Intelligence and the Wealth and Poverty of Nations

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SUMMARY.

National IQs assessed by the Progressive Matrices were calculated for 60 nations and examined in relation to per capita incomes in the late 1990s and to post World War Two rates of economic growth. It was found that national IQs are correlated at 0.757 with real GDP (Gross Domestic Product) per capita 1998 and 0.706 with per capita GNP (Gross National Product) 1998; and at 0.605 with the growth of per capita GDP 1950-90 and 0.643 with growth of per capita GNP 1976-98. The results are interpreted in terms of a causal model in which population IQs are the major determinant of the wealth and poverty of nations in the contemporary world.

INTRODUCTION

The causes of the inequalities in income and wealth between nations have been discussed for some two and a half centuries. In 1748 Montesquieu published De l'Esprit des Lois in which he proposed that temperate climates were more favorable to economic development than tropical climates. In 1776 this problem was discussed by Adam Smith in his Wealth of Nations, in which he proposed that the skills of the population are the principal factor responsible for national differences in incomes and wealth.

Since these early attempts to analyse this problem, numerous other theories have been advanced. These theories fall into four principal categories. First, climatic theories are still proposed. Their leading exponent in recent times is Kamarck (1976) who argues that tropical climates are unfavorable for economic development because the heat and humidity reduce the efficiency of working capacities, impair the productivity of the land and provide a favorable environment for debilitating diseases. This explains the difference between what is sometimes called "the rich north" with its temperate climate and "the poor south" with its predominantly tropical climate.

Diamond (1998) presents similar arguments on the crucial significance of climatic and geographical factors.

The second major contemporary explanation is "dependency theory". This proposes that the economically developed capitalist nations are responsible for the poverty of the underdeveloped nations because they dominate the world economy, force the rest of the world into economic dependency, and pay low prices for Third World agricultural products and natural resources. Some of the leading exponents of this theory are Frank (1969, 1996), dos Santos (1993, 1996), Wallerstein (1998) and Valenzuela and Valenzuela (1998); see also Seligson and PassŽ-Smith (1998).

Third, there is the neoliberal theory. This proposes that the major factor responsible for national differences in economic development consists of the presence of free markets as opposed to command, socialist and communist economies. Bates (1993) and Weede (1993) are leading recent exponents of this theory.

Fourth, there are a variety of psychological theories which argue for the importance of differences in attitudes, values and motivations. The first major theory of this kind was Weber's (1904) theory that the Protestant work ethic explained the more rapid economic development of northern Europe as compared with the Catholic south from the sixteenth century onwards. Later theorists in this tradition include McClelland (1976) who advanced the similar concept of

achievement motivation. Several economists, while not endorsing the theories of Weber or McClelland, are sympathetic to this kind of explanation and propose what are generally termed "cultural" factors as major contributors to national differences in economic development. Landes writes of the importance of culture "in the sense of inner values and attitudes that guide a population" (1998, p. 516). Many economists have taken eclectic positions in which they argue that several of these factors contribute to national differences in incomes and wealth.

We believe it has never been suggested that national differences in intelligence might play some role in national differences in economic development. It is widely assumed that the peoples of all nations have the same average level of intelligence. For instance, Kofi Annan, the United Nations Secretary General, asserted in April 2000 that intelligence "is one commodity equally distributed among the world's people" (Hoyos and Littlejohns, 2000). It is known in psychology that this is incorrect and that there are large differences in average levels of intelligence between different nations. Reviews of the literature have shown that in relation to average IQs of 100 in Britain and the United States, the peoples of north east Asia have average IQs of around 105 and the peoples of sub-Saharan Africa have average IQs of around 70 (Lynn, 1991).

In view of these differences, it seems a reasonable hypothesis that national differences in intelligence may be a factor contributing to national differences in wealth. This is a promising hypothesis for two reasons. First, it is well established that intelligence is a determinant of earnings among individuals; and second, several studies have shown that the intelligence of groups is related to their average earnings. The earlier American research literature, up to 1970, on the relationship of intelligence to earnings among individuals was summarized by Jencks (1972) who concluded that the best estimate was expressed by a correlation of .35. Later studies have confirmed this conclusion. Brown and Reynolds (1995) examined the relation between IQ measured in early adulthood and earnings approximately 12 years later for samples of 24,819 whites and 4,008 blacks and reported correlations of .327 and .126, respectively. Hunter and Hunter (1984) report correlations between .25 and .60 for different types of occupations. Murray (1998) has examined the National Longitudinal Study of Youth sample for the relation between IQ measured in adolescence and income in the late twenties to mid-thirties and found a correlation of .37. Most students of this question have concluded that IQ is a cause of income because IQs are established quite early in childhood and predict incomes achieved in adulthood (Duncan, Featherman and Duncan, 1972; Jensen, 1998). It is estimated by Li (1975) that childhood IQ is correlated .83 with adult IQ. The relation between childhood IQ and adult income is present when parental socio-economic status is controlled (Duncan, Featherman and Duncan, 1972; Jencks, 1979).

The positive association between IQ and income among individuals led to the expectation that there would be positive associations between the average IQs of groups and their average earnings. We believe that the existence of such an association was first reported by Davenport and Remmers (1950) in a study in which the population units were the states of the United States. They obtained IQ scores from tests administered in 1943 to more than 300,000 young men in high schools and colleges as part of selection for placement in training programs for the armed services. The test was composed of verbal, mathematical and scientific items and was described as "a combination of a group intelligence test and a general educational achievement test" (p. 110). They calculated the average score for each state, examined this in relation to the state's per capita income and found a correlation of .81.

The positive relationship between the average IQs of groups and their average incomes has also been found in studies carried out in Europe. A study of the British Isles examined the relation between average IQs in thirteen regions obtained in the 1940s and 1950s and per capita incomes in 1965. The average IQs fell within the relatively narrow range between 102.1 in London and 96.0 in Ireland. The correlation between average IQs and incomes was .73 (Lynn, 1979). A similar study for France examined the relation between average IQs in 90 "departments" (regions) obtained from testing approximately 257,000 young men conscripted

into the armed services in the mid-1950s and per capita incomes in 1974. The correlation between IQs and earnings was .61 (Lynn, 1980). The same relationship has been found in Spain in a study in which average IQs for 48 regions were calculated from approximately 130,000 military conscripts for the mid-1960s. The correlation between these and average regional incomes was .65 (Lynn, 1981). In view of these relationships it seems a promising hypothesis that a positive relationship would be present between the average IQs of the populations of nations and their average earnings. It is this hypothesis that we are now about to investigate.

METHOD

This study presents data for 60 countries for national IQs, per capita incomes in 1998, and economic growth 1950-1998 and examines their relationships by the statistical techniques of correlation and regression analyses.

National IQs

National IQs have been calculated from normative data obtained in 60 countries for the Colored and Standard Progressive Matrices. The reasons for using these data are that the Progressive Matrices is the most widely used test in cross-cultural research, is non-verbal and hence is likely to yield more valid cross cultural data than verbal tests which require translation, is among the best measures of g, and the rate of secular increase is well established. The data have been obtained from the bibliographies of Progressive Matrices studies compiled by Court (1980) and Court and Raven (1995), from the data given by Raven in a series of manuals and research supplements for the Progressive Matrices, and from the Raven archive.

The Standard Progressive Matrices was constructed in Britain in the 1930s and was first published in 1938 with norms for 6-15 year olds and adults. This was followed by the publication in 1947 of the Colored Progressive Matrices, a simpler test suitable for 5-11 year olds. The Standard Progressive Matrices was renormed for 6 to 15 year olds in Britain 1979. A norm table is provided by Raven (1981) giving percentile equivalents of raw scores for half year age groups. The procedure for calculating the IQ of a country in which norms have been obtained for the Standard Progressive Matrices is to read off the raw scores of the 50th percentile from the norm table and obtain the British 1979 percentile. This is then converted to the British IQ equivalent using a conversion table. The raw score of the 50th percentile is the median IQ rather than the mean. Several studies have provided mean raw scores in addition to the medians and these show that means and medians are virtually identical. In most countries in which Progressive Matrices data have been collected norms have been given for a number of age groups. IQs are calculated for each of these and averaged to give a single national IQ. This IQ is then adjusted for the secular rise of the IQ which has been 2 IQ points per decade for the Standard Progressive Matrices in Britain over the period 1938-1979 (Lynn and Hampson, 1986). All national IQs are therefore expressed in relation to a British IQ of 100.

Norms for the Standard Progressive were collected for adults for Britain in 1992 and for the United States for 1993. The norm table for the United States provided by Raven, Court and Raven (1996) gives the most detailed information consisting of the percentile equivalents of raw scores. Less information is provided for the British standardization which gives only the raw score equivalents of the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles. The British medians have been converted to American IQs by the use of the American norm table. The result of this calculation is that the British IQ is 102 on the American norms. Data for adults from other countries are converted to American IQs and then adjusted to British IQs by the subtraction of 2 IQ points.

There are no norms giving detailed percentiles for the Colored Progressive Matrices for Britain, the United States or elsewhere. To deal with data for the Colored Progressive Matrices, raw scores are converted to those of the Standard Progressive Matrices using the conversion table provided by Raven, Court and Raven (1995) and the IQs calculated in the way set out above. In a few instances median raw scores fall below the 1st percentile of the British and American norm tables. The 1st percentile is equivalent to an IQ of 65. In these cases the countries are assigned an IQ of 64. For a number of countries Progressive Matrices data have been collected for two or more samples. These have been averaged to provide a single mean given to the nearest whole number.

The IQ for South Africa has been calculated as follows. The study by Owen (1992) gives the following IQs for the four racial groups. Whites: 94; blacks: 66; coloureds: 82; Indians: 83. The percentages of the four groups in the population are whites: 14%; blacks: 75%; coloreds: 9%; Indians: 2% (Ramsay, 1999, p. 158). Weighting the IQs of the four groups by their percentages in the population gives an IQ for South Africa of 72. The IQ of Singapore has been calculated in the same way by weighting the IQs of the ethnic groups (Malays, Chinese and Indians in Singapore) by their numbers in the population. The data on national IQs are shown in Appendix 1 which gives the IQ, the sample size, the test used (Colored or Standard Progressive Matrices) and the reference. For some countries there are two or more studies of the national IQ. These have been averaged to give mean IQs for these countries.

Because the concept of national IQ is new, it will be useful to examine its reliability and validity. To examine its reliability we have taken the sixteen countries for which there are two or more measures of IQ and calculated the correlation between the two measures. For the countries for which there are more than two measures (Brazil, Hong Kong, India and Mexico) we have used the two extreme values. The correlation between the two measures of national IQ is 0.937. This establishes that the measure of national IQ has high reliability.

To examine the validity of the national IQs we have examined their relation with national measures of educational attainment. This follows the long established methodology of the validation of intelligence tests among individuals by showing that they are positively correlated with test of educational attainment. The measures of education attainment are taken from the second and third international studies of educational achievement in mathematics and science. These data are shown in Table 1 for the countries for which we have IQ measures. The correlations between educational attainment and IQ are shown in the bottom two rows of the table. Five of the six correlations are statistically significant and establish the validity of the measures of national IQ.

Table 1.
National Attainments in Math and Science

Country	Math	Math	Math	Science	Science	Science
Australia	-	546	530	12.9	562	545
Belgium	20.0	-	546	-	-	511
Britain	15.2	513	506	11.7	551	552
Canada	18.4	532	527	13.7	549	531
Czech Rep	-	567	564	-	557	574
Denmark	-	-	502	-	-	478
Finland	14.1	-	-	15.3	-	-
France	15.2	-	538	-	-	498
Germany	-	-	509	-	-	531
Hong Kong	16.3	587	588	11.2	533	522
Iran	-	429	428	-	415	470
Ireland	-	550	527	-	539	538
Israel	18.3	531	522	-	505	524
Italy	-	-	-	13.4	-	-
Japan	23.8	597	605	15.4	574	571
Korea	-	611	607	15.4	597	565
Netherlands	21.1	577	541	-	557	560
New Zealand	14.1	499	508	-	531	525
Nigeria	9.3	-	-	-	-	-
Philippines	-	-	-	9.5	-	-
Poland	-	-	-	11.9	-	-
Portugal	-	475	454	-	480	480
Romania	-	-	482	-	-	486
Russia	-	-	535	-	-	538
Singapore	-	625	643	11.2	547	607
Slovak Rep	-	-	547	-	-	544
Slovenia	-	552	541	-	546	560
S. Africa	-	-	354	-	-	326
Spain	-	-	487	-	-	517
Switzerland	-	-	545	-	-	522
Thailand	13.1	490	522	-	473	525
U.S.A.	15.1	545	500	13.2	565	534

Correlation with IQ	.676	.768	.766	.477	.839	.698
Significance	.01	.001	.001	.1	.001	.001

Notes:

Column 1.
13 year olds, Second International Study of Mathematical Achievement, 1982 (Baker and Jones, 1993).

Column 2.
10 year olds, Third International Mathematics and Science Study, 1994-5 (Mullis, 1997).

Column 3.
14 year olds, Third International Mathematics and Science Study, 1994-5, (Benton et al., 1996a).

Column 4.
10 year olds, Second International Study of Science Achievement, 1985 (IEA, 1988).

Column 5.
10 year olds. Third International Mathematics and Science Study, 1994-5 (Martin et al., 1997).

Column 6.
14 year olds, Third International Mathematics and Science Study, 1994-5 (Benton et al., 1996b).

National Wealth and Rates of Economic Growth

National wealth is measured by per capita national income. Strictly speaking, national wealth and national per capita income are different concepts because national wealth consists of the value of capital stock, whereas income is income, so we use the term national wealth in the general sense in which people speak of rich countries and poor countries. We use two alternative measures of national income: per capita GNP in US dollars and real GDP per capita in US dollars. The second measure is calculated on the basis of the purchasing power parity of the country's currency. It is intended "to make more accurate international comparisons of GDP and its components than those based on official exchange rates, which can be subject to considerable fluctuation" (Human Development Report, 1997, p. 239). For some countries data on per capita GNP and real GDP per capita can differ considerably from each other. The basic difference between GNP and GDP is that GDP comprises the total output of goods and services for final use produced by an economy by both residents and non-residents within the geographical boundaries of a nation, whereas GNP comprises GDP plus income from abroad, which is the income residents receive from abroad, less similar payments made to non-residents who contribute to the domestic economy. The difference between GNP and GDP is relatively small for most countries - much smaller than difference between GNP and real GDP - but in some cases it can be quite substantial (see Gardner, 1998, pp. 22-23; Human Development Report 1999, p. 254; World Development Report 1999/2000, p. 274).
Most data on per capita GNP are taken from the World Bank's World Development Report 1999/2000 and all data on real GDP per capita from the United Nations Development Program's (UNDP) Human Development Report 2000. Sources of supplementary data are given at the foot of **Appendix 2**. Data for per capita GNP and real GDP per capita used in this paper are for the year 1998. These are the latest data available to us at the time of writing. These data for per capita incomes are shown in **Appendix 2** for the same countries as in **Appendix 1**. However, in **Appendix 2** the United Kingdom replaces Britain in **Appendix 1**.
Economic growth rates are measured as percentage increases in per capita GNP and per capita GDP. Consistent national differences in economic growth rates over many decades are responsible for contemporary national differences in GNP and GDP. Our hypothesis that national differences in IQ are a cause of contemporary national differences in GNP and GDP entails the prediction that national IQs should be positively correlated with long term rates of economic growth. We present two tests of this prediction. First, we examine the correlation between national IQs and economic growth rates of per capita GDP over the period 1950-1990 using the per capita GDP data given by Maddison (1995) for 54 of the countries in our sample. Second, we examine the correlation between national IQs and economic growth rates of per capita GNP over the period 1976-1998 using per capita GNP data given in the World Bank's World Development Reports. From these data we have calculated the percentage changes of per capita GDP over the period 1950-90 and per capita GNP over the period 1976-98.

These figures are given in **Appendix 2**.

RESULTS

We examine first the correlations between national IQs and the two measures of national per capita income. These are presented in Table 2. It shows that the two measures of per capita national income are highly intercorrelated (.945). It also shows that the correlations between national IQs and the two measures of per capita national income are strongly positive as hypothesized. The national IQs are correlated .706 with per capita GNP and .757 with per capita real GDP. Both correlations are statistically significant at $p<.001$. We examine next the

relation between national IQs and rates of economic growth. The correlation between national IQs and economic growth rates of GDP per capita over the period 1950-1990 is .605 (N=54, p<.001). The correlation between national IQs and economic growth rates of per capita GNP over the period 1976-1998 is .643 (N=56, p<.001).

It has been suggested by a referee that the mean IQs of sub-Saharan African countries are so low that they cannot be valid and that they spuriously inflate the correlations between the national IQs and the measures of per capita income and economic growth. We believe that we have to some degree met this point by showing in Table 1 that attainment in mathematics in Nigeria and South Africa is well below that in the rest of the world and that this goes some way to establishing the validity of the IQs for the countries of sub-Saharan Africa. Nevertheless to meet this point more fully we have excluded the 15 African countries and rerun the calculations. The results are that the correlation of IQ and per capita GNP 1998 falls from .706 to .625; the correlation of IQ and real GDP per capita falls from .757 to .586; the correlation of IQ and economic growth per capita GDP 1950-90 falls from .605 to .600; and the correlation of IQ and economic growth per capita GNP 1976-98 falls from .643 to .513. Thus the exclusion of the 15 African countries reduces the correlations to some degree, as would be expected with the reduction of variance in the reduced sample, but all four correlations remain substantial and statistically significant at p<.001. We are forced to conclude that the exclusion of the 15 countries of sub-Saharan Africa makes no significant difference to the associations between national IQs and economic growth.

It has been pointed out that correlation analysis does not establish causality because of the fact that correlations merely measure covariation. Let us conseder what causality presupposes. Manheim and Rich (1986: 21-22) say that it is justified to postulate causal relationships only when four conditions are simultaneously met: First, the postulated cause and effect must change together, or covary. Second, the cause must precede the effect. Third, we must be able to identify a causal linkage between the supposed cause and effect. Fourth, the covariance of the cause and effect phenomena must not be due to their simultaneous relationship to some other third factor. We think that the relationship between national IQ and the measures of per capita income and economic growth meets these requirements quite well. First, correlations indicate that the postulated cause and effect change together. Second, because differences in national IQs are partly genetic, they have certainly preceded contemporary differences in economic conditions. Third, the causal linkage between the hypothesized cause and effect will be discussed and explained in the next section. Fourth, it is highly improbable that the observed covariance between cause and effect could be due to any third factor. This last requirement will be discussed in greater detail in the next section. Consequently, we are quite confident that the relationship is causal.

Although the correlations between national IQs and the measures of per capita income are high, there are some countries which have much higher per capita incomes than would be expected from their national IQs and other countries whose national per capita incomes are much lower than expected. To examine these anomalies a regression analysis has been carried out to disclose which countries deviate most from the regression line. This analysis is limited to the regression of real GDP per capita 1998 on IQ. Real GDP per capita 1998 was selected for this analysis because real GDP per capita (purchasing power parity) can be regarded as a more valid measure of living standards than per capita GNP and because the correlation between national IQs and real GDP per capita is stronger than the correlation between national IQs and per capita GNP (see Table 2). The results of regression analysis are given in Table 3.

Table 2.
Inter correlations of National IQs, Two Measures of Per Capita National Income and Two Measures of Economic Growth in 53-60 Countries

Variable	1	2	3	4	5	6
1 National IQ		.706	.757	.605	.643	
		N=60	N=58	N=54	N=56	
2 Per capita GNP 1998			.945	.402	.519	
			N=58	N=54	N=56	
3 Real GDP per cap 1998				.411	.560	
				N=53	N=55	
4 Growth per cap GDP 1950-9					.804	
					N=54	

Table 3.
The Results of Regression Analysis of Real GDP Per Capita 1998 on IQ for 58 Countries

	Country	IQ	Real GDP cap 1998	Per Residual GDP-98	Fitted GDP-98
1	Argentina	96	12013	-3017	15030
2	Australia	99	22452	5799	16653
3	Belgium	99	23223	6570	16653
4	Brazil	87	6625	-3534	10159
5	Canada	97	23582	8011	15571
6	China	98	3105	-13007	16112
7	Congo (Brazzaville)	73	995	-1587	2582
8	Congo (Zaire)	68	822	946	-124
9	Croatia	90	8749	-5033	11782
10	Cuba	85	3967	-5109	9076
11	Czech Republic	98	12362	-3750	16112
12	Denmark	97	24218	8647	15571
13	Egypt	83	3041	-4953	7994
14	Ethiopia	67	574	1239	-665
15	Finland	98	20847	4735	16112
16	France	97	21175	5604	15571
17	Germany	103	22169	3351	18818
18	Ghana	62	1735	5106	-3371
19	Guinea	70	1782	824	958
20	Hong Kong	107	20763	-220	20983
21	India	82	2077	-5376	7453
22	Iran	84	5121	-3414	8535
23	Iraq	87	3197	-6962	10159
24	Ireland	87	21482	11323	10159
25	Israel	90	17301	5519	11782

26	Italy	103	20585	1767	18818
27	Japan	110	23257	651	22606
28	Kenya	72	980	-1061	2041
29	Korea, South	106	13478	-6964	20442
30	Malaysia	92	8137	-4728	12865
31	Mexico	88	7704	-2996	10700
32	Netherlands	100	22176	4982	17194
33	New Zealand	101	17288	-448	17736
34	Nigeria	69	795	378	417
35	Peru	76	4282	76	4206
36	Philippines	86	3555	-6063	9618
37	Poland	92	7619	-5246	12865
38	Portugal	91	14701	2377	12324
39	Puerto Rico	84	-	-	-
40	Qatar	78	20987	15699	5288
41	Romania	94	5648	-8299	13947
42	Russia	96	6450	-8580	15030
43	Sierra Leone	67	458	1123	-665
44	Singapore	103	24210	5392	18818
45	Slovakia	98	9699	-6413	16112
46	Slovenia	96	14293	-737	15030
47	South Africa	72	8488	6447	2041
48	Spain	96	16212	1182	15030
49	Sudan	72	1394	-647	2041
50	Switzerland	101	5161	7776	17736
51	Taiwan	104	-	-	-
52	Tanzania	74	480	-2643	3123
53	Thailand	91	5456	-6868	12324
54	Turkey	90	6422	-5360	11782

55	Uganda	73	1074	-1508	2582
56	United Kingdom	100	20336	3142	17194
57	United States	98	29605	13493	16112
58	Uruguay	96	8623	-6407	15030
59	Zambia	75	719	-2945	3664
60	Zimbabwe	70	2669	1711	958

Table 3 shows how much individual countries deviate from the regression line, which represents the average relationship between national IQs and real GDP per capita in 1998. "Fitted GDP" indicates the predicted value of real GDP per capita in 1998. If the correlation between IQs and Real GDP per capita were perfect, all countries would be at the regression line and all residuals would be zero. Because the correlation (0.757) is not perfect, all countries deviate to some extent from the regression line. The residuals indicate the size and direction of the deviations. Positive residuals indicate that nations have higher real GDP per capita than is predicted on the basis of the average relationship between IQs and real GDP per capita, while negative residuals indicate that their per capita incomes are lower than expected. The sum of "Residual GDP" and "Fitted GDP" is always the same as the actual value of real GDP per capita given in Table 3. There is no natural distinction between countries with large and small deviations. Because one standard error of estimate is 5,583 real GDP per capita dollars in this regression analysis, it is reasonable to regard as highly deviating cases all countries for which positive or negative residuals are larger than 6,000. Positive residuals are large for eight countries: Belgium, Canada, Denmark, Ireland, Qatar, South Africa, Switzerland and the United States. Negative residuals are large for nine countries: China, Iraq, South Korea, the Philippines, Romania, Russia, Slovakia, Thailand and Uruguay. We consider the explanations for these anomalies in the discussion.

DISCUSSION

The hypotheses examined in this study have been that national per capita incomes and rates of economic growth would be positively correlated with national IQs. These hypotheses have been confirmed by strong correlations that are at a high level of statistical significance for both GNP and GDP. If we adopt a one way causal model that national IQs are a determinant of national per capita incomes and rates of economic growth, the results show that national IQ explains 57 percent of the variance of real GDP per capita 1998 and 50 percent of the variance of GNP per capita 1998. National IQ also explains 37 percent of the variance in economic growth of per capita GDP 1950-90 and 41 percent of the variance in economic growth of per capita GNP 1976-98.

There are two reasons why we consider that a causal effect of national IQ on per capita incomes and rates of economic growth is the most reasonable theory to explain the correlations. First, this theory is a corollary of an already established body of theory and data showing that IQ is a determinant of income among individuals, the evidence for which has been reviewed in the introduction. IQs measured in childhood are strong predictors of IQs in adolescence and these are predictors of earnings in adulthood. The most reasonable interpretation of these associations is that IQ is a determinant of earnings. From this it follows that groups with high IQs would have higher average incomes than groups with low IQs because groups are aggregates of individuals. This prediction has already been confirmed in the studies of the positive relationship between IQs and per capita incomes among the American states and among the regions of the British Isles, France and Spain, as noted in the introduction. The positive relation between IQ and income is so well established that it can be designated a law, of which the finding that national IQs are positively related to national per capita incomes is a further instance.

Second, there is a straightforward explanation for the positive association between IQ and incomes at both the individual and population level. The major reason for this association is that people with high IQs can acquire complex skills that command high earnings and that cannot be acquired by those with low IQs. Nations whose populations have high IQs tend to have efficient economies at all levels from top and middle management through skilled and semi-skilled workers. These nations are able to produce competitively goods and services for which there is a strong international demand and for which there is therefore a high value, and that cannot be produced by nations whose populations have low IQs. In addition, nations whose populations have high IQs will have intelligent and efficient personnel in services and public sector employment that contributes indirectly to the strength of the economy such as teachers, doctors, scientists and a variety of public servants responsible for the running of telephones, railroads, electricity supplies and other public utilities. Finally, nations whose populations have high IQs are likely to have intelligent political leaders who manage their economies effectively. Skilled economic management is required to produce the right conditions for economic growth, such as keeping interest rates at the optimum level to produce full employment with minimum inflation, maintaining competition, preventing the growth of monopolies, controlling crime and corruption, and promoting education, literacy and numeracy and vocational training.

While we consider that a causal effect of national intelligence on per capita income and rates of economic growth is the most reasonable model for an explanation of the data, there are two other possible explanations that deserve consideration. The first of these is that there is no direct causal relation between national IQs and per capita incomes and growth rates and the correlation between them is due to some third factor affecting all three. Although this is a theoretical possibility and needs to be mentioned, we do not think it is possible to formulate a plausible theory of this kind.

Second, it might be argued that national per capita incomes are a cause of national differences in IQs. This argument would state that rich nations provide advantageous environments to nurture the intelligence of their children in so far as they are able to provide their children with

better nutrition, health care, education and whatever other environmental factors have an impact on intelligence, the nature of which is discussed in Neisser (1998). Intelligence has increased considerably in many nations during the twentieth century and there is little doubt that these increases have been brought about by environmental improvements, which have themselves occurred largely as a result of increases in per capita incomes that have enabled people to give their children better nutrition, health care, education and the like. Such a theory has some plausibility but it cannot explain the totality of the data. Countries like Japan, South Korea, Taiwan and Singapore had high IQs in the 1960s when they had quite low per capita incomes and the same is true of China today. Nevertheless, the model of national differences in IQ as a major determinant of economic growth and per capita incomes should probably be supplemented by the postulation of a small positive feedback in which national per capita income has some impact on the population's IQ.

Our results are based on a sample of 60 nations out of approximately 185 nations of significant size in the world. We believe that the sample can be regarded as relatively well representative of the totality of nations because all categories of nations are well represented including the economically developed "First World" market economies of North America, Western Europe, Australia and New Zealand; the "Second World" former communist nations of Russia and Eastern Europe; the "Third World" economically developing but impoverished nations of South Asia, sub-Saharan Africa and the Caribbean; and the residual categories of Latin America and East Asia. If the representativeness of our sample is accepted, our results indicate that slightly over half the variance in national per capita income in the contemporary world is attributable to national differences in IQ. However, it should be noted that correlations are somewhat lower in the total group of 185 countries (see Lynn and Vanhanen, 2002). The difference in correlations implies that this sample of 60 nations is probably slightly biased.

The regression analysis suggests that a major additional factor is the economic form of organisation consisting of whether countries have market or socialist economies. The countries that have the largest positive residuals and therefore have higher per capita income than would be predicted from their IQs are Australia, Belgium, Canada, Denmark, France, Ireland, Israel, Qatar, Singapore, South Africa, Switzerland and the United States. With the exception of Qatar and South Africa, all of these are technologically highly developed market economy countries and their higher than predicted per capita incomes can be attributed principally to this form of economic organisation. Qatar's exceptionally high level of per capita national income is principally due to its oil production industries. South Africa's much higher than expected level of per capita income should probably be attributed principally to the cognitive skills of its European minority who comprise 14 per cent of the population.

The countries that have the largest negative residuals are China, Iraq, South Korea, the Philippines, Romania, Russia, Slovakia, Thailand and Uruguay. Four of these countries (China, Romania, Russia and Slovakia) are present or former socialist countries whose economic development has been hampered by their socialist economic and political systems. After the collapse of the Soviet communist systems in 1991 and the introduction of market economies in these countries and in China, the prospects for rapid economic development for these countries are good, although it takes time to establish effective market economies. Of the remaining five countries with large negative residuals, Iraq's low level of per capita national income is due principally to the destruction inflicted in 1990 war and the UN sanctions imposed in 1990. South Korea's Real GDP per capita is also considerably lower than expected on the basis of the country's exceptionally high level of national IQ (106). The principal explanation for this is probably that South Korea had a very low per capita income at the end of World War Two as a result of military defeat and occupation by the Japanese and that it has not yet had sufficient time to achieve the predicted level of per capita income, although economic growth in South Korea since 1950 has been extremely high (see Appendix 2). The Asian economic crisis in 1998 may have increased the negative residuals of the Philippines and Thailand temporarily. Economic growth in Uruguay has been strong since the 1970s, although the country has not yet

achieved the per capita income level expected on the basis of its relatively high national IQ. Thus our general conclusion is that national differences in the wealth and poverty of nations in the contemporary world can be explained first in terms of the intelligence levels of the populations; secondly, to some extent, in terms of whether they operate market or socialist economies; and thirdly by unique circumstances such as the possession of valuable natural resources like oil in the case of Qatar and trade sanctions imposed on Iraq.

Table 4
IQs for 185 countries
National IQs Based on the Results of Intelligence Tests and Estimated National IQs (marked by *) Based on the IQs of Neighbouring or Other Comparable Countries.

	Country	National IQ based on arithmetic means.	Comparison countries
1	Afghanistan	83*	Iran 84, India 81
2	Albania	90*	Croatia 90, Turkey 90
3	Algeria	84*	Morocco 85, Egypt 83
4	Angola	69*	Zambia 77, Zimbabwe 66, Congo (Z) 65
5	Antigua & Barbuda	75*	Barbados 78, Jamaica 72
6	Argentina	96	
7	Armenia	93*	Turkey 90, Russia 96
8	Australia	98	
9	Austria	102	
10	Azerbaijan	87*	Turkey 90, Iran 84
11	Bahamas	78*	Barbados 78
12	Bahrain	83*	Iraq 87, Qatar 78
13	Bangladesh	81*	India 81
14	Barbados	78	
15	Belarus	96*	Russia 96
16	Belgium	100	
17	Belize	83*	Guatemala 79, Mexico 87
18	Benin	69*	Ghana 71, Nigeria 67
19	Bhutan	78*	Nepal 78
20	Bolivia	85*	Ecuador 80, Peru 90
21	Botswana	72*	Zambia 77, Zimbabwe 66
22	Brazil	87	
23	Brunei	92*	Malaysia 92
24	Bulgaria	93	
25	Burkina Faso	66*	Guinea 63, Sierra Leone 64, Ghana 71

26	Burma (Myanmar)	86*	India 81, Thailand 91
27	Burundi	70*	Congo (Z) 65, Tanzania 72, Uganda 73
28	Cambodia	89*	Thailand 91, Philippines 86
29	Cameroon	70*	Nigeria 67, Congo (Braz) 73
30	Canada	97	
31	Cape Verde	78*	Mixed population-see notes
32	Central African Rep.	68*	Congo (B) 73, Congo (Z) 65, Nigeria 67
33	Chad	72*	Sudan 72
34	Chile	93*	Argentina 96, Peru 90
35	China	100	
36	Colombia	88	
37	Comoros	79*	Mixed Negroid-Arab-Malay population - see notes
38	Congo (Braz)	73	
39	Congo (Zaire)	65	
40	Costa Rica	91*	Argentina 96, Uruguay 96, Colombia 88, Puerto Rico 84
41	Côte d'Ivoire	71*	Ghana 71
42	Croatia	90	
43	Cuba	85	
44	Cyprus	92*	Greece 92
45	Czech Republic	97	
46	Denmark	98	
47	Djibouti	68*	Sudan 72, Ethiopia 63
48	Dominica	75*	Barbados 78, Jamaica 72
49	Dominican Republic	84*	Mixed population, Puerto Rico 84
50	Ecuador	80	
51	Egypt	83	
52	El Salvador	84*	Guatemala 79, Colombia 88
53	Equatorial Guinea	59	
54	Eritrea	68*	Sudan 72, Ethiopia 63

55	Estonia	97*	Finland 97, Russia 96
56	Ethiopia	63	
57	Fiji	84	
58	Finland	97	
59	France	98	
60	Gabon	66*	Congo (B) 73, Equatorial Guinea 59
61	Gambia	64*	Sierra Leone 64, Guinea 63
62	Georgia	93*	Russia 96, Turkey 90
63	Germany	102	
64	Ghana	71	
65	Greece	92	
66	Grenada	75*	Barbados 78, Jamaica 72
67	Guatemala	79	
68	Guinea	63	
69	Guinea-Bissau	63*	Guinea 63
70	Guyana	84*	Suriname 89, Barbados 78
71	Haiti	72*	Jamaica 72
72	Honduras	84*	Guatemala 79, Colombia 88
73	Hong Kong	107	
74	Hungary	99	
75	Iceland	98*	Norway 98
76	India	81	
77	Indonesia	89	
78	Iran	84	
79	Iraq	87	
80	Ireland	93	
81	Israel	94	
82	Italy	102	
83	Jamaica	72	

84	Japan	105	
85	Jordan	87*	Iraq 87, Lebanon 86
86	Kazakhstan	93*	Russia 96, Turkey 90
87	Kenya	72	
88	Kiribati	84*	Marshall Islands 84, Fiji 84
89	Korea, North	105*	South Korea 106,Japan 105
90	Korea, South	106	
91	Kuwait	83*	Iraq 87, Qatar 78
92	Kyrgyzstan	87*	Turkey 90, Iran 84
93	Laos	89*	Thailand 91, Philippines 86
94	Latvia	97*	Russia 96, Finland 97
95	Lebanon	86	
96	Lesotho	72*	Zambia 77, Zimbabwe 66
97	Liberia	64*	Sierra Leone 64, Guinea 63
98	Libya	84*	Morocco 85, Egypt 83
99	Lithuania	97*	Russia 96, Finland 97
100	Luxembourg	101*	Netherlands 102, Belgium 100
101	Macedonia	93*	Bulgaria 93, Greece 92
102	Madagascar	79*	Mixed Malay-Negroid population - see notes
103	Malawi	71*	Congo (Z) 65, Tanzania 72, Zambia 77
104	Malaysia	92	
105	Maldives	81*	India 81
106	Mali	68*	Guinea 63, Sudan 72
107	Malta	95*	Italy 102, Spain 99, Morocco 85
108	Marshall Islands	84	
109	Mauritania	73*	Guinea 63, Morocco 85, Sudan 72
110	Mauritius	81*	Mixed population-see notes
111	Mexico	87	
112	Micronesia	84*	Marshall Islands 84

113	Moldova	95*	Romania 94, Russia 96
114	Mongolia	98*	Russia 96, China 100
115	Morocco	85	
116	Mosambique	72*	Tanzania 72, Zimbabwe 66, Zambia 77
117	Namibia	72*	Zambia 77, Zimbabwe 66
118	Nepal	78	
119	Netherlands	102	
120	New Zealand	100	
121	Nicaragua	84*	Guatemala 79, Colombia 88
122	Niger	67*	Nigeria 67
123	Nigeria	67	
124	Norway	98	
125	Oman	83*	Iraq 87, Qatar 78
126	Pakistan	81*	India 81
127	Panama	84*	Colombia 88, Ecuador 80
128	Papua New Guinea	84*	Marshall Islands 84, Fiji 84
129	Paraguay	85*	Ecuador 80, Peru 90
130	Peru	90	
131	Philippines	86	
132	Poland	99	
133	Portugal	95	
134	Puerto Rico	84	
135	Qatar	78	
136	Romania	94	
137	Russia	96	
138	Rwanda	70*	Congo (Z) 65, Tanzania 72, Uganda 73
139	Samoa (Western)	87	
140	Sao Tome/Principe	59*	Equatorial Guinea 59
141	Saudi Arabia	83*	Iraq 87, Qatar 78

142	Senegal	64*	Sierra Leone 64, Guinea 63
143	Seychelles	81*	Mixed population, India 81
144	Sierra Leone	64	
145	Singapore	100	
146	Slovakia	96	
147	Slovenia	95	
148	Solomon Islands	84*	Marshall Islands 84, Fiji 84
149	Somalia	68*	Ethiopia 63, Kenya 72
150	South Africa	72	See notes
151	Spain	99	
152	Sri Lanka	81*	India 81
153	St. Kitts & Nevis	75*	Barbados 78, Jamaica 72
154	St. Lucia	75*	Barbados 78, Jamaica 72
155	St.Vincent/Grenadines	75*	Barbados 78, Jamaica 72
156	Sudan	72	
157	Suriname	89	
158	Swaziland	72*	Zambia 77, Zimbabwe 66
159	Sweden	101	
160	Switzerland	101	
161	Syria	87*	Iraq 87, Lebanon 86
162	Taiwan	104	
163	Tajikistan	87*	Turkey 90, Iran 84
164	Tanzania	72	
165	Thailand	91	
166	Togo	69*	Ghana 71, Nigeria 67
167	Tonga	87	
168	Trinidad & Tobago	80*	78, Jamaica 72 Suriname 89, Barbados
169	Tunisia	84*	Morocco 85, Egypt 83
170	Turkey	90	

171	Turkmenistan	87*	Turkey 90, Iran 84
172	Uganda	73	
173	Ukraine	96*	Russia 96
174	United Arab Emirates	83*	Iraq 87, Qatar 78
175	United Kingdom	100	
176	United States	98	
177	Uruguay	96	
178	Uzbekistan	87*	Turkey 90, Iran 84
179	Vanuatu	84*	Marshall Islands 84, Fiji 84
180	Venezuela	88*	Colombia 88
181	Vietnam	96*	China 100, Thailand 91
182	Yemen	83*	Iraq 87, Qatar 78
183	Yugoslavia	93*	Croatia 90, Slovenia 95
184	Zambia	77	
185	Zimbabwe	66	

See also Publications

IQ and the Wealth of Nations
(Co-author Tatu Vanhanen, Univerisity of Helsinki) Westport, CT: Praeger, 2002.

APPENDIX 1

Data on National IQs Obtained from the Colored and Standard Progressive Matrices

Country	Age	Test	Number	IQ	Reference
Argentina	5-11	CPM	420	98	Raven et al., 1998
Australia	5-10	CPM	700	98	Raven et al., 1995
Australia	8-17	SMP	4,000	99	Raven et al., 1996
Belgium	7-13	SMP	944	99	Goosens, 1952
Brazil	14	SMP	160	88	Natalicio, 1968
Brazil	7-11	CPM	505	84	Angelini et al., 1988
Brazil	5-11	CPM	1,131	90	Angelini wt al., 1988
Brazil	5-11	CPM	1,547	85	Angelini et al., 1988
Britain	6-15	SPM	3,258	100	Raven, 1981
Canada	7-12	SPM	313	97	Raven et al., 1996
China	6-79	SPM	5,108	98	Raven et al., 1996
Congo (Br)	Adults	SPM	320	73	Ombredane et al., 1952
Congo (Br)	13	SPM	88	72	Nkaya et al., 1994
Congo (Zaire)	10-15	SPM	222	68	Laroche, 1959
Croatia	13-16	SPM	299	90	Sorokin, 1954
Cuba	12-18	SMP	1,144	85	Alonso, 1974
Czech Rep.	5-11	CPM	832	98	Raven et al., 1996
Denmark	12	SPM	628	97	Vejleskov, 1968
Egypt	6-12	SPM	129	83	Ahmed, 1989
Ethiopia	15-16	SPM	250	67	Lynn, 1994
Finland	7	SPM	755	98	Kyostio, 1972
France	6-9	CPM	618	97	Bourdier, 1964
Germany	11-15	SPM	2,068	105	Raven, 1981
Germany	6-10	CPM	3,607	101	Raven et al., 1995

Ghana	15	CPM	1,639	62	Glewwe & Jacoby, 1992
Guinea	20	SPM	1,144	70	Faverge et al., 1962
Hong Kong	3-13	SPM	13,822	103	Lynn et al., 1988
Hong Kong	6-15	SPM	4,500	110	Lynn et al., 1988
Hong Kong	6	CPM	4,858	109	Chan & Lynn, 1989
India	9-15	CPM	5,607	81	Sinha, 1968
India	5-10	CPM	1,050	82	Rao & Reddy, 1968
India	11-15	SPM	569	82	Raven et al., 1996
Iran	15	SPM	627	84	Valentine, 1957
Iraq	14-17	SPM	204	87	Abul-Hubb, 1972
Iraq	18-35	SPM	1,185	85	Abul-Hubb, 1972
Ireland	6-13	SPM	3,466	87	Raven, 1981
Israel	9-15	SPM	250	90	Lynn, 1994
Italy	11-16	SPM	2,432	103	Tesi & Young, 1962
Japan	9	SPM	444	110	Shigehisa & Lynn, 1991
Kenya	Adults	CPM	205	69	Boissiere et al., 1985
Kenya	6-10	CPM	1,222	75	Costenbader et al., 2000
Korea, South	9	SPM	107	106	Lynn & Song, 1994
Malaysia	7-12	SPM	5,412	92	Chaim, 1994
Mexico	6-11	CPM	597	84	Raven, 1986
Mexico	6-11	CPM	434	95	Raven, 1986
Mexico	9-12	SPM	404	84	Raven, 1986
Netherlands	4-10	CPM	1,920	99	Raven et al., 1995
Netherlands	6-12	SPM	4,032	101	Raven et al., 1996
New Zealand	8-17	SPM	2,635	101	Reid & Gilmore, 1989
Nigeria	Adults	SPM	86	69	Wober, 1969
Nigeria	6-13	CPM	375	69	Fahrmeier, 1975
Peru	8-11	CPM	4,382	76	Raven et al., 1995
Philippines	12-13	SPM	203	86	Flores & Evans, 1972

Poland	6-15	SPM	4,006	92	Jarorowska et al., 1991
Portugal	6-12	CPM	807	91	Simoes, 1989
Puerto Rico	5-11	CPM	2,400	83	Raven et al., 1995
Puerto Rico	8-15	SPM	2,911	84	Raven & Court, 1989
Qatar	12	SPM	273	78	Bart et al., 1987
Romania	6-10	CPM	300	94	Zahirnic et al., 1974
Russia	14	SPM	432	96	Raven, 1988
Sierra Leone	Adults	CPM	60	67	Berry, 1966
Singapore	13	SPM	147	103	Lynn, 1977
Slovak Rep.	5-11	CPM	832	98	Raven et al., 1995
Slovenia	8-18	SPM	1,556	95	Roben, 1999
South Africa	16	SPM	3,993	72	Owen, 1992
Spain	4-9	CPM	1,189	96	Raven et al., 1995
Switzerland	6-10	CPM	408	99	Raven et al., 1995
Switzerland	6-10	CPM	167	102	Raven et al., 1995
Sudan	8-12	SPM	148	72	Ahmed, 1989
Taiwan	6-7	CPM	43,825	103	Hsu, 1976
Thailand	8-10	CPM	1,358	91	Pollitt et al., 1989
Taiwan	9-12	SPM	2,496	105	Lynn, 1997
Tanzania	17	SPM	2,959	78	Klingelhofer, 1967
Tanzania	Adults	CPM	179	69	Boissiere et al., 1985
Turkey	6-15	SPM	2,277	90	Sahin & Duzen, 1994
United States	18-70	SPM	625	98	Raven et al., 1996
Uganda	11	CPM	2,019	73	Heyneman et al., 1980
Uruguay	12-44	SPM	1,634	96	Risso, 1961
Zambia	13	SPM	894	75	MacArthur et al., 1964
Zimbabwe	12-14	SPM	204	70	Zindi, 1994

APPENDIX 2

Data for GNP Per Capita in 1998 and Real GDP Per Capita (PPP) in 1998 in US Dollars and for Economic Growth of GDP Per Capita over the Period 1950-90 and of GNP Per Capita over the Period 1976-98 for 60 Countries.

	Country	Per capita GNP 1998	Real GDP per capita 1998	Growth per capita GDP 1950-90 %	Growth per capita GNP 1976-98 %
1	Argentina	8,970	12,013	65.3	478.7
2	Australia	20,300	22,452	127.4	232.8
3	Belgium	25,380	23,223	214.4	274.3
4	Brazil	4,570	6,625	187,6	300.9
5	Canada	20,020	23,582	178.1	166.6
6	China	750	3,105	339.7	82.9
7	Congo (Brazz.)	690	995	97.8	32.7
8	Congo (Zaire)	110	822	-28.0	-21.4
9	Croatia	4,520	6,749	-	-
10	Cuba	3,0001	3,967	-17.8	248.8
11	Czech Republic	5,040	12,362	141.8	31.3
12	Denmark	32,7672	24,218	168.6	346.4
13	Egypt	1,290	3,041	292.6	360.7
14	Ethiopia	100	574	26.4	0.0
15	Finland	24,110	20,847	301.9	329.0
16	France	24,940	21,175	240.5	280.8
17	Germany	25,850	22,169	336.5	250.3
18	Ghana	390	1,735	-19.0	-32.8
19	Guinea	540	1,782	72.3	260.0
20	Hong Kong	21,6503	20,763	-	612.2

21	India	430	2,077	120.4	186.7
22	Iran	1,770	5,121	93.6	-8.3
23	Iraq	2,0001	3,197	79.9	43.9
24	Ireland	18,340	21,482	216.2	616.4
25	Israel	15,940	17,301	311.7	306.6
26	Italy	20,250	20,585	365,7	563.9
27	Japan	32,380	23,257	890.3	559.6
28	Kenya	330	980	77.2	37.5
29	Korea, South	7,970	13,478	924.8	1089.6
30	Malaysia	3,600	8,137	232.4	318.6
31	Mexico	3,970	7,704	139.7	264.2
32	Netherlands	24,760	22,176	132.2	299.4
33	New Zealand	14,700	17,288	64.7	245.9
34	Nigeria	300	795	104.4	-21.1
35	Peru	2,460	4,282	32.6	207.5
36	Philippines	1,050	3,555	77.9	156.1
37	Poland	3,900	7,619	108.9	36.4
38	Portugal	10,690	14,701	401.2	532.5
39	Puerto Rico	7,010	-	-	-
40	Qatar	7,4294	20,987	-46.2	77.9
41	Romania	1,390	5,648	192.7	-4.1
42	Russia (USSR)	2,300	6,450	142.4	-16.7
43	Sierra Leone	140	458	42.6	-30.0
44	Singapore	30,060	24,210	619.5	1013.3
45	Slovakia	3,700	9,699	-	-
46	Slovenia	9,760	14,293	-	-
47	South Africa	2,880	8,488	65.2	114.9
48	Spain	14,080	16,212	407.7	77.2

49	Sudan	290	1,394	10.7	0.0
50	Switzerland	32,7672	25,512	142.3	351.4
51	Taiwan	13,2335	-	1019.7	1136.7
52	Tanzania	210	480	40.3	16.7
53	Thailand	2,200	5,456	-	478.9
54	Turkey	3,160	6,422	392.1	219.2
55	Uganda	320	1,074	228.2	33.3
56	United Kingdom	21,400	20,336	138.1	432.3
57	United States	29,340	29,605	128.4	271.9
58	Uruguay	6,180	8,623	31.3	344.6
59	Zambia	330	719	11.6	-25.0
60	Zimbabwe	610	2,669	55.6	10.9

Sources:
GNP per capita in 1998:
World Development Report 1999/2000, Table a and Table 1a, if not otherwise noted.
1. Estimation.
2. In the statistical analysis, the highest number is limited to 32,767.
3. Eccleston, Dawson, and McNamara 1998, p. 221, year 1994.
4. World Development Report 1998/99, Table 1, year 1997.
5. The Far East and Australasia 1999, p. 322, year 1997.

Real GDP per capita in 1998:
Human Development Report 2000, Table 1.
Growth per capita GDP 1950-90 percent:
All data on per capita GDP 1950 and 1990 are from Maddison, 1995.
Growth per capita GNP 1976-98 percent:
All data on per capita GNP 1976 are from the World Bank's World Development Report 1978 and nearly all data on per capita GNP 1998 from World Development Report 1999/2000.

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Estimation of Missing National IQs

We want to extend the analysis to the further 104 countries with populations of more than 50,000 for which we have not been able to find IQ data. For these 104 countries we have estimated the IQs. Two principles have been adopted for making the estimates of national IQs for those countries for which data are lacking. First, it is assumed that national IQs which are unknown will be closely similar to those in neighboring countries whose IQs are known. It can be seen from the results set out in Table 6.1 that neighboring countries normally have closely similar IQs. Thus, for instance, the IQ in both Germany and the Netherlands is 102; the IQ in Japan is 105 and the IQ in South Korea is 106; the IQ in Argentina and in Uruguay is 96; the IQ in Uganda is 73 and in Kenya 72; and so forth. It is therefore assumed that where national IQs are unknown, they will be closely similar to those in neighboring countries. We have therefore taken the most appropriate neighboring countries and used their IQs to assign IQs to countries whose IQs are unknown. Where there are two or more appropriate neighboring countries, the IQs of these are averaged to obtain an estimated IQ for the country whose IQ is unknown. Thus, for example, to estimate an IQ for Afghanistan, we have averaged the IQs of neighboring India (81) and Iran (84) to give an IQ of 83. Averages with decimal points have been rounded towards 100.

A second principle for the estimation of national IQs has been used for several countries which are racially mixed and for which there is no similar neighboring country. In these cases we have assigned IQs to the racial groups on the basis of the known IQs of these groups in neighboring countries. For example, Cape Verde, the archipelago off the coast of Senegal, has a population which is 1 percent white, 28 percent black and 71 percent mixed black-white (Philip's, 1996). On the basis of the IQs of these groups in South Africa, it is assumed that the whites have an IQ of 94, the blacks of 66 and the mixed of 82, the IQ of South African coloreds (see Appendix 1). Weighting these figures by the percentages in the population gives an IQ of 78.

The racially mixed population of the Comoros consists of African (black), Arab and Malagasy elements. It is not any longer possible to separate clearly different racial groups. Because the racial composition of the population is comparable with Madagascar's population, we estimate its national IQ to be 79, the same as in Madagascar. The Malayo-Polynesians and Negroids constitute the principal elements in the racially mixed population of Madagascar. The contribution of each of them may be approximately equal. Therefore, it is reasonable to estimate the national IQ for Madagascar on the basis of the Philippines (86) and Tanzania (72), which gives an IQ of 79 for Madagascar. For Mauritius, the population consists of 68 percent Indians, 27 percent Creole (black-white hybrids), 3 percent Chinese and 1 percent whites. It is assumed that the IQs are 81 for the Indians (as in India), 82 for the Creoles (as for South African coloreds), 100 for the Chinese (as in China) and 94 for the whites (as for the whites in South Africa). Weighting these figures by the percentages in the population gives an IQ of 81.

Table 4 shows these estimated IQs and the comparison countries on which they are based, together with measured IQs. We should emphasize that these data on national IQs are estimates and that they certainly contain errors, but we assume that the margin of error is relatively small in nearly all cases.