Progress Index 2011

Quality of life re-assessed

Around the globe, quality of life and progress are being re-assessed. The Progress Index of the Center for Societal Progress so far is the only index that summarizes the economic, social and ecological aspects of progress, and that is available for 22 countries over the period from 1970 until 2009. It consists of four components: income, health, education and the natural environment. The main findings of the new edition are:

- Norway, Sweden and Switzerland were the most advanced countries in 2009.
- Germany ranked 5th behind Japan, but ahead of the USA.
- Denmark, Belgium and Portugal were at the bottom of the ranking.
- Over the past ten years, the quality of life has improved in all 22 countries.
- From 1999 to 2009, South Korea and Germany have made the largest progress.
- Only little improvement was recorded for Italy, Switzerland and the USA.

The Progress Index is mainly calculated for a German audience. The 60-page study in German includes sections on each of the four index components, a discussion of five other composite measures of progress, several country portraits and special sections on progress initiatives in other countries at the national and local level. It also includes a list of references and a longer appendix.

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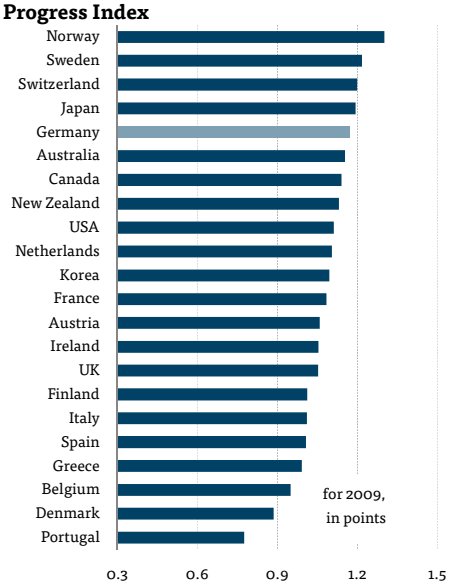
Progress Index



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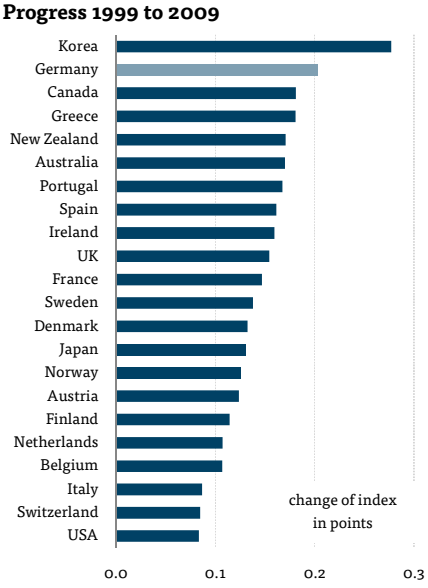
Progress 1999 to 2009



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1. The main results

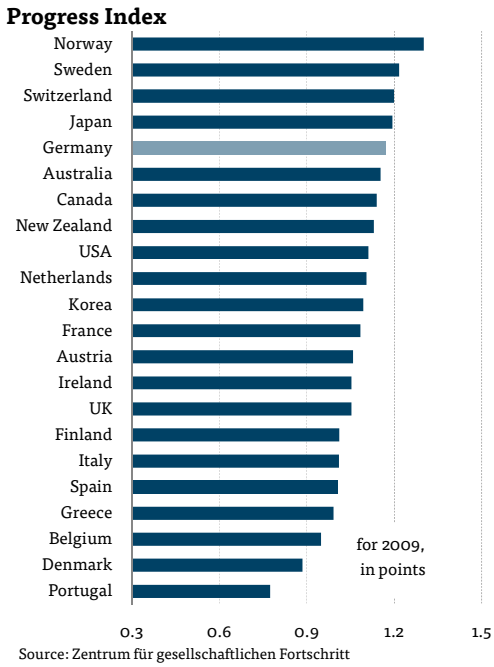
Four components combined

The Progress Index combines four variables that are important to people: income, health, education and the natural environment. They are measured by the net national income, life expectancy at the time of birth, the average years of education and the ecological footprint. All quantities are expressed in per capita terms, so that comparisons across countries become more meaningful. This summary presents the most important results of the 2011 index. The methods of calculation are described in the appendix.

Norway, Sweden and Switzerland on top

Skandinavia and Switzerland most advanced

In 2009, Norway, Sweden and Switzerland ranked on the top places in the Progress Index. These countries offer great material prosperity, long life expectancy and education – with relatively little damage to the environment. In Norway, part of the high level of progress is due to the oil wealth. However, it was already in second place in 1970 (see table on next page). Sweden was number 3 in 1970, never ranked lower than 5th and came in 2nd in 2009. Switzerland had been the most advanced country for decades and was still in 3rd place in 2009.



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The two large economies Japan and Germany were at number 4 and 5 in 2009. Since 1980, Japan has always always been among the five most advanced countries. The declining Japanese population has so far not hampered the high quality of life of the individuals. Germany was one of the rising stars of the 1980s and 90s and moved up to 5th place in 2009. Anglo-Saxon countries took the places 6 to 9 in 2009: Australia, Canada, New Zealand and the USA. However, they have evolved differently in the last decades. In 1970, the USA was in 4th place, while Australia had only been 17th.

Europe's crisis-hit countries can be found at the bottom of the ranking (and not just since 2009): Portugal at number 22, Greece at 19, Spain at 18 and Italy at number 17. Surprisingly, Denmark came in second to last. This is due to the highest ecological footprint and the second lowest life expectancy of all 22 countries surveyed.

South Korea and Germany made the most progress

The good news is that all 22 countries analyzed were able to record progress over the past ten years: Even in these already rich and highly developed countries, life continues to improve according to these objective measures. The chart on the next page illustrates this. Progress was particularly strong in South Korea, where life expectancy and income have increased at a rapid pace. Over the same period, the ecological footprint of Koreans rose only slightly. According to the Progress Index 2011, Germany has developed above average in the ten years to 2009: income per capita

rose by 11% and the ecological footprint remained stable nevertheless. At the same time, the average number of years of education rose strongly.

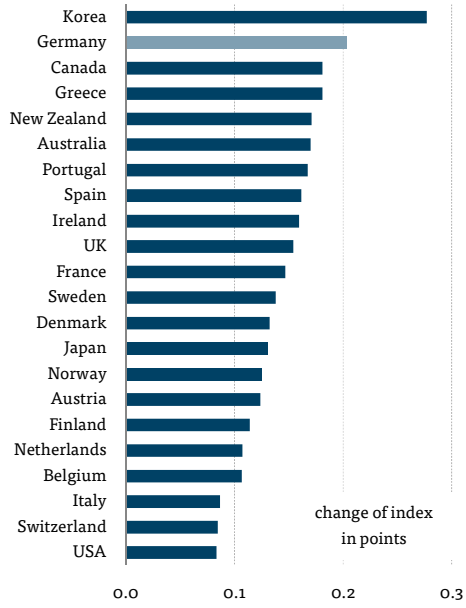
The three countries with the least progress in the last decade were Italy, Switzerland and the United States. In Italy, this was especially due to the declining per capita income, in Switzerland to the stagnant level of formal education, and in the USA to a barely rising life expectancy. The other components of the Progress Index have also developed less dynamically in these countries.

Rankings in the Progress Index since 1970

Rank	1970	1980	1990	2000	2009
1	Switzerland	Switzerland	Switzerland	Norway	Norway
2	Norway	Norway	Japan	Switzerland	Sweden
3	Sweden	Japan	Norway	Sweden	Switzerland
4	USA	USA	Sweden	Japan	Japan
5	New Zealand	Sweden	USA	USA	Germany
6	Netherlands	New Zealand	New Zealand	Germany	Australia
7	Greece	Greece	Austria	Netherlands	Canada
8	Canada	Canada	Italy	Australia	New Zealand
9	Denmark	Australia	Netherlands	France	USA
10	Japan	Netherlands	Australia	New Zealand	Netherlands
11	UK	Austria	Greece	Austria	Korea
12	Italy	Italy	Belgium	Canada	France
13	Ireland	Belgium	France	Italy	Austria
14	Austria	UK	UK	UK	Ireland
15	France	Ireland	Canada	Finland	UK
16	Belgium	France	Germany	Ireland	Finland
17	Australia	Denmark	Spain	Spain	Italy
18	Finland	Finland	Ireland	Korea	Spain
19	Germany	Spain	Finland	Belgium	Greece
20	Spain	Germany	Denmark	Greece	Belgium
21	Portugal	Portugal	Korea	Denmark	Denmark
22	Korea	Korea	Portugal	Portugal	Portugal

Source: Zentrum für gesellschaftlichen Fortschritt

Progress 1999 to 2009



Source: Zentrum für gesellschaftlichen Fortschritt

Different weighting for the ecological footprint

Three components develop hand in hand over time

Three of the four components of the Progress Index are weighted solely by using the data: income, life expectancy and education. They develop in parallel in these countries over time. From this statistical regularity, weights were derived without any subjective value judgments being necessary (see the appendix for details). For the fourth component, the ecological footprint, a similar approach was not possible. Here the data suggest a positive weight. This is in line with the historical experience that increasing income was associated with rising consumption of natural resources. However, it does not correspond with today's widespread notion of progress in rich countries.

Therefore, the weight of the ecological footprint was set using a simple rank change analysis: The inclusion of the footprint must not change the ranking in the index more than the inclusion of the other components. A factor of 0.2 was established for this purpose. However, other weights on a

scale of 0 to 1 are possible. If the footprint gets the weighting of zero, the USA jump to the second place (see table). A weight of 0.8 shifts the ranking of the Progress Index into the vicinity of the ranking of the ecological footprint: Japan then takes first place in the overall index, the USA are third to last.

Index with different weights for the ecological footprint

Year 2009

Rank	Coefficient 0		**Coefficient 0.2**		Coefficient 0.4		Coefficient 0.8	
1	Norway	1.33	Norway	**1.30**	Norway	1.27	Japan	1.23
2	USA	1.27	Sweden	**1.22**	Sweden	1.21	Norway	1.21
3	Canada	1.23	Switzerland	**1.20**	Japan	1.21	Sweden	1.19
4	Australia	1.23	Japan	**1.19**	Switzerland	1.19	Switzerland	1.18
5	Sweden	1.23	Germany	**1.17**	Germany	1.16	New Zealand	1.18
6	Switzerland	1.20	Australia	**1.15**	New Zealand	1.15	Germany	1.15
7	Japan	1.18	Canada	**1.14**	Korea	1.09	Korea	1.10
8	Germany	1.18	New Zealand	**1.13**	Australia	1.08	France	1.07
9	Netherlands	1.16	USA	**1.11**	France	1.08	UK	1.04
10	Ireland	1.13	Netherlands	**1.10**	UK	1.05	Austria	0.98
11	New Zealand	1.11	Korea	**1.09**	Canada	1.05	Italy	0.98
12	Belgium	1.10	France	**1.08**	Netherlands	1.05	Australia	0.93
13	Korea	1.09	Austria	**1.06**	Austria	1.03	Netherlands	0.93
14	France	1.09	Ireland	**1.05**	Italy	1.00	Spain	0.91
15	Austria	1.08	UK	**1.05**	Ireland	0.98	Greece	0.91
16	Finland	1.08	Finland	**1.01**	Spain	0.97	Canada	0.86
17	UK	1.06	Italy	**1.01**	Greece	0.96	Portugal	0.86
18	Denmark	1.05	Spain	**1.01**	USA	0.95	Ireland	0.82
19	Spain	1.04	Greece	**0.99**	Finland	0.94	Finland	0.81
20	Italy	1.02	Belgium	**0.95**	Portugal	0.80	USA	0.63
21	Greece	1.02	Denmark	**0.89**	Belgium	0.80	Belgium	0.50
22	Portugal	0.75	Portugal	**0.77**	Denmark	0.72	Denmark	0.38

Source: Zentrum für gesellschaftlichen Fortschritt

Changes to the Progress Index 2010

Norway, Sweden and Japan remain top

Apart from a few large jumps, the ranking of the new Progress Index of 2011 is similar to the edition of 2010: Norway, Sweden and Japan were also among the most advanced countries; Belgium, Denmark and Portugal among the weaker countries.

Finland and Greece now rank lower – Germany and the USA higher

A few large changes are due to the use of new education data. Instead of the school enrolment ratio, we now use the average years of education. We already pointed out last year that only the years of education assess the level of formal educational of the entire adult population. In 2010, the United Nations made this transition in their Human Development Index using data from Barro and Lee. We now use the same data and have less reason to criticize the quality of education data. This change in the data base had a negative impact on the rankings of Finland and Greece. On the other hand, Canada, the USA and especially Germany rank significantly higher than in the first issue of the Progress Index. Overall, a more coherent picture has developed.

Appendix: Constructing the Index

With the Progress Index, we make a contribution to the international research agenda to measure progress more broadly than with just Gross Domestic Product. In particular, we emphasize the time-series properties of the underlying data and suggest the econometric method of panel cointegration to derive weights for a composite index. Time series with different statistical properties – stationary or non-stationary – must not be combined in a statistical analysis. We use only non-stationary series.

One of the biggest challenges on the way to a composite index is the weighting of its components. Often "equal" weights are used, but they may turn out to be not so equal, when the correlations between the variables and the variances and differences in growth rates are analyzed in detail. Put simply, if one series grows by 3% annually on average and the other series by just 0.3% annually, then changes in the first will dominate a simple average of the two.

For three of our four components – income, life expectancy and years of education – we allow the data to set the weights. For the fourth component, the ecological footprint, the data cannot help us. Therefore, we choose a baseline weighting, but also provide alternative weightings.

Panel cointegration to determine weights

The calculation of the Progress Index is unique because it uses new methods of non-stationary panel-econometrics. Progress is a dynamic phenomenon, so time series have to be used. Progress could also take place in different countries according to the same patterns. To test this, time series for several countries can be combined in a dataset: a so-called panel.

The first step is to test whether the series are indeed non-stationary. We use the panel unit root tests of Breitung (2000) and Im, Pesaran and Shin (2003) in the statistics program "Gauss" with data for 22 countries for the years 1970 to the last available year (2007 or 2009). The table shows that net national income, life expectancy and years of education are clearly non-stationary series. For the ecological footprint, the test statistics are also above the critical values. However, the IPS statistic is lower than for the other three series, which is not surprising, since the footprint declined in some countries since the early 1990s.

Panel unit root tests

P-Values

Variable:	Breitung (2000)	IPS (2003)
Ln NNI	0.9998	1.0000
Life expectancy	0.9822	1.0000
Years of education	0.5453	0.9516
Footprint	0.7117	0.1325

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 can be in a tight statistical relationship to one another: a linear combination of them can be stationary. This case is called a cointegration of the series. We use the panel cointegration tests of Pedroni (2000) and Breitung (2005). Both test the null hypothesis that there is no cointegration against the homogeneous alternative, that the series cointegrate in all countries with the same coefficient (constants and short-term dynamics may, however, differ between coun-

tries). The relationship between net national income and both life expectancy and years of education are statistically highly significant (see table). Because of transitivity, the same applies to the relation between life expectancy and years of education. The calculation for the Progress Index uses the coefficients from the Breitung test.

Panel coinegration tests

Coefficients (T-statistics in brackets)

left side	right side	**Breitung (2005)**	Pedroni (2000)
Ln NNI	Life expectancy	**0.089**	0.090
		(31.3)	(42.3)
Ln NNI	Years of education	**0.153**	0.199
		(9.9)	(26.1)
Ln NNI	Footprint	**0.10**	1.87
		(1.84)	(13.9)

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 income is statistically significant, but not as strongly as the other two relationships. This is partly due to the less clear non-stationary property of the footprint and is one reason why we set different weights for the footprint in the Progress Index. In addition, the estimated coefficient is positive, which corresponds to the historical experience, but probably not with the image that many people have of progress in the 21st century.

Giving some meaning to these empirical coefficients, it turns out that an increase in net national income by 10% is accompanied by a long-term increase in life expectancy by slightly more than a year across the 22 countries (inverse of the calculated coefficients divided by 10). This implies for the Progress Index that 10% more income get the same weight as one additional year of life expectancy. The second connection is between income and the educational level. Over the long term, 10% more income goes hand in hand with an increase of just over 0.6 years of education.

Germany in 2000 is assigned a value of 1.0

As a starting point for all calculations, a fixed reference point is defined: the value for Germany in 2000 is normalized to 1.0. From here, values for Germany in earlier and later years are calculated with the weights described. The values for the other countries are also calculated from this reference point. If a country has a 10% higher income, one more year of life expectancy and 0.6 years more education than Germany in 2000, it gets an index value of 1.10, since all variables were standardized to the increase in income.

Finally, the ecological footprint has to be added – a non-trivial task, since the data do not provide a politically correct weight. Therefore, we use a

rank change approach: Adding life expectancy to income changes the rankings on average by almost two places. Further adding education introduces a rank change of 3.5 places. The weight of the footprint in the baseline Progress Index is set so that the ranking changes by no more than three place on average. Alternative weights and the resulting rankings are offered in the table on page 4.

Progress Index 2011 (coefficient of 0.2 for the Footprint)

Year	Norway	Sweden	Switzerl.	Japan	Germany	Australia	Canada	New Zeal.	USA	Netherl.	Korea
1970	0.60	0.58	0.72	0.46	0.27	0.39	0.51	0.57	0.59	0.56	-0.35
1971	0.56	0.55	0.72	0.50	0.26	0.44	0.55	0.59	0.60	0.55	-0.31
1972	0.58	0.59	0.75	0.53	0.28	0.48	0.57	0.61	0.61	0.54	-0.27
1973	0.61	0.66	0.77	0.55	0.30	0.48	0.57	0.63	0.63	0.56	-0.22
1974	0.64	0.66	0.80	0.55	0.32	0.43	0.57	0.64	0.65	0.59	-0.18
1975	0.66	0.64	0.81	0.60	0.32	0.45	0.57	0.63	0.69	0.60	-0.15
1976	0.67	0.64	0.84	0.64	0.36	0.48	0.58	0.63	0.71	0.61	-0.09
1977	0.68	0.67	0.87	0.66	0.39	0.54	0.60	0.63	0.72	0.62	-0.04
1978	0.70	0.72	0.87	0.69	0.40	0.58	0.63	0.64	0.73	0.61	0.01
1979	0.73	0.74	0.89	0.73	0.42	0.60	0.65	0.66	0.75	0.62	0.04
1980	0.75	0.74	0.90	0.73	0.43	0.67	0.67	0.68	0.76	0.62	0.05
1981	0.74	0.74	0.91	0.77	0.44	0.69	0.70	0.69	0.80	0.64	0.09
1982	0.75	0.75	0.92	0.81	0.46	0.68	0.72	0.68	0.81	0.67	0.13
1983	0.81	0.78	0.92	0.83	0.49	0.71	0.76	0.70	0.84	0.69	0.18
1984	0.86	0.82	0.94	0.85	0.51	0.71	0.79	0.73	0.87	0.69	0.24
1985	0.87	0.83	0.95	0.88	0.53	0.74	0.78	0.74	0.85	0.69	0.29
1986	0.86	0.85	0.95	0.90	0.56	0.79	0.76	0.76	0.86	0.71	0.34
1987	0.85	0.87	0.96	0.92	0.61	0.82	0.79	0.78	0.88	0.74	0.40
1988	0.85	0.87	0.97	0.93	0.65	0.82	0.83	0.81	0.90	0.72	0.45
1989	0.96	0.89	0.97	0.95	0.68	0.80	0.79	0.83	0.91	0.75	0.48
1990	0.97	0.90	0.97	0.97	0.70	0.79	0.76	0.82	0.91	0.79	0.52
1991	0.98	0.92	0.99	0.99	0.74	0.82	0.86	0.80	0.93	0.81	0.56
1992	1.00	0.94	1.00	0.99	0.79	0.84	0.95	0.82	0.94	0.81	0.59
1993	1.01	0.94	1.02	1.00	0.81	0.86	0.95	0.86	0.94	0.82	0.62
1994	1.08	0.98	1.03	1.01	0.84	0.91	0.96	0.88	0.95	0.86	0.66
1995	1.07	0.98	1.03	1.01	0.86	0.91	0.94	0.88	0.96	0.86	0.68
1996	1.11	0.99	1.06	1.04	0.88	0.90	0.90	0.90	0.99	0.89	0.71
1997	1.14	1.03	1.08	1.05	0.91	0.95	0.92	0.94	1.00	0.97	0.74
1998	1.14	1.05	1.10	1.06	0.94	0.97	0.94	0.95	1.01	0.99	0.75
1999	1.18	1.08	1.11	1.06	0.97	0.98	0.96	0.96	1.03	1.00	0.82
2000	1.20	1.10	1.13	1.09	1.00	1.00	0.97	0.97	1.04	1.01	0.85
2001	1.20	1.10	1.13	1.10	1.03	1.01	1.01	0.99	1.05	1.02	0.87
2002	1.24	1.11	1.14	1.12	1.05	1.06	1.06	1.01	1.06	1.02	0.90
2003	1.28	1.14	1.15	1.13	1.07	1.06	1.06	1.04	1.07	1.02	0.92
2004	1.28	1.17	1.18	1.15	1.12	1.04	1.07	1.07	1.08	1.07	0.96
2005	1.29	1.15	1.19	1.16	1.14	1.07	1.09	1.08	1.09	1.08	0.99
2006	1.31	1.19	1.20	1.18	1.17	1.11	1.13	1.10	1.11	1.11	1.03
2007	1.32	1.24	1.19	1.20	1.18	1.15	1.15	1.12	1.12	1.12	1.05
2008	1.31	1.24	1.16	1.21	1.19	1.16	1.15	1.12	1.12	1.12	1.08
2009	1.30	1.22	1.20	1.19	1.17	1.15	1.14	1.13	1.11	1.10	1.09

Source: Zentrum für gesellschaftlichen Fortschritt

Progress Index 2011 (coefficient of 0.2 for the Footprint)

Year	France	Austria	Ireland	UK	Finland	Italy	Spain	Greece	Belgium	Denmark	Portugal
1970	0.38	0.38	0.38	0.43	0.30	0.39	0.24	0.50	0.39	0.49	-0.10
1971	0.38	0.39	0.39	0.43	0.27	0.39	0.26	0.53	0.39	0.49	-0.07
1972	0.39	0.42	0.41	0.45	0.33	0.41	0.30	0.55	0.42	0.50	0.03
1973	0.41	0.45	0.42	0.47	0.37	0.43	0.33	0.58	0.43	0.52	0.03
1974	0.43	0.46	0.43	0.47	0.38	0.44	0.36	0.57	0.45	0.52	0.06
1975	0.45	0.48	0.46	0.49	0.39	0.45	0.37	0.58	0.47	0.53	0.05
1976	0.48	0.51	0.47	0.51	0.41	0.48	0.39	0.60	0.50	0.53	0.08
1977	0.50	0.54	0.48	0.52	0.45	0.50	0.43	0.61	0.52	0.49	0.14
1978	0.51	0.54	0.49	0.54	0.49	0.52	0.44	0.64	0.53	0.53	0.17
1979	0.53	0.58	0.52	0.55	0.50	0.55	0.45	0.66	0.54	0.54	0.23
1980	0.54	0.58	0.54	0.54	0.50	0.55	0.46	0.65	0.56	0.53	0.26
1981	0.56	0.59	0.55	0.57	0.53	0.57	0.48	0.65	0.59	0.54	0.27
1982	0.59	0.61	0.54	0.59	0.57	0.60	0.51	0.66	0.45	0.58	0.30
1983	0.60	0.63	0.56	0.62	0.57	0.61	0.51	0.66	0.45	0.61	0.30
1984	0.62	0.66	0.58	0.64	0.61	0.63	0.53	0.69	0.63	0.63	0.31
1985	0.64	0.67	0.58	0.65	0.62	0.66	0.55	0.69	0.64	0.62	0.32
1986	0.67	0.70	0.56	0.67	0.64	0.69	0.58	0.69	0.66	0.63	0.34
1987	0.69	0.73	0.59	0.69	0.66	0.71	0.59	0.67	0.69	0.64	0.36
1988	0.70	0.75	0.61	0.71	0.67	0.73	0.60	0.70	0.71	0.64	0.37
1989	0.72	0.76	0.62	0.71	0.64	0.75	0.62	0.73	0.74	0.63	0.42
1990	0.75	0.78	0.65	0.73	0.64	0.77	0.63	0.75	0.77	0.64	0.45
1991	0.76	0.79	0.66	0.73	0.69	0.77	0.65	0.75	0.77	0.65	0.45
1992	0.78	0.81	0.70	0.75	0.72	0.79	0.68	0.75	0.76	0.66	0.49
1993	0.80	0.83	0.72	0.76	0.73	0.81	0.69	0.76	0.76	0.66	0.48
1994	0.83	0.84	0.74	0.80	0.77	0.83	0.72	0.77	0.78	0.67	0.51
1995	0.85	0.85	0.74	0.81	0.76	0.85	0.75	0.77	0.77	0.66	0.50
1996	0.87	0.87	0.79	0.83	0.78	0.87	0.77	0.78	0.79	0.69	0.52
1997	0.90	0.89	0.85	0.85	0.84	0.90	0.81	0.80	0.83	0.72	0.56
1998	0.91	0.91	0.89	0.88	0.87	0.91	0.83	0.80	0.83	0.74	0.59
1999	0.94	0.93	0.89	0.90	0.90	0.92	0.85	0.81	0.84	0.75	0.61
2000	0.97	0.96	0.93	0.93	0.92	0.95	0.89	0.81	0.86	0.77	0.63
2001	0.98	0.97	0.94	0.94	0.93	0.97	0.91	0.84	0.87	0.78	0.64
2002	0.99	0.99	0.98	0.96	0.93	0.98	0.92	0.87	0.88	0.79	0.66
2003	1.00	1.00	1.03	0.97	0.94	0.96	0.93	0.90	0.88	0.79	0.67
2004	1.04	1.01	1.06	1.00	0.98	0.99	0.95	0.92	0.92	0.81	0.71
2005	1.04	1.03	1.09	1.01	0.99	0.99	0.97	0.94	0.93	0.83	0.71
2006	1.07	1.05	1.10	1.03	1.01	1.02	1.00	0.97	0.95	0.86	0.74
2007	1.09	1.06	1.11	1.05	1.03	1.03	1.00	0.98	0.96	0.89	0.76
2008	1.09	1.08	1.10	1.05	1.04	1.03	1.00	0.99	0.96	0.90	0.77
2009	1.08	1.06	1.05	1.05	1.01	1.01	1.01	0.99	0.95	0.89	0.77

Source: Zentrum für gesellschaftlichen Fortschritt