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NEW ESTIMATES OF THE INDEX OF ECONOMIC WELL-BEING FOR OECD COUNTRIES, 1980-2012

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Introduction

It has been increasingly recognized that gross domestic product (GDP) is not a satisfactory measure of economic well-being, as it fails to incorporate key aspects of a nation's socioeconomic situation such as the distribution of income across citizens; this is demonstrated by the "Report by the Commission on the Measurement of Economic Performance and Social Progress" published by Joseph Stiglitz, Amartya Sen and Jean-Paul Fitoussi on the behest of the French government in 2009. The Index of Economic Well-being (IEWB) stands as a comprehensive measure of well-being that considers the benefits of not only consumption but also wealth, equality, and economic security, in the calculation of economic well-being. The Centre for the Study of Living Standards (CSLS) produces estimates of the IEWB both for Canada and the provinces (Osberg and Sharpe: 1998, 2001, 2009a, and 2011a) and for selected OECD countries (Osberg and Sharpe: 2002a, 2002c, 2005, 2009b, and 2011b).[1] The purpose of this report is to provide an update to the IEWB for select OECD countries for the 1980-2012 period.

This update of the IEWB comprises five sections. The first section provides a synopsis of the IEWB; readers familiar with the IEWB may skip this section. The second section details the major methodological changes that the CSLS has introduced in the calculation of the IEWB since the last major update in 2011 (Osberg and Sharpe, 2011b). The third section describes the trends in the indicators that drive the IEWB for 1980-2012. The fourth section tests the sensitivity of the IEWB to different sets of weights selected for the components. The fifth section discusses future directions in the measurement of economic well-being and concludes.

[1] The current update includes estimates for fourteen OECD countries: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, United Kingdom, and the United States.

I. A Synopsis of the Index of Economic Well-being

The CSLS first produced the IEWB in 1998 (Osberg and Sharpe, 1998) as a response to the question posed by Lars Osberg in the first paragraph of his 1985 paper "The Measurement of Economic Well-being":

> In 1980 Ronald Reagan asked the American people a seemingly simple question: "Are you better off today than you were four years ago?" Although U.S. per capita disposable real income (*i.e.*, after tax and after inflation) was, in 1980, some 7.6 percent *higher* than in 1976,[2] his audiences answered "No!" Like any politician, Reagan was implying that his government would "do better." The task of a Royal Commission on Economic Prospects is, similarly, to propose economic policies that will make people "better off." However, if increases in per capita disposable real income do not necessarily make people feel "better off," one might well ask: What is it that constitutes "economic well-being"? When is society economically "better off"?
>
> Lars Osberg (1985, p. 49)

The CSLS and the IEWB take the position that aggregate economic welfare can be adequately divided into four components, also often referred to as "domains" and "indices."[3] The precise details of the IEWB have been discussed extensively in previous publications (Osberg and Sharpe: 1998, 2002a, 2005) and we refer readers interested in the motivation behind the IEWB to previous updates (for example: Section I of Osberg and Sharpe, 2009b). In this update, we simply provide the basic outline for each of the four components of the IEWB (below) and methodological novelties (Section II).

The four components of the IEWB include: the Index of Consumption, the Index of Wealth, the Index of Equality, and the Index of Economic Security. Each of these domains can be further disaggregated into subcomponents (Exhibit 1) that are used to calculate an indicator that incorporates the underlying information in a way that permits comparisons across countries and time: the index of consumption; the index of wealth; the index of equality; and the index of economic security.

A. Index of Consumption

The index of consumption is calculated from personal consumption per capita, an adjustment for the relative benefit or cost of leisure per capita, and government final consumption expenditures per capita (all in constant 2005 US$). Personal consumption per capita is adjusted to an equivalent measure of family income via multiplication with an index of the square-root of family size (United States, 1980 = 100). The adjusted measure of the relative cost of leisure per capita is the nation's cost of leisure per capita relative to the United States (1980) baseline. Combining these two indicators with government final consumption expenditures per capita yields a measure of total consumption per capita that incorporates household consumption of goods and services, household consumption of leisure, and government consumption on behalf of household – all three pillars of consumption activity. We adjust this measure by an index of life expectancy (United States, 1980 = 100) to achieve an

[2] Osberg (1985) provides justification for this value in an endnote here.
[3] The latter term acknowledges the method used to construct the IEWB: we assign a scaled value between 0 and 1 for each component of the IEWB and then aggregate using a predetermined set of weights.

adjusted measure of total consumption flows per capita in the country. This value is then scaled using a method henceforth referred to as 'linear scaling' where the index value is obtained from the following calculation:

$$Index = \frac{Value - (Minimum\ Value\ in\ X - Y)}{(Maximum\ Value\ in\ X + Y) - (Minimum\ Value\ in\ X - Y)}$$

where X is the set of values of the relevant indicator (in this case: adjusted total consumption flows per capita) for each country for 1980-2012 and Y is defined as:

$$Y = 0.1 * (Maximum\ Value\ in\ X - Minimum\ Value\ in\ X)$$

This 'linear scaling' process yields a value between 0 and 1 for the indicator and is therefore a useful tool that we use throughout the IEWB to produce comparable values that can be aggregated into the composite IEWB.[4]

Exhibit 1: The Components of the IEWB

Index of Consumption	**Index of Wealth**
a. Personal Consumption per capita (2005 US$) b. Adjusted Relative Cost of Leisure per capita (2005 US$) c. Government Final Consumption Expenditures per capita (2005 US$) d. Adjustment for Life Expectancy	a. Total Net Stock of Fixed Capital per capita (2005 US$) b. Stock of Gross Expenditures on R&D per capita (2005 US$) c. Total Net International Investment Position per capita (2005 US$) d. Human Capital Stock per capita (2005 US$) e. Greenhouse Gas Emission Cost per capita (2005 US$)
Index of Equality	**Index of Economic Security**
a. Gini Coefficient b. Poverty Intensity (all persons)	*A. Security from Unemployment* a. Unemployment Rate b. Replacement Rate *B. Security from Illness* a. Medical Care Expenses as a Percentage of Disposable Income *C. Security from Single Parent Poverty* a. Poverty Intensity (single women with children under 18 or single parents with dependent children) b. Divorce Rate per 1,000 People *D. Security from Old Age Poverty* a. Poverty Intensity (people aged 65 or more)

[4] This choice of methodology is not without consequence. See Sharpe and Salzman (2003) for a discussion of alternative scaling techniques and Andrews (2012) for an empirical example of the effects of linear scaling on the outcome of the IEWB.

B. Index of Wealth

The index of wealth is calculated from the total net stock of fixed capital per capita, the stock of gross expenditures on research and development per capita, total net international investment position per capita, human capital stock per capita, and greenhouse gas emission cost per capita (all in constant 2005 US$). Total net stock of fixed capital per capita, the stock of gross expenditures on research and development per capita, and total net international investment position per capita are all self-explanatory. Human capital stock per capita is assumed to be equal to the investment cost (according to US costs in 2010) that was required to educate the population. Finally, emissions are assumed to be a global cost because air is a global resource that does not respect national boundaries. We assume the cost of carbon dioxide-equivalent emissions is $85 per metric tonne (1990 US constant dollars) and that the appropriate burden for each country is their share of world GDP – richer countries ought to pay a larger share of the cost than poorer countries. We therefore multiply the total global carbon dioxide-equivalent emissions amount by $85 and then multiply the resulting value by each country's share of the global GDP and then adjust to 2005 US constant dollars and divide by population to derive each country's greenhouse gas emission cost per capita. These five values are summed to obtain total real wealth per capita. We then use linear scaling on total real wealth per capita to obtain the index of wealth.

C. Index of Equality

The index of equality is calculated from CSLS calculations of the all-persons Gini coefficient and an all-persons measure of poverty intensity, where poverty intensity is defined simply as the product of the poverty gap and the poverty rate for all persons. Both indicators are based on after-tax equivalent income and are transformed into indices using linear scaling. We construct the index of equality by applying a weight of 75 per cent to poverty intensity and a weight of 25 per cent to the Gini coefficient.

D. Index of Economic Security

The index of economic security is actually calculated from four sub-indices: the index of security from unemployment; the index of security from illness; the index of security from single parent poverty; and the index of security from old age poverty.

- **Security from Unemployment.** The index of security from unemployment is derived from the unemployment rate and average gross replacement rate in each country. We transform each of these indicators into indices using linear scaling and construct the index of security from unemployment by applying a weight of 80 per cent to unemployment and a weight of 20 per cent to the average gross replacement rate.

- **Security from Illness.** The index of security from illness is derived directly from the share of private expenditure on health per capita as a share of disposable income per capita. We transform these shares into an index through linear scaling.

- **Security from Single Parent Poverty.** The index of security from single parent poverty uses three indicators. First, the poverty rate for single parents[5] is multiplied by the poverty gap for single parents to generate poverty intensity for single parents. This value is then multiplied by the divorce rate to create an indicator for the 'risk of single parent poverty' that takes into account the likelihood of slipping into single-parenthood in a country. We transform these 'risk' values with linear scaling to obtain the index of security from single parent poverty.

- **Security from Old Age Poverty.** The index of security from old age poverty is simply the linearly scaled values of poverty intensity for persons aged 65 or more, where poverty intensity is defined as the poverty rate multiplied by the poverty gap.

The index of economic security is a population-at-risk-weighted composite of these sub-indices. In particular, those persons most at risk of unemployment are working-age persons (persons aged 15 to 64), and all persons (100 per cent of the population) are at risk of illness. For single parent poverty, we use mothers and children as a percentage of the population, as we believe that single motherhood is more of a concern in popular culture than single fatherhood and children are economically incapable of self-support and are therefore greatly affected when their household slips into single-parent poverty. Finally, the percentage of the population aged 45 to 64 represents those persons most at-risk of old age poverty in the near future and consequently represent the group of individuals that might feel insecure about high poverty intensity for the elderly. We divide each of these four percentages by the sum of the four percentages in each year to obtain weights for each index that sum to 100 per cent and calculated the weighted sum of these subcomponents to obtain the index of economic security.

The IEWB therefore capture not only consumption flows, but also wealth stocks, equality, and economic security components of national welfare. These components are aggregated into the IEWB via a weighted sum wherein each domain is assigned equal weights. There is no inherent reason that these are the appropriate weights to use to weight the IEWB, as each individual may possess their own tastes across the components. Equal weighting is a simple, transparent solution to the weighting problem, which can be very controversial.[6] Section IV therefore presents the results of the IEWB under alternative weights. Regardless of weights used to aggregate the components, the IEWB has followed the simple four component framework from its inception.

[5] Definitions vary. A discussion is provided in Section II.A.

[6] There are many methods available. See Sharpe and Salzman (2003) for a discussion of weighting composite indicators and Sharpe and Andrews (2012) for a discussion of different weighting schemes with direct application to the IEWB

II. Methodological Updates to the Index of Economic Well-being

Although the basic framework of the IEWB remains unchanged from previous updates, we have adopted some new methodologies for those subcomponents were there was a significant amount of missing data. We believe our new methodologies provide estimates of the underlying indicators that are both (a) reasonably comparable across countries, and (b) enhance the reliability of the IEWB by providing more richness through previously unavailable year-to-year variations. In particular, this section details the new methods used to calculate the poverty intensities used (all persons, single parent, and old age) and the Gini coefficient, average family size, current net capital stock, and monetary values.

A. Poverty Intensities and the Gini Coefficient

The main source for poverty rate, poverty gap, and Gini coefficient estimates in previous updates of the IEWB has been the Luxembourg Income Study (LIS). LIS datasets were considered optimal for calculating these data due to the built-in comparability between countries. Unfortunately, the LIS time series for many of the fourteen selected OECD countries ends abruptly (for example, data for Belgium are not available beyond 2000). Moreover, LIS data are usually only available once per 'wave' (a time period of a few years) and therefore do not provide adequate richness in year-to-year variations. Recently, Osberg and Sharpe (2012) required such year-to-year variations to explain differences in economic well-being across OECD countries through the 'Great Recession' and subsequent recovery. In order to do so, Osberg and Sharpe adopted new methodologies for calculating poverty intensities and the Gini coefficient within the IEWB's existing framework.

We adopt the new methodology of Osberg and Sharpe (2012) here; we have begun the process of switching from the LIS to data sources with greater availability while taking pains to ensure a high degree of comparability.[7] The poverty rates and poverty gaps (50 per cent median income) for all persons and the elderly (aged 65 or older), as well as the poverty rate for lone parents and the Gini coefficient for 1995-2012 are now calculated from new sources whenever possible. In particular, Canadian data are taken from Statistics Canada's Cansim Tables and European data are taken from the Eurostats database, while the CSLS calculates Australian data (2001-2010) from the Household, Income and Labour Dynamics in Australia (HILDA) survey and United States data (1995-2012) from CPS Annual Social and Economic (ASEC) March Supplement data to be reasonably comparable to the values obtained from the Eurostats database. Data for 1980-1994 and prior to the first available year for a country from new sources for 1995-2012 continue to be calculated from the LIS datasets, while years with missing data between two available data points are interpolated based on the assumption of constant growth rates.[8]

This new definition of single parent poverty from Eurostats deviates from the definition of poverty calculated from LIS datasets. Whereas the Eurostats definition includes all households with a single parent with dependent children, the definition used for CSLS calculations from the LIS includes only households comprised of single mothers with dependent children. The latter

[7] The methodology of Osberg and Sharpe (2012) is described in detail in two forthcoming research notes.
[8] This includes years between the first available year of the new data and the last year of LIS data used for each country.

definition, although preferable due to our definition of the at-risk group as only mothers and children, is not available from Eurostats. We therefore use the former definition as a proxy for the latter definition for available years between 1995 and 2012 using the new sources described above. Although this constitutes a significant break in the series, we expect that the two methods result in similar estimates; however, this new methodology is clearly not perfect and it will therefore be altered as better options become available that allow for both goals (a) and (b) described above.

B. Average Family Size

Average family size, used in the adjustment of personal consumption expenditures (an element of the index of consumption), has traditionally been calculated from LIS datasets by the CSLS. In the current update, data for 2004-2012 (the available years) for European countries are taken from the Eurostats database. In the future, values for Australia, Canada, and the United States will also be updated using new data sources; however, this is not a priority. There is little difference between LIS and Eurostats values, and very little to no variation in average family size from year-to-year in each country. We therefore anticipate that this update has little to no effect on the index of consumption and consequently on the IEWB.

C. Current Net Capital Stock

Previously, data for total current net capital stock were only available up to 2002 via the Kiel Institute for the World Economy. However, updates for years beyond 2002 for nine of the fourteen countries were made possible by the inclusion of a net capital stock index in Table 35.1 of the OECD National Accounts at a Glance 2014. We use this index to link values of the total current net capital stock forward for available years and continue to use extrapolations based on constant growth rates for Belgium, Canada, Spain, United Kingdom, United States, and missing years for the other countries.

This is the first significant update to the capital stock data in many updates of the IEWB. Fortunately, the extrapolations based on constant growth rates, used to approximate increases in net capital stock in previous editions of the IEWB, were relatively good approximations. For each of the nine countries for which new data are available, we compared our new estimates against the estimates of total current net capital stock that would have been obtained under simple extrapolation from 2002 onwards. From 2002 through 2012, the old method underestimated total current net capital stock the most in Australia (8.8 per cent) and overestimated total current net capital stock the most in Denmark (10.1 per cent). In fact, the error was smaller than 10.0 per cent in all cases except Denmark. Over ten years of growth, these represent very small deviations in the estimated growth rates year-to-year. Furthermore, the old estimation method does not systematically overestimate (4 of 9 countries) or underestimate (five of nine countries) the data. These observations increase our confidence in the estimates for the five countries and the missing data points where the old method is still employed.

D. Monetary Values

Finally, the OECD base year for OECD Statistics changed from 2000 to 2005 between the last update of the IEWB for selected OECD countries and this report. Consequently, we now convert all of our monetary values to constant 2005 US dollars instead of constant 2000 US dollars to accommodate this external methodological update.

There is some sacrifice implicitly made with these methodological changes: the current update of the IEWB is not directly comparable to previous updates of the IEWB. Nevertheless, we feel that the current methods provide richer data and consequently more accurate year-to-year variations in the IEWB, especially in more recent years. The next section of this update exploits this improvement by detailing the trends in the IEWB and its underlying components with a particular emphasis on the effect of the 'Great Recession' and the recovery – an analysis that would be grossly incomplete without available data on the year-to-year variations in poverty-related data, which feeds into both the index of equality and the index of economic security.

III. Trends in the Index of Economic Well-being for Selected OECD Countries, 1980-2012[9]

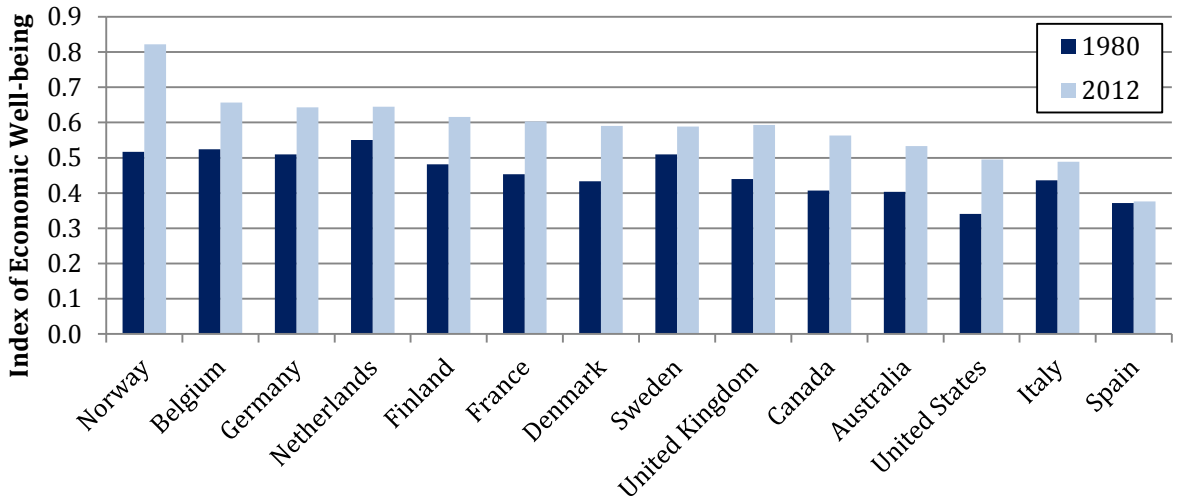
This section of the report examines the level of the Index of Economic Well-being (IEWB) and its components in 2012 for fourteen OECD countries as well as developments since 1980. Above all, this section focuses on changes over the 1980-2012 period, with little attention given to trends within the period. Due to data limitations, values for some of the variables underlying the Index had to be extrapolated to 2012 based on past data. Such cases are identified in footnotes in the IEWB Database for OECD Countries; in all other cases, the Index is based on actual 2012 data.

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

i. Levels

In 2012, the country with the highest level of economic well-being among the fourteen countries covered was Norway, which had a scaled index value of 0.822 points (Chart 1). Norway was followed by Belgium, which had a scaled index value of 0.657 points. The country which had the lowest level of economic well-being was Spain, with an index value of 0.376 points, followed by the Italy (0.490 points) and the United States (0.496 points). Canada ranked tenth out of fourteen countries, with an index value of 0.563 points.

Chart 1: Index of Economic Well-being, Selected OECD Countries, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 9

[9] This report serves only as an update of previous reports. For this reason, the organizational structure in this section is similar to that of previous reports.

ii. Trends

There are two ways to measure progress in the IEWB: the absolute change in the scaled value of the Index, and the per cent change (either the total per cent 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, 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 1980-2012 period, the IEWB grew in all countries, although barely in Spain due to the 2008 financial and Eurozone crises (Chart 1). Note, however, that how we choose to measure the magnitude of the growth – in absolute or proportional terms – can in principle affect the ranking of countries in terms of growth. Exhibit 2 provides the rank order of fourteen countries according to both measurement approaches.

In absolute terms, Norway's 0.305 point increase was the largest among the countries over the 1980-2012 period. Norway was followed by Denmark, Canada, the United States and the United Kingdom, with growth of 0.158, 0.156, 0.155 and 0.154 points, respectively. Spain's index value experienced mere 0.004 point growth, while all other countries experienced growth of between 0.050 and 1.050 points.

In proportional terms, the strongest growth occurred in Norway; where the index increased 1.46 per cent per year over the period. The United States, Canada and Denmark followed, with annual growth rates of 1.18, 1.02 and 0.98 per cent, respectively. The slowest annual growth was 0.03 per cent in Spain, followed by the Italy (0.36 per cent), Sweden (0.45 per cent) and the Netherlands (0.49 per cent).

As Exhibit 3 illustrates, the choice between absolute and proportional growth measurement does make a significant difference in the ranking of countries in terms of growth.[10] 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.

[10] 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 six countries and the bottom four countries are the same regardless of the measure of growth used. Such discrepancies are possible in principle, however.

Exhibit 2: Ranking of Countries by Absolute and Proportional Growth, Selected OECD Countries, 1980-2012

	Absolute (points)	Proportional (per cent per year)
1	Norway	Norway
2	Denmark	United States
3	Canada	Canada
4	United States	Denmark
5	United Kingdom	United Kingdom
6	France	France
7	Finland	Australia
8	Germany	Finland
9	Belgium	Germany
10	Australia	Belgium
11	Sweden	Sweden
12	Netherlands	Netherlands
13	Italy	Italy
14	Spain	Spain

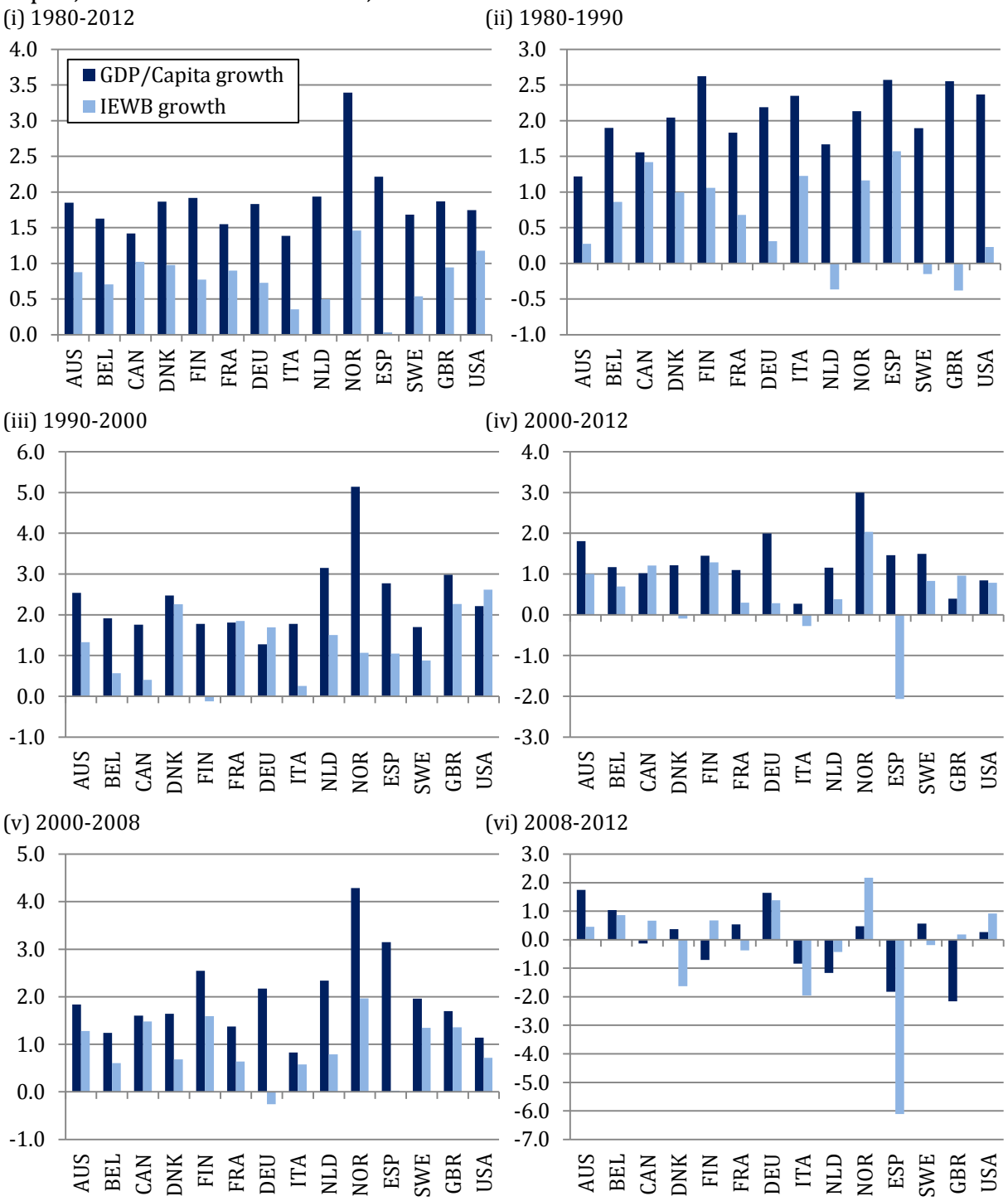
Growth rates varied across countries and across time (Chart 2). From 1980 to 1990, all countries except the United Kingdom, the Netherlands, and Sweden experienced progress in their well-being. Particularly notable were Spain, Canada, Italy and Norway, which grew by over 1.0 per cent per year during the period.

During the following decade of 1990-2000, several countries experienced impressive acceleration in the growth of their index levels. Most notably, the United States went from growth of 0.23 per cent per year during the 1980s to growth of 2.61 per cent per year during the 1990s, and the United Kingdom went from an annual decline of 0.38 per cent during the 1980s to annual growth of 2.26 per cent during the 1990s. Finland and Canada, however, moved the other way and experienced annual declines in their levels of well-being in the 1990s of 0.01 and 0.12 per cent, respectively.

From 2000 to 2008, all countries experienced robust growth in their levels of well-being expect for Germany (-0.26 per cent per year) and Spain (0.02 per cent per year). Norway led the way, with its overall index growing 1.97 per cent per year, followed by Finland (1.59 per cent per year) and Canada (1.53 per cent per year).

From 2008 to 2012, six of fourteen countries experienced declines in their levels of well-being. Spain's level of index decreased the most during the 2008-2012 period (6.09 per cent per year), followed by Italy (1.95 per cent per year), Denmark (1.63 per cent per year), the Netherlands (0.43 per cent per year), France (0.37 per cent per year) and Sweden (0.18 per cent per year), which suggests that the Eurozone crisis has had a significant impact on well-being in the Euro area. Despite the impact of 2008 financial crisis, growth in the level of well-being was strong in the United States (0.91 per cent per year).

Chart 2: Average Annual Growth of the Overall Index of Economic Well-being and GDP per Capita, Selected OECD Countries, Per Cent



Source: IEWB Database for OECD Countries, Table 9 and Appendix Table 21

iii. Comparing the IEWB to Per-capita GDP

Comparing the IEWB 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 and Italy were last in both rankings in 2012 (Exhibit 3 and Chart 3). However, except for Norway, Italy and Spain, the rank positions for all countries are different between the two indicators. For example, Canada was seventh in terms of GDP per capita level in 2012, while it was tenth in terms of the level of the IEWB. Even more strikingly, the United States ranked second in GDP per capita and twelfth in terms of the Index. Similarly, Australia ranked third in GDP per capita and eleventh in terms of the Index.

Growth of GDP per capita was greater than the growth of the IEWB in all countries over the 1980-2012 period (Chart 2). In particular, Spain grew by 2.22 per cent per year in terms of GDP per capita, but grew a mere 0.03 per cent per year in terms of the IEWB. Norway also had a difference of almost 2 percentage points between the growth rates, as it grew by 3.39 per cent per year in terms of GDP per capita, but only 1.46 per cent per year in terms of its overall well-being.

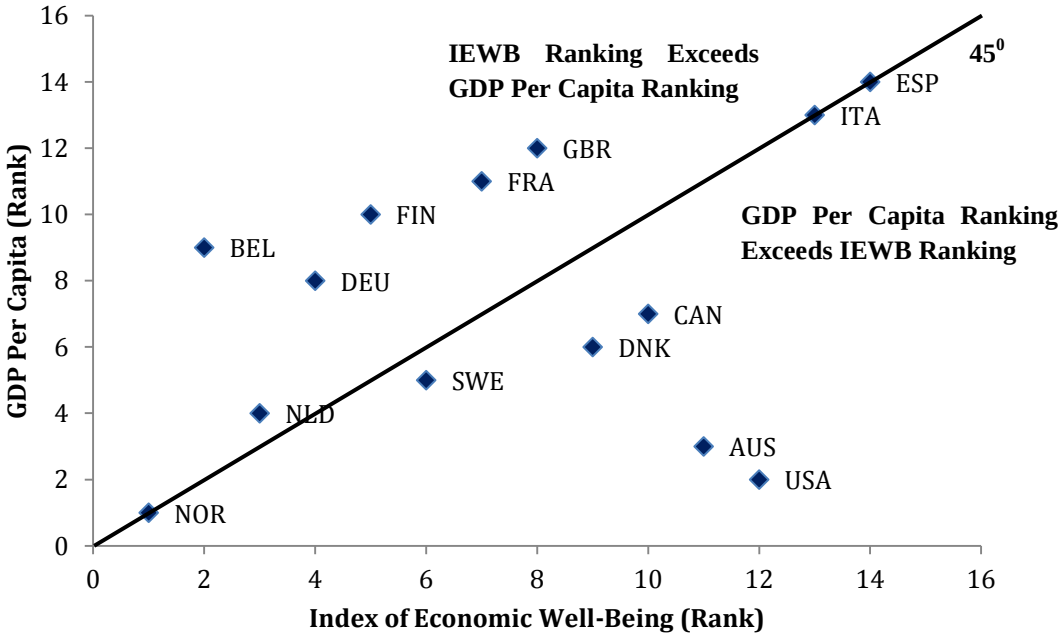
As Exhibit 3 and Chart 3 show, it was not generally true over the 1980-2012 period that countries with fast per-capita GDP growth also experienced fast IEWB growth and vice versa. This divergence shows that certain aspects of the IEWB, which are not included in the measurement of GDP per capita, have grown slower and thus dampened growth of overall economic well-being relative to GDP per capita growth.

Exhibit 3: Ranking by Level and Growth of Per-capita GDP and the Index of Economic Well-being, Selected OECD Countries, 1980-2012

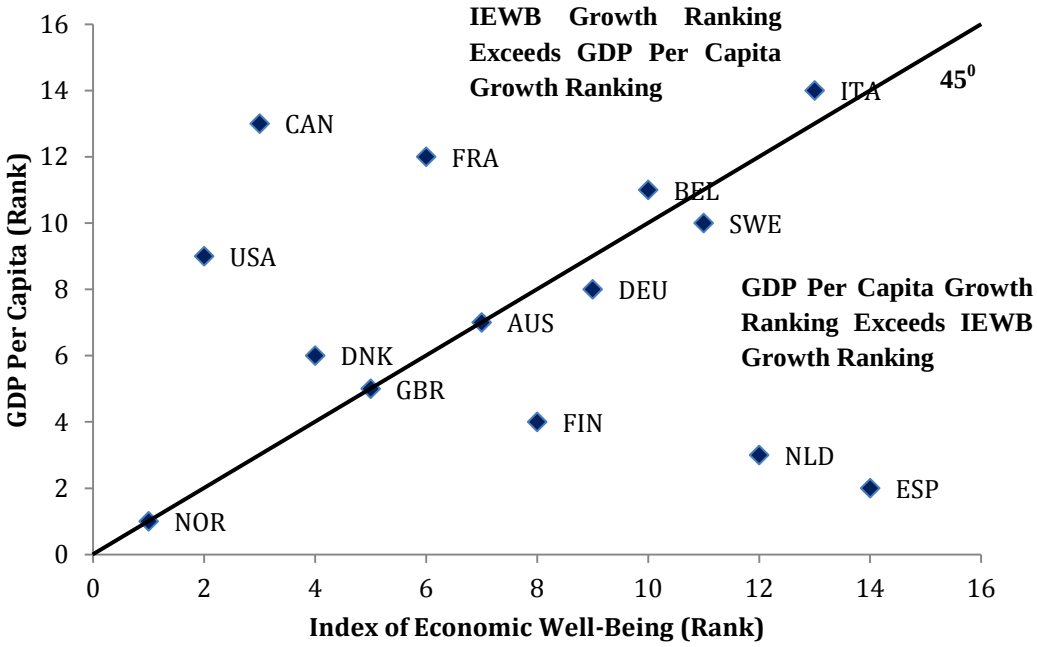
	Level in 2012 (points)		**Growth Rate, 1980-2012 (per cent per year)**	
	GDP Per Capita	**Index of Economic Well-being**	**GDP Per Capita**	**Index of Economic Well-being**
1	Norway	Norway	Norway	Norway
2	**United States**	Belgium	Spain	**United States**
3	Australia	Netherlands	Netherlands	**Canada**
4	Netherlands	Germany	Finland	Denmark
5	Sweden	Finland	United Kingdom	United Kingdom
6	Denmark	Sweden	Denmark	France
7	**Canada**	France	Australia	Australia
8	Germany	United Kingdom	Germany	Finland
9	Belgium	Denmark	**United States**	Germany
10	Finland	**Canada**	Sweden	Belgium
11	France	Australia	Belgium	Sweden
12	United Kingdom	**United States**	France	Netherlands
13	Italy	Italy	**Canada**	Italy
14	Spain	Spain	Italy	Spain

Chart 3: Ranking by Level and Growth of Per-capita GDP and the Index of Economic Well-being, Selected OECD Countries

(i) Levels, 2012



(ii) Annual Growth Rates, 1980-2012



Source: Exhibit 3

B. Summary of Trends in the Four Domains of the Index of Economic Well-being

The IEWB is constructed from four domains: consumption flows, wealth stocks, economic equality, and economic security. The following four subsections examine in detail the trends in the each domain of the IEWB in the fourteen OECD countries over the 1980-2012 period. Summary Table 1 provides a brief overview of the four domains in 2012.

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 1.46 per cent per year in dollar terms over the 1980-2012 period, while the index of the consumption domain (the scaled value of total adjusted consumption) grew 2.45 per cent per year.

As the next four sections show, the consumption flows domain and the wealth stocks domain increased for all countries between 1980 and 2012, 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 increasing in poverty rates, growing inequality in income distribution, and an increasing share of private disposable income going to healthcare-related expenses.

Summary Table 1: Index of Economic Well-being and its Domains, Selected OECD Countries, 2012

	Total Consumption per capita, 2005 US$	Scaled Total Consumption per capita	Total per capita Wealth, 2005 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	31,193	0.677	156,566	0.316	0.447	0.694	0.534
Belgium	28,936	0.606	224,300	0.536	0.747	0.739	0.657
Canada	31,382	0.683	196,694	0.446	0.367	0.673	0.542
Denmark	24,840	0.477	210,793	0.492	0.603	0.792	0.591
Finland	24,105	0.454	195,632	0.443	0.806	0.763	0.616
France	28,897	0.605	167,410	0.351	0.730	0.730	0.604
Germany	28,941	0.606	221,413	0.526	0.709	0.733	0.644
Italy	24,211	0.457	162,495	0.335	0.455	0.711	0.490
Netherlands	30,589	0.658	220,821	0.524	0.812	0.585	0.645
Norway	33,948	0.764	341,863	0.917	0.764	0.843	0.822
Spain	23,372	0.431	149,072	0.292	0.223	0.560	0.376
Sweden	26,630	0.533	173,352	0.370	0.736	0.780	0.605
United Kingdom	29,710	0.630	171,861	0.366	0.615	0.765	0.594
United States	38,786	0.917	220,844	0.524	0.167	0.377	0.496

Source: IEWB Database for OECD Countries, Tables 1, 2 and 9

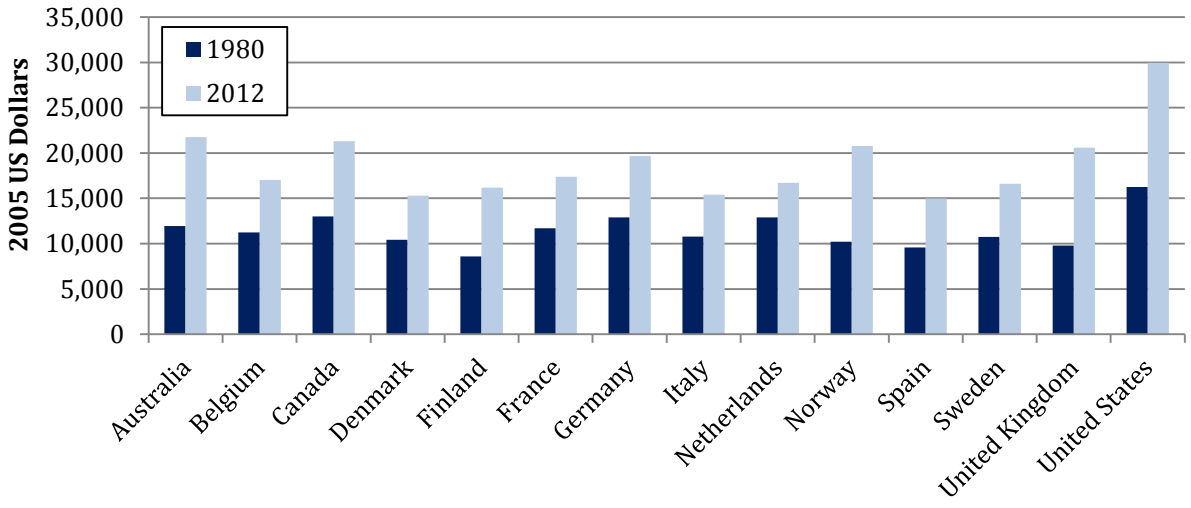
C. Trends in the Components of the Consumption Flows Domain

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.[11]

i. Private Consumption

In 2012, private consumption was greatest in the United States, where it had a per capita value of $29,947 (2005 US dollars) (Chart 4). The United States was well ahead of all the other countries, as the second highest per capita personal consumption was in the Australia at $21,750. Spain had the lowest per capita private consumption for 2012 at $14,992, about one half of the US value. Personal consumption accounted for over 50 per cent of total consumption flows in all countries, the single largest contributor to total consumption flows. From 1980 to 2012, the greatest growth in private consumption was 2.24 per cent per year in Norway. Personal consumption grew the least in the Netherlands, at 0.82 per cent per year. Canada ranked seventh with growth of 1.55 per cent per year.

Chart 4: Private Consumption Per Capita, Selected OECD Countries, 2005 US Dollars, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 1

[11] In the IEWB database for Canada and the provinces, the consumption domain also includes the value of unpaid work and regrettable expenditures. Data limitations currently prevent us from including these concepts in the IEWB database for OECD countries.

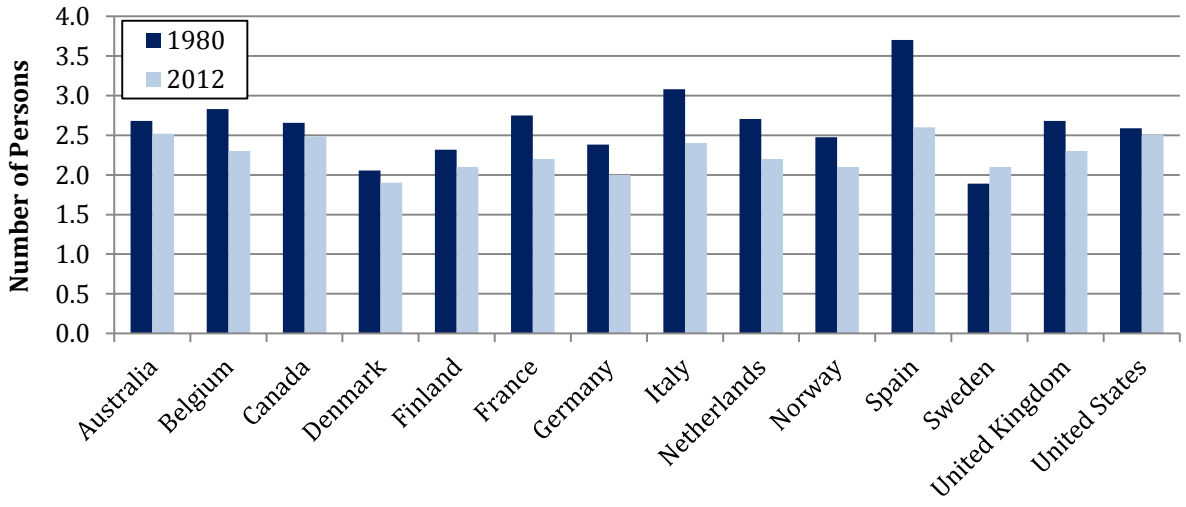
ii. Average Family Size

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 an entire household) and share fixed costs (*e.g.*, a household can share one microwave rather than each person having to buy one).

To account for this issue, we use the Luxembourg Income Study (LIS) 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.[12]

Average family size was greatest in Spain, with 2.60 persons per household (Chart 5). It was followed by Australia, the United States and Canada with 2.52, 2.51 and 2.48 persons per household, respectively. Denmark had the smallest family size, with 1.90 persons per family. Over the 1980-2012 period, the size of families in all but one country declined considerably. The only country where the family size increased was Sweden, which had a remarkably small family size in 1980. 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.

Chart 5: Average Family Size, Selected OECD Countries, Persons, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 1

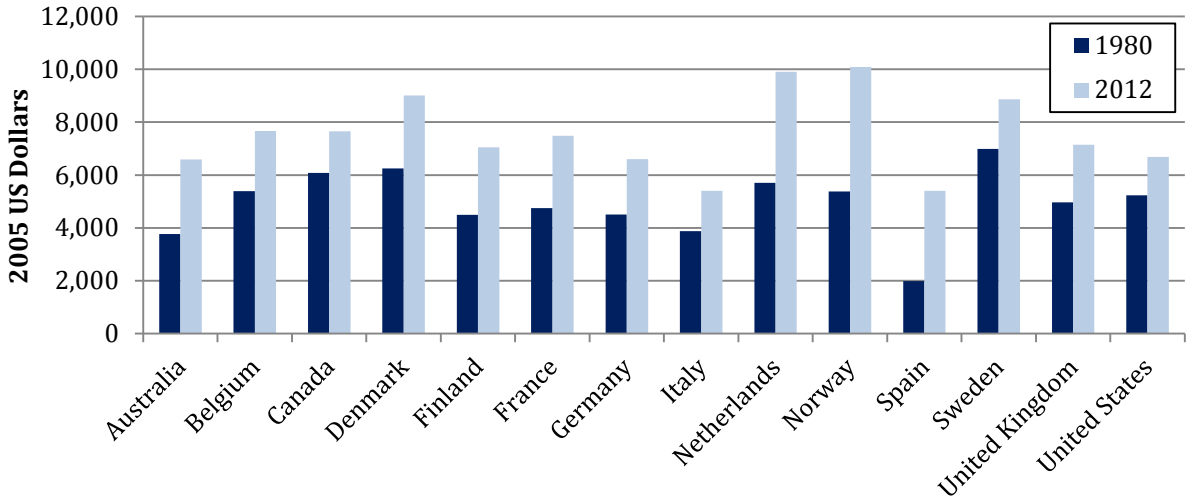
[12] The rationale for this approach is that the equivalence scale would take a value of 1.0 in 1980 in every country if we simply used within-country changes in family size over time. We would not be accounting for cross-country differences in family size in the base year (1980). Measuring family size 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.

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. The largest government expenditures for 2012 were in Norway, the Netherlands, Denmark and Sweden, all four following a very progressive form of social democracy. Their per-capita government expenditures were $10,091 (2005 US dollars), $9,909, $9,012 and $8,862, respectively (Chart 6). It is interesting to note that Germany, which is traditionally thought of as a welfare state, in effect spent less per capita than relatively free-market-oriented United States and Australia. By far, Spain and Italy had the lowest per-capita government expenditures in 2012.

Over the 1980-2012 period, the government expenditures of Spain grew at the highest rate, although that is unsurprising considering that in 1980 Spain had the lowest level of per-capita expenditures. Norway and the Netherlands also experienced significant growth in government expenditures between 1980 and 2012. The weakest growth in government expenditures occurred in Sweden, followed closely by the United States.

Chart 6: Per-capita Government Expenditures on Current Goods and Services, Selected OECD Countries, 2005 US Dollars, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 1

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 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.[13] 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.

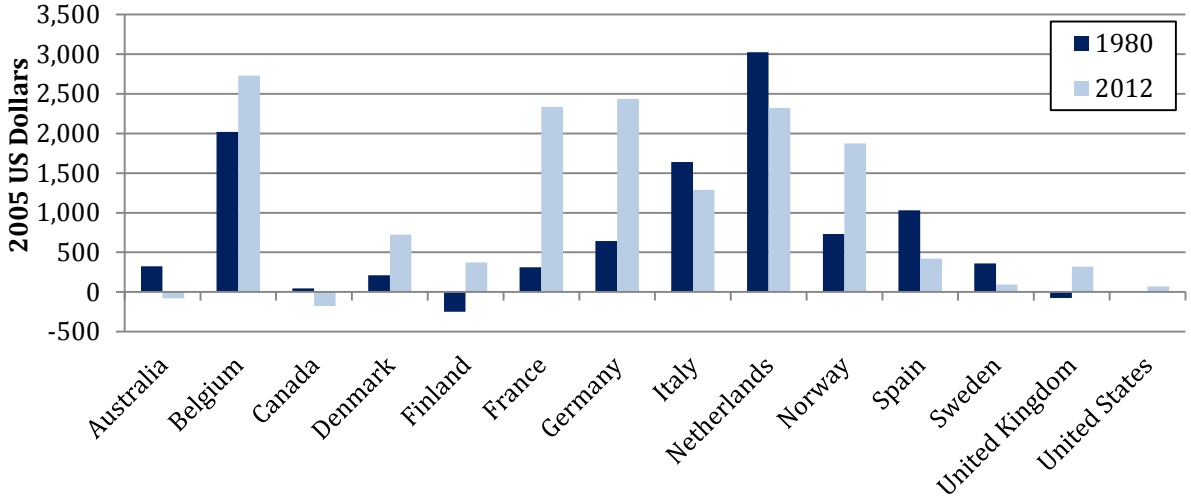
Chart 7 provides the value of leisure (relative to the United States in 1980) for the fourteen OECD countries in 1980 and 2012. In 2012, all European countries had a positive relative cost of leisure, showing that they spent more time on leisure than the United States did in 1980. By contrast, two of the non-European countries, Canada and Australia, experienced falls in the value of leisure due to increased hours spent in the labour force relative to the United States in 1980. The United States had the smallest positive adjusted relative cost of leisure per capita of all the fourteen countries at $69, followed by Sweden $96. The value of leisure decreased in the United States relative to the US 1980 benchmark until 1999, after which the value of leisure has steadily increased. Belgium had the highest adjusted relative cost, $2,731, with Germany, France and the Netherlands following closely at $2,436, $2,334 and $2,322 per capita, respectively. The lowest adjusted cost of leisure was in Canada, a negative $177 per capita. Australia had the second lowest cost of leisure, negative $78 per capita.

Observing the change in the relative cost of leisure from 1980 to 2012, the benefit of leisure increased for most European countries. The most dramatic change was experienced by France, where the relative cost or benefit of leisure increased significantly, from $313 per capita to $2,334; however, Germany and Norway also saw their relative cost or benefit of leisure increase significantly. Finland, which was the only European country to experience a lengthy

[13] 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.

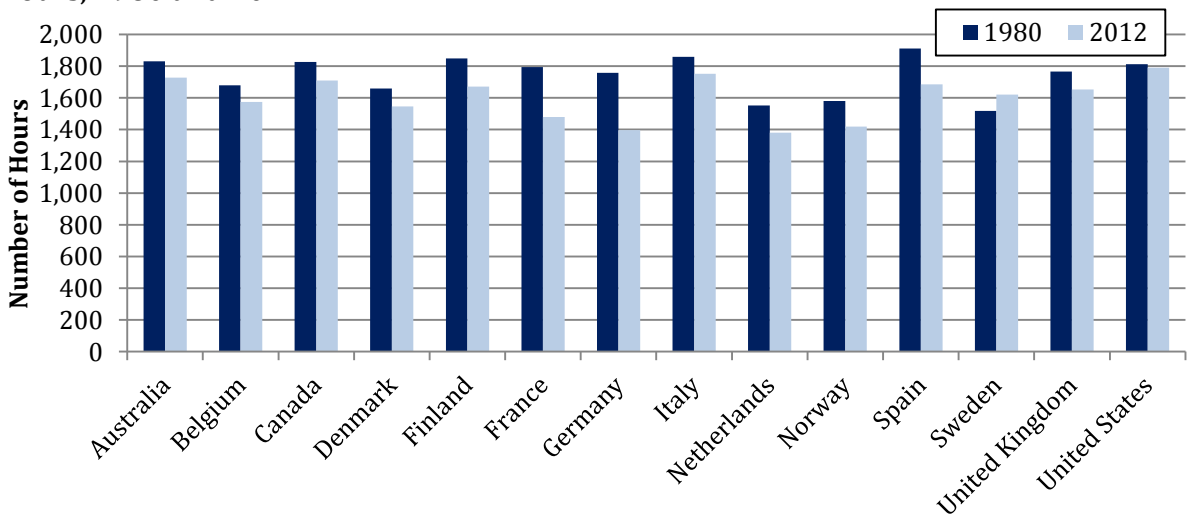
period of negative leisure costs in the 1980s, also experienced significant growth, moving from negative $250 per capita in 1980 to positive $374 in 2012.

Chart 7: Imputed Value of Changes in Leisure per Capita (relative to the United States 1980 Benchmark), Selected OECD Countries, 2005 US Dollars, 1980 and 2012



Source: IEWB Database for OECD Countries, Appendix Table A5

Chart 8: Average Annual Hours Worked per Employed Person, Selected OECD Countries, Hours, 1980 and 2012



Source: IEWB Database for OECD Countries, Appendix Table A5-101

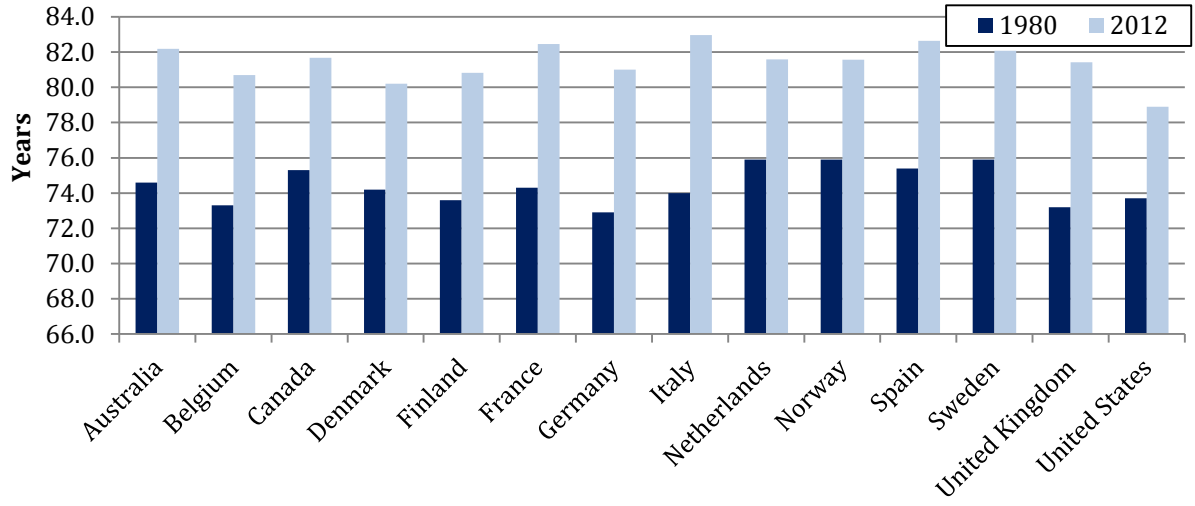
v. Life Expectancy

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.

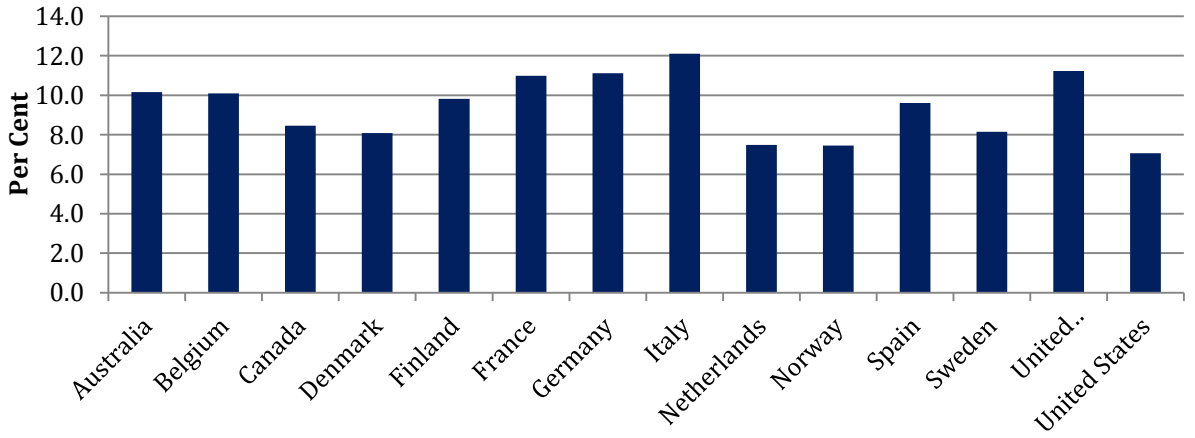
The country with the highest life expectancy in 2012 was Italy, which had an average life expectancy of 82.0 years (Chart 9). The lowest life expectancy, 78.9 years, was in the United States. Over the entire period of 1980-2012, life expectancy in Italy grew the most, from 74.0 years to 83.0 years, a total increase of 12.1 per cent (Chart 10). The United Kingdom experienced the second largest increase in average life expectancy of 11.2 per cent, followed closely by Germany (11.1 per cent) and France (11.0 per cent). The life expectancy of the United States grew the least, at only 7.1 per cent over the entire period. Life expectancy increased almost steadily in most countries over the entire 1980-2012 period, 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 fourteen countries.

Chart 9: Life Expectancy at Birth, Selected OECD Countries, Years, 1980 and 2012



Source: IEWB Database for OECD Countries, Appendix Table A3

Chart 10: Total Change in Life Expectancy at Birth, Selected OECD Countries, Per Cent, 1980-2012



Source: IEWB Database for OECD Countries, Appendix Table A3

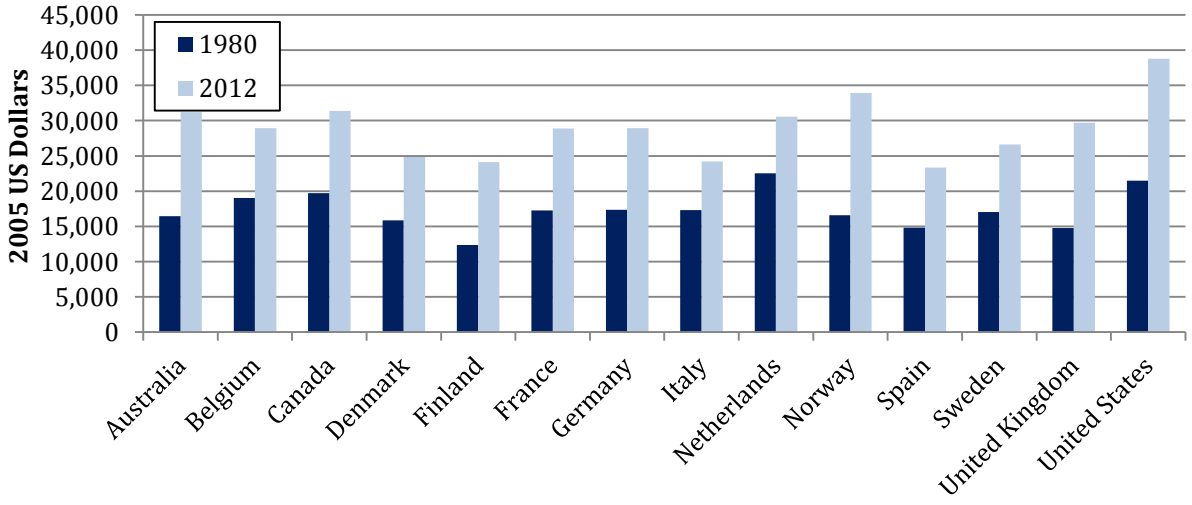
vi. Total Adjusted Consumption Flows

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 2012 was the United States, with $38,786 in 2005 US dollars (Chart 11). The United States was significantly ahead of second-placed Norway, which had consumption flows of $33,948 per capita. Spain was last with $23,372 per capita, greatly trailing the United States. Canada was third, with $31,382 per capita.

Norway had the fastest consumption growth over the 1980-2012 period, at 2.26 per cent per year. The United Kingdom ranked second with growth of 2.21 per cent per year. The slowest consumption growth was 0.96 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 fourteen countries.

Between 2008 and 2012, per-capita consumption flows have declined in Spain (2.1 per cent per year), followed by Italy (1.1 per cent per year), the United Kingdom (1.0 per cent per year) and the Netherlands (0.7 per cent per year). All other countries experienced modest growth in per-capita consumption flows. Weak per-capita consumption flow growth in Europe was due to the effect of the 2008 financial and Eurozone crises on personal consumption as well as the austerity adopted by certain European governments, which have lowered per-capita government expenditures and, in turn, further reduced private consumption.

Chart 11: Total Adjusted Consumption Per Capita, Selected OECD Countries, 2005 US Dollars, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 1

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

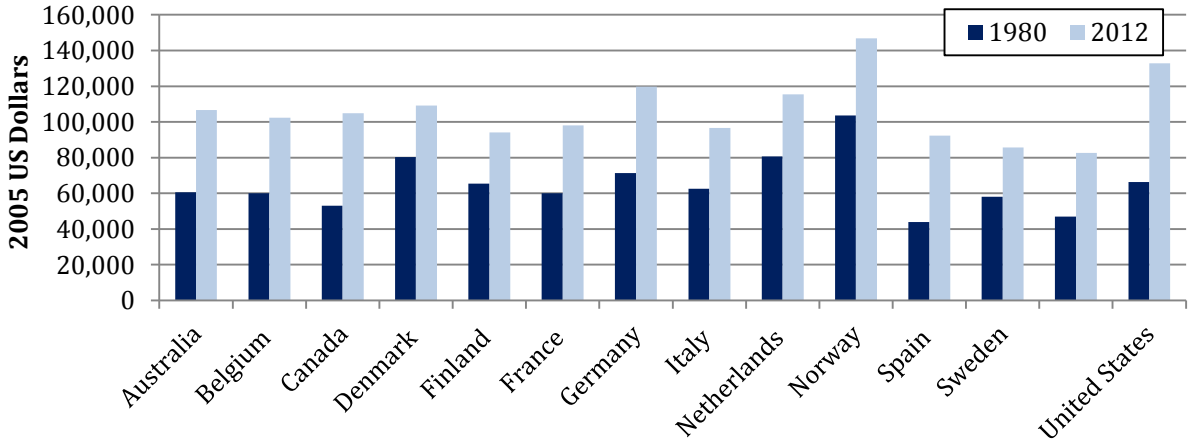
An economy's stock of wealth – both man-made and naturally occurring – determines how sustainable its current level of consumption really is. The measure used in this report contains, as explained earlier, four components: the physical capital stock; the R&D stock; the stock of human capital; and net international investment position.[14] One adjustment is made to the sum of these components: to account for the social costs of environmental degradation, we subtract the estimated annual social 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 largest in Norway in 2012 at $146,792 in 2005 US dollars (Chart 12).[15] The United States, Germany and the Netherlands followed with $132,884, $119,672 and $115,413, respectively. The lowest stock of net capital was in the United Kingdom, $82,536 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 2.36 per cent per year. The United States experienced the second largest growth rate, 2.19 per cent per year, followed closely by Canada, with a growth rate of 2.16 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 Denmark, 0.97 per cent per year.

Chart 12: Physical Capital Stock Per Capita, Selected OECD Countries, 2005 US Dollars, 1980 and 2012



Source: IEWB Database for OECD Countries, Appendix Table 6

[14] In our estimates of the IEWB for Canada and the provinces, the wealth domain also includes the value of natural resource stocks. Data limitations prevent us from including natural resources in our international estimates.

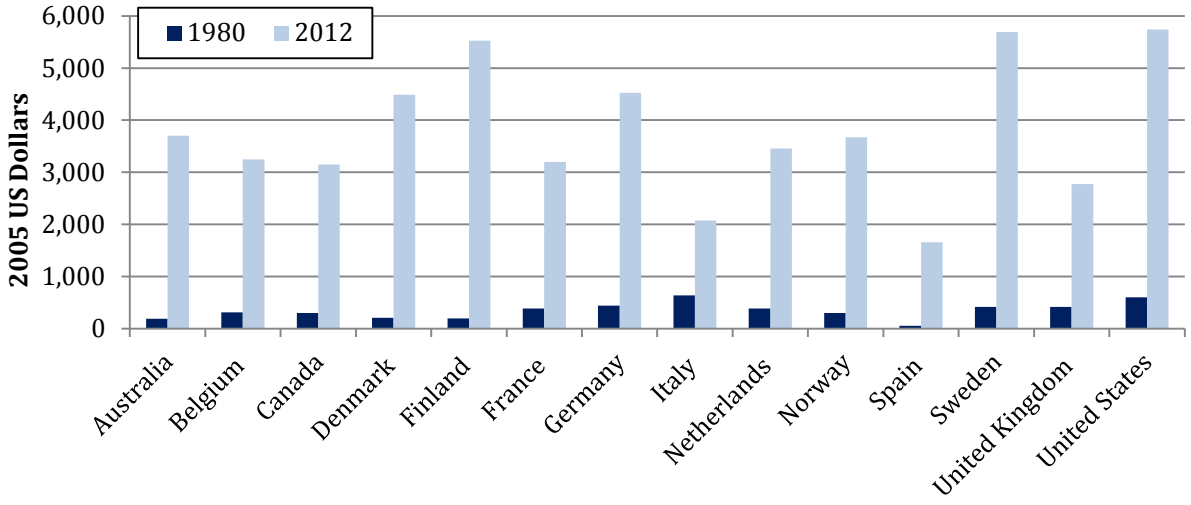
[15] Data on physical capital are from the Kiel Institute for the World Economy Database on Capital Stocks in OECD Countries. For all countries, the most recent year for which data are available is 2002. Values for 2003-2012 are extrapolated based on the compound annual growth rates from the 1997-2002 period. It is unfortunate that more recent comparable estimates of capital stock are not available.

ii. R&D Capital

We compute the stock of R&D using data on gross annual R&D expenditures (from the OECD Science and Technology database) and convert the estimates to 2005 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 recommended the capitalization of R&D, so that annual R&D expenditures represent a form of investment in an R&D capital stock. Our approach is consistent with that recommendation. While some OECD countries such as Canada have implemented the SNA 2008 recommendation, not all countries have done so. For that reason, we continue to calculate our own R&D capital stock estimates using R&D expenditure data.

In 2012, the stock of total business enterprise expenditures on R&D per capita was greatest in the United States at $5,740 in 2005 US dollars (Chart 13). Sweden had the second largest stock of R&D expenditures, $5,692 per capita, followed closely by Finland ($5,525 per capita). Spain had the lowest stock of R&D expenditures per capita in 2012, at $1,657. Many countries experienced extremely rapid increases in R&D over the 1980-2012 period, with the growth rates in Spain, Denmark and Finland each reaching over 10 per cent per year. R&D expenditures grew over the entire period by at least 6 per cent per year for all fourteen countries except for Italy, which clearly lagged the other countries with an annual growth rate of 3.7 per cent.

Chart 13: Per-capita Stock of R&D, Selected OECD Countries, 2005 US Dollars, 1980 and 2012



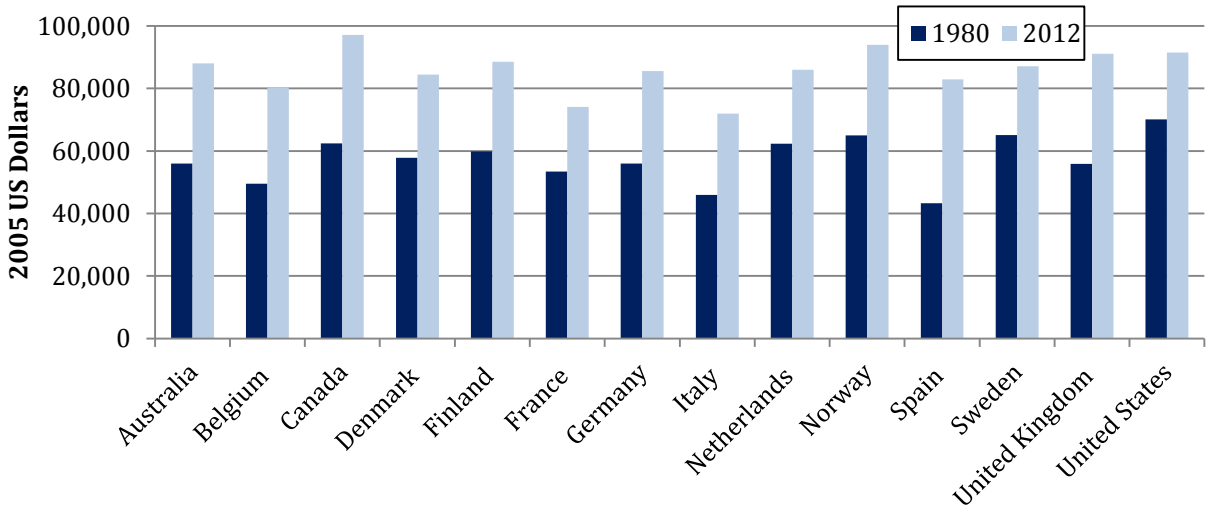
Source: IEWB Database for OECD Countries, Appendix Table 8

iii. Human Capital

The value of human capital in 2012, defined in the IEWB as the accumulated private and public expenditures on all levels of education, was highest for Canada at $97,061 (2005 US

dollars) per capita (Chart 14). In second and third place, Norway and the United States had human capital levels of $93,982 and $91,514 respectively. The lowest human capital levels belonged to Italy and France, at $71,941 and $74,092 per capita, respectively. Per-capita human capital was the second most important contributor to total wealth stocks per capita, contributing between 30 to 50 per cent of the total value. Spain experienced the greatest improvement in human capital over the 1980-2012 period, growing by 2.1 per cent per year. By contrast, the United States, starting from the highest level of per-capita human capital in 1980, experienced the lowest annual growth rate (0.8 per cent).

Chart 14: Human Capital Stock Per Capita, Selected OECD Countries, 2005 US Dollars, 1980 and 2012



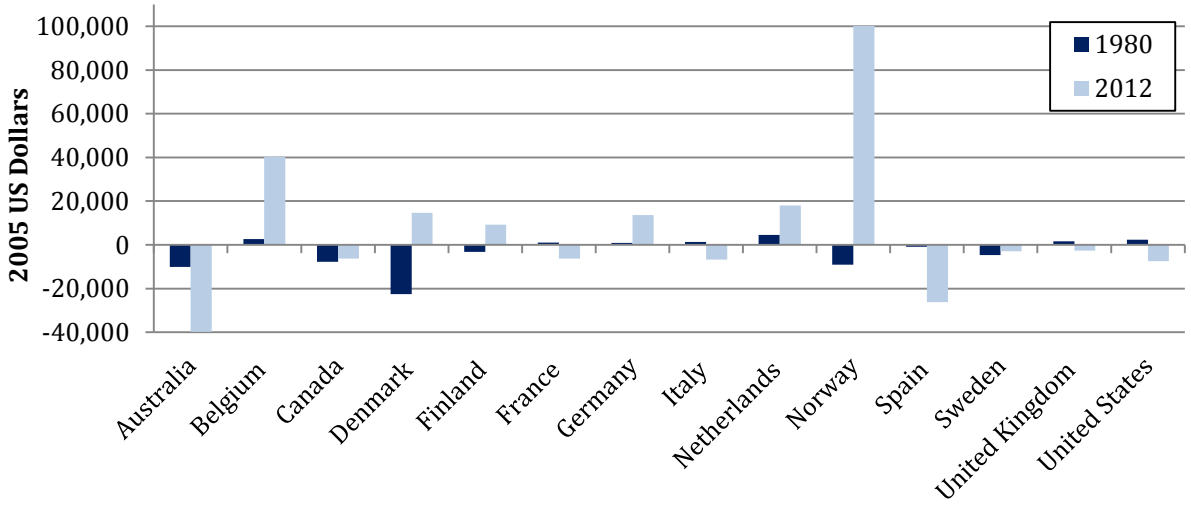
Source: IEWB Database for OECD Countries, Appendix Table 25

iv. Net International Investment Position

Six countries had positive net international investment positions in 2012. Norway had the largest net international investment position, with a per-capita investment surplus of $100,187 (2005 US dollars) (Chart 15). The other five countries with a positive per-capita investment position were Belgium, the Netherlands, Denmark, Germany and Finland. Out of the countries with negative per-capita investment positions, the largest deficit of $39,783 per capita belonged to Australia. It was significantly higher than the second largest international investment deficit of $26,270 per capita, belonging to Spain.

The net international investment position improved over the 1980-2012 period in eight of fourteen countries, reflecting faster growth in foreign assets than in foreign liabilities. The largest increase was in Norway, where the net international investment position increased from -$9,140 per capita in 1980 to $100,187 per capita in 2012. Among the countries in which the net foreign asset position decreased, the largest decline was in Australia, followed closely by Spain. Canada's position improved from -$7,796 in 1980 to -$6,261 in 2012, while the United States' position deteriorated from $2,315 to -$7,424.

Chart 15: Net International Investment Position Per Capita, Selected OECD Countries, 2005 US Dollars, 1980 and 2012



Source: IEWB Database for OECD Countries, Appendix Table 9

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 IEWB. 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.[16] The estimates for the total social costs of global GHG emissions are 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

[16] 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 used this approach in another paper in which we estimate the IEWB for Canada and its provinces (Osberg and Sharpe, 2009). 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 Sweden.

peer-reviewed studies is approximately $23/tCO2-e in 2005 US dollars.[17] We take this as our estimate of the social costs of GHG emissions.

The per-capita social cost of GHG emissions in a given country is a function of GDP per capita. Norway had the highest social cost associated to GHG in 2012, $2,718 (2005 US dollars) per capita (Appendix Table A10).[18] The second highest social cost was $2,104 per capita in Canada. The country with the lowest total in 2012, Italy, had GHG costs of $1,483 per capita. In general, GHG 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, GHG 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.

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 2012, Norway had the greatest total stock of wealth, at $341,863 per capita (2005 US dollars), largely due to its well-above average per-capita international investment position (Chart 16). The second-place country, Belgium, was well behind with $224,300 in wealth. The smallest stock of wealth, with a value of $149,072, belonged to Spain. Canada ranked seventh out of fourteen countries, with wealth valued at $196,664 per capita.

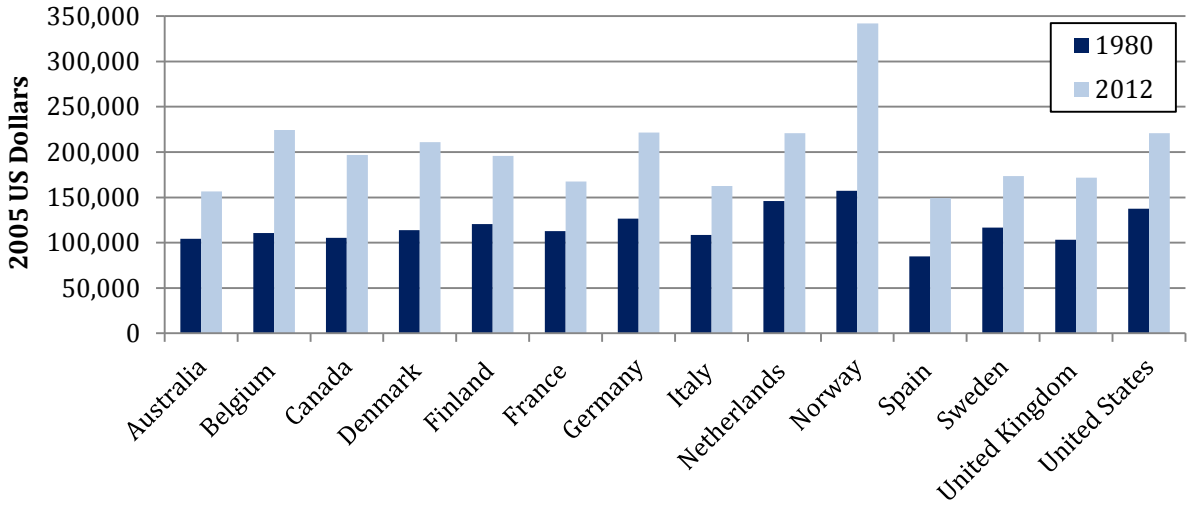
Norway and Belgium had the fastest growth in total wealth over the 1980-2012 period, at 2.46 per cent and 2.23 per cent per year, respectively. The slowest growth was 1.18 per cent per year in Sweden and France (which both experienced growth of 1.24 per cent per year), followed closely by Australia and Italy (which both experienced growth of 1.27 per cent per year).

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 1980-2012 period; this does not affect the cross-country rankings in terms of levels (though it can affect rankings in terms of growth rates).

[17] 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 $85/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.

[18] Data on GHG emissions are from the Carbon Dioxide Information Analysis Centre.

Chart 16: Total Wealth Stocks Per Capita, Selected OECD Countries, 2005 US Dollars, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 2

E. Trends in the Economic Equality Domain

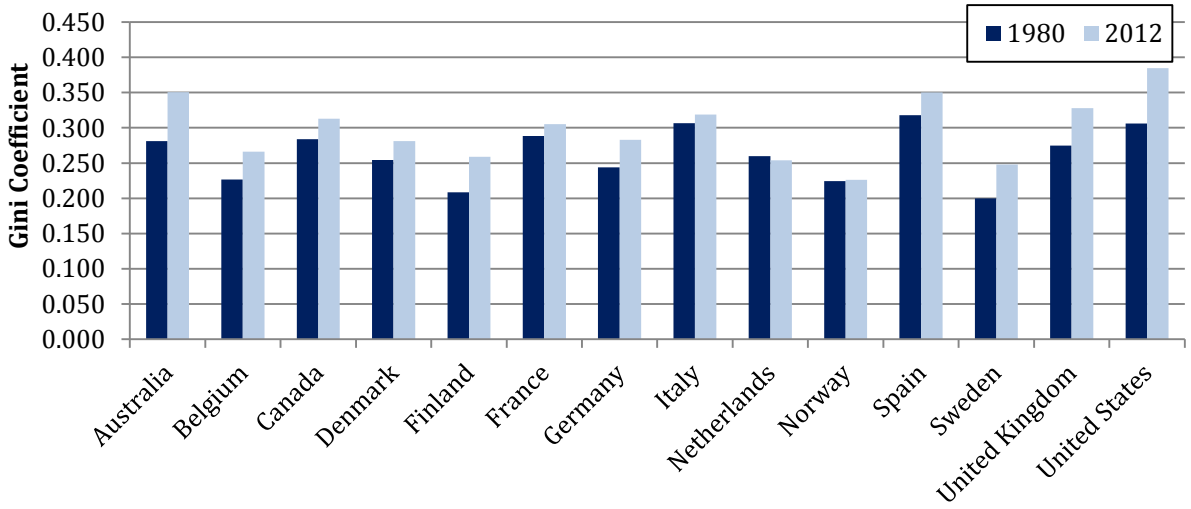
The third domain of the IEWB is economic equality. At current levels, a fall in equality, or rise in inequality, is considered to decrease economic well-being and vice versa. The equality domain consists in two component concepts: income inequality and poverty. We measure income inequality using the Gini coefficient, which we compute for the total population of family units based on family after-tax equivalent income data. 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 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 2012, the Gini coefficient was greatest for the United States at 0.384 and followed by Australia, Spain and the United Kingdom at 0.351, 0.350 and 0.328, respectively (Chart 17).[19] The Scandinavian social democracies had the lowest measured inequality; Norway had a Gini coefficient of 0.226, followed by the Sweden with a coefficient of 0.248. The Netherlands was third with a coefficient of 0.254. Finland and Denmark were fourth and fifth with coefficients of 0.259 and 0.281, respectively. Canada had a Gini coefficient of 0.313 in 2012.

[19] Estimates of inequality and poverty are computed from the LIS database, Statistics Canada, Eurostat, the Household, Income and Labour Dynamics in Australia Survey, and the U.S. Current Population Survey.

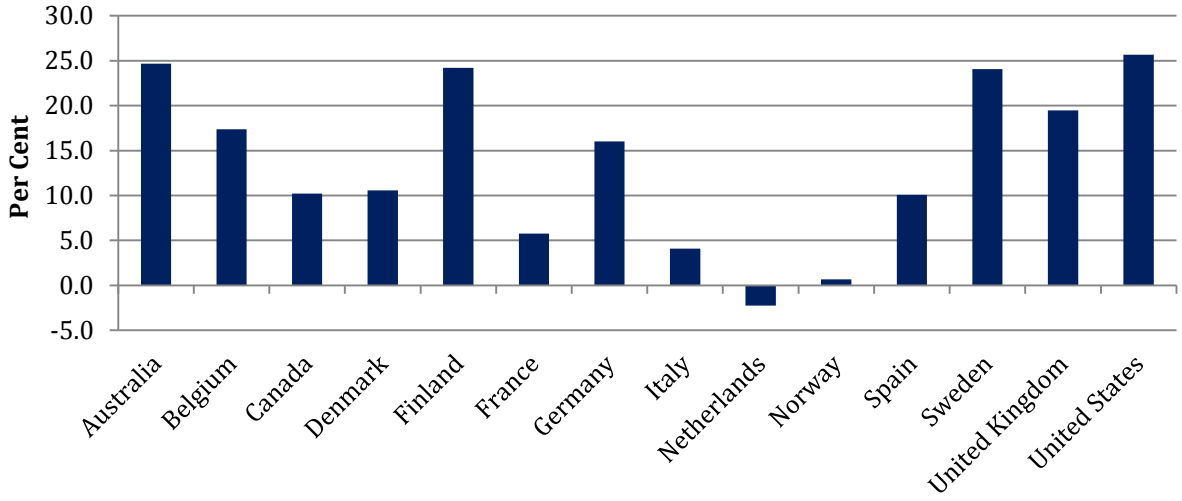
Chart 17: Gini Coefficient Based on Family After-tax Equivalent Income, Selected OECD Countries, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 3

Over the 1980-2012 period, only one country – the Netherlands – achieved a reduction in the Gini coefficient. The Gini coefficient of the Netherlands declined by 2.2 per cent overall (Chart 18). All other countries experienced a rise in economic inequality over the 1980-2012 period. The United States experienced the greatest increase in the income gap (25.7 per cent), followed by the Australia, Finland, Sweden and the United Kingdom, all of which experienced an increase in the Gini coefficient of about 20-25 per cent.

Chart 18: Total Change in the Gini Coefficient, Selected OECD Countries, Per Cent, 1980-2012



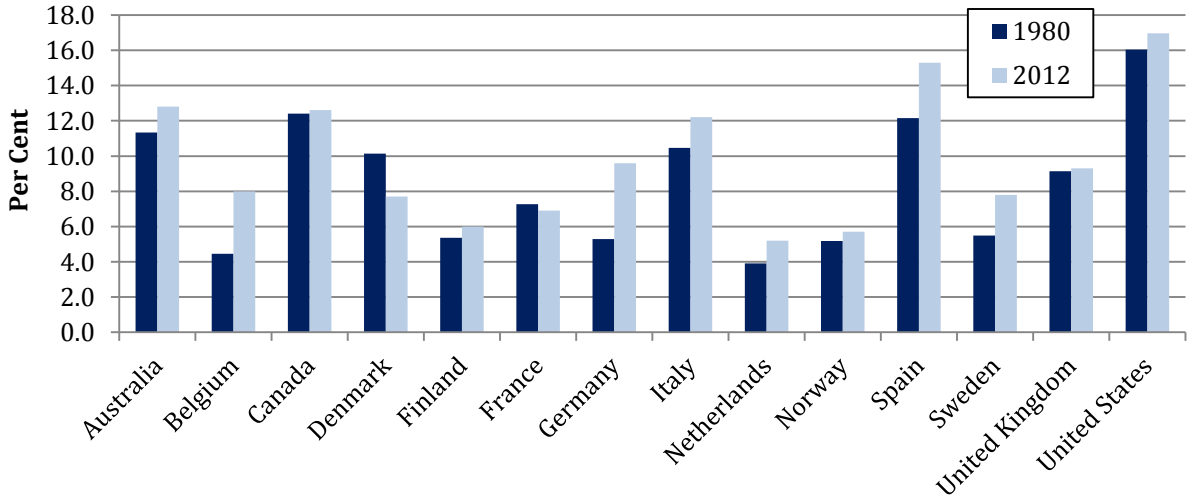
Source: IEWB Database for OECD Countries, Table 3

ii. Poverty

The United States had the highest poverty rate in 2012, with 17.0 per cent of the total population defined as poor (Chart 19). Spain followed, with a poverty rate of 15.3 per cent. Considering the fact that the United States had one of 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 9.0 percentage points lower than the poverty rate of the United Sates. The lowest poverty rates belonged to the Netherlands and Norway, which had rates of 5.2 and 5.7 per cent, respectively. Canada had the fourth highest poverty rate at 12.6 per cent.

Over the 1980-2012 period, all countries but two experienced growing poverty rates; Denmark's poverty rate declined by 2.4 percentage points, while France's declined by 0.4 percentage point. Germany and Belgium led the vast majority of countries increasing 4.3 and 3.5 percentage points over the period, respectively. Spain also had a significant increase in its overall poverty rate (3.2 percentage points), which was largely the result of a 1.9 percentage point rise in the poverty rate from 2008 to 2012. As the poverty rate depends not only on the distribution of income but also on economic growth, the growth of poverty rates over the sub-periods greatly varied with the changing economic conditions in the countries.

Chart 19: Poverty Rate for All Persons, Selected OECD Countries, Per Cent, 1980 and 2012

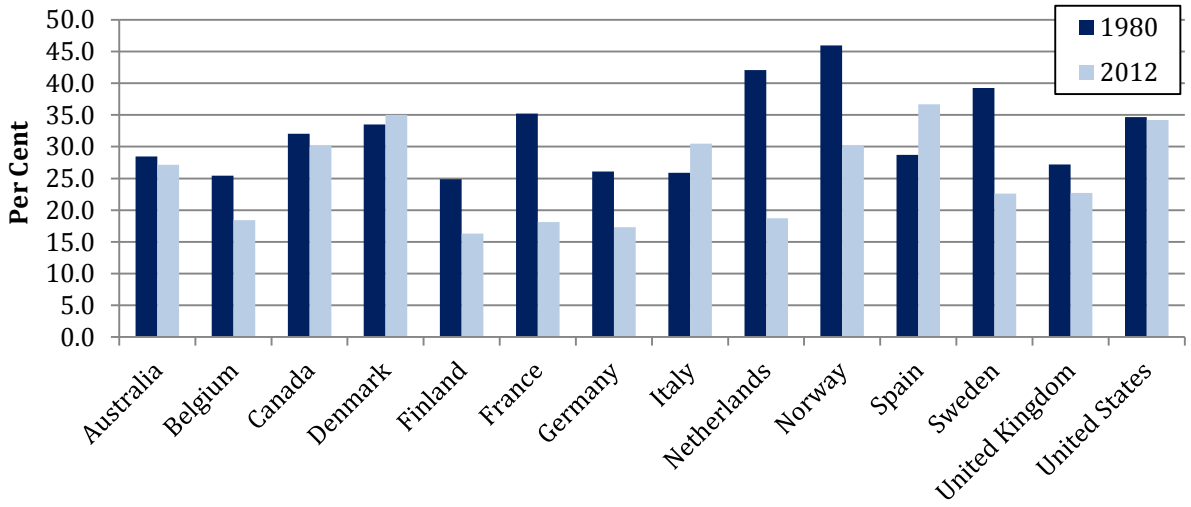


Source: IEWB Database for OECD Countries, Table 3

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 2012, the poverty gap was greatest in Spain, at 36.7 per cent (Chart 20). Denmark and the United States followed with poverty gaps of 35.0 and 34.2 per cent, respectively. The smallest poverty gaps were in Finland and Germany, at 16.3 and 17.3 per cent, respectively. Only three countries experienced increases in their poverty gaps between 1980 and 2012. The greatest increase was experienced by Spain, where the poverty gap grew by 8.0 percentage points over the period, due to a 12.1 percentage point rise in the poverty gap from

2008 to 2012. Among countries in which the poverty gap declined, the greatest improvement was 13.4 percentage points in the Netherlands. France, Norway and Sweden's poverty gaps also decreased impressively over the 1980-2012 period.

Chart 20: Poverty Gap for All Persons, Selected OECD Countries, Per Cent, 1980 and 2012

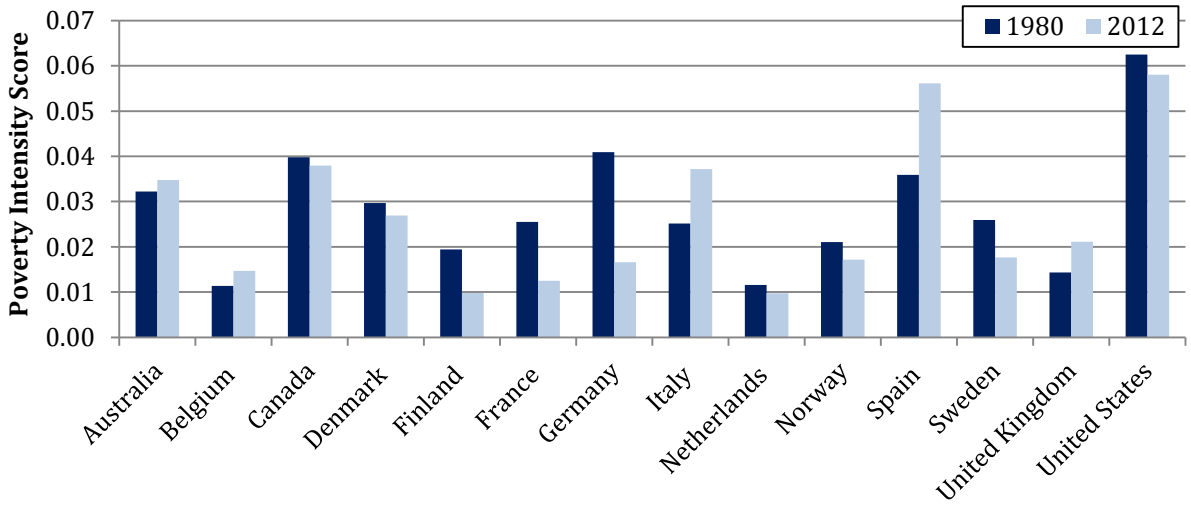


Source: IEWB Database for OECD Countries, Table 3

Poverty intensity is defined as the product of the poverty gap and the poverty rate (also multiplied by a constant). Due to its very high poverty rate, and its moderately high poverty gap, the United States had the highest poverty intensity in 2012 (Chart 21). Conversely, Finland and the Netherlands were among the countries with the lowest poverty gaps and poverty rates, and therefore had the lowest poverty intensities in 2012. Canada had the third highest poverty intensity, after the United States and Spain.

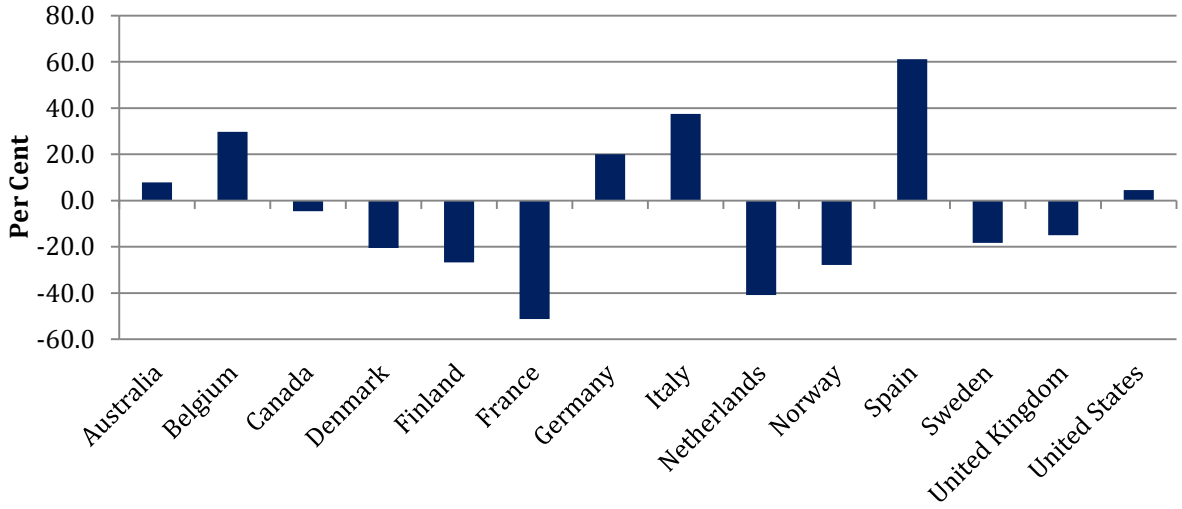
Similarly, trends in poverty intensity over the 1980-2012 period are determined by trends in poverty intensity's constituent parts. Due to the considerable fall in their poverty gaps, and relatively small increases in their poverty rates, Finland, the Netherlands, Norway, Sweden, the United Kingdom and Canada experienced declining poverty intensity (Chart 22). France experienced a decline in poverty intensity due to a decrease in both its poverty rate and its poverty gap. Despite an increase in its poverty gap, Denmark's relatively large decline in its poverty rate resulted in decreasing poverty intensity. Poverty intensity in Spain and Italy rose due to an increase in both the poverty rate and the poverty gap. Despite falling poverty gaps, Belgium, Germany, Australia and the United States experienced increasing poverty intensity due relatively increases rise in their poverty rates.

Chart 21: Poverty Intensity, Selected OECD Countries, 1980-2012



Source: IEWB Database for OECD Countries, Table 3

Chart 22: Changes in Poverty Intensity, Selected OECD Countries, Per Cent, 1980-2012



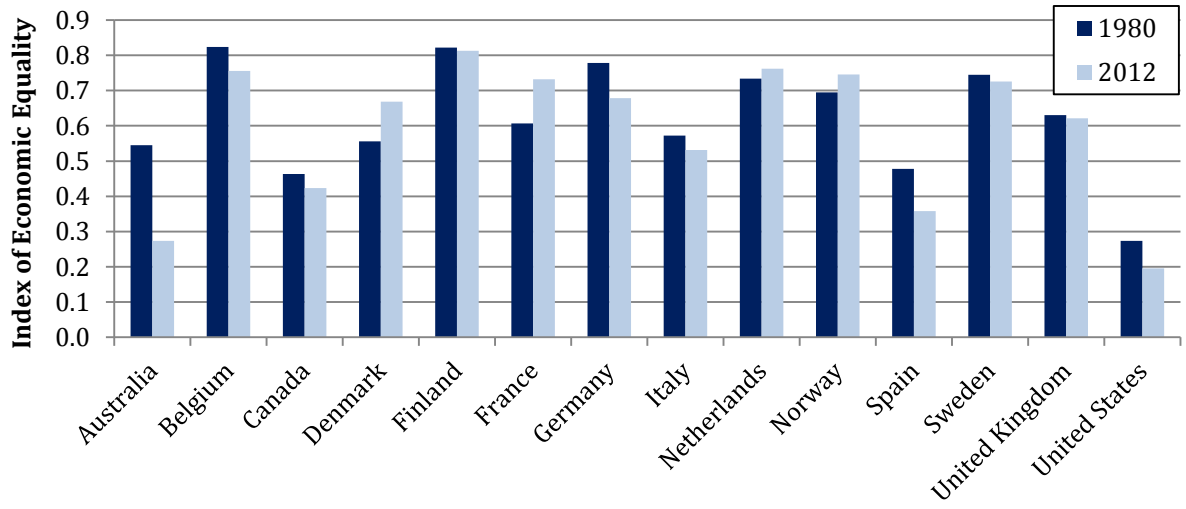
Source: IEWB Database for OECD Countries, Table 3

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 and the Gini coefficient receiving one-quarter of the weight. In 2012, Finland had the highest economic equality score at 0.813 given that it had one of the lowest values for both poverty intensity and the Gini coefficient (Chart 23). The United States was the country with the least equality by far; its index score of 0.195 was well-below the next lowest scores, Australia's 0.274 and Spain's 0.358. Canada ranked eleventh among the fourteen countries with a score of 0.423. The index values of the other countries were ranged from 0.531 (Italy) to 0.762 (The Netherlands).

Economic equality increased in only four countries over the 1980-2012 period: Denmark, France, the Netherlands, and Norway. The most progress among them was made by Denmark, where the index of equality increased by 0.113 points. Spain and Australia experienced the greatest setbacks in terms of equality, falling by 0.120 and 0.271 points, respectively.

Chart 23: Index of the Economic Equality Domain, Selected OECD Countries, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 9

F. Trends in the Economic Security Domain

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

i. Risk from Unemployment

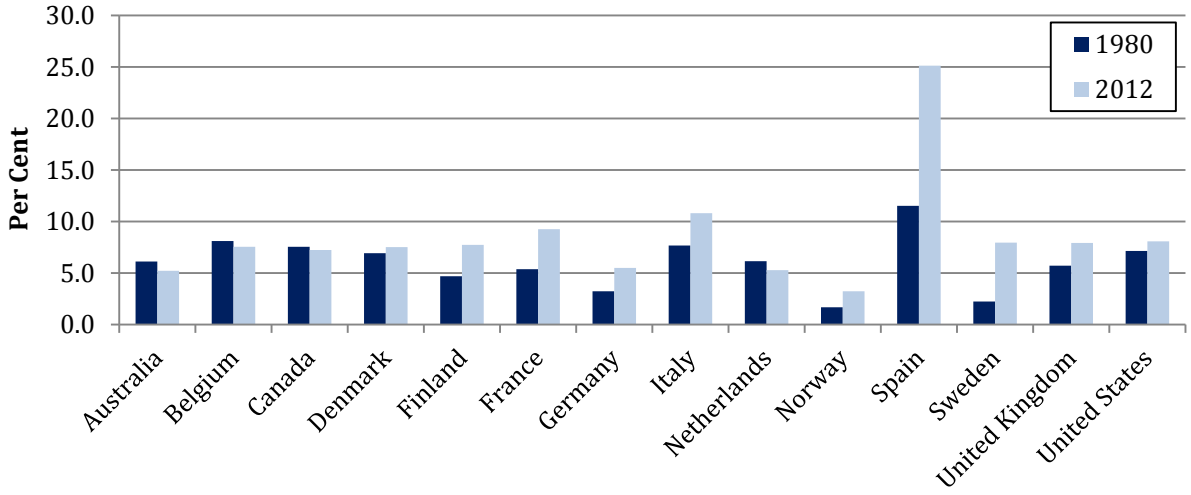
Risk imposed by unemployment is determined by two variables: the unemployment rate and the proportion of earnings that are replaced by unemployment benefits. Each of these measures is scaled, and then summed with weights of 0.8 and 0.2, respectively. This weighted sum is the unemployment component of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

a. Unemployment rate

In 2012, the lowest unemployment rate was in Norway, where 3.2 per cent of the labour force was unemployed (Chart 24). Norway was followed by Australia, the Netherlands and Germany, which had unemployment rates of 5.2, 5.3 and 5.5 per cent, respectively. At 25.1 per cent, Spain's unemployment rate was well-above those of the other countries.

Over the 1980-2012 period, the unemployment rate decreased only in four countries (albeit marginally): Australia, Belgium, Canada, and the Netherlands. The two countries to experience the greatest increase in their unemployment rates were Spain and Sweden. Spain experienced positive growth of 13.6 percentage points, while Sweden's unemployment rate increased by 5.7 percentage points.

Chart 24: Unemployment Rate, Selected OECD Countries, Per cent, 1980 and 2012



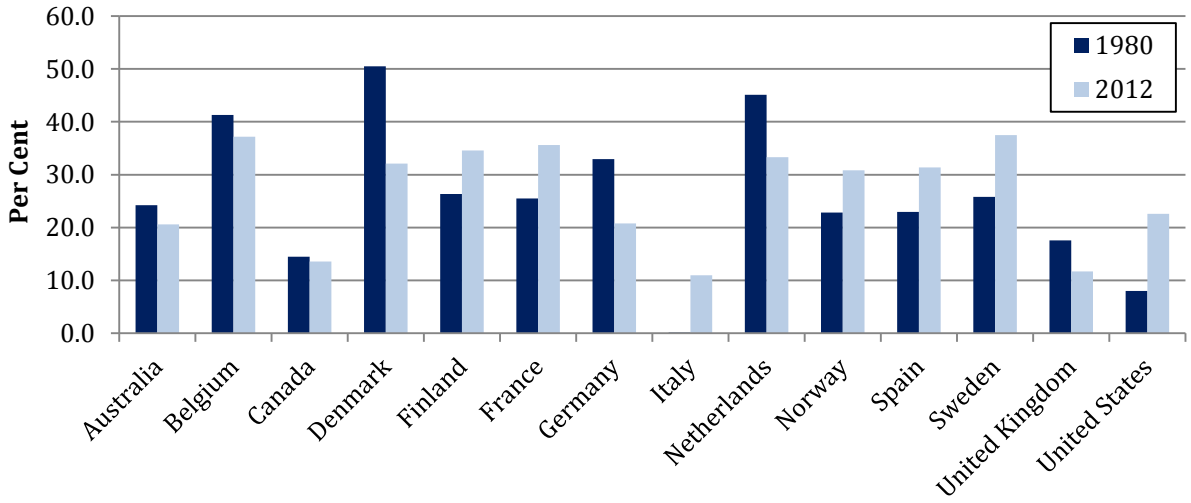
Source: IEWB Database for OECD Countries, Table 4

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). A higher replacement rate is considered better for economic well-being. The proportion of income replaced by unemployment benefits was greatest in Sweden in 2012, at 37.5 per cent (Chart 25). Sweden was followed by Belgium, which had a replacement rate of 37.2 per cent. Italy and the United Kingdom had the lowest replacement rates at 11.0 and 11.7 per cent, respectively. Canada had the third lowest replacement rate at 13.6 per cent.

Over the 1980-2012 period, the replacement rate increased in seven of fourteen countries. The most dramatic growth occurred in Italy, where the replacement rate grew by 11.0 percentage points from an insignificant 0.2 per cent in 1980 to 11.0 per cent in 2012. The United States, Spain and France also experienced significant increases in their replacement rates (14.6, 11.7 and 10.1 percentage points, respectively). The largest declines were in Denmark and Germany, where the replacement rates fell by 18.4 and 12.2 percentage points, respectively.

Chart 25: Unemployment Insurance Gross Replacement Rate, Selected OECD Countries, Per Cent, 1980 and 2012



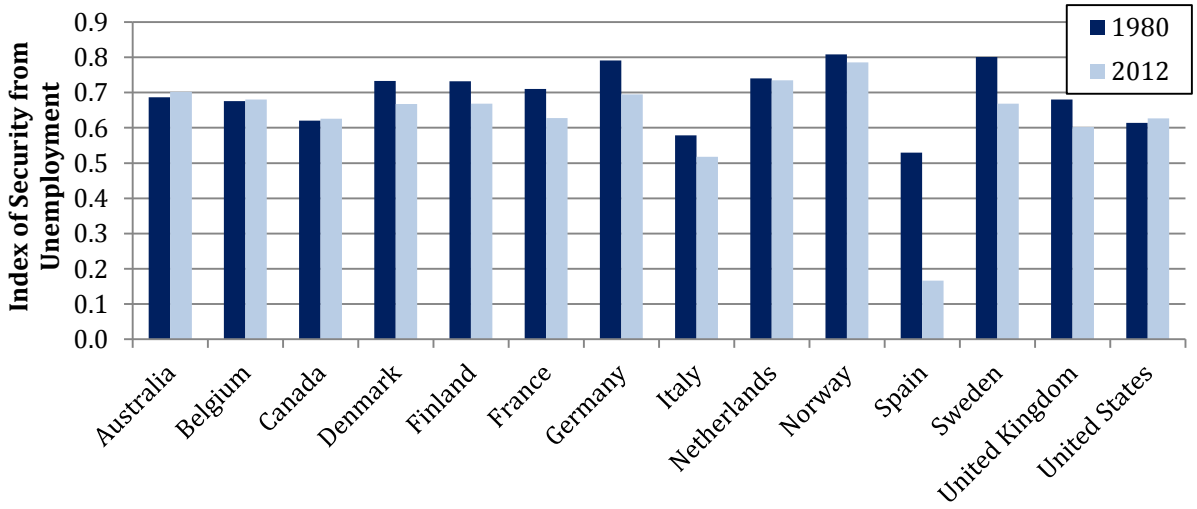
Source: IEWB Database for OECD Countries, Appendix Table A22

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 2012, at 0.786 points, followed closely by the Netherlands at 0.734 points (Chart 26). On the opposite end, mostly due to its extremely high unemployment rate, Spain had the lowest scaled level of protection from unemployment, 0.166 points.

Between 1980 and 2012, the scaled unemployment protection index fell for several countries. Spain experienced the greatest decline, 0.364 points. Australia, Belgium, Canada and the United States, on the other hand, saw their index values grow marginally. Trends in the index scores over time are closely related to trends in unemployment rates. Indeed, a key reason for declining index scores for most countries between 1980 and 2012 was the increase in unemployment rates associated with 2008 financial and Eurozone crises.

Chart 26: Index of Security from the Risk of Unemployment, Selected OECD Countries, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 4

ii. Financial Risk from Illness

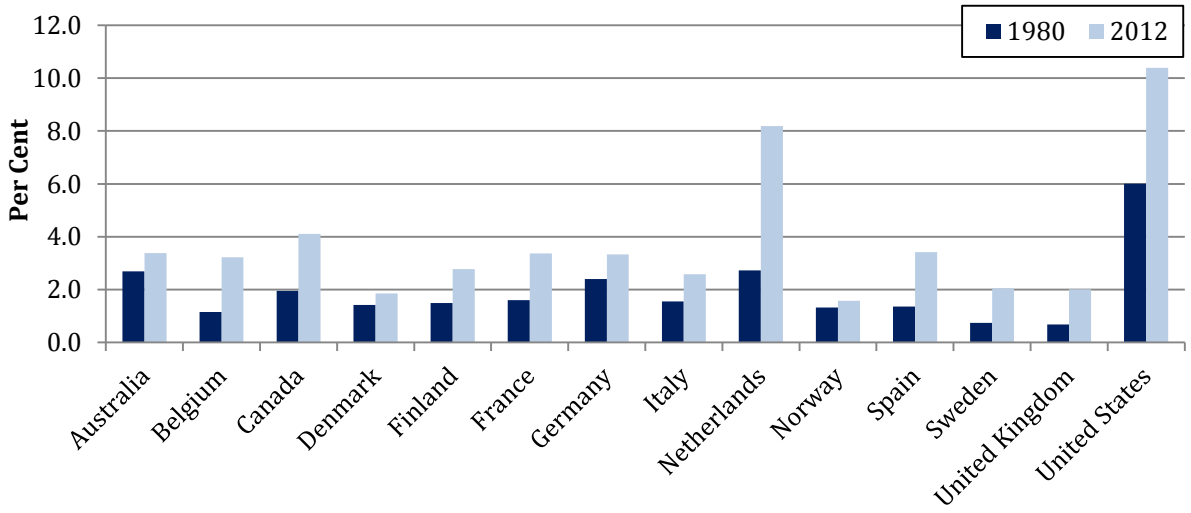
The second component of the economic security domain is the financial risk imposed by illness. In almost all countries in the OECD, health care deemed medically necessary by hospitals and doctors' offices is provided free of charge to all citizens through public medicare programs. In this sense the financial 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 countries with universal health care systems, 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 private health care expenditures' share of personal disposable income will be considered as deterioration in economic security, as increased private health expenditures are usually brought about by poor health and thus represent a growing financial burden for low income persons.

In 2012, the highest share of private expenditure on healthcare in personal disposable income was 10.4 per cent in the United States, giving it the smallest scaled protection from illness value of 0.117 points, followed by the Netherlands (8.2 per cent and 0.298 points) (Chart 27).[20] The United States and the Netherlands were 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, 1.6 per cent, giving it a scaled index value of 0.843 points.

[20] Data on private health care expenditures are from OECD Health Data.

From 1980 to 2012, the share of medical expenses in personal disposable income grew for all countries. In absolute terms, the share of the Netherlands increased the most, growing by 5.5 percentage points, followed by the United States (4.4 percentage points).

Chart 27: Private Health Care Expenditures as a Proportion of Personal Disposable Income, Selected OECD Countries, Per Cent, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 5

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 half of median after-tax equivalent income. The poverty rate is the share of single women with children under eighteen 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 below the poverty line.

a. Divorce rate

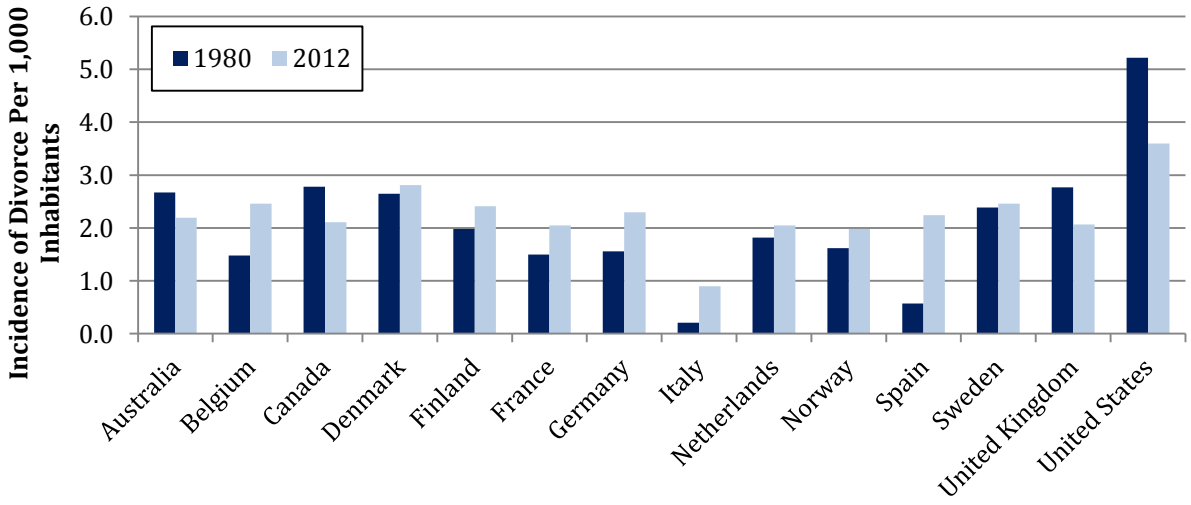
In 2012, the United States had the highest divorce rate for married couples, 3.6 per 1,000 inhabitants (Chart 28).[21] Denmark followed the United States with a divorce rate of 2.8 per 1,000. The lowest divorce rate was in Italy (perhaps due to more traditional or religious values), 0.9 per 1,000, one quarter of the US rate. The divorce rate in Canada was 2.1 per 1,000 inhabitants in 2009, sixth lowest among the fourteen countries.

Over the 1980-2012 period, divorce rates grew in ten of fourteen countries. The largest proportional increases were 328.6 per cent in Italy and 293.0 per cent in Spain; these were the countries with the two lowest divorce rates in 1980, so it is unsurprising that they experienced

[21] Data on divorce rates are from the UN Demographic Yearbook.

the largest per cent increases. The largest decline over the period was 31.0 per cent in the United States, which had the highest divorce rates in 1980.

Chart 28: Divorce Rate, Selected OECD Countries, Incidence per 1,000 Inhabitants, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 6

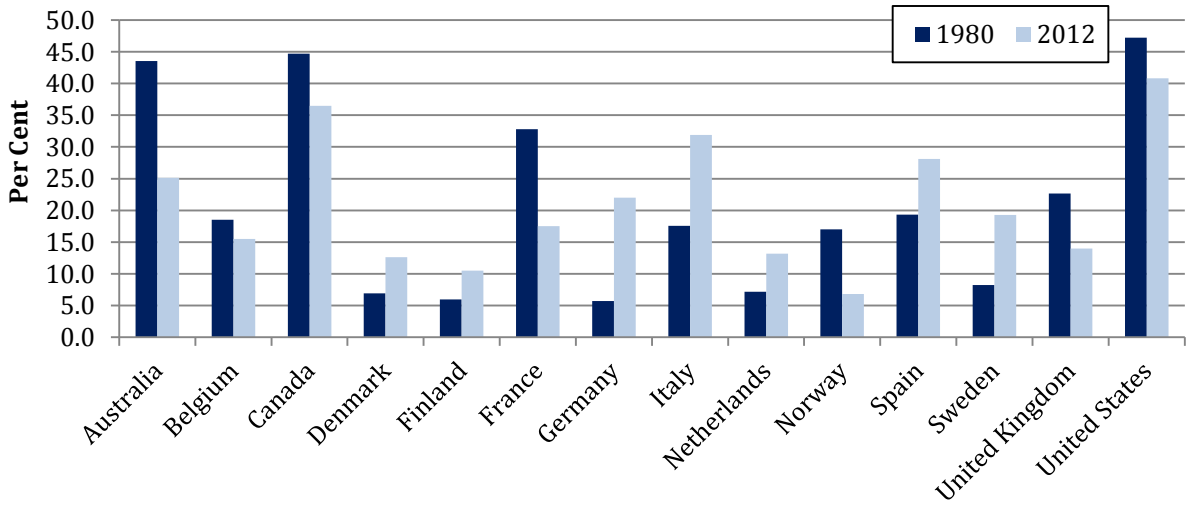
b. Poverty

The poverty rate for single women with children under eighteen in 2012 was greatest for the United States at 40.8 per cent (Chart 29).[22] Canada had the second highest poverty rate, at 36.5 per cent. The poverty rate for single women with children was lowest in Norway (at 6.8 per cent), Finland (at 10.5 per cent) and Denmark (at 12.6 per cent).

The poverty rates for single women with children under eighteen increased in eight of fourteen countries over the 1980-2012 period. The greatest growth was experienced by Germany, where the poverty rate increased by 16.3 percentage points, from 5.7 per cent in 1980 to 22.0 per cent in 2012. Italy also experienced a significant increase here (14.3 percentage points). Among the countries in which the poverty rate fell, the greatest declines were in Australia (18.5 percentage points), France (15.3 percentage points) and Norway (10.2 percentage points). Although they had the two highest single-mother poverty rates in 2012, both Canada and the United States experienced declines in the rate (by 8.2 and 6.4 percentage points, respectively) over the 1980-2012 period.

[22] Estimates are computed from the LIS database, Statistics Canada, Eurostat, the Household, Income and Labour Dynamics in Australia Survey, and the U.S. Current Population Survey.

Chart 29: Poverty Rate for Single Women with Children Under Eighteen, Selected OECD Countries, Per Cent, 1980 and 2012

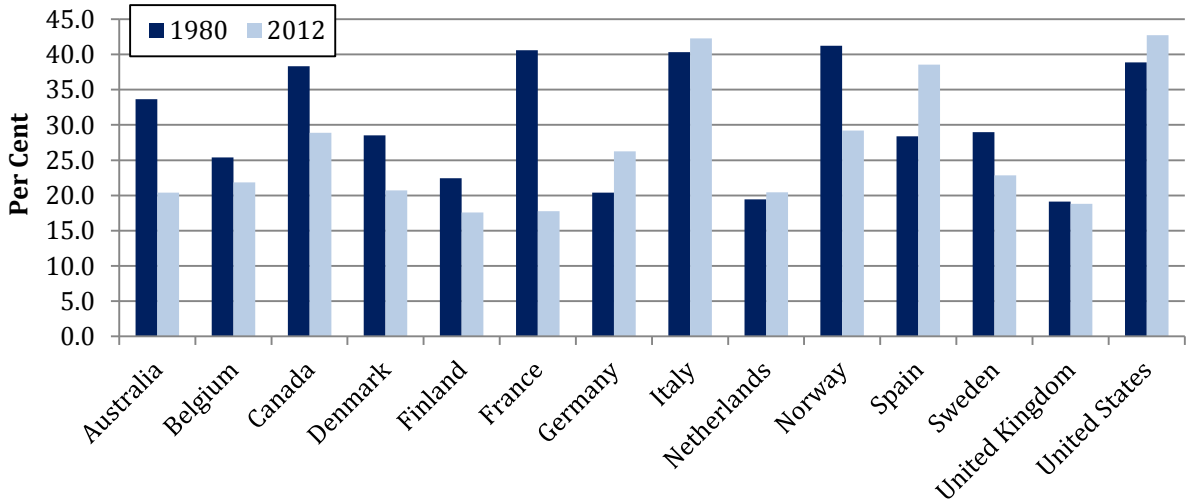


Source: IEWB Database for OECD Countries, Table 6

The 2012 poverty gap for female headed families with children under eighteen was greatest in the United States, at 42.7 per cent, followed by Italy at 42.3 per cent (Chart 30). 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.

Over the 1980-2012 period, the single-mother poverty gap fell in nine of fourteen countries. The largest decline was 22.8 percentage points in France. Of the five countries that experienced a rise in their poverty gaps, the largest increase was in Spain (10.2 percentage points). In Canada, the poverty gap fell 9.4 percentage points from 1980 to 2012; this was the fourth largest percentage-point decline among the fourteen countries.

Chart 30: Poverty Gap for Single Women with Children Under 18, Selected OECD Countries, Per Cent, 1980 and 2012



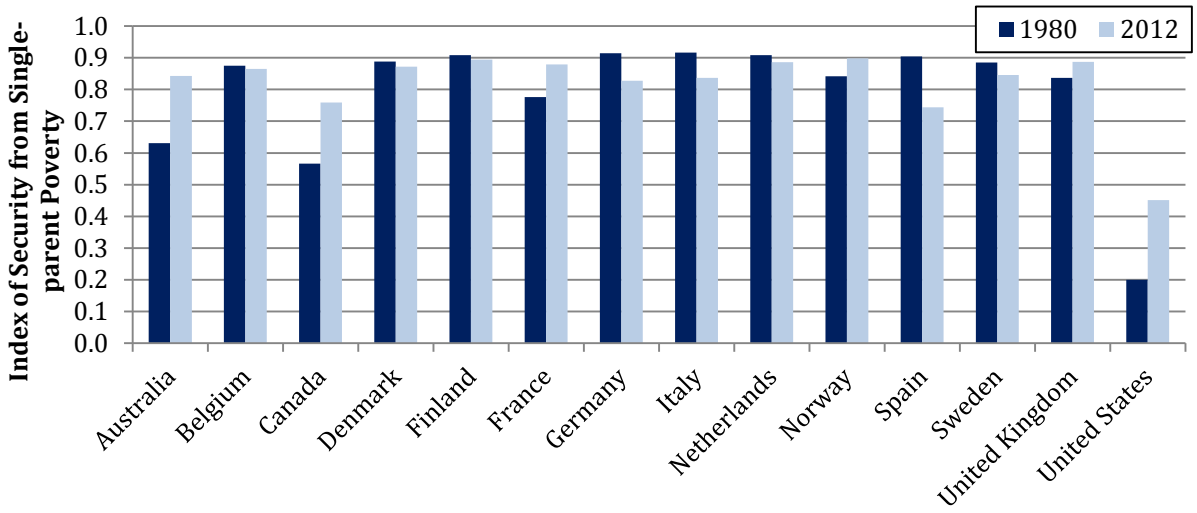
Source: IEWB Database for OECD Countries, Table 6

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, Norway was the country where single parents were safest from poverty in 2012, with a scaled index value of 0.898 points, followed closely by Finland with a scaled index value of 0.894 points (Chart 31). The United States had the lowest index score by a wide margin; its score of 0.451 was well-below the next lowest score, Spain's 0.743.

Despite having the lowest index level for 2012, the United States showed the most improvement over the entire 1980-2012 period; its index grew by 0.251 points. Australia's 0.212 point increase was the second largest, followed by Canada's 0.193 point increase. Security from single-parent poverty decreased in eight of fourteen countries, with the largest declines occurring in Spain (0.161 points), Germany (0.087 points) and Italy (0.081 points).

Chart 31: Index of Security from Single-parent Poverty, Selected OECD Countries, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 6

iv. Risk of Poverty in Old Age

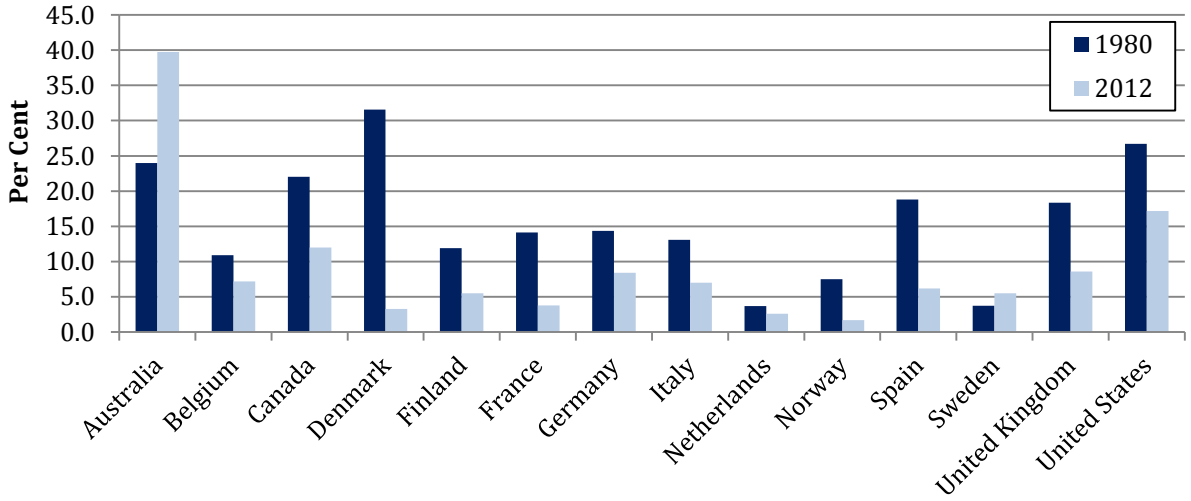
The fourth and final component of the economic security domain is the risk of poverty in old age. This component is proxied by the poverty intensity experienced by the households headed by a person aged 65 years and over.

a. Poverty

In 2012, the elderly poverty rate was greatest in the Australia at 39.7 per cent (Chart 32). The United States had the second highest rate at 17.2 per cent. The lowest elderly poverty rates were 1.7 per cent in the Norway, 2.6 per cent in the Netherlands and 3.3 per cent in Denmark. [23]

Over the 1980-2012 period, twelve of fourteen countries experienced decreasing elderly poverty rates; they were led by Denmark (28.2 percentage points) and Spain (12.6 percentage points). Only Australia and Sweden experienced an increase in their elderly poverty rates. Australia had the largest deterioration in its elderly poverty rate, with an increase of 15.8 percentage points, while Sweden merely saw its elderly poverty rise by 1.7 percentage points.

Chart 32: Poverty Rate for Elderly Families, Selected OECD Countries, Per Cent, 1980 and 2012

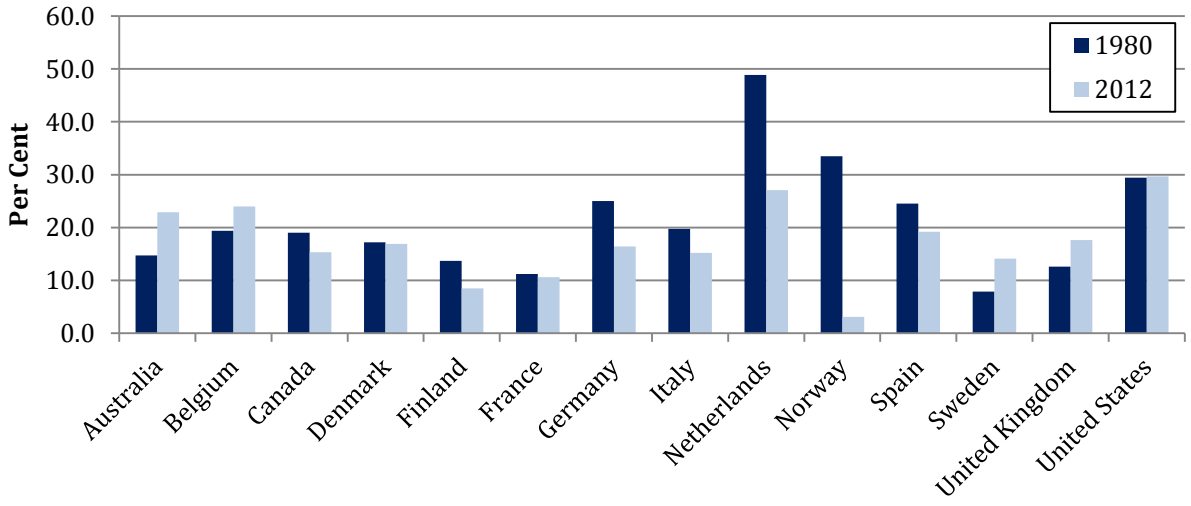


Source: IEWB Database for OECD Countries, Table 7

The elderly poverty gap ratio was highest in the United States in 2012 at 29.7 per cent, followed closely by the Netherlands at 27.1 per cent (Chart 33). The lowest gap, 8.1 per cent, belonged to Norway. Canada's elderly poverty gap (15.3 per cent) was the sixth lowest. Over the 1980-2012 period, the elderly poverty gap fell in nine of fourteen countries. The greatest absolute decrease of 25.4 percentage points was experienced by Norway, followed closely by a 21.7 percentage point decline in the Netherlands. Of the five countries that experienced positive growth in the elderly poverty gap from 1980 to 2012, the largest increase was 8.2 percentage points in Australia.

[23] Estimates are computed from the LIS database, Statistics Canada, Eurostat, the Household, Income and Labour Dynamics in Australia Survey, and the U.S. Current Population Survey.

Chart 33: Poverty Gap for Elderly Families, Selected OECD Countries, Per Cent, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 7

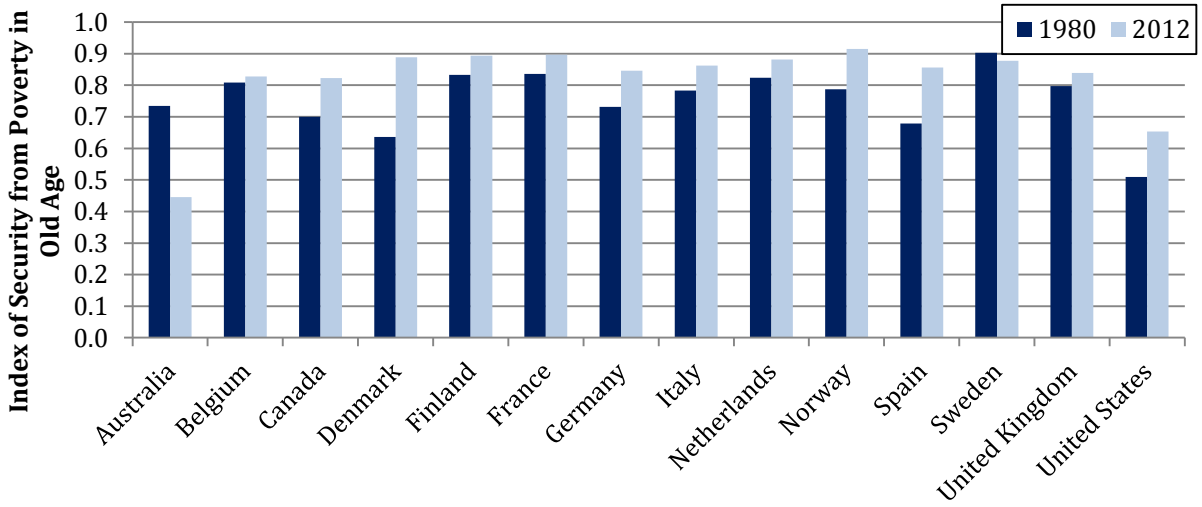
b. Index of security from poverty in old age

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 Australia were least secure from poverty due to old age in 2012, with the lowest scaled index level of 0.445 (Chart 34). This is unsurprising, since Australia had the highest elderly poverty rate and the fourth-highest elderly poverty gap in 2012. At 0.653 points, the United States had the second lowest index value in 2012. The country with the greatest security from elderly poverty was the Norway, which had a scaled index level of 0.915. France, Finland and Denmark followed, with scores of 0.897, 0.893 and 0.889 points, respectively.

Australia was the country that experienced the sharpest drop in its index during the 1980-2012 period, losing 0.289 points. Most likely due to their declining poverty rates, Denmark and Spain experienced the most significant improvements in the index of security from old-age poverty: 0.253 and 0.178 points, respectively.

Chart 34: Index of Security from Poverty in Old Age, Selected OECD Countries, 1980 and 2012



Source: IEWB Database for OECD Countries, 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. 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 eighteen in the total population. Finally, it is assumed that the population aged 45 to 64 years is most likely to feel anxiety regarding the risk from poverty in old age. 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 to 64 years and the proportion of the population aged 45 to 64 years increased for almost all countries, while the proportion of married women with children under eighteen declined over the 1980-2012 period.

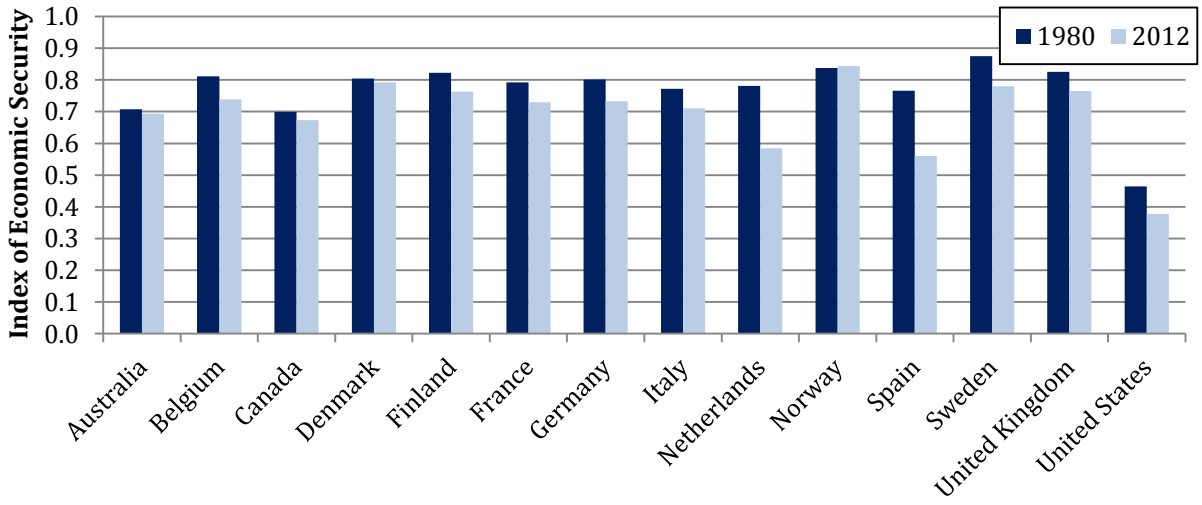
The component-specific weights are generated by summing the four proportions of the population subject to the four risks and then standardizing to unity by dividing each proportion by that sum. The contribution of each component of the security domain index is the product of its scaled value and weight. For example, for Canada in 2012, the weighted scaled security from risk imposed by unemployment was 0.184 points (0.626*0.294), the weighted scaled security from risk imposed by illness was 0.278 points (0.634*0.438), risk of single parent poverty was 0.111 points (0.759*0.146) and risk of poverty from old age was 0.100 points (0.822*0.122). The sum of the four components was 0.673 points, the index value of the overall security domain for Canada in 2012.

vi. Overall Index of the Economic Security Domain

Economic security was greatest in Norway, with a value of 0.843 points in 2012 (Chart 35). Norway was followed by Denmark with a value of 0.792 points. The United States had by far the lowest score for economic security at 0.377 points; the next lowest was 0.560 points in Spain. Canada ranked eleventh with a score of 0.673 points. The United States was a clear outlier.

Thirteen of fourteen countries experienced a decline in the index of economic security over the 1980-2012 period. The Netherlands and Spain fell the most, with declines of 0.206 and 0.196 points, respectively. The overall trend of the index was clearly negative across the fourteen countries, as even the country that experienced the positive growth, Norway, increased by only 0.005 points over the period.

Chart 35: Index of Economic Security, Selected OECD Countries, 1980 and 2012



Source: IEWB Database for OECD Countries, Table 9

IV. Sensitivity Analysis

This section explores 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 (see Sharpe and Salzman (2003) and Sharpe and Andrews (2012) for discussions on alternative weighting methodologies). The choice of weights is a value judgment, and each individual might assess the relative importance of each domain differently. For this reason, the CSLS has long provided readers with access to the data and tools necessary to generate versions of the IEWB based on their own preferences.[24] As it stands, the IEWB is designed to make that judgment as transparent as possible, and so we use equal weights for each domain.[25] Almost any other alternative weighting scheme is defensible, and we would like to know the robustness of our qualitative findings to changes in the weights.

We compute the IEWB under three alternative weighting schemes. They are outlined in Exhibit 4 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.[26]

- **Alternative 3** was 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.

[24] 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 IEWB with their own preferred weights. Alternatively, an interactive weighting tool is available on the CSLS website: http://www.csls.ca/iwbtool.asp.
[25] This same approach is now used by the OECD for its 'Better Life Index,' which is available online at: http://www.oecdbetterlifeindex.org/. Users are encouraged to create their own index using their preferences to construct weights, but the default index upon first access to the website for a user is the equal weights version.
[26] 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.

Exhibit 4: 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

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. For eleven of the fourteen countries, the change of weights increases measured well-being *in all years*. This is illustrated in Chart 36; in Australia, Belgium, Canada, France, Germany, Italy, Netherlands, Spain, Sweden United Kingdom, and the United States, the line representing Alternative 1 is shifted upward for all years between 1980 and 2012, relative to the line representing the baseline results. The exceptions to this rule are Denmark, Finland, and Norway. In Denmark, measured economic well-being increases relative to the baseline for 1980-1981, 1985-1987, 1994-2000, and 2006-2010 while it decreases relative to the baseline for 1982-1984, 1988-1993, 2001-2005, and 2011-2012. In Finland, the alternative weights shift measured economic well-being downwards for 1980-1997, but upwards for 1998-2012. Norway is the only country in which measured economic well-being shifts downward relative to the baseline for the entire 1980-2012 period. 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 5 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. In both cases, the top four countries (in order) are Norway, Belgium, Netherlands, and Germany; respectively, their IEWB values for 2012 are 0.822, 0.657, 0.645, and 0.643 under the baseline weights and 0.799, 0.667, 0.665, and 0.655 under Alternative 1. The bottom four countries are also the same under both weighting schemes. The lowest scores belong to Spain, Italy, the United States, and Australia with scores of 0.376, 0.489, 0.495, and 0.533 under the baseline weights and 0.396, 0.507, 0.554, and 0.587 under Alternative 1. Note that shifting weight from wealth to consumption raises the IEWB scores of the bottom countries and reduces the score of Norway, but not by enough to change their ranks. Regardless of the weights used, Norway is well ahead and Spain is well behind.

Exhibit 5: Ranking of Countries According to Economic Well-being under Baseline and Alternative Weights, 2012

(i) Levels, 2012

	Baseline	Alternative 1	Alternative 2	Alternative 3
Highest well-being	Norway	Norway	Norway	Norway
	Belgium	Belgium	Belgium	Belgium
	Netherlands	Netherlands	Germany	Finland
	Germany	Germany	United States	Netherlands
	Finland	France	Canada	Germany
	Sweden	United Kingdom	Netherlands	Sweden
	France	Sweden	Denmark	France
	United Kingdom	Finland	United Kingdom	United Kingdom
	Denmark	Canada	Australia	Denmark
	Canada	Denmark	France	Canada
	Australia	Australia	Sweden	Australia
	United States	United States	Finland	Italy
	Italy	Italy	Italy	United States
Lowest well-being	Spain	Spain	Spain	Spain

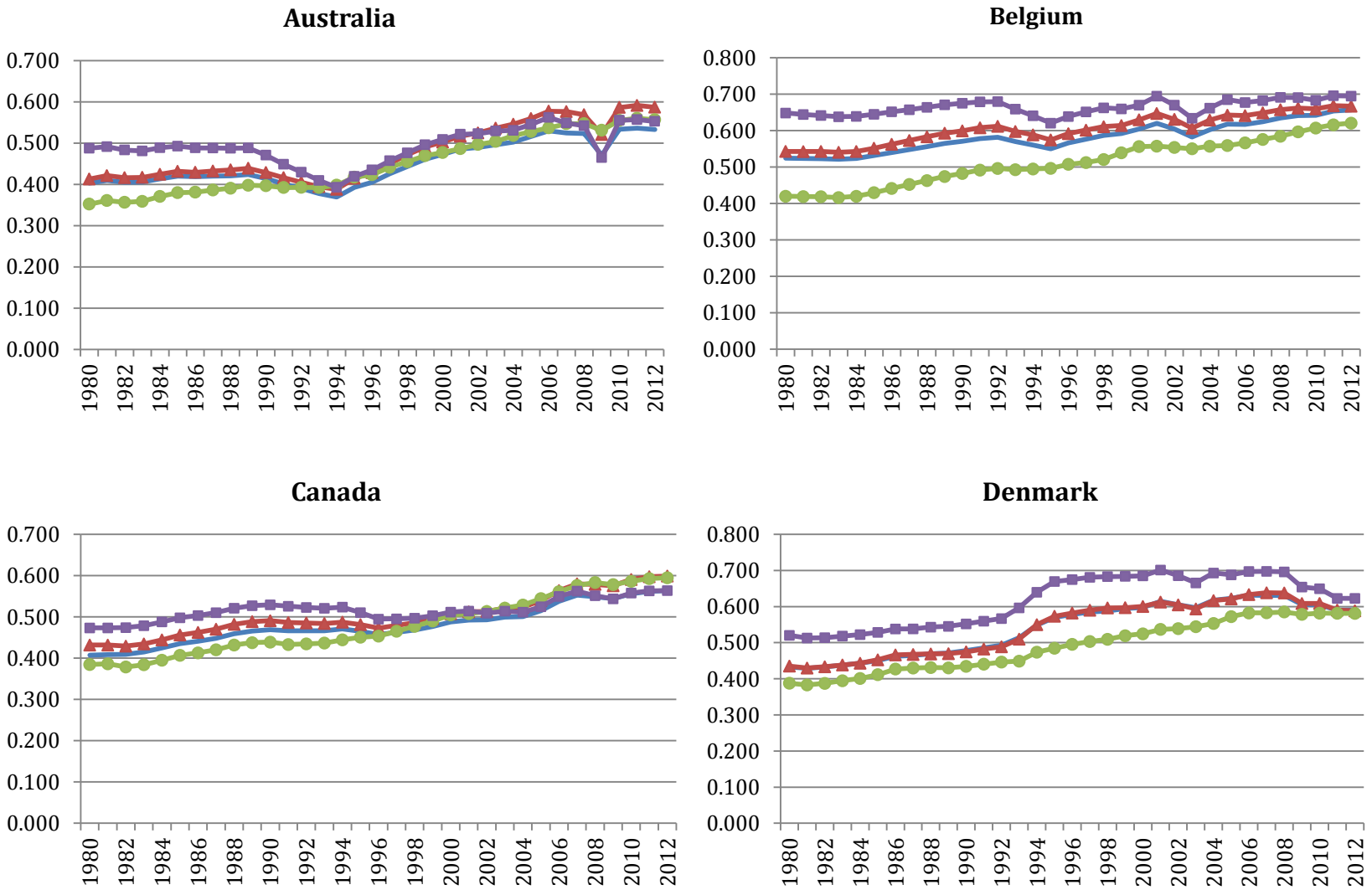
(ii) Growth Rates, 1990-2012

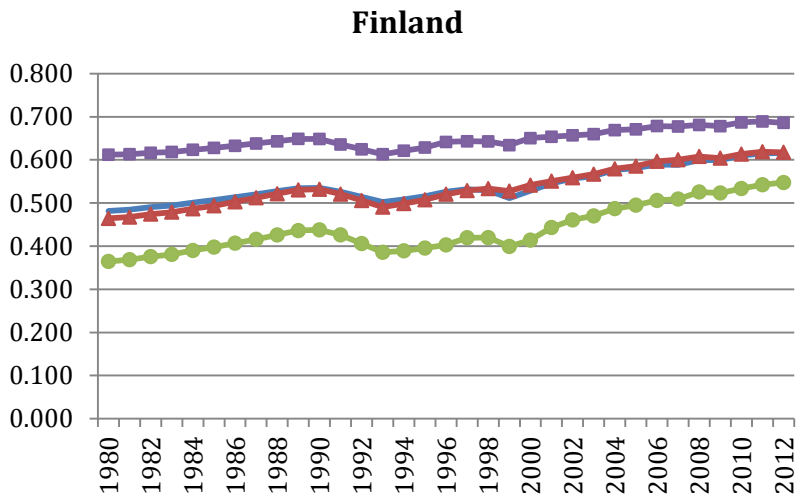
	Baseline	Alternative 1	Alternative 2	Alternative 3
Fastest IEWB Growth	Norway	Norway	Norway	Norway
	United States	United States	United States	France
	Canada	United Kingdom	Australia	Denmark
	Denmark	Australia	United Kingdom	Canada
	United Kingdom	Canada	Canada	United States
	France	France	Finland	United Kingdom
	Australia	Denmark	Denmark	Australia
	Finland	Finland	Germany	Finland
	Germany	Germany	Belgium	Germany
	Belgium	Belgium	France	Sweden
	Sweden	Sweden	Sweden	Netherlands
	Netherlands	Netherlands	Italy	Belgium
	Italy	Italy	Spain	Italy
Slowest IEWB Growth	Spain	Spain	Netherlands	Spain

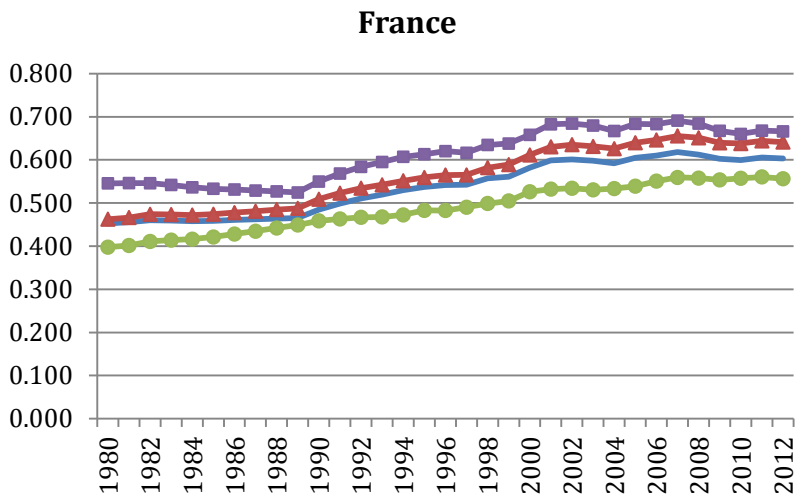
For eleven of the fourteen countries, the IEWB grew faster over the 1980-2012 period under Alternative 1 than under the baseline weights. However, the differences are small in general. The largest difference in growth is in Australia, where the compound annual growth rate of the IEWB for 1980-2012 is 0.23 percentage points higher under Alternative 1 than under the baseline weights (1.10 per cent per year versus 0.88 per cent per year). Compound annual growth of the Index is slower under Alternative 1 in Belgium, Denmark, and Netherlands, but the largest change is 0.06 percentage points in Belgium (0.64 per cent per year under Alternative 1, versus 0.71 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. Relative to the baseline, only six countries change rankings when Alternative 1 weights are used instead. In particular, Denmark falls one place (from ninth to tenth), Finland falls three places (from fifth to eighth), France moves up two places (from seventh to fifth), the United Kingdom goes up two spots (from eighth to sixth), Sweden falls one spot (from sixth to seventh), and Canada moves up one spot (from tenth to ninth).

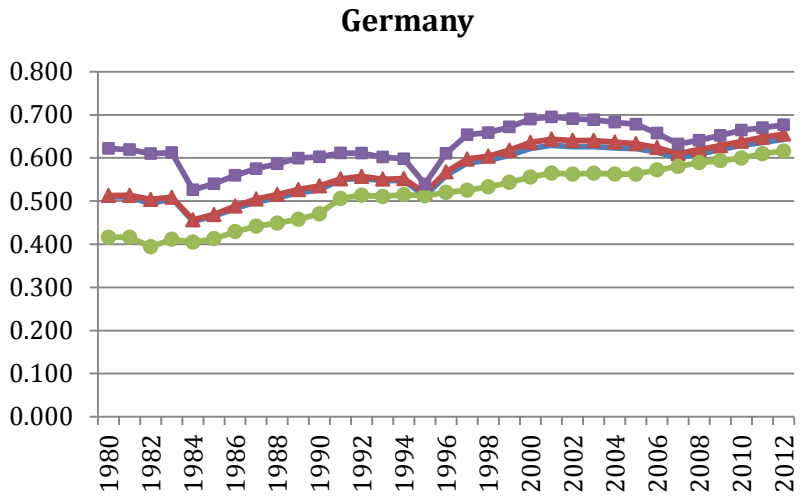
Overall, however, shifting emphasis from wealth stocks to current consumption does not change rankings much. There are no cases in which the change in weights moves a country from a low rank to a high rank or vice versa. The results are robust to the change from the baseline weights to Alternative 1.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

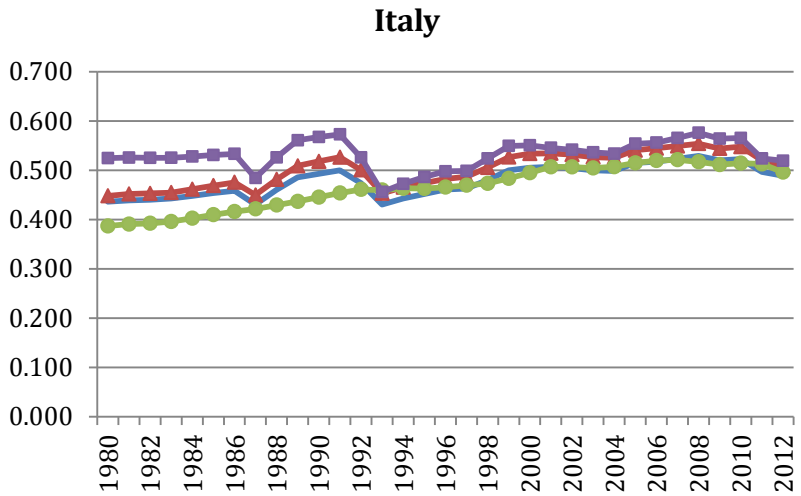
Chart 36: Index of Economic Well-being under Alternative Weighting Schemes, Selected OECD Countries, 1980-2012

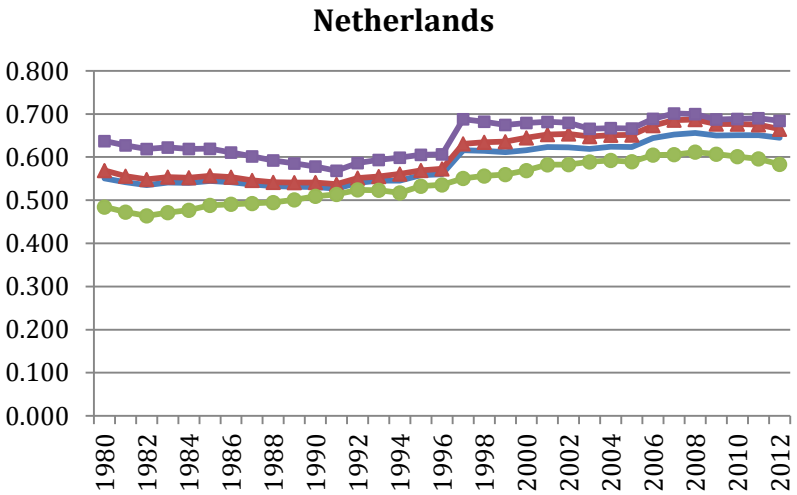


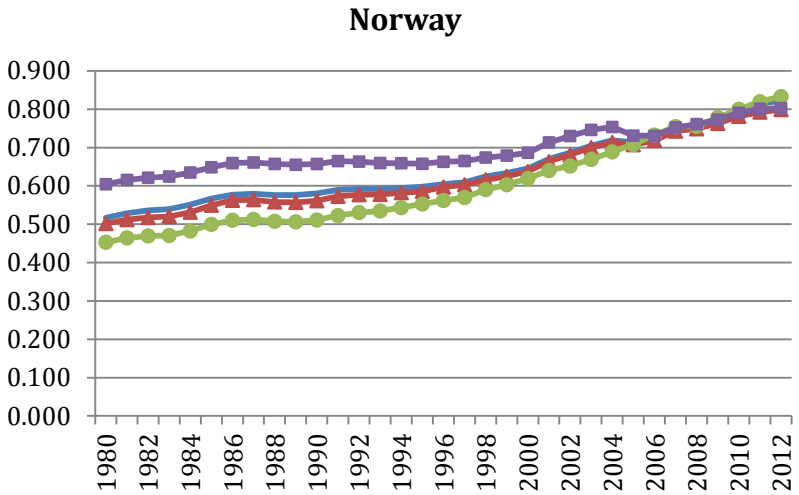

Finland
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012


France
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012


Germany
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012


Italy
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012


Netherlands
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012


Norway
0.900
0.800
0.700
0.600
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0.400
0.300
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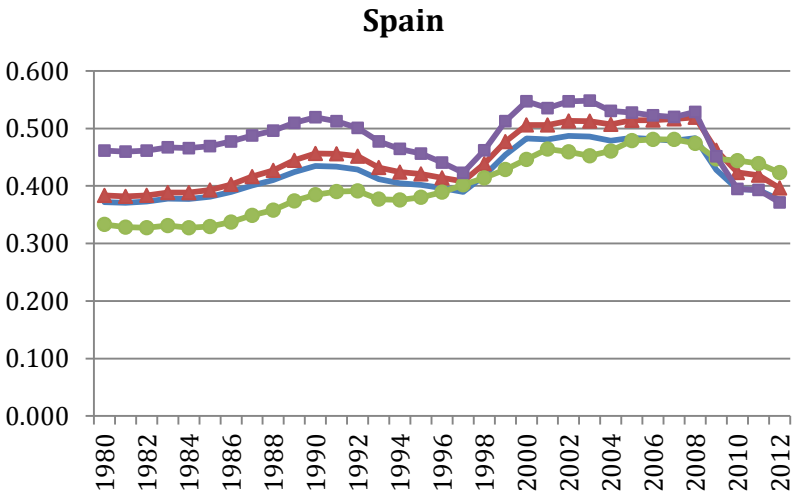
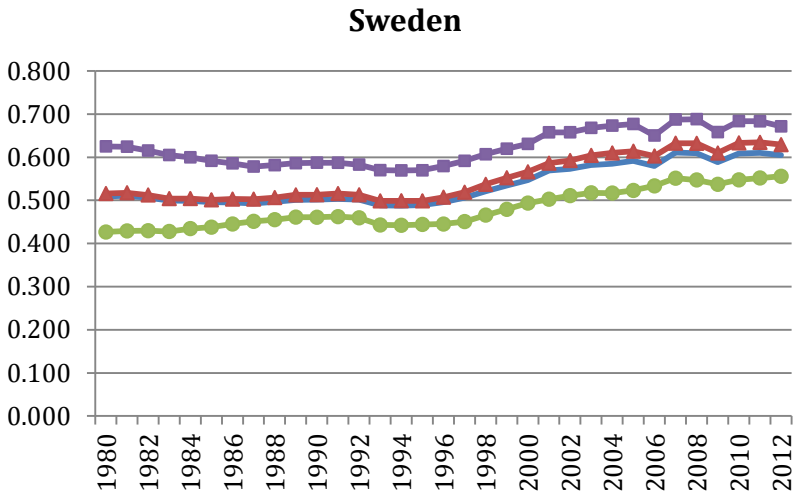
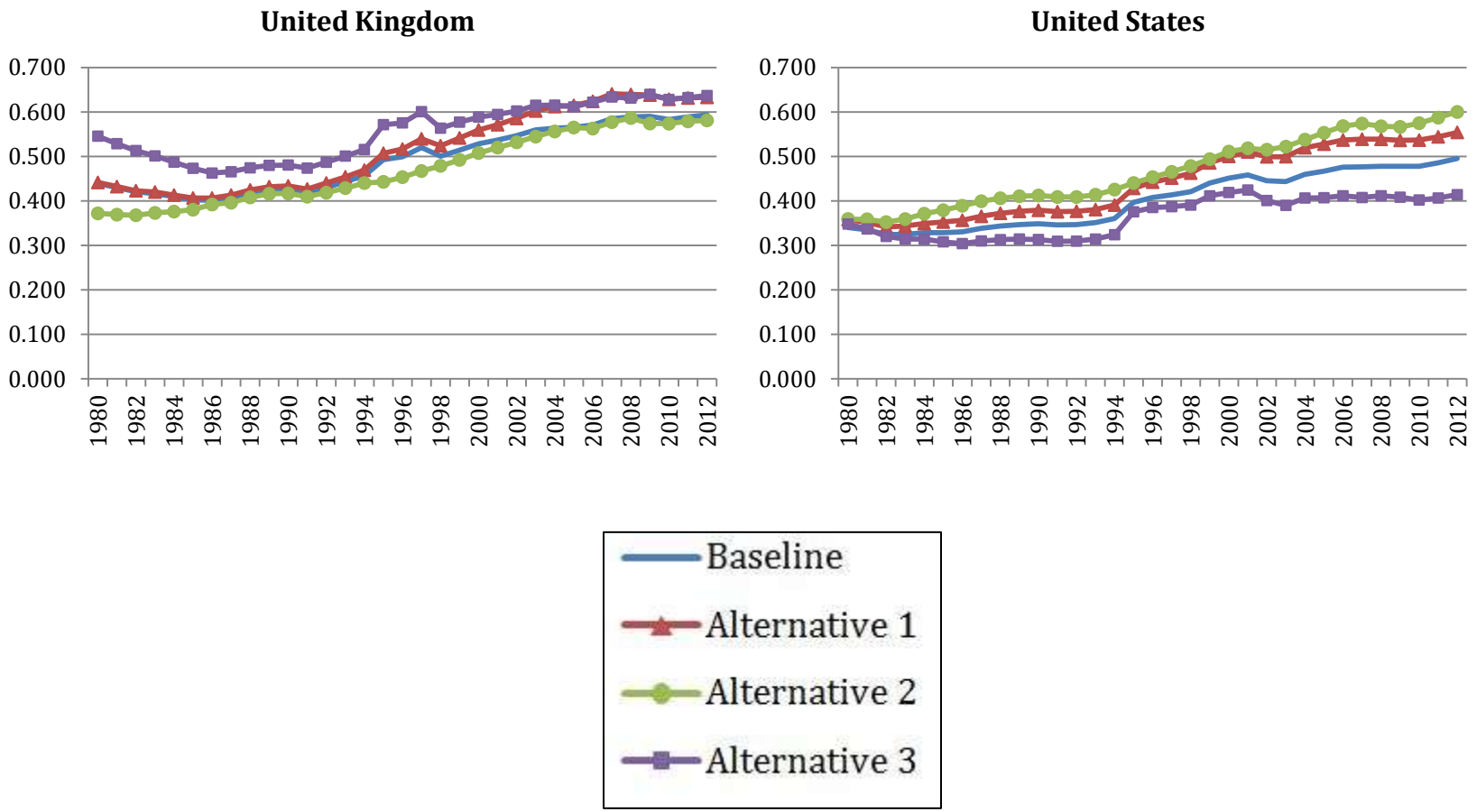
1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012


Spain
0.600
0.500
0.400
0.300
0.200
0.100
0.000
1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012


Sweden
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012


United Kingdom
United States
0.700
0.600
0.500
0.400
0.300
0.200
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0.000
1980
1982
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1998
2000
2002
2004
2006
2008
2010
2012
Baseline
Alternative 1
Alternative 2
Alternative 3

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 36. Australia, Canada, Norway, and Spain share a common pattern: relative to the baseline results, Alternative 2 lowers measured well-being early in the 1980-2012 period.[27] 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, Netherlands, Sweden, and United Kingdom – share a different pattern. In those countries, deemphasizing economic equality leads to lower measured well-being in all years. These are countries that have relatively 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 2012. In addition, the IEWB for the United States exhibits faster growth over the 1980-2012 period when poverty and inequality are given zero weight. The IEWB for the United States grew by 1.62 per cent per year from 0.359 to 0.600 under Alternative 2; under the baseline weights, it grew by 1.17 per cent per year from 0.341 to 0.495 (Table 7). This reflects the very poor performance of the United States in the economic equality domain over the full 1980-2012 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 5). In the baseline results, the United States ranks twelfth in measured well-being in 2012; under Alternative 2, it jumps to fourth place among the fourteen countries.

As in the baseline results, the top two countries under Alternative 2 are Norway and Belgium. Norway's 2012 Index score increased from 0.822 under the baseline weights to 0.833 under Alternative 2; Norway had high values in all four domains for 2012, and its equality score was the lowest of the four. The 2012 IEWB also increased under Alternative 2 relative to the baseline for Australia, Canada, Italy, Spain, and the United States. For all other countries, deemphasizing the equality domain slightly reduces measured economic well-being in 2012.

Spain and Italy remain the countries with the lowest measured well-being for 2012. In Spain, the IEWB is 0.423 under Alternative 2, compared to 0.376 under the baseline weights. In Italy, the IEWB is 0.496 under Alternative 2, compared to 0.489 under the baseline weights. The third-lowest score under Alternative 2 belongs to Finland, at 0.547. In the baseline results, Finland ranks fifth out of fourteen countries with an IEWB score of 0.616. This reflects the fact that Finland scores well in the equality domain, while its scores in the consumption and wealth domains are relatively low.

[27] Italy can also be said to exhibit this pattern loosely, but in the later part of the period, Alternative 2 and the baseline produce approximately similar levels of measured economic well-being. For this reason, the weights that produce the higher measured economic well-being change year-to-year in the later part of the 1980-2012 period.

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 1980-2012 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 36 for the United States and Canada, 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, Finland, and Netherlands – see their IEWB scores improve in all years under Alternative 3 relative to the baseline. This pattern also characterizes measured well-being in Australia, Canada, Denmark, France, Germany, Italy, Sweden, and United Kingdom under Alternative 3.[28] These countries have relatively high scores in the equality and economic security domains relative to their score in the consumption and wealth domains in the 1980-2012 period, so the shift of weight to those domains at the expense of consumption and wealth increase their overall IEWB values.[29]

For Norway, and Spain, 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 1980-2012 period and lowers it in the later years. This reflects the fact that these countries initially had high scores in the equality and economic security domains relative to the other domains (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 1980-2012 period. This is unsurprising, given the results from Alternative 2. The United States' scores in consumption and wealth are high and increasing over 1980-2012, while its scores in equality and economic security are low and decreasing.

[28] With the exception of 2009 for Australia and Canada, where the Alternative 3 shifts measured economic well-being down relative to the baseline. This is likely due to the effects of the Great Recession, which will be discussed in more detail below.

[29] For many countries, such as Canada and Australia, this is specifically due to a low wealth domain score relative to a high economic security domain score.

Under the Alternative 3 weights, the United States ranks thirteenth among the fourteen countries in overall economic well-being in 2012 (Exhibit 5). Its score for 2012 is 0.414 under Alternative 3, compared to 0.495 in the baseline results. Spain ranks last with an IEWB score of 0.371 under Alternative 3, slightly below its baseline result of 0.376. Norway and Belgium remain the top two countries in the ranking; respectively, their scores are 0.803 (down from 0.822 under the baseline weights) and 0.695 (up from 0.657 under the baseline weights). Finland rises to third from its position of fifth in the baseline results; the increased emphasis of economic equality and security raises Finland's measured well-being from 0.616 to 0.686. No other country switches ranks by more than one position under Alternative 3 relative to the baseline in 2012.

Between 1980 and 2012, 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 Spain. There, the IEWB declined by 0.68 per cent per year under Alternative 3, from 0.461 in 1980 to 0.371 in 2012; under the baseline weights, it grew by 0.03 per cent per year from 0.372 to 0.376.

Nevertheless, the ranking of countries by IEWB growth was remarkably similar under the baseline and Alternative 3 weights (Exhibit 5). Even the United States fell only three places, from second to fifth. The largest change in rankings was made by France, which moved out of sixth place under the baseline into second under Alternative 3.

In general, 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. The Effect of the 'Great Recession' on Measured Economic Well-being

In the period prior to the Great Recession (1980-2008), measured economic well-being increased in all fourteen countries under the baseline and all three alternatives. Under the baseline, Norway's economic well-being grew at the fastest pace (1.36 per cent per year) while Netherlands' economic well-being grew at the slowest pace (0.63 per cent per year). Under Alternative 1, economic well-being grew the fastest in the United States (1.47 per cent per year) and the slowest in Netherlands (0.66 per cent per year) owing to the increased weight placed upon consumption. Under Alternative 2, measured economic well-being grew at the most rapid pace in Norway (1.84 per cent per year) and the least rapid pace in Netherlands (0.84 per cent per year). Finally, under Alternative 3, Denmark experienced the fastest growth in measured economic well-being (1.05 per cent per year) while Germany experienced the slowest growth (0.11 per cent per year) owing to the increased weight on the equality and economic security domains.

In contrast to this, most countries experienced slower growth and often decline in measured economic well-being under the baseline and all alternatives during the period that includes and immediately follows the Great Recession (2008-2012).

Under the baseline index, only three countries (Belgium, Germany, and Norway) experienced more rapid growth than in the pre-recession period while six countries experienced decline (Denmark, France, Italy, Netherlands, Spain, and Sweden). The most rapid growth in measured economic well-being during the recession era was 2.18 per cent per year in Norway, well above the pre-recession rate of growth (1.36 per cent per year).

Under Alternative 1, only two countries (Germany and Norway) experienced quicker growth than in the pre-recession period while seven countries experienced decline (Denmark, France, Italy, Netherlands, Spain, Sweden, and the United Kingdom). The most rapid growth in measured economic well-being during this period occurred in Norway (1.63 per cent per year).

Under Alternative 2, two countries (Belgium and Norway) had faster growth in measured economic well-being than in the pre-recession period and six countries experienced decline (Denmark, France, Italy, Netherlands, Spain, and the United Kingdom). Under this alternative, the fastest pace of growth in economic well-being (2.49 per cent per year) occurred in Norway and was well above the pre-recession growth rate (1.84 per cent per year). Finally, four countries (Australia, Canada, Germany, and Norway) had faster growth in measured economic well-being during the recession era than the pre-recession period and six countries experienced decline (Denmark, France, Italy, Netherlands, Spain, and Sweden).

The fastest pace of growth in economic well-being in the recession era under Alternative 3 occurred in Germany (1.38 per cent per year) – a massive increase from 0.11 per cent per year, which was the weakest growth rate under this alternative in the pre-recession era.

Regardless of the weights used, there is some consensus across weighting alternatives as to the effects of the Great Recession on welfare. In particular, measured economic well-being in the recession era increased rapidly in Norway, declined extremely rapidly in Spain, and declined somewhat in Denmark, France, Italy, and the Netherlands. In fact, under all weighting schemes, the most rapid decline in measured economic well-being in the era of the Great Recession occurred in Spain (6.07, 6.54, 2.81, and 8.49 per cent per year for the baseline, Alternative 1, Alternative 2, and Alternative 3, respectively).

E. Summary

Differences in subjective valuations of the different domains of economic well-being can matter, but in the alternative scenarios presented here, they have no major effect on the rankings of countries. Our main results are fairly robust to changes in the relative weights of the domains, but other results are highly sensitive. For example, Norway and Belgium have the two highest IEWB scores, Spain has the lowest IEWB value under all four weighting schemes, and the Great Recession had a robustly negative effect on growth in measured economic well-being. 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 2012 in every country under all four weighting schemes, 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 1980-2012 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 economic security are judged to be.

V. Conclusion

This report presents new estimates of the IEWB for fourteen OECD countries for the 1980-2012 period. Key highlight include the introduction of new methodologies for the calculation of poverty data, Gini coefficients, family sizes, and total current net capital stock. Additionally, this update reports monetary values in constant 2005 USD rather than constant 2000 USD, which was used in previous updates. These updates (especially the update to poverty data) allow for richer year-to-year variation in the components of the IEWB and allow the analysis of the effect of the Great Recession on measured economic well-being.

The results reveal that there were significant differences across countries in terms of economic well-being in 2012. In particular, Norway and Belgium had the highest levels of economic well-being in 2012, while Spain and Italy had the lowest levels. Canada ranked tenth among the fourteen countries. However, there were also similarities across countries. All fourteen countries experienced an increase in economic well-being over the 1980-2012 period, and the Great Recession resulted in decreases in the pace of growth of measured economic well-being in eleven of the fourteen countries.

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. The impact of the Great Recession compounded this problem, resulting in decline in measured economic well-being in six of the fourteen countries in the 2008-2012 period.

There are many methodologies available to aggregate the four components of the IEWB into the final index. An important objective of the IEWB 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 generally robust. Economic well-being increased in every country over the 1980-2012 period under all four of the weighting schemes. Norway and Belgium always had the highest levels of economic well-being in 2012, in that order, while Spain always ranked last.

The IEWB has undergone many modifications in the past and will certainly be modified again in the future. Research on theoretical notions of economic well-being and empirical methods continue to expand, and the methods used to capture economic well-being in the IEWB will adapt alongside this novel research. As it stands, we believe that GDP fails to capture important aspects of economic well-being that are incorporated into the IEWB. Results from the IEWB, although still not perfect, therefore provide a more intuitive conceptualization of economic well-being upon which we can track social progress.

References

Andrews, Brendon (2012). "Estimates of the Sensitivity of the Index of Economic Well-being to LIM and LICO Poverty Estimates," paper presented to the annual meeting of the Canadian Economics Association, University of Calgary, Calgary, Alberta, 9 June 2012.

Dedieu, Franck (2009) "Le bonheur, ça compte et ça se compte" *L'Expansion*, no. 774, September.

Osberg, Lars (1985) "The Measurement on Economic Well-being," in David Laidler (ed.) *Approaches to Economic Well-being*, Volume 36, MacDonald Commission (Toronto: University of Toronto Press). http://www.csls.ca/iwb/macdonald.pdf.

Osberg, Lars (2009) "Measuring Economic Security in Insecure Times: New Perspectives, New Events, and the Index of Economic Well-being," CSLS Research Report 2009-12. http://www.csls.ca/reports/csls2008-12.pdf.

Osberg, Lars and Andrew Sharpe (1998) "An Index of Economic Well-being for Canada," Research Report, Applied Research Branch, Human Resources Development Canada, December. http://www.hrsdc.gc.ca/eng/cs/sp/hrsd/prc/publications/research/1998-000129/r-99-3e.pdf.

Osberg, Lars and Andrew Sharpe (2001) "Trends in Economic Well-being in Canada in the 1990s," in *Review of Economic Performance and Social Progress: The Longest Decade: Canada in the 1990s*, edited by Keith Banting, Andrew Sharpe and France St- Hilaire (Montreal: Institute for Research in Public Policy and Ottawa: Centre for the Study of Living Standards).

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

Osberg, Lars and Andrew Sharpe (2002b) "The Index of Economic Well-being," Indicators: *The Journal of Social Health*, Vol. 1, No. 2, Spring, pp. 24-62. http://www.csls.ca/iwb/iwb2002-p.pdf.

Osberg, Lars and Andrew Sharpe (2002c) "International Comparisons of Trends in Economic Well-being," *Social Indicators Research* vol. 58, pp. 349-382. Available at http://myweb.dal.ca/osberg/wellbeingindex.htm.

Osberg, Lars and Andrew Sharpe (2004a) "Trends in Economic Well-being in Canada and the United States," in *What Has Happened To The Quality Of Life In The Advanced Industrialized Nations?* Ed Wolff, ed. (Edgar Elgar in association with the Levy Economics Institute).

Osberg, Lars and Andrew Sharpe (2004b) "De la bonne analyse des politiques publiques: le role de l'indice du bien-être économique," Groupe de prospective du Senate, Paris, France. http://www.csls.ca/iwb/frenchsenate-f.pdf.

Osberg, Lars and Andrew Sharpe (2005) "How Should We Measure the Economic Aspects of Well-being?" *Review of Income and Wealth*, 51 (2) June, pp. 311-336. http://www.roiw.org/2005/2005-12.pdf.

Osberg, Lars and Andrew Sharpe (2006) "Changing Trends in Economic Well-being in OECD countries: What Measure Is Most Relevant for Health," in Healthier Societies: From Analysis to Action edited by Jody Heymann, Clyde Hertzman, Morris Barer and Robert Evans (New York: Oxford University Press).

Osberg, Lars and Andrew Sharpe (2009a) "New Estimates of the Index of Economic Well-being for Canada and the Provinces," CSLS Research Report number 2009-10. http://www.csls.ca/reports/csls2009-10.pdf.

Osberg, Lars and Andrew Sharpe (2009b) "New Estimates of the Index of Economic Well-being for Selected OECD Countries," CSLS Research Report number 2009-11. http://www.csls.ca/reports/csls2009-11.pdf.

Osberg, Lars and Andrew Sharpe (2011a) "Beyond GDP: Measuring Economic Well-being in Canada and the Provinces, 1981-2010," CSLS Research Report number 2011-11. http://www.csls.ca/reports/csls2011-11.pdf.

Osberg, Lars and Andrew Sharpe (2011b) "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," CSLS Research Report number 2011-12. http://www.csls.ca/reports/csls2011-12.pdf.

Osberg, Lars and Andrew Sharpe (2014). "Measuring Economic Insecurity in Rich and Poor Nations." *Review of Income and Wealth*, 60 (Supplemental Issue) May, pp. S53-S76.

Osberg, Lars and Andrew Sharpe (2014). "The Impact of the Great Recession on Economic Well-being: How Different are OECD Nations and Why?" in *Economics of Wellbeing: Wellbeing: A Complete Reference Guide*, Volume V, edited by David McDaid and Cary L. Cooper.

Sharpe, Andrew and Brendon Andrews (2012). "The Issues in Weighting Composite Indices: The Experience of the Index of Economic Well-being." CSLS Research Report 2012-10. Dec. 2012. Centre for the Study of Living Standards: Ottawa, ON.

Sharpe, Andrew and Julia Salzman (2003) "Methodological Choices Encountered in the Construction of Composite Indicators," paper presented to the annual meeting of the Canadian Economics Association, Carleton University, Ottawa, Ontario, May. http://www.csls.ca/events/cea2003/salzman-typol-cea2003.pdf.

Stiglitz, Joseph E, Amartya Sen and Jean-Paul Fitoussi (2009) “Report by the Commission on the Measurement of Economic Performance and Social Progress.” http://www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf.