverty in old age.

Estimates of the overall provincial indexes of well-being and their sub-components are presented for the 1971-1999 period and compared with the overall Canadian index.

Executive Summary

The objective of this paper is to develop an index of economic well-being for the Canadian provinces for the period 1971 to 1999 using a framework originally laid out by Osberg (1985). It is argued that the economic well-being of a society depends on the level of average consumption flows, aggregate accumulation of productive stocks equality in the distribution of individual incomes and security from the risks imposed by uncertain future outcomes. The weights attached to each of these components of economic well-being will vary, depending on the values of different observers. It is argued that public debate would be improved if there is explicit consideration of the aspects of economic well-being obscured by average income trends and if the weights attached to these aspects were explicitly open for discussion.

The four components or dimensions of economic well-being in the proposed index of economic well-being are:

- effective per capita consumption flows;
- net societal accumulation of stocks of productive resources;
- the absence of poverty and inequality; and
- economic security from job loss and unemployment, illness, family breakup, and poverty in old age.

Consumption flows encompass: marketed personal consumption flows, adjusted for changes in family size which affect economies of scale in household consumption, and regrettables or intermediate consumption goods (cost of commuting, household pollution abatement, auto accidents, and crime); government services; and the value of unpaid work. The total is then adjusted for the value of increased longevity.

Stocks of wealth include the net capital physical stock, including housing stocks; the stock of research and development; the value of natural resources stocks; the stock of human capital; and the level of foreign indebtedness.

The inequality component of the index consists of income inequality, defined as the Gini coefficient for after-tax household income and the intensity of poverty (incidence and depth), defined as the product of the poverty rate and the poverty gap, that is the difference between the average income of those in poverty and poverty line divided by the poverty line. The poverty line is defined as one half median adjusted household income. The measure of inequality is then transformed to obtain an index of equality, so that as inequality rises the index of equality falls.

The security component of the index is based on the change over time in the economic risks associated with unemployment, illness, "widowhood" (or single female parenthood) and old age. The risk of unemployment is determined by the employment/population ratio, the employment insurance coverage of the unemployed, and the benefits ratio. The risk of financial insecurity due to illness is modelled as the percentage of disposable income devoted to health costs. The risk of single parent poverty is determined by the divorce rate and poverty intensity of single parent families. The risk of poverty in old age is a function of the poverty intensity of the elderly population.

Trends in the overall indexes for the provinces are determined by the choice of variables that are included in the index, the trends in those variables and the weights given these variables. Since the four main dimensions of economic well-being are separately identified, it is easy to conduct sensitivity analyses of the impact on perceived overall trends of different weighting of these dimensions. The most transparent means of presentation and discussion however is to give each component equal weight.

The sub-components of the consumption flows and wealth stocks are expressed in constant dollars on a per capita basis. There consequently is no need for explicit weighting as these dollar values represent implicit weights. In terms of the inequality/poverty sub-components, a Rawlsian perspective assigns greater importance to poverty than to overall inequality trends, and therefore within the index of inequality the Gini

coefficient is assigned a weight of 0.25 while poverty intensity is assigned the remaining 0.75. In other words, poverty is given three times the weight of inequality. The subcomponents of the economic security index are weighted by the relative importance of the specific provincial population at risk in the total provincial population.

The overall indexes of economic well-being for the provinces differ substantially from one another. However, a key finding is that the economic well-being of Canadians, at least as measured by the index constructed in this paper, has grown much more slowly in the 1990s than in previous decades in all provinces. This is attributed to large declines in security from the risks imposed by unemployment and illness over this decade.

Some of the year-to-year movement in the provincial indexes reflects the sensitivity of certain components of the index to the business cycle. For example, consumption flows depend on personal income, which is determined largely by demand-driven employment levels. Wealth stocks include the capital stock, which is determined by cyclically-sensitive investment, and the value of natural resources, which reflects cyclical commodity prices. The two inequality measures (poverty intensity and Gini coefficients) are influenced by the state of the economy. Finally, a number of the components of the economic security index are also very sensitive to the business cycle, such as the employment population ratio.

Over the 28-year period from 1971 to 1999 covered by the time series, the economic security component for all the provinces experienced the largest change of any of the four components of the index. For the whole period, the economic security component declined in all provinces except Alberta. For the 1989-99 period, this component declined in all but Quebec. This change largely reflected the increase in the risk of financial insecurity due to illness and to single-parent poverty.

An Index of Economic Well-Being for the Canadian Provinces[1]

1. Introduction

Has the economic well-being of Canadians increased or decreased in recent years? Do trends in well-being differ from one province to another? Why might it be useful to know?

In modern democracies, national systems of social and economic statistics have become a crucial part of the informational feedback loop of public policy. By providing measures of social and economic outcomes, statistical agencies provide decision makers and voters with the information that often defines the success or failure of public policies. Evidence on such successes or failures can be used to reallocate resources, or to replace governments. Hence the calculation of measures of economic well-being is an important issue.

However, the core problem of statistical agencies is that of deciding what information to record and how to present it. Knowing that all statistics summarize a complex reality, and that there are wide variations among the public in which aspects of social reality are considered to be of greatest importance, statistical agencies still have to decide what to count, and what not to count, as part of a measure of economic well-being.

For many years, the System of National Accounts (SNA) has been the accounting framework within which most discussions of trends in economic well-being have been conducted, and Gross Domestic Product (GDP) per capita has been an often used summary measure of economic trends. The compilers of the national accounts have often protested that their attempt to measure the aggregate value of marketed economic output was never intended as a full measure of economic well-being. Nevertheless, it has often been used as such, and the GDP accounting exercise has attracted a great deal of recent criticism (e.g. Waring, 1988) as being a misleading indicator of economic well-being. Dissatisfaction with the GDP as a measure has led to a number of proposals for substitute measures (e.g. the Genuine Progress Indicator).

Summarizing the economic well-being of a complex society inevitably requires a series of ethical and statistical judgements. The problem with any single index number is that although many people may disagree with some of those judgements, it is often difficult to disentangle the relative importance of value judgements. Furthermore, in thinking about the appropriate public policy response, it is not particularly useful to know only that well-being has gone "up" or "down", without also knowing which aspect of well-being has improved or deteriorated.

The construction of measures of economic well-being can be seen as a problem in the optimal aggregation of information. If the objective is to improve the quality of public decision making and political debate, excess aggregation is not helpful, because it does not enable value judgements and statistical judgements to be separated. Furthermore, excess aggregation offers no guide to policy priorities.

Osberg (1985) therefore proposed that an index of economic well-being should be based on indices of consumption, accumulation, inequality and insecurity, with the explicit recognition that the weights attached to each component will vary, depending on the values of different observers. The underlying hypothesis is that public debate is likely to be improved if issues of fact and analysis are as clearly separated as possible. Measurement of the current level, or trend, of economic well-being can be seen as the first stage of a three stage discussion in which a society asks: (1) Where are we? (2) Do we want to go somewhere else? (3) How do we get there? Issues of measurement, of values and of analysis may be conceptually distinct, but in a single index of economic well-being, they often become hopelessly entangled. If the democratic debate on economic policy is to be fruitful, it would seem desirable to separate issues of measurement from the debate on values.

[1] This paper draws heavily on Osberg and Sharpe (1998).

If the discussion is organized in this way, those people who fundamentally care most about a particular aspect of well-being can discuss the facts about that aspect of well-being and the most desirable way of improving it, without confusing the discussion with other issues. (For example, those who are concerned most with the bequest that this generation will leave for the future can discuss whether the best way to safeguard sustainability is to emphasize environmental regulation, or capital accumulation, without simultaneously concerning distributional issues.) Such discussions of measurement issues are of a fundamentally different nature from discussions of values - which aspect of economic well-being should receive greatest weight.

This basic framework - that a society's well-being depends on societal consumption and accumulation and on the individual inequality and insecurity that surround the distribution of macro economic aggregates - is consistent with a variety of theoretical perspectives. We therefore avoid a specific, formal model.[2]

The reason for focussing on these four main dimensions of well-being is to enable persons with differing value judgements (e.g. a greater or less preference for intergenerational bequest, or for the reduction of poverty, compared to increases in average consumption) to account explicitly for those values. Each dimension of well-being is itself an aggregation of many underlying trends, on which the existing literature is sometimes spotty.[3]

As part of a larger project on quality of life in Canada, the Centre for the Study of Living Standards (CSLS) has constructed the index of economic well-being proposed by Osberg over a decade ago for Canada (Osberg and Sharpe, 1998), for a comparison of Canada and the United States (Osberg and Sharpe, 1999 and 2002) and for selected OECD countries (Osberg and Shape, 2000 and forthcoming). This paper provides preliminary estimates for the Canadian provinces of the index.

The paper is divided into two main parts. Part one discusses estimates of the four key components or dimensions of the index-consumption flows, stocks of wealth, inequality, and insecurity for each of the ten Canadian provinces excluding the Yukon North West territories and Nunavut. Part two presents exploratory or preliminary estimates of the overall index for these provinces. Estimates are available from 1971 to 2001, but since the most recent underlying data will be subject to revisions by Statistics Canada, and because some of the variables are only available to 1999 and have been extrapolated to 2001, the period considered will be 1971-1999.

2. The Components of Economic Well-Being

GDP is a measure of the aggregate marketed income of a society and most of its proposed substitutes (such as the GPI) are also primarily measures of adjusted average annual "income" flows [where the adjustments are meant to capture issues (such as environmental degradation) that GDP now ignores]. However, "income" is a flow variable which does not directly consider the aggregate value of the bequest which this generation will leave to its descendants. Although those Canadians now alive clearly care about the level of their own consumption, they also care (in varying degrees) about the well-being of future

[2] However, a sufficient (but not necessary) set of conditions for the index of economic well-being we propose would be that societal economic well-being can be represented as the well-being of a "representative agent", assuming that (1) such an agent has a risk-averse utility function (i.e. diminishing marginal utility); (2) from behind a "veil of ignorance" as to his/her own characteristics, each person draws an individual income stream (and prospects of future income) from the actual distribution of income streams; (3) each person has a utility function in which both personal consumption and bequest to future generations are valued; (4) individual income streams are exposed to unpredictable future shocks; and (5) capital markets and public policies do not always automatically produce a socially optimal aggregate savings rate.

[3] However, although the literature does not always offer a conclusive guide to the size of some of the trends underlying our composite measure of well-being, it is surely a bad approximation to implicitly set the weight of a variable to zero, by ignoring entirely its influence.

generations. Furthermore, although trends in average income are important, individual Canadians are justifiably concerned about the degree to which they personally will share in the prosperity of the average, and the degree to which their personal economic future is secure. The four components or dimensions of economic well-being in the proposed index of economic well-being are, therefore:

- effective per capita consumption flows

    - includes consumption of marketed goods and services, and effective per capita flows of household production and other unmarketed goods and services (section 2.1);

- net societal accumulation of stocks of productive resources

    - includes net accumulation of tangible capital, housing stocks and consumer durables, net accumulation of human capital, social capital and R&D investment, net changes in the value of natural resources stocks; and net change in level of foreign indebtedness (section 2.2);

- the absence of poverty and inequality,

    - as measured by the intensity of poverty (incidence and depth); and the inequality of income (section 2.3);

- security,

    - includes personal security from crime and ill health (including workplace injury), economic security from job loss, unemployment, family break-up, and poverty in old age (section 2.4).

A fuller discussion of the rationale for this framework of average consumption flows, aggregate bequest, equality and security can be found in Osberg (1985). The reason for focussing on these four main dimensions of economic well-being is to enable persons with differing value judgements (e.g. a greater or less preference for intergenerational bequest, or for the reduction of poverty, compared to increases in average consumption) to account explicitly for those values. Each dimension of economic well-being is itself an aggregation of many underlying trends, on which the existing literature is sometimes spotty. However, although the literature does not always offer a conclusive guide to the size of some of the trends underlying our composite measure of economic well-being, it is surely a bad approximation to implicitly set the weight of a variable to zero, by ignoring entirely its influence.

2.1 Average Consumption Flows

2.1.1 Marketed personal consumption

The starting point for this component of the index is aggregate real personal consumption per capita, which is calculated for each province using personal consumption in constant dollars and the total population of the provinces. However, since constant price data from the provincial national accounts are only available as far back as 1981, these series have been linked in 1981 to constant dollar personal consumption series calculated as nominal personal consumption deflated by the CPI in each province. These estimates are of course sensitive to the price series used to deflate nominal consumption. Since the data for the provincial Consumer Price Index are only available after 1979, national CPI growth rates are used for the years prior to 1979. Bias in price series obviously biases estimates of average real consumption flows. The recent debate on CPI bias is thus directly relevant to the estimation of real consumption flows. The Boskin Commission (Boskin et al., 1996) estimated that the US CPI had an upward bias of 1.1 per cent, largely due to the failure of prices indexes to capture the welfare effects of new goods and the quality improvements in existing products (Nordhaus, 1996). The Bank of Canada estimates that CPI bias in Canada is less than 0.5 per cent. In this paper, we do not make an adjustment for this bias.

Adjustments to marketed personal consumption flows

The System of National Accounts provides a strong basis for estimating the consumption of marketed goods and the cost of providing government services, and there have been enough studies of the value of household production to enable some confidence as to the range of reasonable values. Estimates are more imprecise when one considers the value of a number of other factors which also influence consumption flows, such as regrettable expenditures. These factors are discussed below, with approximate estimates of their value, in some cases. At this stage in the development of the index of economic well-being, our inclination is to include, rather than exclude, imprecise measures on the principle that an imprecise measure is likely to embody a smaller error than omitting a variable, which would implicitly set its value to zero. However, subsequent versions of this paper will undoubtedly revise these estimates somewhat.

Reduced economies of scale in household consumption

When individuals cohabit in households, they benefit from economies of scale in household consumption. There is a large literature on the estimation of "equivalence scales", which attempt to account for the magnitude of such economies of scale in households of different sizes. When comparing the average effective consumption of Canadians over time, the implication is that as households have shrunk in average size, economies of scale have been lost. Trends in average per capita consumption should therefore be adjusted for the average loss/gain over time of economies of scale in household consumption.

Since economies of scale diminish with family size, the extent of change in economies of scale depends on where change occurs in the distribution of family sizes. As a consequence, we use the square root of family size as the equivalence factor, multiplying personal per capita consumption by the percentage that this factor has changed relative to a 1971 base year. Data on family size are drawn from Statistics Canada data on population and census families.

In Survey of Consumer Finance data, Osberg (1997) finds that average family size in Canada for all families fell from 2.83 in 1975 to 2.59 in 1984, to 2.51 in 1989, and to 2.41 in 1994. Equivalence scales are non-linear functions of family size. Using the OECD or the Statistics Canada scale, a decline of 14.8 per cent from 2.83 family members to 2.41 from 1975 to 1994 would (holding per capita money income constant) raise equivalent income by about 10 per cent, or 0.50 per cent per year. Using our square root methodology, income has been reduced in every province over the 1971 to 1999 period. The largest reduction occurs in Newfoundland (14.8 percent) and the smallest in British Columbia (3.8 percent).

During the 1989-99 period, the picture looks slightly different, with three of the ten provinces experiencing increased or constant equivalent income due to the rising average family size. These three provinces are Manitoba, Alberta, and British Columbia. Newfoundland still maintains the greatest reduction, as in the 1971-1999 period, this time with a decline of 4.3 percent, followed by 2.3 percent in Prince Edward Island.

Regrettables and intermediate consumer goods

It can be argued that certain types of economic activity included in GDP do not contribute to economic welfare, but rather are defensive expenditures, or intermediate inputs that individuals make in order to be able to produce or consume. The costs households pay in order to commute to work are considered in the GDP to be part of household consumption, but the expenses which firms incur to bring materials to the work site are seen as an intermediate input in production. Since intermediate inputs in the business sector are netted out in the calculation of value added, it can be argued that similar expenditures by households should be subtracted from marketed consumption to obtain a better estimate of true consumption flows. Similarly, if the good that individuals want to consume is "a crime free street", but it now takes a greater expenditure on police services to produce that good, this should not be counted as an increase in consumption.

The Genuine Progress Indicator (GPI), an index of economic well-being developed by the San Francisco based Redefining Progress think tank, has developed methodologies for estimating the costs of crime, cost of commuting, cost of pollution abatement, and the cost of auto accidents. Messinger (1997) has made estimates for these variables for Canada (Appendix Table 4). The costs of commuting are defined as the cost of travelling to and from work using either public transportation or private vehicle, as well as an estimate of time used while commuting. The costs of crime and auto accidents are defined as the costs associated with medical and legal expenses and expenditures related to lost or damaged property. The cost of household pollution abatement represents the expenditure on air and water filters and devices to improve air and water quality in the home. Although provincial estimates for each sub-category of total regrettables can not be computed at this stage, the total regrettables cost per capita for each province have been calculated by applying the national share of regrettables in real personal consumption per capita to the provincial real per capita consumption series.

These estimates are very likely too low in absolute terms, since there is no consideration of any indirect influences - e.g. the impact of crime on residential neighbourhoods. However, it is not so much the absolute level, but the lack of any overall trends that is significant for the measurement of trends in aggregate economic well-being. For each year the proportion of regrettable expenditures in per capita consumption is about 12 percent, so that for Canada and each province regrettables grow at about the same rate as consumption. For each province, the values for total regrettables have been subtracted from consumption after the adjustment for family size (Table 1).

Leisure

With the increased employment/population ratio of the last two decades, the work-hours of Canadian families have risen substantially, and a decrease in leisure, everything else being equal, decreases economic welfare. The valuation of leisure poses a major challenge, although data on leisure time can be obtained residually from data on hours worked and directly from time-use surveys. It should be noted that the increase in unemployment and involuntary part-time employment during the 1980s and 1990s cannot be considered an increase in leisure time.

The average work week for full-time workers in all provinces has declined greatly in the first half of this century, but the fall has been much less since 1950, with little change in recent years. For the overall economy, in 1870, standard weekly hours in manufacturing were 64.0 (Ostry and Zaidi, 1979: Table IV-1). This fell to 58.6 in 1901, 50.3 in 1921, 48.7 in 1946 and 43.6 in 1951. By 1976 it had only reached 39.4. Labour Force Survey Data show that the average usual weekly hours of all workers only fell from 39.0 in 1976 to 37.8 in 1996 despite the growth in part-time employment. Average hours of full-time workers exhibited no downward movement. On a family basis, however, the last 25 years have seen a substantial increase in market work, as two parent families increasingly become two earner families.

There are two main approaches to the valuation of leisure. The first, used by Nordhaus and Tobin in the construction of the Measure of Economic Welfare (MEW), is to place a value on the total amount of leisure. The second, used by the Refining Progress Institute (1995) in the construction of the Genuine Progress Indicator (GPI) is to value changes in leisure relative to the amount of leisure enjoyed in the base year.

Messinger and Tarasofsky (1997) estimated the value of leisure in Canada using both approaches. Based on the MEW approach, they impute a value of $518.5 billion (1986 dollars) to leisure in 1995, or $17,509 per capita, nearly one and one half the value of marketed consumption. This is an increase of 5.2 per cent over the 1971 per capita valuation. Based on the GPI, they value the loss of leisure time relative to the 1970 base at $16.7 billion (1986 dollars) in 1994, or $571 per capita.

Since by the GPI methodology estimates there has been a fall in leisure equal in value to a 2.8% cut in total consumption (i.e. personal consumption plus government services and unpaid work), while the MEW methodology indicates an increase in leisure equal to 4.5% of the value of total consumption, clearly any perception of trends depends on the methodology chosen. Other estimates indicate that if the market and non-market work hours of Canadians aged 20 to 59 are added together, there is not much of any trend over

time (Bittman, 1998). Many Canadian families are feeling the time crunch of two demanding jobs, plus family responsibilities, but although some families are working more, there has also been a substantial trend to earlier retirement. Although work hours and leisure are unequally distributed among people and may be poorly distributed over the life cycle, there does not appear to be reliable evidence of a significant trend in the average. Although other versions of the Index of Economic Well-being (e.g. Osberg and Sharpe 1999 and forthcoming) make an adjustment for the value of increased leisure, this paper will not attempt to assign a value to leisure, or to trends in its magnitude. However, this issue will be investigated further so that future provincial estimates will account for the value of leisure enjoyed by Canadians.

At this point, since our focus is on trends in aggregate consumption, we are concerned with the aggregate amount of leisure enjoyed by Canadians, as a part of aggregate consumption. The distribution of hours of leisure is another issue. Picot (1996) has pointed to the increase in the percentage of individuals working very short weekly hours and the increased percentage working very long hours - although the inequality of weekly working hours has increased, the average is nearly constant. At the family level, MacPhail (1998) has emphasized that working age families have less leisure now than in the early 1970s, due to the increase in paid hours worked by married women entering the paid labour force over the period 1971-1996. However, the trend to earlier retirement also means that over the life cycle, Canadians are now enjoying more aggregate years of leisure, albeit in the latter part of their lives. Since there are offsetting trends in the distribution of leisure, near constancy in its aggregate level may mask declines in the utility derived from leisure, but we leave consideration of distributional issues to Section 2.3.

The underground economy

There has been much discussion in recent years about the growth of the underground economy. However, estimates of the value of goods and services produced, but not captured in official statistics, have ranged widely. The most comprehensive study, by Statistics Canada (1994), calculated that in Canada in 1992 consumption expenditure was underestimated by 3.5 per cent.

Since there always has been some level of "underground" activity, the issue for the measurement of trends in well-being is whether or not the prevalence of the underground economy has changed substantially over time. Rising tax rates in some provinces may have increased the incentive to go underground, but the increased penetration of franchise systems in the small business sector and the greater computerization of business records may have also made it more difficult to escape detection.

It is possible, as in an earlier version of this paper, to measure the aggregate value of unrecorded consumption expenditure for each province by using as a benchmark the 1992 Statistics Canada estimate. As the self-employed have more opportunity to engage in unreported economic transactions than paid workers, it can be assumed that the size of this unrecorded consumption expenditure has varied over time in proportion to the percentage of self employed in the total employment. However, due to the uncertain nature of this adjustment, this paper does not attempt to estimate the trend in underground activity.

Positional goods

Positional goods can be defined as those goods in limited supply that provide utility only because they are inherently scarce. For example, only one type of motorcycle can be "the fastest in town", and if the point of the purchase of motorcycles is to be the fastest, increased competitive expenditures on horsepower generate no aggregate increase in utility. To the extent that individuals' overall satisfaction is related to the consumption of positional goods, increases in aggregate consumption will raise economic well-being by less than the increase in dollar value of consumption. As it is unclear how to quantify the relative importance of positional goods and their implications for economic well-being, this aspect of economic well-being has not been developed in the current version of our work.

2.1.2 Government services

The provision of non-marketed or heavily subsidized services by the government is part of the consumption flow of Canadians. Provincial data on current expenditure of all levels of government including real fixed capital and inventories and excluding capital consumption allowances are used. Current dollar data are deflated by the deflator for government current expenditures on goods and services. Real net government spending per capita from 1971 to 1999 increased from $4,414 to $6,083 at the national level, expressed in 1997 dollars, a 37.8 percent increase.

2.1.3 Unpaid work

Unpaid work contributes to economic welfare and thus should be included in the index of economic well-being. Unpaid work consists of both household work and volunteer work. Statistics Canada (1996) has produced estimates of unpaid work for Canada and the provinces for the years 1961, 1971, 1981, 1986, and 1992, expressed in 1986 dollars. Data for other years have been interpolated or extrapolated. Estimates in 1986 dollars have been rebased to 1997 dollars with the CPI.

There are a number of methodologies for the valuation of unpaid work, including opportunity cost before tax or after tax, or at the replacement cost using a specialist or generalist. The value of unpaid work is not surprisingly greatest when it is valued on the basis of opportunity cost before taxes, followed by replacement cost using a specialist, opportunity cost after tax, and finally replacement cost using a generalist. The rate of growth over time however is not greatly affected by which valuation method is used.

This paper uses the value of unpaid work per capita based on replacement with a generalist - which amounts to $5,624 in 1971 (1997 dollars) and $8,958 in 1999 for Newfoundland, an increase of 59.3 percent, the highest among all provinces (Appendix Table 5). Unpaid work per capita in Saskatchewan rose from $5,701in 1971 to $6,265 in 1999, a 9.9 percent increase, the smallest among the provinces.

Increased female and youth participation, the expansion in the range of personal services available to households provided by the market, and the increase in the number and quality of time-saving household production innovations such as the microwave oven may have tended to decrease the amount of unpaid household work.

2.1.4 The value of increased longevity

Although this paper's estimates of the value of regrettable necessities can certainly be improved on, the impact of such a correction on measured trends in well-being is likely to be slight. The estimates that are available indicate that it is rather small as a percentage of measured consumption. Hence, the impact of errors of measurement on aggregate trends will also be small, and especially because there is some evidence that there is no strong trend in the variable. As a consequence, further refinements of the measurement of regrettable necessities are unlikely to have a major impact on the measurement of trends in economic well-being.

The same cannot be said of the impact of increased longevity on well-being. The life expectancy of Canadians has increased significantly in recent years, and we have every reason to believe that having a long life is an important component of the well-being of Canadians. The economic value of these extra years of life should be included in the total consumption flows of individuals, since presumably people care both about how much they consume per year, and how many years they get to consume it.

Between 1971 and 1999 each province experienced approximately 0.3 percent average annual growth in life expectancy at birth, with British Columbia attaining the highest level in 1999, at 80.0 years (Appendix Table 3). It is interesting to note that the rate of increase in life expectancy has not slowed down in any of the provinces, over the last 25 years, even over that last decade. Between 1989 and 1999 average life expectancy increased by about 2.0 percent in every province.

Years of life are one thing, and years of healthy, enjoyable life are a slightly different thing. A full appraisal of the value of increased longevity should consider trends in morbidity and health-adjusted life expectancy, as well as easier-to-measure trends in longevity. However, in considering either, one has to face the issue that the value of more years of life may look very different, the closer one actually is to death. Changes in life expectancy are occurring "in real time" and are affecting the well-being of all Canadians now alive. In aggregating over the population of Canadians now alive, one is aggregating over individuals at very different points in the life course. Although the economist's reflex is to consider the discounted value of lifetime utility, it may be highly problematic to view the value of additional years of life as discounted to the point of view of a teenager. For the purposes of this paper, we adopt the simple expedient of considering an increase in consumption per year or consumption for an increased number of years to be equivalent - i.e. we add to consumption flows in each year the percentage increase in average life expectancy.

2.1.5 Total consumption flows

For all years after 1971, per capita real consumption expenditure adjusted for family size and net of regrettable expenditures, is added to total per capita government expenditures and the value of unpaid labour, and the total is adjusted upwards by the percentage increase in longevity relative to 1971. Newfoundland experienced the largest increase in total consumption from 1971 to 1999, where it rose from $14,970 to $26,959, a 80.1 percent increase. Following Newfoundland were New Brunswick (67.7 percent), Quebec (62.4 percent) and Nova Scotia (58.8 percent). Ontario had the smallest increase, at 46.0 percent (Table 1).

Summary Table 1: Trends in Total Consumption Flows in Canada and Provinces, Percentage Changes.

	Canada	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1971-99	54.5	80.1	52.4	58.8	67.7	62.4	46.0	52.4	61.9	57.5	48.9
1971-80	22.8	21.9	23.7	23.2	22.1	26.4	12.7	20.3	32.1	33.0	26.2
1980-89	13.7	24.4	11.8	17.7	18.0	13.3	17.0	14.2	12.3	11.2	8.8
1989-99	10.7	18.8	10.2	9.5	16.3	13.3	10.7	10.9	9.1	6.5	8.5

During the 1989 to 1999 period, Newfoundland still maintained its leading position, with a 18.8 percent increase in total consumption, then New Brunswick and Quebec. No provinces had declining total consumption in any period, although growth in the 1990s was everywhere slightly less than or equal to growth in the 1980s and significantly less than growth in the 1970s. Total consumption flows in each province are shown in Chart 1.

2.2 Wealth Accumulation - The Intergenerational Bequest

In our view, measurement of trends in well-being should include consideration of changes in the well-being of generations yet unborn. This consideration of future generations can be justified either on the grounds that those Canadians now living care about the well-being of future generations or on the grounds that a concept of "Canadian society" should include both present and future generations. Either way, wealth accumulation by this generation of Canadians will increase the bequest left to future generations, and is an important component of well-being. We would emphasize that this component of economic well-being consists of those stocks of real productive assets that can generate real income for future generations - not the financial instruments that will determine the allocation of the return from those assets.

2.2.1 Physical capital stock

The physical capital stock includes both residential and non-residential structures as well as machinery and equipment, in both the business sector and the government sector. The greater the capital stock, the greater is future productive capacity and future potential consumption flows, and economic well-being. The capital stock data are based on the perpetual inventory method where investment flows are accumulated over time, with depreciation rates applied to the different assets. Statistics Canada produces estimates of the various components of the capital stock in current and constant prices by province for the 1984-2001 period for non-residential components, and for the 1956-2001 period for the residential component. The non-residential series for 1971-1984 were obtained by linking the most recent series to historical series based on an older methodology.

Newfoundland experienced the greatest increase in total capital stock per capita (residential and non-residential) from $43,720 in 1971 to $88,768 in 1999 (1997 constant dollars), a 103.0 percent rise (Appendix Table 7). Alberta experienced a similar increase (96.1 percent) as did Prince Edward Island (97.5 percent). The smallest increase was in Manitoba (34.4 percent), followed closely by British Columbia (43.1 percent).

2.2.2. Research and development capital stock

Closely related to the physical capital stock is the concept of the research and development (R&D) capital stock. In an era of rapid technological change, expenditure on R&D is a crucial ingredient in the ability of society to innovate and create wealth. Statistics Canada does not produce R&D stock data. The Centre for the Study of Living Standards has constructed an R&D stock series for Canada and the provinces from Statistics Canada's annual flows of general domestic expenditure on research and development (GERD). The stock of R&D capital is valued at cost of investment, and a depreciation rate of 20 per cent on the declining balance is assumed.

The smallest increase in the per capita R&D capital stock between 1971 and 1999 occurred in Nova Scotia, with growth of just 46.3 percent. All other provinces experienced well over 100 percent growth, the largest increase being in Newfoundland, where the per capita stock rose 2,162.6 percent from $39 to $877 in 1997 dollars (Appendix Table 8).

2.2.3 Value of natural resource stocks

The current consumption of Canadians could be increased by running down our stock of non-renewable natural resources or by exploiting our renewable resources in a non-sustainable manner, but this would be at the cost of the consumption of future generations of Canadians. A key aspect of the wealth accumulation component of economic well-being is net changes in the value of natural resources.

From an intergenerational perspective, it is the value of the natural resources, not their physical extent, which counts. The valuation of these resources poses conceptual problems, but estimates certainly are possible. Statistics Canada (2001) has recently provided both physical and value estimates of natural resources such as forests, energy reserves, and minerals. (Data on the value of fish stocks have not yet been developed).

The estimated market value is the price the resources would bring if sold on the open market. It is based on the difference between the annual cost of extraction of a given resource and the revenue generated from the sale of the resource. In other words, the total value or wealth associated with a stock is calculated as the present value of all future annual rent that the stock is expected to yield. This amount of rent is determined by the quality of the resources, the state of existing extraction technologies, the price of the resource and factor costs.

Appendix Table 10 presents estimates of the value of timber resources for each province while Appendix Table 11 presents estimates of the value of the four types of energy resources (crude oil reserves,

natural gas reserves, subbituminous coal and lignite reserves, and recoverable bituminous coal reserves). It should be noted that this valuation is based on remaining established reserves, which represent only a small proportion of known reserves and ultimately recoverable resources. The per capita value of energy resources has fluctuated dramatically over the 1971-97 period for most provinces, reflecting increased energy prices and rising proven reserves.

Appendix Table 12 presents estimates of the value of 10 minerals for Canada (copper, potash, silver, sulphur, uranium, gold, iron, nickel, lead, and molybdenum), again based on remaining established reserves. These per capita mineral stocks are distributed among the provinces according to a constant share for each year, namely the share of each province's GDP in mining industries in national mining industries GDP in 1997.

Appendix Table 13 aggregates the data on the value of timber, energy, and mineral resources into one measure for the value of natural resources for each Canadian province, then converts the current dollar estimates to 1997 dollars using the GDP deflators for each province and calculates real per capita natural resource stocks. Between 1971 and 1999, this total per capita value of natural resources fell in half of the provinces (British Columbia, Manitoba, Ontario, Nova Scotia and Prince Edward Island) but rose in the other half. The greatest decline in the per capita value was in P.E.I, declining from $630 to $319 between the two periods, a 49.4 percent decline. The greatest increase was in New Brunswick, with per capita natural resource wealth increasing 90.5 percent from $12,281 to $23,391.

2.2.4 Stocks of human capital

The human capital accumulated by the workforce generates both current and future income. Trends in the stock of human capital, including both formal educational attainment levels and on-the-job training, are important determinants of current and future economic well-being. School retention and participation in post-secondary education have increased dramatically in Canada over the last three decades, and there is a strong relationship between educational attainment and individual income.

One approach to the valuation of human capital is to estimate the returns associated with different levels of educational attainment of the population and compute the implicit present discounted value of education (Jorgenson and Fraumeni, 1992). A major problem with this methodology, however, is that it imputes to education stocks any differential in the structure of wages that is correlated with education. A second, input-based approach is to apply the perpetual inventory method of estimating the physical capital stock based on investment flows and depreciation assumptions to public and private expenditure on education and training (Kendrick, 1976). A third approach to human capital accounting is to develop methods for systematically evaluating and recording knowledge assets acquired through experience, education, and training (OECD, 1996).

Our approach in this paper is admittedly crude and incomplete and will be improved upon at a later date. We estimate the cost per year of education expenditures at the primary, secondary and post secondary levels by province (Appendix Table 14) and use yearly estimates of the distribution of educational attainment within the population to compute the total cost of production of human capital in education (Appendix Table 15). Our estimates of the change over time in the value of human capital stocks are, therefore, under-estimates, since we do not yet account for the cost of student time in human capital production or for the value of experience or on-the-job training.

In 1992-93, the average cost of educating a student at the elementary-secondary level, calculated by dividing total expenditure at the level by enrolment, was highest in Ontario ($6,886), and lowest in Prince Edward Island ($5,226). At the community college level, the cost varied substantially from one province to another, with $21,172 in New Brunswick being the highest, and $8,661 in Newfoundland, the lowest cost. At the university level, British Columbia had the greatest cost ($26,392) and New Brunswick the lowest ($14,797).

Appendix Table 15 displays the average number of years of education assumed for each educational attainment group, as well as provincial estimates of the size of the population and the stock of human

capital by educational attainment. In 1971, the province with the highest human capital per capita, expressed in 1997 dollars (converted from 1992 dollars using the GDP deflators) was British Columbia ($64,432), followed closely by Ontario ($61,576), and Quebec ($61,445). The lowest human capital per capita was found in Newfoundland and was $42,812. In 1999 the order changed slightly, but British Columbia still held the top spot at $92,417 and Newfoundland still had the lowest per capita human capital stock, at $60,787.

Like these other assets, the value of the human capital of living Canadians represents the future consumption that possession of such assets enables. The endogenous growth perspective has argued that the benefits of societal learning are partly the output such learning enables in the current generation and partly the fact that future generations can start learning at a higher level. As a consequence, higher levels of education produce a higher long run growth rate, as well as a higher current level of income [Galor and Zeira (1993), Eckstein and Zilcha (1994)]. If this is correct, a production cost valuation of human capital may underestimate considerably the value of the human capital stock investments.

2.2.5 Net foreign indebtedness

We do not count the gross level of government, or corporate debt as a "burden" on future generations, and we do not count as part of the intergenerational bequest the value of paper gains in the stock market. In general, financial instruments represent both assets to their holders and liabilities to their issuers. The distribution of such assets/liabilities will play a major role in allocating the real returns to the future capital stock, but the issue at this point is the aggregate value of the intergenerational bequest.

However, net debt to foreigners is another issue. Since interest payments on the net foreign indebtedness of Canadians to other countries will lower the aggregate future consumption options of Canadians, increases in the level of foreign indebtedness reduce economic well-being. Unlike many of the other stock variables, well-developed data are available. Statistics Canada publishes data on net foreign indebtedness for both direct foreign investment and portfolio investment. In this paper, we will not attempt any estimate of the more controversial aspects of the net costs of equity investments and foreign ownership (e.g. possible foreign sourcing of suppliers). Neither is it possible, due to a lack of data, to consider the debt of Canadians in one province to Canadians in other provinces.

Appendix Table 16 gives estimates of the net international investment position of Canada, which is distributed across provinces by the nominal share of national GDP. On a per capita basis, with the figures expressed in 1997 dollars, the net foreign debt increased from $5,961 in 1971 to $8,031 in 1999 at the national level, a 34.7 percent increase.

2.2.6 Estimates of total wealth

As the estimates of the physical capital stock, the R&D capital stock, and natural resource wealth, human capital and net foreign debt are expressed in value terms, they can be aggregated and presented for each province on a per capita basis (Table 2). Note that net foreign debt per capita is a negative entry, and thus would reduce total real per capita wealth for each province.

From 1971 to 1999, on a per capita basis and expressed in 1997 dollars, the value of the stock of physical capital, R&D, human capital and natural resources and foreign debt are presented in Table 2. The increase in total per capita stock from 1971 to 1999 was largest in Newfoundland, increasing from $97,745 to $160,152, a 63.8 percent increase. Then followed New Brunswick (62.8 percent), Prince Edward Island (60.7 percent) and Alberta (60.4 percent). The smallest increase was in Manitoba, from $119,203 in 1971 to $151,704, a 27.3 percent increase.

Summary Table 2: Trends in the Total Stock of Wealth in Canada and Provinces, percentage change.

	Canada	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1971-99	53.9	63.8	60.7	53.8	62.8	56.6	42.2	27.3	37.6	60.4	32.3
1971-80	28.4	14.5	12.0	15.6	21.7	16.6	13.4	13.2	24.1	71.9	16.9
1980-89	3.3	9.6	13.2	14.3	9.3	11.3	9.0	-1.1	-3.4	-14.2	1.4
1989-99	16.0	30.6	26.7	16.4	22.4	20.8	15.1	13.7	14.7	8.7	11.6

During the nineties, P.E.I and Newfoundland both experienced the greatest increase in per capita total wealth as compared with the other provinces, well above the national average growth. Alberta had the smallest increase. Total wealth stocks in each province are shown in Chart 2.

2.2.7 Other wealth variables

Data for the above variables have been used in the construction of the index of economic well-being presented in this paper. In addition, a number of other variables, whose estimation may be more problematic, are discussed briefly below.

Consumer durables

The stock of consumer durables contributes directly to the well-being of Canadians. Statistics Canada's household facilities survey provides data on the ownership of a large number of household equipment.

Social capital

It has been argued by a number of authors that "social capital" is highly important for economic productivity. Social capital can be taken to include the social institutions that produce habits of honesty and co-operation, a justifiable sense of mutual trust in business dealings and a willingness to compromise in negotiations - all of which clearly help to make economic transactions run more smoothly. Recently, Knack and Keefer (1997) have found that countries scoring higher on measures of social capital tend to grow more rapidly over time. Despite the potential importance of this variable, it is not included at this time.

State of the Environment and National Heritage

Like the excess depletion of natural resources, the current consumption of Canadians can be increased at the expense of the degradation of the environment, reducing the economic well-being of future generations. Consequently, changes in the level of air and water pollution should be considered an important aspect of the wealth accumulation of Canadians.

Canadians pass on from generation to generation both a natural and made-made national heritage. If this heritage were damaged, the economic well-being of future generations of Canadians would be reduced. Since it is very difficult, if not impossible, to put a monetary value on, for example, the pristine condition of our national parks, or the Parliament Buildings, there will be no attempt to set an aggregate value to these assets. However, the issue of trends in well-being is the change in such assets, which is easier to measure and indexes of indicators of environmental quality can be developed.

In addition to stocks of physical, natural, and human capital, we believe it desirable to include environmental stocks such as clean air and water in the index of economic well-being. The obvious problem is that is virtually impossible to value the stock of clean air or water. Rather our approach is to use the change in the value of the environmental stocks by estimating the social costs associated with environmental degradation and to subtract these costs from the aggregate stock of wealth.

Probably the best known environmental problem is global warning arising from increased emissions of greenhouse gases, the most common of which is carbon dioxide emissions. While estimates of CO2 emissions were included in the overall index of economic well-being for Canada (see Osberg and Sharpe, 1999, 2000), this paper does not include such estimates because of problems associated with the methodology. A later version of this paper will include these estimates.

2.3 Inequality and Poverty

The idea of a "Social Welfare Function" which is a positive function of average incomes and a negative function of the inequality of incomes has a long tradition in welfare economics. However, in measuring the level of social welfare, the exact relative weight to be assigned to changes in average incomes, compared to changes in inequality, cannot be specified by economic theory. Indeed, the measurement of inequality itself depends on the relative value which the observer places on the utility of individuals at different points in the income distribution. For a "Rawlsian", only changes in the well-being of the least well off matter, but others will admit some positive weight for the income gains of the non-poor, and will assign some negative weight to inequality among the non-poor.

Since the economic well-being of the population is affected by inequality in the distribution of income and by the extent of poverty, there are two issues: 1) one's perspective on the importance of inequality/poverty compared to trends in average income, and 2) one's view of the relative weight to be placed on poverty compared to inequality. We therefore suggest that a compound sub-index to recognize explicitly these issues would place some weight (β) on a measure of inequality in the aggregate distribution of income and some weight ($1-\beta$) on a measure of poverty.

The most popular measure of inequality in the distribution of income is undoubtedly the Gini index. Statistics Canada has published Gini indices for three definitions of income: income before transfers, total money income, and income after tax. For the purpose of the construction of the index of economic well-being, we have chosen the income after tax measure as it represents the best measure of purchasing power (Appendix Table 17). Unfortunately the poverty and inequality data used for this paper have been calculated from Survey of Consumer Finance micro-data and at the moment are only available to 1995. These variables have hence been held constant since 1995. However, as the Survey of Labour and Income Dynamics is now available to 1999, the estimates presented here will be updated as soon as the variables can be computed from the micro-data base.

Between 1971 and 1999, the measure of income inequality was down in four of the ten provinces, namely Saskatchewan (-7.1 percent), Prince Edward Island (-6.3 percent), Manitoba (-0.01 percent) and Alberta (-0.003 percent). The greatest increase in this measure was in Ontario and British Columbia where it increased 14.3 percent. However, between 1989 and 1999 none of the provinces experienced a decline in income inequality. In British Columbia it increased from 0.267 in 1989 to 0.305 in 1999, a 14.2 percent increase, and in Ontario from 0.267 to 0.875, a 13.9 percent increase. During this period Quebec experienced a 10.3 percent rise, and New Brunswick and Newfoundland experienced an 8.2 and 8.1 percent increase respectively. Then followed Alberta (5.8 percent), Nova Scotia (5.0 percent), Manitoba (4.0 percent) and Prince Edward Island (2.3 percent). Saskatchewan experienced the smallest increase in income inequality, increasing from 0.283 in 1989 to 0.289 in 1997, a 2.1 percent increase.

Osberg and Xu (1998) have noted that the Sen-Shorrocks-Thon measure of poverty intensity is both theoretically attractive as a measure of poverty, and also convenient, since it can be decomposed as the product of the poverty rate, the average poverty gap ratio and the inequality of poverty gap ratios. Furthermore, percentage changes in poverty intensity can be approximated as the sum of the percentage change in the poverty rate and the percentage change in the average poverty gap ratio.

As an indicator of poverty we have adopted the Low Income Measure (LIM), defined as the proportion of the population with income below one half the median adjusted income. This is a purely relative measure of poverty, and should be seen as a measure of inequality in the bottom part of the total income

distribution. Another option would be to use Statistic Canada's low-income cut-offs (LICOs), but because of problems with consistency in the series over time (particularly before 1980) with the use of different base years, we use the LIM in this paper. This is consistent with the methodology of most international studies of poverty. In contrast, the LICO is a uniquely Canadian methodology, which includes both absolute and relative components of poverty.

Appendix Table 18 presents the proportion of Canadians living below the LIM in the ten provinces. There are wide variations between the provinces. In 1971 the poverty rate was highest in Newfoundland at 32.9 percent and lowest in British Columbia at 9.2 percent. By 1989 this value had decreased to 20.6 percent in Newfoundland and increased to 13.0 percent in British Columbia. At this point Saskatchewan had the highest poverty rate of 21.4 percent and Ontario the lowest of 10.1 percent. In 1999 the poverty rate in Newfoundland increased from its 1989 rate to 23.9 percent, a 16.0 percent increase, again the highest poverty rate among the provinces. However, for the 1971-99 period as a whole, the poverty rate in this province declined 27.4 percent. In 1999, Ontario's poverty rate was the lowest among the provinces resting at 12.8 percent, a 26.7 percent increase from its 1989 rate, and a 16.4 percent increase from its 1971 rate.

Overall, the 1989 to 1999 period saw a decline in the poverty rate for six of the ten provinces: Saskatchewan (19.3 percent), Prince Edward Island (19.0 percent), Manitoba (14.4 percent), Alberta (11.9 percent), Nova Scotia (2.6 percent) and New Brunswick (0.52 percent). On the contrary, the poverty rate increased in Ontario (26.7 percent), Newfoundland (16.0 percent), British Columbia (10.0 percent) and Quebec (5.5 percent).

The poverty gap is defined as the gap between the average income of those below the poverty line or LIM cut-off and the cut-off. The poverty gap ratio is this gap divided by the LIM cut-off (one half median income). This ratio is relatively stable among the provinces, declining for the 1971 to 1999 period in all but one province, namely Nova Scotia where it increased from 29 percent in 1971 to 33 percent in 1999, a 13.8 percent rise (Appendix Table 18). For this period, the decline was greatest in Ontario, dropping from 37 percent to 29 percent, a reduction of 21.6 percent. Manitoba followed closely with a 20.0 percent decline, from 35 percent in 1971 to 28 percent in 1999.

The period 1989 to 1999 paints a different picture. This time the poverty gap ratio declines in only two of the ten provinces, namely Prince Edward Island and Manitoba where its value drops from 29 percent to 28 percent, a 3.5 percent drop in both provinces. In Alberta, British Columbia and Ontario, the poverty gap ratio remains unchanged between 1989 and 1997 at 35, 33 and 29 percent respectively. The greatest increase in the poverty gap ratio was in Nova Scotia, rising from 28 percent in 1989 to 33 percent in 1997, a 17.9 percent rise. Newfoundland experienced a 9.7 percent increase, Quebec 6.7 percent, New Brunswick 6.5 percent and Saskatchewan, 2.9 percent.

The overall intensity of poverty is the product of the poverty rate and the poverty gap ratio (Appendix Table 18). This value varies considerably among the provinces, registering a decline in seven provinces for the 1971-99 period. This decline was greatest in Prince Edward Island (57.7 percent), followed by Manitoba (30.7 percent), Newfoundland (24.4 percent), Saskatchewan (21.7 percent), New Brunswick and Alberta (17.0 percent) and Ontario (8.8 percent). During this period, poverty intensity actually increased in Quebec by 5.5 percent and in British Columbia by 35.0 percent.

During the 1989 to 1999 period, poverty intensity declined in only four provinces: Prince Edward Island by 21.8 percent, Manitoba 17.3 percent, Saskatchewan 16.9 percent and Alberta 11.9 percent. Poverty intensity increased in Newfoundland by 27.3 percent, Ontario 26.7 percent, Nova Scotia 14.8 percent, Quebec 12.5 percent, British Columbia 10.0 percent and New Brunswick by 5.9 percent.

The overall index of equality is a weighted average of the indexes of the poverty intensity for all units or households and the Gini coefficient for after-tax income, with the weights 0.75 and 0.25 respectively. The index is multiplied by –1 in order to reflect the convention that increases are desirable. To put the equality sub-component of the overall index of well-being to a common base of 1, the constant 2 has then been added to the index (see Summary Table 3).

For the 1971-99 period, the index of equality increased in seven provinces: Prince Edward Island by 44.8 percent, Manitoba 23.3 percent, Newfoundland 21.7 percent, Saskatchewan 18.0 percent, Alberta 13.0 percent, New Brunswick 11.8 percent and Ontario 8.8 percent. The index declined in the remaining three provinces: British Columbia by 29.8 percent, Nova Scotia 13.4 percent and Quebec 4.9 percent.

Summary Table 3: Trends in the Index of Equality in Canada and Provinces, Percentage Change.

	Canada	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1971-99	7.6	21.7	44.8	-13.4	11.8	-4.9	3.0	23.3	18.0	13.0	-29.8
1971-80	5.7	15.6	16.5	-20.1	-6.2	-7.0	-8.8	-10.6	2.8	12.2	-32.1
1980-89	16.2	16.8	17.1	24.0	24.9	14.3	32.5	26.8	3.7	-5.5	22.2
1989-99	-12.5	-9.8	6.1	-12.6	-4.6	-10.5	-14.8	8.7	10.7	6.6	-15.4

In the 1989-99 period however, only four provinces experienced a rise in the index of equality: Saskatchewan rising by 10.7 percent, Manitoba 8.7 percent, Alberta 6.6 percent and Prince Edward Island 6.1 percent. The rest experienced a decline: British Columbia 15.4 percent, Ontario 15.0 percent, Nova Scotia 12.6 percent, Quebec 10.5 percent, Newfoundland 9.8 percent and New Brunswick 4.6 percent. The indexes of equality for each province are shown in Chart 3.

Other indicators of inequality

By using measures of aggregate inequality, and aggregate poverty, we implicitly impose the ethical value of anonymity, and count the poverty of any person as being of equal social concern, regardless of their identity or such characteristics as age or gender. Those who are concerned with norms of equity between groups may in addition wish to consider additional indicators of inequality, such as the earnings gap between men and women. Such differentials are reflected in the aggregate Gini index of all incomes, and in the rate and extent of poverty, but only enter our measures of poverty and inequality in so far as they affect those aggregate measures.

2.4 Insecurity

If individuals knew their own economic futures with certainty, their welfare would depend only on their actual incomes over their lifetimes, since there would be no reason to feel anxiety about the future. However, uncertainty about the future will decrease the economic welfare of risk-averse individuals. Individuals can try to avoid risk through social and private insurance, but such mechanisms do not completely eliminate economic anxieties. Given the value Canadians place on economic security, insecurity reduces economic well-being.

Although public opinion polling can reveal that many Canadians feel themselves to be economically insecure, and that such insecurity decreases their subjective state of well-being, the concept of economic insecurity is rarely discussed in academic economics. Consequently, there is no generally agreed definition of economic insecurity. Osberg (1998) has argued that economic insecurity is, in a general sense, "the anxiety produced by a lack of economic safety - i.e. by an inability to obtain protection against subjectively significant potential economic losses." In this sense, individuals' perceptions of insecurity are inherently forward looking, the result of their expectations of the future and their current economic context - hence only imperfectly captured by measures such as the ex post variability of income flows. Ideally, one would measure trends in economic security with data which included the percentage of Canadians in each province who have credible guarantees of employment continuity and the adequacy of personal savings to support consumption during illness or unemployment. However, such data are not available. For these

reasons, rather than attempt an overall measure of economic insecurity, this paper adopts a "named risks" approach, and addresses the change over time in four key economic risks.

Fifty years ago, the United Nations' Universal Declaration of Human Rights declared:

> Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other loss of livelihood in circumstances beyond his control. [Article 25]

For this paper, we construct measures of the percentage change over time in the economic risks associated with unemployment, illness, "widowhood" and old age for each Canadian province. In each case, we model the risk of an economic loss associated with the event as a conditional probability, which can itself be represented as the product of a number of underlying probabilities. We weight the prevalence of the underlying risk by the proportion of the population which it affects. The core hypothesis underlying the measure of economic insecurity proposed here is that changes in the subjective level of anxiety about a lack of economic safety are proportionate to changes in objective risk.

2.4.1 Unemployment

The economic risk associated with unemployment can be modelled as the product of the risk of unemployment in the population and the extent to which people are protected from the income risks of unemployment. We have taken as a proxy for the risk of unemployment the employment rate (employment/population ratio). Changes in this ratio reflect changes in the unemployment rate and changes in the participation rate (both cyclical and structural). The extent to which people have been protected by UI from the financial impacts of unemployment can be modelled as the product of: 1) the percentage of the unemployed who claim regular UI benefits and 2) the percentage of average weekly wages replaced by UI (see Appendix Tables 19, 20 and 23).

The index of security from unemployment has shown considerable variation for all Canadian provinces over the 1971-99 and 1989-99 periods (see Table 4). For all provinces it increased in the early 1970s with the increased generosity of UI, and then declined substantially due to the falling employment rate, reflecting higher unemployment and the falling participation rate, and cuts to the UI/EI program in both coverage and benefit levels. For the period 1971 to 1999 half the provinces experienced an increase in security from the risk imposed by unemployment, namely Nova Scotia, New Brunswick, Manitoba, Saskatchewan and Alberta, while the other half experienced a drop. However, during the 1990s each province experienced a decline, the greatest being 57.3 percent in Ontario, while the smallest decline was in New Brunswick with a drop of 26.7 percent.

2.4.2 Illness

Viewed from a longer-term perspective, the economic insecurities associated with illness in Canada and the provinces certainly dropped considerably with the introduction of Medicare in the late 1960s. Since data series are often difficult to obtain prior to 1971, the period covered by the present study is 1971 to 1999, which therefore unfortunately largely omits the improvement in economic well-being that Medicare represented. Nevertheless, it is still of interest to examine how the economic insecurities associated with illness have evolved over the last quarter century.

We would emphasize that we do not attempt to model the psychological insecurities associated with health - just the economic risks. Recent decades have seen both substantial advances in medical technology and increased awareness of health hazards (such as Jakob-Kreutzfeld Syndrome -"mad cow disease") which were previously unimaginable. It is not clear whether subjective anxieties about health have increased or fallen as a result.

Our objective is only to model the trend in economic anxieties associated with ill health, but at this stage of our research, there is an important omission. The economic risks associated with illness are partly the risk of loss of earnings. Historically, a portion of the Canadian labour force has had some protection against such losses through sick leave provisions in their individual or collective employment contracts. One implication of the trend to short term contract employment and self-employment in Canadian labour markets is an increase in the fraction of the population whose incomes cease totally in the event of ill health. This paper does not attempt to model such risks. Instead, we focus on the risk of large out of pocket health care costs.

Appendix Table 26 shows the share of private expenditures on health in personal disposable income by province (also see Appendix Tables 24 and 25). During the 1971-99 period only Saskatchewan saw this share fall, from 3.98 percent to 3.94 percent, a 0.01 percent fall. All other provinces saw an increases, the largest of which was 94.3 percent in New Brunswick, and the smallest of which was 29.0 percent in Quebec. Over the 1989-1999 period all provinces saw this share rise by roughly 30 percent.

However, to follow the convention that increases in the sub-components of the index of economic security are improvements, we want an index of "security" and not an index of "insecurity", hence we multiply the risk of illness where increases are negative for economic well-being by –1. A negative sign therefore indicates that an increased negative value represents a decline in well-being (and a decreased negative value an increase in well-being). The constant 2 is then added to arrive at an index of security with a value of 1.000 in the base year of 1971 (Table 5).

2.4.3 Single Parenthood Poverty

When the UN Universal Declaration of Human Rights was drafted in 1948, the percentage of single parent families was relatively high, partly as a result of World War II. At that point in time, "widowhood" was the primary way in which women and children lost access to male earnings. Since then, divorce and separation have become the primary origins of single parent families. However, it remains true that many women and children are "one man away from poverty", since the prevalence of poverty among single parent families is extremely high.

To model trends in this aspect of economic insecurity, we multiply (the probability of divorce) * (the poverty rate among single female parent families) * (the average poverty gap ratio among single female parent families)[4] (see Appendix Table 27).

We stress that in constructing a measure of the economic insecurity associated with single parent status, we are not constructing a measure of the social costs of divorce. Economic well-being is only part of overall well-being, and divorce has emotional and social costs (e.g. for the involved children) that are not considered here. Arguably, over time the social costs associated with divorce (e.g. stigma) have changed, as the institution of marriage itself has changed - but such issues lie well beyond the scope of this paper.

During the 1971 to 1999 period, the divorce rate increased substantially in most provinces, ranging from an increase of 5.7 percent in British Columbia (from 0.93 percent to 0.98 percent of women who are legally married) to an increase of 381.4 percent in Newfoundland (from 0.14 percent to 0.68 percent). However, most of the increase occurred during the seventies and the eighties. The period 1989 to 1997 registers a decline in the rate of divorce in all except Prince Edward Island, which experienced a minimal increase of 3.2 percent. Nova Scotia underwent the largest decline, of 32.7 percent from 1.2 to 0.8 percent.

The poverty rate for lone-parent females, defined on a LIM basis, rose in all but three provinces during the 1971 to 1999 period. The decline took place in New Brunswick, falling from 73.1 percent to 72.7 percent, a 0.6 percent drop. Alberta experienced a decline of 0.9 percent with the rate falling from 53.9 percent to 53.4 percent; and Manitoba a decline of 0.9 percent with the rate falling from 53.2 to 52.7

[4] However, RATE= INCIDENCE x AVERAGE DURATION. Since the poverty rate among single parents is equal to the conditional probability that a single parent will enter poverty and the average duration of a poverty spell, we do implicitly account jointly for the duration of poverty spells and for their likelihood.

percent. The province experiencing the greatest increase in the poverty rate during the this period was British Columbia for which the poverty rate grew from 40.8 percent in 1971 to 51.7 percent in 1997, a 26.7 percent increase.

During the period 1989 to 1999, the poverty rate declined in seven provinces, namely, Manitoba by 17.0 percent (falling from 63.5 percent to 52.7 percent), British Columbia by 13.1 percent (59.5 percent to 51.7 percent), Prince Edward Island by 6.4 percent (65.6 percent to 61.4 percent), Alberta 5.8 percent (56.7 percent to 53.4 percent), Quebec 1.3 percent (52.1 percent to 51.4 percent), Saskatchewan 0.81 percent (62.1 percent to 61.6 percent) and New Brunswick 0.27 percent (72.9 percent to 72.7 percent). Newfoundland registered the greatest increase in the poverty rate, rising from 67.5 percent in 1989 to 80.7 percent in 1999, a 19.6 percent increase. The two provinces that followed were Ontario with a 17.2 percent increase (rising from 45.9 percent to 53.8 percent) and Nova Scotia with the poverty rate increasing from 63.9 percent to 73.8 percent, a 15.5 percent increase.

The average poverty gap ratio dropped from 1971 to 1999 in all provinces but Saskatchewan, where it increased by 21.9 percent. The greatest decline was in Prince Edward Island falling 47.9 percent. During the 1989 to 1999 period, again the average poverty gap ratio dropped in all provinces but one, this time Nova Scotia, where it increased 5.9 percent. The greatest decline was again in Prince Edward Island, with this ratio dropping 34.2 percent. Newfoundland experienced a decline of 18.4 percent, British Columbia 16.7 percent, Saskatchewan 11.4 percent, Quebec 10.5 percent, Manitoba 8.6 percent, Ontario 6.7 percent, Alberta 5.6 percent and New Brunswick 2.6 percent.

The overall index of single parent poverty rose considerably during the 1971 to 1999 period in all but three provinces, namely Ontario, Alberta, and British Columbia. In the nine provinces experiencing an increase in the overall index, the increase was substantial, ranging from 18.2 percent in Manitoba to 338.4 percent in Newfoundland. British Columbia experienced the largest decline, where the index fell 21.2 percent. However, the 1989 to 1999 period shows the overall index of single-parent poverty declining in all provinces, from a fall of 49.2 percent in British Columbia to a fall of 12.4 percent in Newfoundland.

Again to follow the convention that increases in the sub-components of the index of economic security are improvements, we want an index of "security" and not an index of "insecurity", hence we multiply the risk of single-parenthood where increases are negative for economic well-being by –1. A negative sign therefore indicates that an increased negative value represents a decline in well-being (and a decreased negative value an increase in well-being). Again, the constant 2 is then added so that the index of security from the risk imposed by single parent poverty takes the value of 1.000 in 1971 (Table 6).

2.4.4 Poverty in Old Age

Since income in old age is the result of a lifelong series of events and decisions, which we cannot hope to disentangle in this paper, we model the idea of "insecurity in old age" as the chance that an elderly person will be poor, and the average depth of that poverty.

The elderly poverty rate defined on a LIM basis fell in all provinces for both 1971-99 and 1989-99 periods (Table 8). Alberta underwent the greatest decline with this rate falling from 31.3 percent in 1971 to 4.6 percent in 1999, an 85.3 percent drop. Manitoba's decline in elderly poverty was also substantial, dropping 74.7 percent, British Columbia experienced a decline of 69.4 percent, and Ontario 68.1 percent. The smallest decline in the elderly poverty rate for the whole 1971-99 period was in New Brunswick, with this rate falling from 25.7 percent to 17.2 percent, a 33.1 percent drop.

The 1989 to 1999 period also saw a decline in this rate for all provinces ranging from 78.5 percent in Alberta to 26.8 percent in New Brunswick. Quebec experienced a drop from 31.1 percent in 1989 to 13.0 percent in 1999, a 58.2 percent decline. In British Columbia, the elderly poverty rate was down 57.2 percent, falling from 15.9 percent to 6.8 percent. Newfoundland saw a decline from 30.0 percent to 13.0 percent, a 56.7 percent drop. In Nova Scotia, this poverty rate went from 27.1 percent to 12.9 percent, a 52.4 percent decrease. Prince Edward Island saw a decline of 47.7 percent (28.7 in 1989 to 15.0 in 1999),

Manitoba a decline of 43.0 percent (16.5 to 9.4), Saskatchewan a drop of 34.0 percent (18.8 to 12.4) and Ontario a 31.4 percent decline with this rate falling from 11.8 percent in 1989 to 8.1 percent in 1999.

The poverty gap also declined substantially for all provinces during the 1971 to 1999 period. The decline ranged from 40.7 percent in Alberta (falling from 27 percent to 16 percent) to 73.1 percent in Ontario (dropping from 26 percent to 7 percent). During the 1989 to 1999 period the poverty gap among the elderly dropped in all but one province. In Alberta this rate increased by 23.1 percent, from 13 to 16 percent. During this period, the greatest decline was in Newfoundland where the rate fell from 16 percent to 8 percent, a 50.0 percent drop. Ontario followed with a 46.2 percent drop (falling from 13 percent to 7 percent). Quebec underwent a 31.3 percent decline (16 percent to 11 percent), Prince Edward Island a 25.0 percent drop (16 percent to 12 percent), New Brunswick and Manitoba both underwent a 21.4 percent decline, with the poverty gap falling from 14 to 11 percent in both provinces. The rate fell by 16.7 percent in Saskatchewan, falling from 12 percent to 10 percent. Nova Scotia and British Columbia experienced 13.3 percent (from 15 to 13 percent) and 7.7 percent (13 to 12 percent) declines respectively.

Poverty intensity among the elderly declined in all provinces during the 1971-99 and 1989-99 periods. For the whole period, the decline ranged from 68.0 percent in New Brunswick to 91.0 percent in Ontario and Alberta. During the 1990s the decline was greatest in Newfoundland (78.3 percent) and smallest in New Brunswick (45.5 percent). The decline in Alberta was 73.5 percent, followed by Quebec (71.3 percent), then Ontario (63.0 percent), Prince Edward Island (60.8 percent), British Columbia (60.5 percent), Nova Scotia (58.8 percent), Manitoba (55.3 percent) and Saskatchewan (45.0 percent).

Again to follow the convention that increases in the sub-components of the index of economic security are improvements, we multiply the risk of elderly poverty where increases are negative for economic well-being by –1. A negative sign therefore indicates that an increased negative value represents a decline in well-being (and a decreased negative value an increase in well-being). As before, the constant 2 is then added to arrive at an index of security from the risk imposed by poverty in old age with 1971=1.000 (Table 7).

2.4.5 Overall Index of Economic Security

The four risks discussed above have been aggregated into an index of economic security for all provinces (Table 8). The aggregation weights are the relative importance of the four groups in the population, and thus differ from one province to another (Appendix Table 29). To put the sub-components of the overall index of economic security to a common base of 1, the constant 2 has been added to the risks of financial insecurity from illness, single parent poverty and poverty in the old age.

The groups at risk in the population are as follows:

- For unemployment, the proportion of the 15-64 population in the total population (for example 67.3 percent in Ontario in 1999).
- For illness, the proportion of the population at risk of financial insecurity from illness, which is 100 percent.
- For single parenthood, the proportion of the population comprised of married women with children under 18 and the children (36.8 percent in Ontario in 1999).
- For old age, the proportion of the population in immediate risk of poverty in old age, defined as the proportion of the total population aged 45-64 (22.3 percent in Ontario in 1999).

The above proportions have been normalized for all years to one (Appendix Table 29), giving the four risks in Ontario in 1999 the following weights- unemployment (0.2972), illness (0.4417), single parent poverty (0.1627), and old age poverty (0.0984).

Based on the above weights, the overall index of economic security in Ontario declined 44.6 percent between 1971 and 1999 and 38.6 percent between 1989 to 1999 (Table 8). During the 1971 to 1999 period, the index declined in nine provinces, with the greatest decline in Newfoundland where the index fell 78.3 percent. Only in Alberta did the index rise, by just 3.3 percent.

Summary Table 4: Trends of the Index of Economic Security in Canada and Provinces, Percentage Change.

	Canada	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1971-99	-20.2	-78.3	-38.1	-31.0	-47.3	-37.1	-44.6	-12.2	-22.3	3.3	-12.8
1971-80	-1.4		-57.9	-30.6	-49.3	-37.7	-22.9	-8.1	-5.8	-1.1	-15.6
1980-89	12.1		63.7	27.2	26.5	-3.2	17.1	27.5	-6.9	36.1	21.6
1989-99	-27.8	-25.6	-10.2	-21.8	-17.9	4.3	-38.6	-25.1	-11.4	-23.3	-15.0

During 1989-99 period, the economic security index declined in Ontario by 38.6 percent, Newfoundland 25.6 percent, Manitoba 25.1 percent, Alberta 23.3 percent, Nova Scotia 21.8 percent, New Brunswick 17.9 percent, British Columbia 15.0 percent, Saskatchewan 11.4 percent and Prince Edward Island 10.2 percent. Chart 4 shows the indexes of security for each province for 1971-1999.

2.4.6 Other aspects of insecurity

Unanticipated inflation

Anticipated inflation does not create "insecurity" since inflationary expectations become embedded in interest rates, which are known to both borrower and lender. Unanticipated inflation, however, causes unanticipated changes in the real value of money assets and liabilities and an unanticipated redistribution of real income. Since individuals worry about the possibility of such losses and gains, unanticipated inflation can also contribute to economic insecurity.

At this time no estimates of the costs of unanticipated inflation have been incorporated in the index. However, given the relatively small absolute change in inflation uncertainty, we expect the influence of this variable to be small.

Personal security indicators

Freedom from economic catastrophe constitutes an element of economic security. Such catastrophes include crime, auto accidents and work accidents, which can cripple the ability of those affected to earn a living. The incidence of crime reported to police in Canada has increased significantly in recent years. In contrast to rising crime trends, the probability of being killed in an auto accident or on the job has fallen.

At this point, estimates of the incidence of crime, and probability of being killed or injured in an auto accident for the Canadian provinces, have not been incorporated into the paper. It should be noted that the Canadian Council for Social Development is currently developing a personal security index, which may be useful as a sub-component of the economic security component of the index of well-being.

3. Estimates of the Overall Index of Economic Well-being for the Canadian Provinces

3.1 Weighting of components

Trends in the index are determined by the choice of variables that are included in the index, the trends in those variables and the weights given these variables. Since the four main dimensions of average consumption, bequest, inequality/poverty and insecurity are separately identified, it is easy to conduct sensitivity analyses of the impact on perceived overall trends of different weighting of these dimensions.

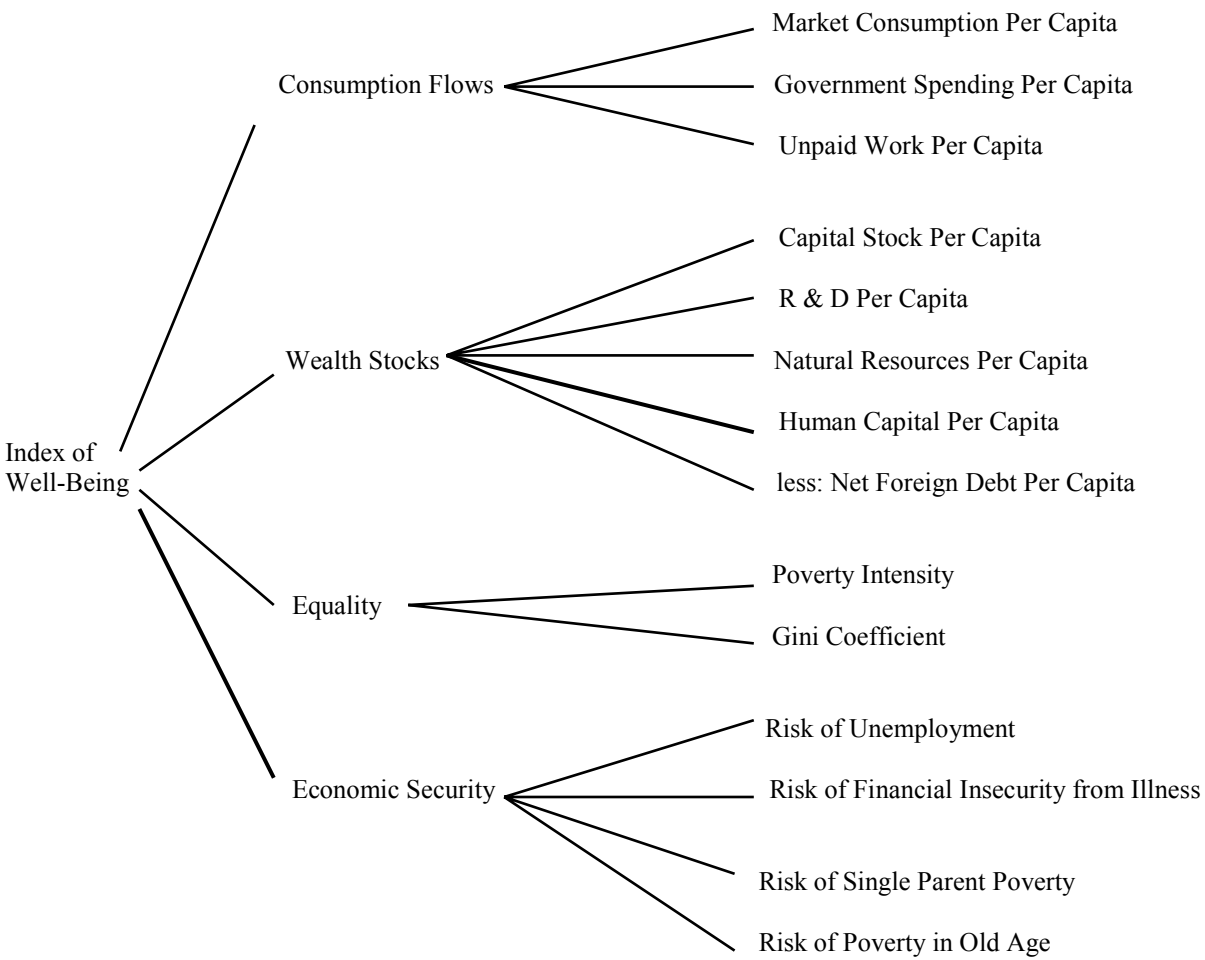
The most transparent means of presentation and discussion however is to give each component equal weight.[5]

As the sub-components of the consumption flows and wealth stocks are expressed in dollars, there is no need for explicit weighting. Their dollar values represent implicit weights. In terms of the inequality/poverty sub-components, a Rawlsian perspective assigns greater importance to poverty than to overall inequality trends, and a weight of 0.1877 or (=0.25*0.75) has therefore been given poverty intensity and 0.0625 (=0.25*0.25) to the Gini coefficient when each of the four main components receive equal weight. In other words, poverty is given three times the weight of inequality. The sub-components of the economic security index are weighted by the relative importance of the specific population at risk in the total population.

The weighting of components and subcomponents of the economic well-being index is illustrated below.

[5] In recent work on the index of economic well-being for Canada and the United States (Sharpe and Osberg 2002) and OECD countries (Sharpe and Osberg forthcoming), the consequences of changing this weighting scheme have been explored by estimating the overall index based on a consumption-biased weighting scheme where consumption flows receive weight of 0.7 and the wealth, equality and security components each receive weight of 0.1. Regardless of the weighting scheme employed the index grows significantly less than GDP per capita over long periods, although as consumption flows are given more weight trends in economic well-being approach those of GDP per capita. For illustration Table 10 provides estimates by province of the index with this consumption-biased weighting scheme. Discussion will focus on the arbitrary equal weighting case, but it is important to note that the weights placed on the components by various individuals are ultimately determined by the value judgements of those individuals. Upon request the authors will make available to interested parties data on the four components of the index by province in spreadsheet form to facilitate calculation of the index based on any chosen weighting scheme.

Weighting Tree



The formula for the overall index follows:

IEWB= (0.25)[C+G+UP](LEX)+ (0.25)[K+ R&D+NR+HC-D]+[(0.1875 (LIM)+(0.0625)Gini]+ (0.25)[(A)UR+(B)ILL+(C)SP+ (D)OLD]

where
IEWB= index of economic well-being
C= real per capita adjusted personal consumption
G= real per capita current government spending excluding debt charges
UP= real value of per capita unpaid labour
LEX= index of life expectancy
K= real per capita capital stock (including housing)
R&D= real per capita stock of research and development
NR= real per capita stock of natural resource wealth
HC= real per capita stock of human capital
D= real per capita net foreign debt
LIM= poverty intensity
Gini= Gini coefficient for after tax income
UR= risk of unemployment
ILL= risk of financial insecurity from illness
SP= risk of single parenthood poverty
OLD= risk of old age poverty
A = Normalized weight for population at risk of unemployment
B = Normalized weight for population at financial risk of illness
C = Normalized weight for women at risk of single parent poverty
D = Normalized weight for the population at risk of poverty in old age

Table 9 shows the indexes for all four components of the index of economic well-being and the overall index with equal weighting, while Table 10 shows the results with the consumption-biased weighting scheme. Comparisons of the index of economic well-being between Canada and the provinces are presented in Table 11 and Charts 5-15.

3.2 Trends in the overall index of economic well-being

Some of the year-to-year movement in the index reflects the sensitivity to the business cycle by certain components of the index. For example, consumption flows depend on personal income, which is determined largely by demand-driven employment levels. Wealth stocks include the capital stock, which is determined by cyclically-sensitive investment, and the value of natural resources, which reflects cyclical commodity prices. The two inequality measures (poverty intensity and Gini coefficients) are influenced by the state of the economy (Sharpe and Zyblock, 1997). Finally, a number of the components of the economic security index are also very sensitive to the business cycle, such as the employment-population ratio.

Trends in the index are, not surprisingly, very sensitive to the weighting given the four components. As mentioned earlier, for discussion purposes our preferred method is to give each component an equal weight, although the consequences of doing otherwise can be seen by comparing Table 9 with Table 10.

It is surprising to note that for the entire 1971-1999 period British Columbia and Ontario, two of the most prosperous provinces in terms of GDP per capita, experienced the slowest growth in economic well-being (at only 9.7 and 11.7 percent respectively) while Prince Edward Island, one of the poorest, experienced growth of 30.0 percent. Poorer provinces such as Newfoundland, New Brunswick, Manitoba and Saskatchewan also experienced growth in economic well-being about twice that of Ontario. These trends possibly reflect a tendency toward convergence in levels of economic well-being: as will be discussed shortly Newfoundland, New Brunswick, and Saskatchewan have low levels relative to the national average. However, the same cannot be said of Prince Edward Island and Manitoba, and the fastest growth in economic well-being over the entire period is found in Alberta, the most prosperous province in terms of GDP per capita and also the province with the highest level of economic well-being relative to the

national average. It is not clear though that convergence should be expected, so the reasons for the unexpectedly low growth in economic well-being in Ontario and British Columbia and the unexpectedly high growth in some Atlantic and Prairie provinces will be examined on a province-by-province basis below.

Summary Table 5: Trends in the Overall Index of Economic Well-being (Equal Weighting of Components) in Canada and Provinces, Percentage Change.

	Canada	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1971-99	24.0	21.8	30.0	17.0	23.8	19.2	11.7	22.7	23.8	33.6	9.7
1971-80	13.9	-12.9	-1.4	-3.0	-2.9	-0.4	-1.4	3.7	13.3	29.0	-1.1
1980-89	11.0	26.6	19.3	19.7	18.1	10.4	18.3	15.7	2.1	3.9	11.6
1989-99	-2.0	10.5	10.5	0.8	7.9	8.5	-4.3	2.3	7.1	-0.3	-0.6

The 1970s is an interesting decade as growth in economic well-being at the national level, at 13.9 percent, was greater than that for the 1980s and 1990s while for individual provinces the 1970s was a disastrous decade, with most experiencing negative growth in economic well-being. Only Manitoba, Saskatchewan and Alberta experienced positive growth, albeit slight in the case of Manitoba. These three provinces experienced only slight declines in economic security as opposed to the sharp declines in other provinces, caused mainly by startling increases in the divorce rate and poverty intensity for single mothers and the consequent drop in security from the risks imposed by single parent poverty. Alberta, with more than twice the national average growth in economic well-being, saw the value of its natural resources appreciate more than threefold due to the oil price shocks of this decade. However, this good fortune did not extend far into the 1980s, in which Alberta along with Saskatchewan saw dismal growth of 3.9 and 2.1 percent respectively in economic well-being. In contrast, all other provinces experienced quite robust growth over the 1980-1999 period, more than making up their losses of the previous decade. In general the 1980s was a good decade for economic security, with security from the risks imposed by poverty in old age and by unemployment forging ahead dramatically while security from the risks imposed by single parent poverty and by illness at least not worsening substantially.

The 1990s was uniformly disappointing in terms of economic well-being, with all provinces except Saskatchewan experiencing growth far below that of the 1980s, negative growth in Ontario and Alberta, and national average growth of –2.0 percent. All four components of the index are generally to blame, with growth in total consumption flows and stocks of wealth somewhat offset by declines in equality and security.

Table 12 provides relative level comparisons of economic well-being between Canada and the provinces for 1999. Following the convention that increases in the sub-components of the index of economic security and equality are improvements, to obtain the relative level estimates of the overall index of well-being, we subtract the provincial to Canadian ratio of poverty intensity, income inequality, divorce rate and risk of illness, from 200.

Alberta had the highest level of economic well-being relative to the national average in 1999, with British Columbia just slightly below the average and Ontario and Manitoba following closely as well. The lowest relative level is found in Newfoundland, well behind even Nova Scotia, with the second lowest level. These rankings fit well with rankings according to GDP per capita.

Summary Table 6: Relative Levels of Economic Well-being (Equal Weighting of Components) in Canada and Provinces in 1999, Canada=100.

	Canada	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Cons.	100.0	85.7	85.5	96.1	94.4	97.0	102.8	100.9	86.5	104.0	102.2
Wealth	100.0	93.9	68.3	79.9	93.7	94.7	93.3	88.9	112.2	131.2	113.5
Equality	100.0	26.6	102.8	61.6	61.7	75.7	109.1	98.7	63.9	86.7	90.1
Security	100.0	105.5	110.0	91.0	104.5	93.9	89.2	97.6	89.4	97.0	94.1
Overall	100.0	77.9	91.6	82.1	88.6	90.3	98.6	96.5	88.0	104.7	100.0

Newfoundland's poor performance in level terms does not stem from all four components, as its level of economic security is impressive, second only to Prince Edward Island and exceeding the national average by 5.5 percent. Alberta too has an impressive level of security, falling short of the national average by only 3.0 percent, but the driving force behind its high level of overall economic well-being is its stock of wealth, which is 31.2 percent higher than the national average, primarily due to the value of natural resources. In most provinces there is a certain trade-off evident between the four components, suggesting that, for example, New Brunswick's high relative level of economic security may have come at the expense of lower than average consumption, wealth accumulation, and equality. Only Quebec and Nova Scotia fall short of the national average in all four components.

The remainder of this section will explore both trends in economic well-being over time as well as relative levels on a province-by-province basis.

Newfoundland

The overall index of economic well-being for Newfoundland fell consistently throughout the 1970s, reaching a low of 0.8332 (1971=1.00) in 1979. There is a general upward trend throughout the 1980s with the exception of a sudden drop between 1986 and 1987. This is due to a sharp drop in the index of security from the risk imposed by single parent poverty, ultimately due to a spike in the divorce rate from 0.51 percent in 1986 to 0.84 percent in 1987. However, positive growth resumed in 1988 and carried on into the 1990s, finally reaching a peak of 1.218 in 1999. For the period 1971 to 1999, it has increased 21.8 percent and for the 1989-99 period it has risen 10.5 percent. The decline in Newfoundland in the 1970s is mainly due to the large fall in economic security. A comparison of the trends in the overall index with the overall Canadian index shows that Newfoundland has been below Canada in terms of trends in economic well-being for all of the 1971-99 period (Chart 6).

In 1999, the overall index of economic well-being was 22.1 percent lower in Newfoundland than in Canada, the lowest among the provinces. This was mainly due to the 73.4 percent lower level of equality in Newfoundland arising from the 105.0 percent higher poverty intensity in this province (0.0813 in Newfoundland, compared to 0.0397 in Canada). Total consumption per capita was also 14.3 percent below the Canadian average, wealth stocks 6.2 percent lower and economic security 5.5 percent higher. The level of security from illness was 14.9 percent higher in Newfoundland than in Canada and security from unemployment 54.6 percent higher. However, security from single-parent poverty was 77.8 percent lower, and security from poverty in old age, 11.4 percent below the Canadian average.

Prince Edward Island

The index of economic well-being has grown moderately and consistently over the entire 1971-1999 period with the exception of the 1978-1980 period, which was followed by four years of more rapid than average growth. The fall was due to a sharp increase in the proportion of disposable income spent on health, from 2.88 percent in 1977 to 5.93 percent in 1980, which decreased the index of security from

illness by 93.3 percent over this period. Both the wealth and equality components experienced more rapid than average growth beginning in 1980, accounting for the rapid growth of the overall index in the succeeding four year period. Prince Edward Island experienced an increase of 30.0 percent in overall economic well-being compared to 24.0 for the national average, and indeed Chart 7 shows this province often out-performing the Canadian average.

A comparison of relative levels between Prince Edward Island and Canada shows the total overall index in 1999 to be only 8.4 percent lower in Prince Edward Island. This is mainly due to the higher levels of security and equality, which exceed Canada's by 10.0 and 2.8 percent respectively. However, stocks of per capita wealth are considerably lower in Prince Edward Island due to much lower than average stocks of net capital, natural resources and human capital.

Nova Scotia

Chart 8 shows that the index of economic well-being has grown slightly less rapidly in Nova Scotia compared to the Canadian average (17.0 percent over the 1971-1999 period versus 24.0 percent for Canada) but has largely followed an identical trend since 1980, namely fairly rapid growth in the 1980s followed by stagnation in the 1990s (when the index grew by a mere 0.8 percent in Nova Scotia and actually shrank by 2.0 percent in Canada. Nova Scotia's poor performance in the 1970s is due primarily to falling security – especially from the risks imposed by single parent poverty and poverty in old age – and equality.

In terms of level comparisons, in 1999 the overall level of economic well-being in Nova Scotia was 17.8 percent below the Canadian level, a deficiency second only to Newfoundland. All four components were lower than the national average in 1999, but the largest difference was in equality, 38.4 percent below Canada. Poverty intensity was 0.0627 in Nova Scotia, 57.9 percent above Canada's 0.0397. Wealth stocks were 20.1 percent below Canada's due mainly to lower human capital ($64,247 compared to $80,972).

New Brunswick

The index of economic well-being showed no overall trend in the 1970s, declined to an all time low of 0.913 in 1983, but grew consistently thereafter, rapidly until 1988 and moderately throughout the 1990s with occasional years of slightly negative growth, reaching a peak of 1.238 in 1999 (Chart 9). From 1989 to 1999, two sub-components of the index underwent a decline while the other two increased. Economic security and equality declined by 17.9 percent and 4.6 percent respectively, while consumption per capita rose 16.3 percent and the stocks of wealth increased 22.4 percent. The decline in economic security was brought about by a decline in unemployment security and an increase in the risk of financial insecurity from illness. For the entire 1971-1999 period growth in economic well-being in New Brunswick was nearly identical to that for the national average, 23.8 percent compared to the 24.0 percent national average.

In 1999 the level of economic well-being was 11.4 percent lower in New Brunswick than in Canada. This was mainly due to the lower relative equality levels (38.3 percent lower), brought about by the 57.9 percent higher poverty intensity. Total wealth stocks and per capita total consumption flows were also slightly lower (by 6.3 percent and 5.6 percent respectively). The security component was 4.5 percent higher in New Brunswick, although this is due solely to a much higher proportion of unemployed receiving employment insurance benefits and to a lesser degree more generous employment insurance payments as a proportion of weekly earnings. This masks substantially lower security from single parent poverty and poverty in old age.

Quebec

Economic well-being, as measured by this index, largely declined in the 1970s, rose steadily in the 1980s with the exception of two periods of negative growth, and grew modestly but steadily in the 1990s, reaching a peak of 1.192 (1971=1.000) in 1999 (Chart 10). Between 1980 and 1981 economic well-being slipped 6.8 percent due to a drop of 91.5 percent in the index of security from single parent poverty. As in Newfoundland in 1987 this was caused by a jump in the divorce rate, of 36.7 percent from 0.90 percent in 1980 to 1.23 percent in 1981. The same thing occurred over the 1985-1987 period, when the divorce rate

shot up from 0.98 percent to 1.38 percent, causing the index of security from the risk of single parent poverty to fall 107.7 percent, the overall security index to fall by 47.3 percent, and the overall index of economic well-being to fall by 5.6 percent. Poor performance in equality and security caused the mostly negative growth of the overall index in the 1970s, but all components except for equality, whose negative growth was 10.5 percent, posted gains in the 1990s, allowing economic well-being in Quebec to make up much of the ground it had lost against the national average in previous years.

In terms of level comparisons between Quebec and Canada in 1999, the total level of economic well-being in Quebec was 9.7 percent lower than the overall level of Canadian economic well-being, which was brought about by relatively lower levels of all the sub-components of economic well-being. Total consumption flows per capita were 3.0 percent relatively lower, wealth stocks 5.3 percent lower, economic security 6.1 percent lower owing to a lower levels of security from single-parent poverty and poverty in old age. Equality was 14.3 percent relatively lower, due to higher levels of poverty intensity in this province.

Ontario

In Ontario (Chart 11) economic well-being declined in the 1970s due to falling security and equality until 1979, at which point followed two years of rapid growth, with a total increase of 10.1 percent between 1979 and 1981. This increase was due to strong growth in each of the four components. Trends thereafter largely coincide with the Canadian average, with Ontario reaching a peak of 1.167 (1971=1.000) in 1989. Again large declines in security and equality lead to the decline in economic well-being in the 1990s, a drop of 4.3 percent. For the overall 1971-1999 period Ontario's economic well-being grew by 11.7 percent, compared to 24.0 percent for Canada.

In terms of level comparisons in 1999, the overall level of economic well-being in this province was only 1.4 percent below the national average, the third best performance. Wealth and security were lower in Ontario, by 6.7 and 10.9 percent respectively. Although there was a larger stock of human capital than in Canada on average, Ontario's accumulation of net capital and value of natural resources were lower, by 6.0 percent and 58.5 percent respectively. A low proportion of the unemployed receiving benefits was the primary cause of Ontario's slightly weaker than average economic security.

Manitoba

The index of economic well-being fluctuated from 1.00 in 1971 to a low of 0.965 in 1977, and a peak of 1.227 in 1999 (Chart 12). Negative growth of 3.9 percent occurred in 1986 as a result of weak growth in wealth and consumption and large declines in security and equality, especially due to an increase of 7.8 percent in the proportion of disposable income spent on health, from 3.08 percent in 1985 to 3.32 percent in 1986. The first half of the 1990s saw economic well-being decline in Manitoba, but this trend was reversed in the latter years of that decade beginning with a 11.5 percent increase in equality (poverty intensity fell by 20.2 percent) and a 8.0 percent increase in security (poverty intensity for single mothers fell, raising the index of security from the risk of single parent poverty by 170.0 percent) in 1995. Manitoba's growth in economic well-being of 22.7 percent between 1971 and 1999 falls just short of the 24.0 percent national average, and growth in the 1990s of 2.3 percent far outshines Canada's –2.0 percent performance.

Manitoba's level of economic well-being in 1999 was only 3.5 percent below Canada's, with total stocks of wealth 11.1 percent below the national average. All components of wealth are lower in Manitoba than in Canada, but the shortfall in the net capital stock and human capital is not great. Both the R&D stock and the value of natural resources, however, are about half of the Canadian level. Manitoba was only 1.3 percent behind the national level of equality, and 2.4 percent behind national economic security.

Saskatchewan

The index of economic well-being rose rapidly from 1971 to 1982, at which point the all time peak of 1.238 in 1999 was almost matched, falling short by just 0.03 points (Chart 13). Negative growth occurred between 1982 and 1986, and thereafter the index grows moderately, with flat growth for the 1988-1992 period but respectable growth of 7.1 percent for the entire 1989-1999 period. Saskatchewan owes its early success to strong growth in all four components of economic well-being, especially a 22.4 percent increase

in economic security between 1971 and 1982 and a 43.2 percent decrease in elderly poverty intensity between 1981 and 1982 alone. Between 1982 and 1986 however, only the consumption component showed positive growth, with divorce rates and single mother poverty intensity increasing, the proportion of disposable income spent on health rising from 2.0 percent to 2.9 percent, and the index of equality falling by 19.4 percent. The value of natural resources also fell in this period, from $32,550 in 1982 to $24,426 in 1986, a drop of 33.3 percent. Only the equality component fell in the 1990s, with consumption and wealth growing strongly, by 9.1 percent and 14.8 percent respectively.

The level of economic well-being in 1997 was 12.0 percent below that of the whole country. This was due to lower relative levels of all components of economic well-being except wealth. Total consumption per capita was 13.5 percent relatively lower due to the lower relative level of unpaid work. Total wealth stocks were 12.2 percent relatively lower, owing to much higher relative levels of net capital stock and the value of natural resources. Economic security was 10.6 percent relatively lower due to higher risks of single-parent poverty and poverty in old age. In addition, equality was 36.1 percent relatively lower owing to greater relative levels of poverty intensity in this province.

Alberta

Alberta is the star performer among the provinces, with an increase of 33.6 percent in economic well-being over the 1971-1999 period, compared to 24.0 percent for Canada as a whole (Chart 14). All four components have shown growth over this period, most notably the 60.4 percent increase in stocks of wealth and the 57.6 percent increase in total consumption flows. Alberta experienced strong growth until 1985 but has shown mostly negative or flat growth since then. Again each of the four components of economic well-being contributed, although the most important factor seems to be the 84.6 percent increase in stocks of wealth over the 1971-1985 period. The relatively dismal performance since then is primarily due to the 47.8 percent decline in the value of natural resources, enough to offset the positive growth of all the other components of wealth, leaving total wealth 13.7 percent lower in 1999 than in 1985. Alberta also shows the largest year-to-year fluctuations in economic well-being among the provinces, again due to the sensitivity of the overall index to the large value of energy natural resources in this province. With the collapse of oil prices Alberta has had to rely on the other components of economic well-being to maintain its impressive performance, although rising oil prices more recently have contributed to some years of positive growth in natural resource wealth in the 1990s.

In 1999 the level of economic well-being was 4.7 percent above that of Canada, the best performance among provinces and the only province with a level above the national average. The 31.2 percent higher stocks of wealth are the primary factor, again stemming from natural resource wealth. Equality and security were below the national average, by 13.3 percent and 3.0 percent respectively. A 24.3 percent higher poverty intensity is to blame for the shortfall in equality, while the decent overall security performance masks the fact that a 14.1 percent lower than average elderly poverty intensity is offsetting higher divorce rates and single parent poverty intensity and a lower proportion of unemployed receiving benefits.

British Columbia

British Columbia also shows larger year-to-year fluctuations in economic well-being than the average, reflecting the variations in the value of its timber resources (Chart 15). For the overall 1971-1999 period economic well-being advanced 9.7 percent, the lowest among all provinces and far short of the 24.0 percent national average. Economic well-being first declined then rose rapidly in the 1970s, fluctuated with a general upward trend in the 1980s, and stagnated in the 1990s. Overall in the 1970s equality declined 37.6 percent, but rebounded slightly in the 1980s before falling again in the 1990s. The wealth component, besides fluctuating with the value of timber resources, has shown only 32.3 percent growth between 1971 and 1999 despite the large increase of 43.4 percent in human capital.

Despite British Columbia's poor growth in economic well-being, its level is second only to Alberta, falling just 0.04 percent short of the national average. Both equality and security fall short of the Canadian average, but only by 9.9 percent and 5.9 percent respectively. The most important factor is British

Columbia's 13.5 percent higher level of wealth, driven by the highest level of human capital across all provinces and a high value of natural resources as well, third to Alberta and Saskatchewan.

4. Directions for Future Research

There are a number of priorities for future development. For consumption flows, priorities include the inclusion of data on changes in the amount of leisure time (either an index or an adjustment to consumption); better data on the valuation of increased life expectancy (either index or adjustment to consumption); and more data on regrettables such as commuting and crime-prevention expenditure (adjustment to consumption).

For stocks of wealth, priorities include the inclusion of the stock of consumer durables or a household facility index; indexes of environmental quality and sustainability; better data on the stock of human capital; and data on the stock of social capital.

For the economic insecurity component, priorities for revision are the incidence of crime; and the insecurity created by unanticipated inflation (actual minus moving average of past inflation).

5. Conclusion

This paper has developed an index of economic well-being based on four dimensions or components of economic well-being, each given equal weighting for discussion purposes: consumption flows , stocks of wealth including physical capital and natural resources, equality, and economic security. Estimates for the index for the ten Canadian provinces for the 1971-99 period are given.

We argue that providing explicit weights of these components of well-being is important in enabling other observers to assess whether, by their values of what is important in economic well-being, they would agree with this assessment of trends in each Canadian province, as well as the Canadian economy as a whole.

A key finding is that the economic well-being of Canadians, at least as measured by the index constructed in this paper has grown much more slowly in the 1990s than in previous decades in all provinces. The structure of the index allows the causes of this recently poor performance to be easily identified, namely declines in equality and economic security due, for example, to a 30.2 percent increase in the proportion of personal disposable income spent on health and declines in the employment rate, proportion of unemployed receiving benefits, and proportion of regular earnings replaced by benefits, causing security from the risks of unemployment to decline by 49.3 percent, at the national level in the 1990s. In terms of policy the index of economic well-being developed here can hence be a useful guide to identifying the programs that would be most effective at increasing economic well-being, at both the national and provincial levels.

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