# The Progress Index

## Measuring and comparing progress

Broad measures of progress are a hot topic of public and scientific debate at the moment. However, no consensus exists on the appropriate index. The new Progress Index published by the Center for Societal Progress is the first to combine economic and ecological aspects for 22 countries over the period 1970 to 2008. It has four components: income, health, education and the environment. The key insights are:

- All rich countries have made progress over the last decade on this objective index.
- South Korea has made the biggest progress and moved to 7th rank in 2008 in the Progress Index.
- The most highly developed countries in 2008 were Norway, Sweden and Finland.
- Germany ranked only 18th out of 22 countries, especially because of its weak performance on education.
- The United States did not make much progress during the last 10 years and only ranked third t last in 2008.

The Progress Index (PI) offers a solid basis for further discussions about how to measure wellbeing, about societal priorities and preferable futures – in Germany and elsewhere.

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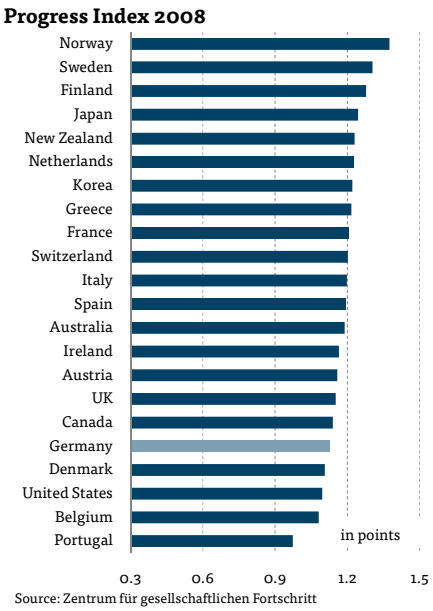


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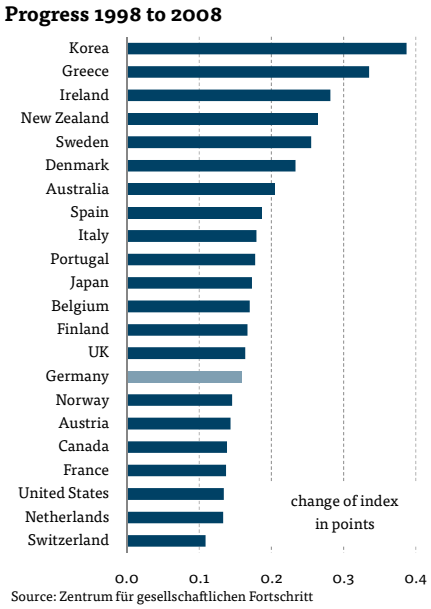


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The German version of this note includes more country portraits, 2-page profiles of the Human Development Index, the Happy Planet Index, the Legatum Prosperity Index and the Canadian Index of Wellbeing, as well as results from our survey on values and progress. It is available on www.fortschrittszentrum.de . This note includes information available by October 29, 2010.

Acknowledgements: The author thanks Deutsche Bank for their kind support, the firm Charles Barker Corporate Communications for their help and the main bright people with open eyes that helped improve this note, especially Andreas Schmid and Tobias Pfaff as well as the colleagues at the Zentrum für gesellschaftlichen Fortschritt.

Dear Reader,

Do you also have the impression that a lot of things are going downhill in Germany and that almost everything used to be better? Maybe not so much for you personally, but rather for the country at large? How can we reconcile this with the fact that things which are important to us and can be measured objectively have improved significantly over the past decades? Did you know that…

- … life expectancy of a newborn in Germany has increased by almost five years since 1991?
- … average income of Germans has increased by 20% after adjusting for inflation in the past 10 years?
- … ecological damage caused by the consumption of German citizens has nevertheless declined since 1991?
- … progress in Germany – according to our Index – was larger than in Switzerland or in the Netherlands?
- … the USA has the lowest life expectancy and the second largest ecological footprint per inhabitant among the rich countries?
- … Sweden has consistently been among the most progressive countries since the 1970s?
- … South Korea has by now reached the level of development of many European countries?

Objectively, a lot of things have improved in Germany. Since our expectations are increasing at a similar rate, however, a lot remains to be done – especially in the field of education.

I hope this article proves useful and provokes your reflections on societal priorities.

Dr. Stefan Bergheim, Director

# 1. The main results

**Four components combined**

The Progress Index of the Center for Societal Progress combines four variables that are important for humans and their relationship to the natural environment: income, health, education and environment. The comprehensive view of progress in 22 relatively rich countries for the period from 1970 to 2008 employs four variables: net national income, life expectancy of newborns, enrollment rates of pupils and students as well as the ecological footprint. All are per-capita values so that the population size of a country doesn't influence the overall results. The motivation behind the Index, the choice of variables, the computations and details concerning some of the countries will be discussed in the next chapters. First the most important results for the overall Index will be presented. It has been set at a value of one for Germany for 2000 and has no fixed upper or lower bounds.

## 1.1. Norway, Sweden and Finland are ahead

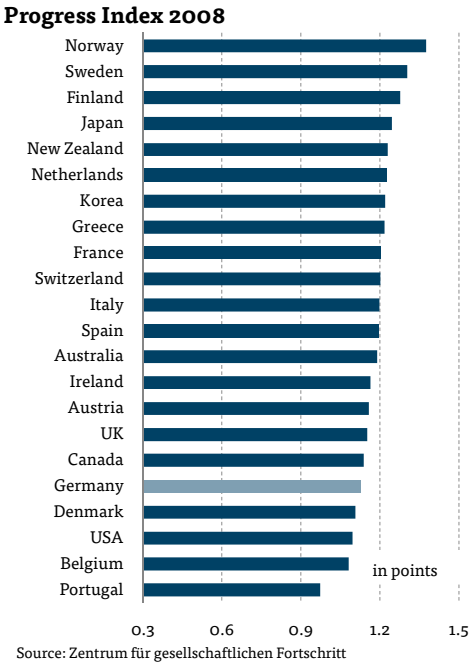
**Scandinavian countries come out on top**

The top rankings in the Progress Index for 2008 are held by Norway, Sweden and Finland. These countries provide a high degree of material well-being, have high life expectancy and education levels and put relatively little pressure on the environment. In Norway, the high level of prosperity can partly be traced to the abundance of oil, but it already ranked 3rd in 1970(see table on the next page). Sweden had been ranked 1st in 1970, the fell to 9th by 1990 and is now in second place. Finland has seen a rapid rise.

The two Asian countries Japan and Korea also demonstrate considerable progress based on our four variables. While Japan has slipped back somewhat in the international comparison since 1990, it was still ranked number four among the 22 countries in 2008. A declining population does not prevent a high welfare level for the individual citizen. South Korea has moved up from rank 21 in 1990 all the way to seventh place.

Germany was only in eighteenth place in 2008, thus in the bottom quarter among the 22 countries. This is the lowest ranking since 1970. Portugal has been stuck at the lower end of the scale for decades, mostly as a result of low income levels and low life expectancy. Belgium and Denmark are two more European countries that rank relatively low, partly based on their high ecological footprint according to the latest data.

The USA, which had still held 6th place in 1990, fell to the third to last place in 2008. The lowest life expectancy and the second highest per capita ecological footprint among 22 countries outweigh the relatively high income level



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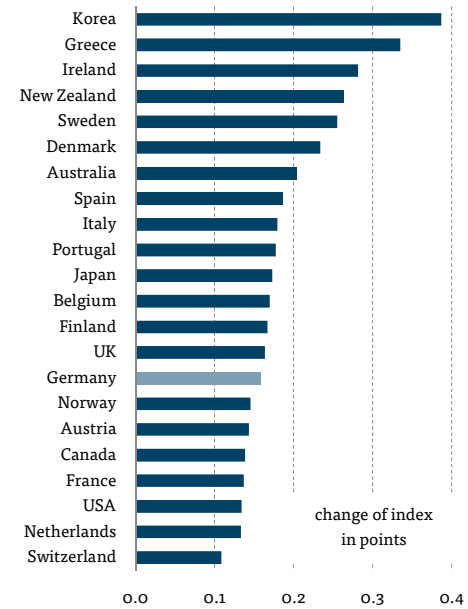
## 1.2. All countries are making progress

The good news is that all 22 countries analyzed have made progress over the past ten years: life has objectively improved in these countries which were already rich and highly developed, as can be seen from the graph on the right. Progress has been especially rapid in South Korea, where life expectancy and income in particular were growing at a rapid rate. Meanwhile ecological damage increased only slightly.

Greece, Ireland and New Zealand have also shown a relatively favorable development from 1998 to 2008. The recent economic crisis, however, indicates that developments in Greece at a minimum can be expected to be less dynamic in the coming years (and there are also some doubts about the quality of some of the data). Germany has witnessed above average and noticeable progress in the past ten years, but it still has a long way to go to reach the top.

Switzerland made the least progress in the past ten years, continuing its relative decline. The Netherlands and the USA also did not show much progress. In the USA, a barely increasing life expectancy, stagnating numbers in the education field and the increasing ecological damage offset relatively rapid advances in income.

**Progress 1998 to 2008**




Source: Zentrum für gesellschaftlichen Fortschritt

**Rankings in the Progress Index since 1970**

| Rank | 1970 | 1980 | 1990 | 2000 | 2008 |
|---|---|---|---|---|---|
| 1 | Sweden | Switzerland | Japan | Norway | Norway |
| 2 | Switzerland | Japan | Switzerland | Finland | Sweden |
| 3 | Norway | Norway | Canada | Sweden | Finland |
| 4 | United States | Canada | Norway | Switzerland | Japan |
| 5 | Netherlands | Sweden | France | Japan | New Zealand |
| 6 | Canada | United States | United States | Netherlands | Netherlands |
| 7 | Denmark | Greece | Netherlands | France | Korea |
| 8 | France | France | Austria | Austria | Greece |
| 9 | Japan | Austria | Sweden | Spain | France |
| 10 | Austria | Spain | Spain | Italy | Switzerland |
| 11 | Greece | Italy | Italy | UK | Italy |
| 12 | Italy | Netherlands | Greece | Canada | Spain |
| 13 | UK | Belgium | Finland | Australia | Australia |
| 14 | Belgium | Germany | Belgium | New Zealand | Ireland |
| 15 | Germany | Finland | UK | Germany | Austria |
| 16 | Finland | Denmark | Germany | United States | UK |
| 17 | New Zealand | UK | New Zealand | Korea | Canada |
| 18 | Spain | New Zealand | Denmark | Belgium | Germany |
| 19 | Ireland | Ireland | Australia | Denmark | Denmark |
| 20 | Australia | Australia | Ireland | Ireland | United States |
| 21 | Portugal | Portugal | Korea | Greece | Belgium |
| 22 | Korea | Korea | Portugal | Portugal | Portugal |

Source: Zentrum für gesellschaftlichen Fortschritt

**The USA is falling back**

# 2. Creation of the Progress Index

**Straightforward, meaningful and valid indicators needed**

The Progress Index of the Center for Societal Progress is a contribution with a strong scientific foundation to the discussion on broad-based measures of well-being in Germany. This discussion requires straightforward, meaningful and valid indicators, which can be used to make statements about levels and developments over time.

In principle there is broad agreement also in Germany that human well-being cannot be captured just by looking at the gross domestic product (GDP). The former Federal President made this point already in October 2009: "Quality of life is more than consumption. [...] There are good reasons to look at other indicators for the well-being of our citizens and societal progress. [...] It is my belief that those who are asking the question, "What can I do to improve my quality of life?" are truly looking ahead".[1]

**Chancellor Merkel on broad measures of wellbeing**

And Federal Chancellor Merkel also agrees that broader measures of wellbeing are important: "The 21st century will demand of us that we think about growth in a new way. At issue are not only the classical economic growth figures, at issue is a form of growth that can secure sustainable wellbeing. In this regard, variables such as security, quality of life, health and the sustainable use of raw materials will play a decisive role."[2]

In fall 2010, the German Federal Parliament, based on a motion by the SPD and Bündnis 90/Die Grünen parliamentary parties, will likely form an investigative committee entitled, "Growth, well-being and quality of life – ways towards a sustainable economy and societal progress."

## 2.1 Going beyond gross domestic product

**GDP is not a measure of welfare or wellbeing**

For more than 70 years it has been known that GDP is not a welfare measure. The inventor of the GDP, Simon Kuznets, who was later awarded the Nobel Prize, wrote in a report for the US Senate in 1934: "The welfare of a nation can, therefore, scarcely be inferred from a measurement of national income as defined above." In 1968, the US senator Robert Kennedy said this about GDP: "It measures everything, in short, except that which makes life worthwhile." For example, GDP goes down when somebody marries his housekeeper, and it goes up when a railroad track needs to be restored following a landslide.

GDP is and will continue to be of great importance for the management of the business cycle by central banks and finance ministers. It was developed for that reason following the great depression, which had to be mastered by economic policymakers without GDP – almost as if blindfolded. Doing

[1] Speech at the commemorative event "60 years Confederation of German Trade Unions" on October 5, 2009.
[2] Video message of February 6, 2010.

away with GDP or replacing it is therefore not the point, but it should no longer be interpreted as a welfare measure. Instead, true measures of well-being and progress need to be discussed; measures that contain much of what makes life worthwhile.

**Identifying targets and measuring their achievement**

**Society and politics are aiming for a large array of targets**

A large number of political goals for society that go far beyond the simple measure of growth already exist today: full employment, price stability and foreign balance are part of the German stability law of 1967. In addition, a strong educational system, a good healthcare system, low crime rates and many other things are regularly discussed as desirable goals by politicians and the public and enshrined in laws. In the German strategy for sustainability, some of these targets are explicitly quantified, both with numerical values and target dates: one of the goals for 2020 is the completion of a university education by 20% of all 25-year old Germans (starting from 8.8% in 2008).

These targets should reflect a societal discourse that is as broad as possible. At any rate, they are important elements for politicians, who need them in order to change and advance the public and societal order accordingly. Social conflicts can be solved in a goal-oriented fashion and an agreeable coexistence can be made possible. Politics needs to influence, shape and assert these demands and goals. It sets framework conditions which allow a society to reach a result which is generally desirable.

**Welfare measures need to be in line with societal targets**

Broad welfare measures need to be in line with societal targets and can form the basis for a discussion on the merits of these targets. With a relevant measure of progress at their disposal, politicians and the public can support the claim that "a step in the right direction" is indeed correct and important. It can also be used to verify whether the targets were met. After all, no strategy can be successful without measurement.

**What is measured can be managed**

**Fears are exaggerated**

In the debate about targets and indicators, it is sometimes pointed out that an indicator may become useless once it is made a political target (see Goodhart's law or the Lucas critique). It is feared that rational optimization strategies of citizens, politicians and civil servants will lead to massive switching operations. The result may be, for example, that the official unemployment rate falls, while at the same time the less visible number of those who are on welfare goes up. Or, if the life satisfaction of humans were to become a target variable, citizens who are surveyed could show strategic behavior related to elections.

However, it is hard to imagine how a socio-political focus on life expectancy could invalidate it as an indicator. In this context it is an additional advantage that many of the variables that are relevant for societal progress

are closely related: for that reason the exact starting point of political activity does not matter as much, and neighboring fields will be pulled up as well. Nonetheless, these reservations should be kept in mind. Variables and interrelations need to be checked regularly and if the necessity arises, the components of every broad measure of welfare should be revised.

**Invest political and financial capital at the right place**

Relative strengths and weaknesses can be identified with the help of broad-based welfare measures. This supports the deployment of political and financial capital into those areas where the largest increase in societal well-being is made possible. Very highly aggregated measures such as our Progress Index are a first step towards that discussion. Should weaknesses in a certain area be identified, additional research, including more detail, is necessary at that point in order to search for causes and interrelations.

## 2.2. Why the Progress Index is necessary

Today the United Nations Development Program and a number of Anglo-Saxon think tanks already produce indexes which can be used to measure progress, welfare and well-being. Our Progress Index is to contribute two things that are only provided by the current approaches in a limited way.

**Stimulate the debate in Germany**

The first aim is to stimulate the discussion on progress in Germany with a positive and constructive contribution. The goal is to show that objectively, people in Germany are much better off than 20 or 30 years ago – in contrast to the frequently published opinion. The comprehensive index is to improve the visibility of the measurement of progress and to provide a scientific foundation for the current debate about societal goals and priorities in Germany.

**Contribute to the international research program**

Second, the choice of components and the method of aggregation are to contribute to international research on broad-based welfare indicators. Time series attributes (stationary or non-stationary) are not discussed by many providers of indexes. Furthermore, they are not making use of the modern statistical method of panel cointegration analysis (more on this in the appendix). As German correspondent in the OECD network on progress measurement, the Center for Societal Progress thus also contributes to the international debate.

Has there been progress? Has well-being been enhanced? Has a country become more “sustainable” with regard to the reporting on sustainability? Only a combined index allows statements about such issues and thus makes it possible to reach a general conclusion in the comparison of two countries with regard to development, progress or sustainability. Sets of indicators, which present many variables side by side, can’t deal with these questions or must leave it up to each user to reach an overall conclusion, which is, however, not transparent to the general public.

Due to their clear and easily understood messages, combined indexes achieve a higher public visibility than sets of indicators and are thus more suitable for a broad public discourse on progress, well-being and political priorities. On this basis, a discussion of interdependencies and relative weights can take place.

**More visibility for aggregate indexes**

The problem of finding appropriate weights is often used as an argument against a combined index. We solve this problem for three of our four variables by leaving it to the data to decide on the weights with the help of statistical procedures (panel cointegration). No value judgment is required. It remains true at a very general level, however, that financial and political capital – also in the interest of the taxpayer – can only be deployed efficiently if the relative importance of different variables is made explicit.

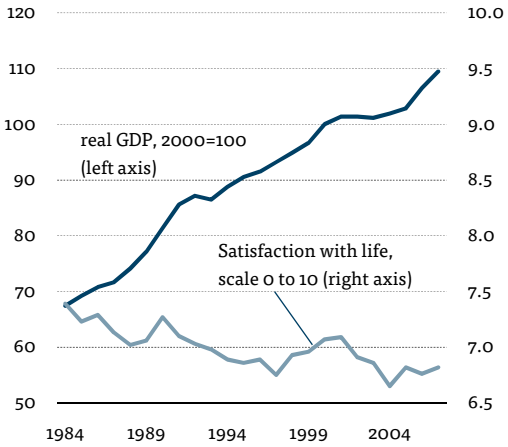
The calculation of an overall figure doesn't imply that all details are swept under the rug. Parts of every combined index are also values of the individual components so that the relative strengths and weaknesses of the individual countries become visible. Transparency is of the utmost importance. A combined index therefore doesn't hide the complexity of the topic but rather takes into account all details.

**Aggregate indexes do not hide the complexity**

## 2.3. Income and satisfaction over time

Prior to giving a detailed description of the Progress Index, the relationship between gross domestic product and life satisfaction is to be considered. Conclusions are repeatedly drawn in this area which are not admissible for econometric reasons and therefore should not be used: In recent decades, GDP has gone up strongly in all OECD countries, while life satisfaction has remained roughly constant. The graph shows this data for Germany, where life satisfaction has even gone down slightly since 1984. A conclusion which is often drawn from this is that our economic system is in need of reform because it is unable to increase life satisfaction for its citizens. Since this correlation was shown empirically in 1974 by Richard Easterlin, it is also known as the "Easterlin Paradox."[3]

**GDP and satisfaction with life, Germany**




Sources: SOEP and Destatis

However, this analysis is flawed for statistical and econometric reasons. In 2003 the Nobel Prize in economics was awarded to Clive Granger for the insight that statistical procedures which are applied to stationary time series may not be used on non-stationary ones. GDP is a non-stationary time series; that is, a series without an upper boundary and with a mean which trends upward over time. Meanwhile, for example, life satisfaction, which is derived from surveys, is measured on a fixed scale from 0 to 10. Furthermore, people adjust their expectations to quality of life levels which they have already achieved. For that reason, a stable life satisfaction

[3] Easterlin, Richard A. (1974): Does Economic Growth Improve the Human Lot? In: Paul A. David and Melvin W. Reder, eds., Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz, New York: Academic Press, Inc.

does not imply at all that the quality of life has not improved. In an analysis, it is not permissible to combine time series with such different attributes. Therefore conclusions drawn from such an approach are not robust and should not serve as the basis for decisions on social policy. Exclusively non-stationary series will thus be used in the Progress Index.

A similar criticism holds with regard to the often heard statement that income beyond a certain threshold will only add marginally to life satisfaction. To reach this conclusion, countries or persons are compared at a specific point in time and a "break" in the curve is diagnosed. The problem with this argument once again stems from the fact that this "break" naturally follows from the construction of the data, namely the upper limit imposed on life satisfaction. The values observed are asymptotically approaching the upper limit – nothing else is possible.

## 2.4. Choice of components

The first step towards an aggregated index is the choice of components. In order to derive the components of our index from a huge number of possible variables, five filters were used, which we now present.

**a) Variables have something to do with the well-being of humans**

Classical surveys, empirical happiness research and positive psychology, which also uses empirical methods, have identified a large number of variables in the past years, which are important to people and their well-being. As an example, the top five rankings in a survey by the GfK Group in 2009 were health, family, friends, work and education.

The table in the margin combines the results from positive psychology by sorting the drivers influencing life satisfaction by relative importance based on our reading of the academic literature (see the bibliography section starting on page 37). At this individual level, work (and the satisfaction it brings), health (mental and physical), social interactions (friends) as well as education are of great importance.

At the societal level, additional factors can be added, some of which are listed in the second table.[4] This list was derived from an empirical investigation of the commonalities of countries that display a high level of life satisfaction of its people.

The three lists from different sources show that it is not necessary to "rethink" or to refocus on "the things which are truly important." Already today, people are quite able to determine what is important to them. From psychology and behavioral economics, we know however, that they don't always act accordingly. The three lists also make it clear that some topics which are often discussed in Germany don't show up: nowhere do exports,

**Drivers of life satisfaction**

| Rank | Driver |
|---|---|
| 1 | Unemployment (negative) |
| 2 | Mental health |
| 3 | Television (negative) |
| 4 | Friends |
| 5 | Work satisfaction |
| 6 | Education level |
| 7 | Physical health |
| 8 | Reflecting on happiness |
| 9 | Thankfulness |
| 10 | Activities |
| 11 | Sense (in work, life etc.) |
| 12 | Giving |
| 13 | Effort, hard work |

Sources: Literature and own assessment

**Characteristics of happy societies**

High life satisfaction
High trust in others
Low corruption
Low unemployment
High education levels
High income per capita
High employment of older people
Low shadow economy
High economic freedom
High birth rate

Source: Bergheim (2007)

[4] See Bergheim (2007) : The Happy Variety of Capitalism.

export champions, or "competitiveness" of a country – however defined – make an appearance.

**Digression: income inequality**

**Inequality not yet included**

Inequalities pose a particular challenge to those attempting to measure progress. Major societal imbalances are negatively related with many things that are important to people such as trust, safety and health. However it is not possible to show a direct correlation between inequality and life satisfaction. There are countries that have low inequality and low life satisfaction (Japan) and countries with major inequality but high life satisfaction (USA and Australia). Inequality is usually captured with the help of income distributions and expressed with so-called Gini coefficients or ratios between the incomes of the top and bottom 10%.

Globalization, technical progress and limited political corrections have led to a strong increase of inequality in many countries over the past decades. It is our conjecture that more income equality would be a good thing for many countries. There is only one big problem: we do not see any possibility to determine an ideal level of equality or inequality. When inequality enters into measures of progress, the implicit assumption is always that a completely uniform distribution is the desirable ideal. This is a hotly contested conclusion and depends strongly on value judgments. For that reason, the time has not yet come to incorporate income distributions into broad welfare measures.

**b) Components have a theoretical foundation**

**A broad array of theories of progress**

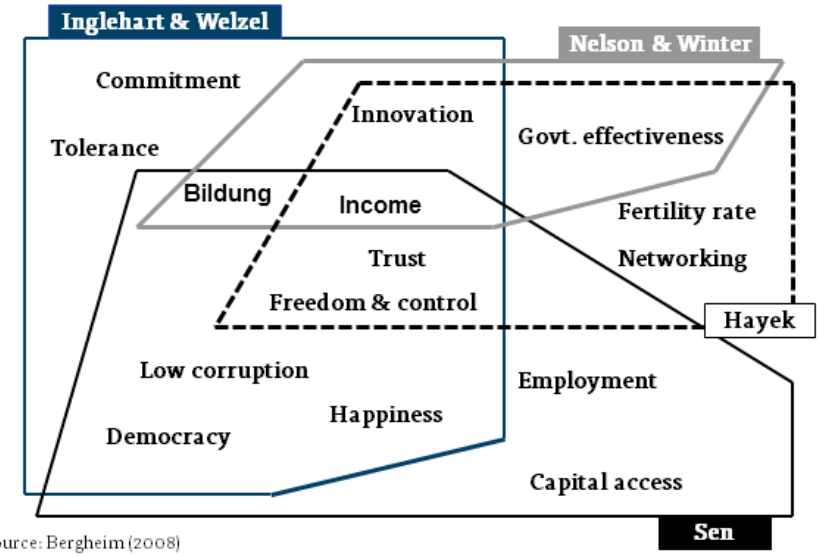
In a next step it is assessed whether the possible components play a role in important theories of human or societal development. Since the theories are rather broad-based in general, no candidates can be excluded based on this filter. A few prominent examples from various disciplines illustrate this point: [5]

- In the pyramid of needs by the psychologist Abraham Maslow from 1943, food and drink are among the basic needs. They are followed by health and work, then further up friendship and family, and finally self-confidence and tolerance.
- The evolutionary theory of economic change by the American economists Richard Nelson and Sidney Winter from 1982 talks among other things about education, income, innovation and a functioning government.
- The theory of cultural development by the Austrian economist Friedrich August von Hayek from 1988 deals with income, trust, stability of the law and many others.

[5] Somewhat more detailed in Bergheim (2008): The broad basis of societal progress.

- The theory of capabilities by the economic philosopher Amartya Sen is about material resources, political freedom, education and health, but also about social safety nets.
- In the theory of human development by the political scientists Ronald Inglehart and Christian Welzel, an even broader spectrum of variables is taken into account, including life satisfaction and quality of democracy.

**Overview of theories of societal progress**




Source: Bergheim (2008)

The graph consolidates four of these theories. The natural environment only appears in a few cases, as the focus of these theories is on people. However, Martha Nussbaum has explicitly included the environment in "Frontiers of Justice."

### c) Components are also used by others

**Income, health, education and the environment**

Over the last few years, it has become clear that the various major projects on progress measurement use similar dimensions and variables, even if the structures differ at times.

**Broad measures of progress cover similar aspects**

| Stiglitz-Sen-Fitoussi | Canadian Index | Australia's Progress | OECD Taxonomie |
|---|---|---|---|
| Material living standards | Living standards | The economy | Economy |
| Health | Healthy population | Individuals - Health | Human wellb. - Health |
| Education | Education | - Education | - Knowledge |
| Activities, incl. work | | - Work | - Work |
| Social connections | Community vitality | Living together | - Relationships |
| Environment | Environment | Environment | Ecosystem Condition |
| Voice and governance | Civic engagement | | Governance |
| | Arts and culture | | Culture |
| Insecurity | Time use | | |

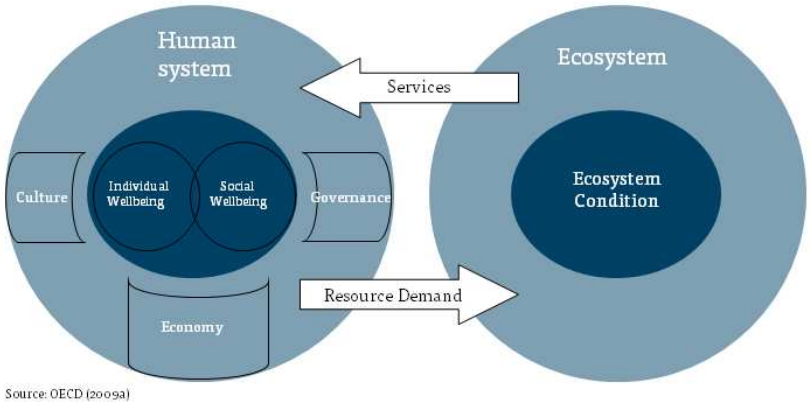
Source: Zentrum für gesellschaftlichen Fortschritt

As the table shows, four relatively broad-based initiatives all deal with the economy, health, education and the environment. These are the four areas we are using as well. In addition, social interactions also play a role in all cases, but no appropriate measure is available to cover all countries over time. Three of the four projects also look at the quality of democracy, and two deal with the arts and culture.

**Also in Europe-2020 and sustainability reports**

Many of these variables are also included in the German reporting on sustainability and in the Europe-2020 strategy of the European Union, which is to be applied all across Europe as the successor of the Lisbon strategy. However, links between these three spheres are still made too rarely.

### OECD taxonomy to measure the progress of societies



Source: OECD (2009a)

In OECD taxonomy, the human system and the ecosystem are closely related (see figure). The human system in its core is divided into individual and social wellbeing. These are embedded in culture, economy and politics – and they require resources from the ecosystem.

### d) Variables are available as time series for many countries

**Time series are needed**

Progress is a dynamic phenomenon, which can only be measured over time. A progress index must thus be available as a time series. Accordingly, the components must also be available as time series, ideally with annual observations. Due to technical advances in recent decades, a vast amount of data is now available. However many factors which are relevant for happiness research are not (yet) available as time series at the country level: mental health, TV consumption, measures of thankfulness and meaning of life. Furthermore, as will become evident when presenting the four components starting on page 19, there are still open issues in these areas as well and an ideal situation will not be reached for a long time. As a general rule, discussions about progress will also have an effect on data collection.

**e) Time series can move either up or down**

**Time series must not be stationary**

A filter which is not discussed much by the various initiatives to measure progress, but which is of prime importance in the variable selection here, is the time series attributes of these variables. Only a variable without a fixed upper or lower bound can be moved by a society or by politics in the long run. These series, which are called "non-stationary" in econometrics, don't have a constant mean towards which they would revert in the long run. Only the Human Development Index is constructed correctly in our opinion with regard to statistics and econometrics. Exclusively non-stationary series are used. The Happy Planet Index includes life satisfaction which is a stationary series, and the Canadian Index of Wellbeing includes a large number of stationary series.

**Many candidates excluded**

This filter leads to the exclusion of many important candidates for the Progress Index, due to their stationarity: life satisfaction, trust, economic freedom, quality of the democracy, corruption, quality of government, unemployment rate and many others. All these variables have fixed upper and lower bounds due to their construction. These variables are possibly valuable for a comparison of countries at a given point in time, but not for comparisons over time.

Following the exclusion of so many variables, it is no longer a problem to stick to another important rule for measures of progress and combined indicators: "Keep it simple." Only four variables are left.

## 2.5. The aggregation of the four components to an index

**Let the data decide their weights**

One of the major challenges on the way towards an index that is made up of several components is the weighting of these components. Often "equal" weights are used, which can turn out to be not all that equal once correlations among the variables and differences in variances and growth rates have been analyzed in detail.

For three of our four components – income, life expectancy and education – we leave it to the data alone to determine interrelations among them. For the fourth component – the ecological footprint – the data doesn't provide any help. Thus we chose a weight but are also providing alternative weights. On our internet page www.fortschrittsindex.de, every interested user has the opportunity to set the weight of the footprint themselves.

**Income, life expectancy and education**

**Close link between income, health and education**

Three of our four time series are non-stationary, implying that they are not returning to a fixed mean but are moving around without a visible boundary: income, life expectancy and education. The testing procedure used and the test statistics are explained in the technical appendix. Occasionally, non-stationary time series develop jointly over time, and this is called cointegration. A combination of these time series will result in a new

series which is stationary, meaning that it always returns to its mean. In order to analyze the relationships between our three time series, we employ the so-called panel cointegration approach (more on this in the appendix), which not only includes the data of one country, but rather makes joint use of the data of all our 22 countries. We use the resulting close statistical fit between the time series for the weighting.

**10% more income go hand in hand with one additional year of life expectation**

Our first result is that every 10% increase in net national income – statistically and across all 22 countries – goes hand in hand with a long-run increase in life expectancy by a little more than one year. For the Progress Index this means that a 10% increase in income gets the same weight as an additional year of life expectancy. However, this doesn't mean that a long-term increase in the level of the Progress Index can be achieved via an increase in just one of the two variables. Since the two variables are in a cointegration relationship with each other, they will always move hand in hand in the long run.

However, in the short term – and considering the constants – it is quite possible that deviations from this relationship, which is stable in the long run, will occur. These deviations provide us with information concerning relative strengths and weaknesses. When, for example, income per capita in Ireland over the past 20 years has increased by more than 80%, while life expectancy has advanced by "only" 5 ½ years (instead of the expected 8 years), further investigations are called for. The increase in income could be unsustainable, or life expectancy could only be lagging behind temporarily.

**10% more income also go hand in hand with five percentage points higher enrollment**

A second link exists between income and education levels (or alternatively between life expectancy and education level, since income and life expectancy are closely related as discussed). Over the long run, a 10% increase in income goes hand in hand with an increase of the enrollment rate of pupils and students by five percentage points. The fundamental relationship appears plausible, since higher education levels are one of the main reasons for higher income – regardless of whether individuals or entire countries are studied.

**The Index without the footprint**

**Starting point: Germany in the year 2000 at 1.0**

The concrete starting point for all calculations is a value of 1.0 for Germany in 2000, since a reference point must be identified somewhere. Starting from this level, earlier and later years for Germany are calculated with the help of the weights just discussed. The values for the other countries are also calculated from this point of reference. If a country has income that is 10% higher and life expectancy that is one year longer, and a student share that is five percentage points higher than in Germany in 2000, it will be assigned an index value of 1.10, since all variables were scaled with reference to the increase in income.

Of course, none of our countries is showing exactly such a combination. However, every index value of 1.10, for example, can be traced back to components that are above the values for Germany in 2010 by that order of magnitude – given the weighting described. This holds for example for Germany in 2006 with an index value of 1.11, which can be explained by an increase in income of close to 10%, a life expectancy that is 1.6 years higher and a student share that has gone up by close to four percentage points.

## The Index including the ecological footprint

**Weight for the footprint is harder to find**

An analogous approach does not work for the ecological footprint. The data shows a long-term relationship between the footprint and the three other variables – however an increase in income, life expectancy and education goes hand in hand with a higher footprint. This is exactly the challenge facing environmental and climate policy: to break this link and to facilitate a decoupling. In a progress index, a lower or even declining footprint must positively affect the assessment of a country.

If the data doesn't provide a politically correct answer, another approach must be found. On these grounds, we compare the ranking changes that follow from the addition of extra components to the index. Adding life expectancy to net national income (NNI), the countries move on average by three positions. Including the education numbers as well, they change by five positions on average. The additional change in ranking that comes from the ecological footprint is limited to six positions in the Progress Index.

**Different weights for the footprint**

**Index with different weights for the ecological footprint**

Year 2008

| Rank | Coefficient 0 | | **Coefficient 0.2** | | Coefficient 0.4 | | Coefficient 0.8 | |
|---|---|---|---|---|---|---|---|---|
| 1 | Norway | 1.40 | **Norway** | **1.37** | Norway | 1.35 | Norway | 1.29 |
| 2 | Finland | 1.34 | **Sweden** | **1.30** | Sweden | 1.29 | Japan | 1.28 |
| 3 | Sweden | 1.31 | **Finland** | **1.28** | Japan | 1.26 | Sweden | 1.27 |
| 4 | Netherlands | 1.28 | **Japan** | **1.25** | New Zealand | 1.24 | New Zealand | 1.27 |
| 5 | Denmark | 1.28 | **New Zealand** | **1.23** | Korea | 1.22 | Korea | 1.23 |
| 6 | Australia | 1.27 | **Netherlands** | **1.23** | Finland | 1.22 | Switzerland | 1.20 |
| 7 | United States | 1.26 | **Korea** | **1.22** | Switzerland | 1.20 | France | 1.19 |
| 8 | Greece | 1.24 | **Greece** | **1.22** | France | 1.20 | Italy | 1.17 |
| 9 | Ireland | 1.24 | **France** | **1.20** | Greece | 1.20 | Greece | 1.15 |
| 10 | Japan | 1.23 | **Switzerland** | **1.20** | Italy | 1.19 | UK | 1.14 |
| 11 | Canada | 1.23 | **Italy** | **1.20** | Netherlands | 1.17 | Germany | 1.11 |
| 12 | Belgium | 1.23 | **Spain** | **1.20** | Spain | 1.17 | Spain | 1.11 |
| 13 | Spain | 1.22 | **Australia** | **1.19** | UK | 1.15 | Finland | 1.09 |
| 14 | Korea | 1.22 | **Ireland** | **1.16** | Austria | 1.14 | Austria | 1.09 |
| 15 | New Zealand | 1.22 | **Austria** | **1.16** | Germany | 1.12 | Netherlands | 1.07 |
| 16 | France | 1.21 | **UK** | **1.15** | Australia | 1.11 | Portugal | 1.05 |
| 17 | Italy | 1.21 | **Canada** | **1.14** | Ireland | 1.09 | Australia | 0.96 |
| 18 | Switzerland | 1.20 | **Germany** | **1.13** | Canada | 1.05 | Ireland | 0.95 |
| 19 | Austria | 1.18 | **Denmark** | **1.11** | Portugal | 1.00 | Canada | 0.86 |
| 20 | UK | 1.15 | **United States** | **1.10** | Belgium | 0.94 | Belgium | 0.65 |
| 21 | Germany | 1.13 | **Belgium** | **1.08** | Denmark | 0.94 | United States | 0.61 |
| 22 | Portugal | 0.95 | **Portugal** | **0.97** | United States | 0.93 | Denmark | 0.59 |

Source: Zentrum für gesellschaftlichen Fortschritt

Because of this difficulty to find a weight for the footprint, the table lists additional weights and the rankings which result from these. A weight of zero, for example, would set back Germany in 2008 to second to last place; the USA would be in position 7 instead of 21.

A coefficient that is twice as high would advance Germany to 15th place; the USA meanwhile would fall to the last position. A further doubling of the coefficient then leads to an overall ranking that differs only marginally from that of the footprint alone. Therefore, a coefficient of 0.2 appears "reasonable" even if there is no hard scientific base for this value.

On the website www.fortschrittsindex.de, all users have the opportunity to assign their own weight for the footprint and download the resulting time series.

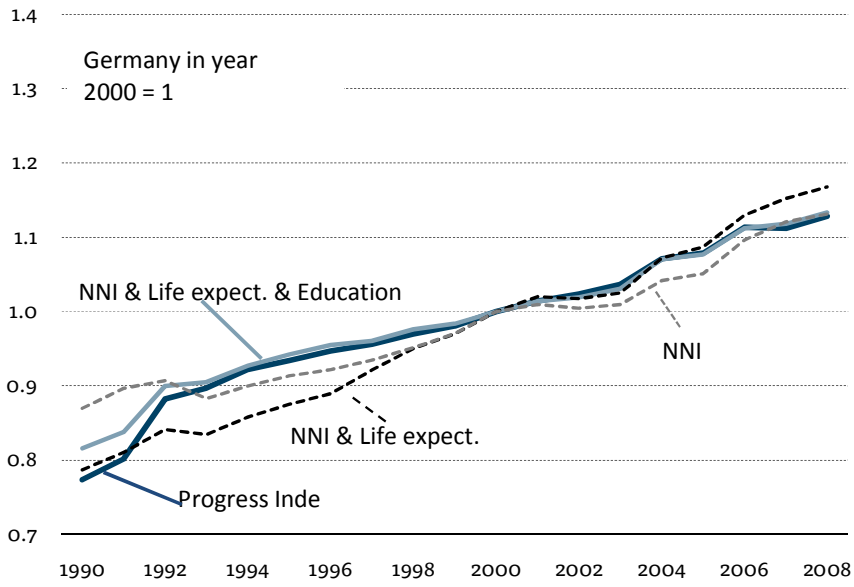
**Transparency is crucial**

Transparency is of prime importance for aggregated measures of well-being. Therefore our approach is to be illustrated with the help of the examples Germany and Netherlands. The first graph shows the development of several combinations of variables in Germany over time – always using the value of 1.0 in the base year 2000.

**Index example: Germany**

Net national income has gone up slightly; the dashed line shows a relatively flat development. When life expectancy is added, the new line gets noticeably steeper. This is due to the fact that life expectancy has increased relatively strongly (compared to the relative weights determined with the help of statistical procedures). Adding in education levels as well, the increase once again looks less pronounced – and starting in the mid 1990's is even smaller than net national income. Adding the ecological footprint does not change the overall index much.

**Index values for Germany**

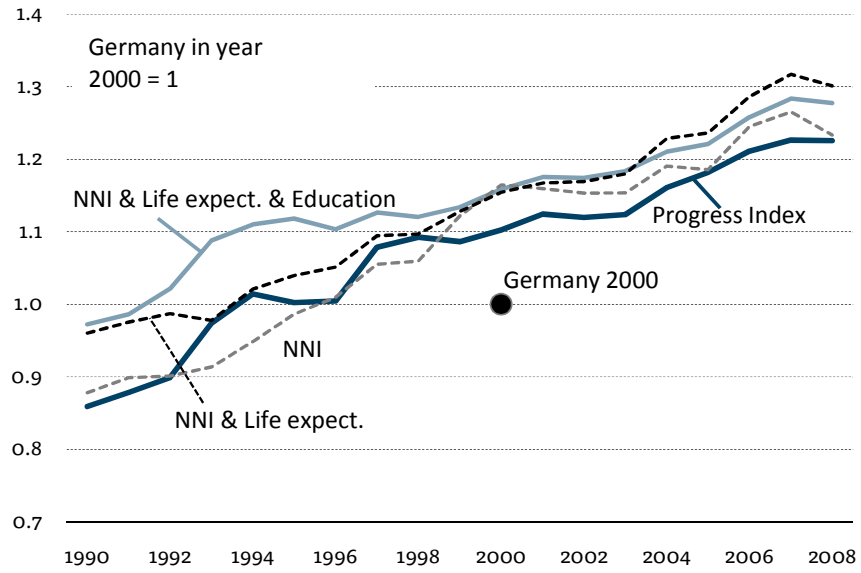



Source: Zentrum für gesellschaftlichen Fortschritt

Similar comparisons can be drawn for all other countries as well. The following graph shows values for the Netherlands, including the point of reference, which is a value of 1.0 for Germany in 2000. For the most part, income and life expectancy have been increasing hand in hand since 1995. Once education is added, however, the new series shows a less pronounced increase, at least since 1995. The entire progress index develops roughly in line with the combination of the first three components.

**Index example: Netherlands**

**Index values for the Netherlands**




Source: Zentrum für gesellschaftlichen Fortschritt

# 3. The four components of the Progress Index

Our Progress Index is made up of just four components. These will now be presented on two pages each and compared to the components in other broad based welfare measures.

## 3.1. Income: net national income

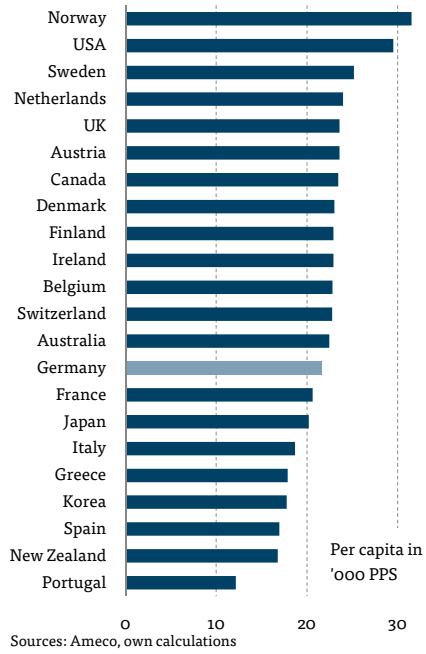
Money alone does not buy happiness, but – if deployed correctly – it makes possible a multitude of activities that are important to human beings. People and countries with a high income level show a higher degree of life satisfaction than people and countries with low income. Poorer people spend a high share of their income for basic things such as nutrition and clothing. The richer they are, the more money is spent for example on large houses, health and education. This similarly holds for entire countries.

The most frequently used income measure is gross domestic product (GDP). It measures the value of all goods and services produced for final use in a country during a period. Oftentimes GDP continues to be the only measure of the success of a society. However, combined indexes such as the Human Development Index also make use of GDP – especially because it is easily available for the large number of countries for which the index is calculated.

The inventor of the GDP measure already pointed out the limitations and disadvantages of the measure in the 1930's (see also page 6). These disadvantages (household work is not considered, use of natural resources is not considered, etc.) were already mentioned above and are presented comprehensively in other studies such as the final report of the Stiglitz-Sen-Fitoussi commission. Due to the lack of availability of data, not all of these disadvantages can be remedied in our approach.

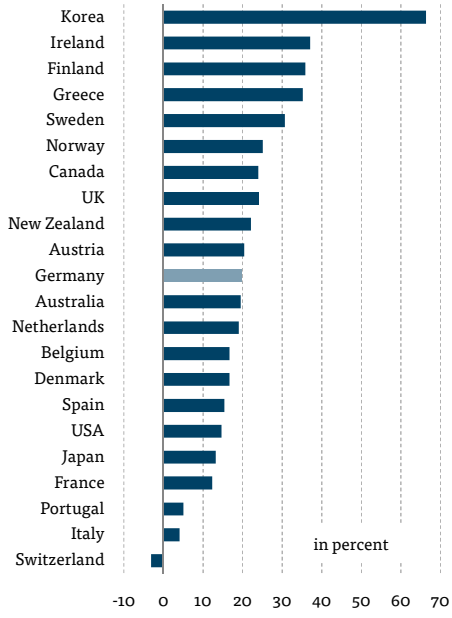
In the Canadian Index of Wellbeing, several income measures are used, among others median income after taxes. While this is a meaningful figure, it is not available for a sizeable number of countries. The Happy Planet Index is the only index that does not use any measure of income, which leads to significantly different country assessments compared to our index or the Human Development Index.

**Net National Income in 2008**




Sources: Ameco, own calculations

**Change in NNI, 1998 to 2008**




Sources: Ameco,own caluclations

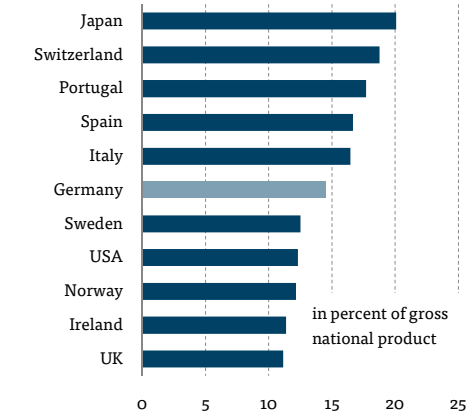
### From Gross Domestic Product to Net National Income

We employ net national income (NNI) per capita of the population expressed in prices of 2000 and using purchasing power parity for the 22 countries. Net national income is largely equal to national income. The only differences are government levies on production and imports minus

subsidies. The details of the calculation and the data sources are described in the appendix. There are two major differences between GDP and NNI:

- First, GDP doesn't measure the income of the people that live in a country, but rather income generated within a country. Income paid to persons in different countries is not excluded. For most countries this does not make a big difference, but for some time Ireland has transferred more than 20% of the income generated there to other countries. Therefore GDP is not adequate to measure income of the Irish.
- Second, part of GDP is also the depreciation on equipment used during that time period. Consequently this is only a replacement of something that was used up during the same period – no new consumption opportunities are generated, be it today or tomorrow. In most countries depreciation amounts to about 14% of gross national product. However the values range from 11% in Ireland and Great Britain to 20% in Japan, which is extremely capital intensive, as the graph on the right shows.

**Depreciation rates in 2008**




Sources: Ameco, own calculations

As a consequence, the differences between GDP and NNI can be rather big on occasion – and also the development over time is different.

**Norway and South Korea are ahead**

The highest net national income per capita was recorded by Norway in 2008 (see graph on the previous page). The oil exporter is ahead of the USA, followed by Sweden and the Netherlands, which are both in leading positions in our combined index. Germany was in 14th place with 86% of the Swedish income. At the lower end we find Spain, New Zealand and Portugal, which reported less than half of the income of Sweden.

With an increase in NNI of 66% between 1998 and 2008, South Korea witnessed by far the most forceful advance. With this it moved up to rank 19 in the group of 22 countries and was only slightly behind Italy and Greece. Ireland, Finland, Greece and Sweden were able to strengthen their NNI per capita between 1998 and 2008 by more than 30% each. However, at least in the case of Greece and possibly also in Ireland, this may not be sustainable over the long run, as the crisis of the past two years exemplifies. Meanwhile in Switzerland, NNI has gone down slightly, which is partly due to massive transfers of income during the financial crisis in 2008.

## 3.2. Health: life expectancy

For a birthday, at the turn of the year and during other occasions, people usually wish for one thing in particular: good health. For some, health is the most valuable possession; for others, it is the basis for all important activities. These are good reasons to include a measure of health into a progress index. Easy availability of data and unboundedness on the upside mean that the life expectancy of a newborn is the almost ideal measure of health in a broad-based welfare index. A possible upper limit – or at least a less steep increase – for life expectancy has repeatedly been forecast in the past. However, Oeppen and Vaupel showed that life expectancy in the respective leading country has been increasing at a stable rate of three months per year for 170 years now.[6]

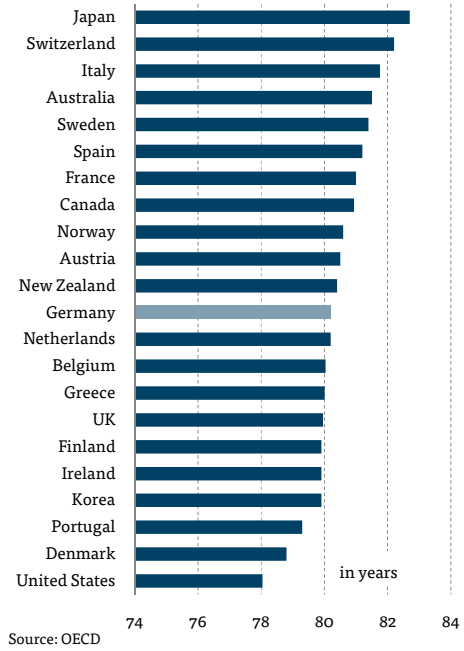
We are using the life expectancy of newborns as a measure of health. This variable is used in other broad-based welfare indicators such as the Happy Planet Index, the Human Development Index and the Canadian Index of Wellbeing (CIW). Naturally a single variable cannot be used to draw a comprehensive picture of the health of citizens of a country. However, for many countries time series are only available for this life expectancy. The CIW also makes use of nine additional variables, among them the percentage of those older than 65 who received flu vaccinations, the share of those suffering from diabetes and the risk of depression.

### Highest life expectancy in Japan and Switzerland

Time series dealing with life expectancy are standardized for many rich countries and available from the OECD. Based on mortality rates for the year under review, they make a statement about how long a newborn baby will live. Among the 22 countries included in our data set, Japan showed the highest life expectancy at 82.6 years in 2007. Japan is followed by Switzerland, Italy and Australia, which are all above 81 years. Germany held a position in the middle with 80 years. Based on the current trend it is likely that Germany will have reached the life expectancy of Switzerland for 2007 by 2014. At the lower end of the 22 countries are Denmark and the USA with slightly above 78 years.

For decades, life expectancy has been on the rise for most countries in the world (exceptions are Southern Africa and Russia). In our 22 countries, it increased between 1997 and 2007 by 3 months every year on average. Over ten years, this is equal to a combined increase of 2.5 years. At the front of this development is South Korea, where life expectancy – starting from a relatively low level – increased by five years within this ten year period and now has reached the levels of Greece and Portugal. Ireland, Portugal and Australia also witnessed major advances. Germany was in the middle with

**Life ecpectancy in 2008**




Source: OECD

**Change from 1998 to 2008**


Source: OECD

[6] Oeppen, Jim und James W. Vaupel (2002): Broken limits to life expectancy. Science 296.

regard to improvement; at the bottom we find the USA, Sweden and Greece with less than two additional years.

### Actual life expectancy is even higher

The data that we and other measures of progress use are based on measures of mortality rates as they are today: a girl who is born today is thus assigned the same mortality rate in 50 years as a woman who is 50 today. This is called the "period-mortality" by the statisticians. Meanwhile, improved health care services and medical progress are likely to lead to further declines in mortality rates. Thus the life expectancy which can be expected in reality is distinctly higher than suggested by the data presented above. Personal life choices and political agenda setting ought to be based on these higher values.

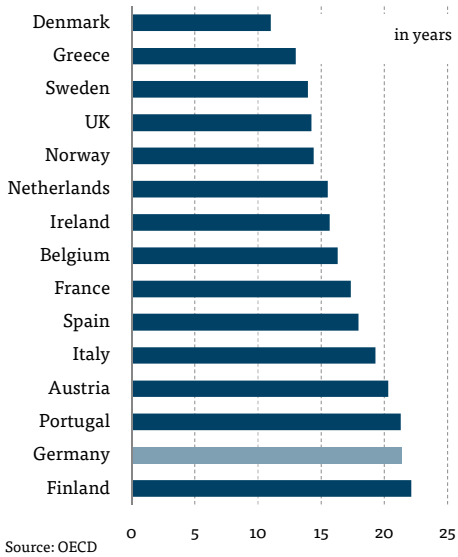
The German Federal Statistical Office regularly calculates life expectancies with the help of so called generational mortality rates. Depending on which forecast version is used, a girl born in 2004 is likely to live between 6.2 and 8.9 years longer compared to period-mortality rates. For boys these values are 5.8 and 9 years. In the lower version, the developments since 1871 are extrapolated, in the higher version the last thirty years, during which mortality declined even faster, are given higher weights.

### However, healthy life expectancy is clearly lower

Not every 80-year old is in truly good health. The life expectancy presented above is helpful, since we can only life longer if we are also healthy for longer. However, it doesn't provide any information about how long we are leading a healthy life. This information is provided by the "Healthy Life Years," which have been published for European countries by Eurostat for a number of years – but unfortunately not yet as long time series. To obtain this information, people are asked whether they live without major health restrictions. In combination with the normal mortality tables, healthy life expectancy is then calculated. In 2007, this figure was between 11 and 22 years lower than the life expectancy used above. The difference was relatively small for Denmark, Greece and Sweden, but relatively large in Portugal, Germany and Finland.

### Actual life expectancy is six to nine years longer

**Gap between life expectancy and healthy life expectancy**




Source: OECD

## 3.3. Education: school enrollment rates

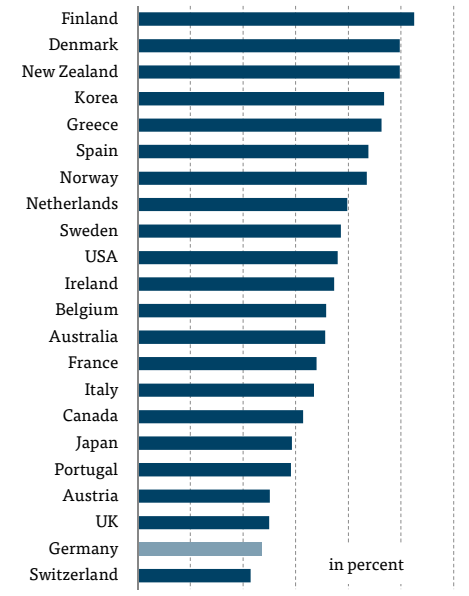
A good education is of enormous importance for the personal development of a human being and opens up a large number of doors to things that are attractive to many: better educated people normally have higher income levels, they live longer, are less frequently unemployed, more often make decisions that have a positive impact on their life satisfaction and lead a more active social life.

Most of these correlations are not only true for individuals, but also for countries. Education is not necessarily the ultimate goal, but rather an enabler for many other things. Therefore a measure for the education level of a society makes sense in an index of progress.

The ideal measure for education would be years in education adjusted for quality and including life-long learning. Until a few years ago, the OECD at least published years in education, up to and including years at a university. However these were revised so often and substantially that now they are no longer published.

We are using the enrollment rate of pupils and students in secondary and tertiary education. This is not ideal, as it does not capture the average education level of the population – which ought to be related to the welfare of society as a whole – but only the intensity of education of young people.

**Enrollment rates in 2007**




Sources: World Bank, own calculations

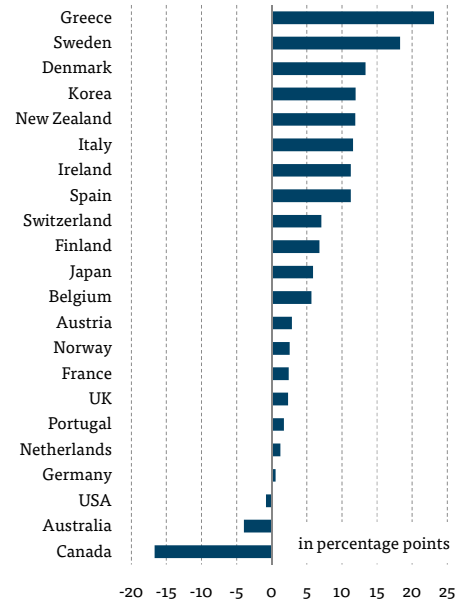
### Data on education also part of other welfare measures

Most other broad-based welfare measures also employ data on education levels or training. An exception is once again the Happy Planet Index, where education does not play a role. The Human Development Index is using the literacy rate as well as the enrollment rate. However, the literacy rate is not meaningful for richer countries as it constantly is close to 100 percent. The education module of the Canadian Index of Wellbeing is about educational degrees and the quality of formal and informal learning.

The World Bank publishes enrollment ratios for many countries as time series. Until 1990 they were collected only every five years, but starting with that year, annual data is available. We interpolated missing values and some values for 2008 were extrapolated. For Belgium, Sweden, Great Britain and Australia we corrected for outliers. This is described in more detail in the appendix. For Germany we had to calculate the share of students ourselves, based on data from the OECD.

In 2007, Finland and Denmark had the highest enrollment ratios. In Denmark, 80% of the young people attended college, and some older persons were seeking a secondary education so that the share there even reached 120%. For certain countries, the quality of the official data may rightfully be questioned; for other countries, the large number of

**Changes from 1997 to 2007**




Sources: World Bank, own calculations

students from abroad might raise the levels (Australia, Canada, and New Zealand). According to these figures, Germany is in second to last place among the 22 countries, and only Switzerland is worse. With an enrollment rate of 74%, the distance to the leading countries is large.

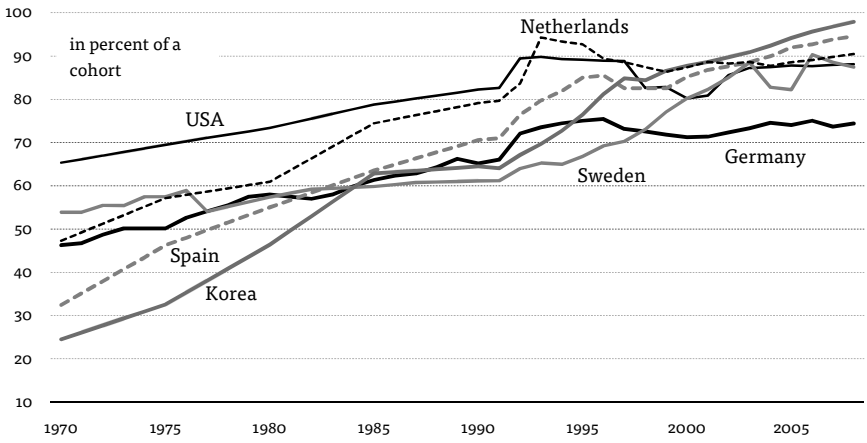
### Strong dynamics in Greece, Sweden and Denmark

**Rapid increase in many countries**

According to this data, particularly strong educational dynamics can be found in Greece, Sweden and Denmark. In these countries, the share of students has increased between 1997 and 2007 by more than ten percentage points. In Germany, this ratio stayed unchanged during this time period.

In the countries that are exporters of education, namely the USA, Canada and Australia, the ratio declined strongly. This is caused among other things by the fact that the base year 1997 lies before the Asian economic crisis. Following the outbreak of the crisis, fewer and fewer parents in the Asian tiger countries were able to afford an education at a US university.

**Secondary and tertiary enrolment rates since 1970**




Sources: World Bank and own calculations

## 3. 4. Environment: ecological footprint

Environmental issues are becoming increasingly important, not least because rapidly growing emerging economies such as China and India with their large populations are using up more and more natural resources. This leads to an obligation by the rich countries to reduce the ecological damage they are causing. A truly progressive country not only makes it possible for its citizens to enjoy a long and prosperous life, but also burdens the natural environment as little as possible.

The most comprehensive measure of environmental damage is the ecological footprint, which is published annually for about 240 countries, territories and regions by the Global Footprint Network. By comparing the use of resources with the earth's potential for renewal, it indicates the degree to which humanity is putting a strain on the earth's eco-system. All possibilities for renewal are expressed in the surface measure of hectares, since land is one of the most important resources. In 2005, there were 13.4 billion hectares of biologically productive areas on earth. Per capita and with a population back then of 6.5 billion people, 2.1 hectares were available. When the available area is compared to the actual resource use, it turns out that humanity in fact would need 1.4 planets in order to restore the resources used.

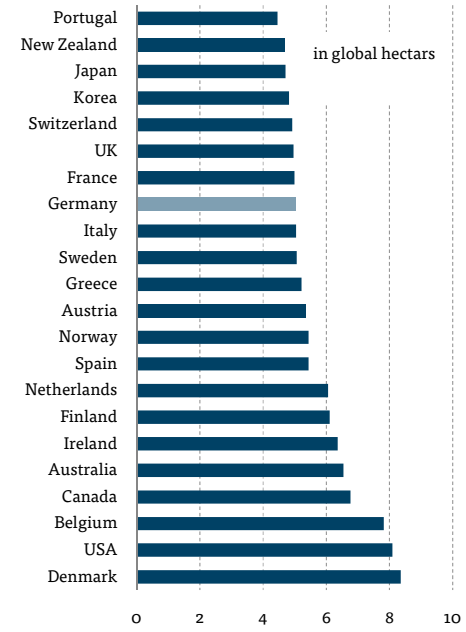
The data assess the damage from the consumption by the citizens of a country or a city. When, for example, a German buys toys made in China which caused significant pollution there, this pollution is attributed to Germany and not to China.

The final report of the Stiglitz-Sen-Fitoussi commission advocates an environmental measure which does not require the transformation of different units into a common unit: CO2 emissions. But the ecological footprint is the broader measure which also includes the exploitation limits of fishing grounds, forests, arable land and drinking water systems. That is why we are employing this broader measure. Countries with high CO2 emissions per capita are usually also reporting large overall footprints, as is revealed by CO2 data of the International Energy Agency.

**Not all indexes consider environmental issues**

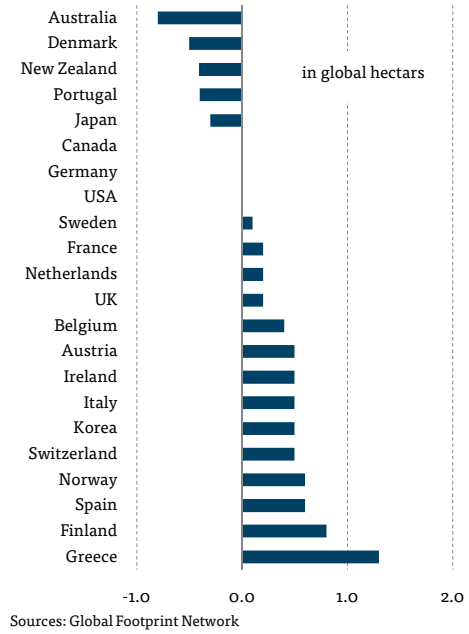
The lack of an environmental measure is one of the major criticisms concerning the Human Development Index of the United Nations. This is where our Progress Index provides a solution. The Happy Planet Index on the other hand is giving a rather strong weight to the ecological footprint, which results in an assessment that differs strongly from that of other welfare indicators. In the Canadian Index of Wellbeing – for which the environmental module has not yet been published – it is indicated that CO2 emissions will be used, together with data on water quality, waste disposal and forest health.

**Footprint 2006/07**




Sources: Global Footprint Network (2010 Edition)

**Change from 1997 to 2007**




Sources: Global Footprint Network

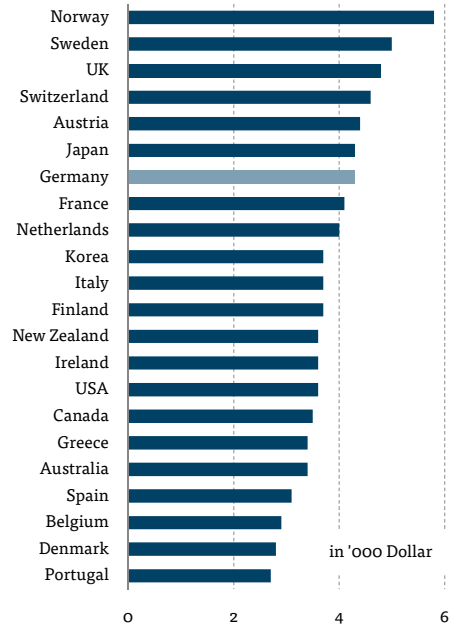
## Low environmental damage in Portugal and New Zealand

The lowest footprint among our 22 countries in 2006/07 was reported by low-income Portugal with 4.4 hectares per inhabitant. However, this was still clearly above the 2.1 hectares per person which are available statistically. Germany at 5.0 hectares ranked 8th. Per hectare footprint, Norway and Sweden are able to generate the largest amount of net national income (see chart). Germany is in seventh place when using this measure of productivity.

In 2006/07, Danes and US-Americans had the highest footprint at more than 8 hectares. Other Anglo-Saxon countries such as Australia, Ireland and Canada also showed an above-average footprint. A surprisingly high footprint was also present in Belgium and the Netherlands, which had a much lower footprint in previous publications of these data.

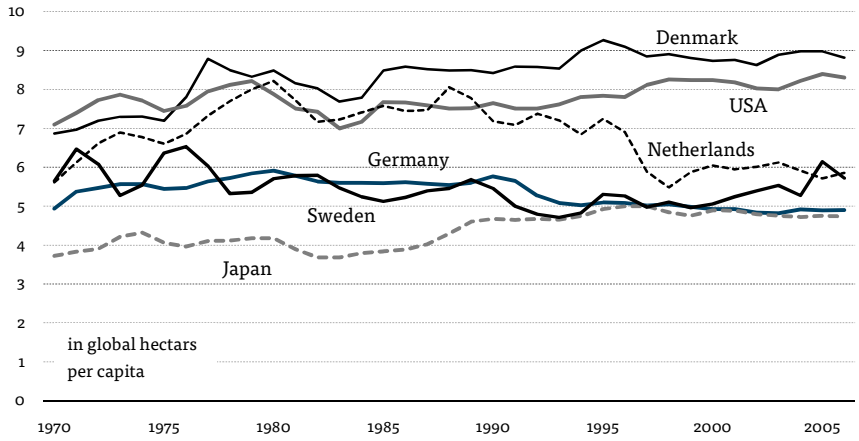
Australia, Denmark and the New Zealand have reduced their ecological footprint per inhabitant particularly strongly since 1997 according to the latest data release. Together with Portugal and Japan, a total of five countries have thus put less pressure on the planet in 2007 than they did in 1997. A decoupling of resource use from economic growth thus appears possible. In all six countries, net national income has gone up during the same time period, particularly so in Australia and New Zealand.

**NNI per hectar footprint**




Sources: Global Footprint Network , own calculations

**Ecological Footprint in selected countries since 1970**




Source: Global Footprint Network (2010 Edition)

# 4. Other measures of progress

**Four other indexes in comparison**

Our Progress Index combines important factors of human well-being with a perspective on the natural environment and comprises a total of four components. The index is available as a time series from 1970 until 2008 for 22 countries and takes into consideration the different time series attributes of potential index components.

The table below provides an overview of some of the features of other broad indicators of progress. Without exception, these are attempts to assess progress, development, prosperity or wellbeing in one figure. This is what distinguishes them, for example, from the indicators for sustainable development in Germany or the "Measures of Australia's Progress," which take into consideration a large number of individual variables but don't make an overall statement about the development over time or comparisons of levels across countries.

**Uniqueness of the Progress Index**

The Progress Index is the only index which provides time series for several countries and which considers both income and the environment:

- The Human Development Index does not consider the environment.
- The Happy Planet Index does not consider income and education – and the different time series attributes of the components.
- The Legatum Prosperity Index does not provide time series.
- The Canadian Index of Wellbeing is calculated only for Canada

Three of the indexes presented here are compiled by private, non-profit research institutions, and one by an international organization.

The German language version of this note includes two-page portraits of each of the four indexes.

**Broad measures of wellbeing in comparison**

| Index | Overall index | Time series available | Number of variables | Number of countries | Income included | Environment included | Stationarity considered |
|---|---|---|---|---|---|---|---|
| Progress Index | yes | yes | 4 | 22 | yes | yes | yes |
| Human Development Index | yes | yes | 3 | 182 | yes | no | yes |
| Happy Planet Index | yes | yes | 3 | 143 | no | yes | no |
| Legatum Prosperity Index | yes | no | 79 | 104 | yes | no | no |
| Canadian Index of Wellbeing | yes | yes | ca. 80 | 1 | yes | yes | no |

Source: Zentrum für gesellschaftlichen Fortschritt

# 5. Country portraits

**Good practices in other countries**

One of the functions of the Progress Index is to identify relative strengths and weaknesses of individual countries. With this data, the discussion about political priorities can be grounded in a better informational base. For this purpose, two of the 22 countries are to be presented in detail: the particularly progressive Sweden and of course Germany.

The table below provides a first overview about relative strengths and weaknesses. The 22 countries are listed in order of the respective indicator in the various columns. Germany, for example, obtained the following rankings: position 14 with regard to net national income, number 13 concerning life expectancy, number 21 with regard to the education indicator and 8th place on the ecological footprint.

**Strengths and weaknesses**

**Ranking of the four index components**

| Rank | Income | Life expect. | Education | Footprint | Total Index |
|---|---|---|---|---|---|
| 1 | Norway | Japan | Finland | Portugal | Norway |
| 2 | USA | Switzerland | Denmark | New Zealand | Sweden |
| 3 | Sweden | Italy | New Zealand | Japan | Finland |
| 4 | Netherlands | Australia | Korea | Korea | Japan |
| 5 | UK | Sweden | Greece | Switzerland | New Zealand |
| 6 | Austria | Spain | Spain | UK | Netherlands |
| 7 | Canada | France | Norway | France | Korea |
| 8 | Denmark | Canada | Netherlands | **Germany** | Greece |
| 9 | Finland | Norway | Sweden | Italy | France |
| 10 | Ireland | Austria | USA | Sweden | Switzerland |
| 11 | Belgium | New Zealand | Ireland | Greece | Italy |
| 12 | Switzerland | **Germany** | Belgium | Austria | Spain |
| 13 | Australia | Netherlands | Australia | Norway | Australia |
| 14 | **Germany** | Belgium | France | Spain | Ireland |
| 15 | France | Greece | Italy | Netherlands | Austria |
| 16 | Japan | UK | Canada | Finland | UK |
| 17 | Italy | Finland | Japan | Ireland | Canada |
| 18 | Greece | Ireland | Portugal | Australia | **Germany** |
| 19 | Korea | Korea | Austria | Canada | Denmark |
| 20 | Spain | Portugal | UK | Belgium | USA |
| 21 | New Zealand | Denmark | **Germany** | USA | Belgium |
| 22 | Portugal | USA | Switzerland | Denmark | Portugal |

Source: Zentrum für gesellschaftlichen Fortschritt

## 5.1. Germany: education is the weak point

Among the 22 countries in our Progress Index, Germany was ranked number 18 in 2008, slightly behind the UK and Canada, but ahead of the USA and Denmark. Germany's relative position has deteriorated slightly: in 1980 it was still in 14th place (see also the table on page 5). The table on the right compares our index with other welfare measures. Overall a heterogeneous picture emerges, which can easily be explained by the different variables in the different indexes. In the 2009 edition of the Human Development Index, Germany was ranked only in 19th place among our 22 countries (and ranked 22 overall). In the Happy Planet Index, meanwhile, the second place among our countries was achieved in 2005 (but only ranked 51 overall). But that index still used the old data for the ecological footprint, which were more favorable for Germany. Only position 14 was achieved in the Legatum Prosperity Index.

**Rank among 22 countries**

| | Germany |
|---|---|
| Progress Index | 18 |
| Human Dev. Index | 19 |
| Happy Planet Index | 2 |
| Prosperity Index | 14 |
| Components of the PI: | |
| Net national income | 14 |
| Life expectancy | 12 |
| Enrollment rate | 21 |
| Footprint | 8 |

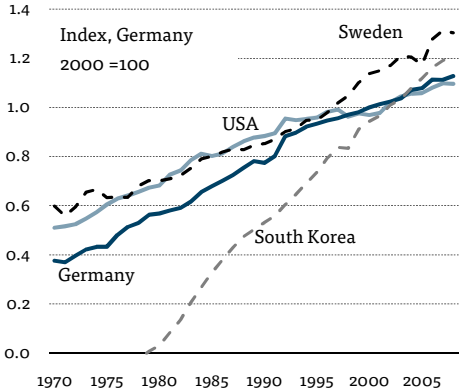
Source: Zentrum für gesellsch. Fortschritt

Between 1998 and 2008, Germany has made some progress (also see the graph on page 5), but less than many other countries. In 15th place in the dynamics ranking, Germany shows a rate of change that is higher than that of the USA or Switzerland. Its relative position has weakened since Ireland, Greece and Korea moved in front.

### No clear points of strength

Its 18th place in the Progress Index is due to average rankings on income, health and the ecological footprint, and a relatively weak level of university enrollment. The 8th place on the ecological footprint is the highest component ranking. Here some countries with low income (Portugal and New Zealand) are ranking better. But even on the measure of productivity calculated as net national income per hectare of footprint, Germany ranks just 7th. Since the mid-1990s the German footprint has remained roughly stable in spite of a 20% rise in net national income. The life expectancy of Germans of 80.2 years in 2008 was 12th among the 22 countries – two years lower than in Switzerland, but more than two years higher than in the United States. The rise of life expectancy over the past 10 years was roughly in line with the average of the 22 countries. The same holds for the increase in net national income: Level and change are roughly equal to the average.

**Progress Index since 1970**




Source: Zentrum für gesellschaftlichen Fortschritt

### Relatively low school enrollment

Income and life expectancy of Germans are not particularly far away from the overall ranking. However, the educational sector is a weak spot in Germany. According to our calculations (standardized figures are unfortunately not available for Germany; this is a further weakness of the country), the share of students in the tertiary sector (universities and master craftsman training) in 2008 stood at 47%. Many countries achieve values above 70%; Finland even reaches 90%.

## 5.2. Sweden: always among the frontrunners

For decades now, Sweden has been among the most progressive countries. In 2008 it was ranked number 2 in the Progress Index. In 1970 it was even first. Only the 1980s were a period of relative decline, which set the country back to 9th place in 1990.

In other indexes as well, Sweden places comparatively well. In the HDI in 2007 rank 6 among our 22 countries, in the HPI 2005 rank 4 (but only rank 53 overall) and third position in the Prosperity Index.

Even at a level that has been relatively high for decades, Sweden continues to be in a position to make noticeable progress. Between 1998 and 2008, our Progress Index for Sweden went up by 0.26 points; position 5 in the ranking by dynamics and most likely more sustainable than the fast sprints of Greece and Ireland in the same time period (see ranking on page 5).

**Rank among 22 countries**

| | Sweden |
|---|---|
| Progress Index | 2 |
| Human Dev. Index | 6 |
| Happy Planet Index | 4 |
| Prosperity Index | 3 |
| Components of the PI: | |
| Net national income | 3 |
| Life expectancy | 5 |
| Enrollment rate | 9 |
| Footprint | 10 |

Source: Zentrum für gesellsch. Fortschritt

### High income and low footprint

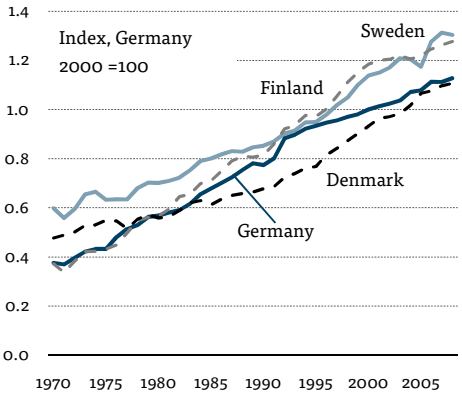
Sweden is in a position to make available to its citizens both high income (position 3 in the ranking) and high life expectancy (position 5) and at the same time put relatively little environmental pressure on the planet with its consumption. At 5.1 global hectares, the footprint of Sweden was roughly the same as that of Germany in 2006/07, although significantly above the threshold of 2.1 hectares per person. Per euro of net national income, only consumption in Norway is less of a burden for the planet.

### Still room for improvement in education

Sweden achieves the second-lowest ranking among the four indicators we used in the school enrollment rate: 9th place. It is not clear whether this points to a true weakness. Ahead are for example South Korea – which is possibly exaggerating somewhat with a tertiary share of almost 100% - , Greece – where we have doubts about the official data – and the exporter of education, USA.

Overall, Sweden is therefore displaying an impressive and balanced record. With this it is ahead of the two other Nordic countries that are not oil-exporting. Finland only moved up to the first place during the 1990s, but has a clear weakness concerning life expectancy. Denmark, by contrast, has lost ground over the past decades: from 7th place in 1970 down to 19th in 2008 with weaknesses both in life expectancy (position 21) and footprint (position 22). The three countries are thus not presenting a unified picture. Sweden is the leader.

**Progress Index since 1970**




Source: Zentrum für gesellschaftlichen Fortschritt

# 6. Ten recommendations for Germany

Germany is not among the leading countries in important areas of progress. Initiatives to more broadly measure prosperity exist in other countries, and these are also of interest for Germany. This leads to the following recommendations for Germany by the Center for Societal Progress:

1. Society and politics ought to put an even clearer focus on the area where Germany is performing relatively poorly, and not only in the Progress Index: education.
2. Politics should be focused even more strongly on indicators in order to justify actions and measure success.
3. The Federal Statistics Office should provide an easily accessible, clearly structured and illustrated online database similar to the Measures of Australia's Progress, for example.
4. Statisticians, scientists, politicians and citizens should jointly demand that even more of the things are measured that are important for human well-being such as mental health, representation, TV consumption and many others.
5. Foundations and think tanks should take a more detailed look at the four components of the Progress Index (and others). In the long run, this should lead to the development of an aggregate index with more components, which provides a more comprehensive view on progress.
6. The Federal ministries or departments which are responsible for reporting on sustainability, broad welfare measures and the Europe 2020 strategy should cooperate even more closely and present the commonalities of the three approaches.
7. The press should continuously report on the existing welfare measures and their components, in order to mirror politics and to inform the public.
8. At the community level, decentralized initiatives of welfare measurement should be created in order to derive priorities for resource use. To do so, a central coordinating body such as the Vital Signs of the CanadianCommunity Foundations should exist.
9. Companies – and their providers of capital as well as clients – should align themselves more closely with broad measures of success such as the "Global Reporting Initiative."
10. Each individual person should make sure that their voice is heard by the other players that are relevant for progress in Germany.

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# Appendix: data and methods

## 1. Data sources and transformations

Time series for price-adjusted **net national income** (NNI) per head in purchasing power parity standards are not available directly in databases, but were computed by us. All raw data come from the Ameco database of the European Commission. Starting point is gross national income in local currency at prices of the year 2000 (code: OVGN). From this the rate of depreciation was subtracted, then the numbers were divided by purchasing power parity standards (code: KNP) and finally by the total population (NPTD). Thus 2000 country comparisons are perfectly permissible and the national growth rates of the NNIs are maintained throughout. Level comparison for years which are away from 2000 are however less reliable. This is the compromise we had to make. For further computations of the overall index the natural logarithm was used on the data.

The time series for the **life expectancy** come from the OECD and were available for most countries until 2008. They refer to life expectancy for the entire population, thus boys and girls averaged. For the year 2008 for the USA, Canada, Italy, Belgium and Great Britain we extrapolated values with the help of the average change of the preceding 10 years. With these relatively stable series this should be unproblematic. For some countries some annual values for the 1970's had to be linearly interpolated: Canada, Greece, Ireland, Italy, Spain and Great Britain.

The secondary and tertiary **enrollment rates** come from the World Bank. Here the absolute numbers of students is divided by the number of inhabitants, who are in the age typical for this education. Starting from 1990 all numbers are available at annual frequency. For most countries data were available until 2008, missing values were extrapolated with data from the preceding 10 years. Between 1970 and 1990 values were available only every five years. We interpolated missing values linearly. The World Bank data for secondary enrollment for Australia, Belgium, Sweden, Great Britain and Canada exhibited jumps in the 1990s, which did not appeared plausible and were smoothed by us. The data for Germany starting from 1991 were computed by us, using absolute enrollment numbers from the OECD and population numbers from the German Federal Statistical Office. Data before 1991 were computed with the help of the estimated coefficient from the cointegrating relationship with net national income. Thus the German numbers are less reliable than the numbers of other countries.

The data for the **ecological footprint** come from the Global Footprint Network (www. footprintnetwork.org), where they are available on request. The footprint measures the amount of ecosystem used by the consumption of a country's inhabitants. The 2010 edition covers data up to the year 2007. The data were significantly revised in comparison to the 2009

edition. Because of individual jumps in some countries average values were formed over 2 years. Values for 2008 were computed by us with linear extrapolations of the last 10 years. This method cannot account for movements caused by the business cycle – but we are not interested in those movements anyway.

**Germany and reunification:** Data points for 1991 to 2008 are the all-German values. Data going further back were computed from the all-German levels for 1991 and the West German rates of change, so that no break appears in the time series. The reliability of the German data before 1990 ago is thus restricted.

## 2. Weighting with panel cointegration methods

The computation of the Progress Index is unique since it uses new methods of the non-stationary panel econometrics. Progress is a dynamic phenomenon, so time series have to be used when measuring it. And progress might happen in different countries according to similar rules. In order to test this, time series for several countries must be combined in one data set: a so-called panel.

Time series can have different characteristics: they can either return again and again to a constant average value (e.g. GDP growth). These are so-called stationary series. Or they can move without recognizable border further and further away from their past values. This would be non-stationary series (e.g. the level the GDP). Clive Granger received the Nobel Prize in economics in 2003 for his insight that one must not apply the same methods of analysis to time series with such different characteristics.

We use only non-stationary time series in the panel, thus require non-stationary panel methods. First it is necessary to test whether the series are indeed non-stationary. We use the panel unit roots tests of Breitung (2000) and Im, Pesaran and Shin (2003). The null hypothesis that all time series are non-stationary is tested against a homogeneous alternative (all series are stationary) in Breitung's approach and against a heterogeneous alternative (some of the series are stationary, others are not) in the Im, Pesaran and Shin approach. The calculations were done in Gauss with data for 22 countries for the years 1970 up to the last available value (thus 2006 to 2008). The table shows that for net national income, life expectancy and the enrollment rate the series are clearly non-stationary. The test statistics for the ecological footprint are also above critical values. However, they are much lower than for the other three series. This is not surprising, given that the footprint fell in some countries since beginning of the 1990s.

### Panel unit root tests

P-Values

| Variable: | Breitung (2000) | IPS (2003) |
|---|---|---|
| Ln NNI | 0.99983 | 1.00000 |
| Life expectancy | 0.99507 | 1.00000 |
| Enrolment rate | 0.99729 | 1.00000 |
| Footprint | 0.12000 | 0.43660 |

Nullhypotheses: Series are I(1), reject hypothese if P-value is below 0.1 or 0.05.

Source: Zentrum für gesellschaftlichen Fortschritt

Two or more non-stationary time series may be closely linked to each other: a linear combination of the series can be stationary. In this case one speaks of a cointegrating relationship. Again, this has to be tested in a panel with cointegration test. We use here the procedures of Pedroni (2000) and Breitung (2005). Both test the null hypothesis that no cointegration is present against the homogeneous alternative that the respective series in all countries cointegrate with the same coefficient (constants and short-run dynamics can differ between the countries). The relations between net national income and life expectancy and/or the enrollment rate are statistically highly significant as the table shows. The same is valid due to transitivity for the relationship between life expectancy and enrollment. The calculations for the Progress Index use the coefficients derived from the Breitung test.

### Panel coinegration tests

Coefficients (T-statistics in brackets)

| left side | right side | Breitung (2005) | Pedroni (2000) |
|---|---|---|---|
| Ln NNI | Life expectancy | 0.102 | 0.079 |
| | | (19,1) | (49,0) |
| Ln NNI | Enrolment rate | 0.021 | 0.017 |
| | | (21,7) | (37,58) |
| Ln NNI | Footprint | 1.38 | 1.61 |
| | | (3,97) | (6,54) |

Other combinations of variables are possible. Coefficients are then ratios of coefficients shown in table. Nullhypotheses: Series are not cointegrated. High T-statistic: reject Null.

Sources: Zentrum für gesellschaftlichen Fortschritt

The relationship between the footprint and the other three variables is statistically significant, but not as clear as among the first three variables. This partly stems from the fact that it is not entirely clear whether the footprint is indeed a non-stationary series. And it is an important reason why we offer in the Progress Index different weights for the Footprint and allow users to set their own weight on our website. Even more, the estimated coefficients are positive, which corresponds to the historical experi-

ence, but probably not to the progress picture many people would like to see.

The literature on non-stationary panel methods is:

Breitung, Jörg (2000): The local power of some unit root tests for panel data. In: Badi Baltagi (ed.): Nonstationary Panels, Panel Cointegration, and Dynamic Panels. Advances in Econometrics, Vol. 15, pp. 161-178.

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Pedroni, Peter (2000): Fully modified OLS for heterogeneous cointegrated panels, In: Badi H. Baltagi (ed.): Advances in Econometrics (Vol. 15): Non-stationary panels, panel cointegration and dynamic panels, pp. 93-130. New York: Elsevier Science.

A summary of these and additional methods can be found in:

Bergheim, Stefan (2008): Long-run growth forecasting. Springer.

## About the Center for Societal Progress

**Aim:** The Center for Societal Progress, which was founded at the beginning of 2009 in Frankfurt am Main, Germany, is an independent think tank. The Center aims at improving the conditions for societal progress, welfare and wellbeing of the people in Germany by contributing sound and easily accessible analyses. The researchers work independently, forward looking and interdisciplinary on topics such as growth, education, health and employment.

The mission of the Center is to build bridges between academic research and the globally available knowledge on the one hand and society, politics and press in Germany in the other hand. In doing so, it develops new ideas, concepts and strategies for relevant topics in politics and society. Role models in organization, aims and financing are Anglo-Saxon think tanks such as the New America Foundation, Brookings Institution or Cato Institute as examples.

Since June 2009, the Center is the first German correspondent in the progress project of the OECD. In March 2010 it received an award as "Ausgewählter Ort 2010" (Chosen location 2010) in the competition "365 Orte im Land der Ideen" (365 locations in the country of ideas).

**Founder:** The think tank is headed by its founder and director Dr. Stefan Bergheim. Previously he worked in the banking sector as German economist, where he dealt among others with topics such as growth, demography, education and life satisfaction.

**Ideas council:** The interdisciplinary work of the Center is made clear in particular by the ideas council and its highly accomplished members. The members of the ideas council share the goals of the Center and support the work from their respective perspectives in a constructive dialogue.

Members are:
Matthias Böttger (architect), Sabine Bode (journalist and author), Dr. Jan Hofmann (physicist), PD Dr. Matthias Michal (medical scientist), Dr. Heiko Roehl (organizational development expert), Frank Trümper (Common Purpose Germany), Prof. Dr. Christian Welzel (political scientist), Prof. Dr. Peer Zumbansen (lawyer, publisher of German Law Journal).

**Financing:** The Center for Societal Progress is recognized as a non-profit organization with a focus on "science and research" and is entered into the registry of non-profit organizations. It is financed by the support of private citizens, companies and foundations.

**Progress Index** (coefficient of 0.2 for the Footprint)

| Year | Norway | Sweden | Finland | Japan | New Zeal. | Netherl. | Korea | Greece | France | Switzerl. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1970 | 0.54 | 0.60 | 0.37 | 0.45 | 0.36 | 0.50 | -0.38 | 0.42 | 0.46 | 0.55 |
| 1971 | 0.50 | 0.56 | 0.34 | 0.50 | 0.38 | 0.50 | -0.34 | 0.46 | 0.47 | 0.58 |
| 1972 | 0.53 | 0.59 | 0.38 | 0.53 | 0.40 | 0.49 | -0.31 | 0.51 | 0.49 | 0.63 |
| 1973 | 0.57 | 0.65 | 0.42 | 0.55 | 0.42 | 0.53 | -0.26 | 0.55 | 0.51 | 0.67 |
| 1974 | 0.60 | 0.67 | 0.42 | 0.56 | 0.43 | 0.57 | -0.22 | 0.54 | 0.54 | 0.72 |
| 1975 | 0.63 | 0.63 | 0.43 | 0.61 | 0.41 | 0.58 | -0.19 | 0.58 | 0.56 | 0.75 |
| 1976 | 0.64 | 0.63 | 0.45 | 0.65 | 0.42 | 0.59 | -0.14 | 0.60 | 0.59 | 0.78 |
| 1977 | 0.66 | 0.63 | 0.50 | 0.67 | 0.43 | 0.60 | -0.08 | 0.62 | 0.61 | 0.80 |
| 1978 | 0.68 | 0.68 | 0.55 | 0.70 | 0.45 | 0.59 | -0.02 | 0.64 | 0.62 | 0.79 |
| 1979 | 0.71 | 0.70 | 0.56 | 0.74 | 0.47 | 0.60 | 0.01 | 0.66 | 0.63 | 0.80 |
| 1980 | 0.73 | 0.70 | 0.57 | 0.74 | 0.49 | 0.60 | 0.03 | 0.66 | 0.64 | 0.81 |
| 1981 | 0.72 | 0.71 | 0.59 | 0.78 | 0.51 | 0.64 | 0.08 | 0.66 | 0.67 | 0.83 |
| 1982 | 0.73 | 0.72 | 0.65 | 0.81 | 0.51 | 0.68 | 0.14 | 0.67 | 0.70 | 0.84 |
| 1983 | 0.78 | 0.75 | 0.66 | 0.82 | 0.52 | 0.71 | 0.21 | 0.68 | 0.71 | 0.85 |
| 1984 | 0.83 | 0.79 | 0.70 | 0.84 | 0.56 | 0.74 | 0.27 | 0.70 | 0.74 | 0.88 |
| 1985 | 0.83 | 0.80 | 0.71 | 0.86 | 0.58 | 0.75 | 0.33 | 0.75 | 0.76 | 0.90 |
| 1986 | 0.83 | 0.82 | 0.75 | 0.89 | 0.60 | 0.77 | 0.38 | 0.75 | 0.79 | 0.91 |
| 1987 | 0.82 | 0.83 | 0.79 | 0.91 | 0.63 | 0.79 | 0.43 | 0.74 | 0.81 | 0.92 |
| 1988 | 0.82 | 0.83 | 0.81 | 0.92 | 0.66 | 0.78 | 0.47 | 0.78 | 0.82 | 0.94 |
| 1989 | 0.85 | 0.85 | 0.81 | 0.93 | 0.70 | 0.81 | 0.50 | 0.81 | 0.84 | 0.95 |
| 1990 | 0.91 | 0.85 | 0.81 | 0.95 | 0.70 | 0.86 | 0.53 | 0.83 | 0.90 | 0.95 |
| 1991 | 0.82 | 0.87 | 0.86 | 0.96 | 0.70 | 0.88 | 0.56 | 0.83 | 0.90 | 0.97 |
| 1992 | 0.64 | 0.90 | 0.92 | 0.97 | 0.76 | 0.90 | 0.60 | 0.84 | 0.94 | 0.99 |
| 1993 | 0.88 | 0.91 | 0.94 | 1.01 | 0.83 | 0.97 | 0.65 | 0.86 | 1.00 | 1.02 |
| 1994 | 1.15 | 0.95 | 0.98 | 1.03 | 0.90 | 1.01 | 0.69 | 0.86 | 1.02 | 1.03 |
| 1995 | 1.15 | 0.95 | 0.97 | 1.03 | 0.90 | 1.00 | 0.74 | 0.88 | 1.03 | 1.04 |
| 1996 | 1.20 | 0.98 | 1.00 | 1.08 | 0.93 | 1.00 | 0.79 | 0.90 | 1.04 | 1.06 |
| 1997 | 1.24 | 1.02 | 1.06 | 1.08 | 0.97 | 1.08 | 0.84 | 0.93 | 1.06 | 1.07 |
| 1998 | 1.23 | 1.05 | 1.11 | 1.07 | 0.97 | 1.09 | 0.83 | 0.88 | 1.07 | 1.09 |
| 1999 | 1.28 | 1.10 | 1.15 | 1.08 | 0.99 | 1.09 | 0.91 | 0.90 | 1.08 | 1.11 |
| 2000 | 1.29 | 1.14 | 1.18 | 1.11 | 1.00 | 1.10 | 0.94 | 0.91 | 1.10 | 1.13 |
| 2001 | 1.28 | 1.15 | 1.20 | 1.13 | 1.03 | 1.12 | 0.97 | 0.95 | 1.10 | 1.14 |
| 2002 | 1.32 | 1.17 | 1.20 | 1.15 | 1.07 | 1.12 | 1.01 | 1.01 | 1.11 | 1.14 |
| 2003 | 1.36 | 1.21 | 1.22 | 1.16 | 1.11 | 1.12 | 1.03 | 1.05 | 1.13 | 1.17 |
| 2004 | 1.36 | 1.21 | 1.21 | 1.18 | 1.18 | 1.16 | 1.08 | 1.10 | 1.17 | 1.20 |
| 2005 | 1.35 | 1.17 | 1.22 | 1.19 | 1.20 | 1.18 | 1.12 | 1.16 | 1.17 | 1.22 |
| 2006 | 1.37 | 1.28 | 1.25 | 1.22 | 1.20 | 1.21 | 1.16 | 1.20 | 1.20 | 1.23 |
| 2007 | 1.37 | 1.31 | 1.26 | 1.24 | 1.21 | 1.23 | 1.19 | 1.18 | 1.21 | 1.22 |
| 2008 | 1.37 | 1.30 | 1.28 | 1.25 | 1.23 | 1.23 | 1.22 | 1.22 | 1.20 | 1.20 |

Source: Zentrum für gesellschaftlichen Fortschritt

**Progress Index** (coefficient of 0.2 for the Footprint)

| Year | Spain | Australia | Ireland | Austria | UK | Canada | Germany | Denmark | USA | Belgium | Portugal |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970 | 0.31 | 0.23 | 0.27 | 0.42 | 0.39 | 0.50 | 0.38 | 0.48 | 0.51 | 0.39 | -0.07 |
| 1971 | 0.34 | 0.27 | 0.28 | 0.44 | 0.40 | 0.55 | 0.37 | 0.49 | 0.52 | 0.39 | -0.04 |
| 1972 | 0.39 | 0.30 | 0.31 | 0.46 | 0.43 | 0.59 | 0.40 | 0.50 | 0.52 | 0.42 | 0.06 |
| 1973 | 0.44 | 0.29 | 0.32 | 0.50 | 0.46 | 0.60 | 0.42 | 0.53 | 0.55 | 0.43 | 0.05 |
| 1974 | 0.48 | 0.23 | 0.34 | 0.51 | 0.46 | 0.60 | 0.43 | 0.53 | 0.57 | 0.45 | 0.07 |
| 1975 | 0.49 | 0.24 | 0.38 | 0.53 | 0.48 | 0.62 | 0.43 | 0.55 | 0.60 | 0.47 | 0.06 |
| 1976 | 0.53 | 0.26 | 0.39 | 0.56 | 0.50 | 0.62 | 0.48 | 0.55 | 0.63 | 0.51 | 0.07 |
| 1977 | 0.56 | 0.32 | 0.39 | 0.58 | 0.51 | 0.64 | 0.51 | 0.52 | 0.64 | 0.53 | 0.12 |
| 1978 | 0.58 | 0.35 | 0.40 | 0.59 | 0.53 | 0.68 | 0.53 | 0.55 | 0.66 | 0.54 | 0.14 |
| 1979 | 0.61 | 0.37 | 0.43 | 0.62 | 0.54 | 0.70 | 0.56 | 0.57 | 0.67 | 0.56 | 0.18 |
| 1980 | 0.62 | 0.43 | 0.45 | 0.63 | 0.54 | 0.72 | 0.57 | 0.56 | 0.68 | 0.58 | 0.19 |
| 1981 | 0.65 | 0.46 | 0.46 | 0.64 | 0.57 | 0.76 | 0.58 | 0.56 | 0.73 | 0.61 | 0.21 |
| 1982 | 0.69 | 0.46 | 0.46 | 0.67 | 0.59 | 0.79 | 0.59 | 0.59 | 0.74 | 0.48 | 0.25 |
| 1983 | 0.69 | 0.50 | 0.48 | 0.69 | 0.62 | 0.85 | 0.62 | 0.62 | 0.78 | 0.49 | 0.25 |
| 1984 | 0.72 | 0.50 | 0.50 | 0.72 | 0.64 | 0.89 | 0.66 | 0.63 | 0.81 | 0.68 | 0.27 |
| 1985 | 0.74 | 0.55 | 0.51 | 0.74 | 0.65 | 0.90 | 0.68 | 0.61 | 0.80 | 0.70 | 0.29 |
| 1986 | 0.78 | 0.60 | 0.49 | 0.77 | 0.68 | 0.89 | 0.70 | 0.64 | 0.81 | 0.71 | 0.32 |
| 1987 | 0.80 | 0.64 | 0.53 | 0.80 | 0.72 | 0.93 | 0.72 | 0.65 | 0.84 | 0.74 | 0.35 |
| 1988 | 0.81 | 0.64 | 0.55 | 0.82 | 0.75 | 0.99 | 0.75 | 0.66 | 0.86 | 0.76 | 0.37 |
| 1989 | 0.83 | 0.63 | 0.57 | 0.84 | 0.77 | 0.96 | 0.78 | 0.66 | 0.88 | 0.78 | 0.43 |
| 1990 | 0.85 | 0.63 | 0.60 | 0.86 | 0.78 | 0.94 | 0.77 | 0.68 | 0.88 | 0.81 | 0.46 |
| 1991 | 0.86 | 0.67 | 0.60 | 0.87 | 0.77 | 1.05 | 0.80 | 0.69 | 0.89 | 0.81 | 0.46 |
| 1992 | 0.91 | 0.70 | 0.69 | 0.92 | 0.82 | 1.12 | 0.88 | 0.72 | 0.95 | 0.81 | 0.61 |
| 1993 | 0.92 | 0.83 | 0.72 | 0.95 | 0.85 | 1.12 | 0.90 | 0.74 | 0.95 | 0.83 | 0.64 |
| 1994 | 0.95 | 0.87 | 0.75 | 0.96 | 0.92 | 1.12 | 0.92 | 0.76 | 0.95 | 0.87 | 0.69 |
| 1995 | 0.98 | 0.91 | 0.76 | 0.97 | 0.92 | 1.10 | 0.93 | 0.77 | 0.96 | 0.86 | 0.71 |
| 1996 | 0.99 | 0.92 | 0.82 | 0.99 | 0.94 | 1.06 | 0.95 | 0.82 | 0.98 | 0.88 | 0.72 |
| 1997 | 1.00 | 1.00 | 0.85 | 0.98 | 0.97 | 1.08 | 0.96 | 0.84 | 0.99 | 0.91 | 0.78 |
| 1998 | 1.01 | 0.99 | 0.88 | 1.02 | 0.99 | 1.00 | 0.97 | 0.87 | 0.96 | 0.91 | 0.80 |
| 1999 | 1.01 | 0.99 | 0.89 | 1.04 | 1.02 | 1.02 | 0.98 | 0.90 | 0.98 | 0.92 | 0.80 |
| 2000 | 1.06 | 1.02 | 0.93 | 1.07 | 1.05 | 1.03 | 1.00 | 0.93 | 0.97 | 0.94 | 0.84 |
| 2001 | 1.09 | 1.02 | 0.95 | 1.08 | 1.06 | 1.06 | 1.01 | 0.96 | 0.98 | 0.97 | 0.86 |
| 2002 | 1.10 | 1.10 | 1.00 | 1.07 | 1.09 | 1.10 | 1.02 | 0.97 | 1.02 | 0.98 | 0.89 |
| 2003 | 1.10 | 1.09 | 1.06 | 1.07 | 1.10 | 1.08 | 1.04 | 0.98 | 1.04 | 0.99 | 0.90 |
| 2004 | 1.14 | 1.07 | 1.12 | 1.09 | 1.12 | 1.07 | 1.07 | 1.02 | 1.06 | 1.01 | 0.90 |
| 2005 | 1.16 | 1.09 | 1.15 | 1.10 | 1.13 | 1.07 | 1.08 | 1.07 | 1.06 | 1.02 | 0.90 |
| 2006 | 1.19 | 1.13 | 1.16 | 1.13 | 1.13 | 1.11 | 1.11 | 1.08 | 1.08 | 1.06 | 0.93 |
| 2007 | 1.20 | 1.17 | 1.17 | 1.14 | 1.15 | 1.14 | 1.11 | 1.10 | 1.10 | 1.07 | 0.96 |
| 2008 | 1.20 | 1.19 | 1.16 | 1.16 | 1.15 | 1.14 | 1.13 | 1.11 | 1.10 | 1.08 | 0.97 |

Source: Zentrum für gesellschaftlichen Fortschritt