

# Comparisons of Trends in Gross Domestic Product and Economic Well-Being – The Impact of Social Capital<sup>1</sup>

*Lars Osberg and Andrew Sharpe*

## 1. Introduction

In 1980, Ronald Reagan asked the American people a seemingly simple question: “Are you better off today than you were four years ago?” Although US per capita disposable real income was, in 1980, some 7.6 percent 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 to that of their parents at the same stage of life, less than half (44%) thought that there had been an improvement – despite an increase of approximately 60 percent in real Gross Domestic Product (GDP) per capita over the previous 25 years.<sup>2</sup> 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? National income accounts omit consideration of many issues (e.g. leisure time, the length of life) which are clearly important to the well-being of individuals. 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 GDP per capita has been an often used summary measure of economic trends.<sup>3</sup> 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 – **but** it has often been used as such. In particular, analyses of the connections between social capital and GDP usually ignore the sometimes tenuous nature of the link between GDP and economic well-being. However, there is good reason to believe that the issues omitted from consideration in GDP accounting are especially relevant to social capital.

Summarizing the economic well-being of a complex society inevitably requires a series of ethical and statistical judgements. There are many different dimensions to well-being, which are valued to different degrees by different observers. With a single index number, it

may be difficult to disentangle the relative importance of value judgements and technical measurement choices in the construction of the index. Osberg (1985a), 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.**<sup>4</sup> The underlying hypothesis is that public debate is likely to be improved if issues of fact, analysis and values are as clearly separated as possible.

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.<sup>5</sup>

As part of a larger project on the state of living standards and the 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 (1985a) for Canada (Osberg and Sharpe 1998), Canadian provinces, and for the US (Osberg and Sharpe 1999). This paper extends the index to the US, UK, Canada, Australia, Norway and Sweden, with a base year of 1981, and includes specific consideration of differentials in working time.

The paper is divided into three main parts. Section 2 develops estimates of the four key components or dimensions of the index – consumption flows, stocks of wealth, inequality and insecurity. Section 3 develops preliminary estimates of the overall index and its components for the US, UK, Canada, Australia, Norway and Sweden, six countries that clearly exhibit very different trends in some of the aspects of economic well-being which are omitted from GDP accounting.<sup>6</sup> Section 4 compares trends in the index and its components, and Section 5 discusses the linkage between social capital and trends in economic well-being.<sup>7</sup>

## **2. An Index of Economic Well-Being**

GDP is a measure of the aggregate marketed income of a society, and most of its proposed substitutes (e.g. the Genuine Progress Indicator) 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 that does not directly consider the aggregate value of the bequest which this generation will leave to its descendants. Although those now alive clearly care about the level of their own consumption, they also care (in varying degrees) about the well-being of future generations. Furthermore, although trends in average income are important, individuals 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 are, therefore:

- effective per capita consumption flows
  - includes consumption of marketed goods and services, and effective per capita flows of household production, leisure and other unmarketed goods and services
- net societal accumulation of stocks of productive resources
  - includes net accumulation of tangible capital, housing stocks and consumer durables, net changes in the value of natural resources stocks; environmental costs, and net change in level of foreign indebtedness; ideally also includes net accumulation of human capital, social capital, and research and development (R&D) investment
- income distribution (poverty and inequality)
  - includes the intensity of poverty (incidence and depth) and the inequality of income
- economic insecurity
  - economic security from job loss and unemployment, illness, family breakup, poverty in old age.

A fuller discussion of the rationale for this framework of consumption, accumulation, distribution and insecurity can be found in Osberg (1985a). We distinguish these four main dimensions of economic well-being to enable persons with differing value judgements (e.g. a greater or lesser 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.<sup>8</sup>

We recognize that the SNA has, thanks to many years of development effort by international agencies, produced an accounting system for GDP which is rigorously standardized across countries. Internationally comparable statistics on other dimensions of economic well-being are far less complete. 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 their influence. Neither assumption seems justifiable.

## **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.<sup>9</sup> Estimates of personal consumption

per capita, expressed in national currency units (NCU) and in constant prices (base years differ among countries) are provided in Table 1. These data have been taken from the OECD National Accounts publication. All countries experienced increases in real per capita marketed personal consumption over the 1971 to 1996 period, but there were large variations in the increase, ranging from a high of 100.2 percent in Germany to a low of 26.4 percent in Sweden. The increases in the other countries were: Norway (73.5% ), UK (71.6% ), Canada (63.5%), US (59.1% ), Australia (58.6%).

*Table 1*

<b>Components of personal consumption</b>						
	Personal consumption per capita (89–90 ncu) (A)	Index of life expectancy 1980 = 1.00 (B)	Average family size, persons (C)	Index of equivalent income 1980 = 1.00 (D)	Adjusted personal consumption per capita (80–90 ncu) E = A*B*D	Index of personal consumption 1980 = 1.00
<b>Australia</b>						
1971	9,308	0.960	2.68	1.000	8,940.0	0.790
1996	14,760	1.048	2.46	0.959	14,834.9	1.311
<b>Canada</b>						
1971	8,981	0.968	<b>2.82</b>	1.026	8,920	0.726
1996	14,682	1.045	2.51	0.969	14,865	1.210
<b>Germany</b>						
1971	10,590	0.963	2.12	0.963	9,819	0.704
1996	21,412	1.046	2.28	0.998	22,356	1.603
<b>Norway</b>						
1971	56,038	0.981	2.49	1.002	55,081	0.755
1996	97,203	1.033	2.19	0.942	94,618	1.297
<b>Sweden</b>						
1971	62,121	0.985	1.97	1.021	62,441	0.880
1996	78,500	1.042	1.85	0.988	80,868	1.140
<b>United Kingdom</b>						
1971	3,714	0.984	3.25	1.107	4,046	0.907
1996	6,374	1.052	2.55	0.976	6,546	1.467
<b>United States</b>						
1971	10,078	0.965	2.98	1.076	10,459	0.868
1996	16,031	1.033	2.54	0.990	16,381	1.359

**Note:** NCU = National Currency Units

*Sources:* Personal Consumption per Capita – National Accounts, Main Aggregates, Volume 1; Population – OECD Health Data 98 CD-ROM, “A Comparative Analysis of 29 Countries”; Life Expectancy – OECD Health Data 98 CD-ROM, “A Comparative Analysis of 29 Countries”; Average Family Size – LIS Database. Data in bold calculated from LIS microdata database, data for other years interpolated or assumed to equal data for first or last year of period with available data.

Appendix Tables: A1, A2, A3.

*Adjustments to Marketed Personal Consumption Flows*

The SNA 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 some other factors that also influence consumption flows, such as leisure, regrettables, the underground economy and life expectancy. 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 preference is to include, rather than exclude, imprecise measures. Since omitting a variable would implicitly set its value to zero, an imprecise measure is likely to embody a smaller error than omitting a variable. However, there is no estimate available at all for some countries, and omission is sometimes unavoidable.

*The underground economy:* Earlier versions of the index of economic well-being for Canada and the US factored in estimates of the underground economy. These estimates were based on benchmark estimates by Statistics Canada, the Bureau of Economic Statistics, and the trend in the share of the self-employed in total employment, on the argument that the self-employed have greater opportunity to hide income than paid workers. 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 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 also have made it more difficult to escape detection by tax authorities.

Unfortunately, central statistical agencies currently do not produce internationally comparable estimates of the magnitude of the underground economy so it was decided to drop this adjustment for construction of the index. Although international estimates of the underground economy based on the monetary approach to the underground economy are available, these estimates were judged too high to be credible.

*The Value of Increased Longevity*

Life expectancy has increased significantly in recent years, and we have every reason to believe that having a long life is an important component of well-being. 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.<sup>10</sup>

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 (HALE),<sup>11</sup> 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 now alive. In aggregating over the population 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).<sup>12</sup> However, we do recognize the crudity of this measure of an existential issue.

Data on life expectancy for the 14 OECD countries are taken from the OECD Health Data CD-ROM and are given in Table 1. Between 1971 and 1996, all countries enjoyed increased life expectancy, with percent increase given in brackets: Australia (9.1%), Canada (7.9%), Norway (5.3%), Sweden (5.8%), UK (6.9%) and the US (7.0%). For all years after 1971, personal consumption per capita is adjusted upward by the increase in life expectancy relative to 1971.<sup>13</sup>

#### *Reduced Economies of Scale in Household Consumption*

When individuals co-habit 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.<sup>14</sup> When comparing the average effective consumption of individuals 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 over time of economies of scale in household consumption.

Since economies of scale diminish in family size, the extent of change in economies of scale depends on where change occurs in the distribution of family sizes.<sup>15</sup> Data on average family size were taken from the Luxembourg Income Study micro-data tapes. Unfortunately, estimates were available only for the years tapes were available. The average family size for the most recent year available was: Australia 2.46 (1994); Canada, 2.51 (1994); Norway, 2.19 (1995); Sweden, 1.85 (1992); UK, 2.55 (1986); and the US, 2.58 (1997). All countries have

experienced a long-term decline since the 1970s in average family size.

The "LIS" (Luxembourg Income Study) equivalence scale (i.e. the square root of family size) has been applied to average family income to construct an index of equivalent family income (1981 = 100), which is used to adjust personal consumption per capita. The UK had the largest downward adjustment in 1996 relative to 1971 (10.8%).

#### *Regrettables and Intermediate Consumer Goods*

It can be argued that certain types of economic activity included in the GDP do not contribute to economic welfare, but rather are defensive expenditures, or intermediate inputs that individuals make to be able to produce or consume. The costs households pay 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, an increase in police expenditures that serves only to maintain the crime rate unchanged should not be counted as an increase in (public sector) consumption.

In our papers estimating the index of economic well-being for Canada and the US (Osberg and Sharpe 1998, 1999), estimates for regrettables were subtracted from personal consumption after the adjustments for the underground economy, family size and life expectancy. However, because of the extensive data requirements involved in estimating these costs, this adjustment has not been made in constructing the index of economic well-being presented in this paper. Expenditure on regrettables was only 12.0 percent of personal consumption in 1996 in Canada, and (more importantly) it has **shown no trend over time**. Hence, exclusion of such expenditure from the index of economic well-being developed in this paper may not have a major effect on the level of personal consumption and its trend.

#### *Differences in "Leisure"*

Among OECD countries, there are major differences in both the initial level and trends over time in the average annual number of hours worked. Given these differences, level and growth rate comparisons of economic well-being are affected by working time differences. In this paper, we want to compare economic well-being over time and across countries, but we have little good data on "leisure." Ideally, one would like estimates of the proportion of non-market time that is spent in home production and the proportion of market remunerated time that

consists of on-the-job leisure, to account for changes in the pace of work, both at home and in the workplace. Such measures are, however, infrequently available for any one country and difficult to compare across countries. We, therefore, proceed by standardizing for hours of paid work in relative, not absolute, terms, where the benchmark is the average annual hours worked per adult of working age in the US in 1980.

Unlike the Measure of Economic Welfare (Tobin and Nordhaus 1972), no attempt is made here to define leisure activities, estimate the amount of leisure enjoyed, and place a value on this total leisure time. Rather, we adjust the value of consumption for differences in paid hours **relative to a benchmark**, with countries having average annual hours worked less than the benchmark (hours of work = average hours in the US in 1980) having a positive adjustment to consumption and countries having more working time than the benchmark having a negative adjustment. Within the US, years with fewer hours worked than those in the benchmark year have positive adjustments and those with more hours worked, negative adjustments.

Our methodology is equivalent to saying that at the margin, individuals ascribe a value equal to the after-tax average wage to changes in non-working time that are not due to unemployment fluctuations. By comparing changes in working time to a benchmark level, we avoid the necessity of placing a monetary value on infra-marginal hours of leisure, which might be highly problematic.

Estimates of relative working time per person employed are adjusted for the employment/working age population ratio to provide estimates of relative non-working time on a working age population (15–64 years) basis to account for differences in employment/population ratios across countries. These estimates are then valued at the after-tax wage rate to provide estimates of the value of relative non-working time per working age person. This figure is then adjusted by the working age population/total population ratio to control for differences in demographic structures across countries. This amount, expressed in constant prices of the national currency, is then added to consumption flows to produce a working time-adjusted estimate of consumption relative to the US benchmark. However, unemployment does not constitute leisure. To account for involuntary leisure, we subtract average annual hours of unemployment per working age person from the relative non-working time estimate.

There are very large differences in working time per employee across countries, ranging in 1980 from a high of 2003 hours per person employed in Spain to a low of 1439 in Sweden (71.8% of those in Spain).<sup>16</sup> The US had the second highest average annual hours worked

at 1883 hours per year. Between 1980 and 1997, most of the countries on which we have data experienced declines in working time, while two countries, Sweden and the US, experienced increases. There are also large international differences in the employment/working age population ratio<sup>17</sup> (the employment rate). This ranged in 1980 from a high of 79.7 percent in Sweden to a low of 50.5 percent in Spain, which reflects differences in unemployment rates and (more importantly) labour force participation rates.

Annual average hours worked per working age person (15–64 years) are the product of the employment/working age population ratio and average annual hours per person employed. For economic well-being, it is the amount of working time (relative to the benchmark) for the total working age population that is relevant, not just that of the working population. Some countries with high hours per person employed (e.g. Spain) have low employment rates and certain countries with low hours per person employed have high employment rates (e.g. Sweden). Since these country differences are partially offsetting, the variation across countries in this measure of hours is less than in hours worked for person employed.

If we are to compare the gains, at the margin, from additional market work compared to either leisure or home production, we would like to estimate the total “tax wedge” between taxed returns to time in the market and untaxed returns to leisure or home production. For this purpose, we need the sum of sales and income taxes. The share of general government current receipts in nominal GDP is used as the tax rate in the calculation of after-tax wages<sup>18</sup> of labour compensation. In 1980, this tax rate ranged from a high of 48.2 percent in Norway to a low of 30.0 percent in the US.

Average annual hours of non-working time relative to the 1980 US benchmark are calculated as the difference between a country’s average annual hours worked per working age person in a given year and the 1980 figure for the US (1225 hours). By 1997, per adult working hours in the US were 204 hours above their 1980 level. Between 1980 and 1997, increased non-working hours per working age person totalled 54 hours in Norway, 52 hours in the UK and 38 hours in Canada. Since some of these changes are large (204 hours is equivalent to 4 hours per week), they represent substantial changes in well-being, which should be reflected in a reasonable measure of economic progress. However, since leisure hours receive zero valuation in GDP accounting, neither the declines nor the increases are reflected in GDP per capita.

Estimates of the imputed value of non-working time per working age person are expressed in constant prices in NCU. These estimates are calculated as the product of the average annual number of hours of non-working time per working age person relative to the US 1980

benchmark<sup>19</sup> and the after-tax hourly compensation. Because we use NCU's (as opposed to common currency units), and because we are evaluating differentials at the margin, level comparisons of the aggregate value of non-working time are not possible.

In 1980, the ratio of the working age population (15–64 years) to the total population ranged from 67.1 percent in the US to a low of 52.1 percent in Germany. These variations reflect differences in the relative size of the dependent population (persons under 15 and over 65) across countries. We estimate the imputed value of non-working time on a per capita basis, as opposed to a per working age population basis. This adjustment is necessary because the index of economic well-being calculates consumption flows on a per capita basis. The figures are calculated as the product of the imputed value of non-working time per working age person and the ratio of the working age population to the total population.

A strong case can be made that some hours of unemployment, which are included in non-work 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). We cannot, in this paper, provide estimates of the negative utility of unemployment time, or the partial value of such time. As an approximation, however, in the calculation of the imputations for the value of non-working time, we can deduct hours of unemployment<sup>20</sup> (i.e. assign such hours zero value).

In 1980, average annual hours of unemployment per working age person averaged 94 in the US. Between 1980 and 1997, average annual hours of unemployment increased in all countries except the US where it fell to 76. Annual average hours of labour supply per working age person are then calculated where unemployment is added to hours of work to give adjusted hours of labour supply. Average annual hours of non-working time are then calculated relative to the 1980 US benchmark of 1319 hours of labour supply.

The three components of per capita consumption flows (adjusted personal consumption, government consumption, and the imputation for non-working time) are summed to total consumption flows adjusted for hours worked. As a share of total per capita consumption flows, the imputation for relative non-working time based on the unemployment adjustment as a share of total consumption in 1996 was: (1996 share without unemployment adjustment in parentheses) 5.9 percent for Norway (4.7%), 1.0 percent for Sweden (1.0%), 0.4 percent for Canada (1.6%) and -7.4 percent for the US (-8.0%).

### *2.1.2 Government Services*

The provision of non-marketed or heavily subsidized services by the

government is part of the consumption flow. Current expenditure by all levels of government, including defence and capital consumption allowances, but excluding debt service charges and transfer payments (which influence marketed consumption), are used. These data were taken from the OECD national accounts, expressed in constant prices in NCUs.

The importance of government final consumption expenditures relative to personal adjusted consumption expenditures differs markedly among OECD countries. In 1996, it ranged from a high of 54.2 percent in Sweden to a low of 24.3 percent in the US. The figures for the other countries in descending order of the relative importance of government expenditure were: Norway (41.5%), UK (32.7%) and Canada (29.1%). In addition, over the 1971 to 1996 period there were major differences in the rate of growth of real per capita government final consumption expenditures, ranging from a low of 16.4 percent for the US to Norway (126.8%), Sweden (46.1%), UK (42.4%) and Canada (29.1%).

### *2.1.3 Unpaid Work*

Unpaid work contributes to economic welfare and thus should in principle be included in an index of economic well-being. Unpaid work consists of both household work and volunteer work.<sup>21</sup> Statistics Canada (1996) has produced estimates of unpaid work for Canada,<sup>22</sup> and these estimates were incorporated into the original index of economic well-being developed for Canada (Osberg and Sharpe 1998). Because of the unavailability of internationally comparable estimates of the value of unpaid work for countries other than Canada, this component has not been incorporated into the index of economic well-being for OECD countries developed in this paper.

### *2.1.4 Total Consumption Flows*

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

Between 1980 and 1996 (since leisure adjustments are relative to 1980, this year will be used as the base), the increase in the real per capita total consumption flows has ranged from a low of 9.6 percent in Sweden to 37.8 percent in the UK, 39.4 percent in Norway, 18.9 percent in the US and 16.9 percent in Canada.

## **2.2 Accumulation, Sustainability and 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 in one of two ways: that those now living care about the well-being of future generations or

on the grounds that a concept of “society” should include both present and future generations. Either way, wealth accumulation by this generation will increase the bequest left to future generations, and is an important component of well-being.<sup>23</sup> We 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 returns from those assets. As Osberg (1998a) discusses in more depth, financial “generational accounting” techniques focus on the distributional impact of government debt – but in this section we are concerned with the real accumulation of productive assets. It is the stocks of “wealth” left to the next generation, broadly conceived to include environmental and human resources as well as physical capital stock, which will determine whether a society is on a long-run sustainable trajectory of aggregate consumption, irrespective of the distribution of those consumption flows at the individual level.

### 2.2.1 Physical Capital Stock

The physical capital stock includes residential and non-residential structures, machinery, and equipment in both the business and government sector. The greater the capital stock, the greater the 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.

Data for the current net fixed capital stock, expressed in constant prices of NCUs, have been taken from the OECD publication *Flows and Stocks of Fixed Capital* and are given in Table 2. It is assumed that the estimates are internationally comparable, although the use of different depreciation rates by statistical agencies may reduce comparability for both level and rate of growth comparisons.<sup>24</sup> Between 1980 and 1996, the increase in the fixed capital stock, on a per capita basis, was UK (34.5%), Norway (33.6%), Canada (27.4%), Sweden (26.7%), US (24.3%) and Australia (20.8%).

### 2.2.2 Research and Development Capital Stock

Closely related to the physical capital stock is the concept of the 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. 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 cost of investment – a depreciation rate of 20 percent on the declining balance is assumed.

Between 1980 and 1996, the rate of change in the per capita real

Table 2

**Stocks of wealth, per capita, 1990ncu constant prices**

	Total net of stock fixed cap- ital per capita	Stock of total business enterprise expendi- ture on R&D	Total net interna- tional invest- ment position per capita	Human capital stock	Green- house gas emission cost per capita	Total real per capita wealth	Index of total wealth 1980 = 1.00
<b>Australia</b>							
1971	42,449.5	244.9	-27,493.3	18,848.7	-394.7	33,655.1	0.5165
1996	64,626.1	795.1	-15,125.8	25,816.5	-430.2	75,681.7	1.1616
<b>Canada</b>							
1971	16,180.2	355.0	<b>-5,150.5</b>	19,065.5	-358.5	11,384.7	0.8236
1996	26,154.0	1,016.7	-10,128.9	25,048.3	-414.9	17,041.9	1.2329
<b>Germany (1000s NCU)</b>							
1971	55,892	6.130	2.975	34.0	-0.448	98,569	0.8301
1996	100,736	5.803	2.847	42.2	-0.611	150,994	1.2716
<b>Norway (1000s NCU)</b>							
1971	317.9	3.324	-128.8	143.4	-2.250	333.5	0.5874
1996	605.7	8.056	-14.6	193.6	-3.561	789.2	1.3902
<b>Sweden (1000s NCU)</b>							
1971	394.1	-	-59.3	165.4	-2.678	497.6	0.9380
1996	486.6	-	-66.0	178.2	-2.735	596.0	1.1235
<b>United Kingdom (1000s NCU)</b>							
1971	24.5	0.439	1.953	9.8	-0.149	36.6	1.0997
1996	29.6	0.649	0.352	12.4	-0.175	42.8	1.2876
<b>United States (1000s NCU)</b>							
1971	38.2	1.316	3.745	17.8	-0.377	60.6	0.8740
1996	59.3	2.073	-2.676	22.1	-0.408	80.4	1.1599

**Note:** Net international investment position expressed in current US\$ recalculated into net international investment position, Constant 1999 NCU with gross domestic product price deflator, 1999= 100, and NCU/US\$ exchange rates.

*Sources:* Total Net Stock of Fixed Capital – Flows and Stocks of Fixed Capital, OECD, 1971–1996.

Stock of Total Business Enterprise Expenditures on R&D – Research and Development in Industry, OECD, 1976–1997, 1999 Edition.

Net International Investment Position – International Financial Statistics Yearbook, IMF, 1998.

Greenhouse Gas Emission Cost Per Capita – Appendix Table CO<sub>2</sub>.

Appendix Tables: A1, A6, A8, A9, A10.

business enterprise R&D stock for business enterprises ranged from an increase of 233 percent in Australia to a decline of 11 percent in Germany. The rate of increase in the other countries (in descending order of magnitude) was Norway (119%), US (91%), Canada (27%) and

UK (20%).<sup>25</sup>

### 2.2.3 Value of Natural Resource Stocks

Current consumption levels could be increased by running down stocks of non-renewable natural resources or by exploiting renewable resources in a non-sustainable 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, which counts. The valuation of these resources poses conceptual problems, but estimates certainly are possible.<sup>26</sup> Statistics Canada (1997) has recently provided both physical and value estimates of natural resources such as forests, energy reserves, and minerals. These estimates, as well as estimates produced by the US Bureau of Economic Analysis, were used in the construction of the index of economic well-being for Canada and the US (Osberg and Sharpe 1998, 1999).

Unfortunately, there are currently no internationally comparable time series estimates of the value of natural resources for OECD countries, so this component of wealth stocks has not been included in the index of economic well-being developed in this paper.

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 and plans to release estimates for a second year (1998) in 2000. Natural capital is defined to include pastureland, cropland, timber resources, non-timber forest resources, protected areas and sub-soil assets. However, the short length of this time series will preclude its use in the index of economic well-being except for the period after 1994.

World Bank estimates of natural capital for OECD countries, on a per capita basis expressed in 1994 US dollars, were Canada (\$36,590), Australia (\$35,340), Norway (\$30,220), US (\$16,500), Sweden (\$14,590) and UK (\$4,940).

### 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 many countries 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 et al. 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).

The approach to measuring human capital used in the construction of the index of economic well-being for Canada and the US (Osberg and Sharpe 1998, 1999) was admittedly crude and incomplete.<sup>27</sup> The cost per year of education expenditures at the primary, secondary and post-secondary levels was estimated. Yearly estimates of the distribution of education attainment in the population were then used to compute the total cash cost of production of human capital in education.

The same approach has been followed for the OECD countries. OECD data on the educational attainment of the 25- to 64-year-old population and expenditure per student (available in both local currency and US dollars) for early childhood, primary, secondary, non-university tertiary and university-level education were used to estimate the per capita stock of human capital.

To distinguish clearly inter-country differences in the quantity of education obtained, as opposed to differences in its cost of production, we apply a common cost base (the cost of education in the US) to all countries.

### *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.<sup>28</sup> 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 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 US dollars, are published in the International Monetary Fund's *Inter-*

*national Financial Statistics Yearbook*. These estimates have been converted 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 NCUs (Table 2).

### 2.2.6 State of the Environment and National Heritage

Like the excess depletion of natural resources, current consumption 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.

Countries pass on from generation to generation both a natural and human-made national heritage. If this heritage were damaged, the economic well-being of future generations would be reduced. Since it is very difficult, if not impossible, to put a monetary value on, for example, the pristine condition of national parks or historic 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 for which indicators of environmental quality can be developed.

Osberg (1985b) has argued that heritage preservation laws can be seen as an optimal intergenerational contract, which constrains the present generation not to despoil irreplaceable assets. In the presence of such constraints, the current generation still has to decide how large a bequest to future generations to leave in the form of replaceable assets, but the “national heritage” remains untouched. As a consequence (like the family heirloom that is never priced because it will never be sold), trends in economic well-being can be evaluated without placing an explicit monetary value on irreplaceable environmental and cultural assets.

Probably the best-known environmental change is global warming arising from increased emissions of greenhouse gases, the most common of which is carbon dioxide (CO<sub>2</sub>) emissions. 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.

The conceptual issues to be dealt with in estimating the costs of CO<sub>2</sub> emissions include whether the costs should be viewed from a global, national or sub-national perspective, whether the costs increase linearly with the levels of pollution, whether the costs should be borne by the producer or receptor of trans-border emissions, and whether costs should vary from country to country or be assumed the same for all countries. Since global warming affects all countries, we estimate world total costs of emissions and allocate these costs on the basis of

a country's share of world GDP.

Fankhauser (1995) has estimated that the globalized social costs of CO<sub>2</sub> emissions (with no adjustment for different national costs) at \$20 US per ton in 1990. World Bank researchers (Atkinson et al. 1997) have applied this number to CO<sub>2</sub> emissions in developed countries to estimate the value of the loss of environmental services as a proportion of output and the measure of genuine saving.

According to data from the International Energy Agency, world CO<sub>2</sub> emissions in 1997 were 22 636 millions of metric tons. Based on the \$20 US per ton cost of CO<sub>2</sub> emissions, the world social cost of CO<sub>2</sub> emissions was \$452,720 million. This amount was allocated on the basis of a country's share of nominal world GDP, expressed in US dollars. It was then converted into national currency at the purchasing power parity exchange rate 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 stock of wealth of the society. For example, in 1997, per capita stocks of wealth in Canada were reduced by \$415 Cdn because of the social costs imposed by CO<sub>2</sub> emissions according to this methodology.

### *2.2.7 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 (Table 2). Net foreign debt per capita is a negative entry, while the social costs of CO<sub>2</sub> emissions are subtracted from the stocks of wealth.

For the 1980 to 1996 period, estimates for the five components of the wealth stock included in this paper are available for various countries (Table 2). The rate of change for per capita real wealth stocks in national currency at constant prices for these countries ranged from an increase of 16.0 percent in the US to Norway's 39.2 percent. The UK (28.8%), Canada (23.3%) and Australia (16.2%) were intermediate cases.

## **2.3 Income Distribution – 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. Since Atkinson (1970), it has been recognized that 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,<sup>29</sup> 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,<sup>30</sup> 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 ( $\beta$ ) 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. For the purposes of the construction of the index of economic well-being, we have chosen the Gini coefficient of after-tax household income.<sup>31</sup> For the most recent year for which data are available for each country (Table 3), income inequality and the Gini coefficient was largest (and hence income inequality greatest) in the US (0.387) and lowest in Finland (0.243). The Gini coefficients for LIS countries can be found in Osberg and Xu (2000).

Recently, Osberg and Xu (1997) 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, since the inequality of poverty gap ratios is essentially constant, poverty intensity can be approximated as twice the product of the poverty rate and the average poverty gap ratio. The poverty rate is the proportion of persons who fall below the poverty line, defined here as one-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.

The poverty rate varies greatly among the countries for which LIS data are available (Table 3). For the most recent year for which micro-data tapes are available for each country, it ranged from a high of 18.0 percent in the US to Australia (17.5%), Canada (12.4%), UK (9.7%), Norway (9.2%) and Sweden (8.9%). There was much less variation across countries in the average poverty gap ratio. The average poverty gap ratio was: Sweden (36.6%), US (34.9%), Canada (31.0%), Norway (28.5%), UK (28.5%) and Australia (27.7%).

The overall index of equality is a weighted average of the indices of poverty intensity for all units or households and the Gini coefficient, 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.

Unfortunately, the LIS database allows calculation of a long-time series of income distribution estimates for only a few countries. Osberg (1999) examines long-run trends in income distribution in the US,

Table 3

**Index of economic equality**

	Gini coefficient (A)	Poverty rate (B)	Poverty gap (% of poverty line) (C)	Poverty intensity D = B * C	Poverty intensity index D'	Gini coefficient (income after tax), index A'	Overall index of inequality E = -1 * (D' * 0.75 + A' * 0.25)
<b>Australia</b>							
1971	0.3040	15.48	26.73	0.0414	1.0000	1.0000	-1.0000
1996	0.3378	17.48	27.66	0.0484	1.1685	1.1112	-1.154
<b>Canada</b>							
1971	<b>0.2440</b>	<b>20.44</b>	<b>35.33</b>	0.0722	1.5204	0.7711	-1.333
1996	0.3019	0.3019	30.99	0.0383	0.8068	0.9541	-0.844
<b>Germany</b>							
1971	0.3034	13.28	30.79	0.0409	1.9204	1.1768	-1.735
1996	0.3069	8.55	30.58	0.0261	1.2271	1.1904	-1.218
<b>Norway</b>							
1971	5.71	36.85	0.2487	0.0210	0.9564	0.9947	-0.966
1996	9.15	28.53	0.2659	0.0261	1.1866	1.0636	-1.156
<b>Sweden</b>							
1971	0.2401	7.21	36.02	0.0260	1.3122	1.1226	-1.265
1996	0.2530	8.65	36.64	0.0317	1.6024	1.1832	-1.498
<b>United Kingdom</b>							
1971	0.2909	10.07	16.74	0.0169	0.9201	1.0021	-0.941
1996	0.3430	13.20	28.49	0.0376	2.0512	1.1816	-1.834
<b>United States</b>							
1971	0.3446	17.95	34.81	0.0625	0.9993	1.0398	-1.009
1996	0.3853	18.34	34.94	0.0641	1.0250	1.1629	-1.060

**Notes:** Poverty rates are the head count ratios calculated on the base of poverty line – one half of median equivalent income.

Median equivalent income is the median of net family income after taxes adjusted by equivalence scale. Square root of family size was used as the equivalence scale. Persons with negative or zero income were excluded from calculations. All families category includes one-person households.

Poverty gap is the ratio of the gap (between poverty line and mean equivalent income of those under poverty line) to poverty line.

Data in bold calculated from LIS micro database, data for other years interpolated or assumed to equal data for first or last year of period with available data.

Source: LIS Database, Poverty Rate and Gini coefficients for United Kingdom 1991, 1995 are from L. Osberg "Long Run Trends in Economic Inequality in Five Countries," October 1999.

UK, Canada, Sweden and Germany. In Table 3, 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. This is obviously an inadequate methodology and may lead to unreliable esti-

mates for countries with short-time series of LIS estimates.<sup>32</sup>

#### **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, 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 state of well-being, the concept of economic insecurity is rarely discussed in academic economics.<sup>33</sup> Consequently, there is no generally agreed definition of economic insecurity. Osberg (1998b) 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” (p. 17). In this sense, individuals’ perceptions of insecurity are inherently forward looking, the resultant 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.<sup>34</sup> Ideally, one would measure trends in economic security with data which included (for example) the percentage of the population 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 widely 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.

Over 50 years ago, the UN Universal Declaration of Human Rights 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]<sup>35</sup>

For this paper, we construct measures of the percentage change over time in the economic risks associated with unemployment, illness, “widowhood” (or single-female parenthood) and old age. 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 that 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 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 modelled as the product of the percentage of the unemployed who claim regular UI benefits, and 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, an unpublished OECD series on the gross replacement rate for the unemployed has been used in the calculation of the risk of unemployment. This series shows a markedly different trend than the Employment Insurance (EI) coverage rate for certain countries such as Canada in the 1990s.

#### *2.4.2 Illness*

Viewed from a longer term perspective, the economic insecurities associated with illness in developed economies certainly dropped considerably with the introduction of universal health insurance in many countries. 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 Kreutzfeld-Jacob 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 labour force has had some protection against such losses 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 increase in the fraction of

the population whose employment income ceases 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, with the risk directly proportional to the share of private medical care expenses in disposable income.

The OECD Health Data CD-ROM provides a long-time series on medical care expenses as a proportion of disposable income. For the 14 countries covered by the LIS database, medical expenses as a proportion of disposable income (excluding medical insurance premia and net of insurance reimbursement for medical expenses) ranged from a high of 14.0 percent in the US to a low of 1.1 percent in the UK in 1996. The proportion in the other countries was: Australia (5.5%), Canada (3.2%), Norway (2.0%) and Sweden (1.6%).

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).

#### 2.4.3 Single-Parent Poverty

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 the Second World War. 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-female-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)<sup>36</sup> \* (the average poverty gap ratio among single-female-parent families).<sup>37</sup> The product of these last two variables is proportional to the intensity of poverty.

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 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 from the UN Demographic Yearbook and esti-

mates of the poverty rate and poverty gap ratio for single-female parents were calculated from the LIS micro-data tapes. The annual divorce rate ranged in 1996 (or the most recent year before 1996 for which data are available) from a high of 4.33 percent of legally married couples in the US to 2.89 percent in the UK, 2.86 percent in Australia, 2.62 percent in Canada, 2.42 percent in Sweden and 2.28 percent in Norway.

The poverty rate for single-female parents in the most recent year (in parentheses) from LIS micro-files ranged from a high of 44.0 percent (1997) in the US to a low of 2.8 percent (1992) in Sweden. The poverty rate for single-female parents in other countries, in descending order of magnitude was Australia, 40.7 percent (1994); Canada, 40.7 percent (1994); UK, 13.8 percent (1986); and Norway, 11.3 percent (1995).

The average poverty gap ratio for single-female parents in the most recent year (same year as for the poverty rate above) from LIS files ranged from a high of 41.6 percent in Norway to a low of 18.2 percent in Sweden. The poverty gap ratio for other countries, in descending order of magnitude, was Norway (41.6%), US (39.6%), Canada (27.5%), Australia (24.5%) and UK (23.6%).

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." We thus 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).

#### *2.4.4 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 poverty rate and the poverty gap ratio for the population 65 or over were calculated from LIS micro-data files. The poverty rate for the elderly in the most recent year (in parentheses) for LIS micro-data files ranged from a high of Australia, 33.1 percent (1994) to US, 24.4 percent (1997); Norway, 12.0 percent (1995); Sweden, 6.0 percent (1992); UK, 5.4 percent (1986); and Canada, 4.8 percent (1994). The average poverty gap ratio for the elderly in the most recent year from the LIS micro-data files ranged from a low of Norway (9.3%) to Australia (27.6%), US (24.4%), Canada (13.4%), Sweden (12.7%) and UK (11.7%).

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." We thus multiply

the risk of elderly poverty 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).

#### *2.4.5 Overall Index of Economic Security*

The four risks discussed above have been aggregated into an index of economic security (Table 4). The aggregation weights are the relative importance of the four groups in the population, which are also in Table 4:

- for unemployment, the proportion of the population aged 15 to 64 in the total population
- for illness, the proportion of the population at risk of illness, which is 100 percent
- for single-parent poverty, the proportion of the population comprising married women with children under 18
- 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 45 to 64 in the total population.

The above proportions have been normalized for all years to one. 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).<sup>38</sup> Implicitly, by expressing changes as proportionate to an initial base, we are assuming that individuals habituate to a given level of background stimulus, but respond similarly to proportionate changes in stimulus.

Based on the above weights, the overall index of economic security for seven LIS countries are given in Table 4.

### **2.5. Estimates of Trends in the Overall Index of Economic Well-Being**

#### *2.5.1 Weighting of Components*

Trends in any index are determined by the choice of variables that are included in the index, the trends in those variables and the weights these variables receive. Since the four main dimensions of average consumption, intergenerational 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. For discussion purposes, our “standard” weighting gives consumption flows a weight of 0.4, wealth stocks a weight of 0.1, and equality and economic security have each been given a weight of 0.25.

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 somewhat Rawlsian perspective would

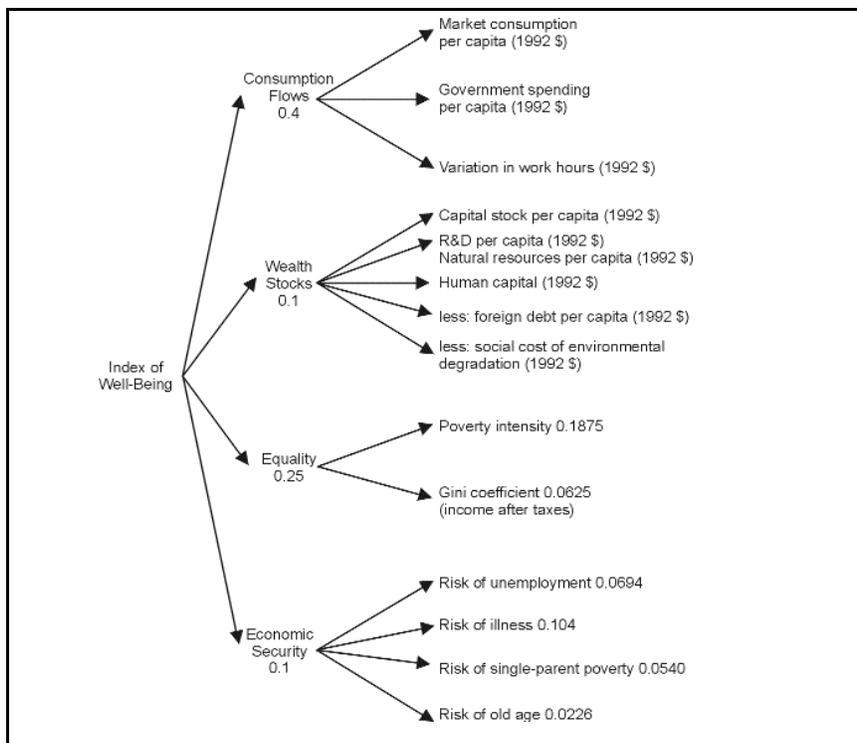
Table 4

**Index of economic security**

	Index 1 unem- plov- ment	Index 2 health (+ 2)	Index 3 women poverty (+ 2)	Index 4 old age (+ 2)	Weight- ed index 1 unem- plov- ment	Weight- ed index 2 health	Weight- ed index 3 women poverty	Weight- ed index 4 old age	Average weighted index of econ- omic security
<b>Australia</b>									
1971	0.8110	1.0192	1.6292	1.0000	0.2154	0.4299	0.3745	0.0827	1.1025
1996	1.0710	0.7291	1.3656	-0.6293	0.2996	0.3058	0.2937	-0.0540	0.8450
<b>Canada</b>									
1971	<b>0.8552</b>	<b>1.0607</b>	1.3436	0.1515	0.2179	0.4429	0.3376	0.0116	1.0100
1996	1.0458	0.6568	1.3424	1.8814	0.2935	0.2753	0.2867	0.1630	1.0185
<b>Germany</b>									
1971	1.0172	1.1305	-0.3781	1.0000	0.2285	0.5106	-0.0846	0.0999	0.7545
1996	0.9254	0.6204	-5.9135	1.3096	0.2577	0.2531	-1.2509	0.1336	-0.6066
<b>Norway</b>									
1971	0.5607	0.9922	1.4676	1.1332	0.1489	0.4108	0.3252	0.1120	0.9969
1996	1.2901	1.1259	0.5885	1.6596	0.3543	0.4814	0.1215	0.1516	1.1088
<b>Sweden</b>									
1971	0.5982	0.6160	1.7592	0.8003	0.1651	0.2604	0.3442	0.0845	0.8543
1996	1.0181	0.0036	1.7717	0.7801	0.2824	0.0016	0.3232	0.0817	0.6889
<b>United Kingdom</b>									
1971	1.0381	1.0033	0.9829	0.0656	0.2611	0.4031	0.2472	0.0062	0.9176
1996	0.8650	0.2259	1.0955	1.1901	0.2318	0.0941	0.2412	0.1132	0.6804
<b>United States</b>									
1971	0.8909	1.2323	1.0882	0.9696	0.2340	0.5083	0.2590	0.0841	1.0855
1996	1.0058	0.3969	1.1736	1.3419	0.2865	0.1722	0.2279	0.1170	0.8036

assign greater importance to poverty than to overall inequality trends. On this basis,<sup>39</sup> a weight of 0.1877 or ( $= 0.25 \cdot 0.75$ ) has, therefore, been given to the poverty intensity and 0.0625 ( $= 0.25 \cdot 0.25$ ) to the Gini. 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

### Weighting Tree



in the total population (see tree diagram).

The “standard” weighting of components and sub-components of the economic well-being index are shown in the following chart.

#### “Standard” weighting of the index of economic well-being

(Weights of total index in parentheses)

Basic Component	Sub-Components
Consumption Flows (0.40)	Real total consumption (NCU per capita) Real current government spending on goods and services excluding debt service (NCU per capita) Adjustment for changes in leisure
Stocks of Wealth (0.10)	Real capital stock (including housing) (NCU per capita) Real R&D stock (NCU per capita) Real net foreign debt (NCU per capita) Real social cost of environmental degradation (CO <sub>2</sub> emissions) (NCU per capita)

Equality (0.25)	Poverty intensity Income inequality (Gini coefficient)
Security <sup>40</sup> (0.25)	Risk of unemployment Risk of illness Risk of single-parenthood poverty Risk of poverty in old age

---

The formula for the overall index is as follows:

$$\text{IEWB} = (0.4)[C + G + UP] + (0.1)[K + R\&D + -D - ED] + [(0.1875)(\text{LIM}) + (0.0625)\text{Gini}] + [(0.0694)\text{UR} + (0.1040)\text{ILL} + (0.0540)\text{SP} + (0.0226)\text{OLD}]$$

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

K= real per capita capital stock (including housing)

R&D= real per capita stock of R&D

NR= real per capita stock of natural resource wealth

HC= real per capita stock of human capital

D= real per capita net foreign debt

ED= real per capita social costs of environmental degradation (CO<sub>2</sub> emissions)

LIM= poverty intensity

Gini= Gini coefficient for after-tax income

UR= risk of unemployment

ILL= risk of illness

SP= risk of single-parenthood poverty

OLD= risk of poverty in old age

---

Table 5 shows the indexes for all four components of the index of economic well-being and the overall index. To put all the sub-components to a common base of 1, the constant 2 has been added to the index of inequality (Table 3) to convert it to an index where an increase corresponds to a rise in economic well-being.

### 3. Trends in the Overall Index of Economic Well-Being

We are acutely conscious that the data sources available to us are far from what we would like. We know that restricting ourselves to internationally comparable data series has meant that we have neglected issues (such as the decline in EI coverage in Canada) which are important for some countries. We also know the reliance on interpolation between the data points available in the LIS implies, necessarily, that

Table 5

**Overall economic well-being index  
(normal sub-components weighting)**

	Consumption flows 0.4 (A)	Wealth stocks 0.1 (B)	Inequality measures 0.25 (+ 2) (C)	Economic security 0.25 (D)	Well-being index
<b>Australia</b>					
1971	0.7781	0.5165	1.0000	1.1025	0.8885
1996	1.3084	1.1616	0.8458	0.8450	1.0622
<b>Canada</b>					
1971	0.7506	0.8236	0.6669	1.0100	0.8018
1996	1.1800	1.2329	1.1564	1.0185	1.1390
<b>Germany</b>					
1971	0.6936	0.8301	0.2655	0.7545	0.6154
1996	1.6564	1.2716	0.7821	0.6066	0.8336
<b>Norway</b>					
1971	0.7034	0.5874	1.0340	0.9969	0.8478
1996	1.3689	1.3902	0.8441	1.1088	1.1748
<b>Sweden</b>					
1971	0.8203	0.9380	0.7352	0.8543	0.8193
1996	1.1169	1.1235	0.5024	0.6889	0.8569
<b>United Kingdom</b>					
1971	0.8897	1.0997	1.0594	0.9176	0.9601
1996	1.4062	1.2876	0.1662	0.6804	0.9029
<b>United States</b>					
1971	0.8895	0.8740	0.9906	1.0855	0.9622
1996	1.2052	1.1599	0.9405	0.8036	1.0341

**Note:** Well-being index = 0.4\*A-0.1\*B+ 0.25\*C+ 0.25\*D.

we cannot detect year-to-year fluctuations in some components of our index. However, we 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 want to examine the sensitivity of a measure of economic well-being to alternative possible weightings of accumulation, income distribution and insecurity, Figures 1 to 7 present both our “standard” and an “alternative” weighting. The “alternative” is much more heavily weighted to average consumption (0.7), has the same weighting on accumulation (0.1), and less heavily emphasizes income distribution (0.1) and insecurity (0.1). For each country, we compare trends in the “standard” and “alternative” indices with trends in GDP per capita.

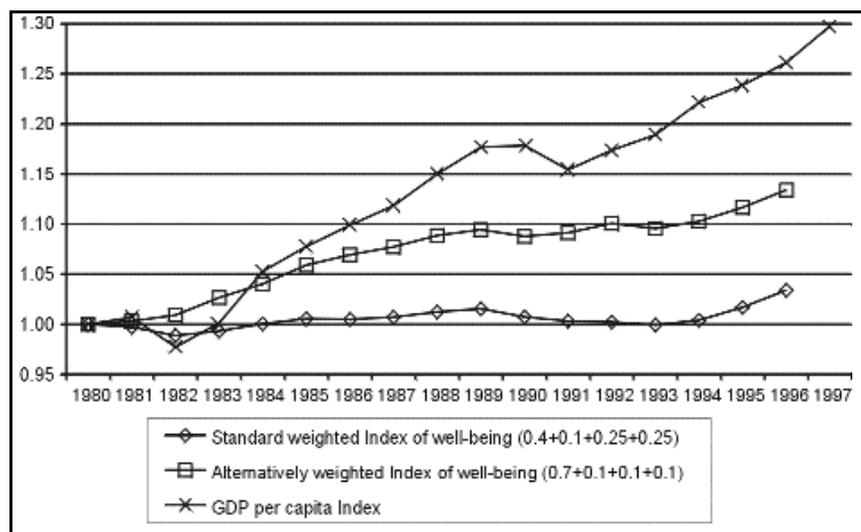
For all countries, consideration of bequest, inequality/poverty and insecurity reduces the measured rate of growth of economic well-being,

compared to the use of the GDP per capita index. Generally, the more heavily current average consumption is emphasized, the closer our index comes to GDP per capita. However, in every instance the consideration of a wider range of issues than those recognized in GDP accounting reduces the measured increase in economic well-being.

In some countries, the change in the perception of trends in well-being that a broader measure produces is striking. In the US, GDP per capita increased by approximately 30 percent over the 1980 to 1997 period, but our “standard” index is essentially flat, with a total increase of 3 percent over the period. In the UK, increases in per capita GDP were even larger (39.8%), but our “standard” weighting (which has a heavy emphasis on economic inequality and insecurity) shows a decline of about 10 percent. Both the US and the UK have been marked by a substantial increase in economic inequality over this period, and increases in money income have been limited to the top end of the income distribution (see Osberg 1999). As well, increases in money income in the US have been obtained at the cost of substantial increas-

Figure 1

### United States



es in working hours. Hence, this is not an unreasonable finding.

For the UK and Sweden, GDP per capita rose, while our “standard” index of economic well-being declined. In both cases, however, this qualitative result is quite sensitive to the relative weighting of current consumption compared to distribution and insecurity – the “alternative” index does not actually decline<sup>41</sup> (although it is almost flat in Swedish data). As Osberg and Xu (2000) note, recent years have seen an

increase in Swedish poverty intensity, so it is not surprising that an index which weights heavily trends in income distribution and inse-

Figure 2

**United Kingdom**

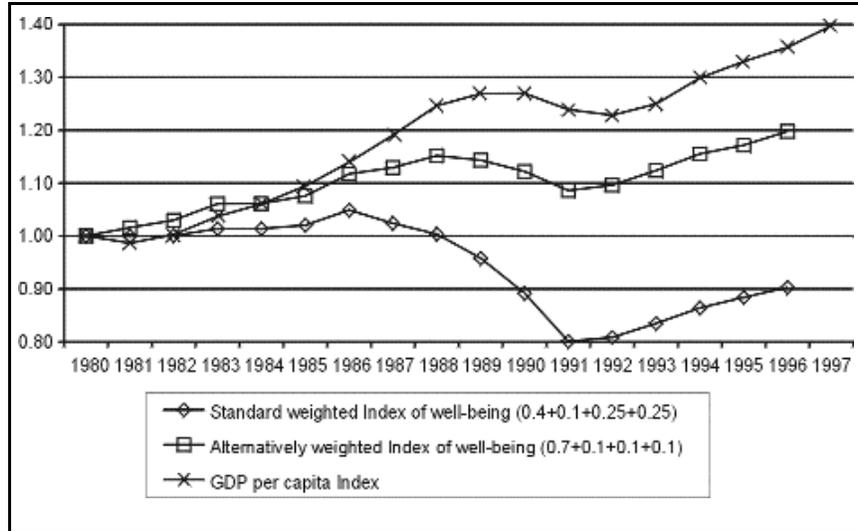
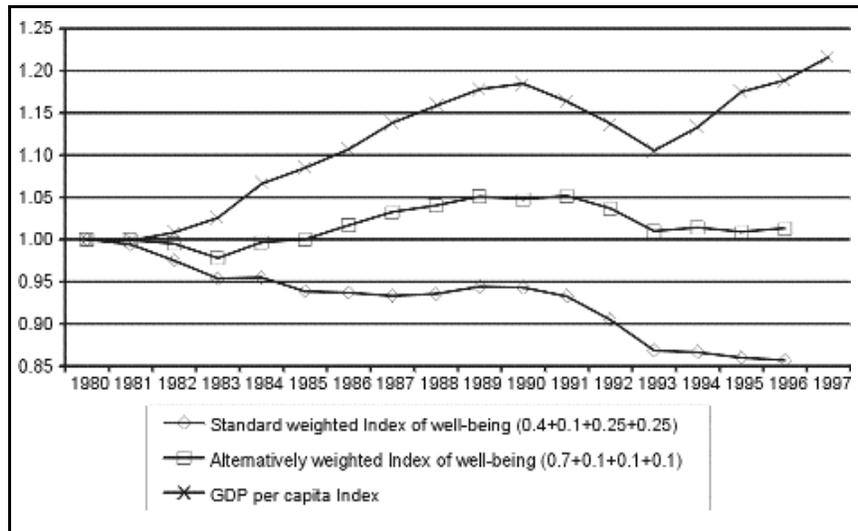


Figure 3

**Sweden**

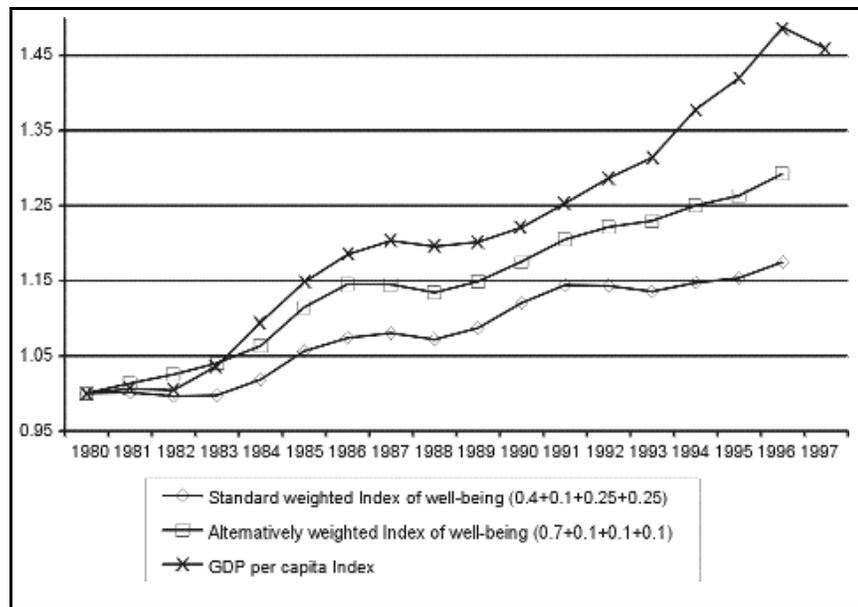


curity should show a deterioration.

Norway is a country where trends in economic well-being are, 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 to trends in GDP per capita, since each index moves in much the same way over time (albeit showing much stronger growth in GDP per capita than in economic well-being).

*Figure 4*

**Norway**



However, Australia and Canada – whose economies share a relative dependence on raw materials production – are 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 Australia and Canada, 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 1980’s 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

Figure 5

**Australia**

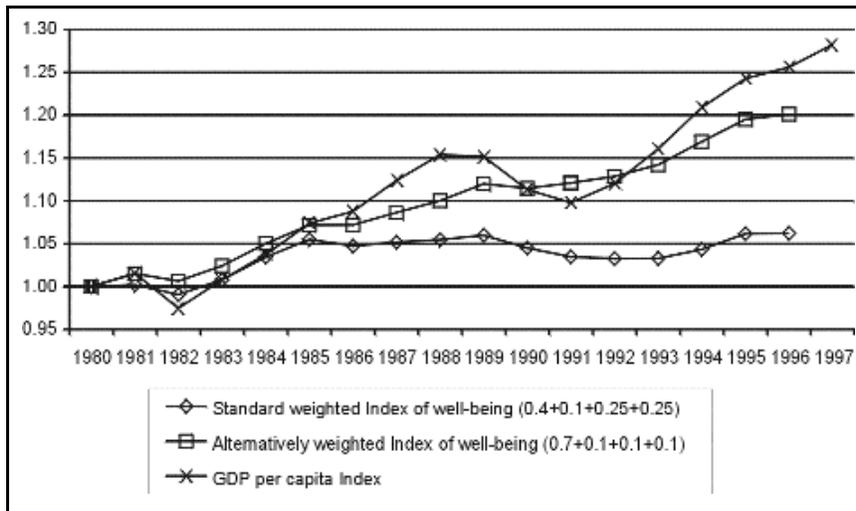


Figure 6

**Canada**

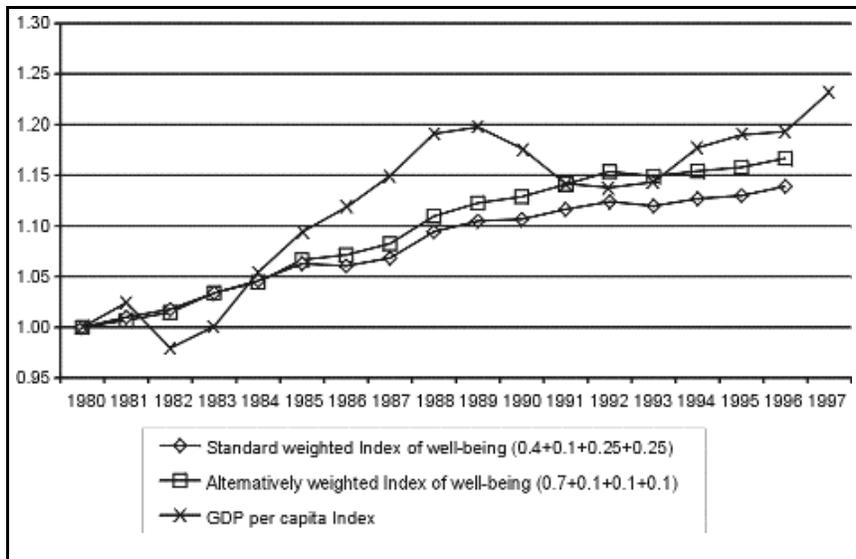
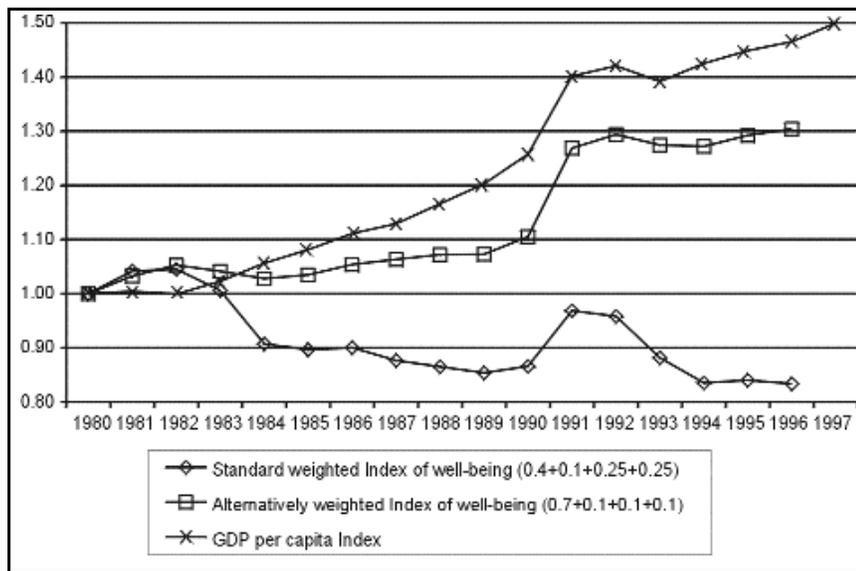


Figure 7

## Germany



“standard” and “alternative” weightings of the index.<sup>42</sup>

#### 4. Level Comparisons of Economic Well-Being

Comparisons of the level of well-being across countries are 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 differs to a far greater extent than in within-country, over-time comparisons. Calculations of purchasing power parity equivalence across several countries have greater uncertainty than comparisons of within-country consumer price levels. Statistical agencies in different countries differ in their data availability and data-gathering practices to a greater degree than they change those practices over time in the same country. For all these reasons, this paper avoids direct commentary on comparative levels of economic well-being.

#### 5. Conclusion and Implications for Social Capital

The regard to those general rules of conduct, is what is generally called a sense of duty, a principle of the greatest consequence in human life, and the only principle by which the bulk of mankind are capable of directing their actions.... Upon the tolerable observance of these duties depends the very existence of human society, which would crumble into nothing if mankind were not generally impressed with a reverence for these important rules of conduct.

Adam Smith *Theory of Moral Sentiments*

Ch. V<sup>43</sup> (1986, pp. 110–112)

“Social capital” may be new jargon, but it is not really a new concept in social sciences. Among many other references, one can also note that De Tocqueville devoted Chapter VIII of his second volume to how “The Americans Combat Individualism by the Principle of Interest Rightly Understood.” He claimed, for example, that “they show with complacency how an enlightened regard for themselves constantly prompts them to assist each other, and inclines them willingly to sacrifice a portion of their time and property to the welfare of the State” (1961, p. 146). Although not really new, “social capital” is, however, now enjoying a run in the sun of academic popularity – perhaps partly as a reaction to a period of recent excessive optimism as to what market individualism without any qualification of rightly understood self-interest will produce.

Earlier literature was not constrained by the conventions of GDP accounting, and could discuss directly the link between social capital and economic well-being. More recently, the measure of economic success has been narrower – and it falls to critics of the SNA to show that alternative measures are possible, plausible and make some difference. This paper has, therefore, 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.

We argue that specifying explicit weights of these components of well-being is important in enabling other observers to assess whether, by their personal values of what is important in economic well-being, they would agree with this assessment of trends in the modern economy. Some events – like a major recession – may have adverse impacts on all four dimensions of well-being, producing lower average consumption, more inequality, more insecurity and less accumulation of capital for the benefit of future generations. In such a case, any differences in the values which determine the relative weights to be assigned to the components of well-being are of secondary concern. However, in other instances (such as environmental policy concerning global warming) the relative weights assigned to different dimensions of well-being may be crucial. A major reason for being explicit about the weights to be assigned to dimensions of well-being is to be clear about when there is, and when there is not, a conflict of values in the assessment of social trends – and when there is a disagreement about values, in a democracy a large part of the political process revolves around attempts to persuade others about which should take precedence.

In general, however, a key finding of this paper is that economic well-being, for at least two different sets of relative weights, has increased at a much slower rate over the last 25 years than real GDP per capita,

a widely used indicator of economic well-being.

In Norway, trends in economic well-being are qualitatively, if not quantitatively, similar to trends in GDP per capita. However, in Australia and Canada trends in well-being are cyclically dissimilar to GDP per capita trends. In the US and the UK, 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 which 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 social capital be concerned with the divergence between trends in economic well-being and trends in GDP?

Clearly, the issue depends partly on the definition of social capital being used, and there are several alternatives. As a consequence, it is perhaps most useful to discuss the links between specific aspects of social capital and the issues neglected in GDP accounting.

In section 2.1, flows of market consumption were adjusted for longevity of life, the amount of non-work time available and trends in household size. Each issue is highly relevant to the debate on social capital. We know from the work of Wilkinson (1996) and Lavis and Stoddart (forthcoming) that 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 work<sup>44</sup> is a primal constraint on the formation of social links outside work and family.

This paper has not been able to include costs of “regrettable necessities” in its measure of personal consumption, although some such adjustments (e.g. the increased expenditures necessary to avoid the costs of crime) are clearly linked to social capital. Neither has it been possible to locate reliably comparable international data on the underground economy, although one could plausibly argue that it epitomizes the problem of decreasing voluntary compliance with the law.

With respect to the accumulation of productive resources from one generation to the next, if social capital produces economic well-being, changes in its stock should be directly counted in measures of accumulation. However, the formation of social capital is clearly not part of the GDP accounting, and it is not clear how it could be added. The measure of economic well-being proposed here does include a proposal to count the accumulated value of human capital stocks, and it is

well known that measures of trust and participation in voluntary organizations are highly correlated with educational attainment. However, ideally one would want to measure both the accumulation of directly productive skills which individuals possess and the extent of changes in the quality of system-wide levels of social interaction (one aspect of social capital).

Measures of income distribution and economic insecurity are included in the proposed index of economic well-being because of their direct effect on the well-being of individuals. Whatever the level of per capita GDP, it clearly matters to individuals what their personal prospect of lifetime income may be, and how uncertain that prospect is.

This paper looks at actual income flows, after taxes and transfers. One possible manifestation of greater levels of trust in society might be electoral support for progressive income taxation, redistribution and the mechanisms of public social insurance. Alternatively, a possible consequence of increased voluntary activity might be the increased availability of private charity for the unfortunate. To the extent that more cohesive societies put in place mechanisms, whether public or private, for income redistribution and social insurance that mitigate the extent of inequality and economic insecurity, social capital matters for these dimensions of economic well-being in a way that is not captured by its impact on per capita GDP. Even if social capital, however defined, had zero impact on per capita GDP, and instead only served to decrease the extent of economic inequality, poverty and insecurity, it would be valuable for economic well-being.

In short, whatever the impacts of social capital on GDP per capita trends, social capital is likely to be even more crucial to a more adequate conceptualization of economic well-being.

#### Notes

- <sup>1</sup> In order that this paper be self-contained and provide a full explanation of the methodology used to estimate the index of economic well-being, it draws on material from earlier papers which develop the index (Osberg 1985a; Osberg and Sharpe 1998, 1999).
- <sup>2</sup> For real GDP per capita, see CANSIM D14606; for poll details, see Angus Reid Globe/CTV poll of July 1998, available at [www.angusreid.com](http://www.angusreid.com).
- <sup>3</sup> Keunig (1998) reviews the contributions of Dawson (1996) and Kendrick (1996) and the most recent (U.N. 1993) revisions to the SNA.
- <sup>4</sup> By specifying additive sub-indices, we are implicitly assuming that preferences for social outcomes are separable in their components (e.g. that the weight placed on consumption does not depend on the weight placed on inequality). We do not explicitly constrain the weights to be assigned to each component of well-being, since we think of them as the preferences of different observers. However, some observers may, if they are consistent, have linked preferences – for example, if attitudes to insecurity are driven solely by risk aversion (but see Osberg 1998b), then the weight an individual places on inequality, and the weight he or she places on insecurity, will both depend on the second derivative of his or her utility function.
- <sup>5</sup> 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 or 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; (5) capital markets and public policies do not always automatically produce a socially optimal aggregate savings rate.

- <sup>6</sup> A crucial data requirement for the index is comparable estimates of poverty rates and poverty gaps for all members of society, the elderly and single-parent families. Comparable estimates require comparable micro-data files and the only international source of such files is the Luxembourg Income Study (LIS). Because the number of years of micro-data tapes available for many of these countries is limited, only some countries (Canada, the United States, the United Kingdom, Australia, Norway and Sweden) have a large enough number of public-use micro-data files accessible from the LIS for construction of reliable long-run time series. Estimates of the index of economic well-being for Canada and the United States in this paper differ somewhat from our earlier estimates because the emphasis on international comparability of estimates has meant that some data originally used to construct the index for Canada and the United States, and not available for other countries, has not been used. Examples include estimates of the underground economy, commuting, human capital and natural resources. These omissions can affect perceived trends and the index of economic well-being presented in this paper is, in consequence, less sophisticated than our earlier estimates – an unfortunate tradeoff needed if more countries were to be included.
- <sup>7</sup> The data for the six countries discussed in this paper and incomplete data for Germany, Belgium, Denmark, Finland, Italy, Netherlands, France and Spain are presented in tables available on the Web at [www.csls.ca](http://www.csls.ca). In these tables, data are partly based on backward and forward extrapolation and interpolation techniques (extrapolated and interpolated estimates are given in italics). We hope that, over time, it will be possible to “fill in the blanks,” and that more reliable estimates for more countries will become available.
- <sup>8</sup> Since a great deal of work has been done on the valuation of household production, there is at least a clearly defined range of estimates. However, economists have paid very little attention to the measurement of insecurity (see Osberg 1998b), and the measures of economic insecurity are correspondingly underdeveloped.
- <sup>9</sup> Consumption can also be calculated on a household basis. This estimate may be sensitive to the price series used to deflate nominal consumption. In the national accounts, the consumer expenditure deflator is used, which differs slightly from the Consumer Price Index. Any bias in price series would obviously bias 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, Dulberger and Griliches 1999) estimated that the US CPI had an upward bias of 1.1 percent, largely due to the failure of prices indexes to capture the welfare effects of new goods and the quality improvements in existing products (Nordhaus 1997). In this paper, no adjustment is made for potential consumer price bias.
- <sup>10</sup> Dan Usher (1980) of Queen’s University has developed a methodology for the estimation of the value of increased longevity.
- <sup>11</sup> Wolfson (1996) found for 1990–92 that the HALE for 15-year-olds was 7.8 years less than life expectancy (55.6 vs. 63.4 years). However, since there is no time series on HALE for Canada, we do not know if the rate of increase in the HALE has been greater or lower than life expectancy over time.
- <sup>12</sup> Implicitly, this procedure ignores both the differential values which individuals might place on changes in mortality probability at different ages and the distribution, by age, of actual changes in mortality probability.
- <sup>13</sup> Longer life and a more affluent retirement may interact in their impacts on well-being.

To some extent, we capture these interactions – in section 2.4.4, we note that economic insecurity depends partly on the level of poverty among the elderly, which has declined in most countries. However, no account is taken in this paper of any relative increase in well-being of the non-poor elderly.

<sup>14</sup> See, for example, Burkhauser, Smeeding and Merz (1996) or Phipps and Garner (1994).

<sup>15</sup> Even though the impact on average household size is the same, the impact on average living standards of (for example) a five-person household splitting will differ from the impact of a two-person household splitting, since the latter change will imply a greater loss of economies of scale.

<sup>16</sup> (To put this in more concrete terms, note that a difference of 564 hours per year is equivalent to an additional working day of 10.84 hours, every week of the year.)

Tables detailing the calculations of this section are available on the CSLS Web site. Tables 101-A to 112-A lay out the data for our estimation of the impact of working time on consumption flows, and hence economic well-being, for nine countries (Canada, Finland, France, Germany, Norway, Spain, Sweden, UK, and the US) over the 1980 to 1997 period. Table 101-A presents estimates of average annual hours worked per employed person from the International Labour Organization's KILM (Key Indicators of the Labour Market) database. Estimates for years where data are unavailable have been interpolated on the basis of a linear trend (and are italicized, for easy reference).

Table 106-A provides estimates of average after-tax hourly compensation in constant prices in NCUs and is calculated as the product of one minus the tax rate (Table 104-A) and hourly pre-tax compensation (Table 105-A).

<sup>17</sup> See Table 102-A.

<sup>18</sup> Table 105-A provides estimates of average hourly compensation per employed person in constant prices, expressed in terms of national currency. Use of NCUs of course means that the compensation levels cannot be compared across countries, although rates of change can be compared. Average compensation per hour is calculated by dividing total annual average compensation per employee (including in theory an imputation for the self-employed) by total annual average hours worked per employed person.

<sup>19</sup> See Table 108-A, Table 107-A, Table 106-A.

<sup>20</sup> 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.

<sup>21</sup> Statistics Canada has identified the following types of unpaid work: food and meal preparation; food or meal clean-up; cleaning; laundry and ironing; clothes repair and shoe care; home repair and maintenance; gardening and grounds maintenance; pet care; other domestic work, not elsewhere classified; physical care-children; education-children; medical care-children; other care-children; personal care-adults; medical care-adults; household management and administration; shopping for goods and services; transport-children; transport-all other household work; volunteer work; other help and care; and transport-other unpaid work. In 1992, household work represented 94 percent of total unpaid work, with volunteer work the remainder.

<sup>22</sup> 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.

<sup>23</sup> If one could assume that income flows were always optimally divided between consumption and savings, one could omit separate consideration of consumption and wealth accumulation and concentrate on trends in average income. However, aggregate accumulation of private assets depends heavily on tax policy and accumulation of

public assets depends on spending decisions. Because both depend heavily on the political process, and because capital markets have significant imperfections, the assumption of automatic optimality seems too hopeful by far – for further discussion, see Osberg (1985a). Note that in aggregating over different forms of capital and environmental assets, we are implicitly following the “Hartwick Rule” for resource depletion, and assuming that accumulation and depletion of stocks of particular types of assets can be offset.

- <sup>24</sup> See Coulombe (2000) who notes that the average depreciation rate for Canada’s business sector capital stock over the 1961 to 1997 period was 10 percent compared to 4.4 percent in the US.
- <sup>25</sup> The R&D investment series starts in 1960 so that 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.
- <sup>26</sup> 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. The quality of the resources, the state of extraction technologies, the price of the resource and factor costs determine this amount of rent.
- <sup>27</sup> Like these other assets, the value of the human capital of living persons 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.
- <sup>28</sup> Implicit in this position is a belief that current stock market valuations (especially in the US) are excessive, and that the economy has not in fact entered a qualitatively new Internet era.
- <sup>29</sup> Jenkins (1991) surveys the issues involved in measurement of inequality.
- <sup>30</sup> Wilkinson (1996) argues that greater inequality increases the mortality rate. Daly and Duncan (1998) argue that absolute deprivation reduces life expectancy and conclude 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.
- <sup>31</sup> Since there is no data available on inequality and poverty within families, we have no option but to follow the standard pattern of assuming that equivalent income is equally shared among family members. Sharif and Phipps (1994) have demonstrated that if children do not in fact share equally in household resources, inequality within the family can make a very big difference to perceptions of the level of child poverty – and the same implications would hold for gender inequalities. However, since the issue for this paper is the **trend** of poverty, our conclusions will hold unless there has been a systematic trend over time in the degree of inequality within families (e.g. if senior citizen families, whose share of the poverty population has fallen over time, have systematically different levels of within-family inequality than younger families).
- <sup>32</sup> In the period 1994 to 1997, poverty has risen in Canada and fallen in the US, for example. Canadian provinces are now indistinguishable from many US states – see Osberg (2000).
- <sup>33</sup> To be precise, in the Econlit database from 1969 to December 1997, there are nine matches to the term “economic insecurity.” A search of the Social Sciences Index from 1983, and the PAIS International and PAIS Periodicals/Publisher Index from 1972, yielded 11 matches. The Social Sciences Citation Index for the years 1987 to 1997 was sim-

ilarly unproductive.

- <sup>34</sup> For example, a tenured professor with occasional consulting income may have a variable income stream, but feel little insecurity – and data only on individuals' income streams cannot reveal who had a long-term employment guarantee (like tenure), and who sweated out a series of short-term contract renewals.
- <sup>35</sup> In the year 2001, the gender specificity of the language of 1948 will strike many people as odd – but Article 2 makes it clear that all Articles of the Universal Declaration of Human Rights are to be guaranteed to male and female persons equally.
- <sup>36</sup> However,  $RATE = INCIDENCE \times AVERAGE \text{ DURATION}$ . 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.
- <sup>37</sup> This procedure effectively ignores single male parents. While the authors of this paper feel this is an important group, males comprise only about 10 percent of the single-parent population, and their income loss on divorce is considerably less than that of women.
- <sup>38</sup> In order that the base year for the indexes of all risks of economic security be the same at 1.000 in Table 9, the constant 2 has been added to the indexes of risk of illness, single parenthood and old age, whose original base was -1.
- <sup>39</sup> A pure Rawlsian would put all the weight on the well-being of the least well-off.
- <sup>40</sup> The weights are for 1997. The actual weights used vary by year.
- <sup>41</sup> As well, we would caution that because we have not been able to get, for this paper, estimates of the income replacement provided under unemployment insurance in these countries, we may be overestimating the importance for economic insecurity of the rise in unemployment in these countries.
- <sup>42</sup> But this paper does not capture the rise in economic insecurity produced by declining EI coverage.
- <sup>43</sup> Thanks to my colleague Mel Cross for this citation, and others similar.
- <sup>44</sup> 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.

#### References

- Atkinson, A.B. 1970. "On the Measurement of Inequality." *Journal of Economic Theory* 2: 244–263.
- Atkinson, G., R. Dubourg, K. Hamilton, M. Munasinghe, D. Pearce, and C. Young. 1997. *Measuring Sustainable Development: Macroeconomics and the Environment*. Cheltenham, UK: Edward Elgar.
- Boskin, M.J. (chairman), E.R. Dulberger, and Z. Griliches. 1999. *Toward a More Accurate Measure of the Cost of Living*. Final Report to the Senate Finance Committee from the Advisory Commission to Study the Consumer Price Index. Collingdale: DIANE Publishing Company.
- Burkhauser, R.V., T. M. Smeeding, and J. Merz. 1996. "Relative Inequality and Poverty in Germany and the United States Using Alternative Equivalence Scales." *The Review of Income and Wealth* 42(4): 381–400.
- Clark, A., and A. Oswald. 1994. "Unhappiness and Unemployment." *The Economic Journal*. 104(424): 648–659.
- Coulombe, S. 2000. "The Canada-US Productivity Growth Paradox." Working Paper Number 12, March 2000. Ottawa: Industry Canada.
- Daly, M.C., and G. Duncan. 1998. "Income Inequality and Mortality Risk in the United States: Is There a Link?" *FRBSF Economic Letter*. October (98): 29.
- Dawson, J.C. (ed.). 1996. *Flow-of-Funds Analysis*. Armonk, NY: M.E. Sharpe.
- De Tocqueville, A. 1961. *Democracy in America*. Vol. 2, Chapter VIII. New York:

- Schoken Books.
- Eckstein, Z., and I. Zilcha. 1994. "The Effects of Compulsory Schooling on Growth, Income Distribution and Welfare." *Journal of Public Economics*. 54(3): 339–359.
- Fankhauser, S. 1995. "Evaluating the Social Costs of Greenhouse Gas Emissions." *Energy Journal* 15: 157–84.
- Galor, O., and J. Zeira. 1993. "Income Distribution and Macroeconomics." *Review of Economic Studies*. 60(1): 35–52.
- Jenkins, S. 1991. "The Measurement of Income Inequality." In L. Osberg (ed.), *Economic Inequality and Poverty: International Perspectives*: 3–38. Armonk, NY: M.E. Sharp Inc.
- Jorgenson, D., and B. Fraumeni. 1992. "The Output of the Education Sector." In Z. Griliches et al. (eds.), *Output Measurement in the Service Sectors*. NBER Studies in Income and Wealth: Vol. 56: 303–338. Chicago: University of Chicago Press.
- Kendrick, J.W. (ed.). 1996. *The New System of National Accounts*. Boston: Kluwer Academic Publishers.
- Keuning, S. 1998. "A Powerful Link Between Economic Theory and Practice: National Accounting." *The Review of Income and Wealth*. 44(3): 437–446.
- Nordhaus, W. 1997. "Do Real-Output and Real-Wage Measures Capture Reality: The History of Lighting Suggests Not." In Bresnahan, T., and R.J. Gordon (eds.), *The Economics of New Goods*, Vol. 58, 29–66. NBER Studies in Income and Wealth. Chicago: University of Chicago Press.
- Nordhaus, W., and J. Tobin. 1972. "Is Growth Obsolete?" In *Economic Growth, National Bureau of Economic Research General Series no. 96E*. New York: Columbia University Press.
- OECD. 1996. *Measuring What People Know: Human Capital Accounting for the Knowledge Economy*. Paris: Organization for Economic Cooperation and Development.
- Osberg, L. 1985a. "The Measurement of Economic Welfare." In David Laidler (coordinator), *Approaches to Economic Well-Being*. Vol. 26 of the Royal Commission on the Economic Union and Development Prospects for Canada. MacDonald Commission. Toronto: University of Toronto Press.
- . 1985b. "The Idea of Economic Well-Being." Paper presented at the 19th General Conference of the International Association for Research in Income and Wealth, Noordwijkerhout, Netherlands, August 25–31. Dalhousie University, June, Mimeo.
- . 1998b. "Economic Insecurity." Discussion Paper No. 88, Social Policy Research Centre, University of New South Wales, Sydney, Australia.
- . 1999. "Long Run Trends in Economic Inequality in Five Countries: A Birth Cohort View." Paper presented at Jerome Levy Institute Conference on Macro Dynamics of Inequality, October 28, 1999. Available at <http://is.dal.ca/~osberg/home.html>.
- . 2000. "Poverty in Canada and the USA: Measurement, Trends and Implications." *Canadian Journal of Economics* 33(4): 847–877.
- Osberg, L., and A. Sharpe. 1998. "An Index of Economic Well-Being for Canada." Paper presented at the CCLS Conference on the State of Living Standards and Quality of Life in Canada, October 30B31, Ottawa, Ontario (paper posted at [www.ccls.ca](http://www.ccls.ca) under conferences), also Research Paper R-99-3E, Applied Research Branch, Human Resources Development Canada, December.
- . 1999. "An Index of Economic Well-being for Canada and the United States." Paper presented to the annual meeting of the American Economics Association, January 3–5, New York.
- Osberg, L., and Kuan Xu. 1997. "International Comparisons of Poverty Intensity: Index Decomposition and Bootstrap Inference." *Bulletin of the International Statistical Institute* LVII(2): 289–292.
- Osberg, L., and Kuan Xu. 2000. "International Comparisons of Poverty Intensity: Index

- Decomposition and Bootstrap Inference.” *Journal of Human Resources* 35(1): 51–81.
- Phipps, S., and T.I. Garner. 1994. “Are Equivalence Scales the Same for the United States and Canada?” *The Review of Income and Wealth* 40(1): 1–18.
- Sharif, N., and S. Phipps. 1994. “The Challenge of Child Poverty: Which Policies Might Help?” *Canadian Business Economics* 2(3): 17–30.
- Statistics Canada. 1996. *Households’ Unpaid Work: Measurement and Valuation*. Studies in National Accounting #3. Cat. No. 13: 603MDE95003.
- . 1997. *Environment-Economy Indicators and Detailed Statistics 1997*. Connections: Linking the Environment and the Economy. Cat. No. 16-200 XKE, December.
- U.N. (United Nations), in collaboration with Eurostat, International Monetary Fund, Organisation for Economic Co-operation and Development, and the World Bank. 1993. *System of National Accounts 1993* Series F, No. 2, Rev. 4 New York: joint publication by Eurostat, IMF, OECD, UN and the World Bank.
- Usher, D. 1980. *The Measurement of Economic Growth*. Oxford: Basil Blackwell.
- Wilkinson, R.G. 1996. *Unhealthy Societies: The Afflictions of Inequality*. London: Routledge.
- Wolfson, M. 1996. “Health-Adjusted Life Expectancy.” *Health Reports* 8(1): 41–45.
- World Bank. 1997. “Expanding the Measure of Wealth: Indicators of Environmentally Sustainable Development.” *Environmentally Sustainable Development Studies and Monographs* Series No. 17. Washington: World Bank.