

Centre for the Study of Living Standards Centre d'étude des niveaux de vie

111 Sparks Street, Suite 500 Ottawa, Ontario K1P 5B5 613-233-8891, Fax 613-233-8250 csls@csls.ca

## New Estimates of the Index of Economic Well-Being for Selected OECD Countries

Lars Osberg and Andrew Sharpe

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#### Abstract

In the late 1990s, the authors developed a new composite measure of well-being called the Index of Economic Well-being (IEWB). The salient feature of this index was that it organized the economic well-being domain into four dimensions: consumption flows, stocks of wealth, equality, and economic security.

Since then, we have greatly advanced our research program on the measurement of economic well-being, both conceptually and empirically. The objective of this paper is to present this new research on and estimates of the Index of Economic Well-being. The paper discusses progress that we have made on methodological issues associated with the construction of the index, in particular the adoption of a linear scaling procedure. The advantages and disadvantages of this technique will be discussed. The paper also presents new estimates of the Index of Economic Well-being and its domains and components for selected OECD countries for the 1980-2007 period and discusses the factors behind these trends.

The main findings are that that the Index of Economic Well-being advanced at rates between 0.61 and 1.72 per cent per year between 1980 and 2007 for the selected OECD countries, generally below the average annual growth rates of GDP per capita. The consumption flows and stocks of wealth domains of the Index experienced solid advances over the period, but these developments were offset somewhat by falls in economic equality and in economic security. Increased income inequality accounted for the fall in economic equality while the rise in private health expenditures, as a share of personal disposable income, accounted for much of the decline in economic security.

## New Estimates of the Index of Economic Wellbeing for Selected OECD Countries<sup>1</sup>

In 1998, the Centre for the Study of Living Standards (CSLS) released the first empirical estimates for Canada of the Index of Economic Well-being (Osberg and Sharpe, 1998), a composite index based on a conceptual framework for measuring economic well-being developed by Osberg (1985). In the past decade, the CSLS has extended the geographical coverage of the Index to the Canadian provinces and to major OECD countries and has made a number of changes to the methodology used to construct the Index. The dual objectives of this paper are to review these methodological changes and to present updated estimates of the Index for selected OECD countries for the 1980-2007 period.

The paper is divided into four main parts. The first part provides a discussion of the motivation for the development of the Index of Economic Well-being (IEWB) and the potential contributions of the Index to the debate on the measurement of economic wellbeing. It also outlines the basic framework of the measures. The second part of the paper discusses major methodological changes incorporated into the index, namely the switch to a scaling methodology, and the move to equal weighting for the four domains. The third part, by far the longest, provides a detailed discussion of trends in the Index of Economic Well-being, and in the four domains and sub-components of the domains, for selected OECD countries over the last quarter century. The fourth part discusses briefly some lessons learned from the authors' experience in the construction of the Index of Economic Well-being.

# The Index of Economic Well-being: Motivation and Framework<sup>2</sup>

A frequent refrain in the "social indicators" literature is the (true) statement that there is more to "well-being" than economics, but it is also widely recognized that a key component of overall well-being is economic well-being or "access to economic resources". Although there are good grounds for thinking that national income accounting measures may not necessarily be a good guide to popular perceptions of trends in economic well-being, GDP per capita is probably the single most often mentioned criterion of economic progress.

<sup>&</sup>lt;sup>1</sup> The authors would like to thank the following persons for assistance in updating the extensive database upon which the estimates in this paper are made: Souleima El Ackhar, Patrick Alexander, Sharon Qiao, Jean-Francois Arsenault, Daniel Ershov, and Simon Lapointe. The authors would also like to thank the Department of Economic Development of the Government of Alberta for financial support for the updating of the IEWB database.

<sup>&</sup>lt;sup>2</sup> This section is largely based on Osberg and Sharpe (2005).

In focusing on the economic aspects of well-being in this paper we do not intend to downgrade the importance of non-economic issues. Instead, we are motivated by the idea that a better measure of "access to resources needed for a decent standard of living" is needed if economic and "social" trends are to be combined into an index with larger ambitions.

In focusing on the economic component of societal well-being, our particular emphasis is on the sensitivity of measures of aggregate "command over resources" to the omission or inclusion of measures of income distribution and economic security.

In contrasting GDP per capita and the IEWB as measures of "command over resources" we do not intend to denigrate the importance of obtaining an accurate count of the total money value of goods and services produced for sale in the market in a given country in a given year (i.e. GDP). Clearly, GDP measurement is essential for many important public policy purposes (e.g. macro economic demand management, public finance). However, GDP accounting does omit consideration of many issues (for example, leisure time, longevity of life, asset stock levels) which are important to the command over resources of individuals. Although the compilers of the national accounts may protest that their attempt to measure the aggregate money value of marketed economic output was never intended as a full measure of economic well-being, it has often been used as such. The question that the critics of GDP have to answer is whether alternative measures of "command over resources" are possible, plausible and make some difference.

In developing an Index of Economic Well-Being which is based on four dimensions of economic well-being – consumption, accumulation, income distribution, and economic security – this paper attempts to construct better measures of effective consumption and societal accumulation. However, an important point of difference with other indices is that we argue that "society's well-being" is not a single, <u>objective</u> number (like the average altitude of a country).

It is more accurate, in our view, to think of each individual in society as making a subjective evaluation of objective data and coming to a personal conclusion about society's well-being. Well-being has multiple dimensions and individuals differ (and have the moral right to differ) in their subjective valuation of the relative importance of each dimension of well-being. But because all adults are occasionally called upon, in a democracy, to exercise choices (e.g. in voting) on issues that affect the collectivity (and some individuals, such as civil servants, make such decisions on a daily basis), citizens have reason to ask questions of the form: "Would public policy X make 'society' better off?" Presumably, self-interest plays some role in all our choices, but unless self-interest is the sole criterion, an index of society's well-being is useful in helping individuals answer such questions.

Although conceptually there may be no way to measure some of the different dimensions of well-being in directly comparable units, as a practical matter citizens are frequently called upon to choose between policies that favour one or the other. Hence, individuals often have to come to a summative decision – i.e. have a way of "adding it all up" – across domains that are conceptually dissimilar. From this perspective, the purpose

of index construction should be to assist individuals – e.g. as voters in elections and as bureaucrats in policy making – in thinking systematically about public policy, without necessarily presuming that all individuals have the same values.

Our hypothesis is that indices of social well-being can best help individuals to come to reasonable answers about social choices if information is presented in a way that highlights the objective trends in major dimensions of well-being and thereby helps individuals to come to summative judgments – but also respects differences in values. Although it may not be possible to define an *objective* index of societal well-being, individuals still have the problem (indeed, the moral responsibility) of coming to a *subjective* evaluation of social states, and they need organized, objective data if they are to do it in a reasonable way.

The logic of our identification of four components of well-being is that it recognizes both trends in average outcomes and in the diversity of outcomes, now and in the future, as Exhibit 1 illustrates.

Exhibit 1 - Dimensions of Economic Well-Being or Command over Resources							
Concept	Present	Future					
"Typical Citizen" or	Average Flow of Current Income	Aggregate Accumulation of Productive Stocks					
"Representative Agent"							
Heterogeneity of	Distribution of Potential	Insecurity of Future					
Experiences of all Citizens	Consumption – Income	Incomes					
	Inequality and Poverty						

When an average flow like GDP per capita (or an alternative, such as the average personal income) is used as a summative index of well-being, the analyst is implicitly stopping in the first quadrant – assuming that the experience of a representative agent can summarize the well-being of society and that the measured income flow optimally weights consumption and savings, so that one need not explicitly distinguish between present consumption flows and the accumulation of asset stocks which will enable future consumption flows.

However, if society is composed of diverse individuals living in an uncertain world who typically "live in the present, anticipating the future," each individual's estimate of societal economic well-being will depend on the proportion of national income saved for the future. GDP is a measure of the aggregate market income of a society that does not reveal the savings rate, and there is little reason to believe that the national savings rate is automatically optimal. Indeed, if citizens have differing rates of time preference, any given savings rate will only be "optimal" from some persons' point of view. Hence, a better estimate of the well-being of society should allow analysts to distinguish between current consumption and the accumulation of productive assets, and thereby enable citizens to apply their differing values.

As well, individuals are justifiably concerned about the degree to which they and others will share in prosperity – there is a long tradition in economics that "social welfare" depends on average incomes, poverty and the degree of inequality in the distribution of incomes. If the future is uncertain, and complete insurance is unobtainable (either privately or through the welfare state), individuals will also care about the degree to which their personal economic future is secure.

These four components therefore have a logical rationale and a manageable number of headings. If the objective of index construction is to assist public policy discussion, one must recognize that when too many categories have to be considered simultaneously, discussion can easily be overwhelmed by complexity. We therefore do not adopt the strategy of simply presenting a large battery of indicators. However, because reasonable people may disagree on the relative weight they would assign to each dimension – e.g. some will argue that inequality in income distribution is highly important while others will argue the opposite – we argue that it is preferable to be explicit and open about the relative weights assigned to components of well-being, rather than leaving them implicit and hidden.<sup>3</sup> We specify *explicit* weights to the components of well-being, and test the sensitivity of aggregate trends to changes in those weights, in order to enable others to assess whether, by their personal values of what is important in economic well-being, they would agree with an overall assessment of trends in the economy.

The paper's basic hypothesis – that a society's economic well-being depends on total consumption and accumulation, and on the individual inequality and insecurity that surround the distribution of macroeconomic aggregates – is consistent with a variety of theoretical perspectives. We do not present here a specific, formal model. In a series of papers (Osberg and Sharpe, 1998, 2002, and 2005) we have described the details of the calculation of the four components or dimensions of economic well-being:

- [1] effective per capita consumption flows which includes consumption of marketed goods and services, government services, adjustment of effective per capita consumption flows for household production, changing household economies of scale, leisure and life expectancy;
- [2] net societal accumulation of stocks of productive resources which includes net accumulation of tangible capital, housing stocks, net changes in the value of natural resources stocks; environmental costs, net change in level of foreign indebtedness; accumulation of human capital and R&D investment;
- [3] income distribution the intensity of poverty (incidence and depth) and the

<sup>&</sup>lt;sup>3</sup> An additional reason to distinguish the underlying components of economic well-being is that for policy purposes it is not particularly useful to know only that well-being has gone "up" or "down", without also knowing which aspect of well-being has improved or deteriorated.

inequality of income;

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

Each dimension of economic well-being is itself an aggregation of many underlying trends, on which the existing data is of variable quality. By contrast, the System of National Accounts has had many years of development effort by international agencies (particularly the UN and the IMF), and has produced an accounting system for GDP that is rigorously standardized across countries. However, using GDP per capita as a measure of "command over resources" would implicitly:

- (1) assume that the aggregate share of income devoted to accumulation (including the public capital stock, human capital, research and development and the value of unpriced environmental assets) is automatically optimal.
- (2) set the weight of income distribution and economic insecurity to zero, by ignoring entirely their influence.

Neither assumption seems justifiable, and neither is innocuous.

Exhibit 2 presents the detailed framework of the Index of Economic Well-being, based on the four domains outlined above.



Exhibit 2: The CSLS Index of Economic Well-being: Weighting Tree

### Methodological Developments in the Index of Economic Wellbeing

The Index of Economic Well-being is a work in progress and has been subject to a number of changes in methodology during its eight years of existence. This part of the paper reviews the major methodological developments that have affected the Index.

#### **Introduction of Linear Scaling**

An essential question that underlies discussions of index methodology is whether a single variable should be scaled, and if so, what is the meaning or interpretation of a scaled variable (Sharpe and Salzman, 2003). The essential reason why it may be necessary to scale variables is that raw data have significantly different ranges. In such cases, without scaling, composite indices will be biased towards variables with high ranges and small, but meaningful changes in a value may insignificantly affect the composite index. An unscaled aggregation of sub-indexes has an implicit weighting scheme. When the variables are aggregated without scaling, higher implicit weights are given the variables that have a large range as their percentage increases are larger.<sup>4</sup>

An additional motivation for the standardization of variables is the fact that increases in some variables, such as consumption flows, correspond to increases in overall well-being, whereas increases in other variables, such as unemployment, correspond to decreases in overall well-being. We call this the directionality issue. We want to standardize variables so that an increase in the standardized score corresponds to increase in overall well-being. The procedure of linear scaling, which produces a scaled variable as the standardized variable, provides a methodologically consistent way to standardize variables so that their increases correspond to increases in well-being. The procedures used to handle the directionality originally used in the Index of Economic Well-being had shortcomings.<sup>5</sup>

Linear Scaling Technique (LST) is a procedure used to standardize the range of a variable. To do this, an estimate is made for the high and low values which represent the possible range of a variable for all time periods and for all countries, and denoted Min

<sup>&</sup>lt;sup>4</sup> Variables with low bases compared to the range of values can skew the index and cause small absolute changes in this variable to overwhelmingly affect the composite. For example, if the unemployment rate ranges from 0.5% to 5.5%, a change from 0.5% to 5.5% will be a ten fold increase. However, for a different range, say between 10% and 15%, the same absolute change, of 5% will only represent a 1.5 fold increase.

<sup>&</sup>lt;sup>5</sup> The first procedure used was to take the reciprocal of the index values of the series. Thus, a doubling and then a tripling of the unemployment rate, from 4 to 8 to 12 per to cent, or in index form from 1.0 to 2.0 to 3.0, results in a series of 1, 0.5, and .33. The weakness of this procedure is that it is not a linear transformation, which can skew the results. The second procedure used was to apply a linear transformation to the series by multiplying the series by -1 and then adding 2 to the result. The index values of the unemployment rate (1, 2, 3) would be transformed into 1, 0, and -1. Disadvantages of this procedure include a lack of transparency, the introduction of negative numbers into the time series, which confuses readers, and the perverse effects that a time series which includes a value of zero can have when multiplicative operations are made (multiplication by zero gives zero).

and Max, respectively. The actual range of values my also be used. The data are then scaled according to these values. If a variable increase corresponds to an increase in overall welfare, the variable, VALUE, is scaled according to the formula

## 1) $\frac{\text{Value-Min}}{\text{Max-Min}}$

In this case, we see that increases in the VALUE correspond to increases in scaled VALUE. Notice that if the Min is equal to zero, the formula above reduces to VALUE/Max.

If, in contrast, an increase in VALUE corresponds to decrease in overall welfare, the VALUE is scaled according to the complementary formula,

## 2) $\frac{\text{Max-Value}}{\text{Max-Min}}$

In this case, we see that increases in the VALUE correspond to decreases in the scaled VALUE. In both cases, the range of values is 0-1, and 0 corresponds to the lowest level of welfare, and 1 corresponds to the highest. Note that this formula reduces to (Max-Value)/Max when Min is set to 0. This technique is used to scale all variables in many indices, including the Human Development Index.

Overall, the linear scaling procedure has worked fairly well in the Index of Economic Well-being, particularly in resolving the directionality problem. However, there are certain weaknesses to this approach. First, the choice of the set of values used in the scaling procedure affects the results. The more values used, the greater the range. For example, we have produced IEWB estimates for Canada alone and for the Canadian provinces, which include a national average. But the results for Canada when the scaling procedure is run with only the values for Canada differ significantly from the results for Canada when the scaling procedure uses values for Canada **and** the provinces. The range of the values is much greater when the provinces are included. Since some provincial values are always by definition both smaller and greater than the values for Canada, the range of the scaled values for Canada only is much more narrow than when the provinces are included.

Second, it is not always clear that the same range (0 to 1) for all variables is in fact desirable. For example, the Gini coefficient is fairly stable over time and exhibits only small percentage changes. In contrast, the unemployment rate experiences large fluctuations. Should the large per cent variations in the unemployment rate be given the same weight in the determination of the IEWB as the small per cent variations in the Gini coefficient? That is in effect what linear scaling does by dampening the impact of variables that exhibit large fluctuations.

Third, the linear scaling methodology presents problems when new values outside the existing range of values are added. If there is an upward trend in a time series, each new scaling procedure will produce new scaled values for the series, and make obsolete the old series. An adjustment to the minimum and maximum values can, in the short run, resolve this problem when the range of actual values is used for scaling. For example, for the calculations in this paper 10 per cent was subtracted from the minimum value and 10 per cent was added to the maximum value to create the range used in the scaling procedure. However, when new values exceed these adjusted minimums and maximums, rescaling will be needed.

Fourth, potentially the most serious problem with the linear scaling approach may be that the per cent changes, unlike the absolute percentage point changes, in the scaled values may not be meaningful because the base of the scaled values used for per cent point calculations varies among variables and it is this base that determines the percentage change. The base also varies with the set of values included in the scaling procedure. A lack of comparisons based on per cent changes of variables, and only based on percentage point changes, would impoverish the analysis of trends in variables. In this paper we have included reference to per cent changes in scaled values, although further research on the appropriateness of this may result in their exclusion.

#### Weighting of four domains

Probably the most controversial issue in the construction of composite indexes is the weighting scheme. Results can indeed be very sensitive to the choice of weights. In the original estimates of the Index of Economic Well-being, the following weights were chosen: consumption flows (0.4), stocks of wealth (0.1), equality (0.25), and economic security (0.25). The authors were criticized for a bias against sustainability because of the low weight for the stocks of wealth. We were also criticized for a bias in favour of material goods because of the high weight given consumption. In subsequent versions of the Index it was decided to give equal weights to the four domains. Although this reflects the value judgment that the domains are equally important, it appears even-handed and balanced. We do, however, provide estimates of the Index based on alternative weighting schemes to show the sensitivity of the results to the weights chosen.

### **Trends in the Index of Economic Well-being for Selected OECD Countries, 1980-2007**

This section of the paper examines the level of the Index of Economic Well-being and its various components in 2007 in 14 OECD countries and developments since 1980. The focus is on the change over the 1080-2007 period, with little attention given to trends within the period.

#### **Overall Level and Trends in the Index of Economic Well-being**

In 2007, the country with the highest level of economic well-being among the 14 countries covered was Norway, which had a scaled index value of 0.793 points (Table 1, Chart 1). Norway was followed by Denmark, which had a scaled index value of 0.702

points. The country which had the lowest level of economic well-being was the Spain, with an index value of 0.478 points, followed by the United States (0.508 points) Canada ranked ninth out of fourteen countries, with an index value of 0.577 points.



There are two ways to measure progress in the Index of Economic Well-being: the absolute change in the scaled value of the index (percentage points), and the per cent change in the scaled value of the index. This latter method is influenced by the initial level of the scaled value For example, assume Country A has scaled values of 0.2 and 0.6 in the base and end years while Country B has values of 0.5 and 0.9. Progress measured in percentage points is the same for the two domains – 0.4 percentage points. But the index of the scaled values shows that Country A increased 200 per cent while Country B advanced only 80 per cent.

During the 1980-2007 period, the Index of Economic Well-being grew in all countries. Norway experienced the most significant growth of 0.275 percentage points, or 53.1 per cent (Chart 2). Italy had the smallest absolute index growth, increasing by only 0.095 percentage points, or 21.1 per cent overall. Canada made an impressive





Comparing the Index of Economic Well-being with Gross Domestic Product per capita, the measure used most often as an indicator of economic well-being, shows that Norway was first in both rankings in 2007 (Tables 1 and 2). However, except for Norway, the rank positions for all countries are completely different between the two indicators. For example, Canada was fourth in terms of GDP per capita level in 2007, while it was only ninth in terms of the level of the Index of Economic Well-being.

<sup>&</sup>lt;sup>6</sup> From 1980 to 1990, all countries except Netherlands and Sweden experienced progress in their wellbeing. Particularly notable were Spain, Canada and Denmark, which grew by over 15 per cent during the period. During the following period of 1990-2000 several countries experienced impressive acceleration in the growth of their index levels. Most notably, the United States went from growth of 5.75 per cent during the 1980s, to growth of 23.3 per cent during the 1990s. Finland and Spain, however, moved the other way and experienced declines in their levels of well-being in the 1990s. From 2000 to 2007, all countries except Belgium experienced positive growth in their levels of well-being. Norway led the way, with its the overall index growing 19.4 per cent, or 0.129 percentage points.

As well, GDP per capita growth has been greater than the IEWB growth for all countries over the 1980-2007 period (Chart 3). In particular, Norway grew by 3.46 per cent per year in terms of GDP per capita, but only by 1.59 per cent per year in terms of its IEWB. Spain also had a difference of almost 2 percentage points between the growth rates, as it grew by 2.76 per cent per year in terms of GDP per capita, but only 1.02 per cent per year in terms of it overall well-being. This divergence shows that certain aspects of the Index of Economic Well-being, which are not considered in the measurement of GDP per capita, have grown slower and thus dampened growth of overall economic well-being relative to GDP per capita growth.



#### **Overall Trends in the Four Domains of the Index of Economic Well-being**

The Index of Economic Well-being is constructed from four domains: consumption flows, wealth stocks, equality and economic security. This section examines the trends in all four domains in the selected OECD countries over the period of 1980 to 2007.

It should also be noted that domains where components are aggregated in prices (consumption and wealth) will have different percentage rates of change depending on whether these rates are based on the scaled or unscaled values of the domain.

The country with the highest level of consumption flows per capita in 2007 was the United States, with a scaled index value of 0.917 points, or \$34,069 (2000 US dollars) (Tables 3 and 3a, Chart 4). The United States was significantly ahead of second placed Norway, which had a value of 0.718 points in the scaled index of consumption flows (\$28,668 per capita). Finland was last with an index value of 0.432 points (\$20,911 per capita), greatly trailing the US. Canada was eighth, with 0.625 points (\$26,142 per capita).



Observing the growth of the scaled index of consumption flows, the country which advanced the most in terms of absolute change from 1980 until 2007 was the Norway, with growth of 0.58 percentage points. The country which grew the least was Belgium, with a 0.27 percentage point change. However, looking at the per cent growth of the countries, it is possible to see that significant absolute changes do not always translate to significant relative changes. Finland, which advanced by only 0.35 percentage points in absolute terms, skyrocketed in relative terms with a 418 per cent increase. By comparison, the United States' absolute advance of 0.55 percentage points constituted only a 153 per cent increase. Belgium advanced the least in relative terms, its index growing by 76 per cent from an absolute growth of 0.27 percentage points. The majority of Finland's growth occurred during the 1980-1990 period, when its consumption flows

index increased by 187 per cent, or 0.15 percentage points. The United States grew the most in absolute terms during this time, increasing by 0.184 percentage points.<sup>7</sup>

The second domain in the index is the accumulated stocks of wealth per capita. In 2007, Norway had the highest absolute real stocks of wealth per capita, with an index level of 0.917 points, followed by Netherlands at 0.653 points (Table 4, Chart 5)). In terms of real wealth they had \$233,590 (2000 US dollars) and \$182,281 per capita, respectively (Table 4a). Spain had the lowest index level of stocks of wealth per capita, 0.325 points (\$118,609). Canada was ranked seventh, with 0.558 points (\$163,788).



The countries which grew the most in absolute terms over the 1980-2007 period were Norway and Denmark, with increases of 0.529 and 0.414 percentage points respectively. These increases corresponded to relative total growth of 136.6 per cent for Norway and 178.4 per cent for Denmark. It is important to note that the countries experiencing the highest absolute growth were not the countries which experienced the highest relative growth, similar to the case of the consumption index. Spain and Canada

<sup>&</sup>lt;sup>7</sup> The absolute consumption flows index growth of half the countries accelerated during the 1990-2000 period, with percentage point changes often doubling. However, Finland's consumption growth considerably declined to 0.044 percentage points, or 28.9 per cent. From 2000 to 2007, consumption flow index generally showed similar patterns, although Belgium's index actually declined 0.034 points.

grew the most in terms of relative per cent change, with growth of 290.4 and 207 per cent as a result of absolute changes of 0.242 and 0.376, respectively. These differences between absolute and relative growth were due to the very large gaps in the scaled index, where the index values of some countries were sometimes around half of the values of other countries.<sup>8</sup>

The third domain is a measure of equality. In 2007, Sweden was the most equitable country with a scaled value of 0.791 and the United States was the country with the least equality, with a scaled index value of only 0.159 (Table 5, Chart 6). Only three countries became more equitable over the 1980-2007 period: Denmark, France, and Sweden. The most progress among them was made by Denmark, where the index of equality grew 0.195 percentage points, or 33.3 per cent. The United States, Italy and the UK experienced the greatest setbacks in terms of equality, the United States falling by 0.139 percentage points (a total of 46.8 per cent), Italy by 0.174 percentage points (a total of 29.3 per cent) and the UK declining by 0.191 percentage points (29.2 per cent) over the period. <sup>9</sup>

<sup>&</sup>lt;sup>8</sup> Observing the sub-periods, the most significant relative growth in the index of wealth for most countries occurred during the 1980-1990 period, with Spain growing by 96.4 per cent and Canada growing by 63.8 per cent. During the following 1990-2000 period, growth slowed down, and as opposed to the previous period, the index of the stocks of wealth did not increase for all countries. Finland's index fell by 0.121 percentage points, or 33.7 per cent over the period. As well, the growth of the indexes of all but two countries decelerated. This deceleration mostly continued for the subsequent period of 2000-2004, with a few exceptions. Finland moved from the aforementioned decline to a very impressive increase of 62.6 per cent, or 0.179 percentage points. No country experienced a decline over the period.

<sup>&</sup>lt;sup>9</sup> Changes in the equality index were not identical between the 1980-1990 and 1990-2000 periods. From 1980 to 1990, the United States experienced the greatest relative decline in equality, its index growing negatively by 44.1 per cent (as a result of a 0.131 percentage point decrease). From 1990 to 2000, however, the United States underwent a complete turnaround, its equality increased and its index grew by a full 23.1 per cent over the period. On the other hand, Italy and Spain moved from growing equality during the 1980s, to index drops of over 30 per cent during the 1990s.



The fourth domain is a measure of economic security. Expressed as a scaled index, economic security was greatest in Norway, with a value of 0.835 points, followed by Denmark with a value of 0.821 points (Table 6, Chart 7). The United States had the smallest index value, 0.319, making it the least economically secure nation as well as the least equitable nation out of the fourteen countries studied.



In terms of changes in the economic security index over the 1980-2007 period, much like in the case of the equality index, a majority of the countries experienced negative growth. In relative terms, the United States and the United Kingdom declined the most, falling by 25.4 and 18.2 per cent; the results of declines of 0.109 and 0.094 percentage points, respectively. The overall trend of the index was clearly negative, as even the country that experienced the greatest positive growth, Denmark, increased by only 11.5 per cent (0.084 percentage points) over the period. The only other countries that experienced positive growth in security were Australia, Canada and Norway.<sup>10</sup>

<sup>&</sup>lt;sup>10</sup> Much like the equality domain, economic security fluctuated considerably between the sub-periods of 1980-1990, 1990-2000 and 2000-2007, growth often changing from negative to positive to negative again. During the 1980s, the United States experienced the greatest relative decline in economic security, its index declining by 14.2 per cent. However, this trend was reversed during the 1990s, as its index grew by 11.0 per cent, only to reverse again after 2000 with a decline of 17.8 per cent. The greatest decline over the 1990 to 2000 period was experienced by Spain at 10.4 per cent.

Summary Table: Index of Economic Well-being and its Components, OECD, 2007									
	Total	Scaled Total	Total per capita	Scaled Total	Index of	Index of	Overall Index		
	Consumption	Consumption per	Wealth, 2000	per capita	Economic	Economic	of Economic		
	per capita,	capita	US\$	Wealth	Equality	Security	Well-being,		
	2000 US\$						equal		
							weighting,		
	А	В	C	D	E	F	G =		
	27.465	0.000	400 700		0.470	0.000	(B+C+E+F)/4		
Australia	27,165	0.662	129,760	0.383	0.476	0.690	0.553		
Belgium	26,424	0.635	168,363	0.581	0.703	0.679	0.650		
Canada	26,142	0.625	163,788	0.558	0.444	0.682	0.577		
Denmark	24,357	0.559	181,202	0.647	0.780	0.821	0.702		
Finland	20,911	0.432	145,522	0.464	0.752	0.763	0.602		
France	26,283	0.630	149,094	0.482	0.727	0.726	0.641		
Germany	23,314	0.520	181,899	0.651	0.678	0.673	0.631		
Italy	24,379	0.560	146,110	0.467	0.420	0.738	0.546		
Netherlands	27,798	0.686	182,281	0.653	0.660	0.658	0.664		
Norway	28,668	0.718	233,590	0.917	0.701	0.835	0.793		
Spain	23,414	0.524	118,609	0.325	0.431	0.629	0.478		
Sweden	23,308	0.520	149,086	0.482	0.791	0.781	0.644		
United									
Kingdom	26,788	0.648	135,240	0.411	0.464	0.780	0.576		
United	24.060	0.017	170 576	0 620	0.150	0.210			
States	34,009	0.917	1/9,5/0	0.039	0.159	0.319	0.508		



#### **Trends in the Components of the Consumption Flows Domain**

As noted earlier in the paper, the consumption domain consists of three main components: private or personal consumption expenditures, government expenditures on goods and services consumed either directly or indirectly by households, and the adjusted cost of leisure.

Three adjustments are in turn made to these components. First, since economies of scale exist in private household consumption, private consumer expenditure is adjusted for changes in family size. Second, an adjustment is made to consumption flows to account for the large international differences in growth rates and levels of annual hours worked (Osberg and Sharpe, 2002). Third, an adjustment for the positive impact of increased life expectancy on well-being is made by adjusting total consumption flows by the percentage increase in life expectancy.

#### Private Consumption

In 2007, personal consumption was greatest in the United States, where it had a per capita value of \$27,319 (2000 US dollars) (Table 7). The United States was greatly ahead of all other nations, as the second highest per capita personal consumption was in the United Kingdom at \$19,970. Finland had the lowest per capita private consumption for 2007 at \$14,797, about one half of the US value. Personal consumption accounted for

over 50 per cent of total consumption flows in all countries, the single largest contributor to total consumption flows.

From 1980 to 2007, the greatest growth in personal consumption was experienced by Norway, which grew by 2.88 per cent per year, or by 116 per cent in total. Personal consumption grew the least in the Belgium, at 1.15 per cent per year, only 36 per cent in total.<sup>11</sup>

#### Average Household Size

Average household size was greatest in Spain in 2004, with 2.89 persons per household (Table 8). It was followed by Italy and the United States with 2.69 and 2.53 persons per household, respectively. Sweden had the smallest household size, with 2.00 persons per household. Over the 1980-2007 period, the size of households in all but two country declined considerably. The only countries where the household size increased were Sweden and Denmark, which experienced growth of 5.8 and 3.6 per cent respectively over the period. However, both countries had a remarkably small household size for 1980 (1.9 and 2.1 persons per household respectively), and over the period they merely seemed to approach the average. Similarly, Spain, the country with a remarkably large household size in 1980, 3.7 persons per household, experienced the greatest decline of 21.9 per cent. The Index of Economic Well-being uses the equivalence scale of the square root of average household size to adjust for economics of scale in consumption. It is converted into a relative index where the US value for 1980 equals 1.00, in order to adjust personal consumption.

#### Adjusted Relative Cost (Benefits) of Leisure

The adjusted relative cost or benefit of leisure reflects the opportunity cost of not being employed, calculated using estimates of average after-tax labour compensation and average number of hours of leisure (standardized as relative number of hours of leisure relative to a US benchmark in 1980). In 2007, all European countries had a positive relative cost of leisure, showing that they spent more time on leisure than the US did in 1980. By contrast, two of the non-European countries studied, Canada and the US, had negative leisure costs or falls in the value of leisure due to increased hours worked. Australia had positive smallest positive adjusted relative cost of leisure per capita of all the fourteen countries at \$44.50 (2000 US dollars). The Belgium had the highest adjusted relative cost, \$2,495 (2000 US dollars), with Netherlands following closely at \$2,292 per capita (Table 9). The lowest adjusted cost of leisure was in the United States, a negative

<sup>&</sup>lt;sup>11</sup> Observing the sub-periods, personal consumption growth accelerated greatly for some countries between the 1980-1990 and 1990-2000 periods. For example, the growth rate of the Netherlands increased by from 1.9 per cent to 23.2 per cent, a significant increase. Nevertheless, other countries experienced deceleration in their personal consumption growth rates, such as Finland which moved from 38.1 per cent growth during the 1980s, to merely 5.6 per cent during the 1990s. More volatile changes occurred during the 2000-2007 period. Personal consumption in all countries except for Belgium accelerated over the period. Most impressive growth rates in personal consumption during this period occurred in Norway and Denmark.

\$370 per capita. Canada had the second lowest cost of leisure, negative \$339 per capita. The time devoted to leisure clearly significantly decreased in both countries.

Observing the change in the relative cost of leisure from 1980 to 2007, the benefit of leisure increased for most European countries. The most dramatic change was experienced by France, where the relative cost or benefit of leisure increased significantly, from \$306 per capita to \$1,753. Finland, which was the only European country to experience a lengthy period of negative leisure costs in the 1980s, also experienced significant growth, moving from negative \$206 per capita in 1980 to \$185 in 2007. The United States experienced continual falls in the value of leisure, either due to increased hours worked reflecting better economic conditions, or due to different cultural values than European countries. Canada, most likely due to worsening economic conditions, experienced increases in leisure costs in the early 1990s, though moving back to negative leisure costs after 1998 as the economy improved.

#### Government Expenditures on Goods and Services

Government expenditures include spending by all levels of government on current goods and services. The largest government expenditures for 2007 were in Denmark, Netherlands and Norway, all three following a very progressive form of socialdemocracy. Their per capita government expenditures were \$7,917, \$7,860, and \$7,857 respectively (Table 10). Norway, Belgium and France, which were also welfare-states, followed. It is interesting to note that Germany, which is traditionally thought of as a welfare state, in effect spent less per capita than relatively libertarian United States and Australia. Spain had the lowest government expenditures in 2004, at \$4,595 per capita.

Over the 1980-2007 period, the government expenditures of Spain grew at the highest rate, 3.62 per cent per year, although that is unsurprising considering that in 1980 Spain had per capita expenditures which were never more than half of the expenditures of other OECD countries. The weakest growth in government expenditures occurred in Denmark, for reasons which will be discussed shortly.<sup>12</sup>

#### Life Expectancy

The country with the highest life expectancy in 2007 was Italy, which had an average life expectancy of 81.6 years (Table 11). The lowest life expectancy, of 78.2

<sup>&</sup>lt;sup>12</sup> From 1980 to 1990, the slowest growth of government expenditures was in the United Kingdom at 0.51 per cent per year, likely during the period when the conservative government of Margaret Thatcher cut spending and reduced the role of government in the life of citizens. Interestingly, similarly minded governments in the United States and Canada still allowed considerable increases in government spending, which annually grew on average by 2.14 and 1.06 per cent, respectively. That changed in the 1990s, when during a general trend of deceleration of government expenditures, the per capita expenditures in Canada and the United States actually decreased by 0.41 and 0.46 per cent per year, respectively. These changes occurred due to the increased debt burden in both countries, combined with a period of economic decline in the early 1990s, which made their left leaning Liberal and Democratic governments realize that they had to cut spending. After 2000, due to a generally improving economic climate, the growth of government expenditures accelerated in all countries, including Canada and the United States.

years, was in United States. Over the entire period of 1980-2007, the life expectancy of Italy grew the most, from 74.0 years to 81.6 years, a total increase of 10.3 per cent (Chart 9). Germany experienced the second largest increase in average life expectancy of 9.8 per cent. The life expectancy of the Netherlands grew the least, at only 5.7 per cent over the entire period. Life expectancy increased almost equally during the 1980s and the 1990s, and it never seemed to decline for more than a year in any country. Consumption flows have increased in all studied OECD countries due to growing life expectancies and the additional consumption arising from that. Life expectancy for each country was converted into a relative index where the US value for 1980 equals 1.00, in order to adjust the consumption flows.



#### Trends in the Components of the Stocks of Wealth Domain

The stock of wealth measure used in this paper contains, as explained earlier, five components: the physical capital stock, the R&D capital stock, the stock of human capital, a measure of the cost of environmental degradation as proxied by the cost of greenhouse gas emissions, and finally, net international investment position.

**Physical Capital** 

The stock of physical capital per capita, defined as residential and non residential capital stock based on geometric depreciation was greatest in Norway in 2007 at \$113,791 (2000 US dollars) (Table 12). The United States, Denmark and Netherlands followed with \$102,186, \$101,517 and \$101,256, respectively. The lowest stock of net capital was in Spain, \$68,977 per capita. Physical capital stocks contributed much to total wealth stocks, over 50 per cent for most countries.

Observing the development of the per capita stock of physical capital over the 1980-2007 period, the greatest growth in the stock was experienced by Spain, at 2.33 per cent per year, leading to total growth of 86.1 per cent. Canada experienced the second largest growth rate, 2.21 per cent per year, increasing by 80.6 per cent overall. The extremely rapid growth of Spain over the period is understandable considering the initial stock of capital in Spain was very small, leading to significant returns from investment in physical capital. The slowest growth rate was in Finland, 1.03 per cent per year, leading to total growth of only 31.7 per cent over the period.<sup>13</sup>

In 2007, the stock of total business enterprise expenditures on R&D per capita was greatest in the United States at \$4.550 (2000 US dollars) (Table 13). Finland had the second largest stock of R&D expenditures, \$4,538 per capita. Spain had the lowest stock of R&D expenditures per capita, at \$1,162. Over the 1980-2007 period many countries experienced extremely rapid increases in R&D, the growth rates of Spain, Denmark, Australia and Finland each reaching over 10 per cent per year. The R&D expenditures grew over the entire period for all fourteen countries.<sup>14</sup>

<sup>&</sup>lt;sup>13</sup> From 1980 to 1990, Canada experienced the most rapid growth of per capita physical capital stock, 2.93 per cent per year, which was possibly due to investment in oil extraction and processing related physical capital in western Canada. In general, growth was very robust during the 1980s, with 1.14 per cent in the Netherlands being the lowest average annual increase in the stock of physical capital. During the 1990s, on the other hand, growth of physical capital slowed down considerably in most countries, dropping by almost 2 percentage points in Finland, from 2.00 per cent per year to 0.05 per cent per year. A notable exception was Germany which experienced a significant acceleration in its rate of growth of physical capital, from 1.47 per cent per year to 2.56 per cent. This was possibly due to the re-unification of East Germany and West Germany, which created an optimistic climate that attracted investment, particularly to East Germany. In the period after 2000, due to improved economic conditions in most countries, the growth rate of physical capital accelerated again, with the United States enjoying the greatest growth of 2.15 per cent per year.

<sup>&</sup>lt;sup>14</sup> The 1980s were a period of tremendous growth for all countries, with R&D increasing by between 36.8 and 71 per cent per year. Growth dampened in the 1990s, with Finland experiencing the highest growth rate of 8.0 per cent per year. Italy was the only country with a negative growth rate during this period, at -3.56 per cent per year. Most countries faced further deceleration in the post-2000 period, although Italy's negative growth rate declined in magnitude, and the United Kingdom enjoyed a higher growth rate than in the 1990s.

Net International Investment Position:

Five countries had positive net international investment positions in 2007. Norway had the best net international investment position, with a per capita investment surplus of \$41,109 (2000 US dollars) (Table 14). The other four countries were Belgium, Germany, France and the Netherlands. Out of the countries with negative investment positions, the highest deficit of \$23,359 belonged to Australia. It was only slightly higher than the second largest international investment deficit of \$20,096, belonging to Spain.

From 1980 to 2007, the greatest average level of net international investment belonged to Belgium, with \$5,570 per capita. The lowest level belonged to Australia, which had an average deficit of \$11,094 to the rest of the world. This was due to the deficits run in Australia during the 1990s and after 2000, which were in excess of \$11,000 on average. During the 1980s, the Netherlands experienced the greatest average annual surpluses, \$4,229 per capita while the greatest average annual deficits were produced by Australia, at \$7,816 per capita. In the following period of 1990-1999, the deficits of Finland were the largest, particularly during the late 1990s. The peak deficit for Finland was an astounding \$42,643 per capita in 1999, roughly as large as the deficits of all other countries for that year combined. However, after 2000, the deficits of Finland declined considerably. Another important development was the continual worsening of the international investment position of the United States after 2000. Due to growing budget deficits and an intensifying trade relationship with China, the net international investment position of the US moved from an average mild deficit of \$1,904 during the 1990s to a much more significant average deficit of \$6,309 from 2000 to 2007.

#### Human Capital

The value of human capital in 2007, defined in the Index of Economic Well-being as the accumulated private and public expenditures on all levels of education, was highest for Canada at \$83,506 (2000 US dollars) per capita (Table 15). Canada barely edged out the second and third placed United States and Denmark, which had human capital levels of \$81,373 and \$81,341 respectively. The lowest human capital levels belonged to Italy and France, at \$60,409 and \$63,108 per capita, respectively. Per capita human capital was the second most important contributor to total wealth stocks per capita, contributing between 30 to 50 per cent of the total value.

Spain and Denmark experienced the greatest improvement in human capital over the 1980-2007 period, growing by 2.46 and 1.89 per cent per year, or 93 and 66 per cent overall, respectively. By contrast, the United States, starting from the highest level of per capita human capital in 1980, experienced one of the lowest annual average growth rates, 1.1 per cent, and increased overall by only 35 per cent. The lowest growth was in Sweden, at 35 per cent over the entire period.<sup>15</sup>

<sup>&</sup>lt;sup>15</sup> During the sub-period of 1980-1990, the value of human capital grew the fastest in Belgium at 2.43 per cent per year, and the slowest in Sweden, at 0.56 per cent per year. During the following period of 1990-2000 some countries, including the United States and Canada, experienced a deceleration in the growth rate of the value of human capital. In particular, the US growth rate was reduced from 1.41 per cent per year

Social Costs of Environmental Degradation:

Degradation of the environment negatively affects the sustainability of stocks of wealth. Placing a value of the environment or the "services provided by ecosystems" is a massive and controversial task and well beyond the scope of the Index of Economic Well-being. But to highlight the importance of the environment for economic well-being, and to show that environment issues can be accommodated in the framework for quantifying economic well-being developed in this paper, the Index does include estimates of the social costs of greenhouse gases, which contribute to global warning. These estimates are a flow, not a stock, and are hence subtracted from the wealth stock estimates.

The estimates are derived by multiplying CO2 emissions by the social cost of such emissions, which a World Bank study estimated at \$20 US per ton in 1990 (Frankhauser, 1995).<sup>16</sup> To simplify the calculation, it is assumed that all the costs of CO2 emissions are bore in the jurisdiction in which they are produced. In reality, the effects of CO2 cross borders and are global in nature, but the distribution of the costs throughout the world is not known.<sup>17</sup>

Norway had the highest social cost associated to greenhouse gasses in 2007, \$2,525 (2000 US dollars) per capita (Table 16). The second highest social cost belonged of \$1,858 per capita to Netherlands. The country with the lowest total in 2007, Spain, had greenhouse gas costs of \$1,442 per capita. In general, greenhouse gas costs made almost no impact on the total stock of wealth per capita, their negative contribution between 0.91 per cent (for the United States) and 1.1 per cent (for Sweden). On the other hand, greenhouse gas costs are only a small part of the total environmental costs that every country faces (such as water pollution, other forms of air pollution, nuclear pollution etc.), which are likely to have a much greater negative effect on total wealth stocks.

Over the 1980-2007 period, greenhouse gas emissions, and therefore the social costs associate with greenhouse gasses, increased in all fourteen countries. Norway experienced the largest growth, with costs increasing by 1.08 per cent per year over the

during the 1980s to a mere 0.47 per cent per year during the 1990s. Eight out of the fourteen countries studied experienced declines in their growth rates. On the other hand, the human capital growth of Norway and Germany both accelerated significantly, more than doubling in each case. Between 2000 and 2007, the growth of human capital in most countries declined again, as most countries experienced minute growth of less than 1 per cent per year. Human capital in Germany actually declined over the period by 0.46 per cent. One of the few notable exceptions was Denmark, where human capital was growing by an annual average 2.36 per cent.

<sup>&</sup>lt;sup>16</sup> See Sharpe, Arsenault, Murray, and Qiao (2008) for a detailed discussion of the appropriate assumptions regarding the social cost of CO@ emissions in the context of the valuation of the oil sands.

<sup>&</sup>lt;sup>17</sup> In the paper on the Index of Economic Well-being in OECD countries (Osberg and Sharpe, 2002), this latter approach was taken, with the total costs of CO2 emissions calculated for the world based on world CO2 emissions and these costs distributed in proportion to a country's share of world GDP.

period. France experienced the lowest growth in cost, with growth of 0.20 per cent per year.<sup>18</sup>



#### **Trends in the Economic Equality Domain**

The third dimension of the Index of Economic Well-being is economic equality. At current levels, a fall in equality, or rise in inequality, is considered to decrease economic well-being and vice versa. The equality domain consists of two components – an income distribution variable and a poverty variable for the overall population. The former is defined as the Gini coefficient, and the latter the rate of poverty intensity, which

<sup>&</sup>lt;sup>18</sup> Observing the sub-periods of 1980-1990 and 1990-2000, it is possible to see that the growth of greenhouse gas varied considerably. Five of the countries, including Canada and Finland, went from positive growth rates in the 1980s to negative rates in the 1990s. On the other hand, in five other countries, including Australia and the Netherlands, the growth rate increased in the 1990s from the 1980s. In the post-2000 period, the growth of greenhouse gas costs accelerated for most countries. The exceptions were Norway and the Netherlands, which both experienced decreases in the growth of social costs.

is the product of the poverty rate and the poverty gap. Poverty is defined in a relative sense as the proportion of households with less than one half median equivalent after-tax income. High poverty intensity is considered more detrimental to economic well-being than a skewed income distribution. Consequently, poverty intensity is given a weight of three quarters, and income distribution a weight of one quarter, in the determination of the overall index for the equality domain.

In 2007, the Gini coefficient, based on after-tax income, was greatest for the United States at 0.372 and followed by the United Kingdom and Spain at 0.345 and 0.336, respectively (Table 17). The Scandinavian social-democracies had the smallest income gaps between the rich and the poor, Denmark with a Gini coefficient of 0.229, followed by Netherlands with a coefficient of 0.231. Sweden and Finland were third and fourth with coefficients of 0.237 and 0.252, respectively.<sup>19</sup> Over the 1980-2007 period, only two countries managed to narrow their income gaps significantly, the Netherlands and Denmark. The Gini coefficient of the Netherlands declined by 0.029 percentage points, a total decrease of 11.2 per cent, and that of the Denmark declined by 0.026 percentage points (10.1 per cent overall) (Chart 11). The UK experienced the greatest increase in the income gap, with its Gini coefficient growing by 0.07 percentage points, 25.5 per cent.<sup>20</sup>

<sup>&</sup>lt;sup>19</sup> It is important to mention that 2007 Gini coefficient values for all countries equal their Gini coefficient values from 2000, due to the lack of more recent data.

<sup>&</sup>lt;sup>20</sup> Between 1980 and 1990, five countries experienced declining income gaps, led by Spain where the Gini coefficient declined by 0.013 percentage points. Much of this progress was reversed in the 1990s, as only Denmark, the Netherlands and France continued to show improvement in their Gini coefficients. Spain moved from its improvement in the 1980s to a 0.036 percentage point increase, its income gap widening. Italy also had a similar experience, moving from a 0.004 percentage point decline to a 0.043 percentage point growth.



The United States had the highest poverty rate in 2007, with 17.3 per cent of the total population defined as poor (Table 18). Spain and Canada followed, with poverty rates of 14.2 and 13.0 per cent, respectively. Considering the fact that the United States had the highest per capita income and consumption flows, its high poverty rate has to be attributed to very unequal distribution of income (as reflected through its Gini coefficient). This is supported by the fact that the Scandinavian countries which had the lowest Gini coefficient values also had the lowest poverty rates, 10 per cent lower than the poverty rate of the United States. The lowest poverty rates belonged to Finland, Denmark and Sweden, which all had rates of 5.6 per cent.

Over the 1980-2007 period, all countries but one experienced growing poverty rates; Denmark's poverty rate declined by 4.5 percentage points (or 44.7 per cent). However, the Netherlands and Belgium led the vast majority of countries increasing 3.4 and 3.64 percentage points, or 87.9 and 81.5 per cent over the period, respectively. As the poverty rate depends not only on the distribution of income but also on economic growth which increases income, the growth of poverty rates over the sub-periods greatly varied with the changing economic conditions in the countries.<sup>21</sup>

<sup>&</sup>lt;sup>21</sup> From 1980 to 1990, Spain experienced the greatest decline in the poverty rate, 1.88 percentage points. Three other countries also experienced negative poverty rate growth. On the other end, the UK experienced a considerable increase of 2.91 percentage points. Overall, the situation improved somewhat from 1990 to 2000 as six countries of the fourteen studied experienced declining poverty rates. These countries included the US, which, perhaps due to improved economic growth in the 1990s, saw it poverty rates decline by 1.04

The poverty gap is defined as the shortfall, in percentage terms, between the poverty line and the average income of those below the poverty line. In 2007, the poverty gap ratio was greatest in the Netherlands, at 40.0 per cent (Table 19). The United States followed with a poverty gap of 35.5 per cent. The smallest poverty gaps were in France and Belgium, at 24.1 per cent and 24.4 per cent, respectively. Changes in the poverty gap between 1980 and 2007 show that all but six countries experienced improvements in their poverty gaps. The greatest increase was experienced by Finland, where the poverty gap grew by 7.49 percentage points, or 30.1 per cent, over the period. The greatest improvement was experienced by Norway, the poverty gap of which declined by 14.2 percentage points, or 30.8 per cent. France's poverty gap also decreased impressively with negative growth of 31.5 per cent resulting from a decline of 11.1 percentage points.<sup>22</sup>

Poverty intensity is defined as the product of the poverty gap and the poverty rate (also multiplied by a constant). Due to its extremely high poverty rate, and its moderately high poverty gap, the US had the highest poverty intensity in 2007, 0.061 points (Table 20). Among the countries with the lowest in poverty gap and poverty rate, Sweden had the lowest poverty intensity of 0.016 points.

The trend of poverty intensity for the 1980-2007 period was the sum of the two trends of the constituent parts. Due to the considerable fall in its poverty gap, Denmark's poverty intensity also declined, by 0.016 points, or 46.6 per cent (Chart 12). On the other end, due to its considerable increase in both the poverty rate and the poverty gap, the Italy's poverty intensity grew by 0.014 points, 50.4 per cent. Again, much like in the cases of its constituent variables, the decomposition of poverty intensity into sub-periods does not show unified trends across countries. The only pattern which does emerge shows a considerable number of countries switching from positive to negative growth between the periods, or vice versa. This was likely due to the strong effect of the economic cycle on the poverty gap and the poverty rate, which would also cause the poverty intensity to rise or decline in poverty intensity between 1980 and 1990, to a 28.8 per cent increase in poverty intensity between 1990 and 2000. In an opposite way, Sweden moves from a 47.6 per cent increase in poverty intensity during the 1980s, to a 26.6 per cent decrease over the 1990s.

percentage points. However, alongside those improvements, European countries such as Belgium, Germany, Italy and Spain experienced positive growth of over 2 percentage points in their poverty rates.

<sup>&</sup>lt;sup>22</sup> From 1980 to 1990, Norway experienced the greatest decline of 22.28 percentage points. The Netherlands experienced the greatest growth, 10.39 percentage points. Between the 1980s and the 1990s, the poverty rate growth trends of most countries were reversed. The Netherlands moved from a poverty gap increase of 10.39 percentage points during the 1980s, to a substantial drop of 12.57 percentage points from 1990 to 2000. In a similar manner, Italy switched from a decline of 2.16 percentage points during the 1980-1990 period, to a positive poverty gap growth of 10.25 percentage points over the 1990s.



#### **Economic Security Domain**

The economic security domain is the most complex domain of the Index of Economic Well-being and the methodologies used in its construction have evolved since the Index was first released in 1998. The domain consists of four components called risks to economic well-being facing the population, namely the risk imposed by unemployment, the financial risk from illness, the risk from single parent poverty, and the risk of poverty in old age. Three of these components are in turn composed of more than one variable.

#### Risk from Unemployment

Risk imposed by unemployment is determined by two variables: the unemployment rate and the proportion of earnings that are replaced by unemployment benefits. Each of these measures are scaled, and then weighted with 0.8 and 0.2 weights respectively. The sum of these weighted values is the unemployment component of the security index.

In 2007, the lowest unemployment rate was in Norway, where 2.53 per cent of the labour force was unemployed (Table 21). Norway was followed by the Netherlands and

Denmark, which had unemployment rates of 3.18 and 4.01, respectively. Germany had the highest unemployment rate of 8.69 per cent.

Over the 1980-2007 period, the unemployment rate decreased most significantly for the UK and Denmark. In the UK, the unemployment rate fell by 12.2 percentage points, or 70 per cent, while in Denmark the unemployment rate fell by a slightly lower 8.4 percentage points, or 67.8 per cent. The two countries to experience the greatest increase in their unemployment rates were Germany and Sweden. Germany experienced positive growth of 5.5 percentage points, or 173.4 per cent, while Sweden increased by 3.9 percentage points, or 176.7 per cent.<sup>23</sup>

The proportion of income replaced by unemployment benefits was greatest in the Denmark in 2007, at 48.9 per cent (Table 22). Denmark was closely followed by Belgium, which had a replacement rate of 40.9 per cent. The United States had the lowest replacement rate of 13.5 per cent, roughly one quarter of the Denmark's rate.

Over the 1980-2007 period, the replacement rates of over half of the countries increased. The greatest positive growth was experienced by Italy, where the replacement rate grew by 31.7 percentage points from an insignificant 0.8 per cent in 1980 to 32.5 per cent in 2007 (an increase of almost 4,000 per cent) (Chart 13). The greatest decline in relative terms occurred in the United Kingdom, where the replacement rate declined by 11.7 percentage points, a negative growth of 48.7 per cent.<sup>24</sup> The greatest decline in percentage points occurred in the Netherlands, a 12.4 point drop.

<sup>&</sup>lt;sup>23</sup> The UK experienced the greatest unemployment rate drop from 1980-1990, decreasing by 10.3 percentage points. The most significant positive growth was a 5.8 percentage points for Spain. In the 1990-2000 period, the Netherlands experienced the biggest drop in unemployment rate of 3.9 percentage points, while Finland experienced the biggest unemployment rate increase at 7.1 percentage points. During this period, the number of countries experiencing declines increased, while the magnitude did not change across the board. During the 2000-2007 period, the unemployment rates of most countries declined or grew slower than in previous periods..

<sup>&</sup>lt;sup>24</sup> After looking at the sub-periods of 1980-1990 and 1990-2000, it is possible to see that there was a considerable change in the growth patterns of the replacement rates between the two periods. For many countries, positive growth of the replacement rate during the 1980s was either reversed or reduced in the following period. For example, Finland's growth of 8.8 percentage points from 1980 to 1990 changed into a decline of 2.3 percentage points over the next decade. However, some of countries experienced the opposite. Most of Italy's overall growth, 31.7 percentage points, occurred during the 1990s. Likewise, Denmark switched from a replacement rate decline of 0.5 percentage points over the 1980s to a 9.4 percentage point growth over the 1990s. Between 2000 and 2007 the negative overall growth trend continued, with Italy moving from its incredible increase over the previous period to a 1.8 percentage point decline. Norway experienced a similar movement, switching from a rise of 2.5 percentage points during the 1990s to a 8.5 percentage point drop over the subsequent period.



In order to obtain the measures of scaled unemployment protection, the replacement rates and the unemployment rates of all countries are scaled, then multiplied by 0.2 and 0.8 respectively, and finally summed together. Due to the fact that it had a high replacement rate and a lowest unemployment rate, Norway had the highest scaled level of protection from unemployment in 2007, 0.808 points (Table 23). On the opposite end, mostly due to its high unemployment rate, Germany had the lowest scaled level of protection from unemployment, 0.599 points.

Between 1980 and 2007, the scaled unemployment protection index fell for several countries. Germany experienced the greatest decline, 0.179 percentage points, or 23.0 per cent. The UK, on the other hand, saw its index grow by .335 percentage points, or 99.9 per cent. The growth pattern of the index over the sub-periods also very closely followed the growth of the unemployment rate. The UK experienced the most significant increase from 1980-1990, 0.303 percentage points, or 90.3 per cent. On the other hand, Spain experienced a significant decline of 23.1 per cent in its index level. Over the next period, 1990-2000, index growth varied from positive to negative changes compared the previous period. This pattern continued over the 2000-2007 period, when the Spain saw the greatest improvement of 0.165 percentage points.

Financial Risk from Illness

The second component of the economic security domain is the financial risk imposed by illness. In some countries such as Canada, health care deemed medically necessary by hospitals and doctors' offices is provided free of charge to all citizens through public medicare programs. In this sense the financial risk imposed by illness is much less than in countries without such universal coverage, like the United States. But there is still significant private expenditure on health care in public medicare countries, and these expenditures have been rising rapidly. Included are spending for dental care, drugs taken outside hospitals, unlisted medical services such as acupuncture, and delisted medical services (physiotherapy and vision care are examples of various medical services that have been recently delisted). Also included are procedures considered socially desirable though medically unnecessary, such as plastic surgery. An increase in the share of expenditures on healthcare of personal disposable income will be considered as deterioration in economic security, as increased private health expenditures are usually brought about by poor health and thus represent a growing financial burden for low income persons.

In 2007, the highest share of private expenditure on healthcare in personal disposable income was 9.70 per cent in the United States, giving it the smallest scaled protection from illness value of 0.0833 percentage points (Tables 24 and 25). The United States, being one of the only countries without a comprehensive universal medical coverage program, was greatly ahead of all other studied countries in terms of private expenditures on healthcare. The United Kingdom had the lowest medical expenses as a share of personal disposable income, 1.17 per cent, giving it a scaled index value of 0.8760 percentage points.

From 1980 to 2007, the share of medical expenses in personal disposable income grew for all countries but one, Norway. There, the share declined by 0.12 percentage points, or 7.3 per cent (Chart 14). In absolute terms, the share of the US increased the most, growing by 3.96 percentage points, or 69.0 per cent (leading to an 81.5 per cent decline in its scaled security from illness index). However, in relative terms this was not the greatest growth, as Spain's 2.68 percentage point increase represented growth of 168.7 per cent.<sup>25</sup>

<sup>&</sup>lt;sup>25</sup> Observing the sub-periods, the positive growth in medical expenses as a share of personal disposable income was higher in the 1980-1990 for some countries and higher in 1990-2000 for others. In relative terms, the UK had the highest growth in the first period, with a 0.45 percentage point, or 61.60 per cent, increase. Nevertheless, in terms of the scaled index, the US still experienced the greatest growth, by 39.01 per cent. It is worth noting that this is the only period throughout which the US does not have the greatest relative decline in its scaled security from illness index. The period of 1990-2000 saw the largest growth rate over the period at 54.4 per cent for Spain, only three other countries experienced relative increases of over 30 per cent. From 2000 to 2007, the highest relative growth over the period belonged to Belgium at 49.9 per cent. The scaled US index declined the most again, this time by 60.67 per cent.



#### **Risk from Single-Parent Poverty**

The third component of the economic security domain is the risk of single parent poverty. This component consists of three variables – the divorce rate (as divorce throws many women into poverty), the poverty rate for lone female-headed families and the poverty gap for these families. The latter two variables, when combined, give the poverty intensity for lone female-headed families. Poverty is defined as it was for all households under the equality domain – in relative terms, as the proportion of households below one half of the median income.

In 2007, the United States had the highest divorce rate for married couple (calculated as the incidence of divorce per 1,000 inhabitants), 4.19 per cent (Table 26). The UK followed the US with a divorce rate of 2.8 per cent. The lowest divorce rate was in Italy (perhaps due to more traditional or religious values), 0.8 per cent, less than one fifth of the US rate. Over the 1980-2007 period, divorce rates grew for all countries except for five of the countries. In Canada, which had one of the largest rates in 1980, the rate declined 21.7 per cent, the largest relative decline, over the period. The US experienced the largest decline in percentage points, at 1.03, or 19.7 per cent. Out of the countries which experienced positive divorce rate growth, Belgium's rate increased the most in absolute terms, 1.29 percentage points, or 87.0 per cent. In relative terms, Italy's

divorce rate grew by over 280 per cent, resulting from a 0.59 percentage point increase.<sup>26</sup> The poverty rate for single women with children under 18 in 2007 was greatest for the United States at 43.7 per cent (Table 27). Much like the general poverty rate, the poverty rate for single women with children was lowest for the three countries of Denmark, Sweden and Finland at 7.4, 9.7 and 11.5 per cent, respectively.

Unfortunately, the poverty rates for single women with children under 18 increased for 9 of the 14 countries studied increased over the 1980-2007 period. The greatest growth was experienced by Germany, where the poverty rate increased by an amazing 29.2 percentage points, from 5.7 per cent in 1980 to 34.9 per cent in 2007 – growth of over 500 per cent. The Netherlands also experienced significant growth here. Out of the countries which experienced negative growth, Australia declined the most, both in absolute terms and relative terms, its poverty rate falling by 12.0 percentage points (27.4 per cent). Between 1980 and 1990, the greatest increase in the poverty rate was experienced by Germany, its poverty rate growing by 18.4 percentage points. During the same period, the poverty rate of Belgium declined the most, falling by 10.4 percentage points. The situation remained similar in the 1990-2000 period, as five countries experienced declining poverty rates (as with the previous period), led by Australia with a fall of 15.7 percentage points (about 32.5 per cent) and Norway with a fall of 9.9 percentage points (49.4 per cent). Out of the countries where the poverty rate increased, Belgium experienced the sharpest rise of 19.4 percentage points.

The 2007 poverty gap for female headed families with children under 18 was greatest in Italy, at 47.5 per cent (Table 28). The lowest poverty gap was in France, where it was only 17.5 per cent. Over the 1980-2007 period, France experienced the most significant decline of 23.1 percentage point, leading to a total 57.0 per cent decrease in its poverty gap (Chart 15). Out of the five countries that experienced positive growth in their poverty gaps, Germany grew by the most, 11.9 percentage points, or 58.5 per cent.<sup>27</sup>

<sup>&</sup>lt;sup>26</sup> From 1980 to 1990, the greatest relative growth in the divorce rate was also experienced by Italy at 119.1 per cent, while the greatest decline was experienced by the United States at 8.8 per cent. During the 1990s, one development in terms of divorce rate trends has been the declining rate among some countries with positive growth rates in the 1980s. Falling divorce rates may reflect the aging population, as the incidence of divorce declines after a certain number of years of marriage. Divorce rates in Canada, Norway, Denmark and the UK moved from positive to negative growth, while the rates of several other countries decelerated. On the other hand, however, Australia's, Belgium's and Sweden's rates moved from negative to positive growth. The final period of 2000-2007 showed very similar variety to the previous periods, with the divorce rates in some countries accelerating, while those in others decelerating. The greatest change was a 73.1 per cent (0.71 percentage point) increase in the divorce rate of Spain.

<sup>&</sup>lt;sup>27</sup> The majority of France's significant decline occurred from 1980 to 1990, when its poverty gap was reduced by 18.7 percentage points. Over the same period, the most significant absolute growth was experienced by the Netherlands, with an increase of 8.2 percentage points in its poverty gap. During the next period of 1990-2000, most of the countries experienced downward trends in their poverty gaps as compared to the previous period. In particular, France moved from a growing gap of 5.3 percentage points in the 1980s to a decline of 7.9 percentage points. On the other hand, Norway moved from a decline of 14.0 percentage points during the 1980s to a 11.9 percentage point rise during the 1990s, showing the opposite trend.



The overall measure of the risk imposed by single parent poverty is calculated as the product of the divorce rate, the poverty rate for lone female families and the poverty gap for single female families. That measure is then converted into a scaled index. Denmark, probably due to its very low poverty rate, was the country where single parents were safest from poverty in 2007, with a scaled index value of 0.897 points (Table 29). The United States had the lowest scaled index value, at 0.333 points, meaning that it was the country with the least economic security for single parent families. Despite having the lowest index level for 2007, the US showed the most improvement, in relative terms, over the entire 1980-2007 period, its index growing by 0.134 percentage points, or 66.9 per cent. Australia experienced the greatest absolute improvement of .171 percentage points. Germany experienced the greatest decline over the period, its index value dropping by 0.185 percentage points, leading to an overall decrease of 20.2 per cent.<sup>28</sup>

<sup>&</sup>lt;sup>28</sup> In contrast with the overall period, from 1980 to 1990, the United States experienced a major decline of 0.066 percentage points (or 32.8 per cent), the largest relative increase, in its index. The most positive development during the 1980s was an 8.8 per cent (0.068 percentage point) increase in the index value of France. The US made all of its progress, in terms of the security from single parent poverty, from 1990 to 2000. During that period, the US index grew by 133.8 per cent, as a result of a 0.211 percentage point increase. In comparison, the greatest negative development over the period was a 0.113 percentage point (13.4 per cent) decline in the scaled index value of Germany. In many cases, the rate changed from positive to negative growth (although the changes were often small), and vice versa, over the period 2000-2007. The

The fourth component of the economic security domain is the risk of poverty in old age. This component is proxied by the poverty intensity experienced by the households headed by a person 65 and over.

In 2007, the elderly poverty rate was greatest in the United States, at 24.6 per cent (Table 30). The lowest elderly poverty rate was 3.2 per cent for the Netherlands. Over the 1980-2007 period, five of the selected fourteen countries experienced increasing elderly poverty rates. In absolute terms they were led by Belgium, the poverty rate of which grew by 4.51 percentage points (41.4 per cent). In relative terms, their leader was Sweden, which grew by 75.8 per cent (as a result of an increase of 2.85 percentage points). Denmark and Canada had the largest improvements, with negative growth of 23.04 and 15.75 percentage points (or 73.1 and 71.4 per cent), respectively.<sup>29</sup>

The elderly poverty gap ratio was highest in the Netherlands in 2007, 42.04 per cent (Table 31). The United States followed the Netherlands with a poverty gap ratio of 29.02 per cent. The lowest ratio, 10.47 per cent, belonged to Norway. In terms of changes in the poverty gap over the 1980-2007 period, the greatest absolute increase of 14.68 percentage points was experienced by France (equal to a relative growth of 167.1 per cent) (Chart 16). Of the nine countries that experienced negative growth in the elderly poverty gap, Norway declined most significantly by 23.00 percentage points, or 68.7 per cent.<sup>30</sup>

most positive development was a 2.5 per cent growth in the Australia's index, while a 14.3 per cent decline in the United States' index was the most negative development.

<sup>&</sup>lt;sup>29</sup> Improvements in the elderly poverty rate appeared to be significant in the 1980-1990 period, when both Denmark and Canada experienced most of their negative growth, with respective drops of 10.79 and 14.15 percentage points. At the same time, Norway experienced the greatest increase in its poverty rate, 9.21 percentage points (123.00 per cent), although it is important to mention that, during that period, there was no other country where the elderly poverty rate grew by more than 3.5 percentage points. That situation changed during the following 1990-2000 period, when the improvements of many countries (including Canada and Denmark) decelerated, while accelerating in others. The largest positive growth of the poverty rate belonged to Spain at 9.27 percentage points (82.0 per cent), while the largest negative growth occurred in Finland at 5.58 percentage points (41.7 percent).



The overall component of the risk of poverty in old age, the poverty intensity, was calculated as the product of the poverty gap and the poverty rate, and then converted into a scaled index of safety from old age poverty. The United States were least secure from poverty due to old age in 2007, with the lowest scaled index level of 0.266 (Table 32). The country with the greatest security from elderly poverty was Norway, which had a scaled index level of 0.837. Australia was the country that experienced the sharpest drop in its index during the 1980-2004 period, losing 20.3 per cent of its 1980 index level, or 0.121 percentage points. Most likely due to their declining poverty rates, Denmark and Canada experienced the most significant improvements in the overall security from poverty due to old age indexes, which grew by 0.385 and 0.292 points (91.1 and 54.5 per cent), respectively.<sup>31</sup>

<sup>&</sup>lt;sup>31</sup> Again, much like in the case of its components, some of the improvements in the scaled index occurred during the 1980-1990 period were later undone or diminished during the 1990-2000 period. Specifically, the overall growth rate in five of the six countries which experienced growth in their scaled index levels over the 1980s was over 10 per cent. They were led by the US, which grew by 69.8 per cent (0.139 percentage points). The highest relative growth rate during the 1990s was almost 300 per cent increase for the UK (1.86 percentage points). Most of Australia's decline in the economic security of the elderly occurred during the first sub-period, with a fall of 0.054 percentage points (9.02 per cent).

## Aggregation of the Components of Economic Security into Overall Economic Security Domain Index

The scaled values of the four components of the economic security domain are aggregated to obtain an overall scaled index for the domain. The weights used for this aggregation procedure are constructed from the relative sizes of the populations subject to each risk.

In terms of the risk of unemployment, it is assumed that the entire population aged 15 to 64 years is subject to this risk. In 2007, this ranged between 63 per cent in France, to 68 per cent in Canada (Table 33). 100 per cent of the population is assumed to be subject to financial risk associated with illness. In terms of the risk of single parent poverty, it is proxied by the share of women with children at risk of widowhood. As a proportion of the population, this group ranged from 28.4 per cent in Spain to 39.3 per cent in the US, in 2007. Population aged 45 to 64 was assumed to be most at risk from poverty in old age. In 2004, it constituted between 24.0 per cent of total population in Spain, and 28.4 per cent of the population in Finland. The component specific weights are generated by adding up all the proportions of the population subject to the four risks, and then standardizing to unity by dividing each proportion of the population affected by the risk by the total.

As a result of demographic shifts, the proportion of the population affected by various risks changed over time. With the aging of the population, the proportion of the population aged 15-64 and the proportion of the population aged 45-64 increased for almost all countries, while the proportion of married women with children under 18 declined over the 1980-2007 period.

The contribution of each component to the security domain index is the product of its scaled value and weight. For example, for Canada in 2007, the weighted scaled security from risk imposed by unemployment was 0.193 (0.647\*0.298), the weighted scaled security from risk imposed by illness was 0.287 (0.65\*0.438), risk of single parent poverty was 0.105 (0.720\*0.146) and risk of poverty from old age was 0.097 (0.827\*0.117). The sum of the four components was 0.682, the index value of the overall security domain for Canada in 2007.

As the consumption flows domain and the stock of wealth domain increased for all countries, the growth of overall economic well-being was therefore dampened by the economic security and equality domains. This was mainly due to changes such as the general increase in the poverty rate, the growth of inequality in income distribution, and the increased share of private disposable income going to healthcare related expenses. Whether the methodology and assumptions embedded in the Index that give this result overestimate the contribution of certain components (such as the financial risk of illness) over others is a topic for additional research.

### Lessons Learned in the Development of the Index of Economic Well-being

The authors of this paper, through the Centre for the Study of Living Standards, have been engaged in the development of the Index of Economic Well-being for nearly a decade. This section of the paper briefly highlights what the authors believe are three of the lessons learned from this experience.

#### **Composite Indicators Focus Debate**

The Index of Economic Well-being, like the well-known Human Development Index developed by the United Nations Development Program, is a composite indicator that produces a single number as a bottom line. There is a major division among social scientists about the merits of composite indicators. One side is critical because of the nature of composite index construction, particularly the weighting issues. The other side sees great value in composite indicators as a heuristic tool.

Our experience resonates with the second perspective. We readily admit that composite indicators involve assumptions such as subjective weighting schemes and that in most cases it would not be appropriate for official statistical agencies to produce composite indicators. But composite indicators can be extremely useful in focusing the attention of both research and policy communities, as well as the media and the general public, on a particular trend or variable that is driving the composite index. This attention can lead to actions, such as research aimed at understanding the trend identified, policy changes to rectify an unacceptable situation, or the allocation of resources to fill data gaps identified by the composite indicator. Examples of composite indicators that have successfully fostered public debate include the already mentioned HDI and *MacLean's* composite ranking of Canadian universities. The Canadian Council on Learning recently released a composite indicator on learning and the motivation of this initiative was explicitly stated as to foster debate about what constitutes lifetime learning in Canada.

#### Sensitivity of Composite Indicators to Methodological Choices

Many different methodologies can be used in the construction of a composite index and the results are very dependent on the choice of methodology. There is no one methodology that is appropriate for all situations. Experts disagree of the best way to deal with many thorny index construction issues.

A situation where composite indexes are highly sensitive to methodological choices can be potentially abused. Unscrupulous composite index constructors can in principle choose the methodology that gives them the results they seek. Such a danger requires a high degree of transparency in index construction (straightforward methodologies are preferable a priori to complicated methodologies, everything else being equal). In addition, it is very important that composite index developers provide clear rationales for their choice of one methodology over competing methodologies.

#### The Importance of Testing Results to Different Weighting Schemes

As noted earlier in the paper, weighting schemes for composite indexes are very controversial. The ideal way to approach weighting is to undertake a large survey of the population to obtain consistent preferences on all variables in the composite index. Such an undertaking is beyond the means of almost all composite index developers.

Our experience is that the most effective and realistic manner to deal with this issue is to give equal weight to the main components of the composite index and to then to undertake sensitivity analysis to ascertain how sensitive the overall trends of the index are to a range of weights. In some cases, the path of a composite index is robust to any set of weights while in others the path varies significantly with the set of weights chosen.

We have posted the time series estimates of the four domains of the Index of Economic Well-being in an Excel file on the CSLS website. A visitor to the website can choose any set of weights for the four domains he wishes and then see the path of the overall Index that his set of weights generates. We believe that such testing of the results to different weighting schemes is an essential element of the transparency of any composite index construction exercise.

### Conclusion

This paper has presented new estimates of the Index of Economic Well-being for selected OECD countries for the 1980-2007 period based on what we believe are methodological improvement to the Index over earlier versions. The main methodological change has been the adoption of a linear scaling procedure. The Index is of course a work in progress and will undoubtedly undergo further changes as our thinking evolves.

The results show that since 1980, the economic well-being in OECD countries has improved considerably, driven by greater consumption and stocks of wealth. But falling equality, related to increased income inequality, and declining economic security, driven by increased private expenditures on health care, have somewhat dampened this upward progress in economic well-being.

### References

Osberg, Lars (1985) "The Measurement on Economic Well-being," in David Laidler (ed.) *Approaches to Economic Well-being*, Volume 36, MacDonald Commission (Toronto: University of Toronto Press).

Osberg, Lars and Andrew Sharpe (1998) "An Index of Economic Well-being for Canada," Research Report, Applied Research Branch, Human Resources Development Canada, December.

Osberg, Lars and Andrew Sharpe (2002) "An Index of Economic Well-being for Selected OECD Countries," *Review of Income and Wealth*, 48 (3), September, pp. 291-316.

Osberg, Lars and Andrew Sharpe (2005) "How Should We Measure the "Economic" Aspects of Well-being," *Review of Income and Wealth*, 51 (2) June, pp. 311-336.

Sharpe, Andrew and Julia Salzman (2003)"Methodological Choices Encountered in the Construction of Composite Indicators," paper presented to the annual meeting of the Canadian Economics Association, Carleton University, Ottawa, Ontario May.

Sharpe, Andrew, jean-Francois Arsenault, Alexander Murray and Sharon Qiao (2008) "The Valuation of the Alberta Oil Sands" CSLS Research Report No. 2008-7, November.