The Impact of National IQ on Income and Growth[1]

A Critique of Richard Lynn and Tatu Vanhanen s Recent Book

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Abstract

Recently Richard Lynn and Tatu Vanhanen have presented evidence that differences in national IQ account for the substantial variation in national per capita income and growth. This paper challenges these findings and claims that, firstly, they simply reflect inappropriate use and interpretations of statistical instruments. Secondly, it is argued that the models presented by Lynn and Vanhanen are under-complex and inadequately specified. More precisely the authors confuse IQ with human capital. The paper concludes that once control variables are introduced and the models are adequately specified, neither an impact of IQ on income nor on growth can be substantiated.

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The Impact of National IQ on Income and Growth

A Critique on Richard Lynn and Tatu Vanhanen s Recent Book

Why Are Some Countries So Rich and Others So Poor?

Recently Richard Lynn and Tatu Vanhanen (2002) raised the most relevant question of why some countries are rich and others are poor. While this question is hardly new and is at the core of development and growth research, the answer the authors gave certainly has controversial potential in many respects, as will soon become clear. Lynn and Vanhanen (2002:23; passim) have claimed that the widespread assumption that the peoples of all nations have the same average level of intelligence is seriously incorrect and that therefore these national differences in intelligence are bound to have significant effects on national economic development and rates of economic growth. The argument is however twofold; in the first part, it is hypothesized that average national IQs are different because IQ is mostly determined by race-dependent genetic predisposition. The second part of the argument supposes a substantial link between national IQ and economic success. While the argument s first part has attracted considerable interest and generated polemic debates in many news groups and academic circles, the second part of the argument has been completely neglected. The question I therefore want to explore in this paper is: does IQ really make a difference? This implies that I am taking part one of the argument seriously, at least for a moment. It also implies that I shall have to use the highly deficient data on the national levels of IQ. In their sample of 185 countries, Lynn and Vanhanen (2002:59f) have only direct evidence of national IQs for 81 countries; the remaining 104 national IQ values have been estimated, based on racial group[2] compositions and neighboring country IQ values.

[2] For the authors the concept of race seems to be so clear that they see no need to make it explicit at all.

Furthermore the available national IQ samples differ greatly in size, the point of time the IQ test has been performed, the composition of the participants and the type of IQ test which has been used. Worst of all, the IQ samples can hardly be considered to be representative on the national level. One may be particularly concerned about the sampling in remote rural areas in Africa during the 1960s. While these deficiencies alone would be enough to fuel methodological and theoretical criticism, I shall take a different approach and take these IQ values for granted in order to explore the possible link between IQ and the wealth of nations.

In following Lynn and Vanhanen I shall, as a first step, discuss the impact of national IQ on per capita income. Here I shall argue that they have seriously misinterpreted the net effect of IQ on average wealth. Furthermore I shall be able to demonstrate that Lynn and Vanhanen confuse IQ with skills or human capital. While the latter is a productive force, the former is just a potential. Therefore, a model which only considers potential is inadequately specified.

As a second step, I shall turn to the link between IQ and economic growth. While Lynn and Vanhanen substantiate their claim by using simple correlations between IQ and growth, I shall be able to demonstrate that once a crude Barro-style growth model is introduced, the effect of national IQ vanishes. Finally, a concise conclusion will answer the question whether development and growth researchers should bother investigating IQ at all.

The Impact of National IQ on National per Capita Income

In their analysis of per capita income for their sample of 185 countries in 1998, Lynn/Vanhanen (2002:142) can only substantiate a modest effect of the average national IQ, leaving more than 60 percent of the variance unexplained. At this point, for the first and only time in their essay, they use multivariate analysis techniques to explain these large residuals. Their promising candidates

are two institutional variables: economic freedom and the political system[3]. Market economies and democracies are seen as more favorable for economic development than command economies and authoritarian political systems. While one can certainly agree that these two institutional variables may have a considerable effect on the average level of wealth, there are two points that need to be further discussed. On the one hand, the methodological treatment and statistical interpretation applied by Lynn and Vanhanen must raise considerable concern. On the other hand the authors fail to discuss education as another very important institutional variable which may explain not only the average wealth, but also the potential for growth in comparative perspective. Therefore, the authors implicitly equate average levels of IQ with average levels of education. As will soon become clear, the link between IQ and education is not as straight forward as Lynn and Vanhanen might want it to be. Again, it is not that the authors might not have addressed some of these issues in earlier chapters, but that they fail to adequately model these relations.

The important point is that the average IQ in a context cannot be regarded as the transmission belt which converts cognitive capacity into wealth and growth. Rather it is cognitive capacity which has been trained which enables this conversion. Thus the educational system is of principle importance. Only in those contexts where the average IQ meets adequate educational institutions can it be expected to unfold its productive power. In other words, high levels of IQ are at best a potential and must not be confused with human capital. Secondly, it is by no means clear whether the highest potential for wealth and growth can be attributed to those with the highest IQ or educational attainment. Thus I shall introduce both the average years of higher school completed and the average years of secondary school completed as control variables in order to isolate the

[3] Data for the level of democracy is from the Polyarchy data set (Vanhanen 2002) and cover the year 1998. Data for economic freedom comes from The Fraser Institute (Gwartney/Lawson 2002) and covers the year 1997.

net effect of the average IQ in the national context. Initially, however, I shall examine whether the sample used by Lynn and Vanhanen is comparable to the sample I use, since the control variables are not available for all countries[4].

[4] The full list of countries in the sample as compared to Lynn and Vanhanen s sample can be found in the appendix.

Table 1: Simple and Multiple Correlations of Real GDP per Capita (PPP $) with National IQs, the Economic Freedom Ratings, the Index of Democratization, and Their Combinations in a Group of 122 and 93 Countries

Explanatory variable	Real GDP per capita 1998[5]	Real GDP per capita 1998
N	122	93
National IQ	.711	.758
Economic Freedom (EF) 1997	.709	.683
Index of Democratization (ID) 1998	.600	.645
EF-1997 and ID-1998	.763	.759
IQ and EF-1997	.787	.791
IQ and ID-1998	.720	.783
IQ, EF-1997, and ID1998	.790	.808

As Table 1 reveals, the correlations between the two samples vary only marginally. While in the smaller sample the association between IQ and average wealth is even stronger than in Lynn and Vanhanen s sample of 122 countries, the Index of Economic Freedom (EF) correlates slightly more weakly and the Index of Democratization (ID) correlates slightly more strongly with the real gross domestic product in 1998. These results mainly reflect the fact that ten post-communist transition countries have been excluded from the sample. While the inclusion of these countries in a model which tries to explain average wealth in 1998 is not unproblematic in itself, the high correspondence of the correlations between the two samples and the inspection of the remaining countries in the smaller sample (see appendix, Table 5) nevertheless inform us that the two

[5] Figures are from Lynn/Vanhanen (2002:155).

samples are highly comparable. Thus it seems to be safe to discuss some further results using the sample of 93 countries.

The discussion of the results presented by Lynn/Vanhanen (2002:156f) is somewhat awkward. They compare multiple correlations (IQ and EF; IQ and ID; IQ, EF, and ID) to the simple correlations between national IQ real GDP per capita. And by simply inspecting the change in the variance explained between the simple and the multiple correlations they conclude that the independent contribution of EF to income is approximately ten percent points, no matter which of the four different measures of per capita income they use. To illustrate this point, consider Table 1. The variance explained by the model with only IQ in it amounts to 51 percent[6], whereas the model with IQ and EF explains 62 percent[7]. Thus Lynn and Vanhanen conclude that the independent effect of EF on real GDP per capita in 1998 amounts to only 11 percent. By simply interpreting changes in the variance explained, however, the authors totally obscure the influence structure of the variables. In line with their strategy, one could rightfully make the point that the variance explained by EF amounts to 50 percent and since IQ and EF together explain 62 percent of the variance, the independent effect of IQ is only 12 percent. However such an interpretation is, at best, fruitless. What one really should want to inspect is the influence structure of the variables in question.

Therefore I shall, before introducing further control variables, discuss the net effects of IQ, economic freedom and democracy on real GDP per capita 1998. Using multiple linear regression technique, Model 1 (see Table 2) estimates the net effects of IQ, EF and ID in the sample of 122

[6] 0.711^2 is equal to 0.51; thus 51 percent of the variance of income is explained by IQ.
[7] 0.787^2 is equal to 0.619; thus 62 percent of the variance of income is explained by IQ and EF.

countries discussed by Lynn/Vanhanen (2002:155). First of all, all variables in the equation are statistically significant. Inspecting the standardized regression coefficients reveals that economic freedom (0.414) is relatively more important in explaining income differences between countries in 1998 than is national IQ (0.323) or the degree of democracy (0.180). A one point increase in the national IQ would increase the average income $235.6. Thus, if Sierra Leone which has the lowest national IQ (64) could somehow become South Korea, which has the highest national IQ (106), it could increase per capita income by $9,895. But far greater gains could be achieved by providing more favorable conditions for economic development. If, for example, Burma — the country with the least favorable economic conditions in the sample — could achieve the same level of economic freedom as Singapore, its per capita income would increase by $16,365. Similarly by maximizing democracy Rwanda, Syria, Burma or China could — all other things being constant — increase their real GDP per capita by $4,963.

The first lesson which can be learned from Model 1 is that the net or independent effects of economic freedom and democracy — *ceteris paribus*— are far from being of minor importance as compared to IQ. On the contrary, Model 1 reveals that the single most important factor in explaining cross-country variance in per capita income is not the national IQ but the degree of economic freedom. To put it in Lynn and Vanhanen s language of explained variance , one can use the following formula in order to determine the explanatory variable s independent effects:

$$R^2 = r_{y\hat{y}}{}^2 = r_{IQ} \cdot \rho_{IQ} + r_{EF} \cdot \rho_{EF} + r_{ID} \cdot \rho_{ID}$$

where r is the simple correlation and ρ is the standardized partial regression coefficient (see Table 1 and 2). Thus one obtains:

$$R^2 = r_{y\hat{y}}{}^2 = 0.711 \cdot 0.323 + 0.709 \cdot 0.414 + 0.6 \cdot 0.18 = 0.63.$$

While the total amount of variance explained by all three variables amounts to 63 percent[8], only 23 percent is due to the independent influence of national IQ. The remaining 40 percent, or roughly two thirds of the total variance, comes into existence due to the independent effects of economic freedom (29 percent of explained variance) and the level of democratization (11 percent of explained variance).

[8] The explained variance differs slightly from Table 2 because the latter shows adjusted R^2 values only.

Table 2: Net Effects of National IQs, the Economic Freedom Ratings, the Index of Democratization, And Average Percentage of Higher And Secondary School Completed in the Population (White-corrected standard errors in Model 4)

	Model 1	Model 2	Model 3	Model 4
Explanatory variable	b (s.e.) beta	b (s.e.) beta	b (s.e.) beta	b (s.e) beta
National IQ	235.63**	321.29**	137.40	137.40
	(64.16)	(72.49)	(74.94)	(80.04)
	.323	.427	.183	.183
Economic Freedom 1997	2246.17**	1517.43**	1173.30**	1173.30*
	(395.25)	(482.08)	(444.19)	(461.23)
	.414	.273	.220	211
Index of Democratization 1998	113.98*	141.68**	125.67**	125.67*
	(49.30)	(53.47)	(47.90)	(61.47)
	.180	.221	.196	.196
Percentage Higher School Completed in the Male Population 1995			303.11*	303.11
			(116.40)	(153.38)
			.207	.207
Percentage Secondary School Completed in the Male Population 1995			215.22**	215.22**
			(53.55)	(55.63)
			.278	.278
Constant	28416.34**	31635.69**	18246.82**	18246.82**
	(4330.48)	(4781.44)	(5154.52)	(5966.59)
N	122	93	93	93
R^2 adjusted	0.62	0.64	0.72	0.73

Dependent variable: Real GDP per capita 1998
** p † .01 * p † .05 (two tailed)

One must therefore reject Lynn and Vanhanen s claim that national IQ is the single most important factor in explaining the large differences in per capita income 1998. Furthermore, institutional factors — economic freedom and the level of democracy — account for nearly two thirds of the variance explained and can by no means be reduced to the marginal figure proposed by the authors. The conclusion of Lynn/Vanhanen (2002:158) that the results of multiple

correlation analyses show that these two additional variables [economic freedom and the level of democracy; ThV] explain 10-12 percentage points of the variation in the measures of per capita income independently from national IQs is therefore fundamentally wrong, since it completely neglects the influence structure of the variables involved.

Let us now consider Model 2 in Table 2. Here the same parameters as in Model 1 are estimated, but this time for the reduced sample of 93 countries. Again, all variables show statistical significance. Since most of the post-communist transformation countries have been excluded from this sample, the most important variable in terms of its net effect now is national IQ. With a standardized regression coefficient of 0.427, it ranks well before economic freedom (0.273) and the level of democracy (0.221). While this result may point to the importance of the average national IQ, it again fails to display the minor role of the two institutional factors. IQ accounts for nearly 50 percent of the 65 percent of the total variance explained, but the other 50 percent are explained by EF and ID[9]. Thus the reduced sample — because of its stronger support for the Lynn/Vanhanen thesis — seems well suited to additional tests.

In the following paragraph I shall reflect on the link between IQ, education and earnings. Lynn and Vanhanen report only weak correlations (0.34) between IQ and earnings on the individual level. This leads them to conclude that earnings must not be regarded as a function of IQ alone; rather earnings are also dependent on motivation and opportunity (Lynn/Vanhanen 2002:29). In taking up this line of reasoning, I argue that educational attainment and the education completed are not determined by IQ alone. Instead they are heavily dependent on motivation and the opportunity structure. There is evidence for both of these factors: Sauer and Gattringer (1985) find that variations in educational attainment are equally determined by the child s cognitive capacity and the parent s educational aspiration for the child. And Bornschier (1988) is able to

demonstrate fundamental shifts in the educational opportunity structure, which promoted mass education and increasing levels of schooling. The latter is especially important, since high levels of IQ are by no means sufficient to unleash economically productive potentials. People must be adequately trained in order to fulfill complex tasks. Thus the presence of an educational system, which acts as an opportunity structure for individuals, is a necessary condition for economic development and growth. Only then can the potential of high IQ be transformed into human capital.

[9] The part of the total variance explained by IQ is 32 percent, while for EF and ID it is 33 percent.

Figure 1: Simple Correlations Between National IQ and Three Levels of education completed in the male population from 1960 to 2000 in a Sample of 93 Countries

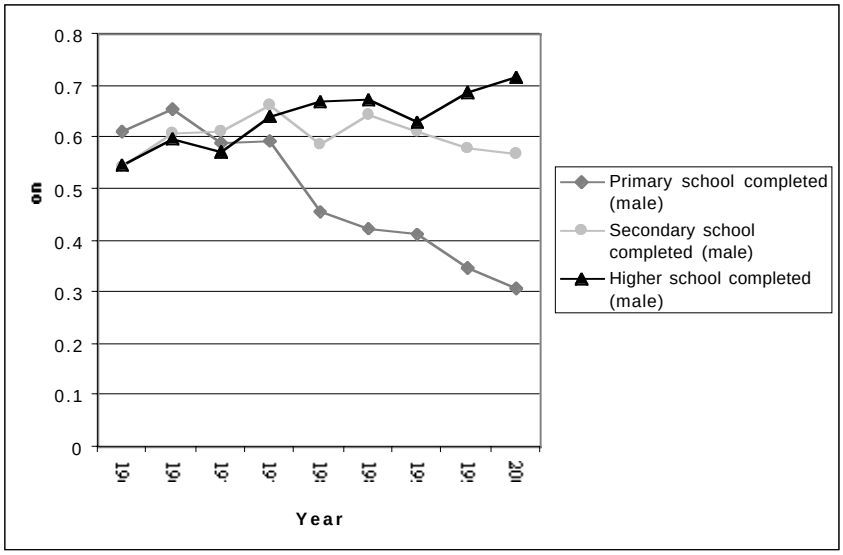
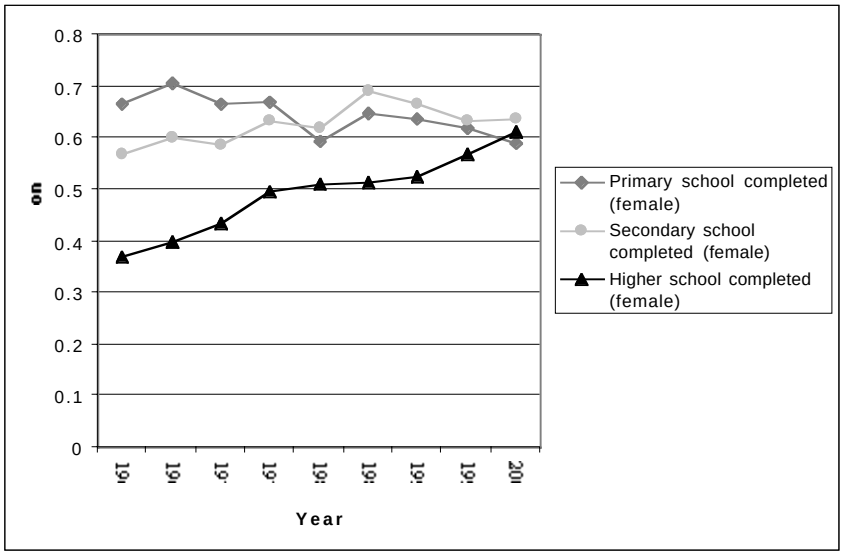


Figure 2: Simple Correlations Between National IQ and Three Levels of education completed in the female population from 1960 to 2000 in a Sample of 93 Countries



The link between opportunity structure and IQ can be illustrated by looking at the changing association between national IQs and the level of education completed over time.

While for both male and female the simple correlation between national IQ and percentage of higher school completed in the population has been rising since 1960, an inverse trend between the correlation of IQ and percentage of primary school completed in the male population can be observed (see Figure 1 and 2).

In 1960 the correlation between percentage primary school completed in the male population and national IQ is 0.612, but by the year 2000 it has dropped drastically to 0.308; the correlation between higher school completed (male) in 1960 is 0.547 whereas in 2000 it is 0.717. This socio-cultural shaping of the opportunity structure can be illustrated slightly more strongly by pointing at the association between national IQ and the percentage of higher school completed in the female population; in 1960 the simple correlation is 0.370, in 2000 it is 0.613. Still, for females,

the correlations with primary school completed show no downward trend. Do we therefore have to conclude that females on average are less intelligent? Certainly not! However the conclusion that can be drawn from this changing link between levels of education and IQ is that one should want to control for the opportunity structure provided by the social context. Since the sample is very heterogeneous, and in order to prevent possible problems of multicollinearity, I shall restrict the variables which control for the opportunity structure to the percentage of secondary and higher school completed in the male population. These two variables not only seem to be reasonable proxies; they will possibly reveal further insights about the link between education and average national income per capita. In line with theories of modernization I would expect those countries which actively promoted and broadened their education system to achieve the highest per capita incomes. By doing so, they would be able to turn their IQ potential into economically productive human capital.

What are the net effects of national IQ, once the opportunity structure is controlled for? Models 3 and 4 (see Table 2) both show the respective coefficients. In order to correct for possible problems of heteroscedasticity Model 4 uses White-corrected standard errors. In both estimates, national IQ loses statistical significance while economic freedom and the level of democracy are robust and positively influence real GDP per capita in 1998. In addition substantial positive effects of the secondary and higher school exist, although in Model 4 higher school loses its statistical significance[10]. The single most important factor in explaining income differences between countries is the percentage of the male population which completed secondary school. It is followed by economic freedom, higher school completed and the level of democracy. The least influential variable is national IQ, which does not reach statistical significance. While these

[10] However it drops only slightly below the 5% level of significance (p=0.51).

findings support the claim that the opportunity structure is of central importance, they also suggest that it is not necessarily the educational and cognitive elite which is most relevant for the wealth of nations. It may be chiefly a broad middle segment of the education hierarchy which most facilitates economic development. To substantiate this hypothesis would however go far beyond the purpose of this paper.

The conclusion that may be drawn from this first extended test, which aimed at analyzing net effects and introducing additional control variables, is that the link between national IQ and per capita income is far from robust. At best there exists weak empirical evidence which, however, does not substantiate the strong claim made by Lynn and Vanhanen. Next I shall examine the effect of IQ on growth.

National IQ and Economic Growth

Does average IQ have an influence on economic growth? Lynn/Vanhanen (2002:116) claim that this is indeed the case. Unfortunately the authors do not extend their analysis beyond the discussion of simple correlations and mono causal IQ-centric explanations. In the light of even the simplest growth theory, this approach seems highly inappropriate. Output and growth cannot be regarded as a simple function of intellectual capacity, since human capital (labor) is only one agent of production and needs to be accompanied by real capital, social capital and other productive resources in order to unfold its full potential. One should therefore want to specify a more adequate model in order to reflect the net effect of national IQ on growth.

However, to avoid needless complications, I shall simply introduce a crude Barro-style lagged growth model (Barro 1991, 1998; Barro/Lee 1993b; Barro/Sala-i-Martin 1998; Perotti 1996) and estimate parameters for the two growth periods 1976-1998 and 1983-1996 discussed by

Lynn/Vanhanen (2002:116ff). Since this type of model is well known in the growth literature I shall only briefly discuss the variables.

The initial level of wealth (GNP or GDP per capita) is interpreted by neoclassic economic theory as a conditional rate of convergence. Countries with a low level of initial wealth are expected to grow faster, since the stock of capital per head increases as investment increases; and so does output, but with a diminishing rate. Therefore a negative sign on the initial level of wealth would substantiate this argument. Another important factor which might influence growth — and a review of the growth literature assures us that it usually does — is investment. Higher levels of invested capital should be expected to result in higher growth rates. To test Lynn and Vanhanen s claim, national IQ is entered in all of the growth models. As has been argued previously, one must not confuse IQ with human capital. While IQ needs to be considered as the potential to acquire skills, human capital is the trained capacity and ability to productively use skills. And only through the use of skills can growth be achieved. Thus in Models 6, 7 (see Table 3) and 9, 10 (see Table 4) the percentages of higher and secondary school completed in the male population are entered in order to control for the opportunity and skill structure[11].

In following Barro (1996; see also Barro and Sala-i-Martin 1998) health status, measured as life expectancy at birth, is considered to be an integral part of human capital. Lynn and Vanhanen would certainly agree with this, since they themselves discuss the impact of health on economic development (Lynn/Vanhanen 2002:188)[12].

Finally the fertility rate is used to model the effects of population growth. The neoclassic growth model would anticipate a negative effect on the steady-state level of output per effective worker

[11] One of the reviewers proposed that the quality of the education system may be important as well. However, introducing public expenditure on education (total or reoccurring) as a proxy in order to account for the quality of schooling did not substantially change the results. Estimates are therefore not shown here.

[12] However, they only consider the indirect impact of health on IQ and then development.

if the population were growing. This is because a portion of the investment is used to provide capital for new workers, rather than to raise capital per worker (Barro 1996:7).

Models 5 and 8 both estimate a simple system which includes initial wealth, investment and national IQ. GNP per capital growth 1976-1998 as well as GDP per capital growth 1983-1996 are both significantly influenced by the parameters, as anticipated by the respective theories. Initial wealth is negatively related to growth, indicating that if other variables are held constant, the economy tends to approach its long-run position. Investment as well as the level of the national IQ is positively related to growth. However, the single most important factor in both initial growth models is the investment rate.

Once additional control variables — fertility rate, life expectancy at birth, higher and secondary school completed — are entered into the models, national IQ loses statistical significance while initial wealth and investment still show the predicted effects.

Table 3: GNP per Capita Growth 1976-1998[13] (White-corrected standard errors in Model 7)

	Model 5	Model 6	Model 7
Explanatory variable	b (s.e.) beta	b (s.e.) beta	b (s.e.) beta
Initial Level of GNP 1976	-143.15**	-282.49**	-282.49**
	(48.80)	(73.91)	(85.48)
	-.339	-.670	-.670
Investment 1976-1998	17.13**	16.04**	16.04**
	(3.84)	(3.81)	(5.61)
	.552	.519	.519
National IQ	8.12**	3.700	3.700
	(2.94)	(3.42)	(4.73)
	.393	.180	.180
Fertility 1970-1974		-208.68	-208.68
		(171.34)	(173.04)
		-.183	-.183
Life Expectancy at Birth 1970-1974		8.62	8.62*
		(4.59)	(4.18)
		.391	.391
Percentage Higher School Completed in the Male Population 1975		-1.86	-1.86
		(7.35)	(6.01)
		-.028	-.028
Percentage Secondary School Completed in the Male Population 1975		1.72	1.72
		(3.52)	(3.03)
		.057	.057
Constant	-301.47	124.75	124.75
	(177.05)	(347.14)	(399.72)
N	92	91	91
R^2 adjusted	.46	.48	.48

Dependent variable: GNP per capita growth 1976-1998
** p † .01 * p † .05 (two tailed)

[13] Three models have been estimated which all use GNP per capita growth as the dependent variable (source: World Bank 1999). The variable National IQ reflects the country specific IQ levels (source: Lynn/Vanhanen 2002). The variable Initial Level of GNP refers to 1976, the beginning of the growth period and enters in the regression in logarithmic form (source: World Bank 1999). The following variables are from Barro/Lee (1993a): Investment is the average of the ratio of real domestic investment (private plus public) to real GDP between 1976 and 1998. Fertility is the average of the total fertility rate (children per woman) between 1970 and 1974; the value enters in logarithmic form. Life Expectancy is the average life expectancy at age 0 between 1970 and 1974. Percentage Higher and Secondary School Completed in the Male Population 1975, at the beginning of the growth period.

Table 4: GDP per Capita Growth 1983-1996[14] (White-corrected standard errors in Model 10)

	Model 8	Model 9	Model 10
Explanatory variable	b (s.e.) beta	b (s.e.) beta	b (s.e.) beta
Initial Level of GDP 1983	-44.84* (18.13) -.250	-94.17** (25.12) -.525	-94.17** (29.04) -.525
Investment 1983-1996	7.50** (1.48) .556	6.96** (1.40) .517	6.96** (1.54) .517
National IQ	3.92** (1.17) .427	1.41 (1.37) .153	1.41 (1.4) .153
Fertility 1975-1979		-170.02* (65.09) .371	-170.02* (69.22) .371
Life Expectancy at Birth 1975-79		2.76 (1.75) .278	2.76 (1.62) .278
Percentage Higher School Completed in the Male Population 1985		-1.14 (2.09) -.052	-1.14 (2.00) -.052
Percentage Secondary School Completed in the Male Population 1985		.10 (1.05) .009	.10 (.97) .009
Constant	-211.05** (71.18)	109.75 (143.55)	109.75 (134.78)
N	91	90	90
R^2 adjusted	.58	.63	.63

Dependent variable: GDP per capita growth 1983-1996
** p † .01 * p † .05 (two tailed)

[14] Three models have been estimated which all use GDP per capita growth as the dependent variable (source: World Bank 1999). The variable National IQ reflects the country specific IQ levels (source: Lynn/Vanhanen 2002). The variable Initial Level of GNP refers to 1983, the beginning of the growth period and enters in the regression in logarithmic form (source: World Bank 1999). The following variables are from Barro/Lee (1993a): Investment is the average of the ratio of real domestic investment (private plus public) to real GDP between 1983 and 1996. Fertility is the average of the total fertility rate (children per woman) between 1975 and 1979; the value enters in logarithmic form. Life Expectancy is the average life expectancy at age 0 between 1975 and 1979. Percentage Higher and Secondary School Completed in the Male Population 1985, at the beginning of the growth period.

These effects persist when using White-corrected robust standard errors (Models 7 and 10). The positive effects of secondary school completed and the negative effects of higher school completed on growth 1976-1998 and growth 1983-1996, although not statistically significant, may be interpreted as reflecting different levels of development. Countries with higher levels of higher education tend to be more developed while countries with higher levels of secondary education tend to be less developed; thus the two variables proxy backwardness; and backwardness induces higher growth rates through the convergence mechanism discussed. While this neoclassic interpretation suggests that investment in higher education has diminishing returns — and this may indeed be the case in the developed countries —, one may alternatively make the point that the negative impact is a concomitant of brain drain and deficient TNC-centric higher education practices in the developing countries. Which of these two alternative interpretations will gain more support is again an empirical question which I shall not be able to discuss further here.

Fertility, and thus population growth, although pointing in the hypothesized direction, only reaches significance in Model 10 where robust standard errors have been used; the same applies to life expectation in Model 7.

From these results one can conclude the following: (1) The only robust variables in the discussed growth models are the initial level of wealth — the conditional rate of convergence discussed by neoclassic growth theory — and the investment rate. (2) In the initial Models 5 and 7, where the influence of national IQ reaches statistical significance, the relative importance of IQ clearly lags behind the relative influence of the investment rate on growth. The claim that national IQ differentials are the most important factor explaining the variations in cross-country growth rates must therefore be rejected.

Conclusion

In this paper I have explored the influence of national IQ on income and growth. In contrast to Lynn and Vanhanen, I find no empirical and statistically significant support for their claim that IQ is the most relevant factor explaining cross-country variations in income and growth. In the case of income, the authors simply fail to consider the influence structure of the explanatory variables, leading them to the wrong conclusion that economic freedom and the level of democracy account for only a small amount of the variance explained.

Furthermore, Lynn and Vanhanen confuse IQ with human capital. Once one controls for the educational opportunity structure, the link between IQ and income disappears.

Also, their case for economic growth and IQ is not supported by the empirical evidence presented for the two growth periods 1976-1998 and 1983-1996. Once control variables are entered, and a more theoretically adequate growth model is specified, the effect of national IQ levels on growth cannot be substantiated. Therefore the correlation between IQ and growth which has been found by Lynn and Vanhanen must be considered as spurious. In short, the simple message is that national IQ has neither an effect on income nor on economic growth.

In the light of these findings, it is hardly worthwhile for any researcher to further consider national IQs as an engine of economic development and growth. If the IQ effect is spurious, why should we still bother? Firstly, the answer of course has to do with the questionable research methods applied by Lynn and Vanhanen. Secondly, part one of Lynn and Vanhanen s argument – however weak its methodological fundament may be – must be subject to strict scientific tests. Polemics alone will not advance the knowledge of the scientific community.

References

Barro, Robert J. 1991. Economic Growth in a Cross Section of Countries . *The Quarterly Journal of Economics* 2: 520-56.

Barro, Robert J. and Lee, Jong-Wha. 1993a. Barro-Lee Data Set. International Measures of Schooling Years and Schooling Quality. Distributed by the World Bank Group. http://www.worldbank.org.research/growth/ddbarle2.htm/

Barro, Robert J. and Lee, Jong-Wha. 1993b. International Comparisons of Educational Attainment . *NBER Working Paper No. 4349*.

Barro, Robert J. 1996. Democracy and Growth . *Journal of Economic Growth 1*: 1-27.

Barro, Robert J. and Sala-i-Martin, Xavier. 1998. *Economic Growth*. New York: McGraw-Hill.

Bornschier, Volker. 1988. *Westliche Gesellschaft im Wandel*. Frankfurt am Main/New York: Campus.

Gwartney, James; Lawson, Robert. 2002. Economic Freedom of the World. Distributed by The Fraser Insitute. http://www.freetheworld.com/

Lynn, Richard; Vanhanen, Tatu. 2002. *IQ and the Wealth of Nations*. Westport, Connecticut: Praeger.

Perotti, Robert. 1996. Growth, Income Distribution, and Democracy: What the Data Say . *Journal of Economic Growth 1*: 149-87.

Sauer, Jochen; Gattringer, Heinz. 1985. Soziale, familiale, kognitive und motivationale Determinanten der Schulleistungen . *K lner Zeitschrift f r Soziologie und Sozialpsychologie 37*: 288-309.

Vanhanen, Tatu. 2002. The Polyarchy dataset. Version 1.2. Distributed by Institutt for Sosiologi og Statsvitenskap. http://www.sv.ntnu.no/iss/data/vanhanen/

World Bank. 1999. World Development Indicators CD-ROM. Washington, DC.: The World Bank Group.

Appendix

Table 5: IQ and Country Samples Used in the Analysis

Country	IQ	Lynn/Vanhanen (n=122)	Volken (n=93)
Sierra Leone	64	x	x
Congo (Zaire)	65	x	x
Senegal	65	x	x
Guinea-Bissau	66	x	
Zimbabwe	66	x	x
Gabon	66	x	
Nigeria	67	x	
Niger	67	x	x
Togo	69	x	x
Mali	69	x	x
Benin	69	x	x
Cameroon	70	x	x
Burundi	70	x	
Rwanda	70	x	x
Malawi	71	x	x
Ghana	71	x	x
Cote d'Ivoire	71	x	
Namibia	72	x	
Haiti	72	x	x
South Africa	72	x	x
Chad	72	x	
Jamaica	72	x	x
Tanzania	72	x	
Kenya	72	x	x
Botswana	72	x	x
Uganda	73	x	x
Congo (Brazzaville	73	x	x
Zambia	77	x	x
Nepal	78	x	x
Barbados	78	x	x
Bahamas	78	x	
Guatemala	79	x	x
Madagascar	79	x	
Ecuador	80	x	x
Trinidad and Tobago	80	x	x
Bangladesh	81	x	x
Pakistan	81	x	x
India	81	x	x
Mauritius	81	x	x
Sri Lanka	81	x	x
Oman	83	x	
Kuwait	83	x	x
Egypt	83	x	x
Bahrain	83	x	x
Belize	83	x	
United Arab Emirates	83	x	
Guyana	84	x	x
El Salvador	84	x	x
Iran	84	x	x

cont.

Country	IQ	Lynn/Vanhanen (n=122)	Volken (n=93)
Honduras	84	x	x
Algeria	84	x	x
Papua New Guinea	84	x	x
Nicaragua	84	x	x
Fiji	84	x	x
Dominican Republic	84	x	x
Tunesia	84	x	x
Paraquay	85	x	x
Bolivia	85	x	x
Morocco	85	x	
Panama	85	x	x
Philippines	86	x	x
Burma (Myanmar)	86	x	x
Syria	87	x	x
Mexico	87	x	x
Jordan	87	x	x
Brazil	87	x	x
Indonesia	89	x	x
Venezuela	89	x	x
Colombia	89	x	x
Croatia	90	x	
Turkey	90	x	x
Albania	90	x	
Peru	90	x	x
Thailand	91	x	x
Costa Rica	91	x	x
Greece	92	x	x
Malaysia	92	x	x
Cyprus	92	x	x
Chile	93	x	x
Ireland	93	x	x
Bulgaria	93	x	
Romania	94	x	
Israel	94	x	x
Malta	95	x	x
Slovenia	95	x	
Portugal	95	x	x
Uruguay	96	x	x
Ukraine	96	x	
Russia	96	x	
Slovakia	96	x	
Argentina	96	x	x
Finland	97	x	x
Spain	97	x	x
Lithuania	97	x	
Canada	97	x	
Estonia	97	x	
Czech Republic	97	x	
Latvia	97	x	
Denmark	98	x	x
Australia	98	x	x
France	98	x	x
Iceland	98	x	x

cont.

Country	IQ	Lynn/Vanhanen (n=122)	Volken (n=93)
United States	98	x	x
Norway	98	x	x
Poland	99	x	x
Hungary	99	x	x
China	100	x	x
Belgium	100	x	x
United Kingdom	100	x	x
New Zealand	100	x	x
Luxembourg	101	x	
Sweden	101	x	x
Switzerland	101	x	x
Austria	102	x	x
Italy	102	x	x
Netherlands	102	x	x
Germany	102	x	x
Singapore	103	x	x
Taiwan	104	x	x
Japan	105	x	x
Korea (South)	106	x	x