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Appendix

Cognitive ability measures

Sources and combination

Data from student assessment studies (SAS) and psychometric intelligence test studies (psychometric IQ) were used to calculate country cognitive ability estimates. Means indicate differences *between* countries, standard deviations differences *within* countries: In countries with a high average level there are also persons with very low cognitive ability, however comparatively few; and in countries with a low average level there are also persons with very high cognitive ability, however also comparatively few. The larger the standard deviations, the larger are the shares of the extremes, the larger are the low and/or high ability groups, and the less indicative is the country mean for any individual. And countries with a large population size can have very large absolute numbers in the shares of the extremes; for instance India, in spite of a low average level, has a quantitatively numerous cognitive elite.

Student assessment studies – data and within study combination

PISA (Programme for International Student Assessment) measures competence (general literacy, not depending on curriculum) in *reading*, *mathematics* and *science* for *15-year-old students*. The surveys began in 2000 and have been repeated every three years, with increasing country participation in each wave. The surveys are organised by the OECD (Organisation for Economic Cooperation and Development). PISA data from 2000 to 2012 were used (2000, 2003, 2006, 2009 and 2012). The reports can be found on the OECD-PISA homepages.

Peculiarities: In 2003 and 2012 *problem-solving* was additionally measured. Because in 2012 the country sample for problem-solving was smaller than for the other competence measures (44 vs. 65 countries) problem-solving was excluded. In PISA 2009 and 2012 for China only results for the province of Shanghai were reported. In order to use them as indicators for whole China we applied a regional correction based on information presented at the Anatoly Karlin web-

page (Karlin, 2012a), on average –57 SASQ equivalent –8.55 IQ. We cannot preclude the further possibility, that in Shanghai schools were positively selected (Chinese students report such rumours). Also, according to Loveless (2013), Chinese migrants from rural regions living in Shanghai are excluded from regular schools in Shanghai (they attend "hukou" schools or no schools) and from participation in PISA. According to an Internet based survey with self selected participants the Shanghai-China-difference is –3 IQ (equivalent –20 SASQ; Lynn & Cheng, 2013), smaller than our –8.55 IQ correction. But self selection processes can artificially reduce regional differences.

Similar corrections were necessary for regional surveys in India (–10 SASQ equivalent –1.50 IQ) and Venezuela (–15 SASQ equivalent –2.25 IQ); corrections are based on information on education and the general developmental level of regions (SAS data from Walker, 2011). If results were presented for Dubai and the entire Emirates, the results of the Emirates were used. If only results were given for Dubai the results were down corrected to take them as measures for the Emirates, –29.33 SASQ equivalent to –4.40 IQ, the correction is based on studies presenting for both territories results.

Calculation: First, PISA scales were simply averaged within survey years across different scales (reading, mathematics, science, 2003: also problem-solving) without any adaptation of scales. Second, on a common scale standardised PISA results were averaged across different survey years. The final PISA grand mean and standard deviation (*SD*) were orientated towards a raw grand mean and *SD* (N=74, M=456, SD=59, no study received a stronger weight).

TIMSS (Trends in International Mathematics and Science Study) measures competence in *mathematics* and *science* for mostly *fourth*, *eighth*, and *twelfth graders* and, depending on school enrolment age, for third and seventh graders in some countries. TIMSS focuses on core aspects of curricula in different countries, with greater emphasis on the curricula of developed countries. The surveys started in 1995, are repeated every four years with increasing country participation in each wave. The surveys are organised by the International Association for the Evaluation of Educational Achievement (IEA). Data from 1995 to 2011 were used (1995, 1999, 2003, 2007, and 2011).

Peculiarities: Parts of the TIMSS 2003 math survey were also applied in two Indian states (Das & Zajonc, 2010). Results standing for India were corrected based on information on education and the general developmental level of participating states (+7 SASQ equivalent +1.05 IQ). There is a doubtful-contradictory result in TIMSS 2007 for Kazakhstan: In 4th grade TIMSS the result was 541 SASQ, but in PISA 2009 for 15-year-old students only 398 SASQ, a difference of 143 points or 21 IQ. The TIMSS result for Kazakhstan is also very different to the ones of comparable countries. Finally, Mullis et al. (2008, p. 34) described sample anomalies. Therefore the TIMSS 2007 Kazakhstan result was deleted. In 2011 in five countries tests were applied in higher grades (instead of in grade 4 in grade 6: Botswana, Honduras; instead of grade 8 in grade 9: Botswana, Honduras, South Africa). For these countries the results were corrected based on results on annual SAS gains (school-based and nonschool-based gains,

annually 51.5 SASQ between grade 4 and 6, annually 34 SASQ between grade 8 and 9; case Yemen with measures in grade 4 and 6, Mullis et al., 2012a; Rindermann, 2011a).

For some countries only data for regions are presented (e.g. only for England and North Ireland but not for Wales and Scotland and not for United Kingdom, for some provinces of Canada). Because we do not have evidence for stable within deviations for these countries, the results were simply averaged. If within Belgium only Flanders participated the results were corrected to represent entire Belgium (–29 SASQ equivalent –4.35 IQ, based on common surveys for Flanders and Wallonia in TIMSS 1995).

Calculation: First, scales were simply averaged within grade and survey year across different scales (mathematics, science) without any adaptation of scales. Second, they were averaged on a common scale within survey year across different grades (4th and 8th grade). Third, on a common scale standardised TIMSS results were averaged across different survey years. The final grand mean and *SD* were orientated towards a TIMSS raw grand mean and *SD* (*N*=80, *M*=464, *SD*=73).

PIRLS (Progress in International Reading Literacy Study) measures competence in *reading* for *fourth graders* and, depending on enrolment age, for third graders in some countries. The surveys are repeated every five years (2001ff.), with more countries participating in each wave. The surveys are organised by the IEA (International Association for the Evaluation of Educational Achievement). Data from 2001 to 2011 were used (2001, 2006, and 2011). The reports can be found on the IEA-PIRLS and TIMSS homepages.

Peculiarities: In 2011 in four countries solely different testing procedures were used (an easier PrePIRLS test, or the usual PIRLS test was applied instead of in grade 4 in grade 6). For these four countries (South Africa, Botswana, Honduras, Kuwait) the results were transformed based on results on countries having both, in PrePIRLS and PIRLS, or in 4th and 6th grade, results and on general information on age and grade increases (Rindermann, 2011a): PrePIRLS to PIRLS, −135 SASQ; 6 to 4, −106 SASQ.

Calculation: Because there is only one scale and grade no within survey year averaging was necessary. On a common scale standardised PIRLS results were averaged across different survey years. The final grand mean and standard deviation were orientated towards a PIRLS raw grand mean and *SD* (*N*=58, *M*=490, *SD*=72).

Student assessment studies – combinations and older studies

The results of the two grade-orientated IEA studies PIRLS and TIMSS were averaged on a common scale (*N*=84, *M*=468, *SD*=75). Then IEA and OECD studies (PIRLS-TIMSS and PISA) were averaged on a common scale (*N*=98, *M*=451, *SD*=70).

PISA, PIRLS and TIMSS are higher quality student assessment studies regarding sample size, sample representativity (for students), comparability of age and grade across countries and reliability of tests, sample selection, testing pro-

cedure, international calibration of a common standard and calculation of country estimates for students (youth being in school). To add data for developing countries we used also older and regional studies. Their results were only considered if there were no data from PISA, PIRLS and TIMSS:

There are two older IEA studies from the 1990s: *IEA-Reading Literacy Study* 1990-1991 (Elley, 1992) and *IAEP-II* 1991 (International Assessment of Educational Progress, mathematics and science; Lapointe, Askew & Mead, 1992, Lapointe, Mead & Askew, 1992). Both studies of 9-year-old and 14-year-old students were combined according to the usual procedures (standardisation using common countries, adaptation to the international SASQ scale). Only one country having no data in PISA, PIRLS and TIMSS, but in older IEA studies, Mozambique, was added.

LLECE (Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación) measured twice, 1997 and 2005-2006, in 19 countries in third to sixth grade reading, mathematics and science (LLECE, 2000, 2008).[1] Both surveys were combined according to the usual procedures (standardisation using common countries, adaptation to the international SASQ scale). Results for seven countries were added: Bolivia, Dominican Republic, Ecuador, Guatemala, Honduras, Nicaragua and Paraguay.

Peculiarities: The highly diverging LLECE-results of Cuba were excluded (local SASQ of 651, about IQ 106). These very high Cuban results do not correspond to intelligence test results (Lynn & Vanhanen, 2012, IQ 85; Malloy, 2013, IQ 90), to observations in the 1990s in Cuba of people's behaviour in everyday life cognitive tasks and proficiency in Spanish orthography. In the past in other for society relevant attributes Communist countries have dressed up their statistics.[2]

The final not for age and grade corrected student assessment sum gives information on cognitive ability for 108 countries (M=444, SD=72; see Table A.1). It is difficult to precisely ascertain what the SASQ scale of defined M=500 and SD=100 stands for. PISA is calibrated for participating OECD countries. Reading is based on participating OECD countries in the year 2000, mathematics on participating OECD countries 2003 and science on participating OECD countries 2006 (OECD, 2012, p. 143). TIMSS and PIRLS are constantly oriented to the chosen country samples in 1995 and 2001 (Foy, Brossman & Galia, 2012, p. 4). We tried to preserve the original scaling (PISA scale and TIMSS-PIRLS scale equally averaged). However, the results needed to be standardised before com-

[1] There was recently published also a newer data set (TERCE) which is not used here.

[2] Malloy (2013): "International rankings can serve as a propaganda tool for non-Democratic governments. This invites a certain skepticism when one-party states like Cuba, North Korea, and China are intermediaries to statistics which are unusually impressive or inconsistent with results shown by multiple, independent research teams."

bination. So *M*=500 stands for the past mean of above average, overwhelmingly "First World" countries.

Additional SAS-based ability measures are

- the *intellectual* or *cognitive classes ability level*, precisely, the ability level of the 95th percentile or the lower threshold of the top 5%, and
- the level of the *least smart group*, 5th percentile or the upper threshold of the lowest 5%.

This information was only given in PISA, PIRLS and TIMSS. Also SAS-based are ability measures for

- *natives* and
- *immigrants*:

Combining PISA, PIRLS and TIMSS data and using their definitions an immigrant is a person with two foreign born parents or "one and a half" foreign born parents meaning having three foreign born grandparents or not more than one native born grandparent. All others are defined as natives. Not all student assessment studies provided information on natives' and immigrants' ability levels (only: PISA 2000, 2003, 2006, 2009 and 2012, PIRLS 2001 and 2006, TIMSS 1995 and 2007). And among the studies sometimes only results for natives and the total group were given, but not for immigrants. In these cases from averages and shares the missing results for immigrants were calculated. However, due to a missing value group, the group of students not giving information on their parents' origin, for nearly all studies and countries the abilities of natives and immigrants multiplied with their percentages did not result in the exact country mean (see Rindermann & Thompson, 2016). Therefore, multiple corrections were applied.

Psychometric intelligence test studies

Richard Lynn and Tatu Vanhanen collected single intelligence test studies from all over the world. The surveys were conducted with different tests, in different age groups, in different years and with differently large and representative samples. Test results were normed to one common benchmark, average of Britain 1979 called "Greenwich-IQ". For the different survey years Lynn and Vanhanen applied FLynn corrections assuming a roughly homogenous historic trend in different countries. The last version (Lynn & Vanhanen, 2012) covers 134 countries.

Peculiarities: A mistake for Bosnia was corrected by me (instead of total IQ 83.2 now 93.1). Their old rough Vietnam estimate (IQ 94) based on Indochina immigrants in the US was substituted by a newer Vietnam sample result (IQ 99; Rindermann, Hoang & Baumeister, 2013). The IQ samples are usually smaller and less representative than student assessment samples. Averaging across tests, age groups, survey years and studies of different authors increases the validity of country measures.

Our student assessment and their psychometric intelligence test results correlate with *r*=.85 (*N*=89). SAS correlates with our final cognitive ability grand mean with *r*=.99 (*N*=108), psychometric IQs with *r*=.96 (*N*=136), in the same

sample of 89 nations the correlations are $r_{SAS\text{-}CAtot}$=.98 and $r_{pIQ\text{-}CAtot}$=.92. The high correlations make larger errors improbable, however, *smaller errors* as errors of researchers in data compiling are quite usual in statistical analyses (in about 88% of all published studies; Panko, 1998) and *systematic biases* (e.g. due to study selection, cultural biases) cannot be excluded. For the proof of the last we need a comparison with other sources of evidence (see Chapter 4).

Further cognitive ability estimates and combination

The SASQ mean was transformed to the more conventional IQ scale by arithmetic transformation (simply used instead of a SASQ-scale with *M*=500 and *SD*=100 now an IQ scale with *M*=100 and *SD*=15, the same was done for the 95%, 05%, native and migrant measures) and then rescaled on the *Greenwich-IQ* with *UK natives* set at *M*=100. SAS and psychometric intelligence test results were combined (standardisation using common countries). Because SAS samples are usually larger and more systematically collected student assessment studies get in this combination a weight of 3, psychometric intelligence a weight of 1. Data are provided for 155 countries (*M*=86, *SD*=11, in IQ points).

Countries differ more (larger cross-country *SDs*) in student assessment than in psychometric intelligence test results. For the same 89 country sample the means and standard deviations are M_{SAS}=89.27, SD_{SAS}=10.88, M_{IQ}=90.86, SD_{IQ}=9.32 (UK: M_{SAS}=99.60 or M_{IQ}=100.00). Student achievement tests measuring – compared to psychometric intelligence tests – more crystallised knowledge loaden cognitive ability are more sensible for effects of educational and environmental quality than psychometric intelligence tests measuring – compared to student assessment tests – more fluid intelligence. International differences are more stressed by student assessment than by psychometric intelligence tests. Ironically, intelligence tests tend to iron out differences.

The African data base is quite unsatisfactory: Samples are rather small and frequently not representative, there are only very few internationally comparable SAS (Wicherts, Dolan & Maas, 2010; Rindermann, 2013). Therefore data for African countries were added from three studies: (1) *SACMEQ* (Southern and Eastern Africa Consortium for Monitoring Educational Quality; reading and mathematics in sixth grade 1995-1998, 1999-2004, 2007, *N*=14; Makuwa, 2010; Hungi et al., 2010), (2) *MLA* (Monitoring Learning Achievement; literacy, numeracy and life skills in fourth grade 1999, *N*=11; Chinapah et al., 2000) and (3) *PASEC* (Programme d'Analyse des Systèmes Éducatifs; French and mathematics in second and fifth grade, due to low comparability we used only mathematics, *N*=11; Conference, 2008). Each study was standardised on the 2012 Lynn and Vanhanen total score (comprising SAS and psychometric IQ studies). That means, because the regional African studies did not use an internationally comparable scale, we applied as a benchmark the only data set giving measured and estimated results for a large enough sample for countries within and outside Africa. The average of the three African studies SACMEQ, MLA and PASEC is given for 29 countries. These are all student assessment studies, but the usually information given by SAS publications, especially on age, participation and school attendancy rates, is missing. The representativity of data is unclear; an

international norm was not given. Therefore, we did not include them in our international SAS measure. However, conventional SAS are not given for the majority of African countries and psychometric intelligence test samples are not always convincing. Thus we used this data set for all African countries and added them to our cognitive ability grand mean (CA total). By adding them we have a broader data base for African countries. For the combination we used psychometric IQ data. Using three different benchmark approaches Sandefur (2016) came with results between 200 to 300 SASQ (TIMSS mathematics 8th grade 1995, in IQ about 55 to 70) to somewhat lower results.

Finally, only for those eight countries without any data but participation in the *International Mathematical Olympiad* (IMO) IMO results were added (Belarus, Brunei, Cambodia, Korea-North, Mauritania, Tajikistan, Turkmenistan, Uzbekistan). At IMO only the best six math students of a country below 20 years of age participate. IMO ranks were transformed to IQ scale and combined (adapted to the international IQ scale; Rindermann, 2011b). The final cognitive ability value (CA total), all with measured data, is given for 173 countries (M=85, SD=12). This value is standardised on a Greenwich-IQ scale with British natives (in the PISA, PIRLS and TIMSS) definition set at 100 (therefore, the UK average is here slightly lower with 99.60 IQ points).

The number of studies, an indicator of data quality of the cognitive ability total measure, is counted in this way: Each single student assessment study per year and grade was given a 1, also psychometric intelligence test results (for one country 1 or 0), IEA-Reading and IEAP (age groups 9 and 14 years) was each given a 0.20, also for LLECE (max. 0.20), African studies a 0.15 (together), IMO a 0.10. Within study quality differences were not considered (e.g. only provinces, small sample size; for psychometric IQ, Lynn & Vanhanen, 2012, pp. 20-29, gave more information). The highest value would be 19.25. However, because no country could participate in mutually exclusive regional studies (e.g. Latin America and Africa), this value could not be achieved. The highest values are achieved by Hungary and the US (both 18.90), followed by Hong Kong (18.50), New Zealand, UK and Norway (all 17.50). Participation and CA total are correlated ($r_{DQ\text{-}CAtot}$=.68, N=173): Countries with a higher ability level participated in more studies.

Older studies before 1991 were not used for calculating ability means intended to indicate current ability levels.

Corrections

Due to systematic differences in *age* (in grade-level oriented studies as PIRLS and TIMSS) students in different countries are differently old. Countries with older students have due to maturation and more learning time an advantage, countries with younger students a disadvantage. Additionally, ability is a developmental characteristic; achieving at younger age an ability level stands for a plus in ability and in the to be expected ability development later on. Therefore, an age-correction is necessary for students.

Second, countries differ in *school attendance rates*. Attending school leads to higher cognitive abilities; youth attending school is positively selected in ability and human capital; societies ensuring high attendance rates will more likely provide favourable conditions for further cognitive development. If we want to use student assessment results as an indicator for a) the ability level of the present youth, b) the ability level of the present population and c) the ability level of the coming workforce and citizens, all relevant for economy, society and culture, we need a measure for a not positively selected sample.

Van Damme, Liu, Vanhee and Pustjens (2010, pp. 62, 56) recommended to split the average gain of around 41 SASQ points per year in an *one third age gain* (around 14 SASQ) and a *two third school gain* (around 27 SASQ).[3] This is roughly comparable to a psychometric IQ-gain of around 5.62 per year (in SASQ 37 points; Rindermann, 2011a). Knowledge-based crystallised intelligence gains are larger than knowledge-reduced fluid intelligence gains (6.12 vs. 3.58 IQ, equivalent to 41 and 24 SASQ; Rindermann, 2011a). Similarly, student assessment gains are larger than general IQ gains and comparable to crystallised IQ gains. Therefore we subtracted *14 SASQ* (1/3 age gain) for each year being older than the average or added *14 SASQ* for each year younger than average.[4] 14 *SASQ* correspond to 2.10 IQ.

In psychometric intelligence tests youth's ability increases by ca. 3 IQ points per school attendance year (equivalent to 20 SASQ; Winship & Korenman, 1997; Falch & Sandgren-Massih, 2011; Brinch & Galloway, 2012). These school gains are larger in student assessment and crystallised intelligence tests compared to fluid intelligence tests (factor 1.5, e.g. 4.5 IQ vs. 3 IQ; Stelzl, Merz, Remer & Ehlers, 1995). We subtracted for each percentage of age cohort not attending school 1.5 SASQ points (equivalent 0.225 IQ points).[5] For example, a country with 50% school attendance rate get subtracted 75 SASQ (or 11.25 IQ). This correction assumes a large difference of 22.50 IQ between school attendees and non-attendees, larger than a one year loss of around 3 IQ – why? First, we cannot assume that youth not at school loses merely one year of education. More probably, they lose more years. If a 10 year old child does not attend school, it could lose around 6 years (≅18 IQ). Maybe it attends school later again, in young adulthood, but ability increases in higher age are smaller (e.g. for the US: Arum & Roksa, 2011; Cunha, Heckman, Lochner & Masterov, 2006). Second, there is not only an effect of lost positive school education, but also an effect of negative

[3] Van Damme et al. (2010) confirm with their results my older assumptions of a 42 SASQ gain per year (Rindermann, 2007a).

[4] Still more specific procedures should be developed in the future because gains depend on age (larger gains in younger age), on level (larger gains for the more intelligent), on school-quality (larger gains for better schools and school systems, smaller losses in worse school systems) and on general environmental quality (larger gains for better nutrition and health care). Genes may further gains.

[5] Our school attendance correction of 1% → 0.225 IQ points is somewhat larger than the one assumed by Hanushek & Woessmann (2015a, p. 69) with 1% → 0.15 IQ points.

selection: Youth not attending school is not identical to youth attending school in abilities and other attributes relevant for development. Except for rare high potentials, differences between them are magnified by different school attendance, but not created. Third, societies with low school enrolment rates will have other for cognitive development detrimental conditions, e.g. worse health care or civil wars. Empirically, the effect of this correction is identical to the one chosen by Das and Zajonc (2010, p. 181) for India.

According to Van de Vijver and Brouwers (2009) school attendance gains *differ* across countries, for instance in Malawi they are below <1 IQ for one year of school attendance. We assume that in countries with lower ability level youth not at school loses less developmental chances by not attending school than youth in countries with higher ability level: First, their school quality is usually lower ($r_{SAS\text{-}SQ}$=.63, N=94; see Chapter 9). Second, if a child loses only one year of school education (e.g. grade 10), the negative effect of this one lost year is larger than the negative effect of losing additionally one more year after already having lost e.g. four other years before (e.g. loosing grades 6-9 plus loosing grade 10; law of marginal utility, diminishing returns). Third, the lower the ability level the closer people come to a more or less common biological lower threshold of cognitive ability. Fourth, stimulation in everyday life buffers school losses.

Therefore, we applied a milder correction in a smoothed way; the lower the country ability level, the smaller the correction. Two examples: Albania has in the PISA grand mean an uncorrected result of 385 SASQ, without low-ability mitigation a corrected 330 SASQ would result, with the applied low-ability mitigation a corrected 341 SASQ is estimated (in IQ-metric: 83, 75 and 76). Or South Africa achieved in the PIRLS-TIMSS grand mean an uncorrected result of 296 SASQ, without low-ability mitigation a corrected 249 SASQ, with the applied low-ability mitigation a corrected 255 SASQ (in IQ 69, 62 and 63). Nevertheless, because in countries at lower student assessment levels students in comparable grades are somewhat older (r=–.26, N=87) and more youth is not attending school (r=.71, N=101) the corrections are still higher than for countries at higher ability levels with usually not too old students and high enrolment rates.

Additionally, it is reasonable to assume that in primary school age school attendance rates are not appropriately documented by international statistics: The majority of youth not in regular primary school is unlikely to be excluded from school education, often they will attend other forms of school as special schools or the school attendance is only interrupted. The reduction represents here only a difference of 15.39 IQ between school attendees and non-attendees.

In studies where information on age and school attendance was not presented the information was estimated from other student assessment studies or by the mean of other countries in the same region. The corrections were identically applied for natives and immigrants. Because we assume no school attendance has a smaller negative impact at the lowest ability level (5% percentile) than at the highest ability level (95% percentile) – youth at the lowest ability level is nearer to the biological lower threshold of cognitive ability – we reduced the correction

for this group (5% percentile) at their lower values. For the intellectual classes ability level not attending school should be particularly detrimental (if not compensated by private instruction). The average corrections across countries were for the 05% level −11.57 SASQ (−1.73 IQ) and for the 95% level −18.97 SASQ (−2.85 IQ).

Also the estimates of Lynn and Vanhanen (2012) were corrected. They provided psychometric intelligence test results for 134 countries and estimates for 65 countries. Their estimates are based on student assessment results (if given) or on results of neighbouring countries. We assume that if countries did not participate in psychometric intelligence test or student assessment studies, the general conditions for cognitive development are less than optimal. They have no psychological research, they are opposed to cognitive ability and/or its research, they have had wars, the general developmental level is very low. Therefore, if the estimates of Lynn and Vanhanen are based on neighbouring countries, we deducted 3 IQ points.[6] Corrected SAS and corrected psychometric IQ correlate with r=.86 (N=108). This correlation is somewhat problematic, because the estimated IQs from Lynn and Vanhanen are based in few countries on SAS. If we take the older corrected values from Lynn and Vanhanen (2006, no SAS based estimations) the correlation is similarly high: r=.84 (N=104).

All corrections are more conservative (smaller) compared to the ones in the 2007 overview paper (Rindermann, 2007a). Reasons: The old 42 SASQ per one year of age corrections did not distinguish between school attendance and age increases (reduced from 42 SASQ to 14 SASQ). The old corrections for not attending school overestimated school effects; old: SAScorr=SAS- ((100-$Part_{SAS}$) ×2); new: SAScorr=SAS- ((100-$Part_{SAS}$) ×1.5) in secondary and ×1.3 in primary. The 2007 correction represented a 30 IQ difference between school attendees and non-attendees, the new for secondary school applies a 22.50 IQ difference, in primary school 15.39 IQ.[7] Comparisons between then missing countries in IQ and later added ones revealed smaller differences between countries having or not having data (from –5 to –3 IQ if no data given). Additionally, countries with data in SAS but not in IQ were not corrected downwards.

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[6] Some small countries, not participating due to their smallness, for instance Andorra, maybe are overcorrected. However, countries as Liechtenstein or Macau have participated.

[7] A correction of 22.50 or 15.39 IQs for not attending (any more) school sounds rather large. However, to give only one example, in Germany with a tracked school system the difference between the cognitive more demanding track, Gymnasium, and the cognitive less demanding track, Hauptschule, is on average in PISA 2000 and 2003 about 179 SASQ or 27 IQ points (Prenzel et al., 2004). In the CogAT intelligence test the difference is in South Germany about 41 (total score) or 25 (figural) IQ points (Heller & Perleth, 2000). On average there is a difference of 31 IQ points between differently schooled children – how large would be the difference between schooled and not (any more) schooled children?

Countries with the largest gains due to all corrections are (for CA total): Brunei (+6 IQ points), Belize and Tunisia (+5), Comoros and Cambodia (+3) and Korea-North (+2). The greatest downward corrections are observable for: Tajikistan and Uzbekistan (–7), Vietnam (–6), Mauritania and Gabon (–5), and Belarus (–4). Per definition, there is no change for the benchmark United Kingdom (0). The United States has a correction of –0.18 IQ points, Germany of –0.38.

Why countries with single measured or estimated values in psychometric intelligence tests do not have the same result in the psychometric and the CA total measure? For instance Afghanistan (Lynn-Vanhanen: 73, CA total 71) or Angola (LV 69, CA total 67)? Some countries have results in African regional studies or in IMO. However, more important is, that SAS and psychometric test results are rescaled to the UK natives mean of 100. We should not forget that SAS or IQs, independent of their terms and scaling, theoretical background and used tasks, are deviation measures from a reference sample. There is no material *mètre des archives* like in Paris for the metre.

Old student assessment studies from 1960s and 1970s

These older studies were taken for calculating a past cognitive ability measure to be used in longitudinal analyses. IEA's first international study of students' competences in *mathematics* was conducted in 11 countries during 1963 and 1964, surveying two age-grade groups: *age 13* (US eighth grade) and the *last year of secondary education* (US twelfth grade). The other older studies measured competences in *reading* and *science* of students between *10 and 14 years* of age or in the *last year of secondary education* in 1972-73.

The results were collected in one summary table by Lee and Barro (2001), the data table was published 1997.[8] We took from 1964: IEA-Mathematics 13-year old students, eighth grade; IEA-Mathematics at the end of secondary school. From 1972: Reading 13-year old students; science 10-year old students; science 14-year old students; science at the end of secondary school. The mean correlation among these studies with weighted N and after Fisher-z-transformation is r=.62.

The final average was standardised according to new student assessment results and IQ measures (corrected total average). UK was not rescaled to 100 (so a historical development is possible to observe). No corrections were applied (no information is given on age etc.). The complete sample for old student assessment studies includes 19 nations: Australia, Belgium, Chile, Finland, France,

[8] World Bank, Table 2, International Test Scores, http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20699068~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html.

Compilation

Germany, Hungary, India, Iran, Israel, Italy, Japan, Malawi, Netherlands, New Zealand, Sweden, Thailand, United Kingdom, USA.

Table A.1: Uncorrected cognitive ability measures

Country	CA total	SASQ	SAS-IQ	95%-IQ	05%-IQ	Nat-IQ	Mig-IQ	LyVa-IQ	Data-Q
Afghanistan	–	–	–	–	–	–	–	–	0
Albania	85	411	84	107	57	84	78	–	3.10
Algeria	83	390	81	98	63	82	77	–	2.10
Andorra	–	–	–	–	–	–	–	–	0
Angola	–	–	–	–	–	–	–	–	0
Antigua-Barbuda	–	–	–	–	–	–	–	–	0
Argentina	87	398	82	106	57	82	77	96	6.30
Armenia	92	459	91	114	68	91	94	92	7.10
Australia	99	519	100	121	77	100	100	98	16.10
Austria	99	512	99	118	77	100	92	100	12.10
Azerbaijan	88	430	87	106	68	87	86	–	4.10
Bahamas	–	–	–	–	–	–	–	–	0
Bahrain	85	418	85	107	62	85	85	81	5.10
Bangladesh	80	–	–	–	–	–	–	81	1.10
Barbados	79	–	–	–	–	–	–	80	1.00
Belarus	100	–	–	–	–	–	–	–	0.10
Belgium	99	510	99	118	76	100	92	99	10.50
Belize	66	267	62	88	41	63	61	–	1.00
Benin (Dahomey)	64	–	–	–	–	–	–	–	0.25
Bermuda	89	–	–	–	–	–	–	90	1.00
Bhutan	–	–	–	–	–	–	–	–	0
Bolivia	83	382	79	–	–	–	–	87	1.30
Bosnia	92	457	91	110	70	91	89	94	2.10
Botswana	73	322	70	92	49	71	65	71	6.35
Brazil	86	417	85	107	62	85	77	87	6.50
Brunei	76	–	–	–	–	–	–	–	0.10
Bulgaria	94	479	94	117	68	94	86	93	12.10
Burkina Faso	65	–	–	–	–	–	–	–	0.15
Burma (Myanmar)	–	–	–	–	–	–	–	–	0
Burundi	73	–	–	–	–	–	–	–	0.15
Cambodia	82	–	–	–	–	–	–	–	0.10
Cameroon	68	–	–	–	–	–	–	64	1.15
Canada	101	528	101	121	81	102	100	100	14.90
Cape Verde	–	–	–	–	–	–	–	–	0
Central Afric R	62	–	–	–	–	–	–	64	1.00
Chad	67	–	–	–	–	–	–	–	0.15
Chile	88	429	86	108	65	87	81	91	9.30
China	103	536	102	120	82	103	93	106	3.30
Colombia	84	405	83	103	62	83	75	84	9.30
Comoros	67	–	–	–	–	–	–	–	0.15
Congo (Brazz)	72	–	–	–	–	–	–	73	1.00
Congo (Zaire)	67	–	–	–	–	–	–	68	1.15
Cook Islands	88	–	–	–	–	–	–	89	1.00

Costa Rica	89	444	89	108	71	89	86	86	3.30
Cote d'Ivoire	65	–	–	–	–	–	–	71	1.25
Croatia	98	499	97	115	78	97	95	99	6.10
Cuba	84	–	–	–	–	–	–	85	1.10
Cyprus	92	460	91	113	66	92	89	–	8.50
Czech Republic	99	516	99	119	78	100	97	98	14.10
Denmark	99	512	99	118	78	100	92	98	11.50
Djibouti	–	–	–	–	–	–	–	–	0
Dominica	65	–	–	–	–	–	–	67	1.00
Dominican Repub	76	328	71	–	–	–	–	82	1.20
East Timor	–	–	–	–	–	–	–	–	0
Ecuador	81	359	76	–	–	–	–	88	1.30
Egypt	83	396	82	107	54	83	72	81	3.00
El Salvador	80	370	78	96	59	78	72	–	2.30
Equat. Guinea	–	–	–	–	–	–	–	–	0
Eritrea	74	–	–	–	–	–	–	76	1.00
Estonia	101	535	102	121	84	103	99	99	5.10
Ethiopia	67	–	–	–	–	–	–	69	1.00
Fiji	84	–	–	–	–	–	–	85	1.00
Finland	101	540	103	121	84	104	95	97	10.50
France	98	506	98	117	76	99	93	98	10.70
Gabon	73	–	–	–	–	–	–	–	0.15
Gambia	60	–	–	–	–	–	–	62	1.00
Georgia	86	418	85	107	61	85	74	–	7.10
Germany	99	515	99	119	77	101	93	99	12.50
Ghana	67	271	63	90	37	64	54	70	4.00
Greece	94	485	95	116	72	96	90	92	9.50
Greenland	–	–	–	–	–	–	–	–	0
Grenada	–	–	–	–	–	–	–	–	0
Guatemala	78	353	75	–	–	–	–	79	1.30
Guinea-Bissau	–	–	–	–	–	–	–	–	0
Guinea	65	–	–	–	–	–	–	67	1.00
Guyana	–	–	–	–	–	–	–	–	0
Haiti	–	–	–	–	–	–	–	–	0
Honduras	74	312	69	86	51	–	–	81	3.30
Hong Kong	105	545	104	122	83	104	103	108	18.50
Hungary	98	513	99	119	77	99	94	97	18.90
Iceland	98	495	96	116	75	97	89	101	10.50
India	80	369	77	103	52	–	–	82	3.10
Indonesia	85	404	83	102	63	83	73	87	12.30
Iran	85	413	84	105	62	84	80	84	13.10
Iraq	86	–	–	–	–	–	–	87	1.00
Ireland	98	518	100	120	78	100	100	93	10.90
Israel	95	482	94	118	67	95	94	95	13.50
Italy	97	500	97	117	75	98	92	97	16.90
Jamaica	70	–	–	–	–	–	–	71	1.00

Japan	104	549	104	124	82	105	95	105	15.10
Jordan	86	428	86	109	61	86	87	84	8.20
Kazakhstan	91	453	90	111	69	90	90	–	4.10
Kenya	76	–	–	–	–	–	–	74	1.15
Kiribati	–	–	–	–	–	–	–	–	0
Korea-North	97	–	–	–	–	–	–	–	0.10
Korea-South	106	561	106	125	86	107	97	106	13.50
Kuwait	79	345	74	96	51	74	72	87	9.10
Kyrgyzstan	77	349	74	99	50	74	77	–	2.10
Laos	88	–	–	–	–	–	–	89	1.00
Latvia	98	506	98	117	78	98	97	–	13.10
Lebanon	84	410	84	106	62	84	80	82	4.00
Lesotho	65	–	–	–	–	–	–	–	0.15
Liberia	–	–	–	–	–	–	–	–	0
Libya	84	–	–	–	–	–	–	85	1.00
Liechtenstein	101	528	101	120	80	103	98	–	5.10
Lithuania	96	499	97	116	77	97	91	92	15.10
Luxembourg	99	511	99	119	76	102	95	–	6.10
Macau	101	526	101	118	83	100	101	–	4.10
Macedonia	87	420	85	108	61	86	77	–	6.10
Madagascar	78	–	–	–	–	–	–	82	1.15
Malawi	60	–	–	–	–	–	–	60	1.15
Malaysia	90	451	90	110	69	90	81	89	7.10
Maldives	–	–	–	–	–	–	–	–	0
Mali	70	–	–	–	–	–	–	70	1.15
Malta	94	465	92	116	64	92	90	97	5.00
Mariana Islands	80	–	–	–	–	–	–	81	1.00
Marshall Islands	83	–	–	–	–	–	–	84	1.00
Mauritania	79	–	–	–	–	–	–	–	0.10
Mauritius	85	434	87	110	62	–	–	89	2.15
Mexico	88	436	88	108	67	88	80	88	6.30
Micronesia	–	–	–	–	–	–	–	–	0
Moldova	90	444	89	110	66	89	89	–	6.10
Mongolia	92	438	88	107	67	–	–	100	3.10
Montenegro	88	428	86	108	64	86	87	–	3.10
Morocco	79	322	70	94	49	71	63	84	11.25
Mozambique	76	426	86	–	–	–	–	64	1.45
Namibia	68	–	–	–	–	–	–	72	1.15
Nepal	77	–	–	–	–	–	–	78	1.00
Nether Antilles	86	–	–	–	–	–	–	87	1.00
Netherlands	101	528	101	119	82	102	96	100	15.50
New Caledonia	84	–	–	–	–	–	–	85	1.00
New Zealand	99	516	100	122	75	100	99	99	17.50
Nicaragua	80	368	77	–	–	–	–	–	0.20
Niger	65	–	–	–	–	–	–	–	0.15
Nigeria	77	365	77	–	–	–	–	71	1.30

Norway	97	493	96	115	75	97	91	100	17.50
Oman	81	377	79	103	54	79	73	85	5.00
Pakistan	83	–	–	–	–	–	–	84	1.10
Palestine	83	388	80	106	53	81	74	86	4.00
Panama	83	392	81	105	56	81	78	–	1.30
Papua N-Guinea	82	–	–	–	–	–	–	83	1.00
Paraguay	81	378	79	–	–	–	–	84	1.30
Peru	83	386	80	104	56	80	74	85	4.30
Philippines	80	352	75	101	50	–	–	90	4.30
Poland	97	500	97	117	76	97	89	95	9.10
Portugal	96	495	96	116	75	97	94	95	10.90
Puerto Rico	82	–	–	–	–	–	–	83	1.10
Qatar	81	375	78	104	53	74	82	83	10
Romania	91	457	91	113	68	91	81	91	13.10
Russia	98	506	98	118	77	98	96	97	16.50
Rwanda	75	–	–	–	–	–	–	76	1.00
Saint Helena	–	–	–	–	–	–	–	–	0
Saint Lucia	60	–	–	–	–	–	–	62	1.00
Samoa-West	87	–	–	–	–	–	–	88	1.00
Sao Tome/Princi	–	–	–	–	–	–	–	–	0
Saudi Arabia	81	389	80	102	58	80	81	79	6.10
Senegal	69	–	–	–	–	–	–	71	1.15
Serbia	92	468	92	114	70	92	92	89	8.10
Seychelles	81	–	–	–	–	–	–	–	0.15
Sierra Leone	62	–	–	–	–	–	–	64	1.00
Singapore	106	555	105	127	81	105	106	109	15.50
Slovakia	98	502	97	118	75	98	88	98	13.10
Slovenia	98	508	98	118	77	99	94	96	16.90
Solomon Islands	–	–	–	–	–	–	–	–	0
Somalia	–	–	–	–	–	–	–	–	0
South Africa	69	285	65	97	41	67	56	72	7.25
Spain	96	492	96	115	75	96	91	97	10.90
Sri Lanka	78	–	–	–	–	–	–	79	1.10
St. Kitts & Nevis	–	–	–	–	–	–	–	–	0
St. Vincent/Gre	70	–	–	–	–	–	–	71	1.00
Sudan	76	–	–	–	–	–	–	78	1.00
Suriname	88	–	–	–	–	–	–	89	1.00
Swaziland	76	–	–	–	–	–	–	–	0.15
Sweden	99	514	99	119	78	100	94	99	15.50
Switzerland	100	520	100	120	78	102	95	101	7.70
Syria	82	388	80	103	61	81	75	81	4.10
Taiwan	103	539	103	123	81	103	94	105	13.50
Tajikistan	89	–	–	–	–	–	–	–	0.10
Tanzania	74	–	–	–	–	–	–	73	1.15
Thailand	90	455	90	110	71	91	83	88	12.30
Tibet	91	–	–	–	–	–	–	92	1.00

Togo	–	–	–	–	–	–	–	–	0
Tonga	85	–	–	–	–	–	–	86	1.00
Trinidad Tobago	88	431	87	112	60	87	87	–	3.50
Tunisia	86	402	82	102	62	83	74	84	12.25
Turkey	89	445	89	111	68	89	80	89	10.10
Turkmenistan	85	–	–	–	–	–	–	–	0.10
Uganda	72	–	–	–	–	–	–	72	1.15
Ukraine	94	475	93	114	71	94	92	95	4.10
United Arab Emi	87	439	88	112	64	81	91	83	8.10
United Kingdom	100	517	100	121	77	100	97	100	17.50
United States	99	511	99	120	76	100	95	98	18.90
Uruguay	91	444	89	112	63	89	79	96	5.30
Uzbekistan	89	–	–	–	–	–	–	–	0.10
Vanuatu	–	–	–	–	–	–	–	–	0
Venezuela	86	419	85	108	58	–	–	84	2.70
Vietnam	100	527	101	118	84	101	92	99	2.10
Yemen	70	265	62	83	41	63	59	83	4.00
Zambia	69	–	–	–	–	–	–	75	1.15
Zimbabwe	72	331	72	–	–	–	–	72	1.45
Country	**CA total**	**SASQ**	**SAS-IQ**	**95%-IQ**	**05%-IQ**	**Nat-IQ**	**Mig-IQ**	**LyVa-IQ**	**Data-Q**
Mean	84.68	444.03	88.70	111.00	67.56	90.74	86.03	86.06	4.61
Standard Deviat.	11.52	71.51	10.73	9.09	11.27	10.50	10.98	11.29	5.34
Number countries	173	108	108	99	99	93	93	136	200

Notes: CA total: grand mean of student assessment and psychometric intelligence-studies in IQ metric; SASQ: mean of student assessment studies (PISA, PIRLS, TIMSS, IEA, 1991-2011) in SASQ-scale with *M*=500 and *SD*=100; SAS-IQ: mean of student assessment studies in IQ scale; 95%-IQ: ability at the 95%-level in PISA, PIRLS, TIMSS (cognitive classes) in IQ scale; 05%-IQ: ability at the 05%-level in PISA, PIRLS, TIMSS in IQ scale; Nat-IQ: natives' mean of student assessment studies (PISA, PIRLS, TIMSS) in IQ scale; Mig-IQ: immigrants' mean of student assessment studies (PISA, PIRLS, TIMSS) in IQ scale; LyVa-IQ: Lynn and Vanhanen's measured psychometric intelligence test mean; Data-Q: number of studies, less reliable studies with weights<1; norm scale: Greenwich-IQ with UK-natives as 100 and UK standard deviation as 15; for United Kingdom (Great Britain) the exact country averages in CA total and SAS-IQ are 99.60, for natives by definition 100.00; for further information see "Sources and procedure". Data compiled March 22, 2014.

Table A.2: Corrected cognitive ability measures including estimates

Country	CA totc	SAS-IQc	95%-IQc	05%-IQc	Nat-IQc	Mig-IQc	N-M-Diff	Migr-gain	LyVa-IQc
Afghanistan	71	–	–	–	–	–	–	–	73
Albania	83	77	100	52	78	72	5.74	−0.19	83
Algeria	84	80	98	62	81	77	4.08	−0.92	85
Andorra	94	–	–	–	–	–	–	–	95
Angola	67	–	–	–	–	–	–	–	69
Antigua-Barbuda	70	–	–	–	–	–	–	–	72
Argentina	87	80	103	56	80	75	5.74	−0.47	96
Armenia	90	86	107	64	85	89	−3.37	0.31	92
Australia	99	99	120	77	99	100	−0.84	0.30	98
Austria	99	98	117	77	99	92	7.82	−1.41	100
Azerbaijan	88	86	105	68	86	86	0.24	−0.19	86
Bahamas	81	–	–	–	–	–	–	–	82
Bahrain	86	85	107	62	85	85	0.60	−0.29	81
Bangladesh	80	–	–	–	–	–	–	–	81
Barbados	79	–	–	–	–	–	–	–	80
Belarus	96	–	–	–	–	–	–	–	93
Belgium	99	99	118	76	100	92	7.91	−1.54	99
Belize	71	60	86	40	61	58	2.55	−1.13	78
Benin (Dahomey)	66	–	–	–	–	–	–	–	69
Bermuda	89	–	–	–	–	–	–	–	90
Bhutan	74	–	–	–	–	–	–	–	76
Bolivia	83	76	–	–	–	–	–	–	87
Bosnia	92	88	107	68	89	87	1.45	−0.18	94
Botswana	73	65	87	46	65	59	5.88	−0.65	71
Brazil	85	80	102	59	80	72	8.23	−0.30	87
Brunei	82	–	–	–	–	–	–	–	90
Bulgaria	93	92	115	67	92	84	8.38	−0.09	93
Burkina Faso	66	–	–	–	–	–	–	–	68
Burma (Myanmar)	82	–	–	–	–	–	–	–	83
Burundi	70	–	–	–	–	–	–	–	70
Cambodia	85	–	–	–	–	–	–	–	90
Cameroon	67	–	–	–	–	–	–	–	64
Canada	101	101	120	81	102	100	1.39	−0.30	100
Cape Verde	72	–	–	–	–	–	–	–	74
Central Afric R	62	–	–	–	–	–	–	–	64
Chad	64	–	–	–	–	–	–	–	64
Chile	89	85	105	64	85	80	5.18	−0.16	91
China	101	99	116	79	100	90	9.66	−0.38	106
Colombia	82	76	96	57	76	68	8.33	−0.38	84
Comoros	70	–	–	–	–	–	–	–	75
Congo (Brazz)	71	–	–	–	–	–	–	–	73
Congo (Zaire)	67	–	–	–	–	–	–	–	68
Cook Islands	88	–	–	–	–	–	–	–	89

Costa Rica	87	84	103	67	84	81	3.30	−0.31	86
Cote d'Ivoire	66	–	–	–	–	–	–	–	71
Croatia	97	96	114	76	96	94	2.35	−0.32	99
Cuba	84	–	–	–	–	–	–	–	85
Cyprus	93	92	114	67	92	89	2.91	−0.36	93
Czech Republic	99	99	118	78	99	96	2.86	−0.12	98
Denmark	98	98	117	77	99	92	7.20	−0.78	98
Djibouti	71	–	–	–	–	–	–	–	73
Dominica	65	–	–	–	–	–	–	–	67
Dominican Repub	78	70	–	–	–	–	–	–	82
East Timor	82	–	–	–	–	–	–	–	83
Ecuador	82	73	–	–	–	–	–	–	88
Egypt	84	80	106	54	82	70	11.60	−1.81	81
El Salvador	79	72	91	55	73	66	6.28	−0.68	79
Equat. Guinea	65	–	–	–	–	–	–	–	67
Eritrea	74	–	–	–	–	–	–	–	76
Estonia	100	101	119	83	102	98	3.59	−0.46	99
Ethiopia	67	–	–	–	–	–	–	–	69
Fiji	84	–	–	–	–	–	–	–	85
Finland	101	103	121	84	104	95	8.30	−0.55	97
France	98	97	116	76	98	92	6.30	−1.20	98
Gabon	68	–	–	–	–	–	–	–	67
Gambia	60	–	–	–	–	–	–	–	62
Georgia	87	83	105	60	83	72	11.12	−0.53	88
Germany	99	99	118	76	100	92	8.26	−1.59	99
Ghana	64	51	81	32	52	43	9.34	−0.79	70
Greece	95	95	116	73	96	90	5.89	−0.75	92
Greenland	88	–	–	–	–	–	–	–	89
Grenada	70	–	–	–	–	–	–	–	72
Guatemala	79	72	–	–	–	–	–	–	79
Guinea-Bissau	65	–	–	–	–	–	–	–	67
Guinea	65	–	–	–	–	–	–	–	67
Guyana	78	–	–	–	–	–	–	–	79
Haiti	63	–	–	–	–	–	–	–	65
Honduras	75	65	84	49	–	–	–	–	81
Hong Kong	104	103	120	82	103	102	0.65	−0.25	108
Hungary	98	98	118	76	98	93	4.72	−0.10	97
Iceland	98	97	117	76	98	90	7.80	−0.49	101
India	78	69	94	47	–	–	–	–	82
Indonesia	84	79	98	60	79	69	10.32	−0.37	87
Iran	85	81	102	60	81	78	3.80	−0.06	84
Iraq	86	–	–	–	–	–	–	–	87
Ireland	97	99	119	78	99	99	0.13	−0.04	93
Israel	95	93	116	66	93	93	0.13	−0.06	95
Italy	98	97	118	75	98	92	5.99	−0.52	97
Jamaica	69	–	–	–	–	–	–	–	71

Japan	104	104	124	82	105	95	9.65	−0.31	105
Jordan	87	85	107	61	84	86	−1.69	0.48	84
Kazakhstan	90	88	109	68	88	88	0.29	−0.10	86
Kenya	74	–	–	–	–	–	–	–	74
Kiribati	82	–	–	–	–	–	–	–	83
Korea-North	99	–	–	–	–	–	–	–	103
Korea-South	105	106	124	85	106	97	9.81	−0.60	106
Kuwait	79	69	92	49	70	68	2.23	−0.48	87
Kyrgyzstan	77	71	96	48	71	74	−3.05	0.29	76
Laos	88	–	–	–	–	–	–	–	89
Latvia	97	97	115	77	97	95	1.61	−0.17	97
Lebanon	83	78	99	58	78	74	4.37	−0.46	82
Lesotho	66	–	–	–	–	–	–	–	67
Liberia	64	–	–	–	–	–	–	–	66
Libya	84	–	–	–	–	–	–	–	85
Liechtenstein	99	99	117	78	101	95	5.48	−1.96	101
Lithuania	95	95	113	75	95	89	6.15	−0.34	92
Luxembourg	97	98	118	75	101	94	7.29	−3.37	96
Macau	98	96	112	79	96	97	−0.86	0.66	101
Macedonia	86	80	102	57	80	72	8.45	−0.48	91
Madagascar	77	–	–	–	–	–	–	–	82
Malawi	61	–	–	–	–	–	–	–	60
Malaysia	90	87	107	67	88	78	9.67	−0.48	89
Maldives	78	–	–	–	–	–	–	–	79
Mali	69	–	–	–	–	–	–	–	70
Malta	94	91	114	63	91	89	2.29	−0.30	97
Mariana Islands	80	–	–	–	–	–	–	–	81
Marshall Islands	83	–	–	–	–	–	–	–	84
Mauritania	74	–	–	–	–	–	–	–	72
Mauritius	86	84	105	59	–	–	–	–	89
Mexico	86	81	100	62	81	73	8.20	−0.39	88
Micronesia	81	–	–	–	–	–	–	–	82
Moldova	90	87	107	65	87	87	−0.54	0.15	93
Mongolia	91	84	103	65	–	–	–	–	100
Montenegro	88	86	107	64	86	87	−1.37	0.33	87
Morocco	76	63	88	44	63	55	8.35	−0.61	84
Mozambique	77	77	–	–	–	–	–	–	64
Namibia	68	–	–	–	–	–	–	–	72
Nepal	77	–	–	–	–	–	–	–	78
Nether Antilles	86	–	–	–	–	–	–	–	87
Netherlands	101	101	119	82	102	96	6.79	−0.98	100
New Caledonia	84	–	–	–	–	–	–	–	85
New Zealand	99	99	121	75	100	99	0.91	−0.22	99
Nicaragua	81	74	–	–	–	–	–	–	82
Niger	66	–	–	–	–	–	–	–	68
Nigeria	75	69	–	–	–	–	–	–	71

Norway	98	97	116	75	97	91	5.68	−0.54	100
Oman	80	72	96	50	73	66	6.71	−0.84	85
Pakistan	83	–	–	–	–	–	–	–	84
Palestine	83	77	102	52	78	71	7.35	−0.86	86
Panama	82	76	100	54	77	73	3.55	−0.32	81
Papua N-Guinea	81	–	–	–	–	–	–	–	83
Paraguay	82	75	–	–	–	–	–	–	84
Peru	83	77	100	54	77	70	6.46	−0.17	85
Philippines	80	70	96	47	–	–	–	–	90
Poland	97	97	117	76	97	89	8.57	−0.16	95
Portugal	95	95	114	74	95	92	2.77	−0.22	95
Puerto Rico	81	–	–	–	–	–	–	–	83
Qatar	83	78	104	53	74	82	–7.88	4.21	83
Romania	91	88	109	66	88	79	9.65	−0.29	91
Russia	97	97	117	76	97	95	2.63	−0.32	97
Rwanda	75	–	–	–	–	–	–	–	76
Saint Helena	83	–	–	–	–	–	–	–	84
Saint Lucia	60	–	–	–	–	–	–	–	62
Samoa-West	87	–	–	–	–	–	–	–	88
Sao Tome/Princi	63	–	–	–	–	–	–	–	65
Saudi Arabia	81	77	98	55	76	77	−0.72	0.12	79
Senegal	69	–	–	–	–	–	–	–	71
Serbia	91	91	111	68	90	91	−0.31	0.11	89
Seychelles	81	–	–	–	–	–	–	–	85
Sierra Leone	62	–	–	–	–	–	–	–	64
Singapore	105	105	126	81	105	106	−1.14	0.27	109
Slovakia	98	97	117	75	97	87	9.99	−0.36	98
Slovenia	97	98	117	77	98	93	5.40	−0.67	96
Solomon Islands	80	–	–	–	–	–	–	–	81
Somalia	68	–	–	–	–	–	–	–	70
South Africa	70	59	92	39	61	51	10.50	−1.90	72
Spain	96	95	114	75	96	90	5.74	−0.56	97
Sri Lanka	78	–	–	–	–	–	–	–	79
St. Kitts & Nevis	70	–	–	–	–	–	–	–	72
St. Vincent/Gre	69	–	–	–	–	–	–	–	71
Sudan	76	–	–	–	–	–	–	–	78
Suriname	88	–	–	–	–	–	–	–	89
Swaziland	74	–	–	–	–	–	–	–	76
Sweden	99	99	118	78	100	94	6.50	−1.08	99
Switzerland	100	100	119	78	102	95	7.30	−2.19	101
Syria	82	77	99	58	78	71	6.04	−0.67	81
Taiwan	103	103	123	81	103	94	9.77	−0.31	105
Tajikistan	82	–	–	–	–	–	–	–	78
Tanzania	72	–	–	–	–	–	–	–	73
Thailand	89	87	106	68	87	79	7.74	−0.23	88
Tibet	91	–	–	–	–	–	–	–	92

Togo	66	–	–	–	–	–	–	–	68
Tonga	85	–	–	–	–	–	–	–	86
Trinidad Tobago	88	85	110	59	85	85	0.08	−0.08	87
Tunisia	91	82	102	62	82	74	8.64	−0.41	84
Turkey	87	82	103	62	82	73	9.17	−0.24	89
Turkmenistan	82	–	–	–	–	–	–	–	81
Uganda	71	–	–	–	–	–	–	–	72
Ukraine	93	91	111	69	91	89	2.02	−0.25	95
United Arab Emi	89	88	112	64	81	91	−10.18	7.42	83
United Kingdom	100	100	121	77	100	97	3.06	−0.40	100
United States	98	98	119	76	99	95	4.11	−0.82	98
Uruguay	90	85	107	60	85	75	9.65	−0.33	96
Uzbekistan	82	–	–	–	–	–	–	–	78
Vanuatu	81	–	–	–	–	–	–	–	82
Venezuela	83	77	99	53	–	–	–	–	84
Vietnam	94	91	104	74	91	82	9.64	−0.28	99
Yemen	69	53	77	37	53	50	3.71	−0.68	83
Zambia	69	–	–	–	–	–	–	–	75
Zimbabwe	70	64	–	–	–	–	–	–	72
Country	**CA totc**	**SAS-IQc**	**95%-IQc**	**05%-IQc**	**Nat-IQc**	**Mig-IQc**	**N-M-Diff**	**Migr-gain**	**LyVa-IQc**
Mean	82.93	86.01	108.16	65.82	88.41	83.70	4.71	−0.35	84.07
Standard Deviat.	11.52	12.50	10.52	12.07	12.17	12.78	4.24	1.12	11.27
Number countries	200	108	99	99	93	93	93	93	200

Notes: See also Table A.1, student assessment values corrected for *age* (students older or younger than international average) and *school attendance rates* (if below 100%); Lynn and Vanhanen's IQ estimates (if no measured data) corrected downwards for assumed critical social conditions in countries without any student assessment and psychometric intelligence research; N-M-Diff: difference between natives' minus immigrants' average IQs; Migr-gain: gains or losses through immigration for country competence mean; for United Kingdom the exact country averages in CA totc and SAS-IQc are 99.60, for natives by definition 100.00. Data compiled at March 22, 2014.

Attributes of students (pupils), instruction, schools and educational systems

Sources and combination

Data mostly stem from student assessment studies (SAS). In some cases other sources were used as collections from economists (based on sources as UNESCO or World Bank). Variables were selected for theoretical relevance and supply. For example classroom volume wouldn't be an important attribute, but percentage of attentive learning time per lesson – what was never reported and we therefore cannot use.

The approach followed here is similar to the prior one for cognitive abilities, to collect data for as many countries as possible based on different sources and combine them to achieve higher representativity, reliability and validity. At the end information is given for many countries from a wide range of cultural, economic and geographical factors allowing a fairly robust and meaningful judgement of distributions, relationships and effects. The limitation is that frequently rather heterogeneous operationalisations are combined leading at the end to very global constructs. The alternative would be to do more narrow single survey studies (e.g. using only data from PISA 2009 for the given countries) or, better, to do the same kind of single survey studies several times (within PISA, TIMSS and PIRLS surveys) and then integrate the results. It would be very informative if for some educational attributes such comparisons would be done in future.

Because we also deal with results from reports and ratings ("schools whose principal reported", "disciplinary climate"), the data basis is shakier than any achievement test (SAS, IQ) data basis. Additionally, because there is some discretion and subjectivity in selecting variables and judging them as being valid indicators of a concept (especially the case for "discipline"), other researchers may come to somewhat different results. Finally, in combining data technical errors can be made. Again, comparisons with results of other researchers would be informative and useful for scientific progress and for educational policy suggestions.

In combining data it was tried to preserve a meaningful scale. Final scales should still be interpreted carefully. One example: In order to create one general scale for *kindergarten attendance* three different operationalisations and corresponding data, all coming from SAS studies, had to be merged: average years attending kindergarten, percentage of pupils with more than one year in kindergarten, an abstract kindergarten attendance index. The final given scale is therefore only a rough yardstick supporting a better understanding. More reliable than the absolute meaning (e.g. Sweden on average 1.65 years kindergarten attendance) is the *relative* cross-country meaning (e.g. in Sweden with 1.65 years much more kindergarten education than in Turkey with 0.57 years).

For some variables there was no meaningful scale at all (relative educational expenditures, being young in high grades, amount of education, school quality sum, educational level of society). Here we standardised the data applying the United Kingdom as benchmark ("Greenwich"; M=0) and the standard deviation within "First World Countries" (Europe, North America, Trans-Tasman and East Asia; N=56 countries; SD=1).

Education expenditures (per capita)

Education expenditures describe how much is spent for education. Expenditures for education per pupil (ppp, purchasing power parity corrected) are based on: PISA 2009, "cumulative expenditure by educational institutions per student aged 6 to 15, 10,000 US dollars converted using ppps" (OECD, 2010c, p. 150). Expenditures in US-Dollars per student, data of IEA-Reading-Literacy-study 1990/91 (Elley, 1992, p. 9), N=30. Expenditures per student (pupils at school, ppp), for primary and secondary schools and 1985 and 1990 aggregated (α=.95), data from Lee and Barro (1997), N=108. The last two were aggregated and standardised in adaptation to PISA 2009, fewer (and older); Elley data were only used for countries without PISA or Lee-Barro data (Nigeria) (α=.91, N=116). Expenditures depend strongly on gross national product.

Education expenditures (wealth-related, relative to GDP)

Education expenditures relative to GDP describe whether countries relatively more or less spend for education. Education expenditures (relative to GDP per capita) come from: TIMSS 2007, "public expenditure on education (% of GDP)" (Mullis et al., 2008, p. 23), N=47. PIRLS 2006, "public expenditure on education (% of GDP)" (Mullis et al., 2007, p. 27), N=39. Both combined and adapted to the TIMSS scale (because TIMSS has more countries; α=.92, N=59).

IEA-Reading 1991 (Elley, 1992,. p. 9, fraction of expenditures and GDP), N=30. IAEP II 1991, "percent of gross national product spent on education, age 13" (Lapointe et al., 1992a, p. 76), N=18. Both old and similar studies were combined and adapted to the IAEP scale (a given scale; α=.84, N=36). Data for 1985 and 1990 from Lee and Barro (1997), N=108. These older sources combined and adapted to the IAEP scale (is newer; α=.64, N=110).

Finally, TIMSS-PIRLS was combined with the older studies, the correlations for an identical variable were low (r=.29, α=.45). Data are given for N=127 countries. Results were restandardised to UK M=0 and First World countries SD=1.

Teacher salary (relative to GDP per capita)

Are teachers relative to other jobs well paid? The relative teacher salary measure stems from PISA 2009, "teachers' salaries relative to GDP/capita: weighted average of upper and lower secondary school teachers (ratio)" (OECD, 2010c, p. 150). We took only information from the more recently and reliable student assessment studies, not older ones from the 1980s or 1990s. We could not find other published data in PISA, TIMSS or PIRLS. Information is given for N=40 countries.

Kindergarten attendance

Kindergarten attendance or preschool education stands for the average years children receiving in age three to six institutional preschool education usually called "kindergarten". Sources: PISA 2003 (OECD, 2004, p. 244), attendance of preschool or kindergarten more than one year, percentages, N=40. PISA 2009 (OECD, 2010b, p. 190), an age index built upon the percentages of the groups have not, one year or more than one year attended kindergarten, N=65. PISA 2012 (OECD, 2013e, p. 363), an age index built upon the percentages of the groups have not, one year or more than one year attended kindergarten, N=65. PISA combined (standardisation oriented towards PISA 2012, α=.96, N=69).

From TIMSS we have data only for 2011, grade 4, (Mullis et al., 2012a, p. 198f.), a like by PISA constructed age-index, N=35. Data from PIRLS are indexes like constructed by PISA: PIRLS 2001 (Mullis et al., 2003, p. 130), N=29; PIRLS 2006 (Mullis et al., 2007, p. 162), N=38; PIRLS 2011 (Mullis et al., 2012b, p. 128f.), N=47. PIRLS combined (α=.92, N=57). TIMSS and PIRLS combined (α=.98, N=57).

Aggregation to an average value of IEA-TIMSS-PIRLS and OECD-PISA (standardisation oriented towards PISA), r=.86, α=.92. Data are given for N=82 countries.

School enrolment age

Age of enrolment at school covers, depending on source, the typical entry age or the actual entry age. Sources PISA: PISA 2000 (OECD, 2003, p. 270, total N=42), PISA 2003 (OECD, 2004, N=30), PISA 2009 (OECD, 2010c, p. 63, N=65), PISA 2012 (OECD, 2013e, p. 74, N=64), averaged oriented to the 2012 results (Cronbach-α=.90). Unfortunately the data are imprecise (e.g. "6", exact would be "6;3", six years and three month) and may not be indicative of the actual ages of the children, but only the official guideline of the school authorities ("typical entry age", OECD, 2003, p. 270). Therefore the effects of enrolment age are probably underestimated.

Sources TIMSS: TIMSS 1995 (Baumert & Lehmann, 1997, p. 182, N=37), TIMSS 2003 (Mullis et al., 2004, pp. 20-24, N=46), TIMSS 2007 (Mullis et al., 2008, pp. 378-380, N=59), averaged oriented to the 2007 results (α=.87). Sources PIRLS: PIRLS 2001 (Mullis et al., 2003, p. 131, N=29) and PIRLS 2006 (Mullis et al., 2007, p. 163, N=38), averaged oriented to 2006 results (α=.98). PIRLS give empirical and more precise results on school entry age. IEA-studies were first combined (TIMSS- and PIRLS-means, averaged oriented to the more empirical PIRLS results, TIMSS was more official school entry age; α=.78). Then OECD and IEA studies (PISA with TIMSS-PIRLS, averaged oriented to the more countries covering IEA results; α=.91). For countries without PISA, TIMSS or PIRLS data we added information from the source IAEP-II 1991 (Lapointe et al., 1992b, p. 20). This was only Mozambique.

The homogeneity (Cronbach-α) among different sources is for an identical characteristic low (effects may be underestimated). In the statistical analysis

the school entry age was reversed; a high numerical value corresponds to young age. Finally we have data for N=96 countries.

Age in grade (being young in high grade)

Being young in a given grade and being in a high grade at given age are indicators of an efficient educational system. Countries with a high value in this variable have an "age-efficient" school system and "time-efficient" students. Sources PISA, age-oriented study: Mean grade of 15 years old students in PISA 2000 (Baumert et al., 2001, p. 413, N=32), in PISA 2009 (OECD, 2010a, p. 180, N=65) and in PISA 2012 (OECD, 2013e, p. 218, N=65); averaged oriented to the 2012 results (Cronbach-α=.96).

Sources grade-oriented TIMSS: TIMSS 1995, country's deviation from mean age in grades 4 and 8 (Martin et al., 1999, p. 11, N_4=25 and N_8=39), the same for TIMSS 1999 in grade 8 (Mullis et al., 2000, p. 11, N_8=38), TIMSS 2003 in grades 4 and 8 (Mullis et al., 2004, pp. 20-24, N_4=25 and N_8=46), TIMSS 2007 in grades 4 and 8 (Mullis et al., 2008, pp. 34f., 379, N_4=37 and N_8=50), TIMSS 2011 in grades 4 and 8 (Mullis et al., 2012a, pp. 430-434, N_4=56 and N_8=48); averaged oriented to 2011 results (α=.84). Sources grade-oriented PIRLS: PIRLS 2001, country's deviation from mean age in grade 4 (Mullis et al., 2003, p. 26, N=34), PIRLS 2006 (Mullis et al., 2007, p. 37, N=39), PIRLS 2011 (Mullis et al., 2012b, p. 262-265, N=48); averaged oriented to 2011 results (α=.96).

IEA-studies were combined (TIMSS and PIRLS, α=.90). For countries without data (Nigeria, Zimbabwe, Venezuela) results from IEA-Reading (Elley, 1992) were added. Finally, OECD- and IEA-data were combined (α=.79). We have data for N=100 countries. Results were restandardised to UK M=0 and First World countries SD=1.

Amount of instruction per year

The variable amount of instruction per year seems to be at first glance a very clear and easily to measure construct: hours of instruction at school per year. This is not the case, because there is a gap between officially announced and actually realised instruction (teacher shortage, illness, training, administration, absence), because there are different times of instruction vs. only supervision and because many pupils receive additional instruction outside the main school. We took the given official amount of instruction per year at the main school (not included instruction at additional cram schools).

Sources: PISA 2000, average instructional time per year (Baumert et al., 2001, p. 417), N=31. PISA 2003, product of instructional weeks per year and instructional time per week in hours (OECD, 2004, p. 242 & 431), N=39. PISA 2009, mean of regular lessons at school in language of instruction, mathematics and science, time student spent for learning per week (minutes) (OECD, 2010c, p. 234), N=65. PISA 2012, total class periods per week (OECD, 2013e, p. 344), N=65. The four variables are not identical, but they cover the same global meaning, amount of instruction. However, homogeneity is very low (α=.08, N=69). Only the indicators of PISA 2003 and PISA 2012 correlate with r=.47

nearly reasonably high. We took all because all intended to measure amount of instruction.

TIMSS 1995, days taught per year in grades 4 and 8 (α=.90; Martin et al., 1999, p. 67), N=32. TIMSS 1999, amount of total time in school in hours per year averaged across students in grade 8 (Mullis et al., 2000, p. 293), N=34. TIMSS 2007, yearly amount of implemented time in instruction in grades 4 and 8 based on information for mathematics and science (α=.53; Mullis et al., 2008, pp. 194f.; Martin et al., 2008, pp. 206f.), N=55. TIMSS 2011, total instructional hours in all subjects per year in grades 4 and 8 (α=.88; Mullis et al., 2012a, pp. 342f., 344f.), N=63. Combination, orientated towards grade 8 and TIMSS 2011 (α=.82, N=76).

PIRLS 2001, total hours of instructional time per year in primary school (Mullis et al., 2003, p. 145), N=32. PIRLS 2006, implemented weekly instructional time (for language and reading), average hours of instructional time per week (Mullis et al., 2007, p. 181), N=38. PIRLS 2011, instructional time spent on language and reading, reported by principals and teachers, instructional hours per year, total (Mullis et al., 2012b, pp. 214f.), N=46. Combination, orientated towards 2011 (more countries, entire year; α=.98, N=57). IEA studies TIMSS and PIRLS combined in orientation to TIMSS (more countries, all subjects; α=.87, N=79).

Finally, OECD- and IEA-studies were combined in orientation to IEA (more countries, more reasonable data; α=.53, N=96). Because the PISA data base seems to be less reliable we have later done also analyses with data only from TIMSS and PIRLS.

Amount of education

Amount of education covers all received education until around age 15 years, in many countries the end of compulsory education. This index was formed from kindergarten attendance, attendance of high grades at a young age, amount of instruction and attendance of additional (cram) schools (PISA 2000, 2003, 2009; α=.86, N=69). Homogeneity (α=.18, N=101) is low because kindergarten and cram school attendance are negatively correlated (r=–.31, N=69); however, both increase total education received. Results were restandardised to UK M=0 and First World countries SD=1.

Tracking age

Tracking between schools (not within) in young age is an aggregation of different sources: Initially we took data from the PISA 2000 (OECD, 2003, p. 221) and PISA 2003 studies (OECD, 2004, p. 262). We initially combined them and then supplemented and corrected them based on further information: OECD data contain obvious errors: Hong Kong's tracking age is not 19 years, but 12 (Marsh, Kong & Hau, 2000, p. 339f.); Switzerland is not 15, but depending on canton between 10 and 12 (Büeler & Merki, 2003; OECD, 1999, p. 30; Woschek, 2005, reported age 12.58). Singapore was added with 10 years, also Netherlands with 12 years.

USA and Japan were missing in the OECD-PISA-tables. USA is difficult to categorize; officially it is characterized by a comprehensive school system until age 16 and mandatory attendance (PISA 2003), but with regular streaming within schools, with unofficial tracking according to residential area and financial situation of parents (indirectly correlated with education, knowledge and intelligence of parents and their children) and even some unofficial tracking at kindergarten! According to Dronkers (2006, p. 69) "the United States has the significantly highest ethnic school segregation" compared to European countries.

Japan has officially and largely realised until grade 9 (14 year old students) comprehensive schools. Below 15 years private schools with entrance exams and ability selection are attended only by a small minority of students. However, about two-thirds of the students additionally attend private cram schools ("Juku") during afternoons, at evening and weekend; and that attendance and the division within cram schools depend on ability and parental income (fees per month ca. 600 to 900 €; Haasch, 2000, p. 199). Schümer (1998, p. 215, 219) described a formal tracking of cram schools according to ability ("select according to achievement", "selective cram schools"). As a result there is tracking in secondary school age (grades 7-9, ages 12-14) outside public schools. In addition there are reports of informal tracking with entrance exams in primary schools and even in kindergarten (Haasch, 2000, pp. 144, 168, 183) and preparatory training for these exams! The Japanese educational system cannot be understood, if these additional tracked cram schools are not considered. Because of this we chose for Japan a tracking age of 14 and not 15 (and, if anything, it could be set to an even younger age). Moreover, it is obvious, that the difference in competences following school attributes is greatest worldwide for 15-year-old students ("effect of schools' economic, social and cultural status"; OECD, 2004, p. 188) and that there are according to OECD many private schools (OECD, 2004, p. 251). Finally, Schaub and Zenke (2004, p. 298) reported for Japan informal differentiation along prestige, fees, and competences.

Further tracking data come from Schaub and Zenke (2004), sometimes different to OECD-sources: The tracking ages of Argentina and Brazil were reduced from 18 (OECD) to 15 (Schaub & Zenke; end of compulsory education, after that different tracks, that correction reduces positive effects of early tracking); Bulgaria from 14 to 13 (onset of vocational schools); Great Britain from 16 to 11 (England: Grammar Schools admit 11 year old pupils after entrance exam, comprehensive schools use tests for admission or streaming, Schaub & Zenke, p. 177, similar for Northern Ireland; this correction increases the positive early tracking effect); Ireland from 15 to 12 (like England, Grammar Schools); Israel from 12 to 15 (tracking starts at age 15); Japan 14 years (not 15 years see above); Canada from 13 to 16 (reducing tracking effect); Luxemburg from 13 to 12; Malta 11 years (beginning of Grammar School); Russia from 15 to 14, here the decision was difficult, because in Russia Grammar Schools are available already for 6 year olds, but only attended by 4% of the students (Döbert, Hörner, Kopp & Mitter, 2004); Switzerland 12 years as the mean between 10, 12 and sometimes 15 (not 15 as in OECD-lists; see above and Schaub & Zenke, 2004, p. 499); Slovakia, Czechia and Hungary from 11 to 10 (beginning of Grammar

Schools); South Africa has comprehensive schools (16 years), but seems to be segregated informally by residential area and race. USA is difficult, it was taken 13 years (from age 12 or 14 on tracking, High Schools in age 14 with entrance exam, large variance in competences between schools depending on parents; Martin et al., 2000a, p. 76ff., Martin et al., 2004, p. 193).

Finally, the data base was completed by newer data from PISA 2006, "First age of selection in the education system" (OECD, 2007, p. 162): Azerbaijan, Jordan, Korea-South, Liechtenstein, Serbia, Kyrgyzstan, Colombia, Macau, Montenegro, Qatar, Thailand, Tunisia and Uruguay (Switzerland was coded by OECD as 12 years, as we have corrected it before). Taiwan was slightly corrected from 15 to 14 years (important additional instruction in private cram schools); and PISA 2012 (OECD, 2013e, p. 78): Albania, Chile, China, Estonia, Malaysia, Slovenia, Czech Republic, United Arab Emirates and Vietnam.

In the statistical analysis the tracking age was reversed; a high numerical value corresponds to young age. We have data for N=72 countries.

Share of immigrants

On the definition of natives and immigrants see Section 10.3.5 and Rindermann and Thompson (2016).

PISA: Percentages of natives (born in country of assessment with at least one parent born in the same country) and immigrants (first-generation or second-generation immigrant students, non-native students) are given from PISA 2000, 2003, 2006, 2009 and 2012.

TIMSS: Percentages of natives (both parents born in country) and immigrants (one parent born in country, neither parent born in country) are given from TIMSS 1995 and 2007 (2007 fourth and eighth grade).

PIRLS: TIMSS and PIRLS use the same system of categorisation of natives and immigrants. Percentages are given from PIRLS 2001 and 2006.

The different definitions of being a migrant and the increases in immigration make it essential to adapt and standardise the varying results of different studies before averaging across studies. The average presented here is for immigrants with two foreign born parents or "one and a half" foreign born parents meaning having not more than one native born grandparent (the native country of the student itself is irrelevant). In all studies and for nearly all countries the competences of natives and immigrants multiplied with their percentages did not result in the exact country mean (for examples see Rindermann & Thompson, 2016). The most likely explanation for this is that there is a missing value group, the group of students not giving information on their parents' origin. For this group results are not presented in the SAS reports. This made the native, immigrant and country mean competence and percentage estimates mathematically contradictory. Therefore the differences were corrected, step by step, for (first) percentages and (second) means leading at the end to mathematically correct and (as assumed) empirically more veridical results (N=93). For a more detailed explanation of the procedure see Rindermann and Thompson (2016).

Language spoken at home and in school is identical

Similar to the portion of migrants the identity of languages spoken at home and in school are no quality indicators of educational systems but features of students influencing instruction and its success. Data are based on: PISA 2012: Sum of "non-immigrant students who speak another language at home, inverted" and "immigrant students who speak another language at home, inverted" (OECD, 2013d, Table II.3.5, p. 232). Sources TIMSS: TIMSS 2007: Students speak the language of the test at home, always or almost always, grades 4 and 8 (Mullis et al., 2008, pp. 148, 149, α=.99, N=58). TIMSS 2011, 4th grade "students spoke the language of the test before starting school, percent of students" (Mullis et al., 2012a, p. 186), "schools with students having the language of the test as their native language, reported by principals, more than 90% of students, percent of students" (Mullis et al., 2012a, p. 218f.), 8th grade: "students speak the language of the test at home, reported by students, always or almost always, percent of students" (Mullis et al., 2012a, p. 188f.) and "schools with students having the language of the test as their native language, reported by principals, more than 90% of students, percent of students" (Mullis et al., 2012a, p. 220f.). TIMSS 2011 together α=.94, N=62. TIMSS combined α=.92, N=70. Sources PIRLS: PIRLS 2001: Students speak language of the test at home (Mullis et al., 2003, p. 101, N=34). PIRLS 2006: Students speak language of the test at home (Mullis et al., 2007, p. 135, N=38). PIRLS 2011: "Schools with students having the language as their native language, more than 90% of students, percent of students" (Mullis et al., 2012b, p. 144f., N=47). PIRLS surveys were combined, standardisation oriented towards the newer and larger 2011 sample (α=.65, N=57). PIRLS was combined with TIMSS, standardisation oriented towards the larger TIMSS sample (α=.91, N=78).

Finally, IEA and OECD studies were combined (α=.93, N=91). For countries lacking data information from the source IAEP-II 1991 was added (13 years old, same language home and school; Lapointe et al., 1992b, p. 69, N=18). This was only Mozambique. The final value is given for total N=92 countries.

Class size and pupil-per-teacher ratio

The standard model is one teacher and one class and all teachers are in front of class teaching. However, that is not always the case, there are sometimes several teachers in one class or additional teachers are outside class working in administration, counselling or coaching. Teacher-pupil ratios having an impact on general educational quality should be also considered.

Sources: PISA 2000, class sizes for students age 15 (OECD, 2003, p. 363), N=40 countries. PISA 2009, average class size for the language of instruction (OECD, 2010c, p. 150), N=65 countries. PISA 2012, student-teacher ratio in the school (OECD, 2013e, p. 321), N=64 countries. PISA combined orientated to 2009 (more countries, intended variable; α=.90, N=70).

TIMSS 1995, average student-teacher ratio and class size in grades 4 and 8 (α=.90; Martin et al., 1999, p. 45f.; Mullis 1997, p. 163), N=36. TIMSS 1999, class size in grade 8 (Mullis et al., 2000, p. 203), N=37. TIMSS 2003, class size in

grades 4 and 8 in mathematics and science (α=.99; Mullis et al., 2004, p. 266f.), N=45. TIMSS 2007, class size in grades 4 and 8 in mathematics and science (α=.97; Mullis et al., 2008, pp. 268f.; Martin et al., 2008, pp. 288ff.). TIMSS combined orientated to 2007 (more countries, intended variable; α=.93, N=73).

PIRLS 2001, class size (Mullis et al., 2003, p. 158), N=34. PIRLS 2006, class size for reading and language instruction (Mullis et al., 2007, p. 188), N=39. PIRLS combined orientated to 2006 (more countries, newer; α=.96, N=46).

TIMSS and PIRLS combined orientated to TIMSS (more countries, also higher grades; α=.95, N=78). PISA and TIMSS-PIRLS combined orientated to TIMSS-PIRLS (more countries, more studies; α=.88, N=94).

For countries lacking data information was added from the following sources: IEA-Reading-Literacy-study 1990/91, number of students per class for age 9, (Scheerens & Bosker, 1997, p. 249), N=26; IAEP-II 1992 class size (Lapointe et al, 1992b, p. 19), N=19; pupil-teacher-ratio by Lee and Barro (1997), 1985 and 1990 aggregated for primary and secondary schools (α=.89), N=143; primary school student-teacher ratio by Kurian (2001, pp. 360f., based on UNESCO), N=176. The final variable is given for N=190 countries. For controlling possible bias effects by these older data sets also an analysis only based on more recent PISA-, TIMSS- and PIRLS-data was done.

Repetition rates

Among the student assessment studies only PISA gives information (no information found in TIMSS and PIRLS reports): PISA 2003, proportion of repeaters among 15-year-olds in primary and secondary schools summed up (OECD, 2004, p. 262, N=30); PISA 2006, proportion of repeaters in participating schools, lower secondary education and upper secondary education summed up (OECD, 2007, p. 162, N=55), PISA 2009 same variable (OECD, 2010c, p. 63, N=65), PISA 2012 same variable (OECD, 2013e, p. 74, N=64), averaged oriented to the 2012 results (Cronbach-α=.97). This aggregated score is given for N=68 countries.

Discipline

Discipline is defined as school-appropriate behaviour of students supporting learning. Sources PISA: PISA 2000: Not skipping class in the last two weeks, not arriving late for school in the last two weeks, both students' self-report (OECD, 2003, pp. 290, 291, α=.49, N=41). PISA 2003: Percentage of students in schools where the principals report that the following hinders students' learning to some extent or a lot: student absenteeism and students skipping classes, discipline problems in class, derived from "disruption of classes by students", "the teacher has to wait a long time for students to quieten down" and "students don't start working for a long time after the lesson begins", always positively inverted (OECD, 2004, pp. 407, 409, α=.69, N=40). PISA 2006: No information given in reports. PISA 2009: Index of disciplinary climate (OECD, 2010c, p. 253, N=65). PISA 2012: The average of percentage of students who had arrived late at least once (inverted, OECD, 2013e, p. 168) and index of disciplinary climate based on

students' reports (OECD, 2013e, p. 168, N=64). All scales were standardised and combined (α=.83).

Sources TIMSS: TIMSS 1995: Not being absent and not leaving school before the end of the school year ("Percent of students who are absent on a typical school day, schools with less than 5% absent", "schools with less than 5% leaving before year end, percent of students" grades 4 and 8, director's assessment, Martin et al., 1999, pp. B11 and B12, B14 and B15, α=.83, N=37). TIMSS 1999: Low problems with school and class attendance (index of "seriousness of attendance problems at school", "arriving late at school, absenteeism, skipping class"; percentage of students with high attendance) and in classroom ("classroom disturbance"; percentage of students whose schools reported that disturbances occur at least weekly) (grade 8, Mullis et al., 2000, pp. 240, 244, α=.40, N=37). TIMSS 2003: Index of good school and class attendance ("principals' responses to three questions about the seriousness of attendance problems in the school: arriving late at school; absenteeism; and skipping class", grades 4 and 8, Mullis et al., 2004, pp. 324f., α=.78, N=45). TIMSS 2007: Index of good attendance at school in grade 4 and 8 (principals' responses to three questions about attendance problems in the school: arriving late at school; absenteeism; and skipping class; high means no problem, Mullis et al., 2008, p. 328, α=.72, N=58). TIMSS 2011, based on 4th and 8th grade: "School discipline and safety, reported by principals, average scale score" (Mullis et al., 2012a, p. 270f., 272f.), "students in classrooms where teachers report instruction is limited by disruptive students, some or not at all, percent of students, mathematics" (Mullis et al., 2012a, p. 386f., 388f.), "students in classrooms where teachers report instruction is limited by disruptive students, some or not at all, percent of students, science" (Martin et al., 2012, p. 396f., 398f.), "percent of students whose principals spend 'a lot of time' addressing disruptive student behaviour, inverted" (Martin et al., 2012, p. 262f., 264f.); α=.92, N=63. The discipline indicators of the five TIMSS-surveys were combined (α=.64).

Sources PIRLS: PIRLS 2001: Percentage of students with absenteeism in schools (moderate or serious problem, inverted; Mullis et al., 2003, p. 243, N=34). PIRLS 2006: Seriousness of absenteeism in schools, not a problem (Mullis et al., 2007, p. 268, N=38). PIRLS 2011: "percent of students whose principals spend 'a lot of time' addressing disruptive student behaviour, inverted" (Mullis et al., 2012b, p. 170f.), "school discipline and safety, reported by principals, hardly any problems, percent of students" (Mullis et al., 2012b, p. 178f.), "students in classrooms where teachers report instruction is limited by disruptive students, some or not at all, percent of students" (Mullis et al., 2012b, p. 232.); α=.52, N=48. The three PIRLS surveys combined (larger numbers standing for more discipline) have Cronbach-α=.82, N=57.

PISA, TIMSS and PIRLS combined Cronbach-α=.70. Finally, we have data for N=95 countries.

Direct instruction

Amount of *direct instruction* represents lecture-style presentation by teachers. Data are only given from TIMSS. Typical items are: "work together as a class with teacher teaching the whole class", "lecture-style presentation by teacher", "listening to lecture-style presentations", or "direct teacher guidance". Sources: TIMSS 1995 (α=.92; Mullis et al., 1997, p. 164f., Beaton et al., 1996a, p. 154f., Beaton et al., 1996b, p. 146f.), N=37; TIMSS 1999 (α=.88; Mullis et al., 2000, p. 205, Martin et al., 2000b, p. 219), N=38; TIMSS 2003 (α=.95; Mullis et al., 2004, p. 286-288, Martin et al., 2004, p. 310), N=45; TIMSS 2007 (4th and 8th grade, α=.92; Mullis et al., 2008, pp. 292ff.), N=58; TIMSS 2011 (4th and 8th grade, α=.85; Mullis et al., 2012a, pp. 398ff.), N=63. Always teacher's view of the portion of lesson time in mathematics and in science instruction of 4th and 8th grades, all surveys combined, α=.82, N=80 countries.

Use of achievement tests

The use of achievement tests covers the use of such tests and the use of their results for student admission or placement, frequently in combination with the use of grades for such measures. Sources PISA: PISA 2000 no information is given. PISA 2003: Directors' statements: School admission depends on ability ("percentage of students in schools where the principals consider the following statements as a 'prerequisite' or a 'high priority' for admittance at school: students' academic records including placement tests"; OECD, 2004, pp. 417 a. 314, N=37), results of achievement tests are used for streaming ("use of assessment results and student performance in mathematics: group students for instructional purposes"; OECD, 2004, p. 421, N=38), tests are used by school for information of parents about the achievement of their children ("use of assessment results and student performance in mathematics: inform parents about their child's progress"; OECD, 2004, p. 421, N=38). The three measures were combined (α=.21, N=39). PISA 2006: Existence of standards-based external examinations (OECD, 2007, p. 163, N=56). PISA 2009: Existence of standards-based external examinations (OECD, 2010c, p. 229, N=62). PISA 2012: "Percentage of students in schools whose principal reported that the following factors are considered for admission to school, students' records of academic performance, always" (OECD, 2013e, p. 282) and "profiles of assessments and examinations across countries and economies, 2: assessment in lower secondary, national exams in upper secondary, few fields requiring tertiary exams, 1: only national exams in lower and upper secondary + National or other non-national examinations in lower or upper secondary, 0: no national or other examinations, most fields requiring tertiary exams" (OECD, 2013e, p. 148), α=.40, N=65. The four PISA surveys were combined oriented to the 2012 measure (α=.72).

Sources TIMSS: Only information from TIMSS 1995 and TIMSS 2011. TIMSS 1995 8th grade for tracking/streaming decisions ("factors that are moderately or very important in deciding courses of study in mathematics, standardised tests"; Martin et al., 1999, p. 64, N=20). TIMSS 2011 8th grade "classroom assessment, reported by teachers, percentage of students whose teachers give mathematics

tests or examinations, every 2 weeks or more" (Mullis et al., 2012b, p. 410f., N=46). Both together α=.51, N=54. Source PIRLS: Only information from PIRLS 2006, "emphasis on sources to monitor students' progress in reading, percentage of students whose teachers reported placing major emphasis on various sources, national or regional achievement tests" (Mullis et al., 2007, p. 238, N=37). Both IEA-studies together α=.32, N=64.

OECD- and IEA-approach together α=.21. Altogether data for N=88 countries.

Central exams and tests

The use of *central exams and objective tests* in educational systems by schools and in entry exams of universities are used in order to define an objective standard. Data come from Bishop (1997) and Woessmann (2002, p. 15). The provided information is for mathematics and sciences in school systems (r=.84, sum value α=.91). Bishop's numbers stand for the relative number of secondary school graduates who participated in central exams. Two modifications were made: 1. China was added (following Heine et al., 2006, central exams "Gao Kao") and 2. the USA were put not at 07 but at 70 on a scale from 0 to 100, because the admission to colleges and universities in the USA is regulated by central and objective competence tests (SAT and ACT), the majority of pupils go at least to colleges and the foundation courses there represent a kind of higher secondary school education in contents and age of pupils. The variable represents the use of central exams (independent from proximity to a given curriculum) in schools or at the end of school education for university entrance (sum value N=54).

School autonomy

School autonomy means that schools can decide on finances, curriculum or teacher recruitment. Measures based on PISA: PISA 2003: Autonomy in appointing teachers, in dismissing teachers, in formulating the school budget and in establishing student disciplinary policies (OECD, 2004, pp. 425, 426, α=.74, N=36). PISA 2009: Index of school responsibility for resource allocation and index of school responsibility for curriculum and assessment (OECD, 2010c, pp. 213, 216, α=.70, N=64). PISA 2012: "School autonomy over resource allocation, index of school responsibility for resource allocation, mean index" (OECD, 2013e, p. 131, N=63). Altogether α=.86, N=72.

Teacher quality and teacher competence

Teacher quality and teacher competence are indicated by the educational level of teachers (there are no ability test assessments for teachers). Sources: PISA 2012, two indicators, percentage of teachers with a university-level degree and percentage of certified teachers (α=.24; OECD, 2013e, p. 99), N=63.

TIMSS 1999, three indicators, percentage of students taught by certified teachers, having mathematics as the major area of study in their BA, MA or teacher training program or both teacher certification and mathematics or science as the major area of study, for mathematics and science, 8th grade (α=.97; Mullis et al., 2000, p. 189, Martin et al., 2000b, pp. 200f.), N=38. TIMSS 2007, percentage of students by completed postgraduate university degree in mathe-

matics and science in 4th and 8th grade (α=.97; Mullis et al., 2008, pp. 248f., Martin et al., 2008, pp. 264f.), N=57. TIMSS 2011, completed postgraduate university degree in mathematics and science in 4th and 8th grade (α=.95; Mullis et al., 2012a, pp. 284f., 286f., Martin et al., 2012, pp. 288f., 290f.), N=62. TIMSS combined orientated towards 2011 (newest, most countries, α=.64), N=75.

PIRLS 2011, completed postgraduate university degree of teacher in reading (Mullis et al., 2012b, pp. 188f.), N=47. TIMSS and PIRLS combined orientated towards TIMSS (more countries, α=.94), N=75. PISA and TIMSS-PIRLS combined orientated towards PISA (more sensible scale, α=.38), N=92.

Private schools

Private schools are schools in private governance. Varying across countries they are privately or publicly funded and more or less similar in curriculum to public schools. Sources: PISA 2000, percentage of students in government-independent private schools (OECD, 2003, p. 221), N=28. PISA 2003, percentage of students enrolled in private schools (OECD, 2004, p. 253), N=28. PISA 2009, Private schools (proportion) (OECD, 2010c, p. 148), N=63. PISA 2012, government dependent and independent private schools (OECD, 2013e, p. 56), N=46. PISA combined orientated towards PISA 2009 (most countries, best scale; α=.80), N=68.

Homework

Amount of homework is based in these sources: PISA 2000, time spent on homework from very high (5) to very low (1) (Baumert et al., 2001, p. 417), N=32. PISA 2003, homework or other study set by their teachers in hours per week (OECD, 2004, p. 431), N=40. PISA 2012, homework or other study set by teachers in minutes (OECD, 2013e, p. 111), N=64. PISA combined orientated towards 2012 (most countries and most exact scale; α=.92), N=64.

TIMSS 2007, index of time students spend doing homework (high) in mathematics and science in 4th and 8th grade (α=.91; Mullis et al., 2008, pp. 170f., Martin et al., 2008, pp. 166f.), N=58. TIMSS 2011, weekly time students spend on mathematics homework, reported by students, percent of students in 8th grade (Mullis et al., 2008, pp. 170f.), N=45. Both scales, combined orientated towards 2011 (more countries; α=.87), N=63.

PIRLS 2006, percentage of students having high index of reading for homework (Mullis et al., 2007, p. 236), N=38. TIMSS and PIRLS combined orientated towards TIMSS (more studies and countries; α=.80), N=71.

PISA combined with TIMSS-PIRLS orientated towards PISA (more natural scale; α=.80), N=89. For countries lacking data in newer student assessment studies were added information from IEA-Reading (N=26; Scheerens & Bosker, 1997, p. 253) and IAEP-II (homework 2 h/d or more, percentages of 9- and 13-year old pupils, α=.70; Lapointe et al., 1992b, pp. 73, 100), both together α=.51, N=35 (added countries: Mozambique, Venezuela). Data from newer and older SAS correlate with r=.45.

Finally, we have data for N=91 countries.

Overall index: Mean of school-education quality

This indicator includes all variables with theoretical and empirical support for impact on competence development (similarly Rindermann & Ceci, 2009): a) Kindergarten attendance rate, b) attendance of high grades at a young age, c) tracking at a young age, d) low repetition rates, e) discipline, f) direct instruction, g) standardised achievement tests and achievement-based decisions, h) use of central exams and objective tests, i) school autonomy, j) teacher quality (educational level) and k) proportion of private schools (α=.74, total N=96). For some countries the index is based on single or only few variables and studies. Results were restandardised to UK M=0 and First World countries SD=1.

Overall index: Adult education mean (educational level of society)

The adult education mean is no characteristic of schools or students but an outcome variable of the educational system. It represents the general educational level of society. Education is frequently used as a proxy of cognitive competence by many scholars and paradigms.

The standardised values of three measures were averaged: 1. Adult literacy rate, the ability to read and write a simple sentence or similar basic literacy as fill out an application form, 15 years old or older, from Kurian (2001, pp. 349f., N=195). 2. Percentage of persons between 12 and 19 years old 1960-1985 (in the interval of student assessment studies from the 1990s on they are adults) having graduated from secondary school (N=117), from Mankiw, Romer and Weil (1992). 3. The mean of years of schooling of persons being 25 years or older for 1990, 1995 and 2000 (N=107), from Barro and Lee (2000). All authors used data from UNO or similar sources. The sum (α=.93 in 101 common countries) is given for N=195 countries. Results were restandardised to UK M=0 and First World countries SD=1.

Background indicator: Number of books at home

Number of books at home covers a family's amount of books, of children and parents, and servers as an indicator of interest and practice of education and intellectual interests. Sources: There is no information from OECD-PISA, but from IEA studies. TIMSS 1995, percentages having more than 200 books at home in 4th and 8th grade (α=.97; Beaton et al., 1996a, p. 95; Martin et al., 1997, p. 102), N=36. TIMSS 1999, percentages having more than 200 books in 8th grade (Mullis et al., 2000, p. 252), N=38. TIMSS 2003, percentages having more than 200 books in 4th and 8th grade (α=.94; Mullis et al., 2004, p. 136ff.), N=45. TIMSS 2007, percentages having more than 200 books in 4th and 8th grade (α=.91; Mullis et al., 2008, p. 156ff.), N=58. TIMSS 2011, percentages having more than 100 books in 4th and 8th grade (information for more than 200 books not given, α=.96; Mullis et al., 2012a, p. 178f., 184f.), N=63. All TIMS-studies combined orientated towards 2011 (newest and largest data base; α=.94), N=78.

PIRLS 2001, parents having more than 200 books and children having more than 100 books together (α=.88; Bos et al., 2003), N=34. PIRLS 2006, number calculated based on parents' reports of children's books in the home, more than

100 books or 51-100 books (Mullis et al., 2007, p. 114), N=38. PIRLS 2011, Percent of students with more than 100 books in their home (Mullis et al., 2012b, pp. 114f.), N=48. PIRL-studies combined orientated towards 2006 (more reasonable scale; α=.96), N=58.

TIMSS and PIRLS combined orientated towards PIRLS (more reasonable scale; α=.94), N=82. For countries where there is no data in these newer student assessment studies but in older IEA (Brazil, China, Mozambique) were added information from IAEP-II (13-year old pupils, Lapointe et al., 1992a, pp. 63). Data from newer and older SAS correlate with r=.64. Finally, we have data for N=85 countries.

Table A.3: Educational attributes

Country	EEa	EEr	TSr	Kig	SEA	YHG	AIn	AEd	Trac	Mi%	LanI	CS	RR	Disc	DirI	AchT	CenE	SAut	TeQa	Priv	Hom	SQM	AdE	Book
Afghanistan	–	–	–	–	–	–	–	–	–	–	–	39	–	–	–	–	–	–	–	–	–	–	-8.12	–
Albania	–	–	–	1.24	6.25	-1.92	790	-1.36	15	4	–	30	4	74	–	46	–	50	77	8	304	-1.78	-1.10	–
Algeria	357	0.63	–	–	5.98	-1.84	953	-1.20	–	23	52	34	–	65	42	–	–	–	43	–	431	-3.83	-4.77	5
Andorra	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	-0.01	–
Angola	–	–	–	–	–	–	–	–	–	–	–	42	–	–	–	–	–	–	–	–	–	–	-7.26	–
Antigua-Barbuda	–	–	–	–	–	–	–	–	–	–	–	36	–	–	–	–	–	–	–	–	–	–	-1.34	–
Argentina	277	-2.2	–	1.45	5.89	-1.72	780	-1.31	15	9	86	28	37	53	–	14	–	57	47	26	223	-4.48	-1.62	30
Armenia	–	–	–	–	6.91	-2.63	926	-1.32	–	12	94	29	–	66	45	46	–	–	97	–	428	-1.02	-0.17	87
Australia	729	-0.39	1.27	1.28	5.24	-0.81	925	-0.05	16	32	80	25	7	63	38	62	81	71	86	37	273	-1.08	0.69	126
Austria	926	0.52	1.13	1.82	6.08	-1.96	876	-0.35	10	18	75	21	13	69	42	37	0	49	57	6	231	-2.42	-0.45	76
Azerbaijan	–	–	–	0.53	6.54	-1.83	911	-1.41	15	10	93	18	4	77	48	54	–	67	67	0	–	-2.04	-0.37	11
Bahamas	–	–	–	–	–	–	–	–	–	–	–	28	–	–	–	–	–	–	–	–	–	–	-0.25	–
Bahrain	–	–	–	–	5.93	-1.42	1022	-1.10	–	23	76	31	–	59	54	79	–	–	73	–	318	-0.41	-0.95	60
Bangladesh	251	-1.1	–	–	–	–	–	–	–	–	–	65	–	–	–	–	–	–	–	–	–	–	-6.73	–
Barbados	–	–	–	–	–	–	–	–	–	–	–	27	–	–	–	–	–	–	–	–	–	–	0.68	–
Belarus	–	–	–	–	–	–	–	–	16	–	–	19	–	–	–	–	–	–	–	–	–	–	-0.29	–
Belgium	840	0.42	1.45	1.98	5.92	-1.43	876	-0.15	12	20	69	19	31	69	45	50	0	74	64	–	271	-1.91	-0.05	76
Belize	–	–	–	1.00	5.21	-0.51	941	-1.21	–	44	37	30	–	48	–	–	–	–	–	–	–	-3.72	-3.97	34
Benin (Dahomey)	–	–	–	–	–	–	–	–	–	–	–	52	–	–	–	–	–	–	–	–	–	–	-7.34	–
Bermuda	–	–	–	–	–	–	–	–	–	–	–	28	–	–	–	–	–	–	–	–	–	–	-0.42	–
Bhutan	–	–	–	–	–	–	–	–	–	–	–	41	–	–	–	–	–	–	–	–	–	–	-7.72	–
Bolivia	249	-1.8	–	–	–	–	–	–	–	–	–	33	–	–	–	–	–	–	–	–	–	–	-3.26	–
Bosnia	–	–	–	–	5.98	-2.64	848	-1.38	–	12	94	24	–	70	70	–	–	–	37	–	309	-3.10	-1.81	9
Botswana	356	3.18	–	0.80	6.20	-3.05	1041	-1.39	–	11	17	37	–	52	44	40	–	–	54	–	377	-4.98	-4.56	26
Brazil	240	-1.8	–	1.22	7.06	-2.35	591	-0.42	15	4	91	43	36	54	–	17	–	56	76	14	251	-4.03	-3.65	34
Brunei	–	–	–	–	–	–	–	–	–	–	–	24	–	–	–	–	–	–	–	–	–	–	-1.64	–
Bulgaria	852	2.06	1.00	1.65	6.81	-2.97	739	-1.40	13	3	80	22	6	56	59	47	100	88	91	2	380	-1.16	-0.29	89
Burkina Faso	257	3.27	–	–	–	–	–	–	–	–	–	66	–	–	–	–	–	–	–	–	–	–	-9.36	–
Burma (Myanmar)	–	–	–	–	–	–	–	–	–	–	–	41	–	–	–	–	–	–	–	–	–	–	-4.65	–
Burundi	297	9.10	–	–	–	–	–	–	–	–	–	64	–	–	–	–	–	–	–	–	–	–	-8.04	–

Cambodia	–	–	–	–	–	–	–	–	–	–	–	58	–	–	–	–	–	–	–	–	–	–	-4.64	–
Cameroon	258	-0.84	–	–	–	–	–	–	–	–	–	54	–	–	–	–	–	–	–	–	–	–	-5.39	–
Canada	990	0.84	–	1.19	5.67	-0.97	950	-0.27	16	30	74	27	10	59	38	53	51	67	75	6	301	-2.30	1.03	106
Cape Verde	–	–	–	–	–	–	–	–	–	–	–	40	–	–	–	–	–	–	–	–	–	–	-3.80	–
Central Afric R	242	0.29	–	–	–	–	–	–	–	–	–	86	–	–	–	–	–	–	–	–	–	–	-6.39	–
Chad	238	1.36	–	–	–	–	–	–	–	–	–	71	–	–	–	–	–	–	–	–	–	–	-7.44	–
Chile	266	-1.8	–	1.13	5.91	-1.45	1101	-1.18	16	4	96	37	23	55	52	39	0	77	58	46	221	-3.02	-1.09	30
China	343	-1.5	1.74	1.83	6.68	-1.91	1041	-1.12	15	4	91	34	8	84	–	54	100	75	83	8	831	-0.30	-2.80	69
Colombia	234	-1.0	1.36	1.11	5.94	-2.45	874	-1.38	15	5	91	38	28	57	37	38	0	58	59	13	386	-3.98	-2.70	16
Comoros	246	1.02	–	–	–	–	–	–	–	–	–	49	–	–	–	–	–	–	–	–	–	–	-5.70	–
Congo (Brazz)	244	-2.6	–	–	–	–	–	–	–	–	–	73	–	–	–	–	–	–	–	–	–	–	-4.24	–
Congo (Zaire)	–	–	–	–	–	–	–	–	–	–	–	48	–	–	–	–	–	–	–	–	–	–	-4.70	–
Cook Islands	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Costa Rica	329	-0.78	–	1.20	6.47	-2.80	1204	-1.21	–	9	91	36	33	54	–	46	–	59	70	10	211	-3.76	-1.90	–
Cote d'Ivoire	–	–	–	–	–	–	–	–	–	–	–	51	–	–	–	–	–	–	–	–	–	–	-7.15	–
Croatia	346	–	0.38	1.25	6.60	-2.74	741	-1.45	14	15	94	26	4	65	54	54	–	72	72	2	355	-1.83	-0.45	40
Cuba	–	–	–	–	–	–	–	–	–	–	–	19	–	–	–	–	–	–	–	–	–	–	-0.58	–
Cyprus	561	0.40	–	1.68	5.76	-0.61	899	-1.12	15	12	78	21	–	64	42	18	0	43	63	–	351	-3.30	-0.57	56
Czech Republic	448	-1.3	0.94	1.83	6.15	-2.06	827	-0.02	11	5	92	24	5	65	51	54	100	95	90	4	201	-0.24	-0.01	92
Denmark	957	1.92	1.16	1.83	6.74	-3.13	847	-0.35	16	11	88	20	4	64	24	39	100	76	73	22	273	-2.15	0.86	99
Djibouti	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	-7.18	–
Dominica	–	–	–	–	–	–	–	–	–	–	–	35	–	–	–	–	–	–	–	–	–	–	-1.34	–
Dominican Repub	231	-2.9	–	–	–	–	–	–	–	–	–	49	–	–	–	–	–	–	–	–	–	–	-3.17	–
East Timor	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Ecuador	273	-1.8	–	–	–	–	–	–	–	–	–	38	–	–	–	–	–	–	–	–	–	–	-1.90	–
Egypt	272	-1.1	–	–	6.20	-1.54	1278	-0.91	–	17	78	38	–	80	50	–	–	–	70	–	460	-0.20	-4.35	21
El Salvador	–	-2.4	–	–	7.07	-3.48	893	-1.44	–	11	91	31	–	46	34	–	–	–	45	–	467	-6.90	-4.33	9
Equat. Guinea	–	–	–	–	–	–	–	–	–	–	–	69	–	–	–	–	–	–	–	–	–	–	-2.88	–
Eritrea	–	–	–	–	–	–	–	–	–	–	–	54	–	–	–	–	–	–	–	–	–	–	-10.7	–
Estonia	430	–	–	1.71	6.88	-3.81	890	-1.37	15	13	87	24	6	57	31	56	–	82	81	1	416	-2.26	-0.05	194
Ethiopia	–	–	–	–	–	–	–	–	–	–	–	47	–	–	–	–	–	–	–	–	–	–	-7.97	–
Fiji	341	-0.96	–	–	–	–	–	–	–	–	–	37	–	–	–	–	–	–	–	–	–	–	-1.07	–
Finland	819	0.15	1.15	1.53	6.75	-2.87	747	-0.56	16	6	89	18	3	64	30	39	100	62	86	4	190	-2.19	1.02	103
France	740	0.14	1.05	1.97	5.95	-1.56	812	0.16	15	19	83	25	34	62	51	44	50	52	79	14	280	-2.23	-0.43	77

Gabon	352	-0.72	–	–	–	–	–	–	–	–	–	56	–	–	–	–	–	–	–	–	–	–	-5.48	–
Gambia	246	0.22	–	–	–	–	–	–	–	–	–	39	–	–	–	–	–	–	–	–	–	–	-7.50	–
Georgia	–	-3.0	–	1.36	6.07	-1.19	718	-1.32	–	5	95	23	–	61	48	52	–	–	100	–	466	-0.52	-0.08	79
Germany	668	-0.49	1.69	1.86	6.10	-2.47	862	-0.31	10	19	82	25	19	69	43	40	35	48	74	4	291	-2.03	0.00	94
Ghana	232	-0.98	–	–	6.20	-5.45	1051	-1.54	–	9	20	40	–	54	48	74	–	–	41	–	364	-4.90	-4.64	24
Greece	438	-1.4	1.13	1.60	6.09	-0.43	742	-1.21	15	13	89	21	7	61	57	15	0	50	75	6	397	-2.62	-0.84	50
Greenland	–	–	–	–	–	–	–	–	–	–	–	17	–	–	–	–	–	–	–	–	–	–	-0.01	–
Grenada	277	-0.78	–	–	–	–	–	–	–	–	–	35	–	–	–	–	–	–	–	–	–	–	-2.01	–
Guatemala	–	–	–	–	–	–	–	–	–	–	–	38	–	–	–	–	–	–	–	–	–	–	-6.00	–
Guinea-Bissau	245	0.59	–	–	–	–	–	–	–	–	–	28	–	–	–	–	–	–	–	–	–	–	-6.02	–
Guinea	–	–	–	–	–	–	–	–	–	–	–	50	–	–	–	–	–	–	–	–	–	–	-8.56	–
Guyana	259	-0.57	–	–	–	–	–	–	–	–	–	40	–	–	–	–	–	–	–	–	–	–	-0.41	–
Haiti	226	-2.3	–	–	–	–	–	–	–	–	–	36	–	–	–	–	–	–	–	–	–	–	-6.72	–
Honduras	256	-1.0	–	1.09	–	-2.92	1023	-1.34	–	–	97	48	–	59	64	53	–	–	57	–	–	-3.04	-4.50	5
Hong Kong	458	-1.6	2.34	1.91	6.00	-1.55	1013	-1.09	12	46	79	37	14	77	61	50	100	86	80	48	328	0.23	-0.83	49
Hungary	459	0.11	0.92	1.98	6.50	-2.64	753	1.21	10	4	93	25	10	63	44	56	100	89	81	10	391	-0.64	0.02	105
Iceland	841	0.02	0.75	1.96	6.16	-0.37	756	-0.14	16	6	84	21	2	67	20	39	50	84	78	85	255	-0.77	.14	119
India	244	-1.3	–	–	–	-3.88	–	-1.74	14	–	–	65	–	–	–	–	–	–	–	–	–	-4.48	-4.91	–
Indonesia	253	-3.1	–	0.88	6.28	-2.04	972	-1.34	15	4	30	36	13	57	48	42	100	72	61	58	330	-2.28	-3.85	9
Iran	293	-1.1	–	0.79	6.28	-1.86	804	-1.43	14	1	58	30	–	64	43	44	100	46	59	–	340	-2.97	-3.68	30
Iraq	–	–	–	–	–	–	–	–	–	–	–	33	–	–	–	–	–	–	–	–	–	–	-4.10	–
Ireland	647	-0.11	1.26	1.12	5.45	-1.87	839	0.04	12	14	81	26	10	68	54	55	100	67	80	47	400	-0.78	0.63	89
Israel	559	1.61	0.82	1.76	6.04	-1.13	995	-1.10	15	31	80	29	4	57	47	60	100	76	72	11	315	-1.26	0.00	87
Italy	733	-0.52	1.13	1.88	5.90	-0.77	950	-0.31	14	9	80	20	16	63	61	45	100	48	62	5	406	-1.73	-1.50	65
Jamaica	282	-1.2	–	–	–	–	–	–	–	–	–	40	–	–	–	–	–	–	–	–	–	–	-1.43	–
Japan	741	-0.91	1.44	1.98	5.97	-1.49	996	3.70	14	3	95	34	1	77	71	47	100	70	81	29	195	0.07	0.73	63
Jordan	314	0.11	–	0.93	5.82	-0.84	950	-1.25	16	25	88	34	8	66	52	56	100	46	66	16	311	-1.97	-0.96	38
Kazakhstan	–	-2.4	–	0.60	6.51	-2.52	838	-1.49	–	18	80	22	2	79	59	59	–	56	73	1	512	-1.68	-0.34	36
Kenya	270	1.87	–	–	–	–	–	–	–	–	–	38	–	–	–	–	–	–	–	–	–	–	-4.78	–
Kiribati	–	–	–	–	–	–	–	–	–	–	–	41	–	–	–	–	–	–	–	–	–	–	-1.34	–
Korea-North	–	–	–	–	–	–	–	–	–	–	–	18	–	–	–	–	–	–	–	–	–	–	-0.68	–
Korea-South	485	-0.69	2.01	1.78	5.93	-1.38	977	2.12	14	6	94	38	2	77	82	55	100	62	84	54	192	0.48	0.60	104
Kuwait	705	0.18	–	1.21	5.94	-1.38	902	-1.26	–	21	71	28	–	49	42	39	0	48	71	–	331	-3.84	-1.62	47
Kyrgyzstan	30	–	1.02	0.52	6.72	-2.69	912	-1.48	15	9	–	22	5	77	–	64	–	65	–	3	–	-1.94	-0.41	–

Laos	–	–	–	–	–	–	–	–	–	–	–	39	–	–	–	–	–	–	–	–	–	–	-5.80	–
Latvia	–	0.11	–	1.40	6.82	-3.05	779	0.41	15	13	82	21	9	60	49	48	50	86	65	1	406	-2.48	-0.08	106
Lebanon	–	-2.4	–	–	6.20	-1.99	930	-1.24	–	11	14	27	–	86	43	76	–	–	63	–	381	0.32	-1.02	37
Lesotho	317	5.27	–	–	–	–	–	–	–	–	–	55	–	–	–	–	–	–	–	–	–	–	-4.92	–
Liberia	–	–	–	–	–	–	–	–	–	–	–	36	–	–	–	–	–	–	–	–	–	–	-6.98	–
Libya	–	–	–	–	–	–	–	–	–	–	–	19	–	–	–	–	–	–	–	–	–	–	-3.18	–
Liechtenstein	–	–	–	1.91	6.29	-3.18	992	-0.22	11	35	79	15	20	73	–	62	–	72	68	6	215	-1.19	-0.01	–
Lithuania	–	0.11	–	1.29	6.76	-3.00	789	-1.44	14	5	91	22	4	63	50	49	100	87	77	0	386	-1.66	-0.08	51
Luxembourg	1337	0.00	1.18	1.46	6.00	-3.62	807	-0.16	12	47	15	18	33	65	56	45	–	54	68	14	254	-2.71	-1.98	90
Macau	–	–	1.23	1.80	6.09	-2.73	1155	-1.13	12	79	78	36	37	69	–	28	–	100	83	96	366	-0.59	-1.41	–
Macedonia	–	-1.6	–	1.00	6.75	-2.60	741	-1.48	15	8	86	30	–	63	58	42	0	80	72	1	459	-2.82	-1.46	35
Madagascar	232	-1.4	–	–	–	–	–	–	–	–	–	46	–	–	–	–	–	–	–	–	–	–	-4.34	–
Malawi	278	6.75	–	–	–	–	–	–	–	–	–	66	–	–	–	–	–	–	–	–	–	–	-6.58	–
Malaysia	381	0.15	–	1.17	6.78	-1.36	937	-1.25	15	5	51	31	0	60	50	40	100	55	73	0	354	-2.12	-1.89	25
Maldives	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	-0.92	–
Mali	297	9.50	–	–	–	–	–	–	–	–	–	60	–	–	–	–	–	–	–	–	–	–	-8.25	–
Malta	386	-0.85	–	1.52	4.89	-0.51	885	-1.15	11	13	16	21	–	69	52	41	–	–	68	–	386	-0.81	-1.35	76
Mariana Islands	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Marshall Islands	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Mauritania	332	8.26	–	–	–	–	–	–	–	–	–	53	–	–	–	–	–	–	–	–	–	–	-7.51	–
Mauritius	359	-1.1	–	–	–	–	–	–	–	–	–	30	–	–	–	–	–	–	–	–	–	–	-2.78	–
Mexico	248	-2.5	–	1.58	6.03	-1.98	789	0.22	12	5	89	43	19	65	–	29	–	66	48	15	331	-2.84	-2.07	–
Micronesia	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	-3.12	–
Moldova	–	-0.57	–	1.62	6.59	-2.90	860	-1.33	–	15	84	24	–	50	36	99	100	–	47	–	551	-2.30	-0.45	35
Mongolia	–	-0.23	–	–	7.61	-3.48	–	-1.64	–	–	–	34	–	–	–	–	–	–	–	–	–	–	-2.29	–
Montenegro	–	–	1.34	1.03	6.57	-2.65	595	-1.56	14	14	92	30	6	68	–	43	–	72	80	1	260	-2.07	–	–
Morocco	368	2.15	–	1.15	6.38	-2.89	1004	-1.33	–	10	54	32	–	47	50	37	100	–	56	–	383	-4.01	-6.34	19
Mozambique	277	3.17	–	–	7.00	–	772	-1.44	–	–	69	59	–	–	–	–	–	–	–	–	252	–	-7.81	19
Namibia	–	–	–	–	–	–	–	–	–	–	–	42	–	–	–	–	–	–	–	–	–	–	-3.24	–
Nepal	–	–	–	–	–	–	–	–	–	–	–	46	–	–	–	–	100	–	–	–	–	–	-7.74	–
Nether Antilles	–	–	–	–	–	–	–	–	–	–	–	30	–	–	–	–	–	–	–	–	–	–	-0.84	–
Netherlands	757	-0.25	1.35	1.72	5.69	-1.81	893	-1.21	12	15	85	26	25	67	33	59	100	93	61	74	232	-0.85	0.49	80
New Caledonia	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	-5.62	–
New Zealand	538	0.36	1.42	1.64	5.14	0.20	888	-0.10	16	29	77	27	5	61	21	66	100	85	76	6	252	-1.13	1.66	116

Nicaragua	282	0.29	–	–	–	–	–	–	–	–	–	45	–	–	–	–	–	–	–	–	–	–	-4.16	–
Niger	–	–	–	–	–	–	–	–	–	–	–	44	–	–	–	–	–	–	–	–	–	–	-9.16	–
Nigeria	392	12.2	–	–	–	-2.72	–	-1.47	–	–	–	47	–	–	–	–	–	–	–	–	–	–	-6.01	–
Norway	1043	1.51	0.66	1.80	5.97	-0.62	749	-0.40	16	10	85	21	1	66	43	42	65	67	74	1	273	-1.56	1.17	116
Oman	491	-0.64	–	0.85	5.98	-0.96	955	-1.27	–	13	84	31	–	64	48	37	–	–	67	–	308	-2.69	-5.72	50
Pakistan	238	-1.9	–	–	–	–	–	–	–	–	–	42	–	–	–	–	–	–	–	–	–	–	-6.78	–
Palestine	–	6.20	–	–	5.66	-0.82	852	-1.17	–	12	89	38	–	57	53	67	–	–	65	–	358	-1.22	–	27
Panama	307	-1.1	–	1.08	5.70	-1.97	741	-1.42	–	9	–	31	30	65	–	14	–	58	–	17	–	-3.88	-0.11	–
Papua N-Guinea	–	–	–	–	–	–	–	–	–	–	–	43	–	–	–	–	–	–	–	–	–	–	-5.79	–
Paraguay	229	-3.0	–	–	–	–	–	–	–	–	–	31	–	–	–	–	–	–	–	–	–	–	-2.79	–
Peru	246	-2.5	0.97	1.41	5.98	-1.26	944	-1.20	15	4	86	33	27	60	–	16	–	69	72	15	327	-3.10	-1.56	–
Philippines	233	-2.4	–	–	6.42	-2.02	1140	-1.07	–	–	–	50	–	53	49	–	0	–	73	–	–	-3.53	-0.34	21
Poland	391	0.44	0.96	1.26	6.30	-1.91	778	0.67	15	2	95	24	6	63	64	42	–	81	95	3	367	-1.23	0.56	64
Portugal	516	-0.65	1.55	1.48	6.01	-1.71	832	-0.11	15	9	92	21	36	65	51	38	0	49	71	8	261	-3.15	-2.90	53
Puerto Rico	–	–	–	–	–	–	–	–	–	–	–	32	–	–	–	–	–	–	–	–	–	–	-1.38	–
Qatar	–	-2.5	0.50	0.95	5.98	-0.83	961	-1.24	15	51	55	27	16	55	53	51	–	60	75	28	282	-2.19	-2.76	67
Romania	244	-2.4	–	1.76	6.77	-3.22	704	-1.42	15	3	92	25	5	64	54	43	50	49	74	1	508	-2.39	-0.45	46
Russia	175	-0.56	–	1.63	6.47	-2.30	791	0.49	14	14	84	23	4	65	57	64	100	82	87	0	543	-0.67	-0.28	74
Rwanda	270	2.59	–	–	–	–	–	–	–	–	–	61	–	–	–	–	–	–	–	–	–	–	-6.74	–
Saint Helena	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Saint Lucia	–	–	–	–	–	–	–	–	–	–	–	35	–	–	–	–	–	–	–	–	–	–	-2.41	–
Samoa-West	249	-2.1	–	–	–	–	–	–	–	–	–	38	–	–	–	–	–	–	–	–	–	–	-0.01	–
Sao Tome/Princi	–	–	–	–	–	–	–	–	–	–	–	47	–	–	–	–	–	–	–	–	–	–	-6.12	–
Saudi Arabia	–	1.91	–	0.55	5.66	-1.17	942	-1.34	–	17	83	29	–	61	52	52	–	–	65	–	282	-2.78	-5.28	42
Senegal	282	1.29	–	–	–	–	–	–	–	–	–	62	–	–	–	–	–	–	–	–	–	–	-7.47	–
Serbia	432	-0.52	–	1.21	6.91	-3.10	761	-1.47	14	18	91	25	5	58	61	40	–	76	51	1	294	-2.90	-0.98	33
Seychelles	524	3.86	–	–	–	–	–	–	–	–	–	24	–	–	–	–	–	–	–	–	–	–	-2.12	–
Sierra Leone	234	-1.7	–	–	–	–	–	–	–	–	–	36	–	–	–	–	–	–	–	–	–	–	-7.69	–
Singapore	457	-1.3	1.67	1.88	6.45	-1.67	1195	-1.01	10	22	33	36	6	72	55	64	100	60	76	2	443	-0.31	-1.11	71
Slovakia	322	-1.4	–	1.75	6.13	-1.87	811	-1.26	10	4	85	24	5	62	50	51	100	87	90	10	294	-0.36	-0.01	59
Slovenia	779	-0.63	1.18	1.54	6.46	-0.98	730	-1.27	14	13	84	23	5	63	55	41	100	78	72	1	265	-1.34	-0.01	63
Solomon Islands	–	–	–	–	–	–	–	–	–	–	–	34	–	–	–	–	–	–	–	–	–	–	-6.13	–
Somalia	–	–	–	–	–	–	–	–	–	–	–	28	–	–	–	–	–	–	–	–	–	–	-8.74	–
South Africa	–	-0.57	–	1.30	6.77	-4.33	1052	-1.39	16	21	44	47	–	50	38	41	100	–	67	–	400	-4.02	-3.22	27

Spain	584	-1.6	1.49	1.82	5.85	-1.30	852	0.46	16	11	71	25	36	66	53	45	0	55	76	30	366	-2.35	-1.24	79
Sri Lanka	258	-1.8	–	–	–	–	–	–	–	–	–	37	–	–	–	–	–	–	–	–	–	–	-1.78	–
St. Kitts & Nevis	–	–	–	–	–	–	–	–	–	–	–	28	–	–	–	–	–	–	–	–	–	–	-1.22	–
St. Vincent/Gre	–	–	–	–	–	–	–	–	–	–	–	29	–	–	–	–	–	–	–	–	–	–	-0.54	–
Sudan	276	1.37	–	–	–	–	–	–	–	–	–	43	–	–	–	–	–	–	–	–	–	–	-6.97	–
Suriname	454	2.31	–	–	–	–	–	–	–	–	–	27	–	–	–	–	–	–	–	–	–	–	-1.10	–
Swaziland	310	0.05	–	–	–	–	–	–	–	–	–	39	–	–	–	–	–	–	–	–	–	–	-3.83	–
Sweden	1042	1.75	0.92	1.65	6.82	-2.90	794	-0.53	16	17	81	22	4	64	41	45	50	91	75	8	203	-2.00	0.29	120
Switzerland	1144	0.65	1.58	1.64	6.49	-2.20	856	-0.39	12	30	75	19	19	70	40	31	0	76	65	6	231	-2.50	-0.80	80
Syria	288	-2.0	–	–	5.98	-0.64	663	-1.30	–	11	85	32	–	49	46	46	–	–	47	–	402	-3.70	-2.69	19
Taiwan	258	-1.6	1.55	1.71	6.60	-1.51	1039	-1.11	14	4	69	37	2	76	80	53	100	79	79	31	326	0.21	-0.66	80
Tajikistan	–	–	–	–	–	–	–	–	–	–	–	23	–	–	–	–	–	–	–	–	–	–	-0.32	–
Tanzania	–	–	–	–	–	–	–	–	–	–	–	42	–	–	–	–	–	–	–	–	–	–	-6.08	–
Thailand	391	-1.0	2.19	1.79	6.07	-1.62	1106	-1.07	16	3	58	37	4	67	46	59	100	74	76	20	376	-0.98	-2.73	17
Tibet	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Togo	247	0.71	–	–	–	–	–	–	–	–	–	57	–	–	–	–	–	–	–	–	–	–	-6.11	–
Tonga	–	–	–	–	–	–	–	–	–	–	–	31	–	–	–	–	–	–	–	–	–	–	-0.97	–
Trinidad Tobago	549	0.14	–	1.46	5.17	-1.64	971	-1.20	–	11	96	27	28	57	58	55	–	55	60	9	388	-2.70	-0.77	67
Tunisia	344	1.06	–	0.81	5.85	-2.12	915	-1.39	16	5	67	29	45	50	36	26	100	44	61	2	317	-4.65	-4.70	21
Turkey	208	-1.5	–	0.57	6.44	-1.37	814	-1.42	11	3	85	34	13	57	67	43	100	42	74	1	290	-2.25	-3.36	30
Turkmenistan	–	–	–	–	–	–	–	–	–	–	–	20	–	–	–	–	–	–	–	–	–	–	-0.32	–
Uganda	–	–	–	–	–	–	–	–	–	–	–	43	–	–	–	–	–	–	–	–	–	–	-6.14	–
Ukraine	–	0.84	–	–	7.07	-1.44	732	-1.34	10	17	68	25	–	65	47	69	–	–	67	–	437	-0.33	-0.22	59
United Arab Emi	–	–	–	1.20	5.76	-0.70	990	-1.17	15	73	56	26	12	64	48	53	–	88	77	55	345	-0.85	-2.78	55
United Kingdom	816	0	1.28	1.34	5.07	0	914	0	11	15	85	27	3	67	32	66	100	99	82	18	271	0	0	102
United States	1043	0.57	–	1.35	6.04	-1.27	913	-0.14	13	23	77	26	14	61	46	62	70	83	84	6	320	-1.17	1.74	86
Uruguay	299	-1.9	–	1.54	5.90	-2.19	772	-1.34	12	3	90	28	41	59	–	19	–	47	29	16	309	-4.69	-1.40	–
Uzbekistan	–	–	–	–	–	–	–	–	–	–	–	19	–	–	–	–	–	–	–	–	–	–	-0.38	–
Vanuatu	327	1.91	–	–	–	–	–	–	–	–	–	35	–	–	–	–	–	–	–	–	–	–	-6.29	–
Venezuela	335	-0.68	–	–	–	-3.41	–	-1.63	–	–	–	30	–	–	–	–	–	–	–	–	300	–	-2.25	–
Vietnam	–	–	–	1.53	6.11	-1.20	861	-1.22	15	3	90	34	8	83	–	66	–	57	71	4	351	-0.77	-0.85	–
Yemen	–	–	–	–	6.20	-3.88	919	-1.47	–	20	88	51	–	48	44	–	–	–	51	–	462	-6.20	-7.68	15
Zambia	255	1.00	–	–	–	–	–	–	–	–	–	46	–	–	–	–	–	–	–	–	–	–	-4.24	–
Zimbabwe	292	1.06	–	–	–	-3.13	–	-1.56	–	–	–	48	–	–	–	–	–	–	–	–	–	–	-3.55	–

Data tables

Country	EEa	EEr	TSr	Kig	SEA	YHG	AIn	AEd	Trac	Mi%	LanI	CS	RR	Disc	DirI	AchT	CenE	SAut	TeQa	Priv	Hom	SQM	AdE	Book
Mean	423	0.08	1.25	1.41	6.20	-2.01	888	-0.88	14	15	77	35	14	63	49	47	69	68	70	16	340	-2.15	-2.90	59
Standard Deviat.	246	2.50	0.41	0.39	0.49	1.02	129	0.83	2	14	20	13	12	8	11	15	42	15	13	21	98	1.49	2.84	36
Number countries	116	127	40	82	96	100	96	101	72	93	92	189	68	95	80	88	54	72	92	68	91	96	192	85

Notes: Eea: Education expenditures (absolute, cumulative per student aged 6 to 15, in 100 US$); EEr: Education expenditures (relative to GDP/c, UK *M*=0, "First World" *SD*=1); TSr: Teacher salary (relative to GDP/c); Kig: Kindergarten (roughly in years); SEA: Young school enrolment (here presented as age, not inverted); YHG: Young in high grade (UK *M*=0, "First World" *SD*=1); AIn: Amount of instruction (roughly in hours per year); AEd: Amount of education (UK *M*=0, "First World" *SD*=1); Trac: Tracking at a young age (here as age, not inverted); Mi%: Share of migrants; LanI: Language identical; CS: Class size/pupil-teacher ratio; RR: Repetition rate (percentage); Disc: Discipline (roughly percentage of disciplined pupils); DirI: Direct instruction (percentage of pupils in every lesson receiving direct instruction); AchT: Use of achievement tests (roughly percentage of pupils for whom achievement tests are considered for admission); CenE: Central exams and tests (percentage of pupils); SAut: School autonomy (percentage of pupils whose schools can decide e.g. on teacher recruitment); TeQa: Teacher quality (roughly percentage of teachers having university degree); Priv: Private schools (percentage); Hom: Homework (roughly minutes per week); SQM: School quality mean (UK *M*=0, "First World" *SD*=1); AdE: Adult education mean (UK *M*=0, "First World" *SD*=1); Book: Number of books. Data compiled 28. September 2014.

Society attributes: Background factors

Data are presented for *culture* (indicator religions weighted for education, rationality, thinking and meritoric orientations, see Section 10.8) and *evolution* (indicators skin lightness, cranial capacity and *G*-factor of evolution not including consanguinity; see Section 10.7).

Table A.4: Culture and evolution (global background factors)

Country	**Culture (weighted religion)**	**Skin lightness**	**Cranial capacity**	***G* factor evolution**
Afghanistan	−39.60	25.54	1355.00	0.649
Albania	−19.00	28.00	1325.00	0.469
Algeria	−39.60	26.79	1325.00	0.369
Andorra	46.40	29.50	1350.00	0.913
Angola	−13.00	12.40	1275.00	−1.461
Antigua-Barbuda	35.00	14.36	1295.59	−1.035
Argentina	49.60	27.81	1350.77	0.782
Armenia	17.20	28.00	1325.00	0.469
Australia	67.00	29.78	1348.66	0.919
Austria	41.50	31.00	1330.00	0.782
Azerbaijan	−36.20	26.20	1325.00	0.320
Bahamas	51.50	14.28	1294.74	−1.054
Bahrain	−32.00	22.00	1325.00	−0.028
Bangladesh	−39.60	19.00	1323.68	−0.293
Barbados	59.00	13.77	1293.00	−1.118
Belarus	16.00	31.00	1375.00	1.356
Belgium	50.00	29.68	1375.00	1.247
Belize	52.50	21.36	1177.65	−1.962
Benin (Dahomey)	−71.50	13.00	1350.00	−0.454
Bermuda	55.80	19.75	1312.78	−0.370
Bhutan	5.00	19.00	1375.00	0.362
Bolivia	20.00	23.31	1339.09	0.260
Bosnia	−2.70	28.00	1325.00	0.469
Botswana	−28.50	16.33	1305.00	−0.752
Brazil	20.00	24.89	1332.79	0.311
Brunei	−34.20	22.00	1325.00	−0.028
Bulgaria	12.00	28.00	1325.00	0.469
Burkina Faso	−57.00	13.36	1325.00	−0.743
Burma (Myanmar)	17.40	25.00	1315.00	0.093
Burundi	−9.00	13.00	1275.00	−1.411
Cambodia	7.30	21.68	1225.00	−1.331
Cameroon	−42.50	10.95	1280.00	−1.518
Canada	53.00	30.31	1353.70	1.027
Cape Verde	−20.00	–	–	–

Central Afric R	−11.00	13.60	1285.00	−1.234
Chad	−44.00	11.07	1320.00	−0.997
Chile	50.00	27.54	1353.20	0.791
China	51.00	26.70	1421.93	1.599
Colombia	39.00	24.46	1336.75	0.326
Comoros	−44.00	–	–	–
Congo (Brazz)	−33.00	13.03	1275.00	−1.409
Congo (Zaire)	−4.00	13.25	1275.00	−1.391
Cook Islands	72.70	28.00	–	–
Costa Rica	43.50	26.01	1341.34	0.513
Cote d'Ivoire	−39.60	13.60	1277.50	−1.330
Croatia	40.70	28.00	1325.00	0.469
Cuba	23.00	25.87	1342.18	0.512
Cyprus	8.40	28.00	–	–
Czech Republic	25.10	31.00	1325.00	0.718
Denmark	87.00	31.00	1375.00	1.356
Djibouti	−39.50	14.03	1275.00	−1.326
Dominica	27.50	14.25	1256.01	−1.550
Dominican Repub	30.00	21.55	1322.14	−0.102
East Timor	50.50	19.00	1325.00	−0.276
Ecuador	20.00	23.96	1337.27	0.292
Egypt	−34.20	22.50	1370.00	0.588
El Salvador	40.00	25.51	1342.09	0.481
Equat. Guinea	−10.00	13.00	1275.00	−1.411
Eritrea	−16.00	16.00	1275.00	−1.163
Estonia	51.00	31.00	1375.00	1.356
Ethiopia	−31.00	14.56	1272.25	−1.317
Fiji	11.10	23.59	1308.89	−0.102
Finland	85.00	31.00	1375.00	1.356
France	42.00	31.00	1360.00	1.165
Gabon	−23.00	13.30	1275.00	−1.387
Gambia	−47.70	10.00	1325.00	−1.021
Georgia	12.20	28.00	1325.00	0.469
Germany	47.30	30.56	1362.50	1.160
Ghana	−50.80	12.85	1280.00	−1.360
Greece	18.80	28.00	1325.00	0.469
Greenland	70.00	–	–	–
Grenada	28.50	14.38	1295.35	−1.038
Guatemala	50.00	25.09	1334.58	0.350
Guinea-Bissau	−66.50	10.00	1325.00	−1.021
Guinea	−51.50	11.50	1325.00	−0.897
Guyana	−21.00	17.02	1263.23	−1.229
Haiti	−20.00	13.84	–	–
Honduras	44.00	24.71	1339.09	0.377
Hong Kong	75.00	28.00	1425.00	1.746
Hungary	59.00	30.40	1325.00	0.668

Iceland	93.00	31.00	–	–
India	−37.60	18.79	1208.75	−1.778
Indonesia	−38.30	20.73	1325.00	−0.133
Iran	−39.60	24.58	1325.00	0.186
Iraq	−39.30	24.86	1325.00	0.209
Ireland	49.00	30.08	1325.00	0.642
Israel	58.20	26.07	1340.54	0.508
Italy	49.00	29.50	1325.00	0.594
Jamaica	27.50	13.79	1292.48	−1.122
Japan	62.50	26.30	1325.00	0.329
Jordan	−34.60	23.82	1325.00	0.123
Kazakhstan	−8.00	28.00	1375.00	1.108
Kenya	18.00	14.24	1269.00	−1.385
Kiribati	28.50	27.72	–	–
Korea-North	38.90	28.00	1425.00	1.746
Korea-South	27.30	28.00	1425.00	1.746
Kuwait	−40.00	22.00	1325.00	−0.028
Kyrgyzstan	−31.00	27.01	1375.00	1.026
Laos	−28.00	19.60	1307.50	−0.450
Latvia	40.00	31.00	1375.00	1.356
Lebanon	−19.00	24.03	1325.00	0.140
Lesotho	−9.00	13.00	1325.00	−0.773
Liberia	−36.00	12.94	1275.00	−1.416
Libya	−31.40	21.36	1325.00	−0.081
Liechtenstein	47.00	31.00	1375.00	1.356
Lithuania	41.50	31.00	1375.00	1.356
Luxembourg	48.30	31.00	1375.00	1.356
Macau	45.50	28.00	1425.00	1.746
Macedonia	1.40	28.00	1325.00	0.469
Madagascar	−42.50	15.70	–	–
Malawi	14.50	12.23	1275.00	−1.475
Malaysia	−29.60	21.70	1257.08	−0.920
Maldives	−38.00	–	–	–
Mali	−49.00	14.61	1325.00	−0.640
Malta	49.00	–	–	–
Mariana Islands	20.00	22.97	–	–
Marshall Islands	0.00	25.00	–	–
Mauritania	−44.80	19.15	1325.00	−0.264
Mauritius	−19.60	–	–	–
Mexico	39.50	24.46	1346.89	0.456
Micronesia	5.00	28.00	1370.00	1.044
Moldova	19.60	29.01	1325.00	0.553
Mongolia	22.40	28.00	1462.50	20.225
Montenegro	9.50	28.00	1325.00	0.469
Morocco	−38.10	25.57	1325.00	0.268
Mozambique	−49.00	10.47	1275.00	−1.621

Namibia	9.00	12.86	1322.50	−0.816
Nepal	−34.40	20.71	1375.00	0.504
Nether Antilles	26.00	–	–	–
Netherlands	34.50	30.67	1375.00	1.329
New Caledonia	32.50	21.49	1365.43	0.446
New Zealand	65.50	29.41	1355.08	0.970
Nicaragua	45.00	24.36	1335.10	0.296
Niger	−51.50	16.00	1325.00	−0.525
Nigeria	−37.50	12.42	1300.00	−1.140
Norway	86.00	31.00	1375.00	1.356
Oman	−40.00	19.45	1325.00	−0.239
Pakistan	−38.60	23.85	1356.98	0.534
Palestine	−32.80	25.00	1325.00	0.221
Panama	47.50	24.80	1348.79	0.508
Papua N-Guinea	−35.00	15.38	1325.00	−0.576
Paraguay	40.00	25.15	1341.13	0.439
Peru	26.00	24.21	1335.02	0.283
Philippines	29.60	23.07	–	–
Poland	48.70	31.00	1365.00	1.228
Portugal	46.60	28.00	1340.33	0.665
Puerto Rico	35.00	25.58	1223.81	−1.023
Qatar	−39.10	22.00	1325.00	−0.028
Romania	27.40	28.60	1325.00	0.519
Russia	7.10	27.12	1387.50	1.194
Rwanda	21.60	13.00	1275.00	−1.411
Saint Helena	–	–	–	–
Saint Lucia	45.50	14.24	1292.74	−1.082
Samoa-West	53.00	25.03	1374.89	0.860
Sao Tome/Princi	20.00	–	–	–
Saudi Arabia	−40.00	22.39	1325.00	0.005
Senegal	−47.60	10.53	1325.00	−0.978
Serbia	9.50	28.00	1325.00	0.469
Seychelles	41.50	–	1341.13	–
Sierra Leone	−51.00	13.00	1300.00	−1.092
Singapore	30.90	26.03	1378.97	0.995
Slovakia	38.80	31.00	1325.00	0.718
Slovenia	37.70	31.00	1325.00	0.718
Solomon Islands	29.50	–	–	–
Somalia	−43.40	13.00	1275.00	−1.411
South Africa	−14.00	17.67	1298.68	−0.722
Spain	46.20	28.96	1340.33	0.744
Sri Lanka	7.60	13.00	1225.00	−20.050
St. Kitts & Nevis	27.50	13.26	1291.34	−1.181
St. Vincent/Gre	61.50	15.87	1267.77	−1.266
Sudan	−51.50	14.23	1287.50	−1.150
Suriname	−4.40	19.25	1279.96	−0.831

Swaziland	−22.50	14.24	1275.00	−1.309
Sweden	86.60	31.00	1375.00	1.356
Switzerland	63.00	31.00	1350.00	1.037
Syria	−33.00	26.21	1325.00	0.321
Taiwan	72.90	25.00	1425.00	1.498
Tajikistan	−34.00	26.50	1375.00	0.984
Tanzania	−27.00	12.31	1275.00	−1.468
Thailand	8.00	22.00	1265.00	−0.794
Tibet	−16.00	25.75	1385.00	1.049
Togo	−55.10	13.00	1290.00	−1.220
Tonga	−12.00	25.00	1375.00	0.859
Trinidad Tobago	7.00	15.11	1249.33	−1.564
Tunisia	−38.90	26.28	1325.00	0.327
Turkey	−39.30	27.25	1325.00	0.407
Turkmenistan	−33.80	27.70	1330.00	0.508
Uganda	7.60	11.50	1257.50	−1.759
Ukraine	18.00	29.01	1350.00	0.872
United Arab Emi	−38.50	22.00	1325.00	−0.028
United Kingdom	65.50	30.13	1325.00	0.645
United States	69.40	28.30	1342.33	0.715
Uruguay	35.60	27.18	1346.94	0.682
Uzbekistan	−33.40	28.00	1371.25	1.060
Vanuatu	12.50	13.00	1375.00	−0.134
Venezuela	43.00	–	–	–
Vietnam	26.00	23.79	1285.00	−0.390
Yemen	−39.60	16.30	1325.00	−0.500
Zambia	−20.00	12.40	1275.00	−1.461
Zimbabwe	−63.60	13.00	1275.00	−1.411
Country	**Culture (weighted religion)**	**Skin lightness**	**Cranial capacity**	***G* factor evolution**
Mean	7.46	22.31	1325.62	−0.002
Standard Deviat.	39.96	6.63	43.09	0.991
Number countries	199	188	180	179

Notes: Variables and sources explained in Sections 10.7 and 10.8.

Future cognitive ability estimates

Table A.5: Estimates of future cognitive ability and effects

Country	**Cogn. ability 2100**	**Asymmetry effect**	**Migration effect**	**Environ. improv. effect**	**Diff. 2100-2010**	**IQ gain per decade** (‘10−100)
Afghanistan	86.70	−5.13	−0.12	20.67	15.42	1.71
Albania	92.60	−5.13	−0.75	15.87	9.99	1.11
Algeria	90.73	−5.13	−1.27	12.63	6.23	0.69
Angola	80.46	−5.13	−1.56	20.02	13.33	1.48
Argentina	95.24	−5.13	−0.88	13.82	7.81	0.87
Armenia	96.80	−5.13	0.36	11.92	7.14	0.79
Australia	99.23	−5.13	0.17	5.24	0.27	0.03
Austria	93.22	−5.13	−5.10	4.87	−5.37	−0.60
Azerbaijan	91.24	−5.13	0.12	8.18	3.17	0.35
Bahrain	89.77	−5.13	−0.25	8.81	3.43	0.38
Bangladesh	88.61	−5.13	−0.12	14.15	8.90	0.99
Belarus	96.33	−5.13	−1.10	6.61	0.38	0.04
Belgium	94.00	−5.13	−4.01	4.34	−4.80	−0.53
Benin (Dahomey)	80.20	−5.13	−1.56	20.88	14.19	1.58
Bolivia	88.63	−5.13	−0.80	11.78	5.86	0.65
Bosnia	95.87	−5.13	−0.39	9.69	4.17	0.46
Botswana	88.51	−5.13	−1.01	21.69	15.55	1.73
Brazil	93.02	−5.13	−0.89	14.13	8.11	0.90
Bulgaria	93.73	−5.13	−1.46	6.92	0.33	0.04
Burkina Faso	80.17	−5.13	−1.56	21.01	14.32	1.59
Burma (Myanmar)	89.83	−5.13	−0.12	13.40	8.15	0.91
Burundi	81.07	−5.13	−1.56	17.90	11.21	1.25
Cambodia	89.27	−5.13	−0.63	10.17	4.41	0.49
Cameroon	80.46	−5.13	−1.56	20.00	13.31	1.48
Canada	98.36	−5.13	−0.63	3.55	−2.20	−0.24
Cape Verde	81.63	−5.13	−1.56	16.00	9.31	1.03
Central Afric R	79.30	−5.13	−1.56	23.96	17.27	1.92
Chad	79.81	−5.13	−1.56	22.23	15.54	1.73
Chile	93.12	−5.13	−0.85	10.32	4.35	0.48
China	101.16	−5.13	−1.19	6.71	0.39	0.04
Colombia	91.96	−5.13	−1.77	16.91	10.01	1.11
Comoros	81.10	−5.13	−1.56	17.81	11.13	1.24
Congo (Brazz)	81.42	−5.13	−1.56	16.72	10.03	1.11
Congo (Zaire)	80.42	−5.13	−1.56	20.13	13.44	1.49
Costa Rica	91.72	−5.13	−0.98	10.63	4.53	0.50
Cote d'Ivoire	80.10	−5.13	−1.56	21.24	14.56	1.62
Croatia	95.32	−5.13	−2.23	5.55	−1.80	−0.20
Cuba	88.88	−5.13	−0.80	10.94	5.01	0.56

Czech Republic	95.95	−5.13	−1.94	4.45	−2.62	−0.29
Denmark	95.69	−5.13	−3.21	5.72	−2.62	−0.29
Djibouti	81.40	−5.13	−1.56	16.80	10.11	1.12
Dominican Repub	87.55	−5.13	−0.80	15.46	9.54	1.06
Ecuador	88.35	−5.13	−0.80	12.72	6.80	0.76
Egypt	86.96	−5.13	−3.57	11.94	3.24	0.36
El Salvador	91.65	−5.13	−1.58	19.83	13.12	1.46
Eritrea	82.01	−5.13	−1.56	14.71	8.02	0.89
Estonia	96.73	−5.13	−0.74	2.29	−3.58	−0.40
Ethiopia	80.36	−5.13	−1.56	20.34	13.65	1.52
Finland	94.49	−5.13	−3.22	2.09	−6.27	−0.70
France	95.51	−5.13	−2.67	5.57	−2.22	−0.25
Gabon	80.70	−5.13	−1.56	19.19	12.50	1.39
Gambia	78.83	−5.13	−1.56	25.57	18.88	2.10
Georgia	94.10	−5.13	−1.50	13.78	7.15	0.79
Germany	93.35	−5.13	−4.64	4.29	−5.47	−0.61
Ghana	90.38	−5.13	−1.00	32.16	26.02	2.89
Greece	91.00	−5.13	−3.12	4.27	−3.98	−0.44
Guatemala	87.73	−5.13	−0.80	14.86	8.93	0.99
Guinea-Bissau	79.99	−5.13	−1.56	21.63	14.94	1.66
Guinea	79.89	−5.13	−1.56	21.95	15.26	1.70
Haiti	80.28	−5.13	−0.80	23.24	17.31	1.92
Honduras	86.84	−5.13	−0.80	17.89	11.97	1.33
Hong Kong	102.14	−5.13	−0.15	3.91	−1.37	−0.15
Hungary	95.78	−5.13	−1.91	5.07	−1.97	−0.22
India	88.91	−5.13	−0.12	16.56	11.30	1.26
Indonesia	94.09	−5.13	−0.01	14.92	9.78	1.09
Iran	91.21	−5.13	−0.36	11.72	6.24	0.69
Iraq	88.11	−5.13	−0.87	8.17	2.16	0.24
Ireland	92.97	−5.13	−3.79	4.46	−4.46	−0.50
Israel	95.70	−5.13	−1.38	7.48	0.97	0.11
Italy	94.10	−5.13	−2.49	4.20	−3.42	−0.38
Jamaica	85.58	−5.13	−0.80	22.20	16.27	1.81
Japan	100.42	−5.13	−0.72	2.64	−3.21	−0.36
Jordan	91.32	−5.13	0.14	9.18	4.19	0.47
Kazakhstan	92.54	−5.13	−0.11	8.24	3.00	0.33
Kenya	82.12	−5.13	−1.56	14.33	7.65	0.85
Korea-North	100.25	−5.13	−0.67	6.66	0.87	0.10
Korea-South	99.88	−5.13	−1.11	1.43	−4.81	−0.53
Kuwait	93.12	−5.13	−1.53	20.71	14.05	1.56
Kyrgyzstan	93.63	−5.13	−0.14	21.84	16.58	1.84
Laos	89.99	−5.13	−0.63	7.72	1.96	0.22
Latvia	97.41	−5.13	−0.61	6.12	0.38	0.04
Lebanon	89.75	−5.13	−2.02	14.36	7.21	0.80
Lesotho	80.09	−5.13	−1.56	21.27	14.59	1.62
Liberia	79.75	−5.13	−1.56	22.43	15.74	1.75

Libya	87.64	−5.13	−0.87	9.78	3.77	0.42
Lithuania	97.05	−5.13	−0.03	7.49	2.33	0.26
Macedonia	97.25	−5.13	−0.10	16.38	11.15	1.24
Madagascar	82.59	−5.13	−1.56	12.72	6.03	0.67
Malawi	79.03	−5.13	−1.56	24.90	18.21	2.02
Malaysia	91.36	−5.13	−1.26	8.08	1.69	0.19
Mali	80.89	−5.13	−1.56	18.52	11.83	1.31
Mauritania	81.97	−5.13	−1.56	14.86	8.17	0.91
Mauritius	84.63	−5.13	−1.56	5.75	−0.94	−0.10
Mexico	93.57	−5.13	−0.32	13.14	7.70	0.86
Moldova	96.16	−5.13	−0.31	11.12	5.68	0.63
Mongolia	92.91	−5.13	−0.67	7.85	2.05	0.23
Montenegro	94.83	−5.13	−0.31	11.82	6.38	0.71
Morocco	94.01	−5.13	−2.83	26.01	18.05	2.01
Mozambique	82.59	−5.13	−1.56	12.72	6.04	0.67
Namibia	80.59	−5.13	−1.56	19.56	12.87	1.43
Nepal	88.68	−5.13	−0.12	17.34	12.09	1.34
Netherlands	93.50	−5.13	−4.42	2.47	−7.08	−0.79
New Zealand	98.65	−5.13	−0.51	5.12	−0.51	−0.06
Nicaragua	88.13	−5.13	−0.80	13.49	7.56	0.84
Niger	80.11	−5.13	−1.56	21.18	14.50	1.61
Nigeria	82.18	−5.13	−1.56	14.14	7.45	0.83
Norway	97.49	−5.13	−2.36	7.08	−0.42	−0.05
Oman	89.95	−5.13	−3.49	18.48	9.85	1.09
Pakistan	89.31	−5.13	−0.12	11.74	6.49	0.72
Palestine	92.33	−5.13	−0.42	14.46	8.91	0.99
Panama	92.27	−5.13	−0.71	16.60	10.76	1.20
Paraguay	88.39	−5.13	−0.80	12.60	6.68	0.74
Peru	93.23	−5.13	−0.84	16.49	10.52	1.17
Philippines	88.26	−5.13	−0.63	13.63	7.87	0.87
Poland	96.86	−5.13	−0.58	5.72	0.01	0.00
Portugal	93.61	−5.13	−2.99	6.25	−1.87	−0.21
Puerto Rico	88.29	−5.13	−0.80	12.95	7.02	0.78
Qatar	96.62	−5.13	2.89	15.74	13.50	1.50
Romania	94.89	−5.13	−0.60	9.86	4.12	0.46
Russia	95.88	−5.13	−1.88	5.63	−1.38	−0.15
Rwanda	82.13	−5.13	−1.56	14.31	7.62	0.85
Sao Tome/Princi	79.51	−5.13	−1.56	23.24	16.55	1.84
Saudi Arabia	91.70	−5.13	0.24	15.51	10.62	1.18
Senegal	80.84	−5.13	−1.56	18.71	12.02	1.34
Serbia	93.33	−5.13	−1.19	8.18	1.86	0.21
Sierra Leone	79.30	−5.13	−1.56	23.96	17.27	1.92
Singapore	102.68	−5.13	0.56	2.28	−2.29	−0.25
Slovakia	97.58	−5.13	−0.57	5.70	0.00	0.00
Slovenia	95.96	−5.13	−1.44	5.12	−1.45	−0.16
Somalia	80.69	−5.13	−1.56	19.21	12.53	1.39

South Africa	87.84	−5.13	−2.66	25.49	17.70	1.97
Spain	93.39	−5.13	−3.65	5.80	−2.98	−0.33
Sri Lanka	88.91	−5.13	−0.12	16.54	11.29	1.25
Sudan	82.48	−5.13	−1.56	13.10	6.41	0.71
Swaziland	82.09	−5.13	−1.56	14.43	7.74	0.86
Sweden	95.37	−5.13	−3.51	5.02	−3.63	−0.40
Switzerland	91.79	−5.13	−6.24	3.15	−8.22	−0.91
Syria	91.07	−5.13	−0.42	14.95	9.40	1.04
Tajikistan	89.94	−5.13	−0.12	13.03	7.78	0.86
Tanzania	81.63	−5.13	−1.56	16.02	9.33	1.04
Thailand	92.06	−5.13	−0.62	8.57	2.81	0.31
Togo	80.22	−5.13	−1.56	20.82	14.13	1.57
Trinidad Tobago	92.89	−5.13	0.05	9.71	4.64	0.52
Tunisia	94.10	−5.13	−2.62	11.03	3.28	0.36
Turkey	92.00	−5.13	−0.63	10.99	5.23	0.58
Turkmenistan	89.81	−5.13	−0.12	13.48	8.23	0.91
Uganda	81.30	−5.13	−1.56	17.12	10.43	1.16
Ukraine	97.42	−5.13	−1.31	10.54	4.10	0.46
United Arab Emi	93.25	−5.13	0.39	9.41	4.67	0.52
United Kingdom	95.67	−5.13	−2.84	4.05	−3.93	−0.44
United States	95.77	−5.13	−2.37	4.93	−2.56	−0.28
Uruguay	95.03	−5.13	−0.14	10.15	4.88	0.54
Uzbekistan	89.93	−5.13	−0.12	13.05	7.79	0.87
Venezuela	88.65	−5.13	−0.80	11.71	5.79	0.64
Vietnam	99.48	−5.13	−0.61	10.80	5.06	0.56
Yemen	96.50	−5.13	−0.23	33.73	27.90	3.10
Zambia	80.87	−5.13	−1.56	18.62	11.93	1.33
Zimbabwe	81.12	−5.13	−1.56	17.76	11.07	1.23
Country	**Cogn. ability 2100**	**Asymmetry effect**	**Migration effect**	**Environ. improv. effect**	**Diff. 2100-2010**	**IQ gain per decade** (‘10−100)
Mean	89.67	−5.13	−1.27	13.07	6.67	0.74
Standard Deviat.	6.36	0	1.15	6.59	6.86	0.76
Number countries	158	158	158	158	158	158

Notes: Asymmetry effect: differential children (reproduction) rates and differences in generation length; variables explained in Section 13.2.6, based on Table 13.7. Migration effect does not include the effects of the 2014ff. migration waves to Europe.

Future wealth estimates (annual GDP per capita)

Table A.6: Estimates of future wealth (GDP per capita)

Country	Growth Advant. backw.	GDP 2100 Advant. backw.	Growth Complexity	GDP 2100 Complexity	Growth Risk factors	GDP 2100 Risk factors	Growth Regional effects (final)	GDP 2100 Regional (final est.)
Afghanistan	4.58	65,788	2.74	13,318	2.24	8,574	2.63	12,081
Albania	3.54	111,111	1.86	25,493	1.69	21,936	1.92	26,798
Algeria	2.83	44,520	2.01	21,660	1.69	16,329	1.82	18,350
Angola	4.09	65,695	1.88	9,507	1.51	6,875	1.33	5,859
Argentina	2.90	139,317	1.58	43,461	1.47	39,452	1.42	37,741
Armenia	4.06	392,504	2.16	74,657	1.95	61,900	1.93	60,672
Australia	2.78	296,682	2.46	224,020	2.24	183,979	2.20	178,537
Austria	2.54	227,698	1.39	82,904	1.31	76,902	1.26	73,383
Azerbaijan	5.51	1,056,000	2.47	76,467	2.16	58,266	1.48	31,904
Bahrain	2.83	76,300	1.66	27,166	1.36	20,868	1.28	19,323
Bangladesh	3.71	35,999	2.70	14,972	2.44	11,864	2.61	13,827
Belarus	4.02	453,074	2.54	124,932	2.27	98,379	2.59	130,563
Belgium	2.52	220,212	1.52	91,073	1.42	82,831	1.43	83,858
Benin (Dahomey)	2.49	15,358	1.44	6,099	1.21	4,939	1.30	5,356
Bolivia	2.90	40,847	1.90	1,6984	1.70	14,230	2.48	28,229
Bosnia	4.07	228,687	2.71	69,858	2.37	51,787	2.34	50,212
Botswana	3.04	72827	1.23	14,838	1.13	13,563	0.63	8,649
Brazil	2.83	82547	1.73	31,343	1.60	27,949	1.85	34,761
Bulgaria	3.23	155,457	2.02	54,090	1.91	48,971	2.10	58,054
Burkina Faso	2.94	17,605	1.78	6,351	1.51	5,002	1.60	5,418
Burma (Myanmar)	4.85	250,259	2.19	24,702	1.87	18,697	1.53	13,856
Burundi	2.27	6,020	2.02	4,802	1.76	3,823	2.17	5,518

Cambodia	4.53	139,712	2.75	29,702	2.42	22,176	2.52	24,316
Cameroon	2.19	9,404	1.58	5,476	1.29	4,247	1.53	5,236
Canada	2.56	241,037	2.29	189,670	2.06	155,470	2.04	152,424
Cape Verde	3.62	72,926	1.61	12,509	1.54	11,777	1.08	7,793
Central Afric R	1.83	4,372	1.57	3,469	1.30	2,715	1.90	4,647
Chad	3.86	30,746	2.21	7,287	1.73	4,740	1.96	5,807
Chile	3.07	205,076	1.42	48,017	1.35	45,105	1.16	38,057
China	5.27	753,783	4.88	542,408	4.44	369,824	4.38	351,886
Colombia	2.91	88,910	1.41	23,884	1.25	20,592	1.64	29,195
Comoros	2.15	5,868	1.98	5,023	1.85	4,516	2.21	6,163
Congo (Brazz)	2.33	19,269	1.35	8,074	1.13	6,632	1.03	6,079
Congo (Zaire)	2.19	2,928	2.19	2,928	1.73	1,948	2.75	4,811
Costa Rica	2.98	112,902	1.54	31,664	1.44	29,074	1.56	32,378
Cote d'Ivoire	1.49	4,898	1.17	3,695	0.95	3,033	1.45	4,722
Croatia	2.98	131,756	2.49	85,658	2.28	71,278	2.36	76,551
Cuba	3.26	71,176	1.97	23,001	1.73	18,487	2.25	29,380
Czech Republic	3.09	200,456	2.78	151,776	2.64	135,069	2.91	171,064
Denmark	2.43	206,816	1.68	106,861	1.63	101,647	1.65	103,731
Djibouti	2.23	11,280	1.64	6,688	1.44	5,603	1.64	6,701
Dominican Repub	3.26	89,677	1.33	16,417	1.21	14,789	1.74	23,754
Ecuador	2.90	60,610	1.48	17,299	1.33	15,209	1.98	27,017
Egypt	3.38	81,798	1.74	19,346	1.51	15,787	1.56	16,465
El Salvador	2.67	33,809	1.78	15,504	1.57	12,866	2.48	28,784
Eritrea	1.65	4,060	1.65	4,060	1.26	2,893	1.95	5,301
Estonia	3.27	348,776	2.70	212,342	2.55	185,292	2.45	169,930
Ethiopia	3.53	26,666	2.11	7,637	1.68	5,247	1.70	5,344
Finland	2.66	249,444	1.86	123,959	1.83	120,626	1.70	107,350
France	2.48	195,661	1.64	93,619	1.52	84,335	1.54	85,155
Gabon	1.55	15,930	0.76	7,952	0.67	7,293	0.49	6,237
Gambia	2.28	10,187	1.35	4,484	1.20	3,908	1.44	4,854
Georgia	3.29	113,177	1.87	32,524	1.66	27,023	2.30	47,419

Germany	2.50	189,808	1.57	83,368	1.47	76,499	1.48	76,744
Ghana	3.01	27,807	1.70	8,788	1.53	7,549	1.50	7,345
Greece	2.69	167,382	1.37	52,182	1.29	48,976	1.42	54,648
Guatemala	2.65	47,768	1.30	14,486	1.10	12,211	1.92	25,149
Guinea-Bissau	1.94	5,247	1.59	3,841	1.40	3,251	1.89	5,001
Guinea	2.58	9,270	1.88	5,038	1.63	4,024	1.91	5,176
Haiti	1.50	3,809	1.36	3,345	1.16	2,808	2.69	10,897
Honduras	2.74	29,258	1.65	11,209	1.51	9,895	2.58	25,573
Hong Kong	3.38	611,462	3.22	533,298	2.94	416,395	2.77	361,583
Hungary	3.03	130,695	2.82	109,377	2.67	95,691	3.32	168,471
India	3.90	102,509	1.77	15,994	1.57	13,381	1.59	13,621
Indonesia	3.59	111,677	2.23	34,022	2.04	28,780	2.01	27,945
Iran	3.04	99,751	1.59	27,811	1.36	22,825	1.20	19,752
Iraq	2.35	11,992	2.28	11,237	1.91	8,082	2.83	18,186
Ireland	2.90	321,761	1.45	90,027	1.39	85,448	1.35	82,348
Israel	2.80	221,010	1.56	74,272	1.41	64,730	1.33	60,337
Italy	2.33	151,524	1.51	73,069	1.43	68,167	1.43	68,195
Jamaica	1.69	16,963	0.96	8,868	0.83	7,874	1.57	15,171
Japan	2.66	234,248	2.66	234,248	2.55	213,227	2.97	307,512
Jordan	3.34	110,496	1.84	29,690	1.60	23,911	1.39	19,922
Kazakhstan	3.96	369,936	1.86	58,982	1.58	45,999	0.93	25,887
Kenya	2.67	13,591	2.15	8,585	1.84	6,560	1.85	6,596
Korea-North	2.39	11,915	2.38	11,736	1.99	8,320	3.86	42,928
Korea-South	3.83	603,937	3.53	465,480	3.31	383,314	3.19	346,554
Kuwait	2.57	123,720	0.92	28,692	0.74	24,390	0.49	19,533
Kyrgyzstan	2.73	33,947	2.12	19,876	1.91	16,443	1.97	17,417
Laos	4.45	97,539	3.31	36,388	2.74	22,171	2.96	26,817
Latvia	3.25	236,301	2.64	138,924	2.46	117,971	2.71	147,057
Lebanon	3.44	97,261	1.77	22,448	1.47	17,236	1.47	17,202
Lesotho	2.82	27,172	1.30	7,098	1.22	6,572	1.08	5,818
Liberia	1.52	4,289	1.29	3,503	1.02	2,767	1.61	4,679

Libya	2.68	34,929	1.84	16,649	1.66	14,114	1.88	17,217
Lithuania	3.32	209,979	2.49	101,796	2.38	92,171	2.84	138,252
Macedonia	2.94	70,790	2.94	70,790	2.48	46,908	3.05	77,294
Madagascar	2.22	6,168	2.18	5,953	1.83	4,399	2.27	6,478
Malawi	2.65	9,332	1.86	4,680	1.64	3,831	1.95	5,046
Malaysia	3.34	194,955	1.67	45,190	1.48	38,274	1.20	29,757
Mali	3.09	19,394	2.06	7,836	1.83	6,368	1.78	6,119
Mauritania	2.86	20,151	1.91	8,726	1.63	6,786	1.67	7,073
Mauritius	2.91	189,746	0.98	34,371	0.93	32,847	0.44	21,269
Mexico	2.60	79,497	1.72	36,521	1.58	32,399	1.76	37,840
Moldova	3.50	87,492	3.50	87,492	3.22	68,209	3.61	96,272
Mongolia	3.63	32,137	3.63	32,137	3.40	26,226	5.13	117,408
Montenegro	3.11	114,878	2.01	43,928	1.84	37,638	2.28	55,496
Morocco	3.13	61,876	1.74	18,255	1.52	14,983	1.70	17,534
Mozambique	3.92	80,339	1.96	14,366	1.62	10,725	1.21	7,454
Namibia	2.41	40,505	0.91	10,691	0.77	9,429	0.42	6,915
Nepal	3.34	27,446	2.46	12,712	2.10	9,293	2.37	11,723
Netherlands	2.55	234,070	1.67	107,343	1.57	98,339	1.48	90,739
New Zealand	2.79	220,874	2.69	202,810	2.42	160,412	2.56	181,687
Nicaragua	2.53	18,478	2.10	12,617	1.83	10,001	3.02	2,8236
Niger	2.29	5,158	2.10	4,366	1.84	3,472	2.37	5,574
Nigeria	3.27	33,414	1.96	10,571	1.58	7,534	1.52	7,178
Norway	2.63	288,588	1.94	157,487	1.89	150,731	1.69	125,590
Oman	2.83	112,069	1.02	22,713	0.88	20,041	0.74	17,718
Pakistan	3.43	51,702	2.36	20,412	2.03	15,160	2.03	15,249
Palestine	1.35	8,135	1.35	8,135	1.16	6,872	2.21	17,346
Panama	3.09	104,739	1.39	23,352	1.27	21,084	1.63	28,990
Paraguay	2.73	39,775	1.63	15,031	1.51	13,563	2.32	27,608
Peru	3.28	103,043	1.77	27,298	1.57	22,939	1.90	30,868
Philippines	2.98	43,336	1.70	14,101	1.53	12,098	2.15	20,944
Poland	3.43	218,199	2.92	139,783	2.81	126,368	3.13	166,586

Portugal	2.52	134,514	1.56	57,506	1.48	53,684	1.63	61,287
Puerto Rico	2.22	107,595	0.71	28,012	0.66	26,750	0.77	29,611
Qatar	3.96	481,205	1.65	63,829	1.34	48,584	0.78	29,321
Romania	3.42	99,978	3.03	71,094	2.84	60,537	3.15	79,321
Russia	3.30	165,561	2.88	114,048	2.52	83,722	3.15	145,150
Rwanda	3.58	31,298	2.44	11,539	2.07	8,307	1.86	6,948
Sao Tome/Princi	2.55	17,091	1.28	5,562	1.17	5,043	1.22	5,240
Saudi Arabia	2.41	79,652	1.07	24,370	0.93	21,464	0.79	18,993
Senegal	2.47	14,576	1.60	6,769	1.46	5,961	1.46	5,968
Serbia	3.28	101,564	2.61	56,571	2.31	43,519	2.72	62,396
Sierra Leone	3.11	15,641	1.99	5,844	1.72	4,625	1.85	5,206
Singapore	3.79	800,658	3.66	715,939	3.14	454,688	2.73	318,376
Slovakia	3.29	236,374	3.01	186,032	2.88	165,707	3.00	183,869
Slovenia	2.86	224,749	2.10	114,799	1.97	102,215	2.32	139,442
Somalia	2.25	9,488	1.72	5,935	1.42	4,559	1.80	6,349
South Africa	2.31	39,207	1.00	12,293	0.87	10,929	0.47	7,652
Spain	2.62	185,089	1.43	64,715	1.35	60,602	1.37	61,483
Sri Lanka	3.28	95,467	1.31	16,801	1.17	14,827	0.99	12,681
Sudan	3.99	83,217	1.96	14,162	1.54	9,784	1.28	7,722
Swaziland	2.58	33,397	1.24	10,203	1.06	8,721	0.78	6,754
Sweden	2.59	245,327	1.74	116,207	1.68	110,105	1.60	102,924
Switzerland	2.37	203,160	1.33	81,721	1.22	73,631	1.19	72,171
Syria	2.77	95,760	1.18	23,570	1.04	20,688	0.91	18,419
Tajikistan	3.62	42,686	2.75	20,063	2.47	15,604	2.51	16,190
Tanzania	3.69	24,169	2.68	10,038	2.24	6,787	2.18	6,486
Thailand	3.40	183,543	1.75	43,399	1.61	38,140	1.38	31,183
Togo	2.00	5,440	1.65	4,022	1.38	3,143	1.87	4,885
Trinidad Tobago	3.25	369,776	1.28	65,595	1.13	57,416	0.70	38,956
Tunisia	3.31	118,152	2.30	48,585	2.09	40,533	1.67	27,910
Turkey	2.96	113,114	1.49	30,974	1.38	28,027	1.41	28,837
Turkmenistan	3.84	133,967	1.70	20,584	1.51	17,275	1.31	14,507

Uganda	3.64	30,875	2.30	9,529	1.89	6,672	1.80	6,118
Ukraine	3.62	119,272	3.62	119,272	3.30	89,986	4.05	172,651
United Arab Emi	2.18	101,737	1.04	37,017	0.86	31,529	0.52	23,271
United Kingdom	2.60	236,897	1.99	138,771	1.86	122,876	1.68	105,363
United States	2.45	268,355	1.47	113,029	1.32	98,866	1.48	114,033
Uruguay	3.01	154,084	1.77	51,734	1.70	4,8585	1.53	41,784
Uzbekistan	3.31	107,236	1.45	20,904	1.26	17,691	1.06	14,826
Venezuela	2.29	78,129	0.95	23,908	0.86	22,080	1.16	28,893
Vietnam	4.70	200,716	4.69	199,231	4.11	120,761	4.35	147,578
Yemen	2.87	38,904	2.03	18,610	1.60	12,732	1.99	18,004
Zambia	2.89	12,600	2.21	6,931	1.87	5,164	2.03	5,914
Zimbabwe	0.78	1,849	0.78	1,849	0.63	1,621	1.73	4,297
Country	**Growth Advant. backw.**	**GDP 2100 Advant. backw.**	**Growth Complexity**	**GDP 2100 Complexity**	**Growth Risk factors**	**GDP 2100 Risk factors**	**Growth Regional effects (final)**	**GDP 2100 Regional (final est.)**
Mean	2.97	129,271	1.94	58,463	1.73	47,843	1.89	51,823
Standard Deviat.	0.73	154,666	0.69	97,496	0.63	72,789	0.80	70,117
Number countries	158	158	158	158	158	158	158	158

Notes: see Section 13.3.3 and Table 13.12.