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MOVING FROM A GDP-BASED TO A WELL-BEING BASED METRIC
OF ECONOMIC PERFORMANCE AND SOCIAL PROGRESS : RESULTS
FROM THE INDEX OF ECONOMIC WELL-BEING FOR OECD
COUNTRIES, 1980-2009

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Moving from a GDP-based to a Well-being-based Metric of Economic Performance and Social Progress: Results from the Index of Economic Well-being for OECD Countries, 1980-2009

Abstract

Initiated by French President Nicolas Sarkozy and chaired by Nobel Prize-winning economists Joseph Stiglitz and Amartya Sen and by Jean-Paul Fitoussi, the Commission on the Measurement of Economic Performance and Social Progress delivered its final report in September 2009 (Stiglitz, Sen and Fitoussi, 2009). Its key message was that in an increasingly performance-oriented society, metrics matter. What we measure affects what we do. If we have the wrong metrics, we will strive for the wrong things. In the quest to increase GDP, we may end up with a society in which citizens are worse off.

The principles expressed by the Stiglitz report are remarkably similar to those underlying the Index of Economic Well-being (IEWB), a composite index developed in the late 1990s by Lars Osberg and Andrew Sharpe, published in the *Review of Income of Wealth* in 2002 and 2005 (Osberg and Sharpe, 2002 and 2005) and recently updated (Osberg and Sharpe, 2009a and 2009b). The salient feature of this index is that it organized the economic well-being domain into four dimensions: consumption flows, stocks of wealth, equality, and economic security.

The objective of this paper is to present new estimates of the Index of Economic Well-being and its components for the 1980-2009 period for 14 OECD countries. The paper discusses the factors behind trends in the Index, with a particular emphasis on the impact of the economic crisis on economic well-being. The paper also highlights the commonality between the recommendations of the Stiglitz report and the IEWB.

Moving from a GDP-based to a Well-being-based Metric of Economic Performance and Social Progress: Results from the Index of Economic Well-being for OECD Countries, 1980-2009

Executive Summary

In 1998, the Centre for the Study of Living Standards (CSLS) released the first estimates of the Index of Economic Well-being for Canada (Osberg and Sharpe, 1998). The Index of Economic Well-being (IEWB) is a composite index based on a conceptual framework for measuring economic well-being developed by Osberg (1985). Over 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.

This report has two main objectives. The first is to outline the methodology underlying the IEWB, with emphasis on improvements since 1998. The second is to present updated estimates of the IEWB for selected OECD countries over the 1980-2009 period. The report also discusses trends in the four domains of economic well-being that make up the Index – current consumption, wealth, economic equality, and economic security – as well as an analysis of the sensitivity of our results to the subjective choice of weights assigned to those four domains.

The Index of Economic Well-being: Motivation and Conceptual Framework

The conceptual framework underlying the Index of Economic Well-being is based on two main ideas. First, economic well-being has multiple dimensions and an index should reflect that fact by aggregating measures of the various domains of economic well-being. Second, an index of economic well-being should facilitate public policy discussion by aggregating across the domains of economic well-being in a way that respects the diversity of individual values. Individuals differ (and have a moral right to differ) in the relative weights they assign to different dimensions of economic welfare, and an index should be useful to all individuals irrespective of those value differences.

The most frequently cited indicator of economic well-being is per-capita GDP. GDP measurement is essential for many important public policy purposes such as macroeconomic demand management and public finance. However, GDP accounting omits consideration of many issues – leisure time, longevity of life, depletion or accumulation of asset stocks, income inequality, economic security, etc. – that are

important to individuals' economic welfare. Implicitly, per-capita GDP assigns zero weight to these dimensions of well-being. It assumes that these issues do not matter.

In accordance with the conceptual framework developed by Osberg (1985), the IEWB is a composite index comprised of four domains of economic welfare:

- **Per-capita consumption**
- **Per-capita wealth**
- **Economic equality**
- **Economic security.**

These four domains reflect economic well-being in both the *present* and the *future*, and account for both *average* access to economic resources and the *distribution* of that access among members of society. In basing the IEWB on data that reflect each of these domains, we are constructing an index that captures the multiplicity of dimensions of economic well-being.

We recognize that there are many non-economic aspects of human welfare. In focusing on *economic* well-being, we do not mean to downgrade their importance. 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.

Indices of economic and social well-being are constructed because societies have to make public policy choices and the members of a society are therefore, from time to time, faced with questions of the form: Would public policy X make ‘society’ better off? Since some policies may favour one dimension of well-being over another, to answer this class of question citizens need a way of ‘adding it all up’ – a way of coming to a summative judgment about impacts across the different, conceptually dissimilar domains of economic welfare. One of the aims of index construction is therefore to facilitate public policy discussion by providing a transparent means of aggregating across different dimensions of well-being.

‘Adding up’ across the domains of well-being necessarily requires an explicit or implicit value judgment about the relative importance of the domains. Since individuals have morally legitimate differences in their values, there can be no single, objectively correct way of aggregating across the domains of well-being. We argue that most indices of economic well-being (such as per-capita GDP) make important value judgments, but they do so implicitly rather than explicitly.

The IEWB addresses this issue by making value judgments as explicit and transparent as possible. Our hypothesis is that indices of societal 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 potential differences in values. In constructing the IEWB, individuals can select weights

for the four domains in accordance with their own values. The IEWB is therefore capable of facilitating summative judgments and of clarifying why such judgments may sometimes diverge. If disagreement about policy decisions occurs, it is useful to know whether such disagreement comes from differing empirical assessment of objective data or differing values about their relative importance.

Thus, the IEWB achieves its two major aims: to aggregate across different dimensions of economic well-being, and to allow for such aggregation even in the presence of morally legitimate value differences.

Methodological Developments in the IEWB

In past papers, we have described the details of the construction of the IEWB (Osberg and Sharpe, 1998, 2002a, 2005). Interested readers may consult those references. In this section, we describe only the significant methodological improvements that the IEWB has undergone since its initial publication in 1998. The following is an outline of the three major changes:

- **A linear scaling technique was introduced.** The linear scaling technique is a method of standardizing the ranges of different variables so that they all take values between zero and one. This serves two purposes. First, it prevents the IEWB from being dominated by a few underlying variables that take on very large range of values. Second, it standardizes variables in such a way that an increase is always good for economic well-being and a decrease is always bad. We note that the values of a scaled variable are always sensitive to the range of values that the scale assumes. The linear scaling technique presumes that the observed range of any variable is a reasonable starting point for the feasible range that can be taken by the variable, and this makes it sensitive to that observed range.
- **The risk of unemployment component of the IEWB was reconceptualized.** In measuring the risk from unemployment, early versions of the IEWB used an expected financial value approach that implicitly gave equal weight to changes in the unemployment rate and changes in the financial protection that Unemployment Insurance provides to the unemployed (Osberg and Sharpe, 1998). Based on recent evidence on the disutility of being unemployed relative to the disutility of the income loss from unemployment, it was decided to weight the unemployment rate much more heavily than the financial protection from unemployment variable (80:20).
- **The baseline weights assigned to the four domains were adjusted.** 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). These weights were motivated partly by the observed proportions of consumption and aggregate savings in affluent nations, but the authors were criticized for a bias against sustainability (because of the low weight

for the stocks of wealth) and for a bias in favour of material goods because of the high weight given consumption. In all our papers we have stressed the subjectivity of value judgments and have provided access to Microsoft Excel spreadsheets so that readers can assess for themselves the implications of differing value judgments. Nevertheless, the ‘base case’ estimates of subsequent versions of the Index give equal weights to the four domains. Although this embodies the value judgment that the domains are equally important, it gives the appearance of being even-handed and balanced. However, we 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, 1980-2009

This section reports our main empirical results. The study examines economic well-being in fourteen OECD countries: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden, the United Kingdom, and the United States. The key results are:

- Among the fourteen countries covered in the study, Norway had the highest overall Index of Economic Well-being in 2009, followed by Denmark and Germany. Spain and the United States had the lowest overall IEWB values in 2009. Canada ranked ninth among the fourteen countries.
- Over the 1980-2009 period, the Index of Economic Well-being increased in all fourteen countries. Denmark experienced the largest growth of 1.42 per cent per year. The Netherlands had the least growth (0.38 per cent per year). In Canada, the Index increased 1.15 per cent per year.
- Norway ranked first and Spain ranked last in both the IEWB and per-capita GDP in 2009. However, aside from Norway and Spain, the IEWB and per-capita GDP produce completely different rankings of countries. For example, Canada was fifth in terms of GDP per capita in 2009, while it was only ninth in terms of the Index of Economic Well-being.
- IEWB growth was slower than per-capita GDP growth in all countries over the 1980-2009 period. In particular, Norway grew by 3.26 per cent per year in terms of GDP per capita, but only by 1.41 per cent per year in terms of its IEWB.
- The United States had the highest score in the index of the consumption domain in 2009, with second-place Norway well behind. Finland had the lowest score in the consumption domain. Canada ranked fifth.
- Finland did have the fastest growth in the consumption domain over the period, at 6.13 per cent per year. The slowest growth was 1.80 per cent

per year in the Netherlands. Canada ranked eleventh with annual growth of 2.68 per cent.

- Norway had the highest score in the index of the wealth domain in 2009, while Spain had the lowest. Canada ranked seventh among the fourteen countries.
- Spain and Canada enjoyed the largest per cent increases in their wealth scores over the period; Spain's score grew 4.63 per cent per year and Canada's grew 3.95 per cent per year. Sweden had the slowest growth in the wealth domain, at 2.12 per cent per year.
- On the index of the economic equality domain, Finland had the highest score among the fourteen countries in 2009. Sweden was second. The United States had by far the lowest score. Canada ranked eleventh.
- The index of the economic equality domain declined in eleven of the fourteen countries over the 1980-2009 period. The largest decline by far was in the United States, where economic security fell 2.15 per cent per year. Economic equality increased in Denmark, France, and Sweden, with Denmark's 1.00 per cent annual growth rate leading the way. Canada ranked sixth among all the countries with an annual decline of 0.36 per cent.
- Norway had the highest score in the economic security domain in 2009, followed by Denmark. The United States had by far the lowest. Canada ranked eleventh in economic security.
- Economic security declined in twelve of the fourteen countries over the 1980-2009 period. The largest decline was in the United States, where economic security fell 1.69 per cent per year. Only Denmark and Australia experienced rising economic security over the period, led by Denmark at 0.06 per cent per year.

Sensitivity of Results to Value Judgments

The overall Index is the weighted sum of the four domains, and individuals may have different opinions about the relative weighting of those domains. An important objective of the Index of Economic Well-being is to make explicit the value judgments that underlie composite indicators of well-being by making the choice of weights as transparent as possible. By testing the sensitivity of our results against changes in the weights assigned to the four domains, we can see whether or not value judgments make a significant difference in the measurement of trends in economic welfare.

Sensitivity analysis shows that our key baseline results are robust to the use of different weights for the four domains. Economic well-being increased in every country

over the 1980-2009 period under all four of the weighting schemes we use. Norway and Denmark (with one exception: Denmark ranked third, behind the Netherlands, in Alternative 2) had the highest levels of economic well-being in 2009, while Spain ranked near the bottom. This reflects the fact that Norway has high index scores in all four of the domains of economic well-being, particularly in wealth and economic security, while Spain's scores are below the OECD average in all four domains. The results for the United States are particularly sensitive to the weights on economic equality and security relative to those on consumption and wealth; the greater the relative weights on equality and security, the worse the United States performs.

The IEWB and the Recommendations of the Sarkozy Commission

This report is being released at a time in which concern about the measurement of economic well-being is growing in the policy community. In September, 2009, the Commission on the Measurement of Economic Performance and Social Progress delivered its final report (Commission, 2009). Initiated by French President Nicolas Sarkozy and written by Nobel Prize-winning economists Joseph Stiglitz and Amartya Sen along with Jean-Paul Fitoussi, the Commission has drawn the attention of the academic and public policy communities toward the problem of appropriately measuring well-being and social progress. For the first time, the government of a major country has taken the explicit position that per-capita GDP growth is an inadequate measure of economic and social progress, and that policymaking should be oriented toward a broader conceptualization of public welfare.

The Commission made twelve recommendations in its final report. Although the Index of Economic Well-being precedes the Commission report by over a decade, it anticipates the Commission's recommendations. The Index addresses most of the Commission's recommendations with regard to what an index of economic well-being should capture, and its framework is potentially capable of incorporating additional concerns such as wealth inequality and risk of environmental catastrophe. Indeed, in its discussion of composite indices of well-being, the Commission report recognizes the Index of Economic Well-being as "more elaborated [than other composite indices] and relatively well-known" (Stiglitz *et al.*, 2009:237). The Index is a work in progress and there are further improvements to be made, but we consider the Commission's report to be an indication that the development of the IEWB is on the right track.

Moving from a GDP-based to a Well-being-based Metric of Economic Performance and Social Progress: Results from the Index of Economic Well-being for OECD Countries, 1980-2009

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 report are to review these methodological changes and to present updated estimates of the Index for Canada and the provinces for the 1981-2009 period.

The report is divided into seven 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 well-being. It also outlines the basic framework of the measure. The second part of the report discusses major methodological changes incorporated into the index, namely the switch to a scaling methodology, the reconceptualization of the risk from unemployment component of the economic security domain, 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 the sub-components of the domains, in fourteen OECD countries over the 1980-2009 period. The fourth part tests the sensitivity of our results to alternative assumptions regarding the relative weights assigned to the four domains of the Index. The fifth part provides projections of the Index through to 2010 on the basis of unemployment rate and aggregate consumption forecasts. In the sixth part, we discuss the recommendations of the recent Stiglitz Report on the measurement of economic well-being and social progress, commissioned by French President Nicolas Sarkozy. We argue that the Index of Economic Well-being addresses nearly all of the report's recommendations. The seventh part discusses some lessons learned from the authors' experience in the construction of the Index of Economic Well-being. The eighth part concludes.¹

¹ The tables referred to throughout this report are located at the end of this document. We also make frequent reference to appendix tables containing the underlying data; these are available at the CSLS web site at http://www.csls.ca/iewb2009/IEWB_OECD_AppendixTables.pdf. The database is also available in Microsoft Excel format at http://www.csls.ca/iewb2009/IEWB_OECD.xls.

I. The Index of Economic Well-being: Motivation and Framework²

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.

In focusing on the economic aspects of well-being in this report 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 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. macroeconomic 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 individuals’ command over resources. 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 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 for Canada based on four dimensions of economic well-being – consumption, accumulation, income distribution, and economic security – this report 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, objective 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 in 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

² This section is largely based on Osberg and Sharpe (2005).

Exhibit 1: Conceptual Framework for the Index of Economic Well-being

Concept	Present	Future
"Typical Citizen" or "Representative Agent"	Average flow of current income	Aggregate accumulation of productive stocks
Heterogeneity of Experiences of All Citizens	Distribution of potential consumption -- income inequality and poverty	Insecurity of future incomes

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, both now and in the future, as Exhibit 1 illustrates.

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 implicitly is 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. It 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’ points 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 (which determines the sustainability of current levels of consumption), 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 both average incomes and the degree of inequality and poverty 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 the economic future is secure for themselves and others.

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 in 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. (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.) 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 report’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, 2002a, 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, and 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 consists of net accumulation of physical capital, the value of natural resources stocks, net international investment position, accumulation of human capital, and R&D stocks, as well as an adjustment for costs associated with environmental degradation;
- [3] income distribution - the intensity of poverty (incidence and depth) and the inequality of income;
- [4] economic security from job loss and unemployment, illness, family breakup, and poverty in old age.

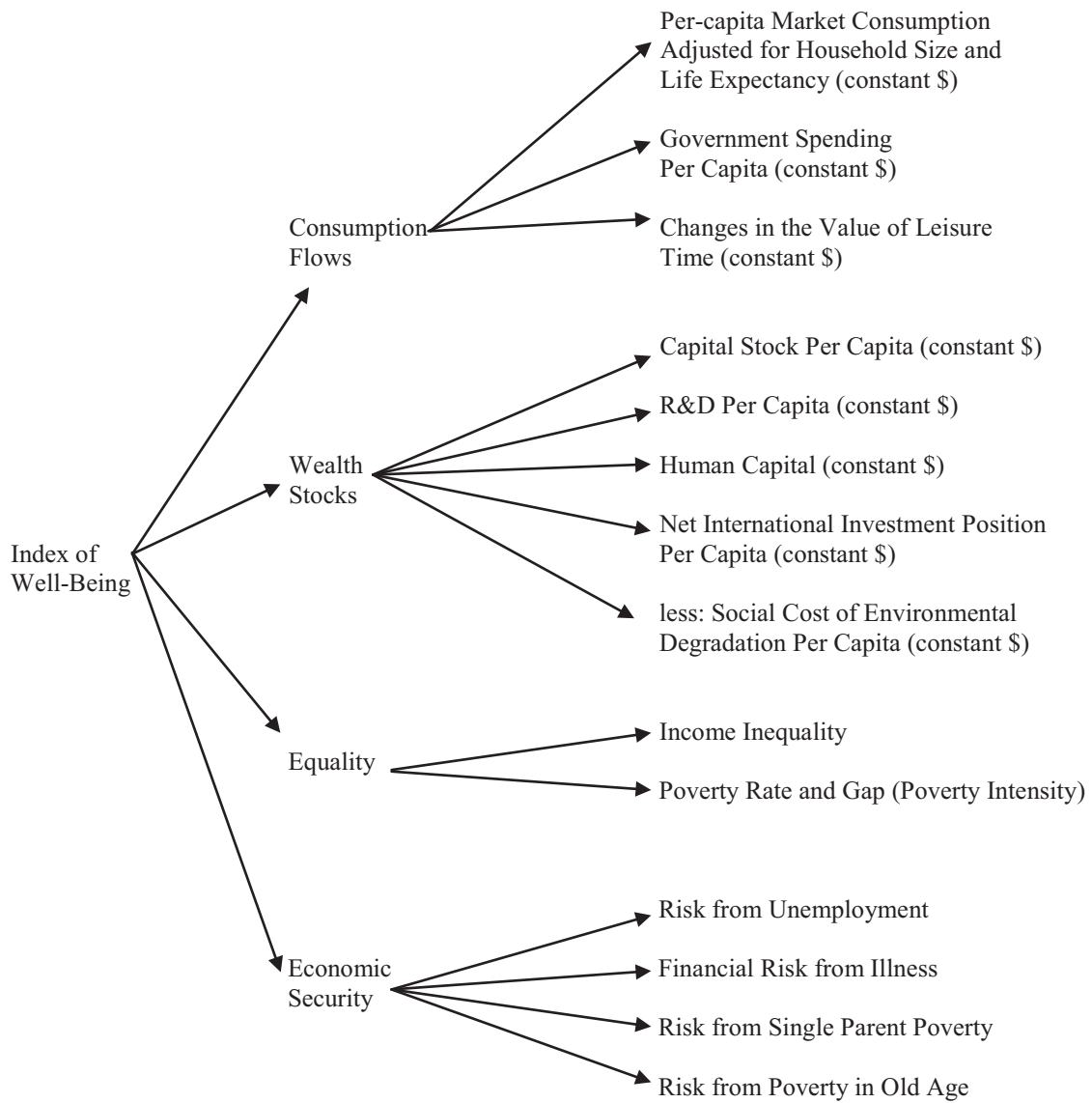
Each dimension of economic well-being is itself an aggregation of many underlying trends, on which the existing data is of variable quality. By contrast, the System of National Accounts has had many years of development effort by international agencies (particularly the UN and the IMF), and has produced 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, and
- (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.

Due to data limitations, estimates of the Index of Economic Well-being computed for different countries may differ in the number of variables that can be included in the calculations. Exhibit 2 illustrates the components that are used in our estimates of the Index of Economic Well-being for OECD countries, based on the four domains outlined above.

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



II. Methodological Developments in the Index of Economic Well-being

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

A. Introduction of Linear Scaling

An essential question that underlies discussions of index methodology is: Should a single variable be scaled, and if so, what is the meaning or interpretation of a scaled variable (Sharpe and Salzman, 2003)? The key reason why it may be necessary to scale variables is that raw data have significantly different proportional ranges. In a standard index number approach, a raw variable is normalized to 100 in a base year and changes over time represent per cent changes in the underlying variable. The problem with this is that trends in the overall composite index will be dominated by variables with large proportional ranges because their per cent changes are larger.

As a hypothetical example, suppose the unemployment rate ranges over time between one and ten per cent, while per-capita consumption ranges between \$25,000 and \$45,000. The unemployment rate has a proportional range of 900 per cent ($900 = 100 \cdot (10-1)/1$), while per-capita consumption has a proportional range of 80 per cent ($80 = 100 \cdot (45,000-25,000)/25,000$). In a composite index, the unemployment rate would dominate per-capita consumption because the unemployment rate would experience much larger per cent changes over time. Meaningful changes in per-capita consumption would have a much smaller impact on the overall index, simply because they are proportionally smaller.

Thus, an unscaled aggregation of sub-indexes has an implicit weighting scheme. When the variables are aggregated without scaling, higher implicit weights are assigned to the variables that have large proportional ranges because their percentage increases are larger.³ Linear scaling addresses this problem by standardizing the range of every variable. All the scaled variables have an identical absolute range (the $[0,1]$ interval), and thus the same proportional range.

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

³ Another way of seeing this problem is to note that a variable with a low base compared to the range of values can skew the composite index and cause small absolute changes in this variable to overwhelmingly affect the composite. For example, if the unemployment rate ranges from 0.5 per cent to 5.5 per cent, a change from 0.5 per cent to 5.5 per cent will be a ten-fold increase. However, for a different range, say between 10 per cent and 15 per cent, the same absolute change, of 5 percentage points, will only represent a 1.5-fold increase.

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.⁴

The 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 and Max, respectively. The actual range of values may 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) Error!

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) Error!

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. For example, we have produced IEWB estimates for Canada alone and for Canada and the provinces together. 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, because the range of the values (e.g. for the unemployment rate) is much

⁴ 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 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. 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).

greater when the provinces are included. By definition, some provincial values must always be smaller than the average values for Canada and some must always be greater. Thus, the range of the *scaled* values for Canada is much smaller when the provinces are included because the denominator is equations (1) and (2) is larger.

Second, it is not always clear that the same linear range (0 to 1) for all variables is in fact desirable. For example, the Human Development Index (HDI) of the UNDP is another well-known index that uses the linear scaling technique. The HDI contains, as one of its three components, an index of the length of life. Because the index is linear, the implicit assumption is that a marginal additional year of life always has the same value, whether life expectancy is increasing from 38 to 39 or from 88 to 89.⁵ It is not obvious that this is appropriate.

Third, the linear scaling method 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, the calculations in this report subtracted 10 per cent of the value from the minimum value and added 10 per cent 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, the linear scaling approach implies that percent changes in the scaled values, unlike absolute percentage-point changes, are not easily comparable across variables because the range of values used for per cent calculations varies among variables and it forms the base that determines the percentage change. 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 report we have included reference to per cent changes in scaled values, although further research on the appropriateness of this may result in their exclusion.

B. Conceptualization of the Risk to Unemployment

Undoubtedly the most controversial aspect of the Index of Economic Well-being has been the risk of unemployment component of the economic security domain. In the

⁵ Income inequality indices provide a subtler example of the problems of linearity. An index like the Gini can only range over a subset of values on the real line. Although the conceptual maximum for the Gini is 1.0 (where one individual has all the income), this is not a practical possibility because people without income do not survive. The 'practical maximum' for the Gini corresponds to a state of affairs in which everybody except a small elite (in the limit, one person) gets only a subsistence income, and the elite gets all the rest; it depends on the ratio of average income to subsistence income. A given change in the Gini index (e.g. by 0.02) might reflect the sort of change (from 0.26 to 0.28) we have seen in Denmark recently, or it could reflect a change (e.g. from 0.85 to 0.87) in which the last few non-elite to have above-subsistence incomes are driven down to bare subsistence. These changes differ significantly in social implications, but the linearity assumption rules out differing marginal values for the same index change and also rules out a dependence on the average level of income.

first version of the Index for Canada (Osberg and Sharpe, 1998), it was the large downward trend in this component that was driving the overall economic security domain and hence the overall Index. The risk of unemployment component was in turn being driven by the fall in the unemployment insurance coverage rate (the ratio of beneficiaries to unemployed). The modeling of the risk of unemployment was done from an “expected value of financial loss” perspective. This motivated a probabilistic approach where the probability of obtaining a job (proxied first by the employment rate and currently by the unemployment rate) was multiplied by the probability of receiving unemployment benefits if unemployed. This methodology amplified changes in the overall risk to unemployment variable from the large fall in the unemployment benefit coverage rate.

Recently, the methodology described above has been changed to reflect recent work on self-reported happiness that assesses the disutility implied by unemployment *per se* compared to the disutility from the financial loss arising from unemployment (Di Tella, MacCulloch, and Oswald, 2003). The probability of finding a job if laid off is more important than the probability of obtaining unemployment benefits if unemployed in the determination of the overall risk arising from unemployment. Consequently, our revised estimates weight the unemployment rate much more heavily than the financial protection from unemployment variable (80:20). It was also decided to make the unemployment rate and the financial protection rate additive, not multiplicative. This change had the effect of dampening the evolution of the risk of unemployment component over time.

C. 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). Although these weights reflected observed aggregate proportions for consumption and savings, 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 the baseline estimates give equal weights to the four domains. Although this reflects the value judgment that the domains are equally important, it gives the appearance of being even-handed and balanced. However, we provide estimates of the Index based on alternative weighting schemes to show the sensitivity of the results to the weights chosen.

III. Trends in the Index of Economic Well-being for Selected OECD Countries, 1980-2009

This section of the report examines the level of the Index of Economic Well-being and its various components in 2009 in 14 OECD countries and developments since 1980. The focus is on changes over the 1980-2009 period, with little attention given to trends within the period. Due to data limitations, values for some of the variables underlying the Index had to be extrapolated for 2009 based on past data. Such cases are identified in footnotes; in all other cases, the Index is based on actual 2009 data.

A. Overall Level and Trends in the Index of Economic Well-being

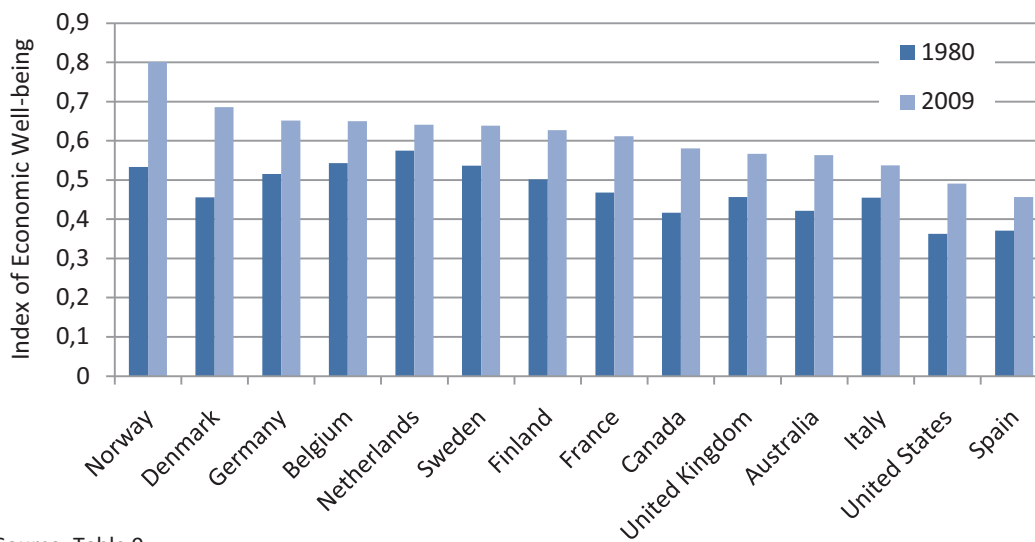
i. Levels

In 2009, the country with the highest level of economic well-being among the 14 countries covered was Norway, which had a scaled index value of 0.801 points (Table 1, Chart 1). Norway was followed by Denmark, which had a scaled index value of 0.686 points. The country which had the lowest level of economic well-being was Spain, with an index value of 0.457 points, followed by the United States (0.491 points). Canada ranked ninth out of fourteen countries, with an index value of 0.581 points.

ii. Trends

There are two ways to measure progress in the Index of Economic Well-being: the absolute change in the scaled value of the Index, and the per cent change (either the total change or the compound annual rate of change) in the scaled value of the Index. This latter method is influenced by the initial level of the scaled value. For example,

Chart 1: Index of Economic Well-being, Selected OECD Countries, 1980 and 2009



Source: Table 9

suppose that 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. In terms of index points, both countries experienced the same improvement in well-being – 0.4 points. In proportional terms, however, Country A increased 200 per cent while Country B advanced only 80 per cent.

During the 1980-2009 period, the Index of Economic Well-being grew in all countries (Chart 1 and Chart 2). Note, however, that how we choose to measure the magnitude of the growth – in absolute or proportional terms – affects the ranking of countries in terms of growth. Exhibit 3 provides the rank order of the fourteen countries according to both measurement approaches.

In absolute terms, Norway's 0.267 point growth was the fastest among the countries over the 1980-2009 period. Norway was followed by Denmark and Canada, with growth of 0.230 and 0.164 points. The smallest growth was 0.066 points, in the Netherlands.

In proportional terms, the greatest growth occurred in Denmark; there, the Index increased 1.42 per cent per year over the period. Norway and Canada followed, with annual growth rates of 1.41 per cent and 1.15 per cent. The slowest growth was 0.38 per cent in the Netherlands.

Growth rates varied across countries and across time. From 1980 to 1990, all countries except the United Kingdom, the Netherlands, and Sweden experienced progress in their well-being (Table 9). Particularly notable were Spain, Canada, Italy and Norway, which grew by over 1.2 per cent per year during the period. During the following decade of 1990-2000, several countries experienced impressive acceleration in the growth of their index levels. Most

Exhibit 3: Ranking of Countries by Absolute and Proportional Growth, Selected OECD Countries, 1980-2009

	Absolute (points)	Proportional (per cent per year)
1	Norway	Denmark
2	Denmark	Norway
3	Canada	Canada
4	France	United States
5	Australia	Australia
6	Germany	France
7	United States	Germany
8	Finland	Finland
9	United Kingdom	United Kingdom

10	Belgium	Spain
11	Sweden	Belgium
12	Spain	Sweden
13	Italy	Italy
14	Netherlands	Netherlands

notably, the United States went from growth of 0.53 per cent per year during the 1980s to growth of 1.96 per cent per year during the 1990s. Finland and Italy, however, moved the other way and experienced declines in their levels of well-being in the 1990s. From 2000 to 2009, all countries experienced positive growth in their levels of well-being. Norway led the way, with its overall index growing 1.86 per cent per year.⁶

As Exhibit 3 illustrates, the choice between absolute and proportional growth measurement does make a difference in the ranking of countries. (Note that in this particular case the differences are not large; there is no country that has one of the largest growth rates in absolute terms and one of the smallest in proportional terms, or vice versa. In fact, the top three countries and the bottom two countries are the same regardless of the measure of growth used. Such discrepancies are possible in principle, however.) Throughout this report, we often provide changes over time in both absolute and proportional terms. In general, however, we consider proportional growth to be a better measure of changes in well-being because it takes account of countries' starting points. If a country improves its Index score from 0.1 to 0.2, it has doubled its well-being; this is much more significant than another country improving its score from 0.8 to 0.9. Proportional growth captures that difference, whereas absolute changes do not.

iii. Comparing the IEWB to Per-capita GDP

Comparing the Index of Economic Well-being with Gross Domestic Product (GDP) per capita, the measure used most often as an indicator of economic well-being, shows that Norway was first and Spain was last in both rankings in 2009 (Tables 1 and 2 and Exhibit 4).

⁶ We do not address the 1980-1990, 1990-2000, and 2000-2009 sub-periods in our discussion of the four domains of well-being and their components in subsequent sections of this report. However, the growth rates for the sub-periods can be found in the tables and appendix tables.

Chart 2: Average Annual Growth of the Overall Index of Economic Well-being and GDP per Capita, OECD, 1980-2009

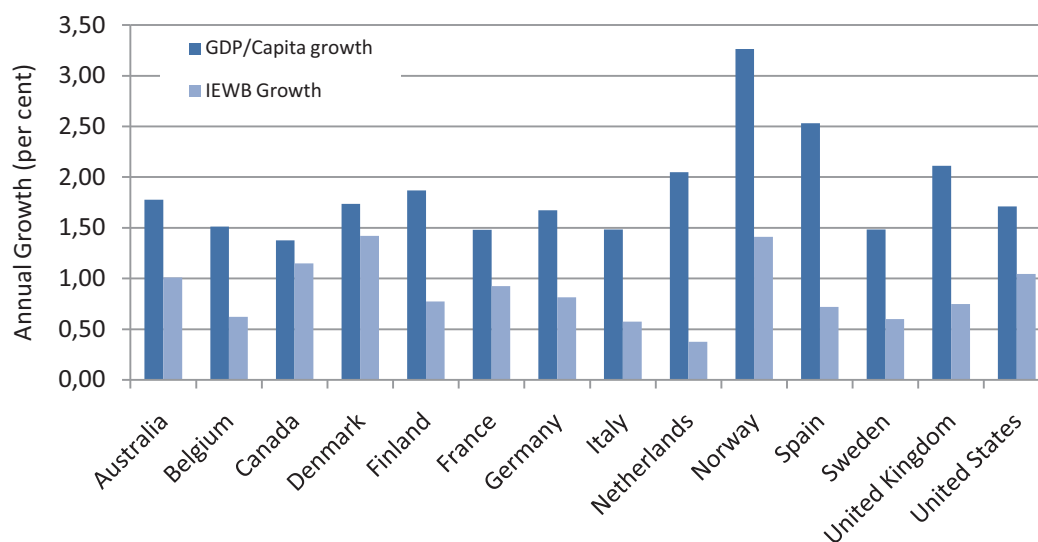


Exhibit 4: Ranking by Level and Growth of Per-capita GDP and the Index of Economic Well-being, Selected OECD Countries, 1980-2009

Level in 2009

Growth Rate, 1980-2009

(points)

(per cent per year)

	Index of Economic Well-being		Index of Economic Well-being	
	GDP Per Capita	Index of Economic Well-being	GDP Per Capita	Index of Economic Well-being
1	Norway	Norway	Norway	Denmark
2	United States	Denmark	Spain	Norway
3	Netherlands	Germany	United Kingdom	Canada
4	Australia	Belgium	Netherlands	United States
5	Canada	Netherlands	Finland	Australia
6	Denmark	Sweden	Australia	France
7	Sweden	Finland	Denmark	Germany
8	Germany	France	United States	Finland
9	Belgium	Canada	Germany	United Kingdom
10	Finland	United Kingdom	Belgium	Spain
11	United Kingdom	Australia	Sweden	Belgium
12	France	Italy	Italy	Sweden
13	Italy	United States	France	Italy
14	Spain	Spain	Canada	Netherlands

However, except for Norway and Spain, the rank positions for all countries are different between the two indicators. For example, Canada was fifth in terms of GDP per capita level in 2009, while it was only ninth in terms of the level of the Index of Economic Well-being. Even more strikingly, the United States ranked second in per-capita GDP and second-to-last in terms of the Index.

Growth of GDP per capita was greater than the growth of the IEWB in all countries over the 1980-2009 period (Chart 2). In particular, Norway grew by 3.26 per cent per year in terms of GDP per capita, but only by 1.41 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 2.53 per cent per year in terms of GDP per capita, but only 0.72 per cent per year in terms of its overall well-being. As Exhibit 4 shows, it was not generally true over the 1980-2009 period that countries with fast per-capita GDP growth also experienced fast IEWB growth and vice versa. This divergence shows that certain aspects of the Index of Economic Well-being, which are not included 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.

B. Summary of 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, economic equality and economic security. The following four sections examine in detail the trends in the domains in the fourteen OECD countries over the period of 1980 to 2009.

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. For example, total adjusted consumption in Canada grew 1.48 per cent per year in dollar terms over the 1980-2009 period, while the index of the consumption domain (the scaled value of total adjusted consumption) grew 2.61 per cent per year.

As the next four sections show, the consumption flows domain and the wealth stocks domain increased for all countries, but the growth of overall economic well-being was dampened by declines in 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.

Summary Table 1 provides a brief overview of the four domains in 2009.

Summary Table 1: Index of Economic Well-being and its Domains, Selected OECD Countries, 2009

	Total Consumption per capita, 2000 US\$	Scaled Total Consumption per capita	Total per capita Wealth, 2000 US\$	Scaled Total per capita Wealth	Index of Economic Equality	Index of Economic Security	Overall Index of Economic Well- being
	A	B	C	D	E	F	G = (B+D+E+F)/4
Australia	27,850	0.709	139,956	0.376	0.476	0.694	0.564
Belgium	26,477	0.657	183,070	0.572	0.708	0.664	0.650
Canada	26,930	0.674	177,046	0.545	0.444	0.661	0.581
Denmark	23,861	0.559	189,574	0.602	0.780	0.803	0.686
Finland	21,440	0.468	167,276	0.500	0.797	0.742	0.627
France	25,662	0.626	148,662	0.416	0.681	0.722	0.611
Germany	24,143	0.569	198,702	0.643	0.698	0.698	0.652
Italy	23,578	0.548	151,876	0.430	0.442	0.728	0.537
Netherlands	27,599	0.699	200,265	0.650	0.563	0.650	0.641
Norway	29,124	0.756	258,804	0.917	0.701	0.829	0.801
Spain	22,363	0.502	125,467	0.310	0.437	0.577	0.457
Sweden	23,440	0.543	156,613	0.452	0.791	0.768	0.638
United Kingdom	26,196	0.646	149,528	0.420	0.464	0.737	0.567
United States	33,187	0.909	192,379	0.614	0.159	0.280	0.491

Source: Tables 1, 2, and 9.

C. Trends in the Components of the Consumption Flows Domain

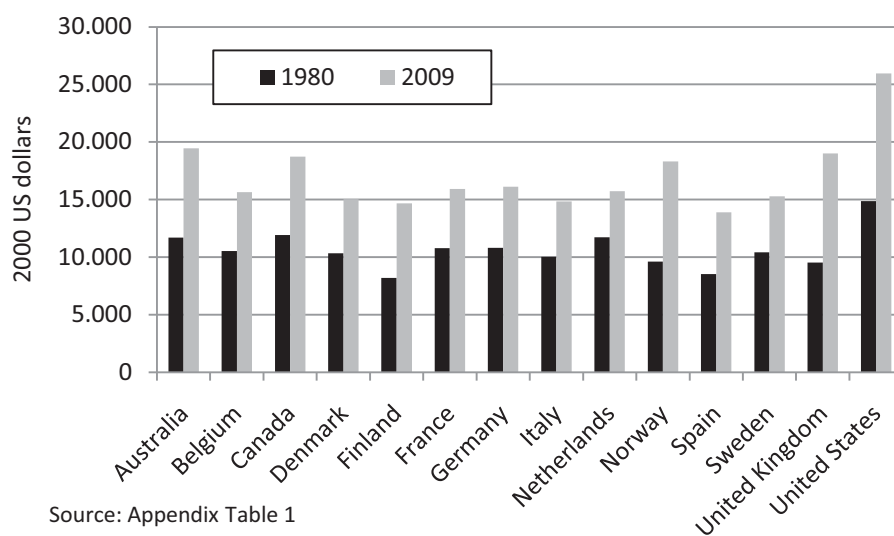
As noted earlier in the report, the consumption domain consists of two main components: private consumption expenditures and government expenditures on goods and services consumed either directly or indirectly by households.

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. 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.⁷

i. Private Consumption

In 2009, personal consumption was greatest in the United States, where it had a per capita value of \$25,954 in 2000 US dollars (Table 1 and Chart 3). The United States was well ahead of all the other countries, as the second highest per capita personal consumption was in the Australia at \$19,459. Spain had the lowest per capita private consumption for 2009 at \$13,887, 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.

Chart 3: Private Consumption Per Capita, Selected OECD Countries, 2000 US Dollars, 1980 and 2009



Source: Appendix Table 1

⁷ In our estimates of the Index of Economic Well-being for Canada and the provinces (Osberg and Sharpe, 2009), the consumption domain also includes the value of unpaid work and regrettable expenditures. Data limitations currently prevent us from including these concepts in our international estimates.

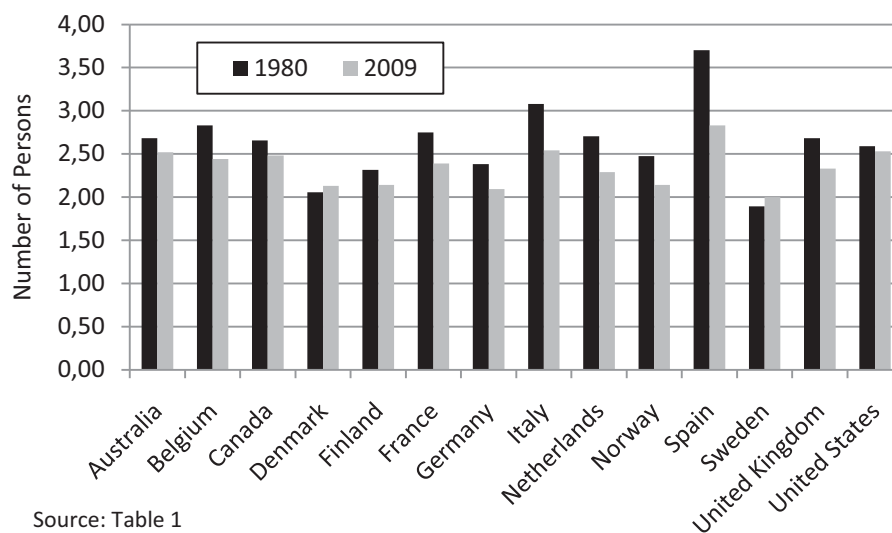
From 1980 to 2009, the greatest growth in private consumption was 2.41 per cent per year in the United Kingdom. Personal consumption grew the least in the Netherlands, at 1.02 per cent per year. Canada ranked seventh with growth of 1.57 per cent per year.

ii. Average Family Size

It is important to adjust the dollar value of per-capita personal consumption to reflect the fact that there are economies of scale in household consumption. When people live together in groups, they can achieve greater effective consumption than they could if they lived alone as individuals; for instance, they can cooperate in household production (e.g. one person can cook for everyone) and share fixed costs (e.g. they can share one refrigerator rather than each person having to buy one).

To account for this issue, we use the Luxembourg Income Study equivalence scale, which is the square root of family size. For a given country in a given year, we compute the square root of family size in that country and year *relative to the square root of family size in the United States in 1980*. This ratio is then multiplied by the per-capita private consumption value to produce an estimate of private consumption adjusted for family size. Changes in our equivalence scale from year to year capture changes in average family size both within countries over time and across countries relative to the United States in 1980.⁸

Chart 4: Average Family Size, Selected OECD Countries, Persons, 1980-2009



Source: Table 1

⁸ The rationale for this approach is that the equivalence scale would take a value of 1.0 in 1980 in every country if we simply used within-country changes in family size over time. We would not be accounting for cross-country differences in family size in the base year (1980). Measuring family size relative to the baseline of the United States in 1980 solves that problem. The choice of the United States as the baseline country is arbitrary.

Average family size was greatest in Spain in 2004, with 2.83 persons per household (Appendix Table 2 and Chart 4).⁹ It was followed by Italy and the United States with 2.54 and 2.53 persons per household, respectively. Sweden had the smallest family size, with 2.00 persons per family. Over the 1980-2009 period, the size of families in all but two country declined considerably. The only countries where the family 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 family size in 1980 (1.9 and 2.1 persons per family, respectively), and over the period they merely approached the average. Similarly, Spain, the country with the largest average family size in 1980 at 3.7 persons per family, experienced the greatest decline among the countries; Spain's average family size fell 23.5 per cent.

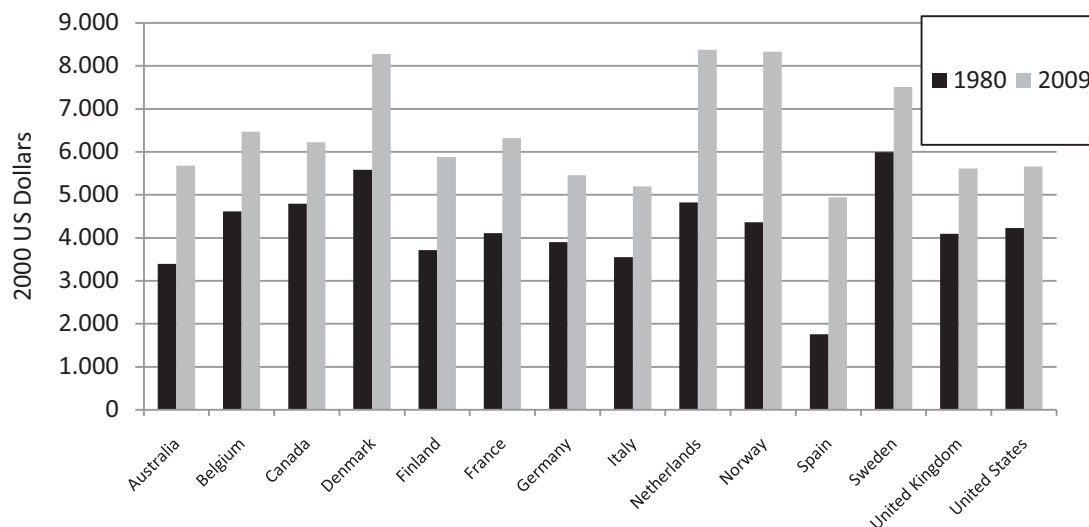
iii. Government Expenditures on Goods and Services

Government expenditures include spending by all levels of government on current goods and services. These expenditures are part of social consumption and therefore contribute to increased well-being.¹⁰ The largest government expenditures for 2009 were in Netherlands, Norway, and Denmark, all three following a very progressive form of social democracy. Their per-capita government expenditures were \$8,375, \$8,331, and

⁹ Average family size is computed from the Luxembourg Income Study database. The most recent year for which data are available varies across countries as follows: Belgium (2000); Australia (2003); Canada, Denmark, Finland, Germany, Italy, the Netherlands, Norway, Spain, the United Kingdom and the United States (2004); France and Sweden (2005). Data for subsequent years are assumed to be equal to the most recent available value.

¹⁰ Some might wish to argue that government expenditures actually reduce economic well-being because the private sector would likely have put those funds to more productive or welfare-enhancing uses had the government not taxed them away in the first place. Whether or not this argument is valid, the fact remains that government expenditures on goods and services form a component of total consumption, and therefore total economic welfare as measured by the Index of Economic Well-being. The Index makes comparisons of well-being across time and space, not between factual and counterfactual worlds.

Chart 5: Per-capita Government Expenditures on Current Goods and Services, Selected OECD Countries, 2000 US Dollars, 1980 and 2009



Source: Table 1

\$8,276 respectively (Appendix Table 4 and Chart 5). Sweden, Belgium and France, which are 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 2009, at \$4,943 per capita.

Over the 1981-2009 period, the government expenditures of Spain grew at the highest rate, 3.62 per cent per year, although that is unsurprising considering that in 1981 Spain had per capita expenditures which, except in the case of Australia, were never more than half of the expenditures of the other OECD countries. The weakest growth in government expenditures occurred in Sweden.

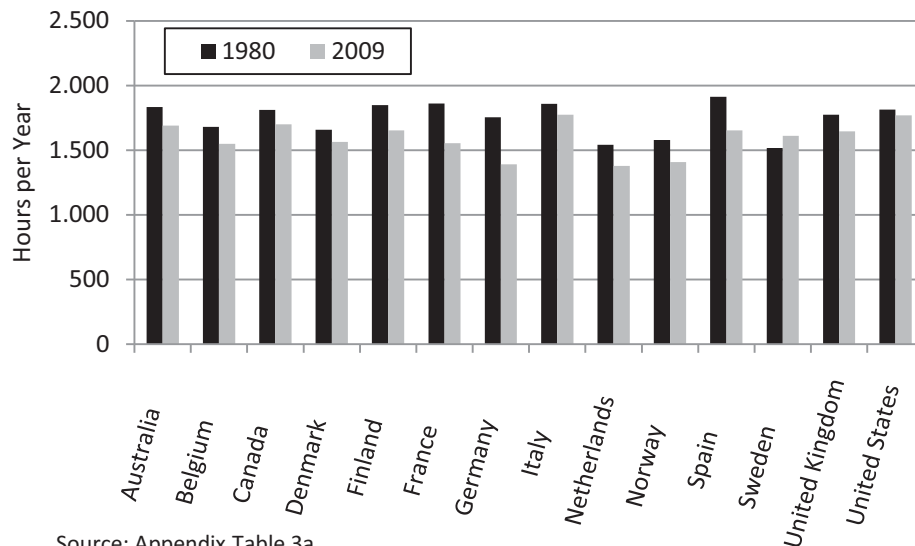
iv. Adjusted Relative Cost (Benefits) of Leisure

One potential benefit of economic progress is that people may be able to take more leisure time. A measure of economic welfare should account for time spent on leisure, but the value of leisure time is difficult to estimate. Our approach is based on the idea that if a person takes an additional hour of leisure time, then he or she values that leisure time at least as much as the next best alternative use of the time. We assume that the next best alternative use of leisure time is paid work in the labour force, the value of which is the total labour compensation (that is, after-tax wages and benefits) that could have been earned during that time.

Our estimate of the marginal opportunity cost of not being employed is calculated using estimates of average after-tax labour compensation and average number of hours of leisure. Note, however, that we are putting a money value on *differences* in time use (both changes over time and differences across countries), not on total leisure hours themselves. We standardize leisure hours as number of hours of leisure relative to a benchmark – namely, the United States in 1980. Ours is a *relative* cost measure. When

leisure hours exceed the benchmark, we add to measured money income the value of leisure relative to the benchmark; if leisure hours fall short of the benchmark, we subtract from measured money income the cost in foregone leisure. The adjusted relative cost of leisure measures the foregone income that people could have earned in the labour force if they had worked the benchmark hours instead of taking more leisure. By the reasoning outlined in the preceding paragraph, this *cost* measure can be taken as an

Chart 6: Average Annual Hours Worked per Employed Person, Selected OECD Countries, Hours, 1980 and 2009



Source: Appendix Table 3a

estimate of the value (or, at least, a lower bound on the value) of the *benefits* of the leisure time itself.

For each country in each year, we compute the average annual number of hours worked per working-aged person, to which we add an estimate of the average annual hours of unemployment per working-age person.¹¹ This gives a measure of average hours spent in the labour force. We then take the difference between these values and the value of the United States in 1980. That difference represents the country's leisure hours (that is, time not spent in the labour force) *relative* to those of the United States in 1980.

Trends in the value of leisure (relative to the United States in 1980) are determined by a number of factors: average hours worked per employed person, employed persons as a proportion of the working-age population (the employment rate), and average hours of unemployment per working-age person. Chart 6 illustrates average annual hours worked per employed person in the fourteen countries. This average actually declined in all countries except Sweden between 1980 and 2009, but the declines were greater in the European countries than in the United States and Canada (with the

¹¹ Average annual hours of unemployment are estimated by multiplying average hours worked per employed person by the proportion of working-aged persons who are unemployed. We assume that if they were employed, unemployed persons would work the average number of hours worked by those who are currently employed.

exceptions of Italy and Denmark). However, average hours worked per *working-age* person increased in the United States because employment rates increased over the period. This trend has recently reversed, as the employment rate and the average hours worked per working-age person have decreased. The average number of hours worked per working-age person in the United States is now only 7 hours more than it was in 1980.

In 2009, all European countries had a positive relative cost of leisure, showing that they spent more time on leisure than the United States did in 1980. By contrast, two of the non-European countries, Canada and the United States, experienced falls in the value of leisure due to increased hours spent in the labour force relative to the United States in 1980. Australia had the smallest positive adjusted relative cost of leisure per capita of all the fourteen countries at \$229 (2000 US dollars). Belgium had the highest adjusted relative cost, \$2,597 (2000 US dollars), with Netherlands and Germany following closely at \$2,168 and \$2,142 per capita, respectively (Appendix Table 3). The lowest adjusted cost of leisure was in the United States, a negative \$75 per capita. Canada had the second lowest cost of leisure, negative \$107 per capita. The time devoted to leisure clearly decreased in both countries; however, the trend reversed in the United States in 1999 and in Canada in 2004. The value of leisure is currently increasing in both countries

Observing the change in the relative cost of leisure from 1980 to 2009, the benefit of leisure increased for most European countries. The most dramatic change was experienced by Germany, where the relative cost or benefit of leisure increased significantly, from \$580 per capita to \$2,142. 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 \$222 per capita in 1980 to positive \$498 in 2009.

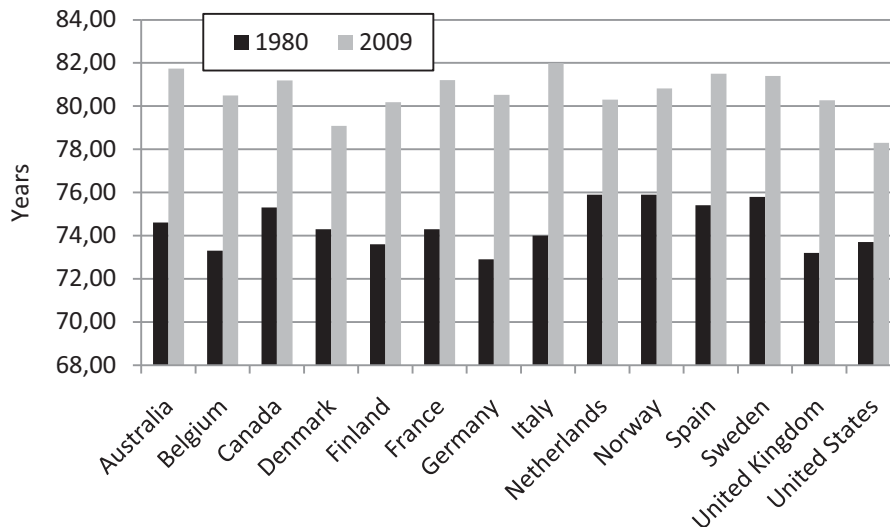
v. Life Expectancy

The final adjustment to consumption flows is to account for the increase in consumption arising from rising life expectancy. Life expectancy for each country was converted into a relative index where the value for the United States in 1980 equals 1.00. This index is multiplied by total consumption flows in order to adjust consumption for life expectancy. Thus, the adjustment captures changes in life expectancy both over time within countries and across countries relative to the United States in 1980.

The country with the highest life expectancy in 2009 was Italy, which had an average life expectancy of 82.0 years (Appendix Table 5 and Chart 7). The lowest life expectancy, 78.3 years, was in the United States. Over the entire period of 1980-2009, life expectancy in Italy grew the most, from 74.0 years to 82.0 years, a total increase of 11.1 per cent. Germany experienced the second largest increase in average life expectancy of 10.9 per cent. The life expectancy of the Netherlands grew the least, at only 6.1 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. Growing life expectancies, and the additional consumption arising from that, increased consumption flows in all the OECD countries covered in this report.

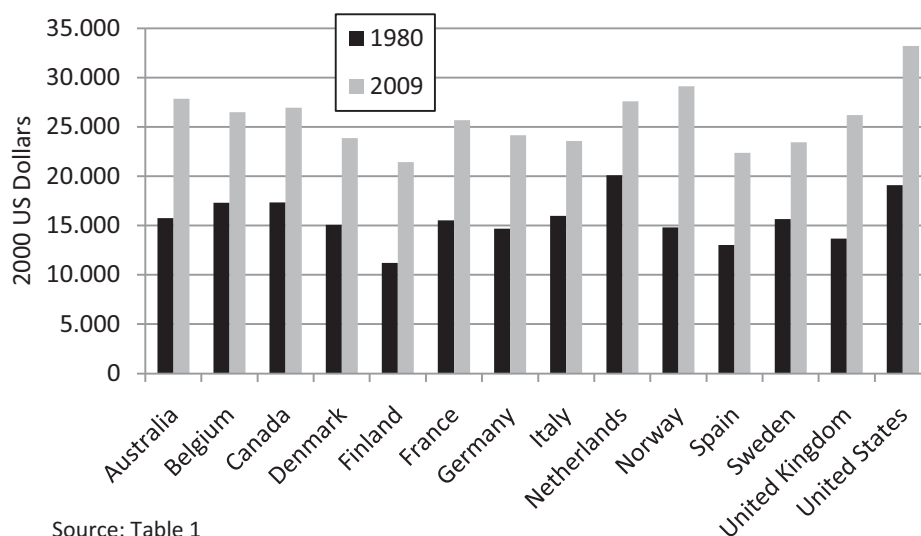
Chart 7: Life Expectancy at Birth, Selected OECD Countries, Years, 1980 and 2009



vi. Total Adjusted Consumption Flows

Total adjusted consumption is computed by summing family size-adjusted private consumption, government expenditures, and the value of leisure, and then multiplying the total by the life expectancy index. The country with the highest level of consumption flows per capita in 2009 was the United States, with \$33,187 in 2000 US dollars (Table 1 and Chart 8). The United States was significantly ahead of second placed Norway, which had consumption flows of \$29,124 per capita. Finland was last with \$21,440 per capita, greatly trailing the United States. Canada was fifth, with \$26,930 per capita.

Chart 8: Total Adjusted Consumption Per Capita, Selected OECD Countries, 2000 US Dollars, 1980 and 2009



Source: Table 1

Norway had the fastest consumption growth over the 1980-2009 period, at 2.36 per cent per year. The United Kingdom ranked second with growth of 2.26 per cent per year. The slowest consumption growth was 1.10 per cent per year in the Netherlands. In Canada, total adjusted consumption grew 1.53 per cent per year over the period; this ranked tenth among the rates of increase of the fourteen countries.

D. Trends in the Components of the Sustainability/Stocks of Wealth Domain

A society's stock of wealth – both man-made and naturally occurring – determines how sustainable its current level of consumption really is. The measure used in this report contains, as explained earlier, four components: the physical capital stock, the R&D stock, the stock of human capital, and net international investment position.¹² One adjustment is made to the sum of these components: to account for the social costs of environmental degradation, we subtract the estimated annual cost of greenhouse gas emissions.

i. Physical Capital

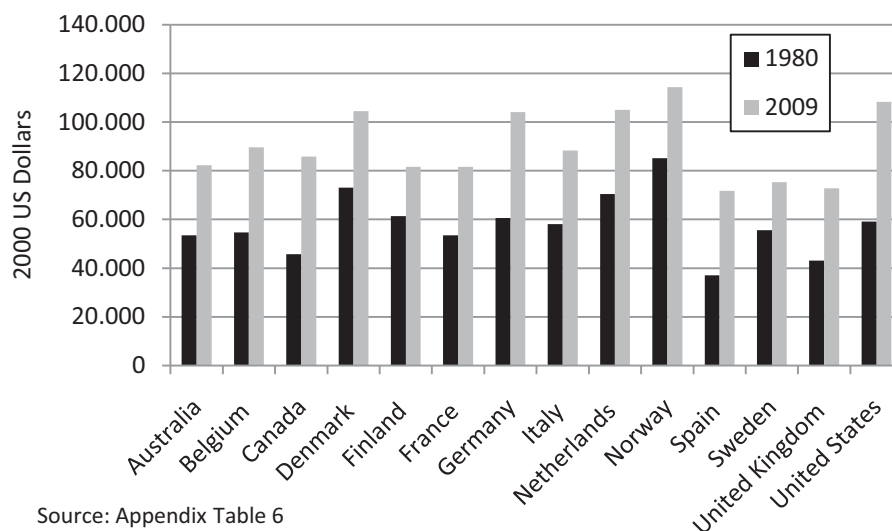
The stock of physical capital per capita, defined as residential and non residential capital stock based on geometric depreciation, was greatest in Norway in 2009 at

¹² In our estimates of the Index of Economic Well-being for Canada and the provinces (Osberg and Sharpe, 2009), the wealth domain also includes the value of natural resource stocks. Data limitations prevent us from including natural resources in our international estimates.

\$114,316 in 2000 US dollars (Appendix Table 6 and Chart 9).¹³ The United States, Netherlands, and Denmark followed with \$108,284, \$104,936 and \$104,489, respectively. The lowest stock of net capital was in Spain, \$71,709 per capita. Physical capital was the largest component of total wealth stocks – over 50 per cent for most countries.

The greatest growth in the per-capita physical capital stock was experienced by Spain, at 2.30 per cent per year. Canada experienced the second largest growth rate, 2.19 per cent per year. The extremely rapid growth of capital in Spain over the period is understandable considering that the country's initial stock of capital was very small, leading to significant returns from investment in physical capital. The slowest growth rate was in Finland, 0.99 per cent per year.

Chart 9: Physical Capital Stock Per Capita, Selected OECD Countries, 2000 US Dollars, 1980 and 2009



Source: Appendix Table 6

ii. R&D Capital

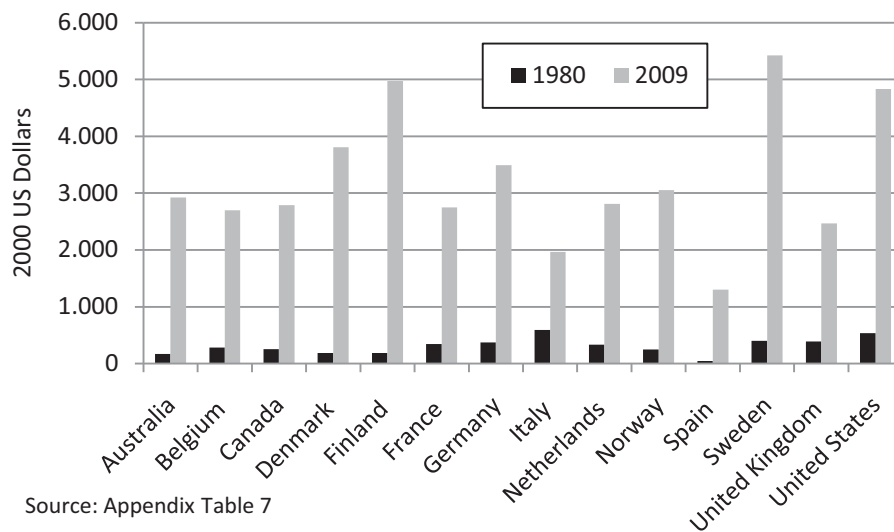
In 2009, the stock of total business enterprise expenditures on R&D per capita was greatest in Sweden at \$5,426 in 2000 US dollars (Appendix Table 7 and Chart 10).¹⁴

¹³ Data on physical capital are from the Kiel Institute for the World Economy Database on Capital Stocks in OECD Countries. For all countries, the most recent year for which data are available is 2002. Values for 2003-2009 are extrapolated based on the compound annual growth rates from the 1997-2002 period.

¹⁴ We compute the stock of R&D using data on gross annual R&D expenditures (from the SourceOECD Science and Technology database) and convert the estimates to 2000 US dollars using GDP deflators and PPP values, also from the OECD. We assume a depreciation rate of 20 per cent per year. Thus, in a given year, the accumulated stock of R&D is that year's gross R&D expenditures plus 80 per cent of the previous year's accumulated stock. The question of how to measure R&D has challenged researchers for some time. Under the SNA 1993 accounting system (the current international standard for national accounting), R&D expenditures are counted as intermediate inputs for businesses or as current consumption for government and non-profit organizations. The new SNA 2008 recommends the capitalization of R&D, so that annual

Finland had the second largest stock of R&D expenditures, \$4,973 per capita.¹⁵ Spain had the lowest stock of R&D expenditures per capita, at \$1,301. Many countries experienced extremely rapid increases in R&D over the 1980-2009 period, with the growth rates in Spain, Denmark, Australia and Finland each reaching over 10 per cent per year. R&D expenditures grew over the entire period for all fourteen countries.

Chart 10: Per-capita Stock of R&D, Selected OECD Countries, 2000 US Dollars, 1980 and 2009



iii. Human Capital

The value of human capital in 2009, 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 \$93,109 (2000 US dollars) per capita (Appendix Table 9 and Chart 11).¹⁶ Canada barely edged out the second and third placed Norway and the United States, which had human capital levels of \$89,654 and \$88,311 respectively. The lowest human capital levels belonged to Italy and France, at \$68,896 and \$69,807 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.

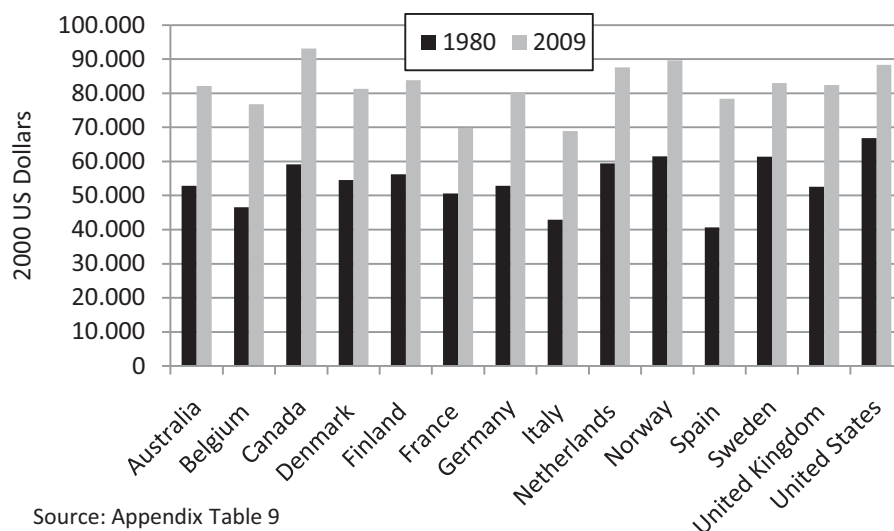
R&D expenditures represent a form of investment in an R&D capital stock. Our approach is consistent with that recommendation.

¹⁵ The most recent year for which data on gross R&D expenditures are available varies by country as follows: Finland and United Kingdom (2010), United States and Australia (2008), and all other countries (2009). Where necessary, 2009 values are extrapolated based on the compound annual growth rate from the 2003-2008 period.

¹⁶ Human capital values are based on education cost estimates for 2007 and estimates of population proportions by level of educational attainment for which the most recent year of data availability is 2008. Values for 2009 were extrapolated using the compound annual growth rates for the 2003-2008 period.

Spain and Belgium experienced the greatest improvement in human capital over the 1980-2009 period, growing by 2.29 and 1.74 per cent per year, or 93.0 and 64.7 per cent overall, respectively. By contrast, the United States, starting from the highest level of per capita human capital in 1980, experienced the lowest annual average growth rate, 0.97 per cent, and increased overall by only 32.2 per cent.

Chart 11: Human Capital Stock Per Capita, Selected OECD Countries, 2000 US Dollars, 1980 and 2009

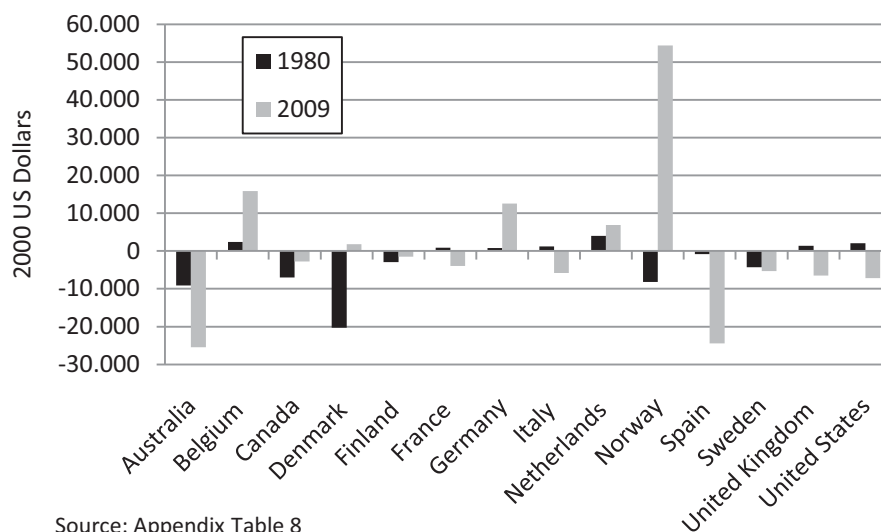


Source: Appendix Table 9

iv. Net International Investment Position

Five countries had positive net international investment positions in 2009. Norway had the best net international investment position, with a per-capita investment surplus of \$54,355 (2000 US dollars) (Chart 12 and Appendix Table 8). The other four countries were Belgium, Germany, the Netherlands, and Denmark. Out of the countries with negative investment positions, the highest deficit of \$25,429 per capita belonged to Australia. It was only slightly higher than the second largest international investment deficit of \$24,432 per capita, belonging to Spain.

Chart 12: Net International Investment Position Per Capita, Selected OECD Countries, 2000 US Dollars, 1980 and 2009



Source: Appendix Table 8

The net international investment position declined over the 1980-2009 period in seven of the fourteen countries, reflecting faster growth in foreign liabilities than in foreign assets. The largest decline was in Spain, where the net international investment position declined \$23,692 per capita in 2000 US dollars from -\$814 to -\$24,432 per capita (Appendix Table 8). Among the countries in which the net foreign asset position increased over the period, the largest increase was \$60,607 per capita (from an \$8,201 net debt to a \$54,355 net asset position) in Norway.

v. Social Costs of Environmental Degradation

Degradation of the environment negatively affects the sustainability of stocks of wealth. Placing a value on the environment or the “services provided by ecosystems” is a massive and controversial task and is 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 our framework for quantifying economic well-being, the Index does include estimates of the social costs of greenhouse gases (GHGs), which contribute to global warming. In each year, we adjust the total wealth stock estimates by subtracting the social costs of greenhouse gas emissions in that year.

Although it is emitted from a particular location, a given tonne of a GHG (especially emissions of CO₂) imposes damages at the global level. In measuring well-being, then, it is the global level of GHG emissions that matters. Our approach is to estimate the total social costs of global GHG emissions, and then allocate those costs across countries in proportion to each country’s share of world GDP.¹⁷ The estimates are

¹⁷ An alternative approach is to use country-specific GHG emissions data and assume that the social costs of GHG emissions are entirely borne by the country in which the emissions occur. We use this approach in

derived by multiplying global GHG emissions (measured in tonnes of CO₂-equivalent emissions, or tCO₂-e) by the per-tonne social cost of such emissions. In a review of 211 published estimates of the social cost of carbon, Tol (2007) finds that the average estimate from peer-reviewed studies is approximately \$21/tCO₂-e in 2000 US dollars.¹⁸ We take this as our estimate of the social costs of GHG emissions.

Norway had the highest social cost associated to greenhouse gasses in 2009, \$2,575 (2000 US dollars) per capita (Appendix Table 10).¹⁹ The second highest social cost was \$1,969 per capita in the Netherlands. The country with the lowest total in 2009, Italy, had greenhouse gas costs of \$1,425 per capita. In general, greenhouse gas costs made almost no impact on the total stock of wealth per capita; their negative contribution was between 0.85 per cent (for Germany) and 1.36 per cent (for Australia). 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 1980-2009 period, greenhouse gas emissions, and therefore the social costs associated with greenhouse gasses, increased in all fourteen countries. Norway experienced the fastest growth, with costs increasing by 1.0 per cent per year over the period. France experienced the lowest growth in cost, with growth of 0.13 per cent per year.

vi. Total Wealth Stocks

Total wealth stocks are computed by summing physical capital, human capital, R&D stock, and net international investment position, and then subtracting the social costs of GHG emissions. In 2009, Norway had the greatest total stock of wealth, at \$258,804 per capita in 2000 US dollars (Chart 13 and Table 4a). The second-place country, the Netherlands, was well behind with \$200,265 in wealth. The smallest stock of wealth, with a value of \$125,467, belonged to Spain. Canada ranked seventh out of the fourteen countries, with wealth valued at \$177,046 per capita.

another paper in which we estimate the IEWB for Canada and its provinces (Osberg and Sharpe, 2009). Neither approach is obviously better than the other, but the choice does affect the estimates. GHG emissions are affected by the composition of national output as well as the volume, so some countries (such as Australia and Canada) emit more GHGs than their share of global GDP would imply while others (such as Norway and Sweden) emit less. If we used the country-specific emissions approach rather than the global emissions approach, the measured social costs of GHG emissions would be higher in countries like Australia and Canada and lower in countries like Norway and Sweden.

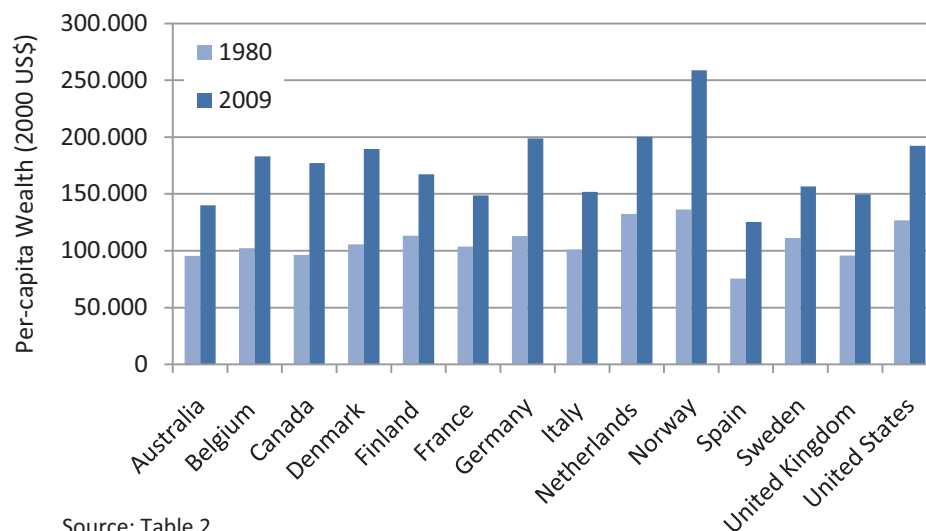
¹⁸ It is also common to express estimates of the social cost of carbon in dollars per tonne of carbon (\$/tC) rather than per tonne of carbon dioxide (\$/CO₂-e). Our assumed social cost of \$21/tCO₂-e roughly corresponds to \$76/tC. See Sharpe, Arsenault, Murray, and Qiao (2008) for a detailed discussion of the appropriate assumptions regarding the social cost of greenhouse gas emissions in the context of the valuation of the Alberta oil sands.

¹⁹ Data on global greenhouse gas emissions are from the Carbon Dioxide Information Analysis Centre and are available to 2008. The value for 2009 is extrapolated based on the compound annual growth rate for the 2003-2008 period.

Norway and Canada had the fastest growth in total wealth over the 1980-2009 period, at 2.23 per cent and 2.13 per cent per year, respectively. The slowest growth was 1.18 per cent per year in Sweden.

The index of the wealth domain is obtained by applying the linear scaling procedure to the total wealth stock data for all countries over the 1980-2009 period. This does not affect the cross-country rankings in terms of levels (though it can affect rankings in terms of growth rates).

Chart 13: Total Wealth Stocks Per Capita, Selected OECD Countries, 2000 US Dollars, 1980 and 2009



Source: Table 2

E. Trends in the Economic Equality Domain

The third domain 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 in two component concepts: income inequality and poverty. We measure income inequality using the Gini coefficient, which we compute for the total population of family units based on family after-tax equivalent income data from the Luxembourg Income Study (LIS). To measure poverty, we use poverty intensity, which is the product of the poverty rate and the poverty gap. The poverty rate and gap are also based on LIS family after-tax equivalent income, with the poverty line defined as fifty per cent of the median family income. The poverty rate is the proportion of persons whose income is below the poverty line, and the poverty gap is the average *per cent* difference between the poverty line and the incomes of those whose incomes fall below it.

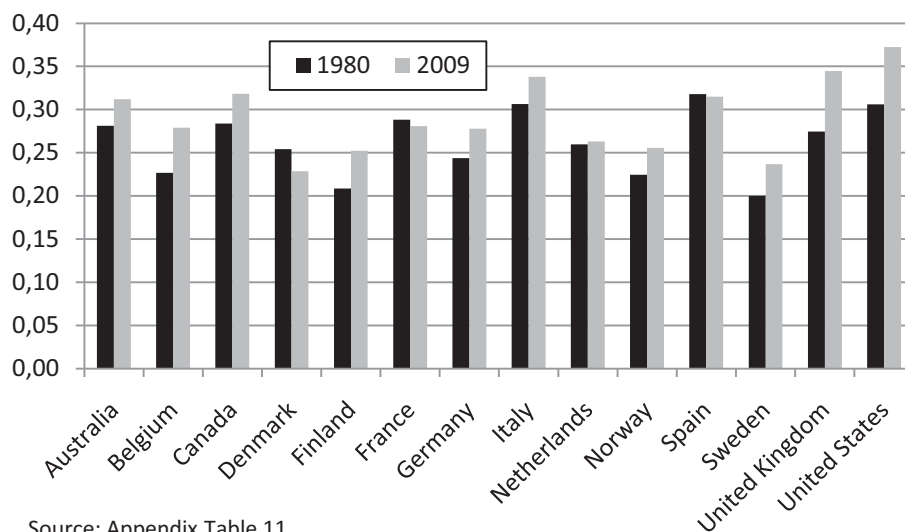
High poverty intensity is considered more detrimental to economic well-being than an unequal income distribution. Consequently, poverty intensity is given a weight of

three quarters, and income distribution a weight of one quarter, in the determination of the overall index for the equality domain.

i. Inequality

In 2009, the Gini coefficient was greatest for the United States at 0.372 and followed by the United Kingdom and Italy at 0.345 and 0.338, respectively (Appendix

Chart 14: Gini Coefficient Based on Family After-tax Equivalent Income, Selected OECD Countries, 1980 and 2009



Source: Appendix Table 11

Table 11 and Chart 14).²⁰ The Scandinavian social democracies had the lowest measured inequality; Denmark had a Gini coefficient of 0.229, followed by the Sweden with a coefficient of 0.237. Finland and Norway were third and fourth with coefficients of 0.252 and 0.256, respectively.²¹ Canada had the fourth most unequal income distribution in 2009, with a Gini coefficient of 0.318.

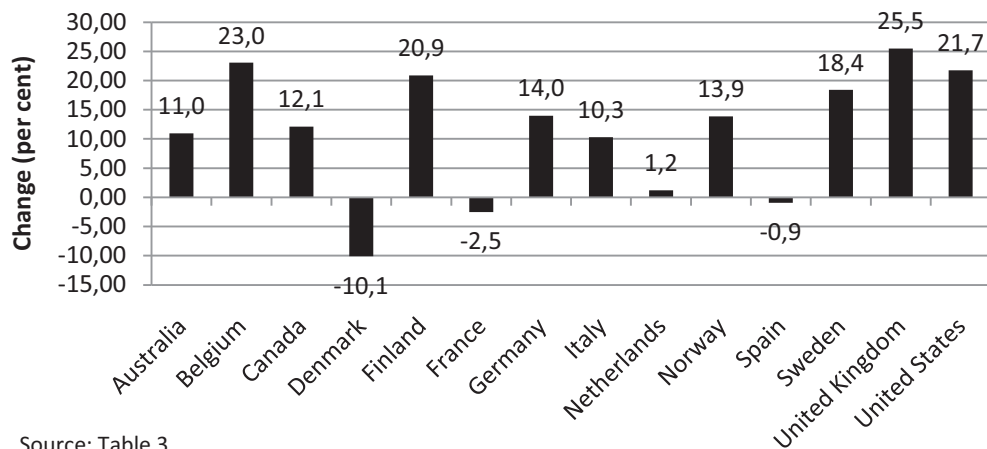
Over the 1980-2009 period, only one country – Denmark – achieved a substantial reduction in economic inequality. The Gini coefficient of Denmark declined by 0.026 points or 10.1 per cent overall (Chart 15). France and Spain were the only other countries in which inequality declined over the period, but the change was just 2.5 per cent in France and 0.9 per cent in Spain. The United Kingdom experienced the greatest increase

²⁰ Data on inequality and poverty are computed from the Luxembourg Income Study database. The most recent year for which data are available varies across countries as follows: the Netherlands (1999); Belgium, France, Germany, Italy and Spain (2000); Australia (2003); Canada, Denmark, Finland, Norway, the United Kingdom and the United States (2004); and Sweden (2005). Data for subsequent years are assumed to be equal to the most recent available value.

²¹ 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.

in the income gap, with its Gini coefficient growing by 0.07 points or 25.5 per cent. In Canada, the Gini coefficient increased 12.1 per cent over the period.

Chart 15: Total Change in the Gini Coefficient, Selected OECD Countries, Per Cent, 1980-2009



Source: Table 3

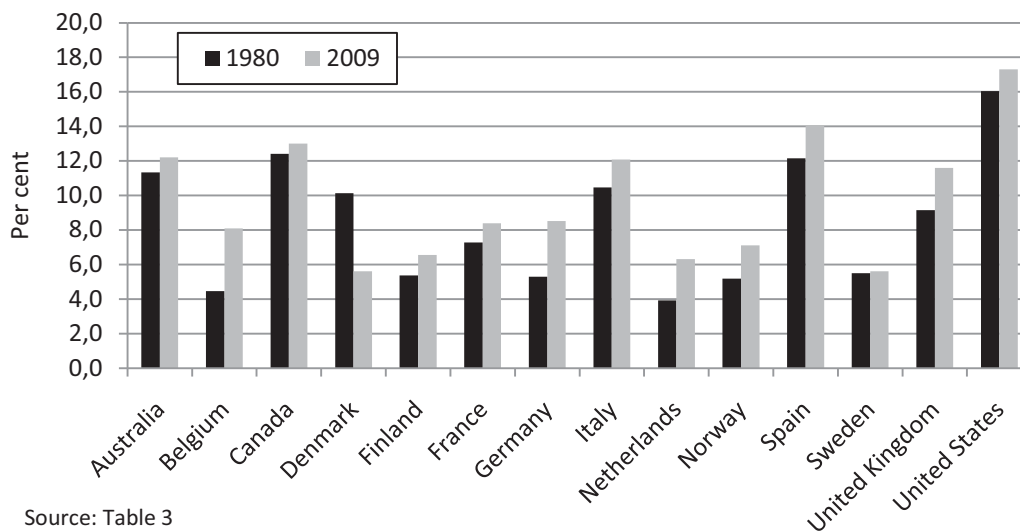
ii. Poverty

The United States had the highest poverty rate in 2009, with 17.3 per cent of the total population defined as poor (Appendix Table 12 and Chart 16). Spain and Canada followed, with poverty rates of 14.1 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 in its high 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, over 10 percentage points lower than the poverty rate of the United States. The lowest poverty rates belonged to Denmark and Sweden, which both had rates of 5.6 per cent. The Netherlands had the third lowest poverty rate at 6.3 per cent.

Over the 1980-2009 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, in proportional terms, Belgium, and the Netherlands led the vast majority of countries increasing 3.64, and 2.39 percentage points, or 87.9 and 61.2 per cent over the period, respectively. Germany also had a significant increase in its overall poverty rate - 3.22 percentage points, or 60.7 per cent. 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.

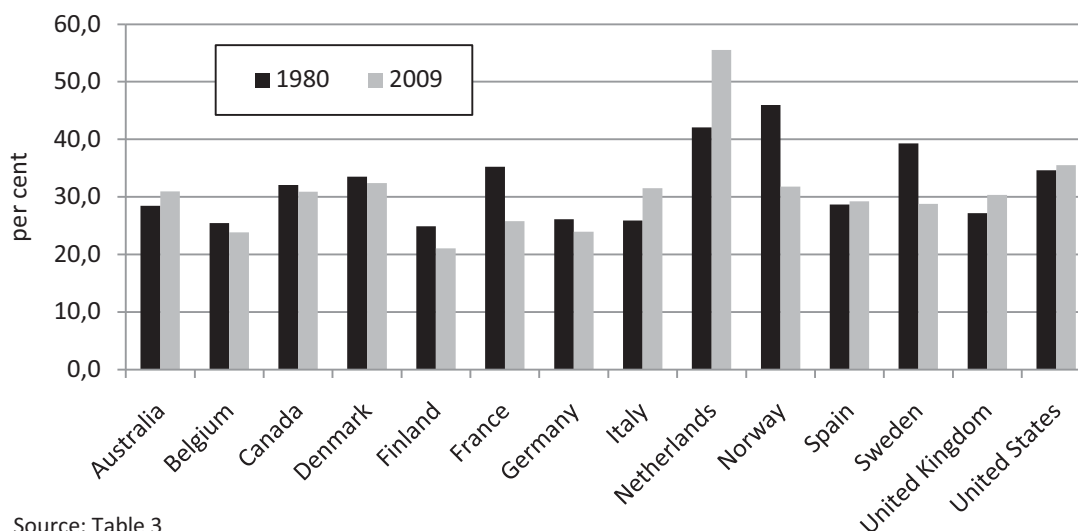
The poverty gap is the average difference between the poverty line and the incomes of individuals living below the poverty line. In this report, we express it as a percentage of the poverty line. In 2009, the poverty gap was greatest in the Netherlands, at 55.5 per cent (Appendix Table 13 and Chart 17). The United States followed with a poverty gap of 35.5 per cent. The smallest poverty gaps were in Finland and Belgium, at 21.0 per cent and 23.8 per cent, respectively. Changes in the poverty gap between 1980

Chart 16: Poverty Rate for All Persons, Selected OECD Countries, Per Cent, 1980 and 2009



Source: Table 3

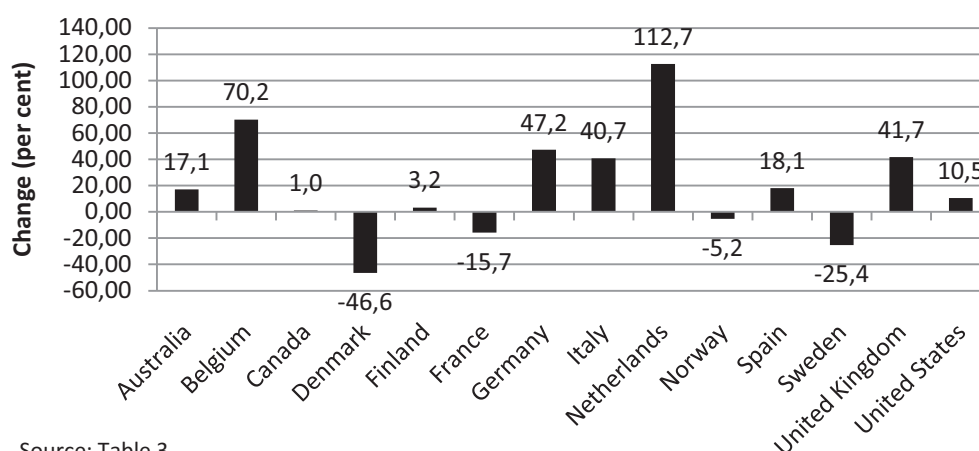
Chart 17: Poverty Gap for All Persons, Selected OECD Countries, Per Cent, 1980 and 2009



Source: Table 3

and 2009 show that only six countries experienced increases in their poverty gaps. The greatest increase was experienced by the Netherlands, where the poverty gap grew by 13.4 percentage points, or 31.9 per cent, over the period. Among countries in which the poverty gap declined, the greatest improvement was 14.2 percentage points, or 30.8 per cent, in Norway. France's and Sweden's poverty gaps also decreased impressively, with negative growth of 26.8 per cent and 26.7 per cent, respectively. In absolute terms, France's poverty gap decreased 9.4 percentage points and Sweden's decreased 10.5 percentage points.

Chart 18: Changes in Poverty Intensity, Selected OECD Countries, Per Cent, 1980-2009



Source: Table 3

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 United States had the highest poverty intensity in 2009 (Appendix Table 14). Conversely, Finland was among the countries with the lowest poverty gaps and poverty rates, and therefore had the lowest poverty intensity in 2009.

The trend of poverty intensity for the 1980-2009 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 declined by 46.6 per cent (Chart 18). On the other hand, due to its considerable increase in both the poverty rate and the poverty gap, the Netherlands's poverty intensity grew by 112.7 per cent.

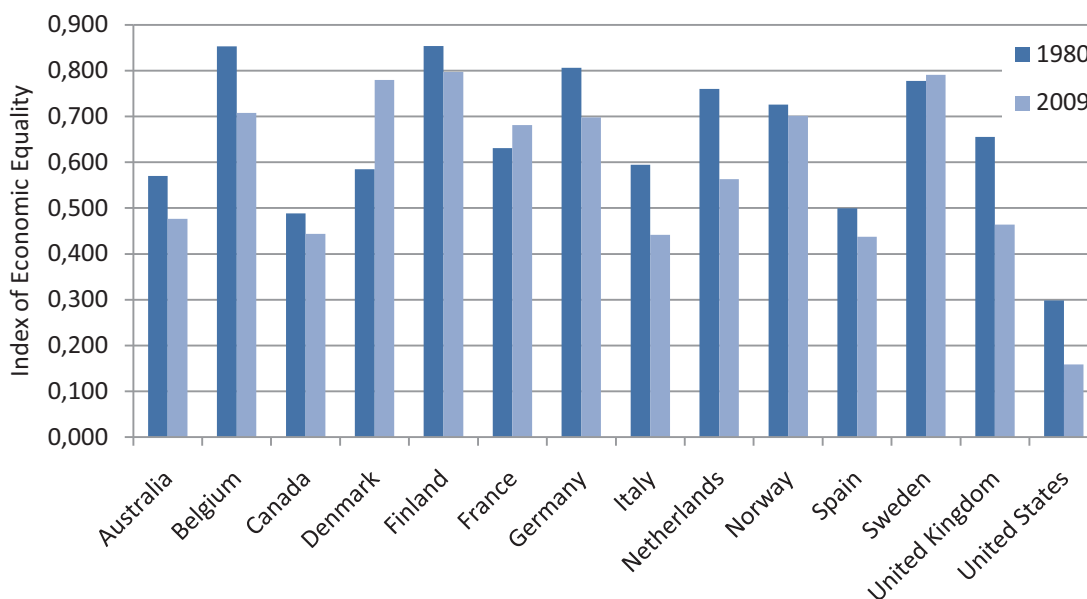
iii. Overall Economic Equality Domain

The index of the economic equality domain is the weighted sum of the scaled Gini coefficient and the scaled poverty intensity, with poverty intensity receiving three quarters of the weight. In 2009, Finland had the highest economic equality score, at 0.797 (Table 3 and Chart 19). The United States was the country with the least equality by far;

its index score of 0.159 was 63.6 per cent below the next lowest score, Spain's 0.437. Canada ranked eleventh among the fourteen countries with a score of 0.444.

Economic equality increased in only three countries over the 1980-2009 period: Denmark, France, and Sweden. The most progress among them was made by Denmark, where the index of equality grew 0.195 points, or 33.3 per cent. The United States, the United Kingdom, and the Netherlands experienced the greatest setbacks in terms of equality, with the United States falling by 0.139 points (or 46.8 per cent), the United Kingdom by 0.191 points (or 29.2 per cent), and the Netherlands falling by 0.197 points (25.9 per cent) over the period.

Chart 19: Index of the Economic Equality Domain, Selected OECD Countries, 1980 and 2009



Source: Table 9

F. Trends in the 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 1998.²² 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.

i. Risk from Unemployment

²² For a discussion of the role of economic security in an index of economic well-being and an assessment of the CSLS approach to the measurement of economic security, see Heslop (2009).

Risk imposed by unemployment is determined by two variables: the unemployment rate and the proportion of earnings that are replaced by unemployment benefits.²³ Each of these measures is scaled, and then summed with weights of 0.8 and 0.2, respectively. This weighted sum is the unemployment component of the security index.

a. Unemployment rate

In 2009, the lowest unemployment rate was in Norway, where 3.19 per cent of the labour force was unemployed (Appendix Table 15 and Chart 20). Norway was followed by the Netherlands and Australia, which had unemployment rates of 3.41 and 5.59, respectively. Spain had the highest unemployment rate of 18.09 per cent.

Over the 1980-2009 period, the unemployment rate decreased most significantly for the Netherlands. There, the unemployment rate fell by 2.74 percentage points, or 44.6 per cent. The two countries to experience the greatest increase in their unemployment rates were Spain and Sweden. Spain experienced positive growth of 6.57 percentage points, or 57.1 per cent, while Sweden's unemployment rate increased by 6.09 percentage points, or 274.1 per cent.

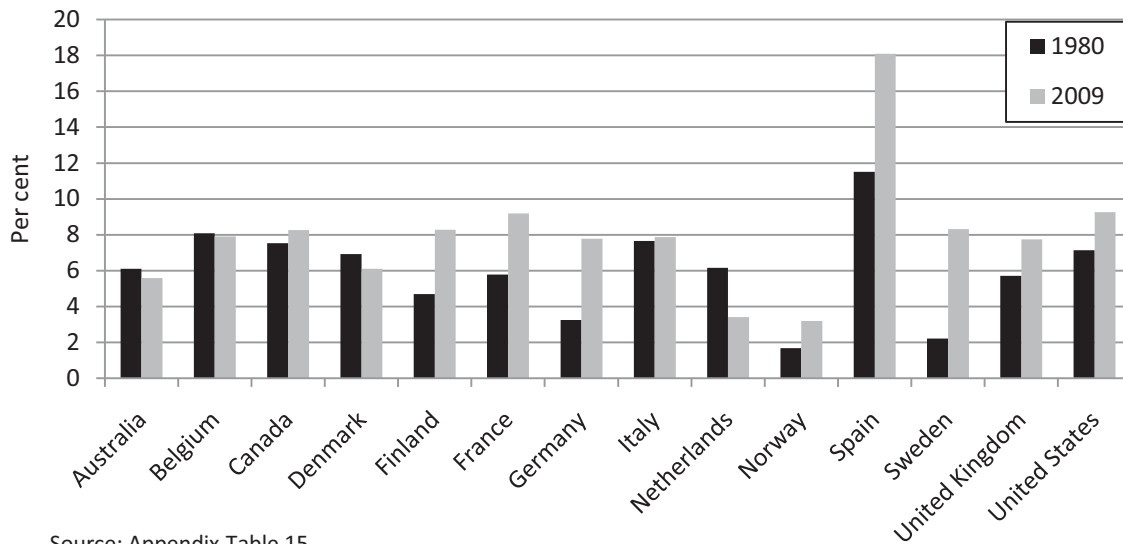
b. Unemployment insurance replacement rate

The unemployment insurance replacement rate is defined as the share of labour earnings replaced by unemployment insurance. It is computed as an average replacement rate for two earnings levels, three family situations, and three durations of unemployment (Martin, 1996). The proportion of income replaced by unemployment benefits was greatest in the Denmark in 2009, at 47.7 per cent (Appendix Table 22 and Chart 21).²⁴ Denmark was followed by Belgium, which had a replacement rate of 40.0 per cent. Canada had the lowest replacement rate at 11.7 per cent, less than one quarter of Denmark's rate.

²³ In our estimates of the Index of Economic Well-being for Canada and the provinces (Osberg and Sharpe, 2009), security from unemployment is also determined by the unemployment insurance coverage rate (the proportion of the unemployed who receive unemployment insurance benefits). The unemployment component of the economic security domain is a weighted sum of the scaled unemployment rate and the scaled product of the unemployment insurance coverage and replacement rates, with eighty per cent of the weight assigned to the unemployment rate. Data limitations prevent us from using the coverage rate in our international estimates.

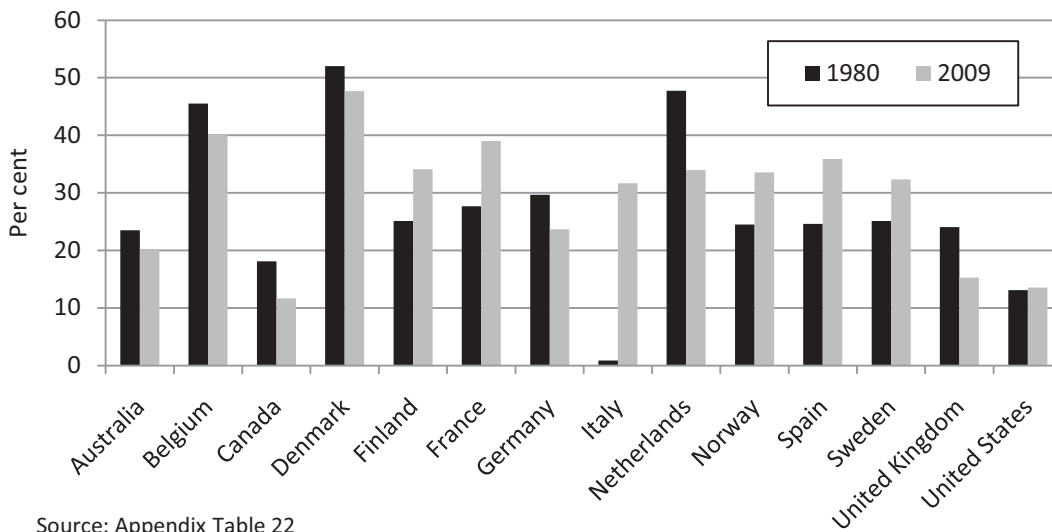
²⁴ Data on the unemployment insurance replacement rate are available to 2007. Values for 2008 and 2009 are assumed to be equal to the 2007 values.

Chart 20: Unemployment Rate, Selected OECD Countries, Per cent, 1980 and 2009



Source: Appendix Table 15

Chart 21: Unemployment Insurance Gross Replacement Rate, Selected OECD Countries, Per Cent, 1980 and 2009



Source: Appendix Table 22

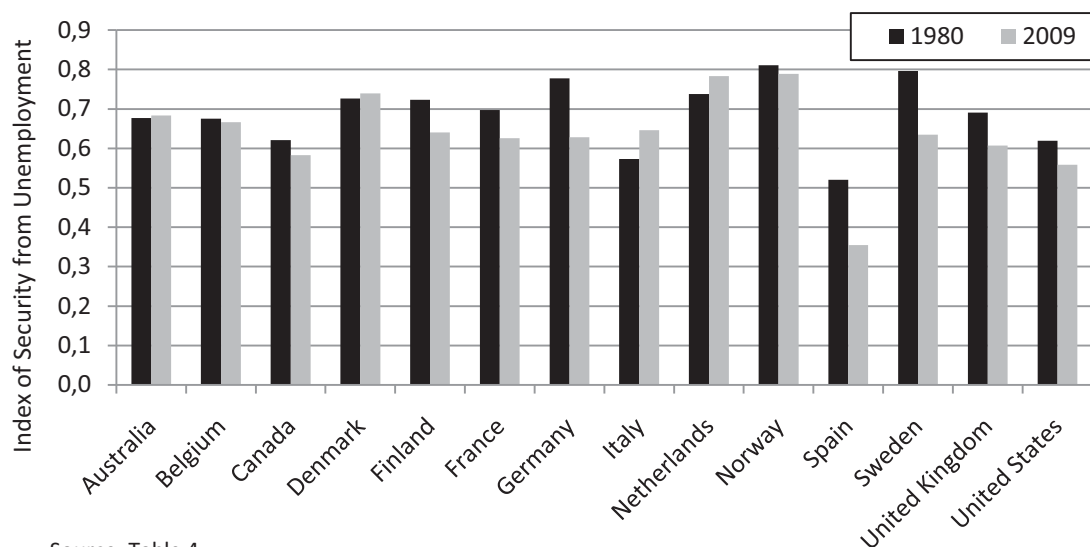
Over the 1980-2009 period, the replacement rate increased in seven of the fourteen countries. By far the greatest positive growth occurred in Italy, where the replacement rate grew by 30.8 percentage points from an insignificant 0.8 per cent in 1980 to 31.7 per cent in 2009 (an increase of 3,639 per cent). The next largest increase was 45.8 per cent in Spain. The largest proportional decline was in the United Kingdom, where the rate fell by 36.6 per cent from 24.1 per cent in 1980 to 15.2 per cent in 2009. Canada's 35.7 per cent decline, from 18.1 per cent to 11.7 per cent, was the second largest over the period.

c. Overall security from unemployment

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 added together. Due to the fact that it had a high replacement rate and a low unemployment rate, Norway had the highest scaled level of protection from unemployment in 2009, at 0.789 points, followed closely by the Netherlands at 0.784 (Table 4 and Chart 22). On the opposite end, mostly due to its high unemployment rate, Spain had the lowest scaled level of protection from unemployment, 0.355 points.

Between 1980 and 2009, the scaled unemployment protection index fell for several countries. Spain experienced the greatest decline, 0.165 points, or 31.8 per cent. Italy, on the other hand, saw its index grow by 0.073 points, or 12.8 per cent. The growth pattern of the index over the sub-periods also very closely followed the growth of the unemployment rate.

Chart 22: Index of Security from the Risk of Unemployment, Selected OECD Countries, 1980 and 2009



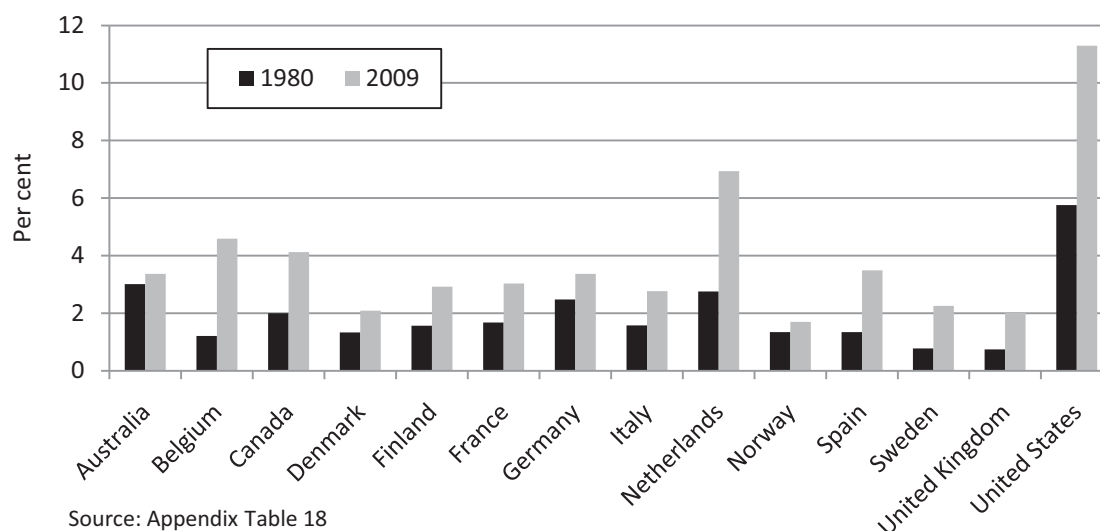
Source: Table 4

ii. 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.

Chart 23: Private Health Care Expenditures as a Proportion of Personal Disposable Income, Selected OECD Countries, Per Cent, 1980 and 2009



In 2009, the highest share of private expenditure on healthcare in personal disposable income was 11.30 per cent in the United States, giving it the smallest scaled protection from illness value of 0.083 points (Appendix Tables 18 and 19 and Chart 23).²⁵ The United States, being the only country without a comprehensive universal medical coverage program, was far ahead of all other studied countries in terms of private expenditures on healthcare. Norway had the lowest medical expenses as a share of personal disposable income, 1.70 per cent, giving it a scaled index value of 0.841 points.

From 1980 to 2009, the share of medical expenses in personal disposable income grew for all countries. In absolute terms, the share of the United States increased the most, growing by 5.55 percentage points, or 96.5 per cent (leading to an 84.0 per cent decline in its scaled security from illness index). However, in proportional terms this was not the greatest growth, as Belgium's 4.71 percentage-point increase represented growth of 279.5 per cent.

²⁵ Data on private health care expenditures are from OECD Health Data. The most recent year of data availability varies across countries as follows: the Netherlands (2002); Belgium (2005); and all other countries (2007). Values for subsequent years are extrapolated based on the compound annual growth rates over the five most recent years of data availability (i.e. 1997-2002 for the Netherlands).

iii. Risk from Single-Parent Poverty

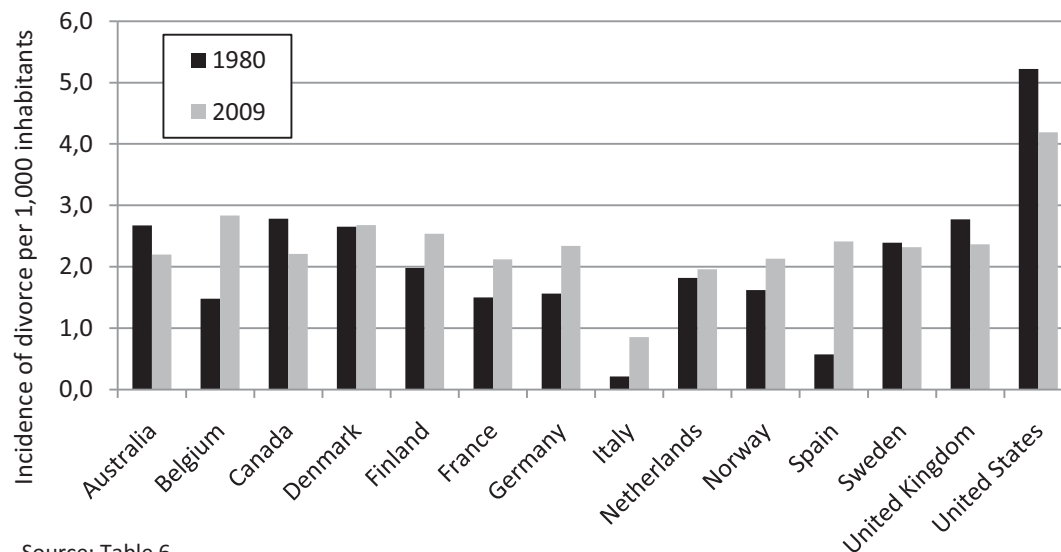
The third component of the economic security domain is the risk of single parent poverty. This component consists of three variables: the divorce rate (as divorce throws many women into poverty), the poverty rate for lone female-headed families and the poverty gap for these families. As in the economic equality domain, the poverty line is defined as fifty per cent of median after-tax equivalent income. The poverty rate is the proportion of single women with young children whose income is below the poverty line. the poverty gap is the average per cent difference between the poverty line and the incomes of the single mothers whose incomes are below the poverty line.

a. Divorce rate

In 2009, the United States had the highest divorce rate for married couples, 4.19 per 1,000 inhabitants (Table 6 and Chart 24).²⁶ Belgium followed the United States with a divorce rate of 2.83 per 1,000. The lowest divorce rate was in Italy (perhaps due to more traditional or religious values), 0.85 per 1,000, less than one fifth of the US rate. The divorce rate in Canada was 2.21 per 1,000 inhabitants in 2009, sixth lowest among the fourteen countries.

Over the 1980-2009 period, divorce rates grew in nine of the countries. The largest proportional increases were 323.0 per cent in Spain and 306.4 per cent in Italy; these were the countries with the two lowest divorce rates in 1980, so it is unsurprising that they experienced the largest per cent increases. The largest decline over the period was 20.5 per cent in Canada, which had one of the highest divorce rates in 1980.

²⁶ Data on divorce rates are from the UN Demographic Yearbook. The most recent year of data availability varies across countries as follows: the United States (1998); the United Kingdom (2003); Canada (2004); Australia and Italy (2005); and all other countries (2006). Subsequent values are assumed to be equal to the value in the most recent year of data availability.

Chart 24: Divorce Rate, Selected OECD Countries, Incidence per 1,000 Inhabitants, 1980 and 2009

Source: Table 6

b. Poverty

The poverty rate for single women with children under 18 in 2009 was greatest for the United States at 43.7 per cent (Appendix Table 21 and Chart 25).²⁷ Canada had the second highest poverty rate, at 43.4 per cent. Much like the general poverty rate, the poverty rate for single women with children was lowest in Denmark (at 7.4 per cent), Sweden (at 9.7 per cent) and Finland (at 11.5 per cent).

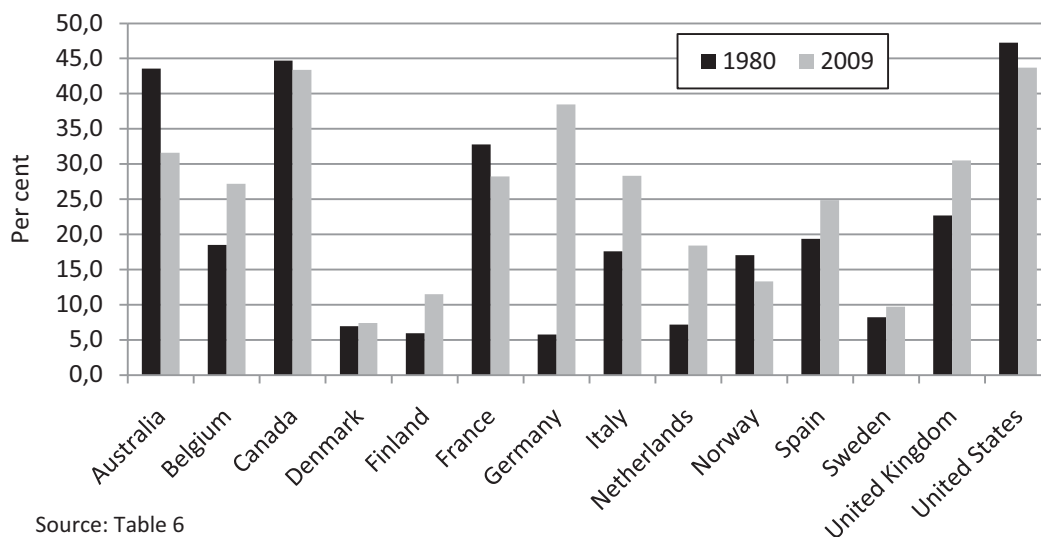
The poverty rates for single women with children under 18 increased in 9 of the 14 countries over the 1980-2009 period. The greatest growth was experienced by Germany, where the poverty rate increased by an amazing 32.7 percentage points, from 5.7 per cent in 1980 to 38.5 per cent in 2009 – growth of over 500 per cent. The Netherlands also experienced significant growth here. Among the countries in which the poverty rate fell, the greatest decline – in both proportional and percentage-point terms – was in Australia; its poverty rate fell by 12.0 percentage points (27.4 per cent). Although they had the two highest single-mother poverty rates in 2007, both Canada and the United States experienced declines in the rate (by 2.9 and 7.5 per cent, respectively) over the 1980-2009 period.

The 2009 poverty gap for female headed families with children under 18 was greatest in the United States, at 42.7 per cent, followed by Italy at 42.3 per cent (Table 6 and Chart 26). The lowest poverty gaps were 17.6 per cent in Finland and 17.8 per cent in France. Canada had the fifth highest rate, at 28.9 per cent.

²⁷ Data are from the Luxembourg Income Study. See Footnote 20.

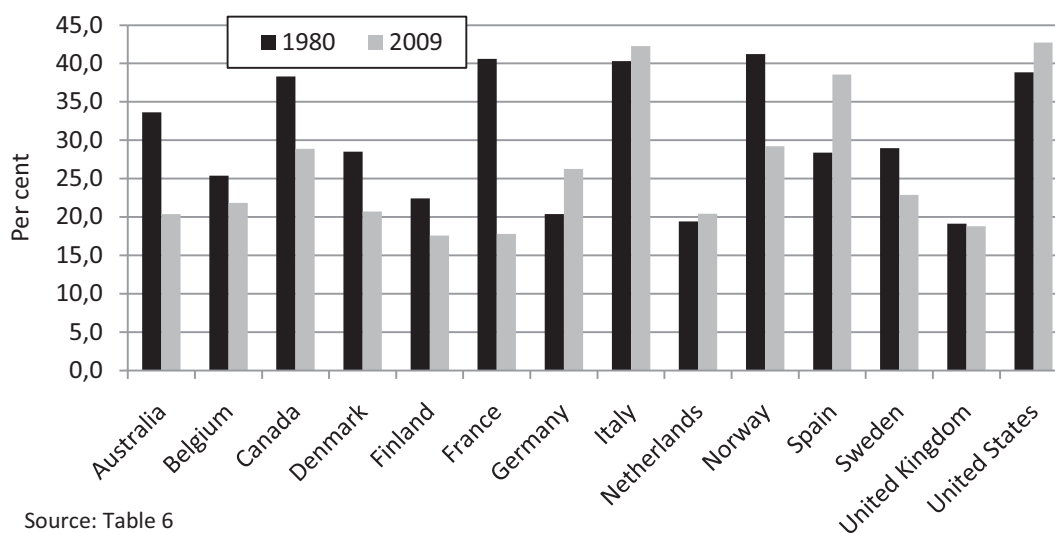
Over the 1980-2009 period, the single-mother poverty gap fell in nine of the fourteen countries. The largest decline was 22.8 percentage points (or 56.2 per cent) in France. Out of the five countries that experienced positive growth in their poverty gaps, the largest increase was 10.2 percentage points (or 35.9 per cent) in Spain. In Canada, the poverty gap fell 9.4 percentage points (or 24.6 per cent); this was the fourth largest percentage-point decline among the fourteen countries.

Chart 25: Poverty Rate for Single Women with Children Under 18, Selected OECD Countries, Per Cent, 1980 and 2009



Source: Table 6

Chart 26: Poverty Gap for Single Women with Children Under 18, Selected OECD Countries, Per Cent, 1980 and 2009



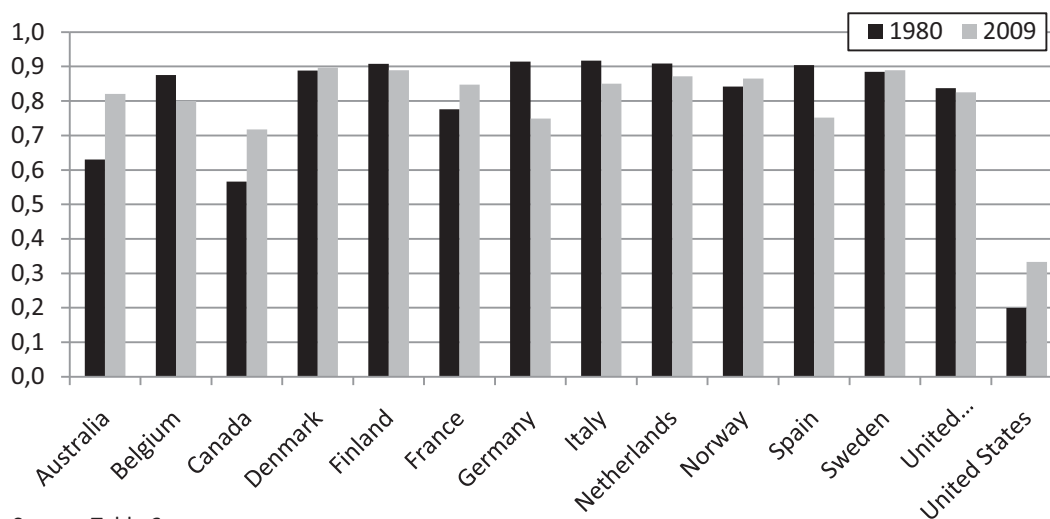
Source: Table 6

c. Overall security from single-parent poverty

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-headed families, and the poverty gap for single female-headed families. That measure is then converted into a scaled index. Due to its very low poverty rate, Denmark was the country where single parents were safest from poverty in 2009, with a scaled index value of 0.897 points (Table 6 and Chart 27). The United States had the lowest index score by a wide margin; its score of 0.333 was 53.6 per cent below the next lowest score, Canada's 0.717.

Despite having the lowest index level for 2009, the United States showed the most improvement, in proportional terms, over the entire 1980-2009 period; its index grew by 66.9 per cent (or 0.134 points). Canada's 26.7 per cent increase was the third largest. Security from single-parent poverty decreased in seven of the countries, with the largest declines occurring in Germany (18.1 per cent) and Spain (16.8 per cent).

Chart 27: Index of Security from Single-parent Poverty, Selected OECD Countries, 1980 and 2009



Source: Table 6

iv. Risk of Poverty in Old Age

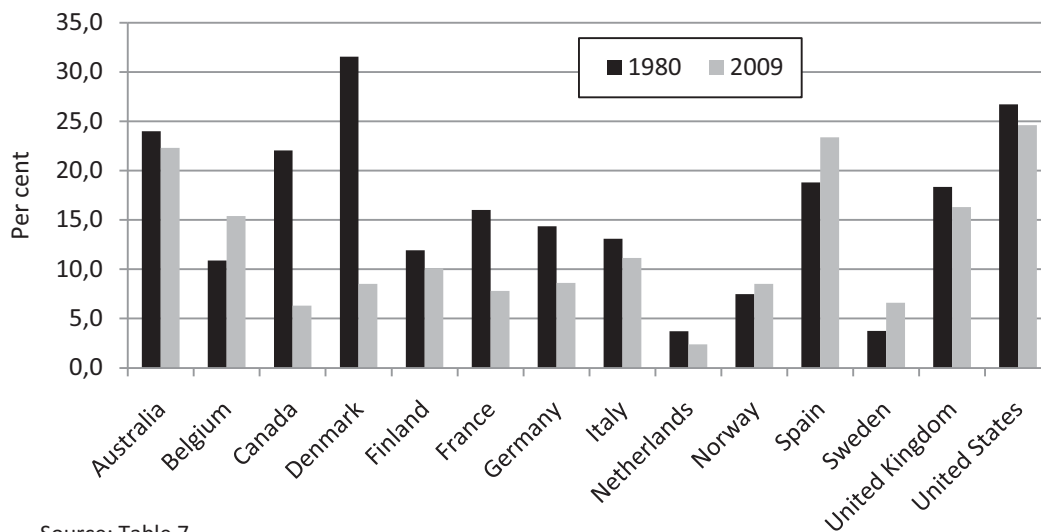
The fourth component of the economic security domain is the risk of poverty in old age. This component is proxied by the poverty intensity experienced by the households headed by a person 65 and over.

a. Poverty

In 2009, the elderly poverty rate was greatest in the United States, at 24.6 per cent (Table 7 and Chart 28).²⁸ Spain had the second highest rate, at 23.4 per cent. The lowest elderly poverty rates were 2.4 per cent in the Netherlands and 6.3 per cent in Canada.

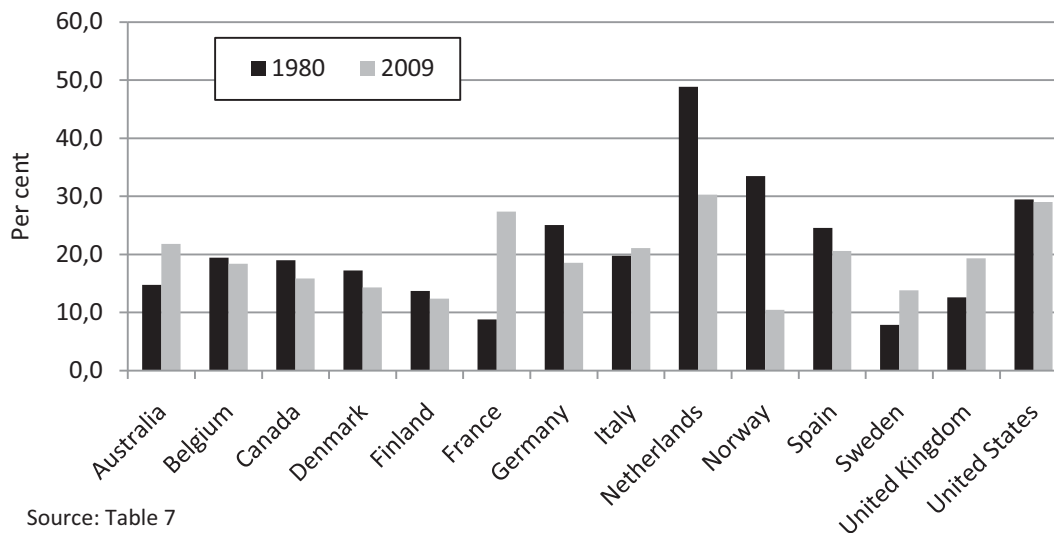
Over the 1980-2009 period, four of the selected fourteen countries experienced increasing elderly poverty rates. In absolute terms they were led by Spain, the poverty rate of which grew by 4.58 percentage points (24.4 per cent). In proportional terms, their leader was Sweden, which grew by 75.8 per cent (as a result of an increase of 2.85

Chart 28: Poverty Rate for Elderly Families, Selected OECD Countries, Per Cent, 1980 and 2009



Source: Table 7

Chart 29: Poverty Gap for Elderly Families, Selected OECD Countries, Per Cent, 1980 and 2009



Source: Table 7

²⁸ Data are from the Luxembourg Income Study. See Footnote 20.

percentage points from a very low rate in 1980). Denmark and Canada had the largest improvements, with declines of 23.0 and 15.8 percentage points (or 73.1 and 71.4 per cent), respectively.

The elderly poverty gap ratio was highest in the Netherlands in 2009, at 30.3 per cent (Table 7 and Chart 29). The United States followed with a poverty gap ratio of 29.0 per cent. The lowest gap, 10.5 per cent, belonged to Norway. Canada's elderly poverty gap of 15.9 per cent was the fifth lowest among the fourteen countries.

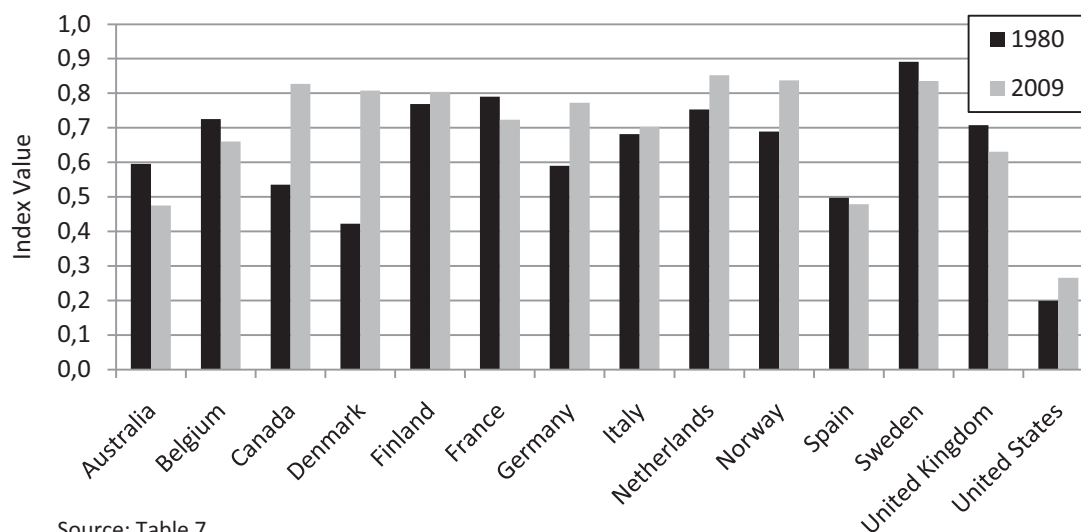
In terms of changes in the poverty gap over the 1980-2009 period, the greatest absolute increase of 18.5 percentage points was experienced by France (equal to proportional growth of 211.0 per cent). Of the nine countries that experienced negative growth in the elderly poverty gap, the largest decline was 23.0 percentage points (or 68.7 per cent) in Norway.

b. Index of security from poverty in old age

To compute the index of security from the risk of poverty in old age, we calculate poverty intensity (the product of the poverty gap and the poverty rate) and then convert it into a scaled index using the linear scaling procedure.

Citizens of the United States were least secure from poverty due to old age in 2009, with the lowest scaled index level of 0.266 (Table 7 and Chart 30). This is unsurprising, since the United States had the highest elderly poverty rate and the second-highest elderly poverty gap in 2009. As in the case of security from single-parent poverty, there was a considerable gap between the United States and the country with the next lowest score; the US score was 44.0 per cent below the next lowest score, Australia's 0.475. The country with the greatest security from elderly poverty was the Netherlands, which had a scaled index level of 0.852. Norway and Sweden followed, with scores of 0.837 and 0.835, respectively.

Australia was the country that experienced the sharpest drop in its index during the 1980-2009 period, losing 20.3 per cent of its 1980 index level, or 0.121 points. Most likely due to their declining poverty rates, Denmark and Canada experienced the most significant improvements in the index of security from old-age poverty: 0.385 and 0.292 points (91.1 and 54.5 per cent), respectively.

Chart 30: Index of Security from Poverty in Old Age, Selected OECD Countries, 1980 and 2009

Source: Table 7

v. Weighting of the Components in the Index of the Economic Security Domain

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 2009, this ranged between 61.8 per cent in France, to 68.0 per cent in Canada (Appendix Table 27). The total population (i.e. 100 per cent) 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 married women with children under 18. As a proportion of the population in 2009, this group ranged from 26.5 per cent in Italy to 39.3 per cent in the United States. Finally, it is assumed that the population aged 45 to 64 is most likely to feel anxiety regarding the risk from poverty in old age. In 2009, this age group constituted between 24.6 per cent (in Spain) and 28.7 per cent (in Finland) of the population.

The component-specific weights are generated by summing the four proportions of the population subject to the four risks and then standardizing to unity by dividing each proportion by that sum.

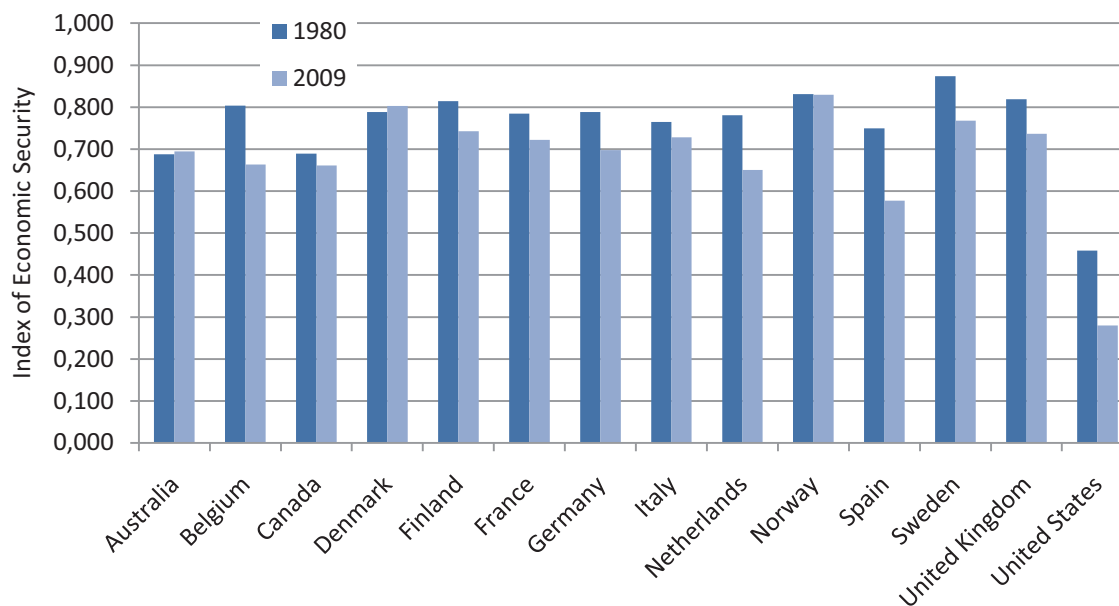
As a result of demographic shifts, the proportion of the population affected by various risks changed over time. With the aging of the population, the proportion of the population aged 15-64 and the proportion of the population aged 45-64 increased for almost all countries, while the proportion of married women with children under 18 declined over the 1980-2009 period.

The contribution of each component of the security domain index is the product of its scaled value and weight. For example, for Canada in 2009, the weighted scaled security from risk imposed by unemployment was 0.173 (0.582×0.297), the weighted scaled security from risk imposed by illness was 0.284 (0.65×0.437), risk of single parent poverty was 0.105 (0.717×0.146) and risk of poverty from old age was 0.099 (0.827×0.120). The sum of the four components was 0.661, the index value of the overall security domain for Canada in 2009.

vi. Overall Index of the Economic Security Domain

Economic security was greatest in Norway, with a value of 0.829 points in 2009 (Table 8 and Chart 31). Norway was followed by Denmark with a value of 0.803 points. The United States had by far the lowest score for economic security, at 0.280; the next lowest was 0.577 in Spain. Canada ranked eleventh with a score of 0.661.

Chart 31: Index of Economic Security, Selected OECD Countries, 1980 and 2009



Source: Table 9

Twelve of the fourteen countries experienced a decline in economic security over the 1980-2009 period. The United States and Spain fell the most in proportional terms, with declines of 39.0 per cent (or 0.179 points) and 23.1 per cent (or 0.173 points), respectively. The overall trend of the index was clearly negative across the fourteen countries, as even the country that experienced the greatest positive growth, Denmark, increased by only 1.8 per cent (or 0.014 points) over the period. The only other country that experienced positive growth in security was Australia (1.0 per cent).

IV. Sensitivity Analysis

In this section, we explore the sensitivity of our results to the choice of the weights that are assigned to the four domains of well-being. In the literature, most composite indices assign equal weight to each component; the best known example is probably the Human Development Index, which assigns equal weight to sub-indices of education, health and access to resources (i.e. the log of GDP per capita). The main baseline results we report continue in this tradition, but there is no objective sense in which this weighting scheme is preferable to all others. The choice of weights is a value judgment, and the IEWB is designed to make that judgment as transparent as possible. There are defensible alternative weighting schemes, and we would like to know the robustness of our qualitative findings to changes in the weights.²⁹

We compute the Index of Economic Well-being under three alternative weighting schemes. They are outlined in Exhibit 5 below. The baseline results are those reported in earlier sections of this report, with each domain given equal weight. Alternative 1 keeps the weights for equality and security unchanged, but shifts some of the weight from wealth stocks to consumption flows. This is reasonable if it is believed that people value current consumption more than accumulated stocks of wealth. Note that these were the weights that we used in the original estimates of the Index (Osberg and Sharpe, 1998); although these weights do not exactly reflect the proportion of national income that Canadians collectively choose to invest rather than consume in a typical year, the implied 4:1 ratio of the value of consumption relative to savings is far closer than the 1:1 ratio in the baseline IEWB. Alternative 2 assigns zero weight to distributional concerns; the weight placed on the economic equality domain, which includes both income inequality and poverty, is set to zero.³⁰ Alternative 3 was recently suggested by the French business magazine *L'Expansion* (Dedieu, 2009). It assigns high weights to economic equality and security and low weights to consumption and wealth.

Exhibit 5: Weighting Schemes for Sensitivity Analysis

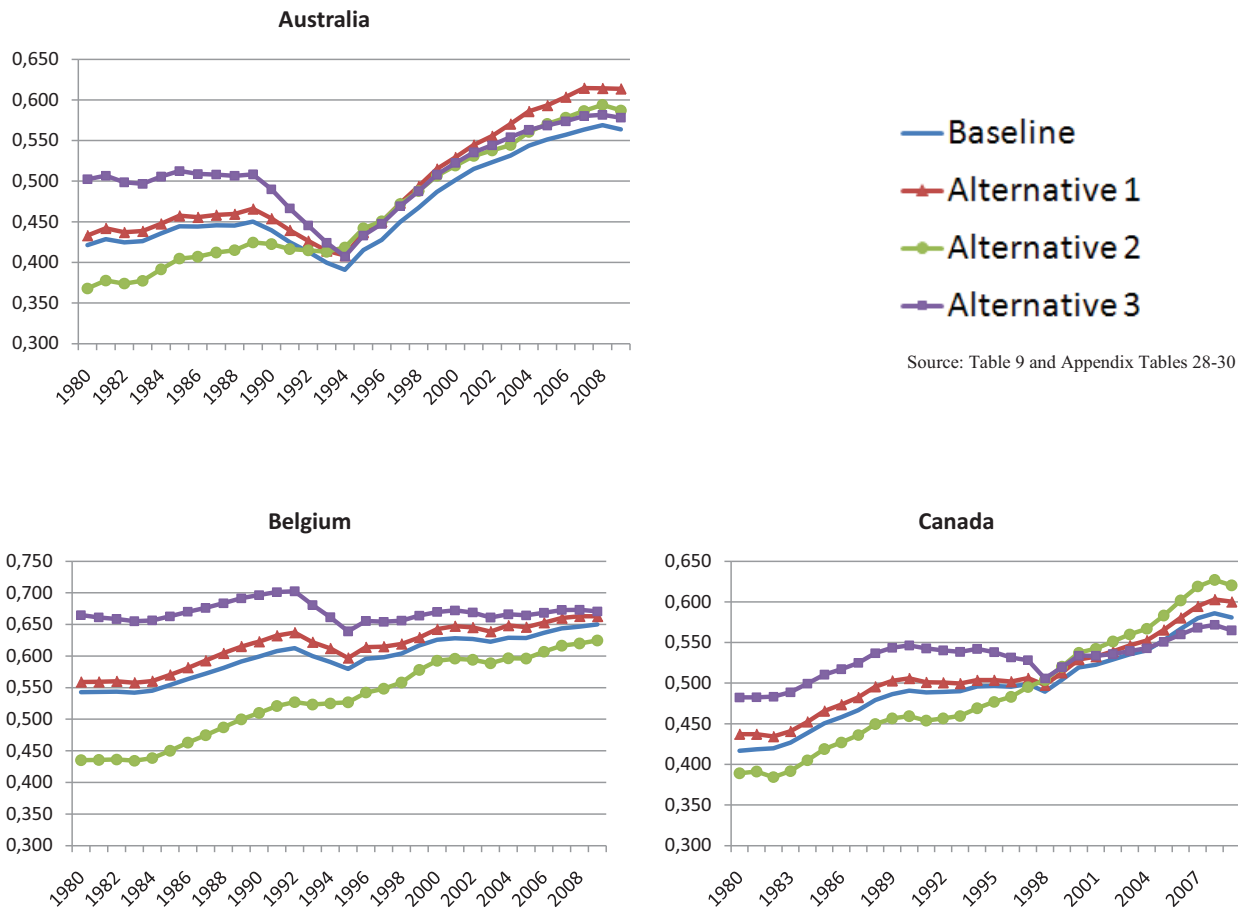
Weights

	Consumption	Wealth	Equality	Security
Baseline (Alternative 0)	0.25	0.25	0.25	0.25
Alternative 1	0.40	0.10	0.25	0.25
Alternative 2	0.33	0.33	0.00	0.33
Alternative 3	0.20	0.10	0.40	0.30

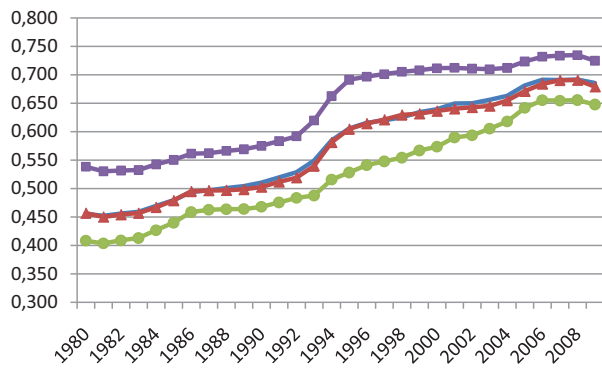
²⁹ Again, we invite readers to download the data tables in Microsoft Excel format at the CSLS web site (http://www.csls.ca/iwb/Weights_OECD.xls) and build versions of the Index of Economic Well-being with their own preferred weights for the four domains.

³⁰ If it is thought to be 'left-wing' to emphasize distributional issues, then putting zero weight on such issues might be thought to be an extreme 'right-wing' perspective.

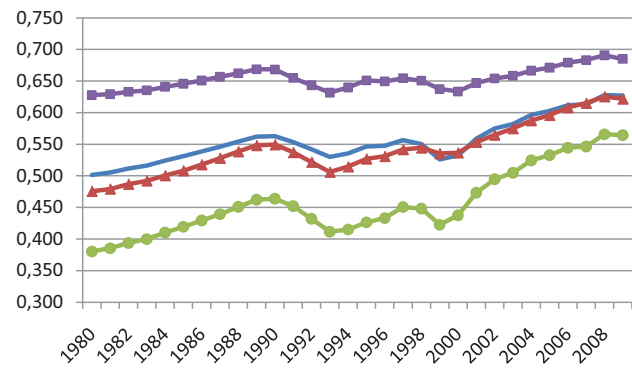
Chart 32: Index of Economic Well-being under Alternative Weighting Schemes, Selected OECD Countries, 1980-2009



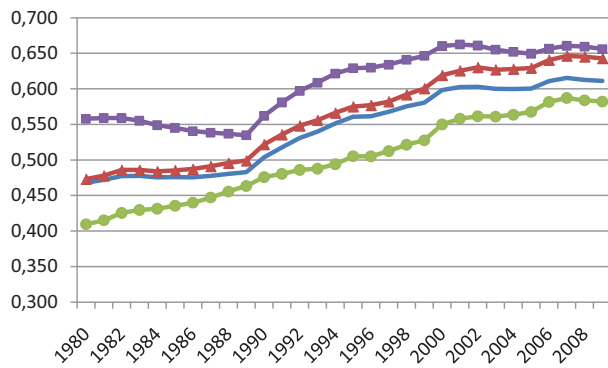
Denmark



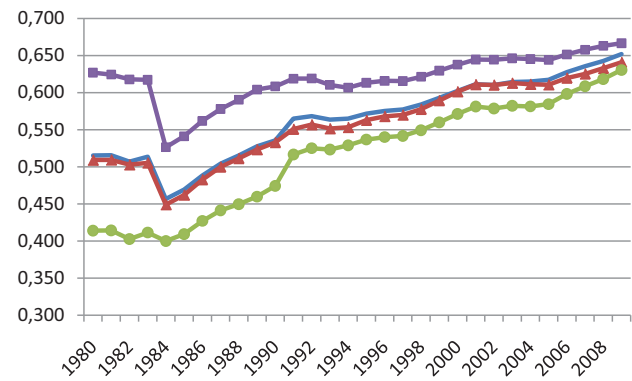
Finland



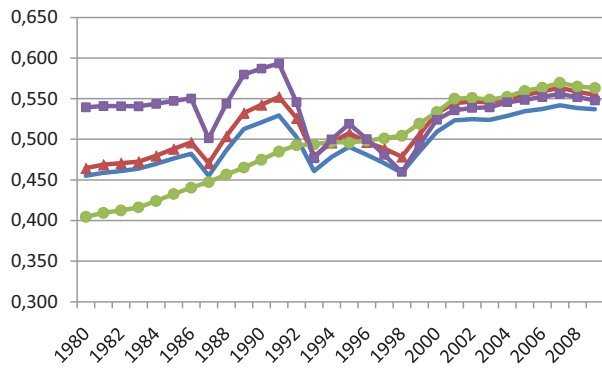
France



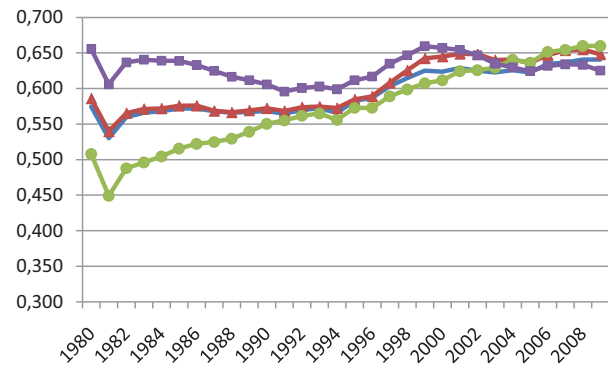
Germany



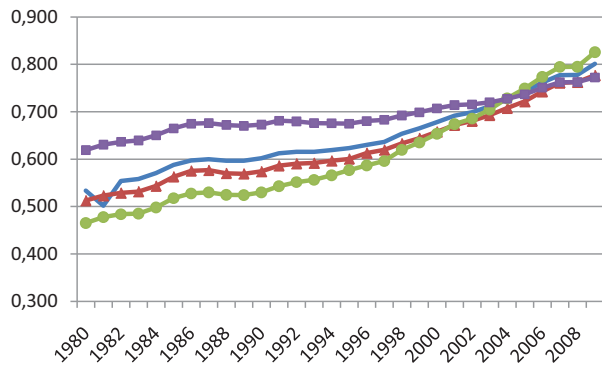
Italy



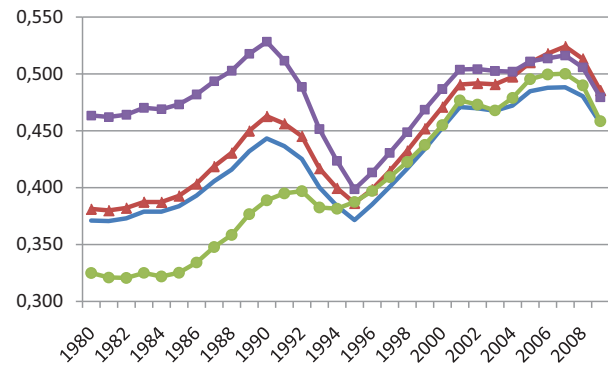
Netherlands

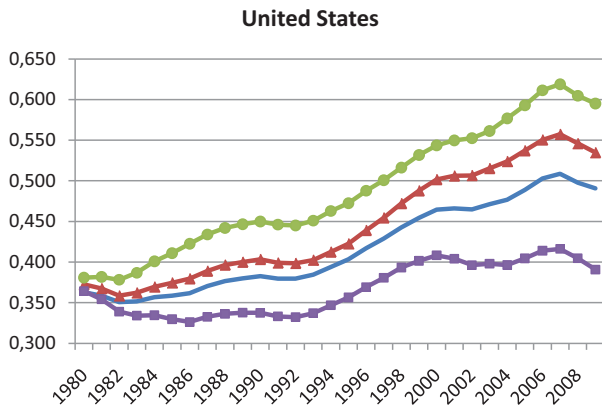
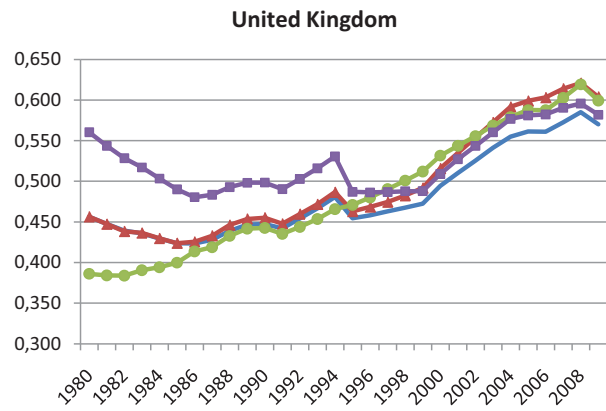
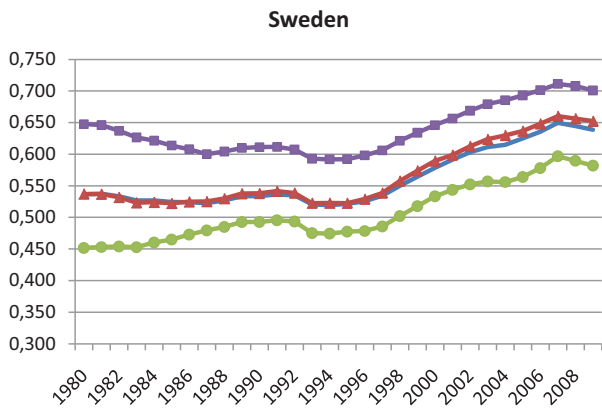


Norway



Spain





- Baseline
- ▲— Alternative 1
- Alternative 2
- Alternative 3

A. Alternative 1: Consumption Weighted More Heavily than Wealth

Under Alternative 1, the weights are 0.4 for consumption, 0.1 for wealth, and 0.25 for each of economic equality and economic security. Thus, relative to the baseline, weight is shifted from the wealth domain to the consumption domain. Nearly all of the fourteen countries fall into one of two categories: countries for which the change of weights increases measured well-being *in all years*, and countries for which the change of weights lowers measured well-being *in all years*. This is illustrated in Chart 32; in nearly every country, the line representing Alternative 1 is either shifted upward or shifted downward for all years between 1980 and 2007, relative to the line representing the baseline results. The former group includes Australia, Belgium, Canada, France, Italy, the Netherlands, Spain, the United Kingdom, and the United States; the latter includes Denmark, Finland (except for 1999-2000 and 2007), Germany, and Norway (except for 1981). The one remaining country, the Sweden, fits into neither category. In Sweden, the shift of weight from wealth to consumption lowers well-being in the 1981-1986 period but raises it in all other years.

These changes reflect the relative magnitudes of the indices of the consumption and wealth domains within each country. Intuitively, countries with higher scores in the consumption domain than the wealth domain have higher measured well-being when the consumption domain receives higher weight, and vice versa for countries with higher wealth scores than consumption scores.

Exhibit 6 provides the rankings of the countries according to the levels and growth rates of their overall Index scores under the baseline and alternative weighting schemes, while Table 7 summarizes the IEWB estimates themselves under the different weighting schemes. The shift from the baseline weights to Alternative 1 has no substantial effect on the ranking of the countries (with the exception of Germany, which slips from third place into seventh). In both cases, the top two countries are Norway and Denmark; respectively, their Index values for 2009 are 0.801 and 0.686 under the baseline weights and 0.777 and 0.679 under Alternative 1. The bottom three countries are also the same under both weighting schemes. The lowest scores belong to Spain, the United States, and Italy, with scores of 0.457, 0.491 and 0.537 under the baseline weights and 0.485, 0.535, and 0.555 under Alternative 1. Note that shifting weight from wealth to consumption raises the IEWB scores of the bottom countries and reduces the scores of the top countries, but not by enough to change their ranks.

For eight of the countries, the IEWB grew faster over the 1980-2009 period under Alternative 1 than under the baseline weights. However, the differences are small. The largest difference in growth is in the United States, where the compound annual growth rate of the IEWB for 1980-2009 is 0.21 percentage points higher under Alternative 1 than under the baseline weights (1.25 per cent per year versus 1.04 per cent per year). Compound annual growth of the Index is slower under Alternative 1 in

Exhibit 6: Ranking of Countries According to Economic Well-being under Baseline and Alternative Weights, 2007

		<u>Level, 2009</u>			
		Baseline	Alternative 1	Alternative 2	Alternative 3
Highest well-being	Baseline	Norway	Norway	Norway	Norway
	Alternative 1	Denmark	Denmark	Netherlands	Denmark
	Alternative 2	Germany	Belgium	Denmark	Sweden
	Alternative 3	Belgium	Sweden	Germany	Finland
	Alternative 4	Netherlands	Netherlands	Belgium	Belgium
	Alternative 5	Sweden	France	Canada	Germany
	Alternative 6	Finland	Germany	United States	France
	Alternative 7	France	Finland	United Kingdom	Netherlands
	Alternative 8	Canada	Australia	Australia	Australia
	Alternative 9	United Kingdom	United Kingdom	France	United Kingdom
	Alternative 10	Australia	Canada	Sweden	Canada
	Alternative 11	Italy	Italy	Finland	Italy
	Alternative 12	United States	United States	Italy	Spain
	Alternative 13	Spain	Spain	Spain	United States
Lowest well-being					

		<u>Growth Rate, 1980-2009</u>			
		Baseline	Alternative 1	Alternative 2	Alternative 3
Fastest IEWB Growth	Baseline	Denmark	Norway	Norway	Denmark
	Alternative 1	Norway	Denmark	Australia	Norway
	Alternative 2	Canada	United States	Canada	France
	Alternative 3	United States	Australia	Denmark	Canada
	Alternative 4	Australia	Canada	United States	Australia
	Alternative 5	France	France	United Kingdom	Finland
	Alternative 6	Germany	United Kingdom	Germany	Sweden
	Alternative 7	Finland	Finland	Finland	United States
	Alternative 8	United Kingdom	Spain	Belgium	Germany
	Alternative 9	Spain	Germany	France	Spain
	Alternative 10	Belgium	Sweden	Spain	United Kingdom
	Alternative 11	Sweden	Italy	Italy	Italy
	Alternative 12	Italy	Belgium	Netherlands	Belgium
	Alternative 13	Netherlands	Netherlands	Sweden	Netherlands
Slowest IEWB Growth					

Belgium, Canada, Denmark, Germany, and the Netherlands, but the largest change is 0.05 percentage points in Canada (1.10 per cent per year under Alternative 1, versus 1.15 per cent per year in the baseline results).

Although the changes in the compound annual growth rates are small, they do affect the ranking of countries in terms of Index growth because several countries had similar growth rates under the baseline results. In most cases, the change to the Alternative 1 weights does not affect a country's rank by more than one place; for example, Denmark and Norway switch places in first and second place in the ranking (Exhibit 4). Exceptions are Canada (which falls from third to fifth place under Alternative 1), Germany (which falls from seventh to tenth), the United Kingdom (which rises from ninth to seventh) and Belgium (which falls from eleventh to thirteenth).

Overall, however, shifting emphasis from wealth stocks to current consumption does not change rankings much. There are no cases in which the change in weights moves a country from a low rank to a high rank or vice versa. The results are robust to the change from the baseline weights to Alternative 1. The cross-country patterns are essentially the same under both weighting schemes, as are the general trends over time within each country.

B. Alternative 2: No Weight Given to Economic Equality

Under Alternative 2 it is assumed that inequality and poverty do not matter to national economic well-being; no weight at all is given to this domain and a weight of 0.33 is given to each of the remaining three domains. The new time series based on these weights are plotted in Chart 32. Australia, Canada, Italy, the Netherlands, Norway, Spain, and the United Kingdom share a common pattern: relative to the baseline results, Alternative 2 lowers measured well-being early in the 1980-2009 period but raises it late in the period. This reflects the fact that these countries initially had high scores in the equality domain relative to the other domains (particularly consumption and wealth), but their consumption and wealth scores grew quickly over the period while their inequality scores stagnated or declined.

By contrast, a second group of countries – Belgium, Denmark, Finland, France, Germany, and Sweden – share a different pattern. In those countries, deemphasizing economic equality leads to lower measured well-being in all years. These are countries that have high scores in the economic equality domain and have maintained that performance over time.

The United States is unique in that deemphasizing poverty and inequality improves its measured well-being in every year between 1980 and 2009. In addition, the Index for the United States exhibits faster growth over the 1980-2009 period when poverty and inequality are given zero weight. The IEWB for the United States grew by 1.55 per cent per year from 0.381 to 0.595 under Alternative 2; under the baseline weights, it grew by 1.04 per cent per year from 0.363 to 0.491 (Table 7). This reflects the

very poor performance of the United States in the economic equality domain over the full 1980-2009 period.

The sensitivity of the US results to the weight of the economic equality domain is also illustrated in the ranking of the countries under Alternative 2 (Exhibit 6). In the baseline results, the United States ranks second-to-last in measured well-being in 2009; under Alternative 2, it jumps to seventh place among the fourteen countries.

As in the baseline results, the top five countries under Alternative 2 are Norway, the Netherlands, Denmark, Germany, and Belgium. Norway's 2009 Index score increased from 0.801 under the baseline weights to 0.844 under Alternative 2; Norway had high values in all four domains for 2009, and its equality score was the lowest of the four. The 2009 Index also increased in the Netherlands from 0.641 under the baseline weighting to 0.660 under Alternative 2. For the other three countries, deemphasizing the equality domain slightly reduces economic well-being.

Spain remains the country with the lowest measured well-being for 2009; its score is 0.458 under Alternative 2, compared to 0.457 under the baseline weights. The third-lowest score under Alternative 2 belongs to Finland, at 0.564. In the baseline results, Finland ranks eighth out of fourteen countries with an IEWB score of 0.627. This reflects the fact that Finland scores well in the equality domain, while its scores in the consumption and wealth domains are relatively low.

Overall, omitting consideration of the economic equality domain alters the results substantially. Countries vary significantly in their economic equality performances. For countries with relatively high levels of economic equality, Alternative 2 leads to lower measured well-being. The opposite is true for the United States, a country characterized by high economic inequality throughout the 1980-2009 period. In addition, for the countries in which the index of the equality domain declined substantially over the period, the Alternative 2 weights alter the pattern of overall well-being over time. Relative to the baseline results, measured economic well-being is lower in the 1980s and higher in the 2000s under Alternative 2. This implies faster growth in economic well-being over the period in those countries, as illustrated by the steep lines for Alternative 2 in Chart 32 for the United States, Canada, and the United Kingdom, among other countries.

C. Alternative 3: High Weights Given to Economic Equality and Security

In contrast to Alternative 2, Alternative 3 gives much greater weights to economic equality and security relative to consumption and wealth. Under Alternative 2, the equality and security domains receive weights of 0.4 and 0.3, while consumption and wealth are assigned weights of 0.2 and 0.1 (Exhibit 5). It represents the judgments of the French business magazine *L'Expansion* (Dedieu, 2009), and it is an example of how our data can be used to test the implications of differing value judgments on the relative

importance of the dimensions of economic well-being. As one might have expected, the qualitative results under Alternative 3 are in essence the opposite of the results under Alternative 2. For the countries with high scores in the equality domain relative to the other three domains – Belgium, Denmark, Finland, France, Germany, and Sweden– see their IEWB scores improve in all years under Alternative 3 relative to the baseline. This pattern also characterizes measured well-being in Spain and the United Kingdom under Alternative 3. These countries have relatively high scores in the economic equality and security domains early in the 1980-2009 period, so the shift of weight to those domains at the expense of consumption and wealth increase their overall Index values. Although their equality scores fall slightly by the end of the period, overall measured well-being is kept above its baseline level by large increases in consumption and wealth.

For Australia, Canada, Italy, the Netherlands, and Norway, shifting weight from consumption and wealth to equality and security raises measured well-being (relative to the baseline results) in the early years of the 1980-2009 period and lowers it in the later years. This reflects the fact that these countries initially had high scores in the equality domain relative to the other domains (particularly consumption and wealth), but their consumption and wealth scores grew quickly over the period while their inequality scores stagnated or declined.

Once again, the United States is unique. Shifting weight from consumption and wealth to equality and security reduces measured well-being in the United States (relative to the baseline results) in every year in the 1980-2009 period. This is unsurprising, given the results from Alternative 2. The United States' scores in consumption and wealth are high and increasing over 1980-2009, while its scores in equality and security are low and decreasing.

Under the Alternative 3 weights, the United States ranks last among the fourteen countries in overall economic well-being in 2009 (Exhibit 6). Its score for 2009 is 0.391 under Alternative 3, compared to 0.491 in the baseline results. Spain ranks second-last with an IEWB score of 0.479 under Alternative 3, although this score is actually higher than its baseline result of 0.457.

Norway and Denmark remain the top two countries in the ranking; respectively, their scores are 0.772 (down from 0.801 under the baseline weights) and 0.725 (up from 0.686 under the baseline weights). Sweden rises to third from its position of sixth in the baseline results; the increased emphasis of economic equality and security raises Sweden's measured well-being from 0.638 to 0.701.

Between 1980 and 2009, all fourteen countries experienced slower growth in measured economic well-being under Alternative 3 than under the baseline weights. This reflects the fact that the indices of the consumption and wealth domains experienced robust growth in every country over the period, while those of the equality and security domains either grew slowly or declined. The largest difference in the growth of well-being between the baseline and Alternative 3 results was in the United States. There, the

IEWB grew by 0.24 per cent per year under Alternative 3, from 0.364 in 1980 to 0.391 in 2009; under the baseline weights, it grew by 1.04 per cent per year from 0.363 to 0.491.

Nevertheless, the ranking of countries by IEWB growth was remarkably similar under the baseline and Alternative 3 weights (Exhibit 6). Even the United States fell only four places, from fourth to eighth. The largest change in rankings was made by Sweden, which moved out of twelfth place under the baseline into seventh under Alternative 3.

Overall, the effects of the Alternative 3 weights are the opposite of the effects of the Alternative 2 weights. Countries that perform well in the economic equality and security domains have higher measured well-being under Alternative 3 than under the baseline weights, and vice versa.

D. Summary

Value judgments regarding the importance of the different domains of economic well-being can matter, but in the alternative scenarios presented here, they have no significant effect on the rankings of countries according to the Index of Economic Well-being. Our main results are fairly robust to changes in the relative weights of the domains, but other results are highly sensitive. Norway has the highest Index value under all four weighting schemes, while Spain is always in the bottom two. The results for the United States are particularly sensitive to the weights on economic equality and security relative to those on consumption and wealth.

Although economic well-being increases between 1980 and 2009 in every country under all four weighting schemes (with the exception of the Netherlands under Alternative 3), the magnitudes of the increases vary dramatically with the weights. In general, consumption and wealth have increased faster over time than economic equality and security (if the latter two increased at all), so economic well-being grows faster when the consumption and wealth domains are weighted heavily relative to the equality and security domains. In all fourteen countries, the Index grows faster over the 1980-2009 period under Alternative 2 (in which equality is given zero weight) than under Alternative 3 (in which equality and security receive the highest weights among the domains). The United States has high consumption and wealth scores, but very low equality and security scores (with a negative trend), so it follows that the relative ranking of the United States depends heavily on how important inequality and security are judged to be.

V. The Index of Economic Well-being and the Recommendations of the Sarkozy Commission

In September, 2009, the Commission on the Measurement of Economic Performance and Social Progress (hereafter the Commission) delivered its final report (Commission, 2009). Initiated by French President Nicolas Sarkozy and authored by Nobel Prize-winning economists Joseph Stiglitz and Amartya Sen along with Jean-Paul Fitoussi, the Commission has drawn the attention of the academic and public policy communities around the world toward the problem of the appropriate measurement of well-being and social progress. For the first time, the government of a major country has taken the explicit position that per-capita GDP growth is an inadequate measure of economic and social progress, and that policymaking should be oriented toward a broader conceptualization of public welfare. As President Sarkozy noted in his speech upon the release of the Commission report, the statistics we collect both reflect our shared values and influence our actions:

Statistics reflect our aspirations and the value we assign to things. They cannot be uncoupled from our view of the world, of the economy, of society, of the idea of a person and his relationships with others. To think of statistics as being objective, exterior to ourselves, incontestable and indisputable, is no doubt comfortable and reassuring, but it is dangerous. It is dangerous because from that perspective, we do not ask questions about the finality of what we do, about what we are really measuring, or about the lessons we must learn.³¹ (Sarkozy, 2009)

The same points were reinforced by Professor Stiglitz in his remarks at the same event:

In an increasingly performance-oriented society, metrics matter. What we measure affects what we do. If we have the wrong metrics, we will strive for the wrong things. In the quest to increase GDP, we may end up with a society in which citizens are worse off. (Stiglitz, 2009)

The principles expressed by President Sarkozy and Professor Stiglitz are remarkably similar to those underlying the Index of Economic Well-being. As we noted in the first section of this report, the Index is designed to account for both the variety of outcomes that people value and the variety of philosophical frameworks through which people interpret the world. The Index reflects multiple dimensions of economic well-being; per-capita GDP reflects only one, namely the average amount of output per person a society produces. Further, the Index explicitly acknowledges that individuals differ

³¹ This passage was translated by the CSLS. The original French is: “La statistique, la comptabilité reflètent nos aspirations, la valeur que nous accordons aux choses. Elles sont indissociables d’une vision du monde, de l’économie, de la société, d’une idée de l’homme, de son rapport aux autres. Les prendre comme des données objectives, extérieures à nous-mêmes, incontestables et indiscutables, c’est sans doute rassurant, confortable, mais c’est dangereux. C’est dangereux parce que l’on en vient à ne plus se poser de questions ni sur la finalité de ce que l’on fait, ni sur ce que l’on mesure réellement, ni sur les leçons qu’il faut en tirer.”

(and have a moral right to differ) in their values by making the underlying values judgments (for instance, the choice of the weights for the four domains) as transparent as possible. Per-capita GDP involves such values judgments – it assigns zero weight to asset accumulation, economic equality, economic security, and all conceivable dimensions of well-being other than per-person output – but it does so implicitly rather than explicitly. By making value judgments explicit, the Index of Economic Well-being invites us to ask questions about what we are measuring, what we think it is important to measure, and how we approach measurement methodologically-speaking.

If people disagree about policy evaluation, it is important for the democratic debate to know *why*. When strong value judgments are implicitly built into an index, it is unclear whether people disagree about the ranking of social choices implied by that index because they have different subjective values or because they have differing cognitive assessments of objective data. The Index of Economic Well-being attempts to disentangle value judgments from objective data by making value choices clear and explicit.

In its report, the Commission makes twelve specific recommendations regarding how statisticians and policymakers should approach the measurement of well-being. The Index of Economic Well-being incorporates, either in total or in part, ten of the twelve.

Recommendation 1: When evaluating material well-being, look at income and consumption rather than production.

We agree that individuals' command over resources is better described by data on their consumption rather than their production, and that human well-being is influenced by a broader conception of consumption than the purely monetary measure now captured as part of GDP. That is why one of the four domains of the Index of Economic Well-being is entirely based on adjusted per-capita consumption flows rather than per-capita GDP.

Recommendation 2: Emphasize the household perspective.

Two of the four key domains that comprise the Index of Economic Well-being are based on household-level data. The economic equality domain is based on household measures of both income distribution (Gini coefficient) and poverty (both the poverty rate and poverty gap). In the economic security domain, the Index incorporates household-level data on the poverty rate among the elderly, as well as the poverty gap for single-parent households. In that sense the Index takes seriously the household as the fundamental social unit whose perspective is most relevant for the measurement of well-being.

However, households live in societies, so an index of national economic performance should reflect both the potential resources available to the aggregate of all households and the actual realization of resource access by individual households. The consumption and wealth domains are based entirely on aggregate data expressed in per-capita terms because those domains represent the aggregate consumption potential and

wealth acquisition of society as a whole. They do not exclusively reflect the household perspective; for instance, the consumption domain includes total government consumption rather than government expenditures that represent household consumption (transfer payments, education subsidies, and so on). The Index therefore strikes a balance between aggregation of societal outcomes and disaggregation to household outcomes.

Recommendation 3: Consider income and consumption jointly with wealth.

Current wealth represents the potential for future consumption, so a good measure of well-being should account for it. The Index of Economic Well-being devotes one of the four domains entirely to changes over time in wealth stocks, and it adopts a wider conception of wealth than is captured in the GDP perspective (including, for example, environmental degradation, natural resource wealth, human capital wealth and the present value of research and development). The ‘wealth’ component of the IEWB could equally well be labeled the ‘sustainability’ component, since it attempts to measure the aggregate stock of productive resources (man-made and naturally occurring) that is necessary for future consumption.

Recommendation 4: Give more prominence to the distribution of income, consumption, and wealth.

Economic equality comprises one of the four domains of the Index. The inclusion of the Gini coefficient directly quantifies economic inequality, while the poverty gap measures economic deprivation. Poverty is a distributional matter to the extent that deprivation is particularly objectionable where it exists in the context of an affluent society; when people are poor in a rich society, it is an indicator of possible distributional injustice.

The economic equality domain addresses only inequality of income, but in principle this domain can be expanded by explicit consideration of other dimensions of inequality that are relevant for economic well-being, including wealth inequality, unequal access to credit, and so on. These areas may be explored in the future.

Recommendation 5: Broaden income measures to non-market activities.

The consumption domain of the Index of Economic Well-being incorporates estimates of the market value of non-market activities, including consumption flows that arise from unpaid work or household production and change over time in the value of leisure (more specifically, changes in the value of leisure relative to the United States in 1980). Although estimates of “regrettable necessities” – for instance, the cost of expenditures, like commuting or crime prevention, that do not add to utility – are often not available, the Index also includes such data when it is possible to do so.

Recommendation 6: Quality of life depends on people’s objective conditions and capabilities. Steps should be taken to improve measures of people’s health, education,

personal activities and environmental conditions. In particular, substantial effort should be devoted to developing and implementing robust, reliable measures of social connections, political voice, and insecurity that can be shown to predict life satisfaction.

The Index of Economic Well-being addresses some of these concerns. Changes in health are reflected in the adjustment of consumption for changes in life expectancy. An entire domain is devoted to the measurement of economic risk, and that domain includes a component that addresses health-related financial risk. The condition of the natural environment is explicitly incorporated through the environmental degradation adjustment to the wealth stocks domain.

However, the Index of Economic Well-being is consciously limited to an *economic* focus, on the theory that one index should not try to do everything and that there are many dimensions of life – broad sociopolitical conditions, freedom of speech and religion, and so on – that probably should be part of a separate set of indices. It may be fruitful to explore such measures, to the extent that they influence well-being mainly through economic channels.

Recommendation 7: Quality-of-life indicators in all dimensions covered should assess inequalities in a comprehensive way.

In terms of economic determinants of well-being, this is similar to Recommendation 4. As noted above, the Index of Economic Well-being contains an entire domain devoted to economic equality.

Recommendation 8: Surveys should be designed to address the links between various quality-of-life domains for each person, and this information should be used when designing policies in various fields.

The IEWB methodology is based on the premise that the weights individuals place on the dimensions of well-being differ across individuals. We take this recommendation to be a recommendation for empirical research on the actual patterns of value weightings in different societies.³²

Recommendation 9: Statistical offices should provide the information needed to aggregate across quality-of-life dimensions, allowing the construction of different indexes.

The Index of Economic Well-being is an example of an index that aggregates across dimensions of well-being. In another sense, however, the Index reflects the principle that multiple indices can be useful. The Index of Economic Well-being can be examined as four separate sub-indices, and the transparent nature of the weighting choices effectively allows for the construction of many aggregate indices depending on the values of the index-maker.

³² In Section 4.1 on sensitivity analysis, for example, we evaluated four alternative possible sets of weights. We would like to know how relatively popular each might be.

We also agree that the primary responsibility of official statistical agencies is to provide the high-quality basic data necessary to construct aggregate indices of well-being. Such data should be made freely available for Index construction by outside researchers.

Recommendation 10: Measures of both objective and subjective well-being provide key information about people's quality of life. Statistical offices should incorporate questions to capture people's life evaluations, hedonic experiences and priorities in their own survey.

The relative weights assigned to components of the Index are explicitly subjective aspects of measurement. One way to generate baseline weights for the domains of the Index would be via surveys of public opinion on the relative importance of different aspects of well-being.

Public opinion polls do not relieve individual citizens of the moral responsibility of making personal judgments. Knowing what other citizens think is certainly interesting as an ingredient in predicting political trends, but each citizen in a democracy still has the responsibility of voting for the alternative that he or she personally thinks is best for society. We construct indices of well-being as ways of summarizing the information people need to fulfill such a responsibility.

With respect to the raw data underlying the Index, we think it important not to meld together different types of data. Although measurement of subjective attitudes is a hugely important area of research, it is crucial to distinguish clearly between subjective opinion polling and objective measurement of economic data. For this reason, the Index does not include any measures of subjective well-being such as self-assessed happiness. While such measures are undoubtedly important for measuring overall quality of life, it is not clear that they outperform 'hard data' as indicators of the *economic* aspects of well-being.

Recommendation 11: Sustainability assessment requires a well-identified dashboard of indicators. The distinctive feature of the components of this dashboard should be that they are interpretable as variations of some underlying "stocks." A monetary index of sustainability has its place in such a dashboard but, under the current state of the art, it should remain essentially focused in economic aspects of sustainability.

The "Wealth" component of the Index could equally well be labeled the "Sustainability" component, since it measures the net accumulation of productive stocks broadly conceived. Negative accumulation – depletion of wealth stocks over time – is clearly not sustainable. By summing over the values of different types of wealth stock, the Index assumes one type of wealth can be substituted for another.³³ As the Commission report notes, sustainability deals with whether and for how long given states of affairs may be maintained, while assessment of current well-being is an attempt to

³³ This is sometimes called the Hartwick rule for sustainability.

rank states of affairs at a point in time. Nevertheless, voters care about both present and future outcomes (although to differing degrees) and are from time to time faced with choices that require assessing trade-offs between current well-being and long-run sustainability. Such choices are facilitated by an index that can ‘sum up’ changes in well-being and changes in sustainability.

The Index of Economic Well-being aggregates over both man-made and natural forms of wealth, and accounts explicitly for environmental degradation in the form of greenhouse gas emissions. The wealth/sustainability component could easily be “opened up” so as to be more explicit about the values of the components, and to make it easier to incorporate differing judgments, for example, about the appropriate shadow price of CO₂ emissions. The Index is therefore fully capable of incorporating sustainability concerns, though data constraints prevent a full treatment of those concerns at this time.

Recommendation 12: The environmental aspects of sustainability deserve a separate follow-up based on a well-chosen set of physical indicators. In particular there is a need for a clear indicator of our proximity to dangerous levels of environmental damage (such as associated with climate change or the depletion of fish stocks).

In using the idea of “proximity to dangerous levels of environmental damage,” Recommendation 12 asks for both measurement of the current level of physical environmental indicators and a specification of “dangerous levels” of damage. It has an implicit ‘risk of environmental catastrophe’ perspective, and a full treatment of this issue would require some specificity as to what “dangerous levels” is meant to imply. The security component of the IEWB provides a natural way for such considerations to be incorporated into the measurement of well-being.

The IEWB currently includes the value of natural resource stocks (whenever such data are available), as well as the social costs of greenhouse gas emissions. These do not really measure the risk of catastrophe; they measure the dollar values of the levels of resources and emissions costs, without reference to *optimal* or *sustainable* levels. As noted above, risk/security, current consumption, and sustainability are conceptually distinct components of well-being.

The Index of Economic Well-being precedes the Commission report by over a decade, but it anticipates most of the Commission’s recommendations. The Index addresses most of the Commission’s recommendations with regard to what an index of economic well-being should capture, and its framework is potentially capable of incorporating additional concerns such as wealth inequality and risk of environmental catastrophe. Indeed, in its discussion of composite indices of well-being, the Commission report recognizes the Index of Economic Well-being as “more elaborated [than other composite indices] and relatively well-known” (Stiglitz *et al.*, 2009:237). The Index is a work in progress and there are further improvements to be made, but we consider the Commission’s report to be an indication that the development of the Index is on the right track.

VI. Lessons Learned in the Development of the Index of Economic Well-being

The authors of this report, through the Centre for the Study of Living Standards, have been engaged in the development of the Index of Economic Well-being for more than a decade.³⁴ This section of the report discusses this experience. We first outline the history of the IEWB and briefly discuss its impact. We touch upon the methodological developments mentioned earlier in the report, and we summarize the data limitations and conceptual challenges we have encountered. Finally, we highlight what we believe are three of the lessons learned from this experience.

A. History of the IEWB

In 1997, the Centre for the Study of Living Standards (CSLS) received a contract valued at \$50,000 CAD from Human Resources Development Canada (HRDC) to construct the IEWB based on the conceptual framework for measuring economic well-being developed by Lars Osberg in 1985 (Osberg, 1985). The Index was first released in October 1998 at a CSLS conference “The State of Living Standards and Quality of Life in Canada”³⁵ and subsequently published by Human Resources Development Canada as an Applied Research Branch research report (Osberg and Sharpe, 1998).

A key IEWB finding was that the economic well-being of Canadians was falling despite the economic growth of the mid and late 1990s. This development was due to the decline in the economic security component of the index. In turn, economic security was falling in large part because of the increased financial risk from unemployment. This indicator is determined by the unemployment rate, the employment insurance (EI)

³⁴ In addition to its work on the IEWB, the CSLS is currently involved in a number of other projects on well-being. These include:

- the Canadian Index of Wellbeing (CIW) project spearheaded by the Atkinson Charitable Foundation where the CSLS is responsible for the living standards domain (Sharpe and Arsenault, 2009);
- the Levy Institute Measure of Economic Well-being (LIMEW) project where the CSLS is developing estimates for Canada (Evans and Sharpe, 2010);
- the OECD Measuring the Progress of Societies project where CSLS Executive Director Andrew Sharpe is a member of the coordinating committee;
- the Vital Signs project coordinated by Community Foundation of Canada where the CSLS has responsibility for developing and maintaining a large database of community well-being indicators;
- a benchmarking project for the National Aboriginal Economic Development Board where the CSLS is developing indicators to track the economic development of Aboriginal Canadians in a number of areas;
- a research project on the determinants of subjective well-being in Canada in collaboration with the Institute for Competitiveness and Prosperity;
- a project to develop a new measure of well-being for Canada called the Good Life Time (GLT) Index, with Michael Wolfson from Statistics Canada; and

the coordination of an International Working Group on Methodology for Composite Index Construction for the International Society for Quality of Life Studies (ISQOLS).

³⁵ Papers from the conference are posted at <http://www.csls.ca/events/october.asp>.

replacement rate and the EI coverage rate. It was this latter variable that was responsible for the increase because of major cuts to the EI program during the first half of the 1990s. Thus the fall in the IEWB in the 1990s was largely driven by public policy, in particular the cuts to the EI programs.

HRDC, the financier of the IEWB, was the department responsible for the EI program. It did not welcome the message that it was directly responsible for the fall in economic well-being in Canada. It was felt that too much weight was being given to this one variable. Perhaps not surprisingly, HRDC decided to provide no additional financial support to the CSLS for work on the IEWB.

The loss of financial support from HRDC was a major setback to the development of the IEWB. Other sources of funding were approached, but none were found. This meant that work by the CSLS on the IEWB had to be financed by cross-subsidization from CSLS funded projects. As the CSLS is a small economic research organization with no core funding, there were limited resources from cross-subsidization so the work on the IEWB has proceeded at a much slower pace than originally anticipated or planned. It should be noted that the option of changing the IEWB to make it more palatable to HRDC was never considered. It was felt that the independence of the project from funder influence was paramount, and from a long-run perspective more important than short-term financial support.

In the early 2000s the CSLS devoted significant energy to the IEWB. Papers were presented at national and international conferences,³⁶ presentations were made to many difference audiences, and the IEWB was published in a number of outlets, including two papers in the *Review of Income and Wealth* (Osberg and Sharpe, 2002a and 2005).³⁷ Since 2004, the CSLS has devoted less energy to the IEWB due to the lack of funding and the time demands from income-generating projects. The number of papers, presentations, and publications by the CSLS on the IEWB is down from that of the early 2000s and a planned book on the IEWB has not been completed. In 2009, the CSLS redirected energies toward the IEWB and released revised estimates.

B. Factors Limiting the Impact of the IEWB

There is great interest in measures of economic well-being that go beyond GDP, even among orthodox economic organizations such as the OECD.³⁸ The IEWB has

³⁶ For example, the IEWB was presented at the 1998, 2000 and 2002 General Conferences of the International Association for Research in Income and Wealth, the 2000, 2003, 2006, and 2009 annual meetings of the Canadian Economics Association, the 2000 annual meeting of the American Economic Association, and the 1998, 2000, and 2006 international conferences of the International Society for Quality of Life Studies.

³⁷ Other publications include Osberg and Sharpe, 2001, 2002a, 2002b, 2004a, 2004b, and 2006.

³⁸ A research paper from the OECD Economics Department (Boarini, Johansson and D'Ercole, 2006) concluded that while measures of GDP per capita and economic growth remain critical for any assessment of well-being, they need to be complemented with measures of other dimensions of well-being to obtain a comprehensive picture of well-being. The authors found that calculations to extend measures of economic resources to include leisure, sharing of income within households and distributional concerns suggest that

certainly received significant attention, particularly outside Canada and especially in France.³⁹ Nevertheless, we believe that the Index could become even more well-known. In our view, three major factors have prevented the IEWB from becoming a household name like the Human Development Index (HDI).

The first and most important factor is the lack of resources that the CSLS has put into its communication strategy. This of course reflects the lack of funding for the IEWB as well as a lack of expertise in self-promotion.

A second factor has been the focus on academic outlets for the IEWB instead of more accessible publications, which has limited the public profile of the Index. This choice has reflected the desire to obtain academic credibility for the IEWB. It was also related to the objective of the CSLS for developing the IEWB, namely to assess actual trends in economic well-being of societies in a dispassionate, objective, balanced manner. As the CSLS is an economic research organization, the advancement of a particular advocacy objective through the promotion of a composite index is not part of its mandate.⁴⁰

A third and final factor that has limited the use of IEWB is its complexity, both conceptually in terms of the specification of the components and empirically in terms of data requirements. For example, instead of using the poverty rate, the IEWB uses the concept of poverty intensity, which requires estimates of poverty from micro-data sets, a major undertaking. This complexity means that an investment of time and effort is required to fully understand the various components of the IEWB and the interrelationships between the variables. It also means that efforts (e.g. Perez-Mayo and Jurado, 2008) to replicate the IEWB beyond the set of 14 OECD countries for which it has been originally estimated generally run up against data constraints, at least for a complete replication.

cross-country rankings based on these indicators and GDP are similar, although they have evolved differently over time. It also found that levels of most measures of specific social conditions are significantly correlated to GDP per capita, while changes over time are not. But it found that survey-based data on happiness and life satisfaction are weakly correlated with GDP per capita.

³⁹ On the interest of the IEWB in France, see Gadrey and Jany-Catrice (2004), the symposium in *Travail et emploi* in January-February 2003 and the summary of the IEWB prepared for the French Senate (Osberg and Sharpe (2004). The French business magazine *L'Expansion* featured the IEWB in August 2009 (Dedieu, 2009).

⁴⁰ In contrast to the non-advocacy approach of the CSLS, the London-based New Economics Foundation has used its composite index, the Happy Planet Index (HPI) as an effective advocacy tool (NEF, 2006 and 2009). However, the HPI results may be suspect. The United States ranks 114th out of 143 on this index, while the Dominican Republic ranks 2nd, Jamaica 3rd, Guatemala 4th, Vietnam 5th, Columbia 6th, Cuba 7th, and El Salvador 8th. Given the migration flows from these countries to the United States, such a massive gap in well-being against the United States seems improbable. Of course, these results reflect the small ecological footprint of the Latin American countries (and the large footprint of the United States), which in turns reflect the low level of development and income. Poor countries have small footprints and hence to well on the index especially if their life satisfaction and life expectancy are average or above.

C. Changes in Methodology

Like the national accounts, the IEWB is a dynamic construct subject to changes in methodology over time as new knowledge and understanding is incorporated. As noted earlier in this report, there have been four major methodological changes in the IEWB since 1998. To recapitulate:

- In 2003, we abandoned an index number approach in favour of the linear scaling approach.
- In 2006, we reconceptualized the risk of unemployment component of the economic security domain. The weights of the unemployment rate variable and the financial protection from unemployment variable were altered, so that the unemployment rate now receives a much higher weight than the financial protection from unemployment variable.
- We also adjusted the weights of the four economic security domain. These weights are proportionate to the population affected by the risk, and we made two small changes to the definitions of those populations. First, the risk from single parent poverty was extended to all persons in two-parent families (with children under 18) as an increasing proportion of single-parent families are headed by men. Second, the risk from old age poverty was extended to the population 65 and over, the group directly affected by this risk.
- The baseline weighting scheme for the four domains of the IEWB was changed, so that the four domains now receive equal weight.

There is no need to repeat the discussion of these methodological developments here. We simply note that the Index of Economic Well-being remains a work in progress, and we will continue to improve the methodology whenever possible.

D. Data Limitations

The data requirements for the IEWB are huge, and data gaps have been a major obstacle to the construction of the IEWB, particularly at the international level. Indeed, there are in fact two IEWB data sets, one for Canada and the provinces and another for selected OECD countries. This reflects the availability of certain variables for Canada, such as time series estimates of the value of natural resources and unpaid work, for which comparable data are unavailable from international data sources such as the OECD.⁴¹

Nearly thirty countries are members of the OECD, but the CSLS has produced estimates of the IEWB for only fourteen countries. The reason for this is that the micro-

⁴¹ Such estimates may of course be available from certain national statistical agencies. However, taking data on a piecemeal basis from national statistical agencies will not result in consistent estimates across countries so such a strategy of data gathering has been avoided.

data sets based on comparable definitions are required to calculate poverty rate and gaps as well as the Gini coefficients. The only source of such micro-data is the Luxembourg Income Study (LIS). Unfortunately, the LIS maintains suitable datasets (that is, datasets spanning the period from the early 1980s to the late 2000s) for only fourteen countries, with one dataset for approximately every five year period. This means that estimates for the IEWB cannot be produced for countries for which LIS micro-data sets are not available.

In the conceptual development of the IEWB a number of variables were identified for inclusion for which official data proved unavailable, especially at the international level. For certain variables such as human capital, R&D stocks, the value of increased life expectancy, and the costs of environmental degradation, the CSLS was able to develop its own estimates. For other variables, it was not possible for the CSLS to do so. The international data gaps are highlighted below:

- a time series on the value of unpaid work, both household work and volunteer work;
- a time series on the value of regrettable expenditures, including the cost of commuting, and auto accidents;
- a time series on the value of natural resources; and

It is hoped that these data gaps can be filled in the future.

E. Conceptual Challenges

In constructing the Index of Economic Well-being, we have confronted conceptual challenges that lie at the heart of economics. These challenges are largely related to the valuation of non-market economic activity and the modeling of risk. Some of these challenges are discussed below.

i. Modeling the financial risk from illness

The financial risk from illness is currently modeled in the IEWB by the proportion of unreimbursed medical expenses in disposable income. But whether this variable adequately captures the financial risk from illness across countries, or over time in one country, is unclear. The real financial risk from illness manifests itself mainly from bankruptcy. In countries with universal health coverage, which include all developed OECD countries except the United States, it is very difficult for one to be forced into bankruptcy because of catastrophic medical costs (although lost income due to illness could precipitate bankruptcy). In the United States, on the other hand, many persons go bankrupt for medical reasons. For example, Himmelstein *et al.* (2009) report that: nearly two thirds of the one million bankruptcies in the United States in 2007 were linked to illness; that three quarters of the families who filed for bankruptcy due to medical reasons were insured; that medical bankruptcies have increased 50 per cent since 2000; and that

overall risk of medical bankruptcy was 0.6 per cent in 2007, or 6 per cent over a decade.⁴²

Consequently, a time series on medical bankruptcy may be a better indicator of the financial risk from illness than the proportion of unreimbursed medical expenses in disposable income. The CSLS is exploring the availability of such a series for OECD countries.

ii. Estimating the costs of environmental degradation

The IEWB explicitly recognizes the importance of the environment for economic well-being by reducing the annual estimates of stocks of wealth by an annual estimate of costs of environmental degradation. This sub-component of the IEWB is admittedly underdeveloped. The only aspect of environment degradation currently included is the social cost of greenhouse gases, which are valued at \$21 per tonne of CO₂-equivalent emissions (or \$76 per tonne of carbon) in 2000 US dollars. The CSLS has produced a research report that discusses the issue of the valuation of greenhouse gases (Sharpe, Arsenault, Murray and Qiao, 2008), but much work of both a conceptual and empirical nature remains to be done on this topic. We also hope to make it easier in future for analysts who believe in different shadow costs for carbon emissions to see the sensitivity of estimates of well-being to such assumptions.

The CSLS also wants to add estimates of additional types of environmental degradation (e.g. loss of wetlands) to the IEWB, but has not yet had the opportunity to explore the conceptual issues involved in the construction of such estimates. Other composite indexes, such as the Genuine Progress Indicator and the Happy Planet Index, do make estimates of different types of environment degradation, but these estimates often seem extremely large. The expansion of the environmental degradation component of the wealth domain of the IEWB is a priority for future work.

iii. Valuation of natural resources

The IEWB for Canada and the provinces includes, as part of the wealth component, official estimates of the value of natural resources produced by Statistics Canada. But there remain many conceptual issues associated with these estimates, including the discount rate, the definition of reserves, and the time path of the exploitation of the resource. Motivated by what we saw as the undervaluation of the Alberta oil sands in official estimates, due to too narrow a definition of reserves, the CSLS produced a detailed report on conceptual and empirical issues related to natural resource valuation in 2008 ((Sharpe, Arsenault, Murray and Qiao, 2008). Perhaps not surprisingly, a key finding was the interaction of the time path of exploitation of the reserves and the discount rate for the valuation of natural resources. Resources that are

⁴² Given the economic downturn and the upward trend in medical bankruptcies experienced over the 2001-2007 period due to health care inflation, which will likely continue, the proportion of US families experiencing medical bankruptcies may be considerably higher than 6 per cent over the next decade.

expected to be exploited well into the future have little present value under assumptions of high, or even a moderate, discount rates. In any case, much more work remains to be done in this area, particularly at the international level to produce consistent and comparable estimates of natural resources.

iv. Happiness and weighting schemes

It has been noted that the IEWB has already been influenced by recent research on happiness. Because surveys of subjective well-being have revealed the serious negative effect of unemployment in well-being, the unemployment rate was assigned a much greater weight relative to the generosity of unemployment insurance protection (0.8 instead of 0.5), in the risk from unemployment sub-component of the economic security component of the IEWB.

It is possible that the weighting scheme for the four components of the IEWB (as well as the weighting scheme for the four risks in the economic security component and the income distribution and poverty sub-components of the equality component) could be developed as a function of their impact on happiness. For example, if happiness studies consistently show that increased consumption has minimal effect on economic well-being, there may be a strong case for reducing the weight of this component of the IEWB.

v. Valuation of increased life expectancy

The IEWB already values increased life expectancy by boosting consumption by the per cent rise in life expectancy. But this is a crude approximation and more sophisticated methodologies may yield a more accurate (and likely larger) estimates of the contribution to economic well-being from longer lives.⁴³ More work is needed on this issue.

vi. Valuation of leisure

The IEWB also includes an adjustment to consumption flows for reductions in hours worked. But the estimate is based only on changes in hours work relative to a benchmark and does not capture the overall value of leisure to well-being, which is very large.⁴⁴ Such a valuation exercise is difficult, but merits a place in the long-term development of the IEWB.

⁴³ For example, Nordaus (2003) found that that the economic value of increases in longevity in the last 100 years is about as large as the value of measured growth in non-health goods and services. Over the 1900-1995 period, the value of improved health or health income grew at between 2.2 and 3.0 per cent per year in the United States, compared to only 2.1 per cent for consumption. Over the 1980-1990 period, the increase in expenditure on health care was one half the increase in the value of health income. Indeed, Nordhaus (2003:35) states that "The medical revolution over the last century appears to qualify, at least from an economic point of view, for Samuel Johnson's accolade as 'the greatest benefit to mankind.'"

⁴⁴ For example, Nordhaus and Tobin (1972:12) estimated that in the United States in 1965 the absolute value of leisure exceeded that of GDP!

vii. Middle class insecurity related to retirement

One of the four risks of the economic security component is the risk of poverty in old age. This risk is currently captured by the poverty intensity rate for persons 65 and over. But the current economic crisis and stock market crash has greatly increased anxiety over the retirement plans of the middle class. Instead of focusing on only the risk of poverty in old age, consideration is being given to broaden the risk to a lower than expected living standards in old age (Osberg, 2009). Variables such as pension coverage, particularly from defined benefit plans, the likelihood of pension plan defaults, and the size of individual retirement funds could be included in a new formulation of the financial risks associated with old age.

F. Lessons Learned

This section highlights three lessons that have been learned from the CSLS experience in developing the Index of Economic Well-being.

i. 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 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 about the relative importance of different aspects of welfare – but so does the real world of public policy choices. Although in most cases it would not be appropriate for official statistical agencies to produce composite indicators, such indicators can be extremely useful in focusing the attention of the 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 Human Development Index and the *MacLean's* composite ranking of Canadian universities. The Canadian Council on Learning recently released a composite indicator on learning and the explicit purpose of this initiative was to foster debate about what constitutes lifetime learning in Canada.

ii. 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 about 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.

iii. The Importance of Testing Results to Different Weighting Schemes

As noted earlier in the report, weighting schemes for composite indexes are very controversial. The ideal way to approach the baseline 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.

In our experience, the most effective and realistic way to deal with this issue is to give equal weight to the main components of the composite index and 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 conducted sensitivity analyses based on three alternative weighting schemes in this report. In addition, we have posted the time series estimates of the four domains of the Index of Economic Well-being in a Microsoft Excel file on the CSLS website.⁴⁵ Visitors to the website can choose any set of weights for the four domains they wish and then see the path of the overall Index that their 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.

⁴⁵ The CSLS web site for the Index of Economic Well-being is located at <http://www.csls.ca/iwb.asp>.

VII. Conclusion

This paper presents new estimates of the Index of Economic Well-being for fourteen OECD countries for the 1980-2009 period based on what we believe are methodological improvements to the Index. The results reveal that there were significant differences across countries in terms of economic well-being in 2009. Norway and Denmark had the highest levels of economic well-being in 2007, while Spain and the United States had the lowest levels. Canada ranked ninth among the fourteen countries. However, all fourteen countries experienced an increase in economic well-being over the 1980-2009 period.

Across the OECD, rising economic well-being was driven by growth in consumption and stocks of wealth. In most of the countries, however, the growth of economic well-being was hindered by declines in economic equality and security. These trends were driven by rising income inequality and increased private expenditures on health care in most countries.

An important objective of the Index of Economic Well-being is to make explicit the value judgments that underlie composite indicators of well-being by making the choice of weights for the four domains as transparent as possible. We test the sensitivity of our baseline results to three alternative weighting schemes and find that our key baseline results are robust. Economic well-being increased in every country over the 1980-2009 period under all four of the weighting schemes (with the exception of the Netherlands under Alternative 3). Norway always had the highest level of economic well-being in 2009, while Spain always ranked in the bottom two positions.

We also estimate the Index of Economic Well-being for the fourteen OECD countries over the 2008-2010 period, using recent consumption and unemployment projections published by the OECD. The IMF has referred to the recent financial crisis and the global recession it engendered in 2008 and 2009 as the most severe international financial crisis of the post-war period, so one must expect that the downturn has affected the economic well-being of people across the world. We find that the cessation of per-capita consumption growth and the increase in the unemployment rate cause the IEWB to decline in every country between 2008 and 2010. The sharpest projected decline is 8.7 per cent in Spain – no surprise, given that Spain has both the largest projected consumption decline and the largest projected unemployment increase among the fourteen countries. In every country, declines in the index of the economic security domain are the major driver of the projected deterioration of overall economic well-being.

This report is being released at a time in which concern about the measurement of economic well-being is growing in the policy community. The Commission on the Measurement of Economic Performance and Social Progress, which delivered its final report in September 2009, has drawn the attention of the academic and public policy communities throughout the world toward the problem of the appropriate measurement of well-being and social progress. The Commission made twelve recommendations in its

final report, and although the Index of Economic Well-being precedes the Commission report by over a decade, it anticipates the Commission's recommendations in many respects. Indeed, in its discussion of composite indices of well-being, the Commission report recognizes the Index of Economic Well-being as "more elaborated [than other composite indices] and relatively well-known" (Stiglitz *et al.*, 2009:237).

The Index remains a work in progress. It will undoubtedly undergo further modifications as research on the conceptualization of economic-well-being, and ways to capture these concepts empirically, evolves. We consider the Commission's report to be an indication that the development of the Index is on the right track.

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