Chapter 11

Trends in Economic Well-being in OECD Countries: What Measure Is Most Relevant for Health?

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The connection between health and economic well-being has become a growing area of research, and there has been much debate about how best to measure "health." In this discussion we look at the other side of the issue—how best to measure economic well-being—to better understand the relationship between economic well-being and health.

The most commonly used measure of economic well-being at the national level has been average money incomes—specifically, per capita gross domestic product (GDP). However, this measure is blind to many things that people clearly care about. Money income from market transactions omits consideration of the goods and services produced outside the market, as well as any changes in life span and in leisure. In general, economic well-being also depends on the size of the bequest this generation will leave for the benefit of future generations, which current money incomes do not reveal. Average money income also does not indicate how unequally incomes are distributed and, therefore, does not indicate how likely it is that any particular individual will share in average prosperity. Finally, average money incomes do not reflect the degree of anxiety and insecurity with which individuals contemplate their own futures.

We therefore argue that a better index of a society's economic well-being should be composed of four components:

- current effective per capita consumption flows
- net societal accumulation of stocks of productive resources
- income distribution
- economic security

In this chapter we develop such an index of economic well-being for selected Organization for Economic Cooperation and Development (OECD) countries for the period 1980–1999 and compare trends in economic well-being to trends in GDP per person. Estimates of the overall index and the subcomponents are presented for 1980 through 1999 for the United States, the United Kingdom, Canada, Australia, Norway, and Sweden. In every case, growth in economic well-being proved less than growth in GDP per capita, although to different degrees in different countries. We conclude with a discussion of why the connection between health and trends in economic well-being might be stronger than the relationship between health and GDP per person.

Economic Well-being, GDP per Capita, and Health

In 1980 Ronald Reagan, then campaigning for election as U.S. president, asked the American people a seemingly simple question: "Are you better off today than you were four years ago?" Although U.S. per capita disposable real money income was, in 1980, some 8.8% higher than in 1976, his audiences answered "No!" More recently, when Canadians were asked in 1998 how the overall financial situation of their generation compared with that of their parents at the same stage of life, only 44% thought that there had been an improvement—despite an increase of approximately 60% in real gross domestic product (GDP) per capita over the previous 25 years (Angus 1998). Evidently, national income accounting measures may not necessarily be a good guide to popular perceptions of trends in economic well-being. Are such popular perceptions unreasonable? And if GDP per capita is not a good measure of economic well-being, is it possible to find a better measure, conceptually and practically?[1]

In measuring GDP, national income accountants attempt to get an accurate count of the total money value of goods and services produced for sale in the market in a given country in a given year. This measure is clearly important for many purposes, but it is equally clear that it omits consideration of many issues (e.g., leisure time, length of life) that are important to individuals' well-being. All the same, for many years the System of National Accounts (SNA), developed by the United Nations and several international organizations to standardize methods for calculating the output and economic growth of countries, has been the accounting framework within which most discussions of trends in economic well-being have been conducted, and GDP per capita has often been used as a summary measure of economic trends.[2]

The compilers of the national accounts have sometimes protested that their attempt to measure the aggregate money value of marketed economic output was never intended as a full measure of economic well-being—*but* it has often been used as such. If an inappropriate measure of economic well-being is used, both

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policy and analysis are likely to suffer. Economic policy makers may want to in-
crease economic well-being, but if they are aiming at the wrong target, they are
unlikely to be fully successful in hitting the right one. Also, there is good reason
to believe that the issues omitted from consideration in GDP accounting are es-
pecially relevant to health, so analysts of the relationship between health and eco-
nomic well-being are likely to be misled if they focus on trends in per capita GDP.

Early economists (such as Adam Smith, Karl Marx, or Alfred Marshall) were
fairly broad (and a bit vague) in their conception of "prosperity," but they were
in no doubt that it had many positive implications (including better health). More
recently, the measure of economic success (GDP per capita) has been both nar-
rower and more precise. It now falls to critics to show that alternative measures
to GDP per capita are possible, plausible, and more reflective of true economic
well-being. In this chapter we therefore present for selected OECD countries an
index of economic well-being based on four dimensions or components of eco-
nomic well-being: consumption, accumulation, income distribution, and economic
security.

In identifying these dimensions of economic well-being, we recognize explicitly
that reasonable people may disagree in the relative weight they would assign to
each dimension—that is, some will argue that inequality in income distribution is
highly important, whereas others will argue the converse. For this reason, specifying
explicit weights of the components of economic well-being is important because it
enables others to assess whether, by their personal values of what is important in
economic well-being, they would agree with an overall assessment of trends in the
economy.

Of course, some events have qualitatively similar impacts on all four dimensions
of well-being. A major recession will, for example, usually produce lower average
consumption, more inequality, more insecurity, and less accumulation of capital
for the benefit of future generations. In such a case, differences among people in
the values that determine the relative weights to be assigned to the components of
well-being are of secondary concern. However, in other instances (e.g., environ-
mental policy concerning global warming) the relative weights assigned to different
dimensions of economic well-being (e.g., current consumption versus the bequest
to future generations) may be crucial. A major reason for being explicit about the
weights to be assigned to the dimensions of well-being is to be clear about when
there is, and when there is not, a difference of values large enough to matter in
the assessment of aggregate social trends.[3]

In everyday life, it is common to observe that debates about values, facts, and
economic policies are hopelessly intermingled. However, the hypothesis underlying
this chapter is that democratic discourse is likely to be more productive if issues
of values, fact, and analysis can be separated as much as possible. Issues of fact
can be seen as answers to the question "Where are we?" Discussions of values can
be seen as answering the query "Where do we want to go?" There remains the

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crucial question of policy: "How do we get there?" But in principle these are separable questions.

This chapter is about the "Where are we?" issue. Its basic hypothesis—that a society's well-being depends on total consumption and accumulation and on the individual inequality and insecurity that surround the distribution of macroeconomic aggregates—is consistent with a variety of theoretical perspectives. We therefore avoid a specific, formal model.[4] The rest of the chapter is divided into three main parts. In the following section, we discuss how we have developed estimates of the four key components or dimensions of the index—consumption flows, stocks of wealth, inequality, and insecurity. Next, we present preliminary estimates of the overall index and its components for the United States, the United Kingdom, Canada, Australia, Norway, and Sweden from 1980 to 1999, and we compare trends in the index and its components.[5] In the final section, we conclude by discussing the linkage between health and trends in economic well-being.

An Index of Economic Well-being

If people typically derive pleasure both from their own consumption and from the prospect of future generations' well-being, they will want to consume part of their current income and save the rest. Economic well-being will therefore depend on the proportion of income saved for the future, but GDP is a measure of the aggregate market income of a society that does not reveal the savings rate. Furthermore, there is little reason to believe that the savings rate is automatically optimal—particularly if some assets (like the environment) do not have market prices. Hence, to estimate the economic well-being of society, one must measure both current consumption and the bequest this generation will leave for the benefit of future generations. In addition, although trends in average income are important, individuals are justifiably concerned about the degree to which they personally will share in prosperity and the degree to which their personal economic future is secure.[6] Therefore, four components or dimensions of economic well-being are

1. effective per capita consumption flows, which include consumption of marketed goods and services, government services, effective per capita flows of household production, leisure, and changes in life span.
2. net societal accumulation of stocks of productive resources, which includes net accumulation of tangible capital, housing stocks, and net changes in the value of natural resources stocks; environmental costs; net change in the level of foreign indebtedness; and accumulation of human capital and R&D investment.
3. income distribution—the intensity of poverty (incidence and depth) and the inequality of income.

   4. economic security from job loss and unemployment, illness, family breakup,
      and poverty in old age.

Each dimension of economic well-being is itself an aggregation of many under-
lying trends, on which the existing literature is of variable quality—and often
differs across countries. By contrast, the System of National Accounts has had many
years of development effort by international agencies (particularly the United
Nations and the International Monetary Fund) and has produced an accounting
system for GDP that is rigorously standardized across countries. Internationally
comparable statistics on other dimensions of economic well-being are far less com-
plete. However, using GDP per capita as a measure of well-being would implicitly
(1) assume that the aggregate share of income devoted to accumulation (including
the value of unpriced environmental assets) is automatically optimal and (2) set
the weight of income distribution or economic insecurity to zero, by ignoring
entirely either's influence. Neither assumption seems justifiable.

Average Consumption Flows

Current consumption is certainly an important component of economic well-
being, and the objective of this section is to estimate its average effective level. The
easiest part to measure is purchased consumer goods and services. Data on aggre-
gate real personal consumption per capita expressed in national currency units and
in constant prices are available from the OECD national accounts. All countries
experienced increases in real per capita marketed personal consumption over the
1980–1999 period, but there were large variations in the increase, ranging from a
high of 59.4% in the United Kingdom to a low of 19.4% in Sweden. The increases
in the other countries were: Norway (44.7%), Canada (30.2%), the United States
(48.7%), and Australia (43.3%).

However, several other factors also influence effective consumption flows, such
as leisure, household size, regrettables, the underground economy, and life expec-
tancy. We discuss these and other factors later, with approximate estimates of their
value, in some cases. At this stage in the development of the Index of Economic
Well-being, our preference is to include (wherever possible), rather than exclude,
imprecise measures. Omitting a variable would implicitly set its value to zero.
Hence, an imprecise measure of a variable is likely to embody a smaller error than
complete omission. However, there is no estimate available at all for some coun-
tries, and omission is sometimes unavoidable.

In some instances, however, assessment of aggregate trends in economic well-
being may not be very sensitive to the omission of a particular variable. The so-
called underground economy is an example.[7] 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

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substantially over time. Some trends may encourage an expansion (e.g., rising tax rates), but other factors have worked in the opposite direction (e.g., the increased penetration of franchise systems in the small business sector and the greater computerization of business records). However, whatever the direction of the trend, it is from a small base. Credible benchmark estimates of the prevalence of underground activity put it at a relatively small percentage of GDP. Gervais (1994), for instance, estimated the upper limit of unmeasured production at 2.7% of GDP in Canada in the early 1990s. When the level is this small to start with, the absolute size of a change is even smaller. Because comparable estimates of the underground economy were not available over time and across countries, we omitted this variable.

We also omitted any adjustment for the fraction of consumption expenditures that are arguably an "intermediate input" in the production of income (like commuting expenses) or a "defensive necessity" to offset the impact of adverse social trends (like expenditures on antiburglary measures due to higher crime rates). This class of expenditure has been labeled regrettable expenditures on the grounds that increases do not indicate greater utility for consumers. In our earlier estimates of the Index of Economic Well-being for Canada and the United States (Osberg and Sharpe 1998, 1999), we subtracted estimates for regrettable expenditures from personal consumption. However, such data were unavailable for other countries; and since there was little *trend* in the amount of such expenditures in North America, the omission of these data may not be crucial.

By contrast, we had good data on the significant increase in life expectancy in recent years in all the countries examined, and we have every reason to believe that having a long life is an important component of well-being. If one wants to measure the current consumption of this generation, the economic value of these extra years of life should be included in the total consumption flows of individuals, since, presumably, people care about both how much they consume per year and how many years they get to consume whatever they choose.[8]

Although a longer life span is valuable to people, GDP numbers will not reveal its importance and may, in fact, move in a contrary direction. If people can make more money by assuming more risk,[9] increases in marketed output that come from greater risk taking will have costs in decreased longevity that should be counted in an index of economic well-being. Ideally, a full appraisal of the value of increased longevity should consider trends in morbidity and health-adjusted life expectancy (HALE).[10] However, one also must face the issue that the value of more years of healthy life may look very different, the closer one actually is to death. Changes in life expectancy and morbidity are occurring "in real time" and are affecting the well-being of everyone now alive. In aggregating over the population now alive, one is aggregating over individuals at very different points in the life course. For the purposes of this chapter, we adopted the simple expedient of adjusting per capita consumption flows in each year upward by the percentage increase in av-

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erage life expectancy relative to the base year (1980).[11] However, we do recognize the crudity of this measure of an existential issue.

Our data on life expectancy were taken from the OECD Health Data CD-ROM.[12] Between 1980 and 1999, all countries enjoyed increased life expectancy, but there was a significant variation across countries in the size of the increase, as follows: Australia, 5.9%; Canada, 4.8%; Norway, 3.4%; Sweden, 4.9%; the United Kingdom, 4.5%; and the United States, 4.1%.

The old saying "Two can live as cheaply as one" is romantic, but it is also a bit of an exaggeration of the fact that when individuals cohabit in households, they save money because they benefit from economies of scale in household consumption (e.g., see Burkhauser, Smeeding, and Merz [1996] or Phipps and Garner [1994]). Because households have shrunk in average size in all countries, people have lost some of the savings in cost of living that come from sharing a household.[13] Trends in average per capita consumption should, therefore, be adjusted for the average loss in economic well-being over time due to lessened economies of scale in household consumption.

As well, countries differed markedly in the average size of households. The average family size for the most recent year available (year in parentheses) was 2.46 in Australia (1994); 2.51 in Canada (1994); 2.19 in Norway (1995); 1.85 in Sweden (1992); 2.55 in the United Kingdom (1986); and 2.58 in the United States (1997). All countries had experienced a long-term decline in average family size since the 1970s. We applied the Luxembourg Income Study's (LIS) equivalence scale (i.e., the square root of family size) to average family size in each year and used an index of these data (1980 = 100) to adjust personal consumption per capita. Australia had the largest downward adjustment in 1999, relative to 1980 (4.1%).

A major defect of GDP as a measure of well-being is that because it counts only market income, it effectively assigns a zero value to leisure time. Among OECD countries there are major differences in both the initial level and trends over time in the average annual number of hours worked. For example, in 1980 average working hours per adult (ages 15–64) were 1,224.5 in the United States and 1,154.9 in Germany. These differences were greatly magnified by 1997. Working hours per adult rose by 204 hours in the United States, to 1,428.5, while falling by 173 hours in Germany, to 981.9. Since these differences in working hours are large—equivalent to about 8.6 hours per week—it seems important to take them into account in a measure of economic well-being.

To account for the value of these differences, we adjusted the value of consumption for differences in paid hours relative to a benchmark, namely the value in the United States in 1980. Specifically, countries with average annual hours worked less than the benchmark had a positive adjustment to consumption, and countries with more working time than the benchmark had a negative adjustment. Our methodology was equivalent to saying that at the margin, individuals ascribe a value equal to the after-tax average wage to changes in nonworking time that

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are not due to unemployment fluctuations. However, unemployment does not constitute leisure. To account for involuntary leisure, we subtracted average annual hours of unemployment per working-age person from the relative nonworking-time estimate.

Between 1980 and 1997 most of the countries for which we had data experienced declines in working time, although Sweden and the United States experienced increases.[14] By 1997, U.S. per-adult working hours were 204 hours above their 1980 level of 1,225 hours. Between 1980 and 1997, working hours per working-age person declined by 54 hours in Norway, 52 hours in the United Kingdom, and 38 hours in Canada. Since some of these changes were large (204 hours is equivalent to 4 hours per week), they represented substantial changes in economic well-being. Such changes should be reflected in a reasonable measure of economic progress.

A strong case can be made that some hours of unemployment, which are included in nonwork or leisure time, are not by choice and do not contribute to economic well-being. (Indeed, if there are psychological costs to unemployment, such hours may have strong disutility associated with them [Clark and Oswald 1994]). In the calculation of the imputations for the value of nonworking time, we deducted hours of unemployment[15]—that is, assigned such hours zero value. Compared with a 1980 U.S. base, the imputation for changing nonworking time was, by 1999, worth +$700.70 per capita in Norway (1995 U.S. dollars), +$113.40 for Sweden, −$41.60 for the United Kingdom, −$242.00 for Canada, −$467.90 for Australia, and −$1,473.00 for the United States.

To measure the value of consumption, we needed to count the provision of nonmarketed or heavily subsidized services by the government as part of the consumption flow. Current expenditure data on all levels of government, including defense and capital consumption allowances but excluding debt service charges and transfer payments, were taken from the OECD national accounts, expressed in constant prices in national currency units. The importance of government expenditures in our total adjusted consumption measure differed markedly among OECD countries. In 1996, it ranged from a high of 54.2% in Sweden to a low of 24.3% in the United States. The figures for the other countries, in descending order of the relative importance of government expenditure, were as follows: Norway, 41.5%; United Kingdom, 32.7%; and Canada, 29.1%. In addition, from 1980 to 1999 there were major differences across countries in the rate of growth of real per capita government final consumption expenditures.

TOTAL CONSUMPTION FLOWS

Total per capita consumption is defined as the sum of personal consumption (adjusted for changes in average household size and longevity of life), government services, and the adjusted relative value of leisure. Between 1980 and 1999 the

increase in real per capita total consumption flows was 23.8% in Sweden but much higher in the United Kingdom (62.6%), the United States (54.4%), Australia (45.5%), and Norway (41.1%). Canada (32.2%) was an intermediate case (see table 11.1).

Accumulation, Sustainability, and the Intergenerational Bequest

If individuals today care about the well-being of future generations, then the measurement of trends in current well-being should include consideration of probable changes in the well-being of those generations. This consideration of future generations can also be justified on the grounds that a concept of "society" should include both present and future generations. The economic well-being of future generations depends on their inheritance of real productive assets—not on the financial instruments that will determine the *allocation* of the returns from those assets. It is the stocks of real wealth, broadly conceived to include not only natural

Table 11.1. Consumption—components of average personal consumption

Country and year	Personal consumption per capita ($95 U.S.) (A)	Index of life expectancy 1980 = 1.00 (B)	Average family size, persons (C)	Index of equivalent income 1980 = 1.00 (D) = index of the square root of (C)	Adjusted personal consumption per capita ($95 U.S.) E = A*B*D	Index of adjusted personal consumption per capita 1980 = 1.00 (F)
Australia 1980	10,167	1.000	2.68	1.000	10,167.4	1.000
1999	14,571	1.059	2.46	0.959	14,793.7	1.455
Canada 1980	10,729	1.000	2.68	1.000	10,729	1.000
1999	13,974	1.048	2.51	0.969	14,188	1.322
Norway 1980	8,541	1.000	2.48	1.000	8,541	1.000
1999	12,363	1.034	2.19	0.942	12,049	1.411
Sweden 1980	8,918	1.000	1.89	1.000	8,918	1.000
1999	10,648	1.049	1.85	0.988	11,039	1.238
U.K. 1980	8,260	1.000	2.68	1.000	8,260	1.000
1999	13,170	1.045	2.55	0.976	13,430	1.626
U.S. 1980	14,084	1.000	2.59	1.000	14,084	1.000
1999	20,950	1.041	2.58	0.997	21,747	1.544

Sources: Data appendix posted at http://www.csls.ca; personal consumption per capita, Table A2; population, Table A1; life expectancy, Table A3; average family size, LIS database.

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and human resources but also physical capital stock, left to the next generation that will determine whether a society is on a sustainable long-run trajectory of aggregate consumption, irrespective of the distribution of claims on those consumption flows at the individual level.

The physical capital stock includes residential and nonresidential structures, machinery, and equipment in both the business and government sectors. The greater the capital stock, the greater are the future productive capacity, future potential consumption flows, and economic well-being. We took from the OECD publication *Flows and Stocks of Fixed Capital* (1998) data for the current net fixed capital stock, expressed in constant prices and national currency units. We assumed that the estimates were internationally comparable, although the use of different depreciation rates by statistical agencies may have reduced comparability for both level- and rate-of-growth comparisons.[16] Between 1980 and 1999, the increase in the fixed capital stock, on a per capita basis, was notably less in the United States (30.8%) and Australia (27.5%) than in the United Kingdom (41%), Norway (39.9%), Canada (33%), and Sweden (32.5%).

In a knowledge-based economy, the stock of skills embodied in the workforce is a crucial determinant of current and future economic well-being. There is a strong relationship between educational attainment and individual income, and there is substantial evidence that education yields significant social benefits, beyond its impact on individual earnings. Although school retention and participation in postsecondary education have increased dramatically in many countries over the past three decades, human capital is intangible and is not now counted in balance sheet estimates of national wealth.[17]

In our analyses, we used an admittedly crude and incomplete (but feasible) method of estimating investment in human capital—the cost per year of education expenditures at the primary, secondary, and postsecondary levels. OECD data on the educational attainment of the population aged twenty-five to sixty-four and expenditure per student (available in both local currency and U.S. dollars) for the early childhood, primary, secondary, nonuniversity-tertiary-level, and university-level education were used to estimate the per capita stock of human capital. In order to distinguish clearly intercountry differences in the quantity of education obtained, as opposed to differences in its cost of production, we applied a common cost base (the cost of education in the United States) to all countries.

In an era of rapid technological change, expenditure on research and development (R&D) is also a crucial ingredient in society's ability to innovate and create wealth. Statistical agencies do not produce R&D stock data, but OECD data on annual flows of total business enterprise expenditure on R&D can be accumulated into a stock of R&D capital valued at the cost of investment, with a depreciation rate of 20% on the declining balance assumed. Between 1980 and 1999, the per capita real business enterprise R&D stock increased proportionately quite rapidly in Australia and Canada—but from a relatively small base. The United States

started with the greatest absolute stock of R&D investment, and the absolute size of the increase in R&D capital in the United States ($1,274) was much larger than in Norway ($626), Australia ($567), Canada ($720), and the United Kingdom ($337).[18] Only Sweden came close, at +$1,010.

Current consumption levels could be increased by running down stocks of non-renewable natural resources or by exploiting renewable resources in a nonsustainable manner, but this would be at the cost of the consumption of future generations. 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, that counts.

The World Bank (1997) has produced estimates for one year (1994) of natural capital, or "the entire environmental patrimony of a country," for nearly 100 countries. *Natural capital* is defined to include pastureland, cropland, timber resources, nontimber forest resources, protected areas, and subsoil assets. Unfortunately, the single year of data availability would preclude the use of this variable in our proposed index of economic well-being. World Bank estimates of natural capital for OECD countries, on a per capita basis expressed in 1994 U.S. dollars, were $36,590 for Canada; $35,340 for Australia; $30,220 for Norway; $16,500 for the United States; $14,590 for Sweden; and $4,940 for the United Kingdom.

In general, a financial instrument can be seen from two angles: It is an asset to the holder and a liability to the issuer. If both persons are residents of the same country, these assets and liabilities offset each other. With our index, we therefore did not count the gross level of government or corporate debt as a "burden" on future generations, and we did not count as part of the intergenerational bequest the value of paper gains in the stock market. Although the distribution of financial assets and liabilities will play a major role in *allocating* the future returns to the capital stock, 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 citizens of one country to residents of other countries will lower the aggregate future consumption options of those citizens, increases in the level of foreign indebtedness reduce economic well-being within a given country.

Estimates of the net investment position, expressed in current U.S. dollars, have been published in the International Monetary Fund's *International Financial Statistics Yearbook* (2002). We converted these estimates to current-price national currencies at market exchange rates and then deflated by the GDP deflator and adjusted for population to obtain real per capita estimates in the net international investment position, expressed in national currency units.

Like the excess depletion of natural resources, current consumption can be increased at the expense of the environment's degradation, reducing the economic well-being of future generations. Consequently, changes in the level of air and

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water pollution should be considered an important aspect of wealth accumulation. Probably the best-known environmental change is global warming, which has arisen from increased emissions of greenhouse gases—most commonly, carbon dioxide (CO_2) emissions (Intergovernmental Panel on Climate Change [IPCC] 2001). Fortunately, data are available on these emissions, and it is possible to estimate the costs of these emissions. These costs can then be subtracted from the stock of wealth to obtain an environmentally adjusted stock of wealth.[19] Since global warming affects all countries, we estimated world total costs of emissions and allocated these costs on the basis of a country's share of world GDP.

Fankhauser (1995) has estimated the globalized social costs of CO_2 emissions (with no adjustment for different national costs) at $20 U.S. per ton in 1990. According to data from the International Energy Agency (IEA), world CO_2 emissions in 1997 were 22,636 millions of metric tons (2003). Based on the $20 U.S. per ton cost of CO_2 emissions, the world social cost of CO_2 emissions was $452,720 million. We allocated this amount on the basis of a country's share of nominal world GDP, expressed in U.S. dollars. We then converted it into national currency at the purchasing power parity exchange rate[20] and divided by population. As these costs represent a loss in the value of the services provided by the environment, they can be considered a deduction from the total societal stock of wealth. For example, in 1999, per capita stocks of wealth in Canada were reduced by $317 (U.S. dollars) because of the social costs imposed by CO_2 emissions, according to this methodology.

ESTIMATES OF TOTAL WEALTH

As the estimates of the physical capital stock, the R&D capital stock, net foreign debt, and environmental degradation are expressed in value terms, they can be aggregated and presented on a per capita basis. Net foreign debt per capita is a negative entry, and the social costs of CO_2 emissions are subtracted from the stocks of wealth.

For the 1980–1999 period, estimates for the five components of the wealth stock included in this chapter indicated that per capita real wealth stocks increased by 18.0% in the United States, much less than Norway's 55.7%. Sweden (20.1%), the United Kingdom (28.2%), Australia, (30.5%) and Canada (35.8%) were intermediate cases (see table 11.2).

Income Distribution—Inequality and Poverty

Would economic well-being in a society in which everyone had a $500 income remain the same if income were redistributed so that half the population had $999 and the other half had $1? Average income would be the same in both cases, but the more equal situation would be likely to generate more aggregate utility.[21] The

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Moving from Research to Policy

Table 11.2. Accumulation—stocks of wealth, 1995 U.S. dollars

Country and year	Total net fixed capital per capita	Total business enterprise expenditures on R&D per capita	Total net international invest. position per capita	Human capital stock per capita	Greenhouse gas emission cost per capita	Total real per capita wealth	Index of total real per capita wealth 1980 = 1.00
Australia 1980	44,827.5	179.4	−8,536.7	18,562.4	−299.8	54,732.8	1.0000
1999	57,188.5	746.4	−10,838.0	24,663.8	−318.6	71,442.1	1.3053
Canada 1980	22,578.6	336.7	−6,491.5	20,563.7	−333.5	36,654.0	1.0000
1999	30,043.7	1,057.6	−6,342.3	25,347.5	−317.2	49,789.3	1.3584
Norway 1980	51,037.4	386.6	−8,041.8	19,570.4	−301.0	62,651.7	1.0000
1999	71,425.8	1,012.9	−2,312.6	27,747.4	−339.9	97,533.6	1.5568
Sweden 1980	43,345.3	1,593.9	−3,953.1	22,057.6	−311.8	62,731.9	1.0000
1999	57,442.7	2,604.0	−8,085.6	23,693.1	−294.0	75,360.1	1.2013
U.K. 1980	40,111.4	850.6	1,320.8	20,055.8	−264.4	62,074.2	1.0000
1999	56,567.9	1,188.1	−3,506.2	25,629.4	−282.7	79,596.6	1.2823
U.S. 1980	50,414.2	1,324.9	1,931.6	24,443.9	−779.4	77,335.2	1.0000
1999	65,956.9	2,599.0	−5,022.5	28,709.8	−1,006.7	91,236.5	1.1798

Source: Data appendix posted at http://www.csls.ca.

idea that "social welfare" depends, in general, on *both* average income and the inequality of incomes has a long tradition in welfare economics (e.g., Arrow 1951; Sen 1970). However, in measuring the level of social welfare, the exact relative weight to be assigned to changes in average incomes, compared with changes in inequality, cannot be specified by economic theory.

Furthermore, poverty is not quite the same issue as inequality. Since the population's economic well-being is affected both by inequality in the distribution of income among all people and by the adequacy of incomes for the least well-off (i.e., the extent of poverty), there are two issues: (1) one's perspective on the importance of inequality/poverty compared with trends in average income and (2) one's view of the relative weight to be placed on poverty compared with inequality. We therefore suggest that a compound subindex that explicitly recognizes these issues would place some weight (β, a parameter between zero and unity) on a measure of inequality in the aggregate distribution of income and the remaining weight (1 − β) on a measure of poverty.

The most popular measure of inequality in the distribution of income is undoubtedly the Gini index.[22] For the construction of the Index of Economic Well-

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being, we have chosen the Gini coefficient of after-tax household income, calculated from the Luxembourg Income Study micro-data files. For the most recent year for which data were available for each country, income inequality as measured by the Gini coefficient was largest (and, hence, income inequality greatest) in the United States (0.387) and lowest in Norway (0.222).

Recently, Osberg and Xu (2000) noted that the Sen-Shorrocks-Thon measure of poverty intensity is not only theoretically attractive as a measure of poverty but 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. The *poverty rate* is the proportion of persons who fall below the poverty line, defined here as half the median equivalent after-tax family income. The *poverty gap ratio* is defined as the percentage gap between the poverty line and the income of those below the poverty line. Furthermore, since the inequality of poverty gap ratios is essentially constant, changes in poverty depend on changes in the poverty rate and the average poverty gap ratio.

We observed from the LIS data that the poverty rate varied greatly among each of the countries. For the most recent year for which micro-data tapes were available for each country, it ranged from a high of 18.0% in the United States and 17.5% in Australia to 12.4% in Canada, 9.7% in the United Kingdom, 9.2% in Norway, and 8.9% in Sweden. There was much less variation across countries in the average poverty gap ratio: Sweden, 36.6%; the United States, 34.9%; Canada, 31.0%; Norway, 28.5%; the United Kingdom, 28.5%; and Australia, 27.7%.

For our overall index of equality, we used a weighted average of the indices of poverty intensity for all units or households and the Gini coefficient, with equal weights. We multiplied the index by -1 in order to reflect the convention that increases are desirable. Unfortunately, the LIS database allows calculation of income distribution estimates for several years over a long time period for only a few countries. Hence, values of the income distribution and poverty variables in the years before the first LIS estimate for that country are assumed equal to the estimate for the first year of LIS data, and the values for the years after the last LIS estimate are assumed equal to the estimate of the last year of LIS data (see table 11.3). This is obviously an inadequate method and may lead to unreliable estimates for countries for which LIS estimates are only available for a small number of years over a short time period.

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

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Table 11.3. Distribution—economic inequality and poverty

Country and year	Gini coefficient (A)	Poverty rate (B)	Average poverty gap (% of poverty line) (C)	Poverty intensity D = B*C	Poverty intensity index D'	Gini coeff. (income after tax), index A'	Overall index of inequality E = (−1)* (D'* 0.5+ A'*0.5)
Australia 1980	0.3040	15.48	26.73	0.0414	1.0000	1.0000	−1.000
1999	0.3378	17.48	27.66	0.0484	1.1685	1.1112	−1.140
Canada 1980	0.3099	15.36	30.93	0.0475	1.0000	1.0000	−1.000
1999	0.3019	12.37	30.99	0.0383	0.8068	0.9743	−0.891
Norway 1980	0.2500	6.35	34.66	0.0220	1.0000	1.0000	−1.000
1999	0.2659	9.15	28.53	0.0261	1.1866	1.0636	−1.125
Sweden 1980	0.2139	5.49	36.02	0.0198	1.0000	1.0000	−1.000
1999	0.2530	8.65	36.64	0.0317	1.6024	1.1832	−1.393
U.K. 1980	0.2903	9.20	19.93	0.0183	1.0000	1.0000	−1.000
1999	0.3430	13.20	28.49	0.0376	2.0512	1.1816	−1.616
U.S. 1980	0.3314	17.96	34.80	0.0625	1.0000	1.0000	−1.000
1999	0.3869	17.93	34.94	0.0627	1.0023	1.1677	−1.085

Source: Authors' calculations from LIS database.

Note: Poverty line = one half of median equivalent income; equivalent income = net family income after taxes adjusted by equivalence scale (square root of family size), negative or zero income excluded; average poverty gap = ratio of the gap (between poverty line and mean equivalent income of those under poverty line) to poverty line.

completely eliminate economic anxieties, which have to be considered a subtraction from well-being.

Although public opinion polling can reveal that many feel themselves to be economically insecure, and that such insecurity decreases their subjective well-being, there is no generally agreed-upon 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. Ideally, one would measure trends in economic security with data that included (for example) the percentage of the population who had credible guarantees of employment continuity and the adequacy of personal savings to support consumption during illness or unemployment. However, such data are not widely available.

For these reasons, rather than attempt an overall measure of economic insecurity, we have adopted a "named risks" approach, and we have addressed the change

over time in four key economic risks. More than fifty years ago, the United Nations' *Universal Declaration of Human Rights* (1948) stated:

> 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][23]

For this discussion, we constructed measures of the percentage change over time in the economic risks associated with unemployment, illness, "widowhood" (interpreted here as single-female parenthood), and old age. In each case, we modeled the risk of an economic loss associated with the event as a conditional probability, which can itself be represented as the product of several underlying probabilities. We weighted the prevalence of the underlying risk by the proportion of the population that it affected. The core hypothesis underlying the measure of economic insecurity we propose is that changes in the subjective level of anxiety about a lack of economic safety are proportionate to changes in objective risk.

Security from the economic risk associated with unemployment can be modeled as dependent on the risk of unemployment and the extent to which people are protected from the income losses of unemployment. We took as a proxy for the risk of unemployment changes in 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 unemployment insurance (UI) from the financial impacts of unemployment can be modeled 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. Internationally comparable data on these two variables, particularly the first, have proven very difficult to obtain. Hence, when calculating the risk of unemployment, we used an unpublished OECD series on the gross replacement rate for the unemployed. This series showed a markedly different trend than the UI coverage rate for certain countries such as Canada in the 1990s.[24]

We did not attempt to model the psychological insecurities associated with health or confront the issue of whether more education and greater knowledge of potential health risks (even ones of very small probability, such as mad cow disease) produce more or less anxiety. Our focus was on the economic losses associated with illness, which certainly dropped considerably with the introduction of universal health insurance in many countries. However, data limitations forced us to ignore trends in the risk of loss of earnings. Historically, a portion of the labor force has had some income-loss protection through sick leave provisions in their individual or collective employment contracts. One implication of a trend to short-term contract employment and self-employment in developed economies is an

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increase in the fraction of the population whose employment income ceases totally
in the event of ill health.

Instead, we focused on the financial risk associated with health care costs, as-
suming that risk to be proportional to the share of uninsured private medical care
expenses in disposable income. The OECD Health Data CD-ROM provided us
with data for a long period on medical care expenses as a proportion of disposable
income (excluding medical insurance premiums and net of all insurance reim-
bursement for medical expenses), which ranged from a high of 14.0% in the United
States to a low of 1.1% in the United Kingdom in 1996. The proportion in the
other countries was 5.5% in Australia, 3.2% in Canada, 2.0% in Norway, and 1.6%
in Sweden.

To follow the convention that increases in the subcomponents of the index of
economic security are improvements, we wanted an index of "security" and not
an index of "insecurity." Hence, since increases in health costs are negative for
economic well-being, we multiplied the financial risk due to illness by -1. An
increased negative value therefore represented a decline in well-being.

When the UN Universal Declaration of Human Rights was drafted in 1948, the
percentage of single-parent families was relatively high in many countries, partly
as a result of World War II. At that 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 (e.g.,
OECD 2003, 53). To model trends in this aspect of economic insecurity, we applied
the following formula: (the probability of divorce) $\times$ (the poverty rate among
single-female-parent families)[25] $\times$ (the average poverty gap ratio among single-
female-parent families).[26] The product of these last two variables is the intensity
of poverty.

We stress that in constructing a measure of the economic insecurity associated
with single-parent status, we were *not* constructing a measure of the social costs
of divorce. Economic well-being is only part of social 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.

Data on divorce rates come from the UN's *Demographic Yearbook* (1997) and
estimates of the poverty rate and poverty gap ratio for single-female parents were
calculated from the LIS micro-data tapes. The annual divorce rate in 1996 (or the
most recent year before 1996 for which data were available) was 4.33% of legally
married couples in the United States—significantly higher than in the United King-
dom (2.89%), Australia (2.86%), Canada (2.62%), Sweden (2.42%), and Norway
(2.28%).

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The data indicate that international differences in the economic consequences of single-parent status reinforce differences in its probability. The poverty rate for single-female parents in the most recent year (in parentheses) from LIS micro-data files ranged from a high of 44.0% (1997) in the United States to a low of 2.8% (1992) in Sweden. In between were Australia, 40.7% (1994); Canada, 40.7% (1994); the United Kingdom, 13.8% (1986); and Norway, 11.3% (1995). The average poverty gap ratio for single-female parents in the same year was 41.6% in Norway, 39.6% in the United States, 27.5% in Canada, 24.5% in Australia, and 23.6% in the United Kingdom.

Again, to follow the convention that increases in the subcomponents of the index of economic security are improvements, we wanted an index of "security" and not an index of "insecurity." Hence, we multiplied the financial risk associated with single-parenthood, where increases were negative for economic well-being, by −1. A negative sign, therefore, indicated that an increased negative value represented a decline in well-being.

Since income in old age is the result of a lifelong series of events and decisions, which we cannot hope to disentangle in this chapter, we modeled the idea of "insecurity in old age" as dependent on the chance that an elderly person would be poor, and the average depth of that poverty. The poverty rate for the elderly in the most recent year (in parentheses) for LIS micro-data files ranged from a high of 33.1% (1994) in Australia to 24.4% (1997) in the United States; 12.0% (1995) in Norway; 6.0% (1992) in Sweden; 5.4% (1986) in the United Kingdom; and 4.8% (1994) in Canada. The average poverty gap ratio for the elderly in the same years ranged from a low of 9.3% in Norway to 27.6% in Australia. The United States (24.4%), Canada (13.4%), Sweden (12.7%), and the United Kingdom (11.7%) were in between.

Again, to follow the convention that increases in the subcomponents of the index of economic security are improvements; we wanted an index of "security" and not an index of "insecurity." Hence, we multiplied the risk of elderly poverty by −1.

OVERALL INDEX OF ECONOMIC SECURITY

We aggregated the four risks discussed thus far into an index of economic security using as aggregation weights the relative importance of the four groups in the population:

- for unemployment, the proportion of the population aged fifteen to sixty-four in the total population
- for illness, the proportion of the population at risk of illness—100%
- for single-parent poverty, the proportion of the population comprised of married women with children younger than eighteen

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- for old-age poverty, the proportion of the population in immediate risk of poverty in old age, defined as the proportion of the population aged forty-five to sixty-four in the total population

As indicated in table 11.4, these proportions were normalized for all years to 1.0. For example, the weights for Canada in 1997 were the following: unemployment, 0.2779; illness, 0.4160; single parenthood, 0.2158; and old age, 0.0904.[27] Implicitly, by expressing changes as proportionate to an initial base, we were assuming that individuals habituated to a given level of background stimulus but responded similarly to proportionate changes in stimulus.

Estimates of Trends in the Overall Index of Economic Well-being

Trends in any index are determined by the choice of variables included in the index, the trends in those variables, and the weights those variables receive. Since the four main dimensions of average consumption, intergenerational bequest, inequality/poverty, and insecurity were separately identified, we found it easy to conduct sensitivity analyses of the impact on perceived overall trends of different weighting of these dimensions.[28] Also, we found it straightforward to use these estimates to determine which component of economic well-being had the largest impact on which dimension of "health." It may be that all dimensions of health—mortality from different causes, morbidity of different types—respond similarly to each of these four components of economic well-being, but this supposition remains to be proven.

For discussion purposes, our "standard" weighting gave each component an equal weight of 0.25. Since the subcomponents of the consumption flows and wealth stocks were expressed in dollars, there was no need for explicit weighting. Their dollar values represented implicit weights. In terms of the inequality/poverty subcomponents, we assigned equal weight to each. The subcomponents of the economic security index were weighted by the relative importance of the specific population at risk in the total population (see table 11.5).

Economic Well-being over Time

We are acutely conscious that the data sources available to us were far from what we would have liked. We know that restricting ourselves to internationally comparable data series has meant that we have neglected issues (such as the decline in UI coverage in Canada) important for some countries. We also know the reliance on interpolation between the LIS data points implies, necessarily, that we cannot detect year-to-year fluctuations in some components of our index. However, we

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Table 11.4. Economic security

Country and year	Index 1, unemploy- ment	Index 2, health (+2)	Index 3, single- parent poverty (+2)	Index 4, old-age poverty (+2)	Weighted index 1, unemploy- ment	Weighted index 2, health	Weighted index 3, single- parent poverty	Weighted index 4, old-age poverty	Average weighted index of economic security
Australia									
1980	1.0000	1.0000	1.0000	1.0000	0.2729	0.4189	0.2283	0.0799	1.0000
1999	1.1656	0.9329	1.3656	−0.6293	0.3210	0.3830	0.2875	−0.0652	0.9262
Canada									
1980	1.0000	1.0000	1.0000	1.0000	0.2791	0.4114	0.2316	0.0779	1.0000
1999	1.2521	0.2926	1.3424	1.8814	0.3471	0.1190	0.2781	0.2051	0.9493
Norway									
1980	1.0000	1.0000	1.0000	1.0000	0.2655	0.4210	0.2231	0.0905	1.0000
1999	1.6829	0.7509	0.5885	1.6596	0.4615	0.3180	0.1204	0.1622	1.0621
Sweden									
1980	1.0000	1.0000	1.0000	1.0000	0.2781	0.4339	0.1902	0.0978	1.0000
1999	1.0031	−0.0637	1.7717	0.7801	0.2771	−0.0274	0.3193	0.0884	0.6575
U.K.									
1980	1.0000	1.0000	1.0000	1.0000	0.2643	0.4127	0.2304	0.0926	1.0000
1999	0.7876	0.0925	1.0955	1.1901	0.2124	0.0383	0.2396	0.1160	0.6064
U.S.									
1980	1.0000	1.0000	1.0000	1.0000	0.2809	0.4238	0.2109	0.0843	1.0000
1999	1.0812	0.4133	1.1736	1.3419	0.3047	0.1771	0.2250	0.1315	0.8384

Source: Data appendix posted at http://www.csls.ca.

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Table 11.5. Index of economic well-being

Country and year	Consumption per capita (A)	Wealth stocks per capita (B)	Income distribution (C)	Economic security (D)	Well-being index— equal weighting	Well-being index— alternative weighting	GDP per capita index
Australia 1980	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1999	1.4176	1.3053	0.8602	0.9262	1.1273	1.3015	1.4779
Canada 1980	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1999	1.2247	1.3584	1.1094	0.9493	1.1604	1.1990	1.3228
Norway 1980	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1999	1.4727	1.5568	0.8749	1.0621	1.2416	1.3803	1.5703
Sweden 1980	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1999	1.2192	1.2013	0.6072	0.6575	0.9213	1.1001	1.3113
U.K. 1980	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1999	1.5215	1.2823	0.3836	0.6064	0.9484	1.2923	1.4873
U.S. 1980	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1999	1.3782	1.1798	0.9150	0.8384	1.0778	1.2580	1.4970

Source: Data appendix posted at http://www.csls.ca.

Note: Equal weighting well-being index = 0.25 * A + 0.25 * B + 0.25 * C + 0.25 * D. Alternative weighting well-being index = 0.7 * A + 0.1 * B + 0.1 * C + 0.1 * D.

hope that enough data remain to give a preliminary indication of trends in economic well-being from a broader perspective than that provided by GDP accounting.

Since we wanted to examine the sensitivity of a measure of economic well-being to alternative possible weightings of accumulation, income distribution, and insecurity, figures 11.1 to 11.6 present both our "standard" and an "alternative" weighting. The alternative one is much more heavily weighted to average consumption (0.7) and has much less weight on accumulation (0.1), income distribution (0.1), and insecurity (0.1). For each country, we compared trends in the standard and alternative indices with trends in GDP per capita.

For all countries, consideration of bequest, inequality/poverty, and insecurity reduced the measured rate of growth of economic well-being, compared with the use of the GDP per capita index. Generally, the more heavily current average consumption was emphasized, the closer our index came to GDP per capita. However, in every instance the consideration of a wider range of issues than those recognized in GDP accounting reduced the measured increase in economic well-being.
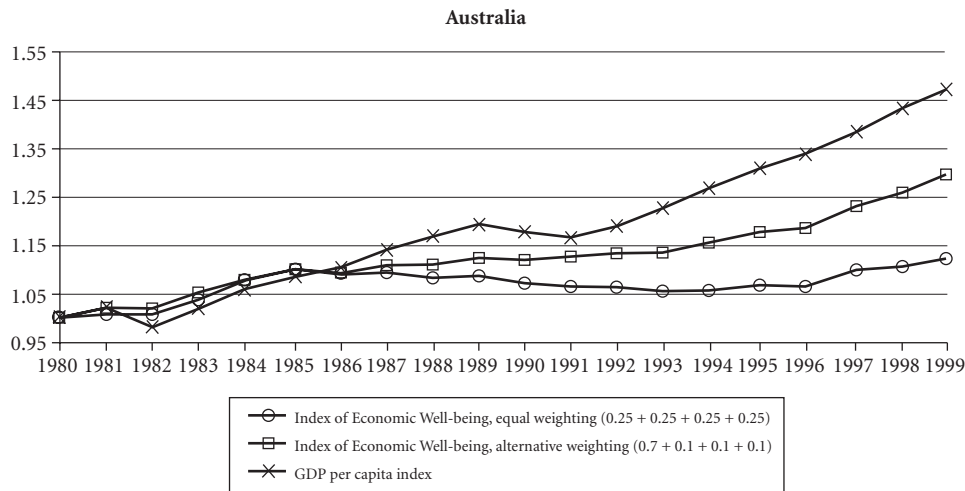
Australia

Figure 11.1. The index of economic well-being for Australia, 1980–1999

In some countries, the change in the perception of trends in economic well-being that a broader measure produced was striking. In the United States, GDP per capita increased by approximately 50.0% from 1980 to 1999, but our standard index was much flatter, with a total increase of 8% over the period. In the United Kingdom, increases in per capita GDP were of similar size (48.7%), but our standard weighting (which had a heavy emphasis on economic inequality and insecurity) showed a decline of about 5.0%. Both the United States and the United Kingdom were marked by a substantial increase in economic inequality over this
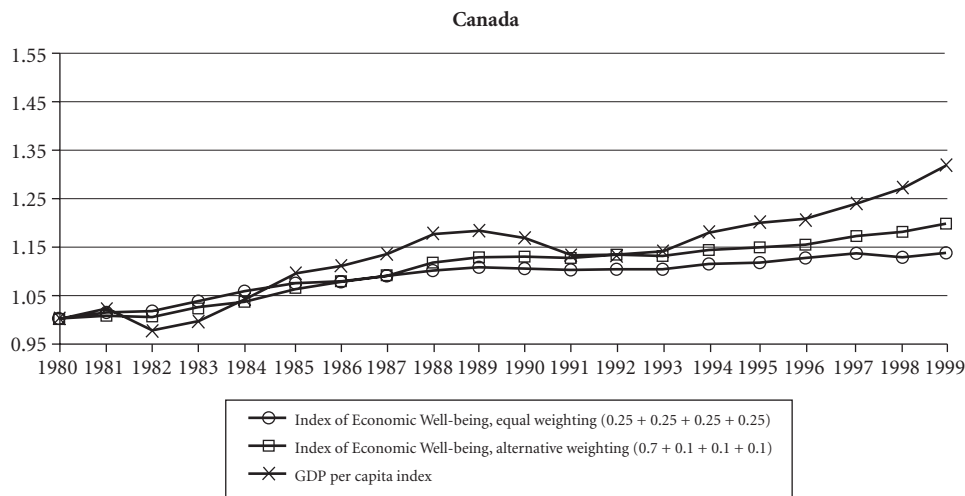
Canada

Figure 11.2. The index of economic well-being for Canada, 1980–1999
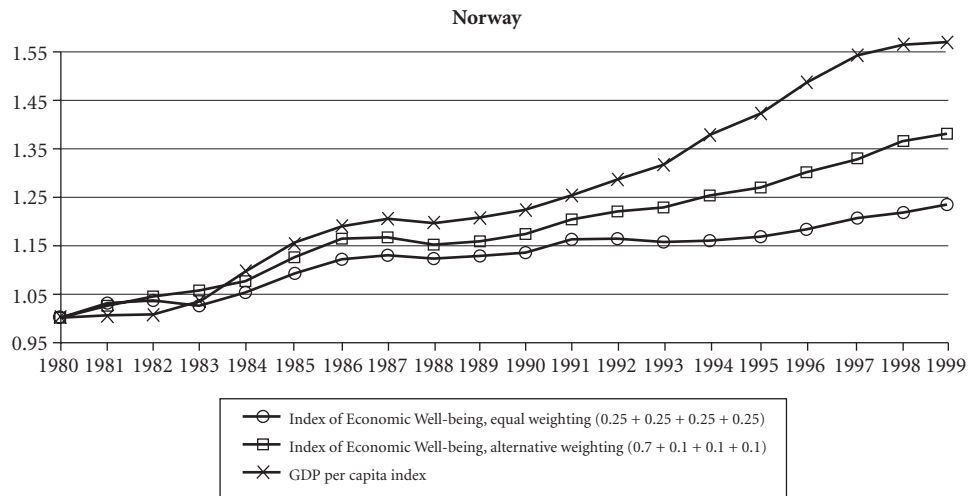
Norway

Figure 11.3. The index of economic well-being for Norway, 1980–1999

period, and increases in money income were limited to the top end of the income distribution (see Osberg 1999). In addition, increases in money income in the United States were obtained at the cost of substantial increases in working hours.

For the United Kingdom and Sweden, GDP per capita rose, whereas our standard index of economic well-being declined. In both cases, however, this qualitative result was quite sensitive to the relative weighting of current consumption, compared with distribution and insecurity: The alternative index did not actually decline[29] (although it was almost flat in the Swedish data). As Osberg and Xu (2000)
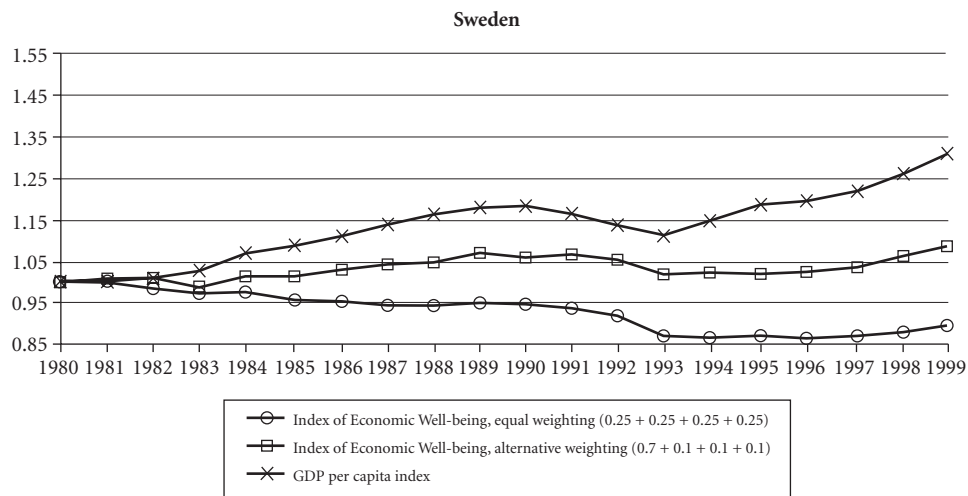
Sweden

Figure 11.4. The index of economic well-being for Sweden, 1980–1999
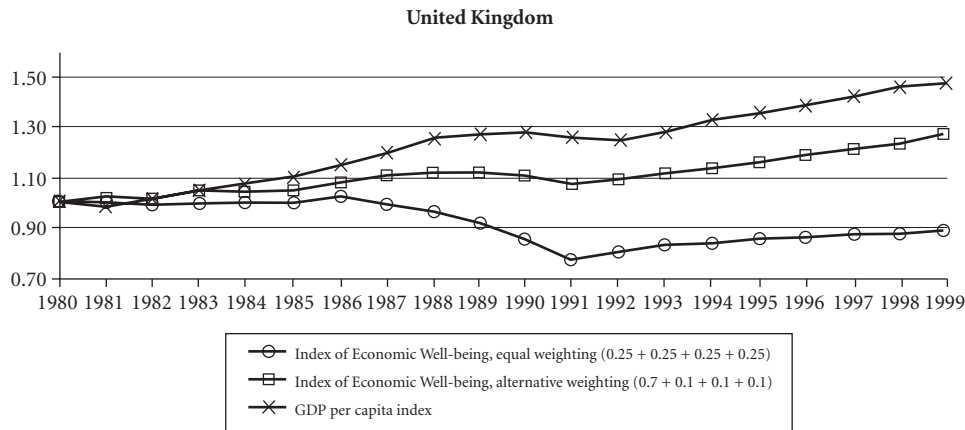
United Kingdom

Figure 11.5. The index of economic well-being for the United Kingdom, 1980–1999

have noted, recent years have seen an increase in Swedish poverty intensity; hence, we were not surprised that an index heavily weighting trends in income distribution and insecurity showed a deterioration.

From 1980 to 1999, Norway had the greatest increase in both GDP per capita and economic well-being, whichever weights were used for calculations. In Norway, trends in economic well-being were, more or less, scaled-down versions of the trend in GDP per capita. In this case, our current estimates of trends in the Index of Economic Well-being could be said to provide relatively little "value added," compared with trends in GDP per capita, since each index moves in much the
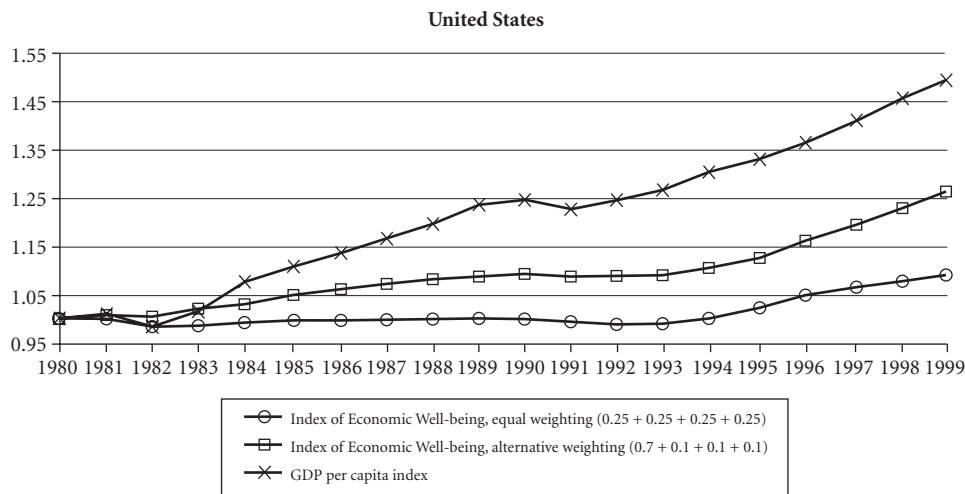
United States

Figure 11.6. The index of economic well-being for the United States, 1980–1999

same way over time (albeit showing much stronger growth in GDP per capita than in economic well-being).

However, Australia and Canada—whose economies share a relative dependence on raw materials production—were noteworthy in showing a greater cyclical sensitivity in GDP per capita than one finds in either measure of economic well-being or in GDP per capita in other countries. In Canada and Australia, the recessions of both the early 1980s and early 1990s show up clearly in per capita GDP fluctuations—to a much greater degree than in Germany or Norway (the early 1980s recession is hard to find in UK or Swedish GDP per capita data). However, in both countries the trend in economic well-being indices is much smoother, because changes in current income can be much more rapid than changes in wealth stocks, income distribution, and insecurity. Canadian trends in economic well-being are also quite similar for "standard" and "alternative" weightings of the index.[30]

Level Comparisons of Economic Well-being

Comparisons of the level of well-being across countries are, in our judgment, inherently much more problematic than comparisons of the trends in various components of economic well-being within countries. In cross-country comparisons, the institutional context of economic data may differ far more than in within-country, longitudinal comparisons. Calculations of purchasing power parity equivalence across several countries appear to have greater uncertainty than comparisons of within-country consumer price levels. Statistical agencies in different countries typically differ in their data availability and data-gathering practices more than they change those practices over time in the same country. For all these reasons, we avoid in this chapter direct commentary on comparative levels of economic well-being.

Conclusion and Implications for Health

Early economists were fairly broad in their conception of "prosperity," but they were in no doubt that it had many positive implications. More recently, however, the measure of economic success has been narrower. Now, it falls to critics of the SNA to show that alternative measures to GDP per capita are possible, plausible, and more reflective of true economic well-being. Therefore, we have developed an index of economic well-being based on four dimensions, or components, of economic well-being for selected OECD countries: consumption, accumulation, income distribution, and economic security. One key finding was that economic well-being, for at least two different sets of relative weights, had increased at a much slower rate over the past twenty years than had real GDP per capita, a widely used indicator of economic well-being.

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In Norway, trends in economic well-being are qualitatively, if not quantitatively, similar to trends in GDP per capita. However, in two countries (Australia and Canada), trends in well-being are cyclically dissimilar to GDP per capita trends. In the United States and the United Kingdom the secular trend one perceives in economic well-being depends heavily on whether one uses GDP per capita or a broader index of economic well-being that includes consideration of income distribution and economic insecurity—and the same is even more true of Sweden. In some countries (e.g., Sweden) the trend one perceives in economic well-being is very sensitive to the relative weighting of consumption, accumulation, distribution, and insecurity—but in others this sensitivity is much less pronounced. In short, even with the highly imperfect data available for this study, there is a good deal more information content in using a broader measure of economic well-being than GDP per capita.

Why should someone concerned with health outcomes be concerned with the divergence between trends in economic well-being and trends in GDP? Clearly, the issue depends partly on the definition of *health* being used, and there are several alternatives. However, to ascertain the relationship between health and economic well-being, we should not concentrate solely on health measurement and ignore the issue of accurate measurement of trends in economic well-being.

Some trends are likely to have both a direct link to health and an effect on economic well-being. Obviously, increased life span is directly linked to health, and we have argued for its consideration in a measure of trends in economic well-being. This chapter has also argued that changing household size affects economic well-being, and we know from the work of Wilkinson (1996) and Lavis and Stoddart (2000) that a broad range of health outcomes are closely linked to the social support available to individuals. It is also clear that decreasing household size necessarily implies less shared contact within families and that the availability of time outside of work[31] is a prime constraint on the formation of social links outside of work and family.

We were not able to include in this chapter costs of "regrettable necessities" in our measure of personal consumption, although some such adjustments (such as the increased expenditures necessary to avoid the costs of crime) are linked to aspects of health. Our proposed measure of economic well-being also included a proposal to count the accumulated value of human capital stocks, and it is well known that health outcomes are highly correlated with educational attainment.

We included measures of income distribution and economic insecurity in the proposed index of economic well-being because they directly affect individuals' well-being and because they strongly affect health. Whatever the level of per capita GDP, it clearly matters to individuals both what their personal prospect of lifetime income may be and how uncertain that prospect may be. Insecurity and economic stress have often been linked to mental and physical ill health. Wilkinson (1996) also argued that greater inequality increases the mortality rate. Daly and Duncan

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(1998) argued that absolute deprivation reduces life expectancy, and they con-
cluded that policies targeted at increasing the incomes of the poor are likely to
have a larger effect on mortality risk than policies designed to reduce inequality
more generally. In short, whatever the relationship between health and GDP per
capita trends, health probably is more closely linked to a more adequate concep-
tualization of economic well-being.

Notes

1. For this chapter to be self-contained and provide a full explanation of the methodology
used to estimate the index of economic well-being, we have drawn on material from earlier
papers in which we developed the index (Osberg 1985; Osberg and Sharpe 1998, 1999). This
chapter represents part of the output of an ongoing research agenda. Other articles and the
most recent amendments to index methodology—such as those embodied in Osberg and
Sharpe (2005)—can be found at *http://www.csls.ca/iwb.asp*. The sources for the data under-
lying all charts in the text of this chapter can be found in an Excel database file, posted for
free download at *http://www.csls.ca.iwb/oecd.asp*. Please follow the links for specific charts to
find the most recent discussion of sources and any revision of data. Background data for
additional OECD countries, as well as for the seven countries that this chapter considers
(for which data are more reliable), are also presented.

2. Keunig (1998) reviewed the contributions of Dawson (1996) and Kendrick (1996) and
the most recent revisions to the SNA (UN 1993).

3. Furthermore, if we discover that there is disagreement about values and that it does
matter for policy purposes, we can focus further discussion on those issues. In a democracy,
much of the political process revolves around attempts to persuade others about which
values should take precedence.

4. However, a sufficient (but not necessary) set of conditions for the index of economic
well-being that we propose would be the following: Societal economic well-being can be
represented as the well-being of a "representative agent" *if* (1) such an agent has a risk-
averse utility function (i.e., diminishing marginal utility); (2) each person, from behind a
"veil of ignorance" as to his or her own characteristics, 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 a 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.

5. Only these countries had a large enough number of public-use micro-data files for
construction of reliable long-run time series on the variables we needed. In addition, main-
taining international comparability of estimates meant that some data used in our other
papers to construct the index for Canada and the United States, but not available for other
countries, were not used for this chapter.

6. An extended discussion of the rationale for this framework of consumption, accu-
mulation, distribution, and insecurity can be found in Osberg (1985).

7. The underground economy refers to economic activity that is either illegal, or legal
but unreported to the tax authorities.

8. Dan Usher (1980), of Queen's University, has developed a methodology for the esti-
mation of the value of increased longevity.

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0
+1

9. For example, when fishing fleets stay in port because of stormy weather conditions, they are not generating marketable output and GDP is lower. If they put out to sea, however, some fish would be caught (GDP would increase) and some boats would sink (average life expectancy would decline).

10. Wolfson (1996) found for 1990–1992 that the HALE for 15-year-olds in Canada was 7.8 years less than life expectancy (55.6 versus 63.4 years). However, since there is no time series on health-adjusted life expectancy for Canada, we do not know if the rate of increase in the HALE has been greater or lower than life expectancy over time. Neither are data on the HALE available over time for other countries.

11. Implicitly, this procedure ignores both the differential values that individuals might place on changes in mortality probability at different ages and the distribution, by age, of actual changes in mortality probability.

12. This product is released annually by the OECD and can be purchased at http://www.oecd.org. The CD-ROM contains data on the health system and indicators of the health of the population for all OECD countries, as well as macroeconomic and demographic data.

13. The average size of households was calculated from the Luxembourg Income Study micro-data files.

14. Annual average hours worked per working-age person (ages fifteen to sixty-four) depend on the fraction of the population that has employment, the number of weeks per year that employed people typically work, and their average hours of work per week. The major differences between countries are in the proportion of people who participate in full-time paid employment (particularly large differences are observed for married women and men fifty to sixty-four). However, in this chapter, we ignore *how* differences in average working hours are generated.

15. Total annual hours of unemployment are calculated as the product of the number of unemployed and average annual hours per employed person, on the assumption that an unemployed person wants to work average hours. Total unemployed hours are then divided by the working-age population to determine average annual hours of unemployment per working-age person.

16. See Coulombe (2000), who notes that the average depreciation rate for Canada's business sector capital stock over the 1961–1997 period was 10%, compared with 4.4% in the United States.

17. See OECD (2001) for trends in educational attainment and the individual and social outcomes associated with education.

18. The R&D investment series starts in 1960; therefore, the stock of R&D in 1960 is equal to the R&D investment that year, and the series has a base of zero in 1959.

19. The conceptual issues to be dealt with in estimating the costs of CO_2 emissions include whether the costs should be viewed from a global, national, or subnational perspective; whether the costs increase linearly with the levels of pollution; whether the costs should be borne by the producer or the receiver of transborder emissions; and whether costs should vary from country to country or be assumed equally by all countries.

20. A purchasing power parity exchange rate is the rate at which a national currency is exchanged for U.S. dollars so as to leave the price of an identical basket of goods the same in both countries. Purchasing power parity exchange rates are preferred to market exchange rates for living standards comparisons because they account for differences in prices between countries.

21. Recognizing that an additional dollar means less to a millionaire than to a pauper, economists tend to agree that "diminishing marginal utility" is a reasonable assumption.

22. The Gini index is an indicator of inequality that increases as inequality increases. A value of zero indicates perfect equality (every individual in a given society has the same income), and a value of unity indicates perfect inequality (one individual has all the income in a given society).

23. Today, the sex specificity of the 1948 language will strike many people as odd, but Article 2 makes it clear that all rights are to be guaranteed to males and females equally.

24. The term "unemployment insurance" is used here because it is common in most countries, although Canada changed to the term employment insurance (EI) in 1996.

25. However, *rate = incidence × 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 implicitly account jointly for the duration of poverty spells and for their likelihood.

26. This procedure effectively ignores single male parents, an approach justifiable on the grounds that males make up only about 10% of the single-parent population, and their income loss on divorce is generally considerably less than that of women.

27. To uniformly establish the base year for the indices of all risks of economic security at 1.000 in table 11.4, we have added the constant 2 to the indices of risk of illness, single parenthood, and old age, whose original base was -1.

28. A Microsoft Excel spreadsheet with the required data and programs is available on request from the authors.

29. In addition, we would caution that because we were not able to get, for this chapter, estimates of the income replacement provided under UI in these countries, we may have overestimated the importance for economic insecurity of the rise in unemployment in these countries.

30. But this chapter does not capture the rise in economic insecurity produced by declining UI coverage.

31. In practice, the timing and predictability of work hours (e.g., shift work or mandatory overtime) may be just as important to the possibility of participation in voluntary activities, such as youth sports or choral groups, as the absolute amount of work hours.

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