

ARTICLE

Blessing Chiripanhura
Office for National Statistics

Measures of economic activity and their implications for societal well-being

SUMMARY

Gross Domestic Product (GDP) is the most commonly used measure of a country's economic activity. GDP, however, has limitations as a measure of society's well-being and of people's material living standards. This article presents alternative measures of economic activity that may be more suitable indicators of society's well-being. The article explains how the different measures are calculated and the additional insights they offer.

Introduction

GDP is the most widely used measure of national income but it has often been criticised for being a poor indicator of a society's well-being despite it not being designed for this purpose.¹ This is because it does not measure some activities inside the production boundary² well, and that it excludes some welfare determinants outside the production boundary (see Allin (2007) for a discussion of these criticisms). The Commission on the Measurement of Economic Performance and Social Progress (CMEPSP) noted that 'it (GDP) has often been treated as if it were a measure of economic well-being. Conflating the two (GDP and economic wellbeing) can lead to misleading indications about how well-off people are.' (CMEPSP, 2009: 13).

These perceived limitations have prompted widespread interest in developing alternative measures which better measure society's well-being. Four main approaches have emerged:

- **Corrected GDP**, which involves adding and subtracting terms that have the same structure as GDP (monetary aggregates) computed as quantities valued at market prices (or imputed where market prices are not available)
- **Gross National Happiness**, which attempts to define quality of life in more holistic and psychological terms than GDP (Brooks, 2008)
- **The Capabilities Approach**, which provides a framework developing indicators of well-being. (Sen, 1979, 1985 and 1999); and

- **Synthetic indicators**, which are typically constructed as weighted averages of summary measures of social performance in various domains, for example Index of Sustainable Economic Welfare (Jackson et al, 1997).

This article concentrates on the first of these approaches. It builds on CMEPSP's (2009:13) conclusion that material living standards are one of eight dimensions of well-being³ and that these are 'more closely associated with measures of net national income, real household income and consumption (than GDP)'. This article will be complemented by another article (Thomas, 2010) that outlines ONS's plans for work on measuring societal wellbeing in all its dimensions.

The structure of the article is as follows: the next section examines GDP and three alternative measures of national income, adjusting for the consumption of fixed capital and net factor income from abroad. The following section explores disposable income and consumption as indicators of material wellbeing. Both sections highlight the insights which the measures offer into material well-being. The last two sections examine other limitations of national income as a measure of welfare and draw conclusions.

Four measures of national income

Four main measures of national income are considered. The framework for calculating them is outlined in **Box 1**. The values differ

Box 1

Frameworks for measuring national income

Gross Domestic Product (GDP)

Calculated to internationally agreed standards, GDP is an aggregate measure of production equal to:

- the sum of the gross values added of all resident institutional units engaged in production (plus any taxes, and minus any subsidies, on products not included in the value of their outputs)
- the sum of the final uses of goods and services (all uses except intermediate consumption) measured in purchasers' prices, less the value of imports of goods and services; or
- the sum of primary incomes distributed by resident producer units

Net Domestic Product (NDP)

Gross Domestic Product
 less Consumption of fixed capital
 equals Net Domestic Product

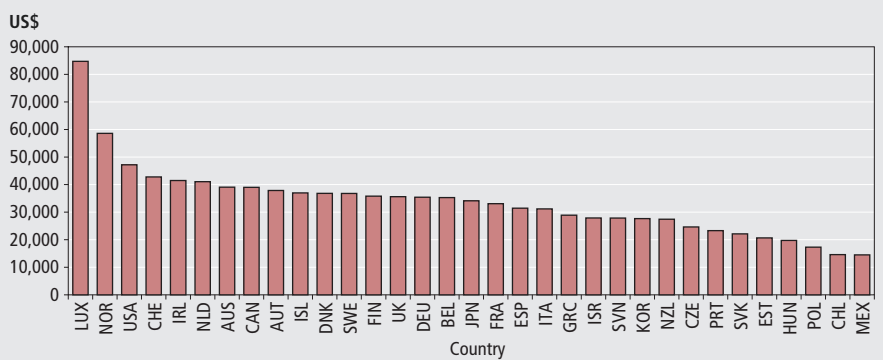
Gross National Income (GNI)

Gross Domestic Product (GDP)
 less net taxes on production and imports
 less compensation of employees and property income payable to the rest of the world
 plus the corresponding items receivable from the rest of the world
 equals Gross National Income

Net National Income (NNI)

Gross Domestic Product
 less Consumption of fixed capital
 plus Net factor income from abroad (NFAI)
 equals Net National Income

Figure 1
GDP per capita in OECD countries, 2008¹



Note:

1 US\$ current prices and PPPs.

Source: OECD Annual National Accounts, 2010

across OECD countries and may provide different insights into well-being.

Gross Domestic Product

Calculated to internationally agreed standards, GDP is an aggregate measure of production of goods and services in an economy. **Figure 1** shows GDP per head for OECD countries in 2008. The UK is ranked 14th amongst OECD countries, with GDP per head of \$35,600 roughly 40 per cent of top ranked Luxembourg and broadly the same as Germany and France.

Volume income measures (frequently referred to as 'real' measures) are preferable to nominal measures as they show changes in quantities alone rather than changes in quantities and prices shown in nominal measures. Similarly, per head measures (those divided by population) are better indicators of material well-being than aggregate measures. To allow international

comparisons, figures for individual countries have to be converted into a common currency, typically US dollars, using an appropriate exchange rate. Because market exchange rates do not properly adjust for the difference in price levels between two countries and therefore do not provide a true comparison of the volume of goods and services produced per head, statisticians and economists use Purchasing Power Parities (PPPs). These are the rates of currency conversion that equalise the purchasing power of different currencies by eliminating the differences in price levels between countries⁴.

Figure 2 shows the evolution of volume GDP per head for the UK, Germany, France, Luxembourg, the USA, Ireland and Japan since 1970⁵. Over the period, the rankings of most countries changed little, with growth in France, the USA, Germany, the UK and Japan averaging around two

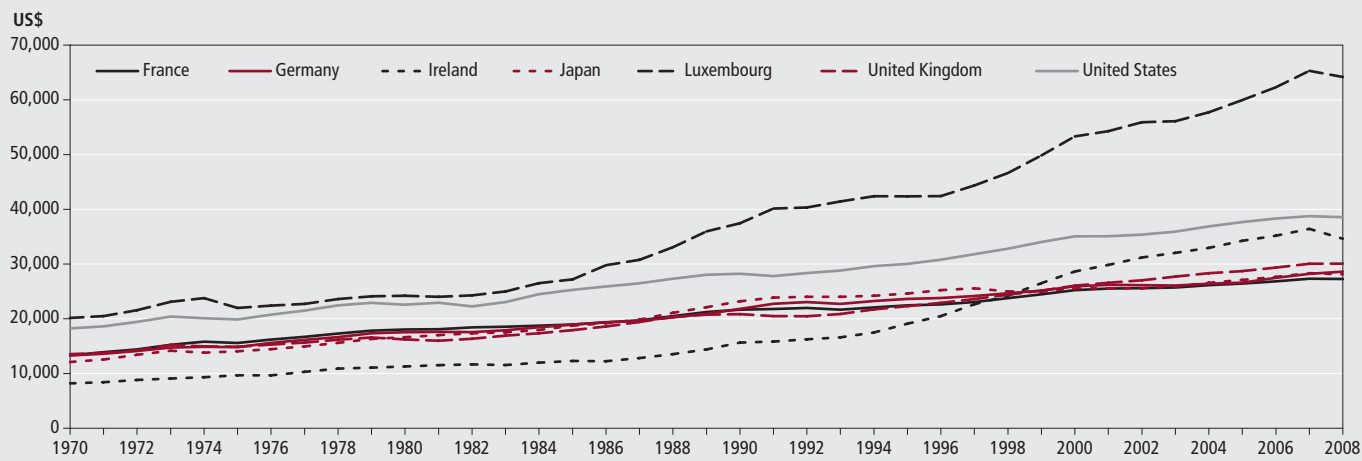
per cent. However, that of Luxembourg accelerated from around 1982, and Ireland's from 1994, giving them an overall rate of nearly three per cent and four per cent per annum respectively. Despite the upward trend depicted in the figure, work by Easterlin (1995) and others suggests that this has not been associated with any increase in subjective well-being measures.

Accounting for consumption of fixed capital – Net Domestic Product (NDP)

One limitation of GDP as a measure of well-being is that no deduction has been made for the 'wear and tear' of machinery, buildings and other capital products used in the production process - referred to in National Accounts as consumption of fixed capital⁶. In general, the more resources that are devoted to replenishing a nation's capital stock, the fewer resources are available for consumption in the short-run. Subtracting the consumption of fixed capital from GDP gives NDP, which may be a superior measure of material well-being as it more accurately describes the new wealth created during the period.

Figure 3 shows NDP per head for OECD countries in 2008. This measure of material wellbeing increases the UK rank amongst OECD countries to 11th (from 14th using GDP per head). However, the UK does not reduce the gap when compared to top ranking Luxembourg. The higher ranking reflects the UK having one of the lowest rates of capital consumption in the OECD, at 10.8 per cent. Only Luxembourg, Ireland and Mexico have lower rates. In contrast, Japan devoted over one-fifth of

Figure 2
Volume GDP per capita in selected countries, 1970–2008¹

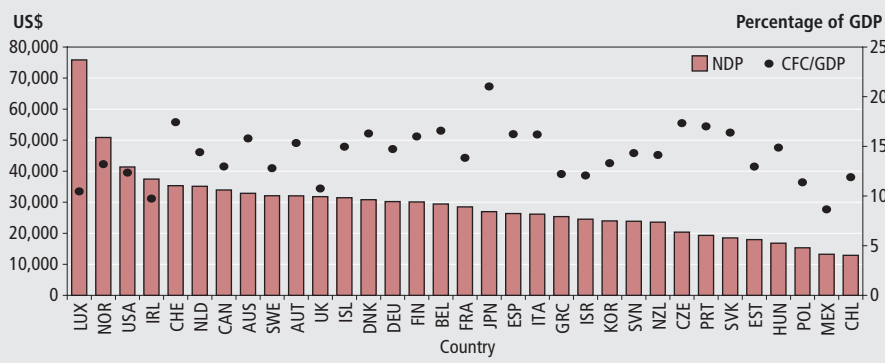


Note:

1 2000 constant PPPs.

Source: OECD Annual National Accounts, 2010

Figure 3
Net domestic product per capita in OECD countries, 2008¹

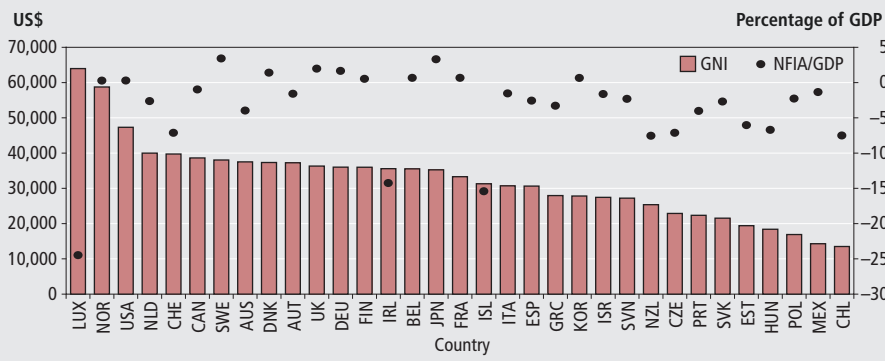


Note:

1 US\$ current prices and PPPs.

Source: OECD Annual National Accounts, 2010

Figure 4
GNI per capita in OECD countries, 2008¹



Note:

1 US\$ current prices and PPPs.

Source: OECD Annual National Accounts, 2010

its output to replacing fixed capital used up in the production process, the highest rate among OECD countries. Lower rates of consumption of fixed capital may give indication of an industrial structure with a lower capital stock (such as the UK which has shifted from a manufacturing to a

service-based economy), or it may indicate that a country had fairly new capital stocks whose rate of depreciation is lower.

Caution should be applied when comparing rates of capital consumption between countries because of differences in the assumptions about service lives,

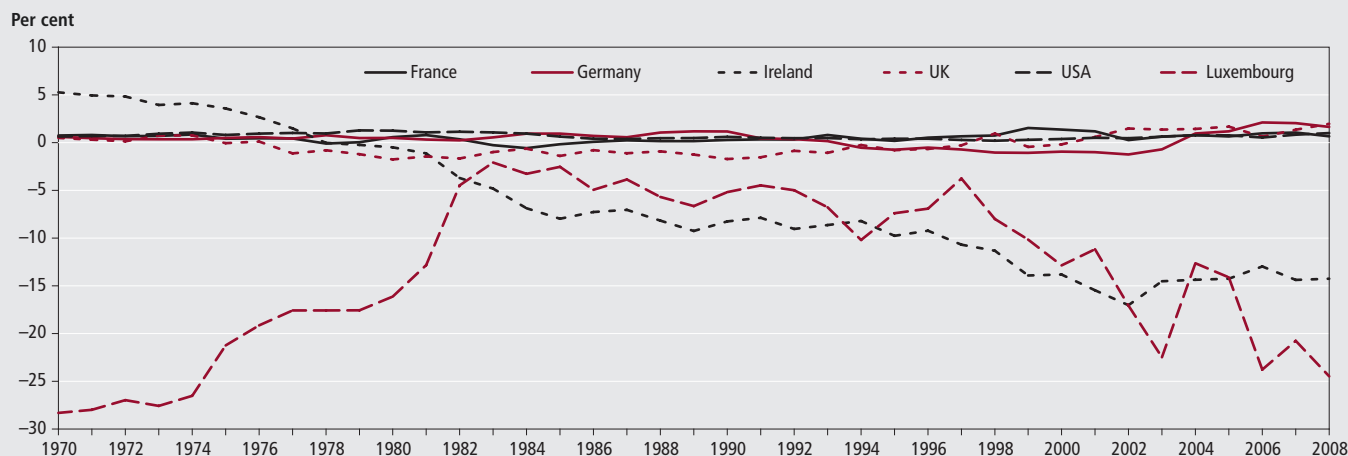
mortality functions, and depreciation patterns used in calculating capital consumption by different national statistical institutions⁷. Further, some items are given different accounting treatments in different countries, most notably in the United States where, for example, spending on military equipment such as tanks, fighter-bombers and warships, is recorded as investment whilst it is recorded as current expenditure in other countries. This investment generates additional consumption of fixed capital in the USA⁸. The difficulties associated with internationally comparable and timely estimation of annual consumption of fixed capital figures is the main reason for the continued use of gross figures.

Accounting for international income flows – Gross National Income (GNI)

The ‘Domestic’ in GDP indicates that activity is measured within the economic territory of the country concerned. GNI, formerly known as Gross National Product, reflects cross-border ownership of economic assets of nationals of the particular country. In particular, adding to GDP the income received from abroad by one country’s resident units⁹ and deducting the income created by production in the country but transferred to units residing abroad gives GNI. The net of income received from abroad and income transferred to units residing abroad is called net factor income from abroad (NFIA).

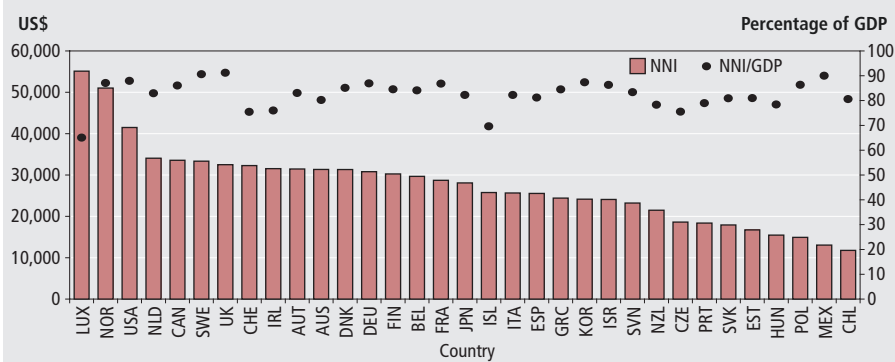
GNI is a theoretically better measure of a society’s welfare than GDP since it not only indicates production in the economy, but also how much of that production, in addition to resources owned by nationals of

Figure 5
Net factor income from abroad as a percentage of GDP in six OECD countries, 1970–2008



Source: OECD Annual National Accounts, 2010

Figure 6
Net national income in OECD countries, 2008¹



Note:

1 US\$ current prices and PPPs.

Source: OECD Annual National Accounts, 2010

a country abroad, is available to nationals of that country. However, it is difficult to measure remittance flows between countries, especially where they are undertaken outside of the formal financial system. Ranking OECD countries using 2008 GNI per head (Figure 4) produces a similar order as produced using NDP per head: Luxembourg is ranked first, the UK 11th, and Chile is ranked last. Although the relative ranking of the UK amongst OECD does not change, the divergence between the UK and Luxembourg does fall, reflecting the large net outflow of NFIA from Luxembourg.

For most countries, NFIA is a small proportion of GDP but for Ireland and Iceland, net outflow is around 15 per cent of GDP, and nearly a quarter of Luxembourg's. One of the reasons why NFIA is relatively high for Luxembourg is because of the earnings of workers who work in Luxembourg but live in neighbouring countries. The workers' earnings must be subtracted from Luxembourg's GDP

to obtain its GNI. In the case of Ireland, substantial investment from foreign companies has increased the amount of output produced and hence GDP, but the profits from those companies are largely sent back to their home countries, reducing the income available to Irish residents. Irish remittances from abroad have also fallen with the decline in emigration. For the UK, GNI is around two per cent higher than GDP due to net inflow of NFIA. This indicates more income available for UK residents than is produced in the country.

The influence of NFIA can further be understood by analysing it over time in six countries as illustrated in Figure 5. The figure highlights that the ratio has been relatively stable for France, Germany, the UK and the US but has changed markedly for Luxembourg and Ireland. Up until 1979, Ireland was a net recipient of factor income from abroad but since then it has increasingly been sending some of its GDP to the rest of the world in the form of net factor income, just like Luxembourg. This

highlights that although foreign direct investment can raise a country's GDP and GNI, this does not consistently translate into additional income for the residents of that country.

Accounting for international income flows and consumption of fixed capital – Net National Income (NNI)

The combined adjustment for the consumption of fixed capital and net factor income from abroad in GDP produces NNI. This shows the net value of income obtained from resources owned by nationals of a country and thus, in theory, is a better indicator of material well-being than both GDP and GNI.

Figure 6 shows NNI for OECD countries in 2008. The figure illustrates that using NNI as a measure of society's material wellbeing further narrows the gap between the UK and Luxembourg. In fact, the gap between Luxembourg and other countries in general declines as the national income measures change from GDP to NNI because of Luxembourg's net outflow of factor income. The UK is ranked 7th in this comparison (from 11th when comparing GNI, and 14th when comparing GDP). The ratio of NNI to GDP shows that just under two-thirds of Luxembourg's GDP represents new wealth for its residents. In contrast, this figure is 91 per cent for the UK.

Income and consumption indicators

A common limitation of the aggregates above as measures of well-being is that they are all measures of national income. CMEPSP (2009: 13) argues that, 'while it is informative to track the performance of economies as a whole, trends in citizens'

Box 2

Measuring household income and consumption in National Accounts

In National Accounts, the three main measures of household income and consumption are:

- household disposable income
- household final consumption expenditure
- household actual consumption expenditure

Household Disposable Income

Total household income
less payments of income tax and other taxes, social contributions and other current transfers
equals Household disposable income

Household adjusted disposable income

Household disposable income
plus the value of the social transfers in kind receivable by households
less the value of the social transfers in kind payable by households
equals Household adjusted disposable income

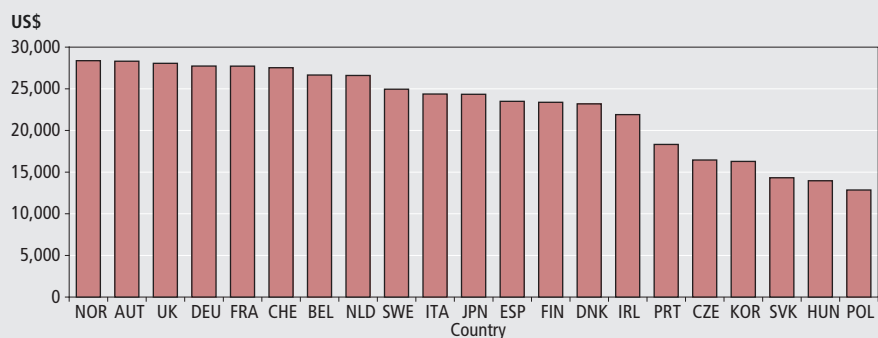
Household final consumption expenditure

It consists of the expenditure, including imputed expenditure, incurred by resident households on individual consumption goods and services, including those sold at prices that are not economically significant.

Household actual consumption expenditure

The value of the consumption goods and services acquired by households, whether by purchase in general, or by transfer from government units or NPISH's, and used by them for the satisfaction of their needs and wants; it is derived from their final consumption expenditure by adding the value of social transfers in kind receivable.

Figure 7

Household adjusted disposable income per capita in OECD countries, 2007¹**Note:**

1 US\$ current prices and PPPs.

Source: OECD Annual National Accounts, 2010

material living standards are better followed through measures of household income and consumption.

Households have the choice of improving current welfare by allocating more resources to consumption, or improving future welfare by increasing savings and wealth accumulation. These welfare decisions are not reflected in GDP per head analysis. This section analyses the implications of disposable income and consumption expenditure on well-being. **Box 2** outlines the three main measures of household income and consumption in National Accounts.

Household disposable income

Total household income is the sum of the earnings of the employed and

self-employed, property income, interest and dividends, gross operating surplus, pensions, social security benefits (other than pensions), miscellaneous transfers and insurance claims received¹⁰. Subtracting payments of income tax and other taxes, social contributions, property income expenditures, other current transfers and insurance premiums paid from total household income gives Household Disposable Income. This provides a measure of both the present and future consumption possibilities available to households.

Figure 7 shows household disposable income for a selection of OECD countries. It shows household adjusted disposable income per head in 2007¹¹. The figure shows that using household adjusted disposable

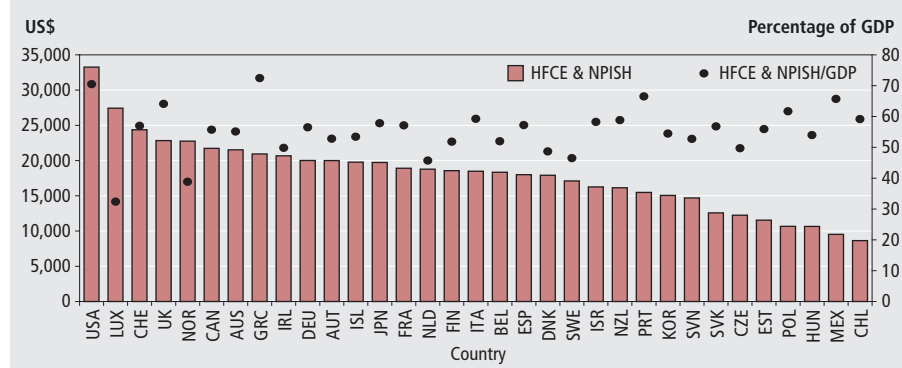
income as a measure of societal wellbeing places the UK third amongst this sample of 21 countries, only slightly behind Norway which is top of the rankings.

Supposing that higher disposable income increases consumption possibilities, and that higher consumption indicates higher welfare, then Norway had the highest welfare, followed by Austria and the UK. However, people receive satisfaction from consumption of goods and services, not income. Disposable income is not all spent on consumption, and as income increases a declining proportion is allocated to consumption. Income can also be saved, adding to wealth, and representing potential consumption postponed to the future. Given differences in saving rates and wealth across countries, consumption differs too, hence disposable income analysis may not fully indicate the material well-being of a country (see section on income versus wealth). For further analysis of disposable income, savings and consumption in the UK, refer to Davies, Fender and Williams (2010). The following section analyses household consumption expenditure as a measure of wellbeing.

Household final consumption expenditure

Household final consumption expenditure consists of the expenditure (including imputed expenditure) incurred by resident households on individual consumption of goods and services, including those

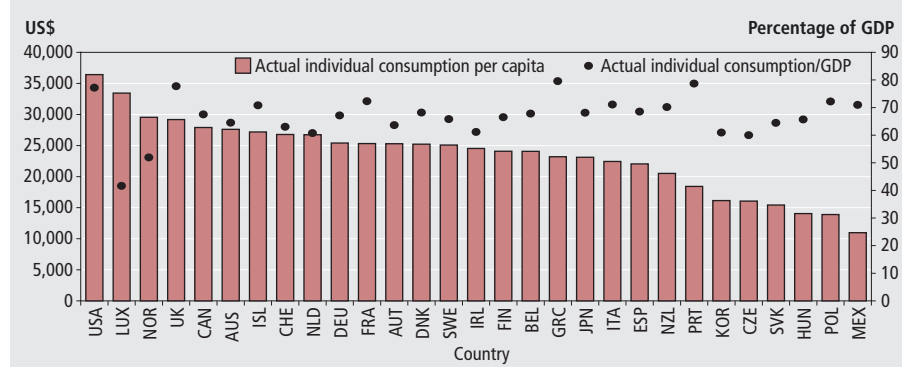
Figure 8
Household final consumption expenditure (including NPISH) in OECD countries, 2008¹



Note: Source: OECD Annual National Accounts, 2010

¹ US\$ current prices and PPPs.

Figure 9
Actual consumption expenditure in OECD countries, 2008¹



Note: Source: OECD Annual National Accounts, 2010

¹ US\$ current prices and PPPs.

sold at non-market prices. This covers all purchases made by consumers: food, clothing, housing services (rents), energy, durable goods (notably cars), spending on health, on leisure and on miscellaneous services. Consumption expenditure does not, however, include households' purchases of dwellings, which are counted as household gross fixed capital formation (GFCF). The 'consumption' variable is in contrast to 'GFCF', with consumption intended to designate purchases that are consumed (in the sense of 'used up' or 'destroyed') during the period, while GFCF refers to purchases intended to be used for future production.

Figure 8 shows household final consumption expenditure (including NPISH) per head in OECD countries in 2008. By this measure, the USA has the highest household final consumption expenditure per capita amongst OECD countries, spending around 50 per cent more per annum than the UK. However, the UK has the 4th highest final consumption expenditure, reflecting the relatively low rate of saving amongst households. But

this may indicate lower resources for expenditure in the future. Figure 8 also shows that Greece and the USA had the highest allocation of GDP to consumption, whilst the UK ranked fifth. The lowest ratios were for Norway and Luxembourg. Thus, while Luxembourg had the highest GDP per head, it devoted the lowest share of its GDP to consumption activities.

Household actual final consumption expenditure

Actual final consumption expenditure of households is the value of the goods and services acquired by households, whether by purchase in general or transfer from government units or NPISHs, which is used in order to satisfy needs and wants. It is derived from adding the value of social transfers in kind receivable to household final consumption expenditure. Figure 9 shows household actual final consumption expenditure in the OECD in 2008. The UK remains 4th under this measure but the gap when compared to the USA narrows to only 25 per cent, indicating the greater influence of the state upon household budgets in

the UK. The balance between current and future consumption as indicated by saving as a proportion of income may help to indicate the sustainability of current consumption expenditure and provides additional insight regarding expenditure and well-being.

Some countries have larger government spending than others, and this spending contributes to household consumption expenditure to varying degrees. The difference between Figures 8 and 9 represents government consumption expenditure. The growth in final consumption expenditure in France and Germany between 1970 and 1982 was driven by growth in government consumption expenditure which averaged 13.3 per cent for France and 12.1 per cent for Germany. Government consumption expenditure for the UK and the USA grew by an average of 10.7 per cent and above 9 per cent respectively. Between 1983 and 2008, average government consumption growth in all four countries was not very different, ranging from 4 per cent for Germany to about 6 per cent for the UK. Since the government contribution to household consumption (for example through the provision of health and education services and social transfers) has implications for the welfare of society, the following section examines actual household consumption expenditure, which is household final expenditure plus government expenditure on households.

Other limitations of national income as a measure of welfare

There are a number of limitations of national income as a measure of welfare that affect all of the above measures. These limitations will be considered in turn.

Quality changes

Typically, the quality of goods and services produced in the economy improves over time, and yet such quality improvements are not fully captured in national income. It may be argued that quality improvements are captured in the price, but this does not apply to all goods. An example is ICT hardware whose quality has improved greatly over time but the price of hardware has been declining due to competition and technological advances. Hedonic methods are used to capture some of these quality changes but they are not applied to all goods¹². Quality improvements enhance the quality of life, but such enhancement is missed in measured national income. Furthermore, product quality differs

between nations in ways that are not captured by merely comparing national income statistics.

Non-market output

As noted in the introduction, national income is the total market value of production in a country's economy during a year. But there are several productive activities that contribute to a society's welfare that do not have an explicit market value. First is the measurement of government output, which is inside the production boundary but where there are valuation issues; the second is household production which is outside the production boundary.

Government output

Because there is often no market for the goods and services that government produces, government output has traditionally been valued at cost rather than at market prices. In the UK, government expenditure accounts for nearly 17 per cent of GDP¹³. Work undertaken by the UK Centre for the Measurement of Government Activity (UKCeMGA) within ONS to improve the measurement of public service output, following the Atkinson Review (2005), is estimated to have produced a 3.8 per cent cumulative addition to measures of government output between 1995 and 2005 (Pont, 2008). Other OECD countries have begun to adopt direct measures in measuring government output.

Household production

Whilst quality changes and government output may be measured imperfectly in the National Accounts, non-market production in the household (for example, meal preparation, cleaning, laundry, and child care) are not included at all. Therefore, when these activities are, because of greater labour force participation, shifted to the market – as restaurant meals and semi-prepared meals, cleaning and laundry services, and day care – the change in the value of production is overstated due to the decline in non-market (household) production¹⁴. Another missing component of well-being is the valuation of leisure time. 'Full' income (consisting of household income, household production, and leisure) more accurately indicates societal well-being.

Defensive expenditures

A common criticism of GDP is the idea of 'defensive' or 'regrettable' expenditures. This is the idea that military spending or

expenditures on repairing the damage caused by a flood does not improve society's well-being. The concept of defensive expenditures is vague as it is not clear what should be counted as a defensive expenditure. For example, expenditure on food and drink is, in part, a defence against hunger and thirst.

Income versus wealth

The income measures discussed above are all flow concepts (measured per period). Also important for well-being are stock concepts including net wealth (consisting of physical, financial, property and private pension wealth), as well as environmental resources, human capital and social capital that are not measured in the main National Accounts. Daffin (2009) analyses the UK's wealth composition and distribution in detail. Generally, wealth, like income, is unequally distributed within and between countries, and such inequality is passed down through generations. Since wealth indicates the possible long term material well-being of households, lower current wealth stock may be indicative of lower long-term material well-being. The valuation of stocks of natural resources, as featured in Recommendation 2 of the CMEPSP Report (2009), is being addressed at United Nations level. The United Nations Statistical Commission is working towards elevating the 'Handbook of National Accounting: Integrated Environmental and Economic Accounting' (SEEA) to an international statistical standard to sit alongside the System of National Accounts. The revised SEEA will be the statistical standard for environmental-economic accounting. It will provide an internationally agreed set of concepts and definitions, including the accounting rules for physical and monetary asset accounts including: sub-soil assets, water, forest, aquatic and land. The first volume is currently being edited, and the proposed contents are readily available. ONS has already done some work on the valuation of oil and gas reserves.

Inequality and distributional issues

Societal well-being also contains an implication of social justice and is thus concerned with the distributional issues that society faces. However, per head income analysis (an average measure) can be a misleading image of the representative resident's well-being if the distribution of income is very unequal. This is often the case. As such, the analysis of well-being may best be undertaken at consumption

unit level (usually the household, adjusted for size and composition) so as to incorporate economies of scale advantages that are assumed away in per head analysis. Emphasis of consumption over income allows for a more disaggregated analysis by grouping households according to specific characteristics in combination with median analysis. Consumption unit analysis reduces the average income required to maintain a given standard of living. Although household income can be adjusted for size (called 'equivalising'), there is no consensus on the nature and structure of intra-household resource receipt and distribution, and how this changes with size. Further, even though 'equivalised' income reflects the sharing of consumption goods, it 'does not allow broader assessment of the consequences of living with others' (Boarini et al, 2006: 21). One suggestion is to use median rather than mean analysis, but deriving the median in a National Accounts context is challenging given the complex derivation of National Accounts indicators.

The income approach to measuring GDP, alternatively known as Gross Domestic Income, allows for the analysis of distributional issues by examining the shares of wages, rents and profits in Net Domestic Income (that is, Gross Domestic Income less Consumption of Fixed Capital). The analysis can be carried out by decile or by quintile (Atkinson and Voitchovsky, 2008), and gives insights not discernible from GDP per head. The CMEPSP Report (2009) shows that the evolution of wage shares differs between low and top earners. The report notes that the wage share for the UK rose by one and half per cent between 1954 and 1964, but the share of the bottom half declined by two per cent. The overall wage share in 2006 was the same as in 1954, but the share for the bottom half was four per cent lower. **Table 1** shows wage share changes by quintile between 1980 and 2000 for 22 OECD countries. It is adopted from the CMEPSP Report (2009), Table 3, Page 119.

The figures in Table 1 are based on household surveys hence they are not directly comparable to figures from annual National Accounts. However, they show that the wage share of the bottom quintile declined in Austria, Germany, Japan, Mexico, Turkey and the USA. The share of the top quintile declined in Austria, Japan, Mexico and Turkey. The bottom quintile's share increased markedly in Greece, Ireland, Norway and the UK. The top quintile's share increased markedly too in Belgium, Finland, Greece, Ireland, Spain and Sweden. These inter-quintile dynamics

Table 1
Trend in real household income by quintiles

| | Average annual change mid-1980s to mid-1990s | | | | | Average annual change mid-1990s to mid-2000s | | | | | Per cent | |
|-----------------------|--|-----------|------------------------|--------|--------------|--|-----------|------------------------|--------|--------------|----------|------|
| | Bottom quintile | | Middle three quintiles | | Top quintile | Bottom quintile | | Middle three quintiles | | Top quintile | Median | Mean |
| | quintile | quintiles | Top quintile | Median | Mean | quintile | quintiles | Top quintile | Median | Mean | | |
| Australia | .. | .. | .. | .. | .. | 2.4 | 2.0 | 1.9 | 2.2 | 2.0 | | |
| Austria ¹ | 2.5 | 2.7 | 2.8 | 2.8 | 2.7 | -2.1 | -0.5 | -0.4 | -0.6 | -0.6 | | |
| Belgium ¹ | 1.2 | 0.5 | 1.2 | 0.4 | 0.8 | 1.4 | 1.3 | 1.7 | 1.2 | 1.5 | | |
| Canada | 0.3 | -0.2 | -0.1 | -0.2 | -0.1 | 0.2 | 1.2 | 2.1 | 1.1 | 1.4 | | |
| Czech Republic | .. | .. | .. | .. | .. | 0.4 | 0.6 | 0.7 | 0.5 | 0.6 | | |
| Denmark | 1.3 | 0.9 | 0.8 | 0.9 | 0.9 | 0.6 | 0.9 | 1.5 | 0.9 | 1.1 | | |
| Finland | 0.9 | 0.9 | 1.0 | 0.8 | 1.2 | 1.6 | 2.5 | 4.6 | 2.5 | 2.9 | | |
| France | 1.0 | 0.5 | -0.1 | 0.5 | 0.3 | 0.9 | 0.7 | 1.0 | 0.8 | 0.8 | | |
| Germany | 0.4 | 1.4 | 1.6 | 1.2 | 1.4 | -0.3 | 0.5 | 1.3 | 0.6 | 0.7 | | |
| Greece | 0.3 | 0.1 | 0.1 | 0.3 | 0.1 | 3.6 | 3.0 | 2.7 | 2.9 | 2.9 | | |
| Hungary | .. | .. | .. | .. | .. | 0.9 | 1.2 | 1.0 | 1.1 | 1.1 | | |
| Ireland ¹ | 4.0 | 3.0 | 2.9 | 3.2 | 3.1 | 5.2 | 7.7 | 5.4 | 8.2 | 6.6 | | |
| Italy | -1.3 | 0.5 | 1.5 | 0.6 | 0.8 | 2.2 | 1.0 | 1.6 | 1.0 | 1.3 | | |
| Japan | 0.8 | 1.8 | 2.1 | 1.8 | 1.9 | -1.4 | -1.0 | -1.3 | -1.0 | -1.1 | | |
| Luxembourg | 2.3 | 2.5 | 3.0 | 2.4 | 2.7 | 1.5 | 1.5 | 1.7 | 1.5 | 1.6 | | |
| Mexico | 0.7 | 1.2 | 3.8 | 1.1 | 2.6 | -0.1 | -0.1 | -0.6 | -0.2 | -0.4 | | |
| Netherlands | 1.1 | 2.7 | 3.9 | 2.8 | 3.0 | 1.8 | 2.0 | 1.4 | 2.0 | 1.8 | | |
| New Zealand | -1.1 | -0.5 | 1.6 | -0.6 | 0.3 | 1.1 | 2.2 | 1.6 | 2.3 | 1.9 | | |
| Norway | -0.3 | 0.3 | 1.0 | 0.4 | 0.5 | 4.4 | 3.9 | 5.1 | 3.8 | 4.3 | | |
| Portugal ¹ | 5.7 | 6.5 | 8.7 | 6.2 | 7.3 | 5.0 | 4.1 | 4.4 | 4.2 | 4.3 | | |
| Spain ¹ | 4.4 | 3.2 | 2.4 | 3.2 | 3.0 | 5.2 | 5.1 | 5.0 | 5.5 | 5.1 | | |
| Sweden | 0.5 | 0.9 | 1.2 | 0.9 | 0.9 | 1.4 | 2.2 | 2.8 | 2.2 | 2.3 | | |
| Turkey | -0.6 | -0.7 | 1.4 | -0.8 | 0.4 | -1.1 | -0.5 | -3.2 | -0.3 | -1.9 | | |
| United Kingdom | 0.7 | 2.0 | 4.3 | 1.9 | 2.8 | 2.4 | 2.1 | 1.5 | 2.1 | 1.9 | | |
| United States | 1.2 | 1.0 | 1.9 | 1.0 | 1.4 | -0.2 | 0.5 | 1.1 | 0.4 | 0.7 | | |
| OECD-22 ² | 1.2 | 1.4 | 2.1 | 1.4 | 1.7 | 1.5 | 1.8 | 1.9 | 1.9 | 1.8 | | |
| OECD-20 ³ | 1.3 | 1.5 | 2.1 | 1.5 | 1.7 | 1.7 | 2.0 | 2.2 | 2.1 | 2.1 | | |

Notes:Source: OECD (2008a) *Growing Unequal? Paris*

- Changes over the period mid-1990s to around 2000 for Austria, the Czech Republic, Belgium, Ireland, Portugal and Spain (where 2005 data, based on EU-SILC), are not deemed to be comparable with those for earlier years.
- OECD-22 refers to the simple average for all countries with data spanning the entire period (i.e. excluding Australia, the Czech Republic and Hungary, as well as Iceland, Korea, Poland, the Slovak Republic and Switzerland).
- OECD-20 refers to all countries mentioned above except Mexico and Turkey. Income flows have been deflated with each country's consumer price index.

have important implications on wellbeing which cannot be inferred from headline GDP figures. Growth in the annual average income indicates growth in resource endowments, which may be associated with improving standards of living; the reverse is also true.

Well-being is multi-dimensional

Wellbeing is a multi-dimensional concept and it may be challenging to represent this in a single indicator if indeed there is a need for this. Well-being includes good health and longevity, freedom to access and acquire educational training, quality of social relations, economic security and freedom from poverty, good environment, and personal safety, among other qualities. Exploring this aspect of societal well-being leads into the other approaches listed above. These are being explored further, and will be reported on in a forthcoming article (Thomas, 2010).

Conclusions

This article has presented different measures of income and consumption. Bearing in mind the caveats about the

international comparability of measures and the inability of national income to fully capture material well-being, it has shown that using different National Accounts indicators to represent countries' material well-being may produce rankings that are dependent on the indicator used. If GDP per head is used, the UK would be ranked 14th among OECD countries. Its GDP per head would be nearly 40 per cent that of Luxembourg. Using NDP per head, the UK would, as with GNI per head, be ranked 11th among OECD countries, higher than Iceland, Denmark and Finland that rank higher using GDP per head. Using NNI per head, the UK would be ranked 7th among OECD countries and this would be close to seventy per cent that of Luxembourg. The UK would be ranked 3rd if a sample of OECD countries were ranked on the basis of disposable household income per head. Using household final consumption expenditure (including NPISH) per head, the UK would be ranked 4th, slightly over two-thirds that of the USA with the highest. Finally, using household actual final consumption expenditure per head to rank OECD countries, the UK would

be ranked 4th again, but with consumption that is about eighty per cent that of the USA with the highest.

The different rankings for OECD countries resulting from, among other things, their levels of consumption of fixed capital, net foreign income from abroad, and tax and saving policies, means that their materials well-being cannot be represented by any one headline National income measure. Given the other weaknesses of national income that have been discussed, it emerges that it is necessary to give prominence to some National Accounts indicators other than GDP when considering material wellbeing. Such prominence will likely help reduce the emphasis on GDP as a measure of society's material well-being. Yet still, more work is necessary to produce plausible and generally acceptable measures of societal wellbeing, recognising that overall well-being is a multi-dimensional concept.

Notes

- See for example Vanoli, 2005 for a discussion of the development of National Accounts.

2. The production boundary delimits what activities are to be included or excluded from the measure of economic production.
3. The other dimensions are Health; Education; Personal activities including work; Political voice and governance; Social connections and relationships; Environment (present and future conditions); and Insecurity of an economic as well as a physical nature.
4. Further details can be found in the Eurostat–OECD Methodological manual on purchasing power parities.
5. The base year for prices is 2000.
6. Technically, consumption of fixed capital is the ‘decline in the current value of the assets used by producers during an accounting period, as a result of physical deterioration, normal obsolescence and accidental damage’ (ONS, 1998). This differs from the concept of depreciation as recorded in business accounts or as allowed for taxation purposes as it is calculated on a current cost rather than historic cost basis.
7. In the UK, annual estimates of the consumption of fixed capital are obtained using the perpetual inventory model (PIM). For structures and buildings, the straight line method is used whilst for plant and machinery the proportion of the value of the asset (at the beginning of each year) method is used.
8. This is included in the estimation of the value added of government, and thus in GDP. The result is to raise ‘statistically’ the level of United States GDP by around 0.6 per cent. This difference should disappear since the new SNA has adopted the method applied in the United States.
9. Resident unit refers to individuals, households and institutions that have a centre of economic interest in the economic territory of a country.
10. Some OECD countries (including the UK) also include the income of non-profit institutions serving households (NPISHs). The justification for this treatment is that because these institutions are largely financed by households and because their purpose is to serve households, their accounts can be assimilated to those of households. Moreover, the NPISHs

constitute a small sector, and their inclusion in the household account makes little difference to the final result. In practice, this means that international comparisons will have to compare ‘households plus NPISHs’ rather than the household sector alone.

11. The data are from the OECD website. 2007 data are used because they are available for more countries than 2008 data.
12. The hedonic method is a regression technique used to estimate the prices of qualities or attributes of goods and services that are not observable in the market. It is based on the idea that the prices of different goods and services on sale on the market are functions of certain measurable characteristics such as size, weight, power, speed, etc and so regression methods can be used to estimate by how much the price varies in relation to each of the characteristics.
13. Calculation based on data from the UK’s Blue Book of National Accounts, 2009.
14. In early editions of his best-selling textbook, *Economics*, the late Paul Samuelson gave his favourite example of this pitfall in GDP accounting. Samuelson pointed out that if a man married his maid (and stopped paying her), then, all else equal, GDP would fall.

ACKNOWLEDGEMENTS

The author would like to thank Tim Andrews, Barry Williams, Valerie Fender, Geoff Bright, Stephen Hicks, Richard Jones and Paul Allin for their contributions to this article.

CONTACT

✉ elmr@ons.gov.uk

REFERENCES

Allin P (2007) ‘Measuring societal wellbeing’, *Economic and Labour Market Review*, Vol 1, No 10, pp 46-52

Atkinson A and Voitchovsky S (2008) *The distribution of top earnings in the UK since the Second World War*, University of Oxford

Atkinson Review: Final Report (2005) *Measurement of government output and productivity for National Accounts*. Palgrave Macmillan, Basingstoke.

Boarini R, Johansson Å and Mira d’Ercole M (2006), ‘Alternative measures of well-being’, *OECD Economics Department Working Papers*, No. 476

Brooks A (2008) *Gross National Happiness: Why happiness matters for America—and how we can get more of it*, New York, Basic Books.

CMEPSP Report (2009) ‘Report by the Commission on the Measurement of Economic Performance and Social Progress’, CMEPSP, Paris

Daffin (ed)(2009) ‘Wealth in Great Britain: Main results from the Wealth Assets Survey 2006/08’, Office for National Statistics

Davies, C, Fender V and Williams B (2010) ‘Recent developments in the household saving ratio’, *Economic and Labour Market Review*, Vol 4, No 5, pp 16-24.

Easterlin R A (1995) ‘Will raising the incomes of all increase the happiness of all?’ *Journal of Economic Behaviour and Organisation*, Vol 27, No 1, pp 35-47

Eurostat (2001) ‘Handbook on price and volume measures in National Accounts’. Eurostat, Luxembourg

Jackson T, Marks N, Ralls J and Stymne S (1997). *Sustainable economic welfare in the UK 1950-1996*. London and Guildford: New Economics Foundation and Centre for Environmental Strategy (University of Surrey)

Jones F, Annan D, and Shah S (2009) ‘The redistribution of household income 1977 to 2006/07’, *Economic and Labour Market Review*, Vol, 3, No 1, pp 31-43

Pont M (2008) ‘Improvements to the measurement of government output in the National Accounts’, *Economic and Labour Market Review*, Vol 2, No 2, pp 17-22

Sen A (1979) ‘Utilitarianism and welfarism’, *The Journal of Philosophy*, LXXVI (1979), 463-489

Sen A (1985) *Commodities and capabilities*. Oxford: Oxford University Press

Sen A (1999) *Development as freedom*. New York: Knopf

Thomas J (2010) ‘There is more to life than GDP, but how can we measure it?’ *Economic and Labour Market Review*, forthcoming

Vanoli A (2005) *A History of National Accounting*, IOS Press, Amsterdam

APPENDIX

Table A1
Data (in US\$ current prices and PPPs)

| Country | Code | GDP | NDP | GNI | NNI | NFIA/GDP (Per cent) | HFCE & NPISH | US\$ | |
|----------------|------|--------|--------|--------|--------|------------------------|--------------|--|--|
| | | | | | | | | Household actual individual consumption | 2007 Household adjusted disposable income |
| Australia | AUS | 39,056 | 32,888 | 37,507 | 31,339 | -3.97 | 21,527 | 27,614 | .. |
| Austria | AUT | 37,858 | 32,051 | 37,256 | 31,449 | -1.59 | 19,992 | 25,291 | 28,314 |
| Belgium | BEL | 35,288 | 29,441 | 35,523 | 29,676 | 0.67 | 18,339 | 24,074 | 26,649 |
| Canada | CAN | 39,014 | 33,954 | 38,632 | 33,572 | -0.98 | 21,730 | 27,899 | .. |
| Switzerland | CHE | 42,783 | 35,324 | 39,735 | 32,276 | -7.12 | 24,374 | 26,775 | 27,524 |
| Chile | CHL | 14,614 | 12,876 | 13,517 | 11,779 | -7.50 | 8,646 | .. | .. |
| Czech Rep | CZE | 24,631 | 20,362 | 22,875 | 18,607 | -7.13 | 12,245 | 16,059 | 16,457 |
| Germany | DEU | 35,432 | 30,214 | 36,017 | 30,799 | 1.65 | 20,013 | 25,406 | 27,730 |
| Denmark | DNK | 36,808 | 30,813 | 37,323 | 31,327 | 1.40 | 17,912 | 25,226 | 23,190 |
| Spain | ESP | 31,455 | 26,350 | 30,648 | 25,542 | -2.57 | 17,998 | 22,037 | 23,492 |
| Estonia | EST | 20,648 | 17,971 | 19,402 | 16,726 | -6.03 | 11,547 | .. | .. |
| Finland | FIN | 35,809 | 30,081 | 35,995 | 30,268 | 0.52 | 18,562 | 24,075 | 23,375 |
| France | FRA | 33,090 | 28,509 | 33,309 | 28,729 | 0.66 | 18,905 | 25,311 | 27,719 |
| Greece | GRC | 28,896 | 25,367 | 27,947 | 24,418 | -3.29 | 20,938 | 23,189 | .. |
| Hungary | HUN | 19,732 | 16,798 | 18,407 | 15,473 | -6.71 | 10,654 | 14,054 | 13,959 |
| Ireland | IRL | 41,493 | 37,451 | 35,581 | 31,539 | -14.25 | 20,671 | 24,537 | 21,904 |
| Iceland | ISL | 36,994 | 31,459 | 31,291 | 25,756 | -15.42 | 19,767 | 27,193 | .. |
| Israel | ISR | 27902 | 24,536 | 27,448 | 24,082 | -1.63 | 16,255 | .. | .. |
| Italy | ITA | 31,195 | 26,143 | 30,713 | 25,661 | -1.55 | 18,486 | 22,443 | 24,369 |
| Japan | JPN | 34,132 | 26,954 | 35,258 | 28,080 | 3.30 | 19,732 | 23,116 | 24,343 |
| Korea | KOR | 27,658 | 23,979 | 27,839 | 24,160 | 0.65 | 15,061 | 16,140 | 16,288 |
| Luxembourg | LUX | 84,713 | 75,846 | 63,978 | 55,112 | -24.48 | 27,431 | 33,438 | .. |
| Mexico | MEX | 14,501 | 13,246 | 14,305 | 13,050 | -1.35 | 9,527 | 10,977 | .. |
| Netherlands | NLD | 41,063 | 35,145 | 39,983 | 34,065 | -2.63 | 18,775 | 26,740 | 26,596 |
| Norway | NOR | 58,599 | 50,861 | 58,756 | 51,019 | 0.27 | 22,749 | 29,548 | 28,377 |
| New Zealand | NZL | 27,444 | 23,565 | 25,374 | 21,495 | -7.54 | 16,148 | 20,509 | .. |
| Poland | POL | 17,294 | 15,327 | 16,900 | 14,933 | -2.28 | 10,669 | 13,894 | 12,856 |
| Portugal | PRT | 23,283 | 19,324 | 22,345 | 18,387 | -4.03 | 15,485 | 18,417 | 18,317 |
| Slovak Rep | SVK | 22,141 | 18,513 | 21,545 | 17,917 | -2.69 | 12,577 | 15,423 | 14,315 |
| Slovenia | SVN | 27,864 | 23,873 | 27,220 | 23,230 | -2.31 | 14,692 | .. | .. |
| Sweden | SWE | 36,790 | 32,080 | 38,045 | 33,335 | 3.41 | 17,107 | 25,084 | 24,957 |
| United Kingdom | UK | 35,620 | 31,791 | 36,320 | 32,492 | 1.97 | 22,834 | 29,176 | 28,052 |
| United States | USA | 47,186 | 41,357 | 47,320 | 41,491 | 0.28 | 33,264 | 36,421 | .. |

Source: OECD Annual National Accounts, 2010