Cognitive Ability (IQ), Education Quality, Economic Growth, Human Migration: Implications from a Sociobiological Paradigm of Global Economic Inequality

Benjamin Wong*
University of Toronto

Modernization theories propose that third world developing nations will eventually undergo a transformational process where they will go from traditional agrarian societies to industrialized ones, eventually reaching the development levels of Western, first world nations. It remains to be explained why industrialization has worked for only a small handful of European and Pacific Rim countries and has failed for most other nations of the world in South Asia, the Pacific Islands, Latin America, and sub-Saharan Africa. The 2007 World Bank Report *Education Quality and Economic Growth* demonstrates that education quality and cognitive skills, measured by international standardized test scores, are stronger predictors for national economic growth than educational quantity, measured by years of schooling and enrollment rates. This paper summarizes key findings of the World Bank report and finds that the intelligence quotient (IQ) is highly correlated with international standardized test scores and other indices that complement income levels as indicators of national well-being. As IQ is substantially heritable, blunt strategies directed at simple resource expansions or institutional changes are unlikely to be effective at reducing disparities in international cognitive skills. Imminent workable solutions geared towards reducing global economic inequalities continue to remain elusive. Implications from the consequences of global inequality are discussed in the context of 21st century human migration in the West and Northeast Asia.

Key Words: Cognitive Ability, Education, Economic Growth, IQ, Life Expectancy, Infant Mortality, Intelligence, Human Migration, Immigration, Global Inequality, Eugenics, Northeast Asia, Korea, Japan.

At the dawn of the 21st century it has become clear that not all countries in the world are on their way towards sustainable development, modernization, and economic prosperity. In a 2006 World Bank report entitled *06 World Development*

* Address for correspondence benny.wong@utoronto.ca

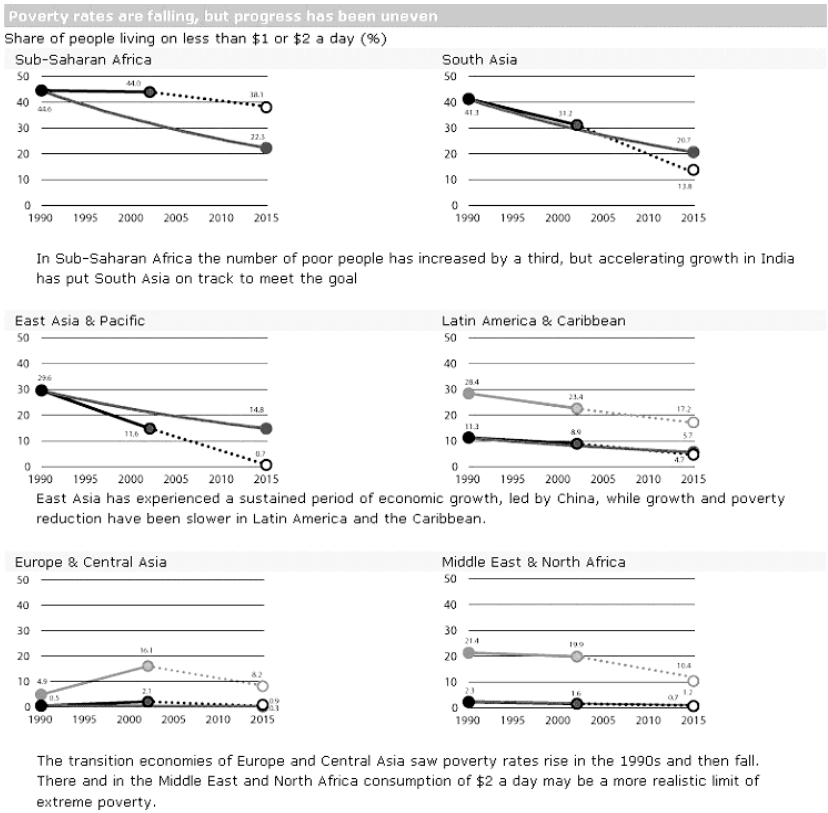
Indicators,[1] the progress of the set of eight millennium development goals laid out in September 2000 in the 8th plenary meeting at the UN Headquarters in New York was reviewed. These goals were the targets that developing countries ought to aim to achieve by 2015: "reduction of poverty and hunger", "educating all children", "empowering women", "saving children", "caring for mothers", "combating disease", "using resources wisely", and "working together". This paper focuses on education and economic growth based on a new 2007 World Bank report that delineates the impact of education quality on economic growth and will therefore review data about the the status of the first two of the eight millennium goals of 2000.

Data from the *06 World Development Indicators* indicate that sub-Saharan Africa continues to perform way below expectations when it comes to achieving the millennium goal of poverty reduction and hunger. As of 1990, 44.6% of people in sub-Saharan Africa subsisted on less than $1 per day. A projected 38.1% of people will still be subsisting on the same amount per day by the year 2015, falling far behind the 2015 goal of 22.3%. In stark contrast, in East Asia and Pacific Rim in 1990, 29.6% of people subsisted on less than $1 per day, with a projected level dropping to an astoundingly low of 0.7% by 2015. The intended UN goal was to reduce the percentage to 14.8% by 2015. In 1990 in Europe and Central Asia, 0.5% of people subsisted on less than $1 per day. This figure rose to 2.1% shortly after 2000, and is anticipated to decline back to 0.9% by 2015. The millennium goal was set at 0.3% for this region in 2015. The projected trends for other regions including South Asia, Latin America and the Caribbean, and the Middle East and North Africa are summarized in figure 1.

Figure 1. (below)

Worldwide Poverty Rates Are Falling, But Progress Has Been Uneven. Dotted Lines Are Projected Trends; Two Point Solid Lines Represent The 2015 Millennium Goal; Three Point Dark Lines Represent the Percentage of People Living on Less Than $1 a Day; Three Point Light Lines Represent the Percentage of People Living on Less Than $2 a Day

[1] Full report in *.pdf format may be found here: http://devdata.worldbank.org/wdi2006/contents/Section1_1_1.htm



Of all the above developing regions, only "East Asia and Pacific Rim" has exceeded expectations and has actually *surpassed* the 2015 goal shortly after 2000.

The report proceeds to note that moderate to severe malnutrition rates amongst children under 5 years of age are predicted to fall everywhere in the world, except in sub-Saharan Africa (data not shown). Malnourished children develop more slowly, enter school later, and perform less well later on in school.[2]

Not surprisingly, the poorest countries also have the lowest primary school completion rates. As of 2005, 61.7% of sub-Saharan African children will complete primary school,

[2] On-line reference
http://devdata.worldbank.org/wdi2006/contents/Section1_1_1.htm

compared to 82.0% in South Asia, 99.0% in East Asia and Pacific Rim, 96.7% in Latin America and Caribbean, 94.4% in Europe and Central Asia, and 87.8% in Middle East & North Africa. The stated 2015 millennium goal of "educating all children" was for all developing regions to have a 100% primary school completion rate.[3]

Though there is a relative paucity of data amongst many developing countries with respect to the above indices, what is striking is that sub-Saharan African countries have consistently the largest share of "seriously off track countries" as defined in the report, while Europe and Central Asia have the largest share of those that have already "reached target". And from projected trends, East Asia and the Pacific Rim countries will continue to harvest the largest gains in the near future.

Modernization theories propose that nations evolve from subsistence agriculture to various stages of urbanization and industrialization, and third world underdeveloped nations likewise undergo a transformational process where they go from traditional agrarian societies to developed ones, eventually reaching development levels of Western, first world nations. From World Bank data above, it is clear that at the dawn of the 21th century, in spite of the laudable efforts directed at attempting to solve the intractable problem of persistent global poverty, substantial levels of inequality remain and not all countries perform identically.

This paper reviews a landmark 2007 World Bank study and seeks to paint a larger picture from a sociobiological paradigm by integrating insights from recent psychological research with the various economic, educational, and health indices. Current approaches and practical implications for first world developed Western and Northeast Asian nations of human migration, a consequence of intractable global inequality, will be discussed in the context of education and human capital.

History

Income and wealth inequalities have been of great interest to politicians and philosophers over two centuries. Adam Smith proposed that population skills are the principal factor responsible for national differences in incomes and wealth.

[3] On-line reference:
http://devdata.worldbank.org/wdi2006/contents/Section1_1_2.htm

Lynn and Vanhanen summarized a history of the various paradigms used to explain worldwide income and wealth inequalities in their 2002 book *IQ and the Wealth of Nations*. These include: (1) Climatic theories; e.g., Kamarck (1976) 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. Diamond (1998) presented similar arguments. (2) Dependency theories which propose that economically developed capitalist nations are responsible for the poverty of the underdeveloped nations because they dominate the world economy and force the rest of the world into economic dependency. (3) Neoliberal theories which propose that the major factor responsible for wealth is free markets as opposed to command, socialist and communist economies. And (4) Psychological theories, where differences in attitudes, values and motivations contribute to national wealth. The above theories are of course not necessarily mutually exclusive, and some economists may subscribe to various theories and place various degrees of emphasis on each one. Lynn and Vanhanen (2002) themselves suggested a novel hypothesis that national differences in cognitive capacities may play a role in national differences in economic development.[4]

Education Quality Matters Much More Than Education Quantity

The concept of human capital and economic growth is not new. Solow and Samuelson in the 1950s first attempted to model long-run growth analytically, and predicted that increasing capital relative to labor creates economic growth, and poor countries with less capital per person will grow faster because each investment in capital will yield a higher return than in richer countries with ample capital. Eventually there comes a steady state where there will be diminishing returns to capital, where no new increase in capital will create economic growth. This steady state may however be overcome by continually inventing new technology that allows more production with fewer resources. As technology improves, this steady-state level of capital increases and the country in

[4] Brief summary may be found on line:
http://www.geocities.com/race_articles/lynn_intelligence_wealth.html

question manages to continually invest and grow.[5] Mincer and Becker of the "Chicago School" of economics wrote in their classic *Human Capital* (1964) that human capital is similar to "physical means of production" and one can invest in human capital via education or training and one's output depends on the rate of return on the human capital one owns. Human capital is a means of production; additional investment yields additional output.[6]

The focus on human capital therefore has had a long tradition. Yet what most measures of human capital have been centered around are traditional quantifiable education variables such as years of schooling or formal educational attainment levels. Little attention has been paid to education quality. De la Fuente (2006) from the Prime Minister's Office Economic Council of Finland reviewed evidence and policy guidelines and summarized findings that there were large social returns to education in European countries and that an investment in human capital should be accorded greater priority. The focus was on "school autonomy, transparency, performance pay for teachers, school competition, and parental choice."[7] There was a brief mention that direct measures of skills (i.e. education quality) could be better proxies for human capital than years of schooling, and de la Fuente admitted that this would be a 'rather fruitful line of research', citing recent work by Hanushek and Kimko (2000) and Coulombe et al (2004). (Hanushek and Kimko themselves however did reveal their underlying assumption [or rather, assertion] that, "[w]e assume that the international level of average ability of students does not vary across countries" and focused on other measures instead, e.g. pupil/teacher ratio, teaching materials and teacher salary in primary schools, per pupil current public expenditure, etc., as proxies for quality.) De la Fuente's report's focus was, however, still on the years of schooling and the report proceeded to document how various European countries vary in the social rate of return to schooling. It concluded that increasing resource input indiscriminately

[5] Quoted from Helpman, 2004. On-line reference: http://en.wikipedia.org/wiki/Economic_growth#_note-0
[6] Quoted from Becker, 1964. On-line reference: http://en.wikipedia.org/wiki/Human_capital
[7] Archived: **http://tinyurl.com/26nfok**

might not improve student performance, and that priority should be given to incentive-improving measures, accountability measures, as well as to early intervention.[8]

In February 2007, the World Bank released a major study built on earlier work that focused on how education *quality* might be, on a global scale, much more important than education *quantity* in terms of economic growth. The authors wrote that the study was motivated by doubts that had been raised about the role of education and human capital in economic development and encompassed concerns about whether "one really knows how to change educational outcomes, particularly in developing countries."[9] Authors Eric A. Hanushek and Ludger Wößmann (2007) of *The Role of Education Quality in Economic Growth* stated that:

> The role of improved schooling, a central part of most development strategies, has become controversial because expansion of school attainment has not guaranteed improved economic conditions. This paper reviews the role of education in promoting economic well-being, with a particular focus on the role of educational quality. It concludes that there is strong evidence that the cognitive skills of the population – rather than mere school attainment – are powerfully related to individual earnings, to the distribution of income, and to economic growth.[10]

In the preface of the graphical distribution of the report[11], François Bourguignon, Senior Vice President and Chief Economist of the World Bank, commented on how similar years of schooling could nonetheless produce drastically different education outcomes depending on which countries children

[8] Hanushek and Kimko (2000) showed that direct measures of labor-force quality from international mathematics and science test scores are strongly related to growth; that direct spending on schools is unrelated to student performance differences; that the estimated growth effects of improved labor-force quality hold when East Asian countries are excluded; and, finally, that home-country quality differences of immigrants are directly related to U.S. earnings if the immigrants are educated in their own country but not in the United States. Interestingly they also wrote that "we assume that the international level of average ability of students does not vary across countries (or at least is exogenous to the other determinants considered here)."

[9] On-line reference: http://tinyurl.com/35msgg (page 78)

[10] On-line reference as above: http://tinyurl.com/35msgg

[11] On-line reference: http://tinyurl.com/25t49l

are educated in:

> As shown in this report, differences in learning *achievements* matter more in explaining cross-country differences in productivity growth than differences in the average number of years of schooling or in enrollment rates... In recent surveys in Ghana and Zambia, it turned out that fewer than 60 percent of young women who complete six years of primary school could read a sentence in their own language.

The statistical thrust of how quality trumps quantity was laid out a few pages later in an on-line graphical summary of the document:

> Adding educational *quality* to a base specification including only initial income and educational quantity boosts the variance in GDP per capita among the 31 countries in Hanushek and Kimko's sample that can be explained by the model from 33% to 73%. *The effect of years of schooling is greatly reduced by including quality, leaving it mostly insignificant.* At the same time, adding the other factors leaves the effects of quality basically unchanged. Several studies have since found very similar results. In sum, the evidence suggests that the *quality* of education, measured by the knowledge that students gain as depicted in *tests of cognitive skills*, is substantially more important for economic growth than the mere quantity of education. (This author's emphasis)

What, then, is "quality of education"? Hanushek and Wößmann used the term "cognitive skills" as a measure of educational quality, and they defined it as measured by what people *know*, i.e. their knowledge base. This knowledge base was, in turn, well captured by standardized international test scores.

Data Synopsis

One of the most astonishing findings of the World Bank report is that high international test scores, as proxy for knowledge base and educational quality, are highly correlated with economic growth even if years of education are taken into account, while years of schooling are *no longer* correlated with economic growth when education quality (as measured by average test scores on international student achievement tests) is controlled for (see Figure 2, Table 1).

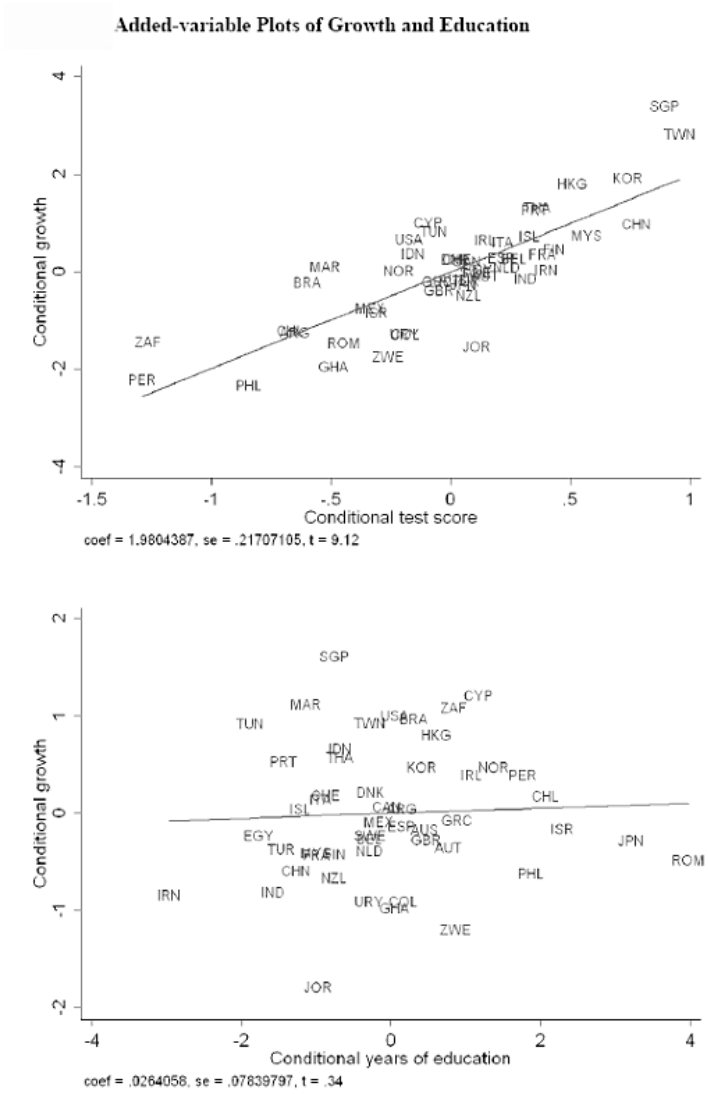
Growth rates are important for another practical reason in the context of global inequality. In the late 20th century and

21st century, through a confluence of social, political, climactic, and demographic factors, it is now possible to migrate great distances from underdeveloped countries to first world developed nations that have voluntarily opened their borders. With a widening gap between the rich and the poor, the economic incentives of migration become stronger and stronger. In America, there are an estimated 7.5 million illegal alien workers with more than 12 million household members, and another 700,000 to 850,000 are predicted to come to the US each year.[12] Easing the socioeconomic gradient across nations by looking at ways to improve growth rates in underdeveloped nations may help dampen the flow of migrants and brain drain, a topic that will be discussed later on in this paper.

It is therefore not surprising that one of the goals of many international agencies seems to surround the question of income and wealth redistribution and "equity", namely how human beings "as one world" can narrow the economic gap between first world nations and third world nations in the coming years. The answer is that only if third world nations grow at a *sustained* and *higher* rate than first world nations will there be a chance of this gap ever narrowing. For even if countries with disparate initial starting points grow at the same rate, the *absolute* difference in GDP per capita will continue to *increase*, and absolutely inequality will thus increase. If a country with an initial GDP per capita of $20,000 sustains a compound growth rate of 5% over 5 years, its 5-year endpoint GDP per capita will be $25,525. At the same time, a country with an initial GDP per capita of $5,000 that sustains a compound growth rate of 5% over 5 years will have its 5-year endpoint GDP per capita at $6,381. The ratio of inequality will still be a 4-fold difference, but the absolute difference of $15,000 between the two countries initially will be inflated to $19,144 at the 5-year endpoint, even though both countries have had an identical growth rate. Equal growth rates between rich and poor nations will therefore tend to magnify *absolute* differences in wealth over time. An initial low income country will require a lot of “catching up” and will need to sustain a much higher

[12] On-line reference:
http://en.wikipedia.org/wiki/Immigration_to_the_United_States#_note-2

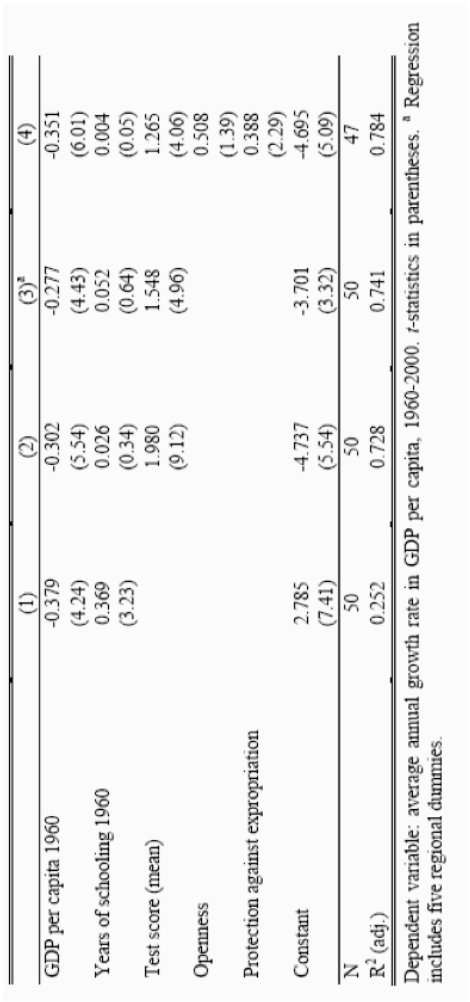
growth rate in order to close the gap in the near future.



Notes: Added-variable plots of a regression of the average annual rate of growth (in percent) of real GDP per capita in 1960-2000 on the initial level of real GDP per capita in 1960, average test scores on international student achievement tests, and average years of schooling in 1960. Author calculations; see Table 4.1, column (2).

Figure 2: (opposite page)
Test Scores (As Opposed to Years of Schooling) Have a Powerful Impact On Economic Growth

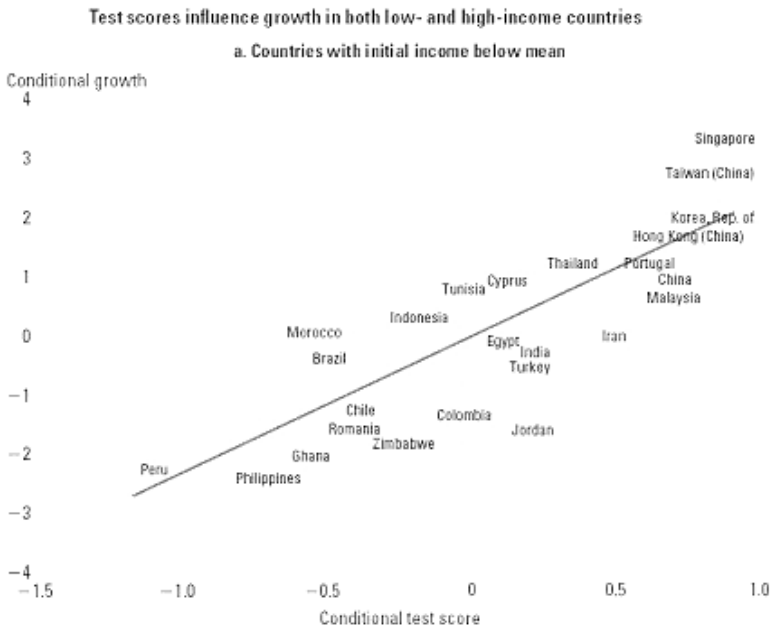
Table 1: (below)
Education As Determinant Of Economic Growth Of Income Per Capita, 1960-2000: Regression Coefficients



	(1)	(2)	(3)[a]	(4)
GDP per capita 1960	-0.379	-0.302	-0.277	-0.351
	(4.24)	(5.54)	(4.43)	(6.01)
Years of schooling 1960	0.369	0.026	0.052	0.004
	(3.23)	(0.34)	(0.64)	(0.05)
Test score (mean)		1.980	1.548	1.265
		(9.12)	(4.96)	(4.06)
Openness				0.508
				(1.39)
Protection against expropriation				0.388
				(2.29)
Constant	2.785	-4.737	-3.701	-4.695
	(7.41)	(5.54)	(3.32)	(5.09)
N	50	50	50	47
R^2 (adj.)	0.252	0.728	0.741	0.784

Dependent variable: average annual growth rate in GDP per capita, 1960-2000. *t*-statistics in parentheses. [a] Regression includes five regional dummies.

Figure 4: Education as Determinant of Growth of Income per Capita, 1960-2000: Regression Coefficients



Source: Hanushek and Wößmann (2007).
Note: These are added-variable plots of a regression of the average annual rate of growth (in percent) of real GDP

What the World Bank data demonstrate is that test scores have predictability on income growth for both low income nations and high income nations, but their effects are *magnified for lower income nations*. Education quality is therefore an even more important variable and more at a premium for low income nations (See Figure 3). Low income nations with below average test scores are likely to have below average growth rates and are consequently very unlikely to catch up with first world nations.

Figure 3:
Test Scores Are More Significant In Influencing Growth Rates In Initial Lower Income Countries Than In Initial Higher Income

When one re-examines the top graph of figure 5, it does indeed appear that the so-called four "Asian Tigers" (Singapore, Taiwan, Hong Kong, Korea) are skewing the trend upwards. Yet the World Bank analysis concluded that several East Asian countries feature both high educational quality and high economic growth – these countries dominate the top right corner of the figure. Still, the association between educational quality and growth is not solely due to a difference between the East Asian countries and the rest, or between any other world regions. Furthermore, when all 10 East Asian countries are dropped from the sample, the estimate on educational quality remains statistically highly significant at a point estimate of 1.3. The significant effect in the sample without East Asian countries is also evident in the two separate sub-periods, with the point estimates larger in the separate regressions.

(As a very amusing side-point, the authors noted that,

> The institutional framework affects the relative profitability of piracy and productive activity. If the available knowledge and skills are used in the former activity rather than the latter, the effect on economic growth may be very different, perhaps even turning negative. The allocation of talent between rent-seeking and entrepreneurship matters for growth: *countries with more engineering students grow faster and countries with more law students grow more slowly.* [this author's emphasis])

The overall relationship between scores of cognitive skills tests and economic growth therefore remains robust.

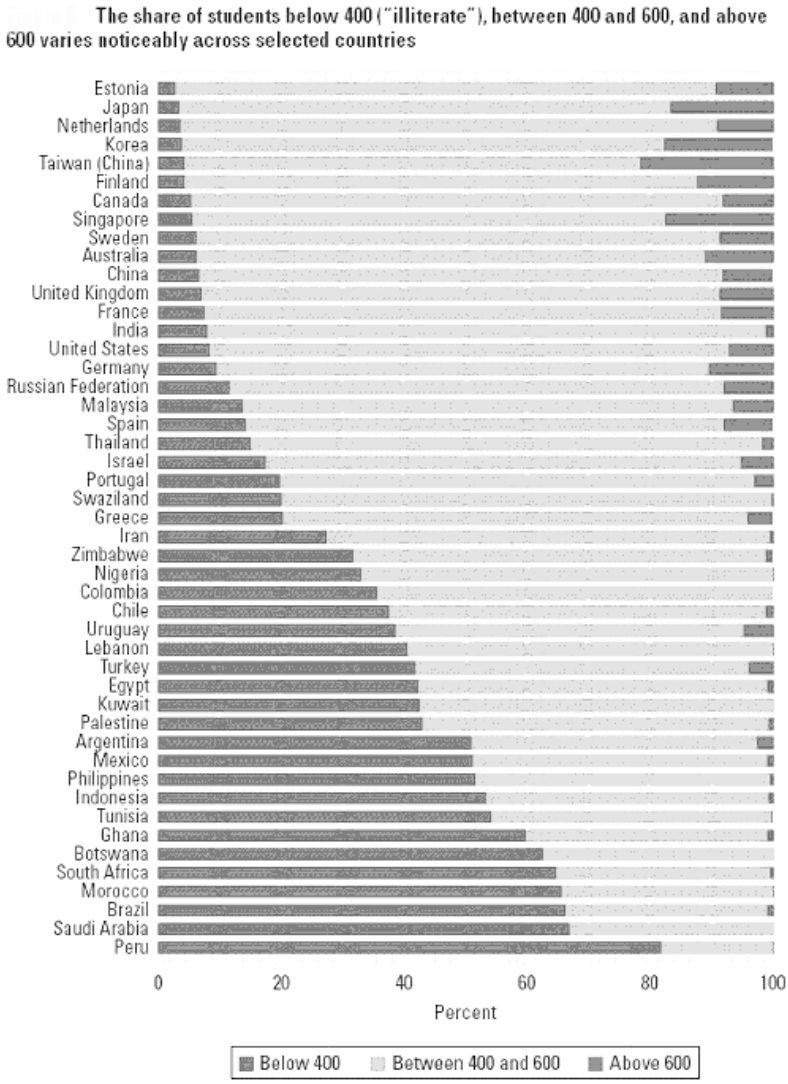


Figure 4:
Share Of Students Who Are "Illiterate" (Below 400) And Students Who Are High Scorers (Above 600) Across Selected Countries

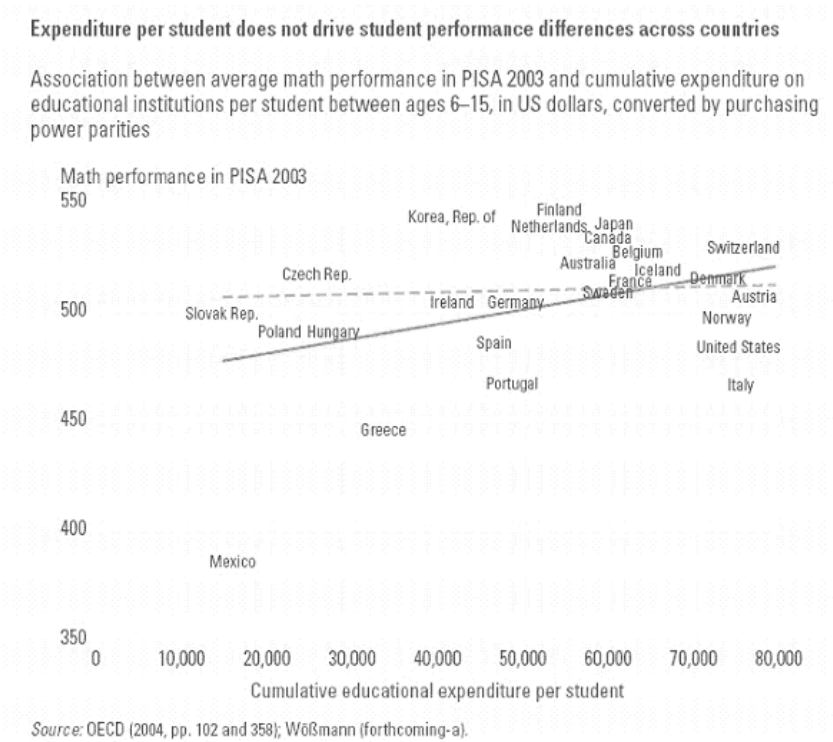


Figure 5:
Expenditure Per Student Does Not Drive Student Performance Differences Across Countries

Of course, it is important to not just look at averages but also the distribution of scores, or the proportion of top and bottom scorers as well. One of the conclusions from this World Bank report is that low scorers, average scorers, as well as high scorers contribute independently as predictors of economic growth. How the various countries compare with each other is documented in figure 4.

There are substantial differences in the quality of education or 'cognitive skills' between nations across the world.

No Imminent Solutions Found

How then does one tackle this vexing and persistent problem of global underdevelopment? The World Bank study

agrees that spending more money and injecting resources into the current system – what one may perhaps label as the traditional "modern liberal" late 20th century approach – is not the answer. The data graphically illustrates that expenditure per student does *not* drive student performance differences across countries (Figure 5).

The solid line is the best fit line when all countries are taken into account. Yet a closer inspection of the data reveals that the above relationship is weighted down on the left primarily by two outlier countries: Greece and Mexico, where students significantly under-perform. The authors note that if these two countries are taken out of the equation, the dotted line shows that *there is no relation between expenditure per student and subsequent performance.*

Simple resource expansions will likely accrue little educational quality gains, yet simple resource expansions have often been the default management strategy that is being touted by many "liberal" government officials, or perhaps by prominent personalities and celebrities as at least part of, if not a major part of, the solution to a myriad of social problems that occur in some Western nations locally or nationally. At international levels, some governments beg for increased development or third world aid quite openly. Yet the conclusion from the World Bank indicates that these band-aid solutions will likely have little effect on driving education quality and human cognitive skills.

Hanushek and Wößmann focused on possible solutions and drew three conclusions from the study:

1. Educational quality – measured by what people know – has powerful effects on individual earnings, on the distribution of income, and on economic growth.
2. The current situation in developing countries is much worse than generally pictured on the basis just of school enrollment and attainment.
3. Just providing added resources to schools is unlikely to be successful; improving the quality of schools will take structural changes in institutions.

The authors admitted that new empirical results revealed much larger skill deficits in developing countries than previously imagined. Proposed solutions would require

fundamental changes not just in the education systems across various countries under varied local conditions, but changes should occur at a fundamental level at some of these countries' sociopoliticoeconomic institutions as well. The authors admitted in the World Bank graphical version of their paper that "...attempts to improve quality have frustrated many policymakers around the world...." and "....uncertainty about the best design of incentive programs for schools is most acute in developing countries, largely due to lack of relevant experience. For this reason, it is especially important to implement a program of *experimentation* and evaluation – a key missing aspect of policymaking in most developing countries." (this author's emphasis)

Towards a Sociobiological Paradigm

The word "consilience" was coined by William Whewell in *The Philosophy of the Inductive Sciences* in 1840. It was subsequently vividly revived in E.O. Wilson's 1998 *Consilience: The Unity of Knowledge*. Whewell explained that, "The Consilience of Inductions takes place when an Induction, obtained from one class of facts, coincides with an Induction obtained from another different class. Thus Consilience is a test of the truth of the Theory in which it occurs."[13] In practical terms, just as physics is predicated on math, chemistry is predicated on physics, biology is predicated on chemistry, and psychology is predicated on biology, sociology, economics and anthropology are in turn no longer separate from the study of properties that are emergent from psychological and biological sciences.

Hanushek and Wößmann proffered some bold ideas and laid out ways to improve the admittedly dismal educational quality and economic output of developing countries. By paying attention to education quality and 'cognitive skills', they, perhaps not inadvertently, alluded to the idea of cognitive ability, *g*. The overall persistent global inequalities might be much more understandable and less mysterious if one seeks consilience and refines the equation by including cognitive ability or the intelligence quotient in the overall equation.

Chris Brand once said that IQ is to psychology as carbon is

[13] On-line reference: http://en.wikipedia.org/wiki/Consilience

to chemistry. Yet with the exception of a few researchers (e.g. Garett Jones of Southern Illinois University, Bryan Caplan of George Mason University), the role of cognitive ability has seldom been taken into account in analyzing many pressing microeconomic and macroeconomic questions of our time.

According to a public statement published by Arvey et al (1994) in the *Wall Street Journal* in December 1994 shortly after *The Bell Curve*, a statement that was signed by 52 internationally known scholars:

> Intelligence is a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill, or test-taking smarts. Rather, it reflects a broader and deeper capability for comprehending our surroundings – "catching on," "making sense" of things, or "figuring out" what to do.
>
> Intelligence, so defined, can be measured, and intelligence tests measure it well. They are among the most accurate (in technical terms, reliable and valid) of all psychological tests and assessments. They do not measure creativity, character, personality, or other important differences among individuals, nor are they intended to.

The authors of the World Bank study recognized explicitly that the quality of education, as measured by *tests of cognitive skill*, does matter much more in economic growth than the quantity of schooling, as measured by years of enrollment or enrollment rates. The question is therefore how well properly administered standardized intelligence tests correlate with standardized aptitude test results.

There is an avalanche of evidence that IQ tests are highly correlated with both national standardized achievement test scores and international test scores. It is well known that national standardized test scores, such as the Scholastic Aptitude Test (SAT), correlate highly with IQ.[14] More specifically, as shown in figure 6, there is a high correlation between SAT scores and IQ scores from the Armed Services Vocational Aptitude Battery and the Raven's Advanced

[14] Taken from http://www.gnxp.com/MT2/archives/sat_vs_iq.JPG

Progressive Matrices.

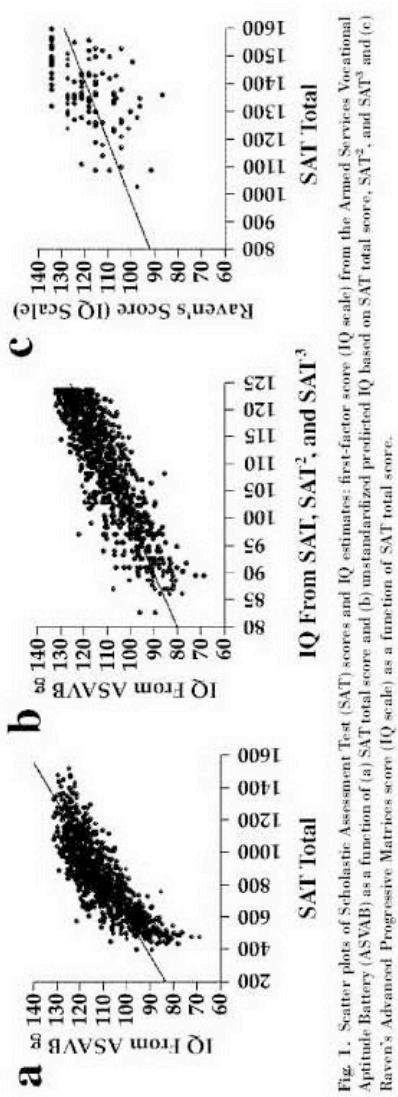


Fig. 1. Scatter plots of Scholastic Assessment Test (SAT) scores and IQ estimates: first-factor score (IQ scale) from the Armed Services Vocational Aptitude Battery (ASVAB) as a function of (a) SAT total score and (b) unstandardized predicted IQ based on SAT total score, SAT^2, and SAT^3 and (c) Raven's Advanced Progressive Matrices score (IQ scale) as a function of SAT total score.

Figure 6: Correlation Of IQ And Standardized (SAT) Scores

Freyl and Detterman (2004) calculated an *r* of roughly 0.82 between the SAT and IQs. A press release from the American Psychological Society wrote that researchers found that "students' SAT test scores correlate as highly as, and sometimes higher than, IQ tests correlate with each other. This is strong evidence that the SAT is a *de facto* intelligence test."[15] In the original abstract, the authors were more succinct: "these studies indicate that the SAT is mainly a test of *g*."

International test scores are even better correlated with IQ scores. One analysis found that the 1999 international TIMSS[16] composite Math and Science scores were correlated with national IQs at a level of close to 0.90.[17] Subsequently, Lynn and Mikk (2007) found attenuation corrected correlations of 0.92 and 1.00 with scores in 2003 TIMSS math and science scores in 25 and 46 countries respectively. In that particular paper, the results were interpreted as a validation of national IQs and do suggest that national differences in educational attainment may be attributable to differences in IQ, or alternatively that national IQs and educational attainment are both indicators of the mental ability of national populations. Whetzel and McDaniel (2006) verified national IQs based on Lynn's and Vanhanen's data set as being correlated with national per capita income (r = 0.62 for 1998 GDP, r = 0.60 for 2002 GDP). It is interesting that a "truncated" IQ score (i.e. setting all countries with IQ scores below 90 to 90, thereby bypassing criticism that low IQ countries had falsely depressed IQ scores based on inaccurate measurements) actually boosted the IQ-GDP correlation to a slightly higher 0.65. Using various combinations of the variables of democracy, economic freedom, oil production per capita, public education spending per student in primary school, and health spending per person, the authors found that including truncated IQ in a curvilinear model and economic freedom increased r to 0.81, including truncated IQ in a curvilinear model and democracy and economic freedom and oil production per capita increased r to 0.85, while including truncated IQ in a curvilinear model and

[15] On-line reference:
http://www.gnxp.com/MT2/archives/cat_psychometrics.html
[16] Gonzales P et al. 2003. Full report archived here:
http://www.nces.ed.gov/pubs2005/2005005.pdf
[17] On-line reference: http://www.gnxp.com/MT2/archives/timss.jpeg

economic freedom and public health spending per capita increased r to 0.95. The authors interpreted their study as providing substantial support for results offered by Lynn and Vanhanen (2002). Nonetheless they discussed the causal quandary between IQ and national wealth, specifically that between public per capita health spending and national wealth. The authors asked, "does health spending increase national wealth, or does being wealthy cause a nation to spend more on health care? Or is there reciprocal causality?"

Recent economic research suggests that the rising health share of GDP may reflect the natural course of economic growth: as people get richer, one of the most valuable and productive opportunities for their spending is to purchase better health and longer lives. Newhouse (1992) suggested that rising health care expenditures as a share of GDP was due to the discovery and use of new, expensive medical technologies, such as the invention of MRI and CAT scans, newer drugs and medical procedure. These technologies are likely to be affordable and hence utilized by more affluent countries. Hall and Jones (2004) noted how life expectancy would become increasingly valuable in an affluent population and concluded that the Law of Diminishing Returns comes into play. As countries become more affluent, there is a progressively diminishing return in non-health consumption (e.g. a third car, a fourth large-screen television etc.) while adding months of life, especially quality of life, does not run into similar diminishing returns. The standard economic model predicts that consumption and health spending should rise as income increases, but health spending should rise by even more. In an affluent society, one of the most valuable uses of our income is to increase the quality and quantity of our remaining lives.[18] Scheffler (2004) noted an elasticity of 1.25 for healthcare in wealthier countries (i.e. for every ten percent increase in income one gets a 12.5 percent increase in health care spending) indicating that healthcare is indeed a luxury good. It seems to this author that the preponderance of evidence points to a high GDP being a cause of increased

[18] See, for example, Jones CI. 2005. More Life vs. More Goods: Explaining Rising Health Expenditures. Federal Reserve Bank of San Francisco (FRBSF) Economic Letter. May27, 2005. Archived at:
http://www.frbsf.org/publications/economics/letter/2005/el2005-10.pdf

expenditure in healthcare, and not the other way around.

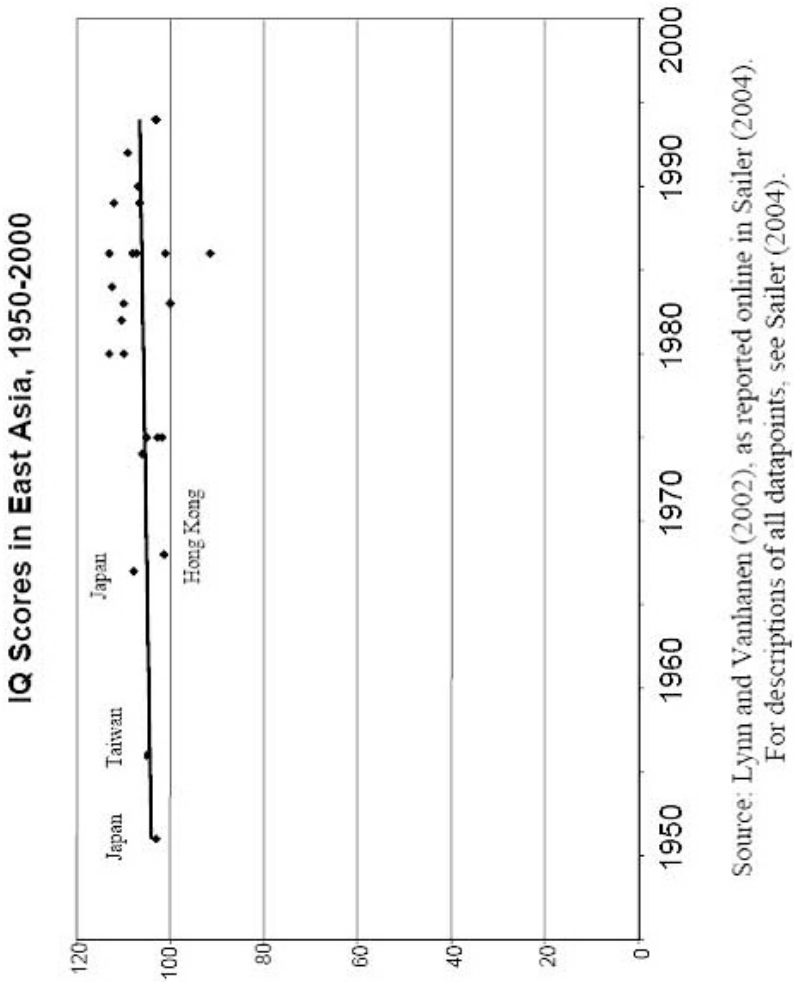


Figure 7:
IQ Scores In East Asia, 1950 – 2000. From Sailer, 2004.

A similar causal quandary applies to IQ and GDP. Jones and Schneider (2006) commented that if the arrow of causality

flows from GDP towards IQ, one should expect the increasingly prosperous Northeast Asian countries in the latter half of the twentieth century to have concurrently rising IQ levels – from significantly below world average levels, if not sub-Saharan levels to developed-nation levels. Yet this has not been borne out by data, as shown in Figure 7 (Sailer, 2004).[19]

Along a similar vein is the causal quandary between IQ and GDP per capita. It is observed that modern China and Japan have very similar IQs, even though modern China is much lower in GDP per capita. The above suggests that the causal direction flows from IQ to GDP and not vice versa.

What is the difference between using IQ as a predictor versus using international achievement test scores such as TIMSS or PISA as predictors?[20] One difference is that it gives us a glimpse of the overall *magnitude* and hence *prognosis* of global inequality. If inequalities were merely due to lack of education or poor schools, improving these, while difficult, might nonetheless be plausible and feasible. If these were due to more inherent endogenous and innate causes, then attempting to alter a fundamental biological variable itself would likely prove to be a much more Sisyphean task.

g is substantially heritable at an individual level. The heritability of IQ has often been cited to be somewhere between 0.4 and 0.8, with some taking the middle estimate of 0.6 (e.g. Murray, 1994). A 1995 report of a Task Force established by the Board of Scientific Affairs of the American Psychological Association concluded that:

> Like every trait, intelligence is the joint product of genetic and environmental variables. Gene action always involves a (biochemical or social) environment; environments always act via structures to which genes have contributed. Given a trait on which individuals vary, however, one can ask what fraction of that variation is associated with differences in their genotypes (this is the heritability of the trait) as well as what fraction is associated with differences in environmental experience. So defined, heritability (h^2) can and does vary from one population to another. In the case of IQ, h^2 is markedly lower

[19] See table at: http://www.isteve.com/IQ_Table.htm

[20] See, for example, Hunt, E., Wittmann, W. National intelligence and national prosperity. Intelligence. (In Press)

> for children (about .45) than for adults (about .75). This means that as children grow up, differences in test scores tend increasingly to reflect differences in genotype and in individual life experience rather than differences among the families in which they were raised.[21]

Likewise, from a population perspective, the preponderance of evidence is that population differences in *g* are due to both genetic and environmental causes, and are more consistent with the hereditarian model (e.g. 50% genetic and 50% environmental) than the cultural-only model which proposes group differences being 0% genetic and 100% environmental. In what is now the classic 21st century article on race differences in cognitive ability, Rushton and Jensen (2005) reviewed the ten categories of evidence (worldwide distribution of IQ test scores, g factor of mental ability, heritability, brain size and cognitive ability, transracial adoption, racial admixture, regression, related life-history traits, human origins research, and hypothesized environmental variables) relevant to this question in the lead article of *Psychology, Public Policy, and Law*. The authors concluded that the totality of evidence over the past thirty years points to some genetic component in black-white differences in mean IQ. More recently, Rushton et al (2007) published new evidence that group differences are heritable and are part of the normal variation expected within a universal human cognition. Using adult monozygotic and dizygotic twins reared apart, the researchers noted that estimates of heritability and environmentality of the various puzzles of the Standard Progressive Matrices of these twins correlated with the differences among 11 diverse population samples, including East Asian, White, South Asian, Colored, and Black high school and university students in South Africa. Group differences were more pronounced on the more heritable and on the more environmental items as well. After controlling for measurement reliability and variance in item pass rates, the heritabilities still correlated with group differences but the environmentalities

[21] See *Intelligence: Knowns and Unknowns*. Report of a Task Force established by the Board of Scientific Affairs of the American Psychological Association. Released August 7, 1995. A slighted edited version was also published in the *American Psychologist*, Feb 1996.

did not.

From a worldwide population perspective, Lynn and Vanhanen's ground-breaking book *IQ and The Wealth of Nations* (2002) put forward the thesis that differences in national income (in the form of GDP per capita) correlate with differences in average national IQ. Since then, an updated database was used in Lynn's new book *Race Differences in Intelligence: An Evolutionary Analysis* (2006). The latter book summarizes global cognitive data of over 800,000 individuals in 620 different IQ studies from around the world and demonstrates that Northeast Asians average 105 on IQ tests, Europeans (as a whole) average 99, Southeast Asians and Amerindians 87, Middle Easterners 84, sub-Saharan Africans 67, and Australian Aborigines 62. Needless to say there are exceptions as some high IQ nations have low GDPs and vice versa. For instance, it would be very difficult to explain North Korea's and South Korea's GDP per capita by IQs alone. Likewise, Qatar's disproportionately high GDP per capita may be due to its high petroleum resources. Botswana's relatively high GDP per capita may be partially explained by its large resources of diamonds. And obviously none of the above estimates are pinpoint figures and there is debate about whether the averages are too high or too low or about the magnitude of their error bars. But as Lynn himself notes, it is more helpful to concentrate on general patterns when discussing global inequality. Even if one figure is off, the overall statistical trend will likely remain. To the extent that IQ scores are so very highly predictive of international school achievement test scores, which, in turn, predict economic growth, and to the extent that IQ is so highly heritable, it is difficult to see how global inequities will be reduced, let alone eradicated, in the near future. At the same time, it is difficult to see how realistic and wise public policies geared towards efficient resource utilization can be formulated without consideration of this one very important biological and psychometric variable.

In Lynn & Vanhanen's *IQ and Global Inequality* (2006), a new statistic, the quality of human conditions (QHC) index, was introduced. This was computed by purchasing power parity in Gross National Income per capita 2002 (correlation r=0.616 with IQ), adult literacy rate 2002 (correlation r=0.655 with IQ),

gross tertiary enrollment ratio (correlation r=0.745 with IQ), life expectancy at birth in 2002 (r=0.750 with IQ), and the level of democratization in 2002 (correlation r=0.530 with IQ). The authors note that the QHC index differs from other indices (e.g. Human Development Index), as it also measures democratization. National IQs were found to correlate at a level of 0.791 with the overall QHC index. What is also very significant is that Lynn and Vanhanen (2006) found that national IQ correlated with economic growth rate (r=0.747), economic freedom ratings (r=0.606) and was negatively correlated with infant mortality rate (r= - 0.771) among the other indices examined.

The latter findings are very important. Higher education quality and achievement may have biological implications outside economics, which are not specifically touched upon by the Hanushek and Wößmann World Bank report. For example, Jamison and Hanushek (2006) discussed findings that were strongly suggestive of the importance of improved cognition for effecting mortality change, and that the mechanism could be that *higher levels of cognitive skills facilitate the uptake and utilization of available knowledge and methods.* Mortality rates, in turn, complement income levels as indicators of national well-being, and improved education quality increased the rate of decline in infant mortality. Education quality and achievement therefore have more than purely economic implications.

The above may also be seen as convergent evidence with a growing body of contemporaneous psychological research at the "micro" end of the spectrum. Lower IQs in individuals are well known to be associated with premature death. In the now famous Aberdeen Longitudinal cohort study, a one standard deviation (15 IQ points) disadvantage in mental ability at age 11 conferred a relative risk of 0.79 [95% CI 0.75-0.84] of being alive 65 years later, while a two standard deviation (30 IQ points) disadvantage conferred a relative risk of 0.63 [95% CI 0.56-0.71]. The mechanism of how this happens was elucidated recently by a study by Deary and Der (2005) which demonstrated that psychometric intelligence and reaction times were both significantly related to all-cause mortality in a representative sample of 898 people aged 56 years who were followed until age 70, even after adjusting for education, occupational social class, and smoking. The effect of IQ on

mortality was, however, not significant after adjusting for reaction time, suggesting that *reduced efficiency of information processing might link lower mental ability and earlier death.* The authors interpreted this as the strongest evidence for the importance of psychological factors in physical health and human survival.

The importance of intelligence influencing health-outcome and biological variables has been recognized and studied by evolutionary psychologists as well. Kanazawa (2006) of the London School of Economics noted in the *British Journal of Health Psychology* that macro-level analyses have shown that income inequality and economic development have no effect on life expectancy at birth, infant mortality, and age-specific mortality net of average intelligence quotient (IQ) in 126 countries; that average IQ has a very large and significant effect on population health – but not in the evolutionarily long-adapted sub-Saharan Africa (as general intelligence evolved as a domain-specific adaptation in novel environments, e.g. the technological and information based societies of the developed world). More importantly, while both income and intelligence have independent positive effects on self-reported health on a micro level, intelligence has a stronger effect than income. He concluded that individuals in wealthier and more egalitarian societies live longer and stay healthier not because they are more egalitarian (contra Wilkinson, 2005) but because they are more intelligent.

Perhaps one may also conceptualize the above from a biological and Darwinian perspective. Living organisms are known to use accumulated resources they are able to gather to enhance their quality and quantity of mates, and hence quality and quantity of their offspring, as well as their own survival. Those with higher intelligence have a higher capacity for goal-directed action and are therefore likely able to acquire more resources. In Darwinian terms, the twin vectors of selection may be conceptualized into fecundity and fitness that roughly parallel the processes of sexual selection and natural selection. Success at these traits should therefore, at least partially, be captured by indices such as infant mortality and life expectancy (or other indices such as quality-adjusted life years). In other words, populations with more geopolitical and socioeconomic resources should be able to transform gathered resources into

biological gains which are reflected in life expectancy and infant mortality rate reduction. Socioeconomic resources are used as a means to an end, and not as an end itself.[22]

The above are supported by a casual inspection of the latest available 2006 and 2007 adult personal net worth per capita, life expectancy, and infant mortality rates data worldwide. A study by Davies et al (2006) released by the Helsinki-based World Institute for Development Economics Research (WIDER) of the United Nations University demonstrated that the richest 1 percent of adults alone owned 40% of global assets in the year 2000, and the richest 10% of adults accounted for 85% of the world total. The bottom half of the world adult population owned barely 1% of global wealth. The world's richest five countries (including OECD and non-OECD countries) are: Japan ($180,837), Hong Kong ($173,353), Switzerland ($170,755), Luxembourg ($160,030), and the United States of America ($143,727). The world's poorest five countries are: Democratic Republic of Congo (formerly Zaire) ($180), Ethiopia ($193), Tajikistan ($298), Burundi ($327), and Chad and Niger (tied at $329). [23] Therefore, an average Japanese adult has accumulated a per capita economic net worth of more than a thousand times (by US exchange rates) that of an average citizen in the Democratic Republic of Congo (formerly Zaire).

The countries with top life expectancies and lowest infant mortality rates are located in areas of Europe and Northeast Asia. Based on 2007 numbers released by the CIA factbook, the top five countries with the highest life expectancies are also countries that have a high IQ population: Andorra (83.52), Macau (82.27), Japan (82.02), San Marino (81.80), Hong Kong

[22] As a side point, this author notes that the focus on children in a postmodern information-based economy is one of "quality" and health, and not one of reproduction and "quantity". It is true that in some high parasitic load and variable environments (e.g. sub-Saharan Africa) there may be an advantage to select for an *r*-strategy that tweaks the balance towards offspring quantity instead of quality at a cost of higher infant mortality. However, this is not consistent with the Millennium Goals as stated at the beginning of this paper and these are: "reduction of poverty and hunger", "educating all children", "empowering women", "saving children", "caring for mothers", "combating disease", "using resources wisely", and "working together". A high fertility rate is clearly highly correlated with a high infant mortality rate. Interested readers may look up the uploaded on-line diagram at: http://i10.tinypic.com/6aik6fp.jpg

[23] Released December, 2006. Archived at http://tinyurl.com/yd4hh4

(81.68). The five countries with the lowest life expectancies are of low IQ populations located in sub-Saharan Africa: Swaziland (32.23), Angola (37.63), Zambia (38.44), Zimbabwe (39.50), and Lesotho (39.97).[24] The same pattern holds for the top five countries with the lowest infant mortality rates: Singapore (2.30), Sweden (2.76), Japan (2.80), Hong Kong (2.94), Iceland (3.27). The five countries with the highest infant mortality rates are: Angola (184.44), Sierra Leone (158.27), Afghanistan (157.43), Liberia (149.73), and Niger (116.83).[25]

Taken in total, there is an emerging paradigm of consilience where micro and macro socioeconomics, psychology, and neuroscience converge in predicting the biological variables of human survival as reflected by life expectancy and infant mortality rate indices.

A Practical Consequence of Global Inequality: Human Migration and the First World Dilemma

Human migration has become a defining global issue in the 21st century. There was an increase of 45 million international migrants between 1965 and 1990 throughout the world, resulting in roughly 192 million people living outside their place of birth today, which is about three percent of the world population. The International Organization of Migration (IOM) identified some of the major factors that lead to this phenomenon, including economic liberalization (globalization), economic decline (lower global economy growth leading to downward pressure on the movement of information technology, construction, and manufacturing sector labor), demographic changes (rapid population growth combined with economic difficulties push people out of their own habitat; declining and ageing populations in first world countries that accept migrants), emergence of 'migrant networks' that lobby for political decisions in host countries to provide economic assistance to their own country of origin, and transnational migration (advances in communication and air

[24] Archived at: https://www.cia.gov/library/publications/the-world-factbook/rankorder/2102rank.html

[25] Archived at: https://www.cia.gov/library/publications/the-world-factbook/rankorder/2091rank.html

transport facilitate movements of people resulting in a growing number of people having dual citizenships and voting rights).[26] Of these, it is likely that demographic and economic differentials are the only likely and consistent fundamental cause. Factors such as poverty, poor medical care, lack of education and job opportunities, political and economic oppression as well as man-made and natural disasters will consistently provide the incentive for many migrants from poor, third world undeveloped countries to move to richer first world countries where even if they remain at the bottom of the socioeconomic hierarchy they will nonetheless have much better living standards, better medical care, higher chances of education and job opportunities, as well as higher levels of economic freedom and political security compared to their own home country. The other factors identified by the IMO above (migrant networks, transnational migration) are either mechanisms of how migration is facilitated or simply more proximate and transient factors (e.g. economic decline, economic 'liberalization').

To put it simply, if the migrants themselves are doing well economically in their own home countries in comparison to their future adopted country, there will be much less incentive to migrate, no matter how advanced aviation technology is, no matter how much a foreign country requires labor, no matter how much a foreign country requires replenishing its population due to ageing and declined fertility, and no matter how open a foreign country may be towards potential immigrants. Migrants seek to better their own lives first and foremost, while the benefits (or harms) to their adopted countries are merely a byproduct. Global inequality therefore has the very practical dimension of human migration where its immediate effects can be felt throughout the world. But it also has longer-term consequences, since it may further redistribute worldwide human capital.

Migrants tend to migrate from poorer countries to richer countries in general. Countries that have high immigration rates currently are predominantly in affluent North America, Western Europe, Central Europe, Southern Europe, and

[26] International Organization for Migration. http://www.iom.int/jahia/Jahia/pid/3

Australia. The affluent areas in Northeast Asia tend to have either zero (Japan, Korea) or very high immigration rates (Hong Kong, Singapore, Taiwan). On the other hand, countries of origin with high emigration rates tend to be poor and are located predominately in Africa, East Europe, Central Asia, South and Central America.[27]

One effect of human migration if the host country selects for human capital is the well known brain drain or 'human capital flight' phenomenon where richer countries get richer and poor countries get poorer in cognitive capital. The former Soviet countries and today's Russia are experiencing a huge brain drain in science, business, and culture as their citizens leave for the US, Israel, Europe, Japan, China, and Latin America. Lithuania has lost about 100,000 citizens since 2003 to emigration to Ireland. One million young and educated Polish people have emigrated to Western European countries.[28] In Macedonia, one survey (Horvat, 2004) showed that 85% of young Macedonians plan or wish to leave the country after they finish their studies.[29] The same effect holds in third world countries. Ethiopia has lost 75% of its skilled workforce between 1980 and 1991. While Ethiopia has a population of more than 73 million, there are only 108 surgeons and 15 anesthesiologists (Shore, 2007).[30] According to the IMF, more than 150,000 "best young minds" leave Iran (Harrison, 2007) yearly.[31] In the Philippines, nine million people, that is more than one out of every 10, work abroad, while more than 3,100 leave the country daily.[32] If a developing country continues to hemorrhage a significant portion of its elite, who are required as part of its political, diplomatic, scientific, cultural, managerial or military cognitive landscape, such a country will have lost invaluable human capital and will likely see its future development hamstrung by this loss of human capital.

---

[27] Archived at: https://www.cia.gov/library/publications/the-world-factbook/fields/2112.html

[28] Archived at: http://en.wikipedia.org/wiki/Brain_drain#_note-2

[29] Archived at http://www.seep.ceu.hu/archives/issue51/horvat.pdf

[30] Archived at: http://www.sharingwitness.org/health_welfare/medical_students_beyond_border/

[31] Archived at: http://news.bbc.co.uk/1/hi/world/middle_east/6240287.stm

[32] Archived at: http://en.wikipedia.org/wiki/Brain_drain#_note-2

Massive migrations have a huge impact on the receiving country as well, depending on the quality of the immigrant stream. There may be a brain gain phenomenon, but it is important also to bear the costs in mind. Even at the skilled end of the spectrum, in a Statscan report in 2005 based on the 2001 Longitudinal Survey of Immigrants to Canada, the unemployment rate of *skilled* worker principal applicants was still pegged at an astounding 34%. Skilled worker spouse and dependants had an even higher unemployment rate at 43%, while refugees had an employment rate of 51% (Statistics Canada, 2005).[33] At the other end of the spectrum, according to the US Census Bureau, about one of every two people added to the United States' population between July 1st 2004 and July 1st 2005 was Hispanic. Hispanics number 42.7 million and currently make up 14.4% of the population; a large number are Mexican and recent immigrants. (The number was merely 22.4 million in the 1990 US census.) Currently, of all Hispanics, 53% were foreign born and this amounts to 18.3 million people. 10 million alone were born in Mexico, the rest from El Salvador, Cuba, Dominican Republic, Guatemala, and Colombia.[34]

A report released in 2006 revealed that the median per capita income of Hispanics was about half that of the white population: $14,100 for Hispanics as compared to $27,500 for whites. As of 2005, 23% of Hispanics lived in poverty. The median net worth of Hispanic households in 2002 was $7,932, or *nine percent* of the median white net worth of $88,651. (Limiting the group to US-born Hispanics raised the figure to $10,425, or under 12%.) Perhaps most disturbingly, Hispanics were much more likely to drop out of high school *even after three generations*, and were less likely than blacks to attend college. Third generation Hispanics were still less likely than blacks to graduate from College (figure 8).[35]

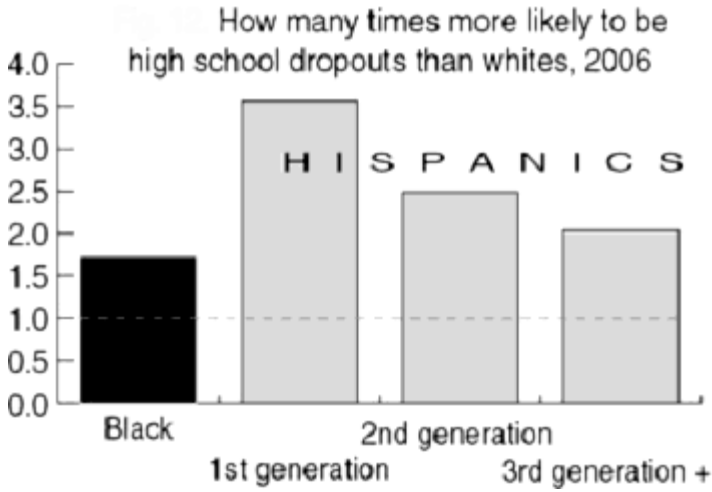
[33] Archived at: http://www.statcan.ca/english/freepub/89-614-XIE/2005001/tables/table8.5.htm

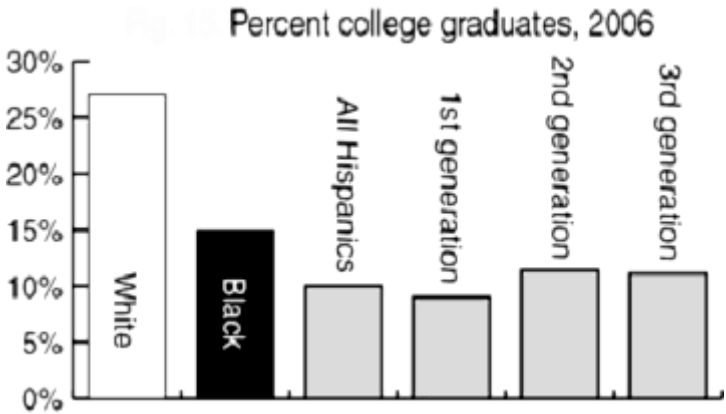
[34] Archived at: http://www.infoplease.com/spot/hhmcensus1.html

[35] Archived at http://amren.com/Reports/Hispanics/HispanicsReport.pdf

Figure 8:

Hispanics In The United States Are Much More Likely To Drop Out of High Schools Compared To Blacks And Are Less Likely To Graduate From College Compared To Blacks Even After 3 Generations





In a separate Pew Hispanic Center (2005) statistical portrait, among those who were foreign-born Hispanics, 34.4% had less than a 9th grade education. Only 9.8% of foreign-born Hispanics compared to 15.8% of native-born Hispanics had a college degree, giving a total aggregate Hispanic figure of 12.3%. The corresponding percentages for non-Hispanic whites, blacks, and Asians were 30.0%, 17.3%, and 49.3% respectively.[1]

As one of the 'push-pull' factors, global inequality therefore has real practical consequences even if one is fortunate enough to be living in a first world developed country and one who is not a migrant himself.

Global Migration From A Psychometric Perspective

There is a plethora of research that deals with the predictive power of cognitive ability. Linda Gottfredson (2006) wrote:

> Correlations do not prove causation, but they are a first step in doing so. The most studied outcomes [of what intelligence predicts] are performance in school (such as school marks and achievement test scores), performance on the job (mostly supervisor ratings), socioeconomic advancement (level of education, occupation, and income), and social pathology (adult criminality, poverty, unemployment, dependence on welfare, children outside of marriage). The relations of intelligence to health, health behavior, resilience in the face of extreme adversity, longevity (length of life), and functional literacy (the ability to do routine reading, writing, and arithmetic tasks in modern societies) have also begun to draw much attention.
>
> Thousands of studies have looked at the impact of mental abilities on school and job performance, and large national longitudinal studies in both Europe and the United States have shown that IQ is related to various forms of socioeconomic success and failure. Here are their most general findings about *g*'s association with life outcomes. Correlations with IQ vary systematically by type of outcome. IQ's predictive value ranges widely, depending on the outcome in question. For example, when averaged over several years, performance on standardized tests of academic achievement correlates about as highly with

[1] Archived at: http://pewhispanic.org/files/other/middecade/Table-19.pdf

> IQ as two IQ tests do with each other (over .8 on a scale of -1.0 to 1.0). In contrast, correlations with IQ are closer to .6-.7 for school marks, years of education completed, and longevity. They are about .5 with prestige level of occupation, .3 to .4 with income (the correlations rising with age), and .2 with law-abidingness. Correlations with IQ are higher when tasks are more complex. To illustrate, when jobs are ranked in overall complexity of work, the correlations between IQ and job performance rise from .2 for simple, unskilled jobs, to .5 in middle-level jobs (skilled trades, most clerical work), to .8 in the most complex (doctors, engineers, top executives). Stated another way, it matters little how intelligent workers are in low-level jobs, but it matters a great deal in high-level jobs, regardless of whether the job seems academic or not.

An immigrant's cognitive ability therefore has a lot of predictive power and potentially yields a lot of downstream information about the individual in the future.

The above on IQ, its predictability and heritability, have downstream implications for migration policies of advanced countries, and this author shall use the term "first world dilemma" to denote the choice facing developed and richer nations that accept migrants. The first world dilemma is as follows: From a *global business* perspective, the advantages of importing an underclass that is willing to work for suboptimal wages is very attractive and tempting. However, while prevailing business conditions and hence the demand of labor may change, once an underclass is imported into a country, it will practically be impossible to reverse the process, and they and their descendants will become part of society's mosaic. Given that these workers are let in precisely because they are unskilled and are willing to work for low-wage jobs, and given that the majority are precisely from areas with low cognitive capital (IQ), and given that individual IQs are highly heritable, what a country has done by importing a massive underclass is to harvest transient short-term benefits in unskilled labor and lower wages for the managerial class, but at a longer-term cost of the dilution of human capital for the host country for generations to come. This is the *socioeconomic hazard* many first world countries face.

From a country's *national* perspective, it is therefore perhaps more advantageous to import highly skilled people

with high cognitive capital. Yet this is precisely the system that will drain developing countries of cognitive capital, and thus will likely result in exacerbating the overall differential and global inequality, even if some workers may remit their wages back home or if a few of them return home eventually. This is the *moral hazard* that many first world countries face.

The dilemma is therefore to decide whether rich nations contribute to further brain drain of the poor countries which need human capital the most, thus further magnifying the already stark differential in cognitive abilities and skills between developed and underdeveloped countries, or whether advanced countries risk becoming underdeveloped themselves by lowering its own human capital in the long run. This concern is not unfounded because, as demonstrated previously, at least with regards to certain population groups, the passing of three generations does not translate into seamless assimilation and the stark education and socioeconomic differentials still remain.

The latter is the situation that the United States faces today, where immigrants are not selected for quality and where cognitive capital and intelligence are not taken into account (e.g. illegal migrants, 'undocumented workers', refugees, family unification migrants). Unselected immigrants from lower IQ nations may therefore, not surprisingly, at least partially reflect the IQ distribution of their own ancestral countries and are also likely to be of lower cognitive abilities and skills themselves. One is therefore not surprised that a country's average national IQ is a useful predictor of the wages that immigrants from that country will subsequently earn in the United States. Jones and Schneider (2006) noted that:

1. If one knows the average IQ of a nation's citizens as estimated by Lynn and Vanhanen (2002, 2006), one can predict the average wages that immigrants from that country will earn upon their arrival in the U.S. – whether or not one controls for immigrant education. In other words, national average IQ measures part of what Hendricks (2002) calls "unmeasured worker skill."
2. We find that a one point increase in national average IQ predicts one percent higher immigrant wages – precisely the value found repeatedly in microeconometric studies (note that by construction, 1 IQ point ≈1/15th of a

standard deviation within any large national population). Together, points 1 and 2 provide evidence that cross-country IQ tests are valid predictors of worker productivity, predictors that measure more than just differences in education.

3. When IQ is added to the production function in the form implied by traditional, externality-free human capital theory, differences in national average IQ are quantitatively significant in explaining cross-country income differences. That said, our productivity accounting exercise does not resolve the puzzle of why high-IQ countries are 15 times richer than low-IQ countries.
4. We provide suggestive evidence that little of the IQ-productivity relationship is due to causality running from income to IQ by demonstrating that the East Asian "miracle" economies had (or in China's case, have) high average IQ's when relatively poor. Thus, economists who wish to explain the IQ-productivity relationship will need to look at deeper causes for the world's IQ inequality, causes such as culture, environment, geography, and genetics.[2]

Some countries implicitly recognize the above and attempt to place a premium on the quality of potential immigrants. Thus a point system or some type of filter or a sieve has been devised in countries such as Australia and Canada as a criterion for 'admission'. Immigrants who fall below the acceptable threshold (be it education or cognitive skills, and in other cases, assets) will be barred entry, while those who fulfill the criterion from whatever country will be given residency status. Some see this as a meritocratic immigration policy with immigrant skills hinged on the host nation's needs. Yet a Bayesian approach will tell us that, due to the *a priori* drastically different distributions of a variable (e.g. cognitive skills or IQ or any variable at hand) between countries, application of an *identical* cutoff at the point of entry will still likely produce a result where the *a posteriori* distribution of individuals admitted into the host country favors those individuals whose country of origin has a more desirable distribution of the variable in question. In other words, group membership will still likely be relevant after point of entry even if an *identical* cutoff criterion

[2] Archived at: http://www.siue.edu/~garjone/naive.pdf

has been applied to everyone at the point of entry. Therefore, national IQs are still relevant in such an immigration policy, to the extent cognitive skills and human capital are a proxy for IQ. This idea has received study in group-based selection process, otherwise known as affirmative action, in the United States, in another context (Miller, 1994).

Taking heritability of IQs into account, however, gives us an even more complete picture of the relevance of group membership. Due to the regression towards the mean of intelligence, and due to intelligence being a highly heritable trait, *individuals* with initial *identical* cognitive abilities from different population (or racial) groups are still likely to have offspring who are *not* identical in intelligence, as their offspring regress towards their respective population means. Going back to the above example, even if the *a posteriori* distribution of a variable between immigrant groups admitted to the country are the same (perhaps through an initial slightly biased admission policy that uses an adjustment factor in favor of individuals from host countries with a more desirable national distribution of the variable in question), the children of all the groups are unlikely to fare the same. Jensen (1998) documented this important consequence of group membership in *The g Factor: The Science of Mentality Ability*:

> Siblings are especially interesting to study in the context of regression to the mean because they are exposed to the same environments. Jensen (p. 471) describes the results of a study he did that involved 14 schools with over 900 white sibling pairs and over 500 black sibling pairs. "In this school district , blacks and whites who were perfectly matched for a true-score IQ of 120 had siblings whose average IQ was 113 for whites and 99 for blacks. In about 33 percent of the white sibling pairs both siblings had an IQ of 120 or above, as compared with only about 12 percent of black siblings." This is a predictable result of regression to the mean when the frequency of intelligence-enhancing genes differs in the two populations, and is predicted by a genetic theory of racial differences. There is no environmental theory that predicts such differences in the siblings of highly intelligent children.

Therefore, *individuals* from a lower IQ population group, even if they are of identical intelligence to other individuals

from a higher IQ population group to begin with, are still at a statistical level much more likely to have lower-IQ children. Group membership – be it country of origin or ancestry – *does* and *should* come into play if one were to select not just productive immigrants for the current generation, but for children who will grow up to be productive citizens in the next generation with high human capital.

Other Consequences of Migration

Given the law of diminishing returns, the non-economic effects of mass migration on social cohesion are perhaps just as important, if not even more important, in first world developed nations. Exploring this area is beyond the scope of this paper. This author merely points out that there seems to be a disproportionate number of non-European immigrants migrating to Western Europe and to North America. This is likely in large part driven by global inequality as documented above. An unselected mass immigration policy leads to higher levels of socioeconomic inequality as immigrants often earn less and are poorer than their counterparts in their adopted host countries. In the model of multiculturalism, cultural diversity, linguistic diversity, as well as religious, ethnic, and racial diversity will likely result and are now increasingly celebrated in many advanced Western first world nations. Yet there is evidence from social epidemiology (e.g. Wilkinson, 2005) that homogeneity can be a strength, at least in the socioeconomic realm. Socioeconomic inequality *per se* may lead to greater unhappiness and perhaps even death from physiological consequences of stress, which result from poor health (as seen in arteriosclerosis) and social malaise (as in homicide rates).

Furthermore, massive non-traditional migrations and their resultant demographic changes in the host countries have now been shown to erode social capital. In a recent study, Harvard professor and political scientist Robert Putnam (2000, 2007) wrote, "in colloquial language, people living in ethnically diverse settings appear to 'hunker down' – that is, to pull in like a turtle." Moreover, "…in terms of the effect on neighborly trust, the difference between living in an area as homogeneous as Bismarck, North Dakota, and one as diverse as Los Angeles is roughly as great as the difference between an area with a poverty rate of 7 percent and one with a poverty

rate of 23 percent, or between an area with 36 percent college graduates and one with none."[3] Furthermore, a high level of racial diversity has been shown to independently predict a high Gini index (Meisenberg, 2007). Therefore, merely focusing on the economic effects of migration to advanced first world nations may miss a larger picture of other (often negative) downstream effects that have a bearing on overall national social well-being and cohesion.

A Snapshot of Northeast Asia:
Sidestepping the First World Dilemma Through Human Capital Investment and Robotic Technology

If a wealthy country has no restrictions of immigration, there will likely be millions of people from poorer countries who are willing to migrate there based on socioeconomic pressures. It is therefore interesting, perhaps instructive, to see how homogeneous northeast Asian countries such as Japan and Korea have sidestepped the above dilemma by investing in human capital and thus enabling them to invest in modern technology.

Currently both Japan and Korea have zero net migration rates in spite of an impending demographic implosion. Economists have noted how Japan and Taiwan have increasingly heavily invested in resources allocated to education (figure 9), although it may also be noted that Korea, Singapore, and Hong Kong nonetheless have allocated relatively little resources to education, and yet in spite of this have managed to "produce" cognitive levels of children that are "extremely high" (Padmanabhan, 2001). This is consistent with Hanushek and Wößmann (2007) that there is little correlation between expenditure per student and subsequent student performance (see figure 5). Nonetheless, the overall trend seems to be one of a gradually increasing allocation of resources towards education, probably reflecting these East Asian countries' cultural background as well as priorities.

[3] Quoted from Sailer (2007).

Figure 9:
Growth in Allocation of Resources to Education in East Asia (Percent of GNP)

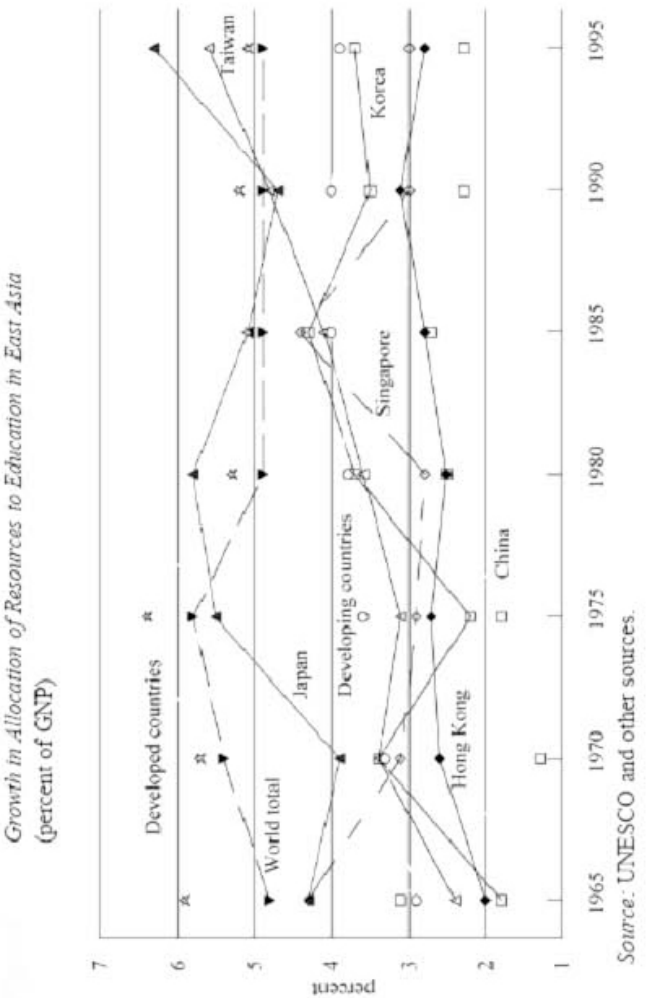


Figure 9: Growth in Allocation of Resources to Education in East Asia (Percent of GNP)

> *One ingredient that makes Northeast Asia unique is the view that education contributes to the development of a strong 'nation-state'. This is evident from the 'nation-building' exercise in Japan after the Meiji Restoration to using education as an instrument of political socialization in Japan, China, Korea and others in the latter half of the 20th century. Indeed, education is seen as the fostering of "national consciousness, group spirit, perseverance, egalitarianism, meritocracy" and that "fostering a strong sense of national identity" has been the chief task of education in Japan as well as in Korea (Morris & Sweeting, 1995).*[4] *Others have observed similar ideals: the promotion of patriotism and support was emphasized as the chief goal of education in Korea and Taiwan. National identity and cohesion seemed to be the primary motive for education development in these economies and "the intensive process of state formation with which educational expansion has been associated in each of the four tigers has been about much more than economic development."*[5] *(this author's emphasis)*

Talik (2002) further noted that the strong state apparatuses enabled rulers to pursue development goals single-mindedly without bothering about populist pressures, in contrast to many of the problems that plague democracies in the West or in South Asia. An educated populace was also able to rebound quickly after political turmoil and economic shock (e.g. 1997-98), and the vast spread of an educational base served as the best safety valve to cushion such shocks. Combined with a high cognitive capital pool, this fuelled the remarkable economic growth of East Asia in the latter part of the 20th century.

With high cognitive capital and with necessity beckoning at the door, it is perhaps not surprising that a recent study carried out by the Economist Intelligence Unit, a research firm spin-off from the *Economist* magazine, rated Japan as the global leader for innovation, followed by Switzerland, the US, Sweden, Finland, Germany, Denmark, Taiwan, Netherlands, Israel, Austria, France, and Canada. Innovation in this study was defined as the "application of knowledge in a novel way primarily for economic benefit". Two parallel studies were

[4] Lee, Wing O. 1995. Quoted from Tilak. 2002. Archived at: http://siteresources.worldbank.org/WBI/Resources/wbi37166.pdf

[5] Green, Andy. 1997. Education, Globalization, and the Nation State. London: Macmillan. Quoted from Tilak.

performed, one involving a worldwide survey of 485 executives to better understand the drivers of innovation, and the second was a ranking based on the number of patents filed per million population (with the "Japan effect" corrected for). [6] The forecast innovation rank for 2007-2011 would have Finland drop from 5th to 7th place, Germany rise from 6th to 5th place, Denmark fall from 7th to 9th place, Taiwan rise from 8th to 6th place, Netherlands fall from 9th to 13th place, and Israel rise from 10th to 8th place. The report specifically highlighted how Japan and Taiwan are very *efficient* innovators in that they produce a lot of innovations (output) for a low level of inputs. Japan ranked 11th place in direct ranking but came out first in output ranking; likewise Taiwan ranked 14th in terms of direct inputs but placed 8th in terms of output rankings.[7]

The ideals of a strong nation state, a population with a high cognitive capital pool, and a capacity for efficient innovation in the face of increasing migration pressures have led countries such as Japan and Korea to invest heavily in domestic robotic technology. Rather than importing millions of people from underdeveloped countries who are willing to work for sub-minimum wages, the Japanese and the Koreans prefer investing in the future and in a technology that will "take care of the dirty jobs that the locals will not do". Robots are seen in Japan as a way to deal with its rapidly aging population and are perceived to make up the shortfall in manpower and to help care for the country's growing elderly population (Tabuchi, 2006).[8] The Japanese government has also recently targeted robots as a key industry for promotion. By the end of 2004, 356,500 industrial robots were operating in Japan (the largest number in the world), as compared to the United States which ranked a distant second with 122,000.[9] At the same time, the

[6] Until recently a different patent application had to be submitted in Japan for each claim, thus this might inflate the number of patents in Japan. Thus a bicycle could be patented as a two-wheeled, human-powered machine for transport, but some patenting jurisdictions might patent the components such as the frame, the wheels, the handlebars, the saddle, crank, and chain separately. Correcting for the "Japan effect" takes this into account when comparing nations.

[7] Economist Intelligence Unit. 2007. Archived at: http://tinyurl.com/32cey6

[8] Archived at http://dsc.discovery.com/news/2006/12/21/robot_tec.html?category=technology

[9] JETRO 2006. New Possibilities for Japan's Robot Industry:

development of social robotics remains a Japanese prerogative. Domestic robots such as PaPeRo (standing for Partner-type Personal Robot) have a facial recognition system, a speech recognition system, an ultrasound system located in its chest to detect objects in its path, as well as sensors located in its head to detect if it is being patted or slapped.[10] Honda researchers are developing an advanced version of ASIMO (Advanced Step in Innovative Mobility) such that there is a domestic machine "that's as versatile as a human but that works 24 hours a day and does all the household chores," according to the senior chief engineer at Honda lab. Other Japanese companies such as Sony (AIBO robo-dog as a personal pal), Matsushita (vacuum-cleaning droid with powerful dust sensors), and Sanyo (remote-controlled guard dog equipped with a digital camera and mobile phone) have joined in the fray. It is expected that Japan's personal-robot market could grow to $8 billion by 2010, as "Japan's rapidly aging population and shrinking workforce is expected to create a growing need for personal assistants and low-level health care workers *that machines might fill* (Lee, 2002)."[11] (this author's emphasis) More recently, the "Wakamaru" Japanese domestic robot has been manufactured by Mitsubishi and has internet, speech, and speech-recognition abilities. Its function includes reminding the (often elderly) user to take medicine on time and calling for help if it suspects something is wrong, thus perhaps potentially eliminating the need of a nursing aid.[12] Jobs such as a receptionist or a worker at an automotive manufacturing line are also deemed suitable for humanoid robots.[13]

South Korea is not lagging far behind and has set a goal that *all* of her households should have domestic robots by 2020. In what was claimed to be the world's first, "Tiro", officiated as robot priest and master-of-ceremonies at a wedding in Daejeon – a city 75 miles or 120 km south of Seoul. Samsung's "SGR-A1" is designed to replace human-oriented guards and has the purpose of protecting the major military

---

http://www.jetro.go.jp/en/market/report/pdf/2006_10_c.pdf

[10] Archived: http://en.wikipedia.org/wiki/PaPeRo

[11] Archived at http://www.time.com/time/magazine/article/0,9171,265481,00.html

[12] Archived at http://en.wikipedia.org/wiki/Wakamaru

[13] Archived at http://en.wikipedia.org/wiki/Humanoid_robot

base and national strategic site. It is also being manufactured to guard the Demilitarized Zone (DMZ) between South and North Korea. DU Robo's "OFRO" has conducted a trial security project involving "droid chaperones" in Korean middle schools (Page, 2007; Page 2007).

The above is likely driven by both necessity and cultural prerequisites. If one were in mainland China today, a rapidly growing yet still poor country, to which few in the world would want to migrate to live under a still repressive regime, this author would be surprised if Chinese in China would find the emerging 21st century demographic picture of the United States or Western nations with their massive diverse immigration as conducive towards *héxié shèhuì*, or a 'harmonious society'. More interestingly, in spite of the racial similarity between Koreans and northern Chinese and the cultural affinities between these two nations historically, South Korea has managed to build what is perhaps the world's "first Chinatown without Chinese" in Incheon.[14]

It appears that for many northeast Asians, there are some qualities that make a country what it is and what it will be, and that these are not necessarily captured by pure economic variables alone. Other writers have similarly commented on how the Japanese and Koreans have resisted the urge to import a low human capital and divergent population and thus have

[14] Archived at:
http://www.iht.com/articles/2007/03/01/news/korea.php?page=1
There is "fitful progress" – there are about 400 Chinese who now live there. This author points out some revealing paragraphs in the above article that illustrate the insular mentality in Korea that still permeates society in modern times and will help put to rest questions about emigration to Korea: "If Korean officials traveled to Beijing to pay tribute to China's emperor, they at least took pride in the fact that there was no Chinatown back home"; "….obtaining visas for Chinese was a big obstacle and… a mainland Chinese businessman's plan to open a $200,000 foot massage center had fallen through because of his inability to get visas for Chinese therapists." Another interesting paragraph is: "Chinatowns flourished in every corner of Asia and in the far reaches of every other continent. If San Francisco, Paris and London had Chinatowns, so did Sydney, Johannesburg and Lima. They took root in three boroughs in New York and even in three cities in Japan, the only other Asian country besides South Korea where the Chinese never succeeded in gaining economic power." It is interesting if it is a coincidence that the Chinese never gained economic power in nations that probably had very similar levels of modern IQs to the Chinese; at the same time Chinese have historically dominated many Southeast Asian countries – precisely areas that have relatively low modern IQs.

perhaps spared themselves of some potentially deleterious demographic downstream ramifications generations ahead. Derbyshire (2006) wondered if America will still be navigating itself through its "demographic gales" in the 21st century while East Asians may be sailing under clear skies. Several hundred million Chinese, Filipinos, and Indonesians would love to migrate to rich and homogeneous Japan and Korea if they have a chance. Yet the Japanese and Koreans prefer robots over helots.[15]

Final Thoughts and Conclusions

To return to the Hanushek and Wößmann 2007 World Bank report and its implication for global inequality: economists have recently come to agree that simple resource expansions or band-aid solutions to increase education quantity are unlikely to effect real, meaningful change in the long run. What the report has revealed and proposed as solutions are:

> International comparisons incorporating expanded data on cognitive skills reveal much larger skill deficits in developing countries than generally derived from just school enrollment and attainment. The magnitude of change needed makes clear that closing the economic gap with developed countries will require *major structural changes* in schooling institutions. (this author's emphasis)
>
> Likewise, they pointed out the main points of the study:
>
> 1. Educational quality – measured by what people know – has powerful effects on individual earnings, on the distribution of income, and on economic growth.
> 2. The current situation in developing countries is much worse than generally pictured on the basis just of school enrollment and attainment.
> 3. Just providing added resources to schools is unlikely to be successful; improving the quality of schools will take structural changes in institutions.
>
> Based on all the above discussions, this last point requires

[15] Archived at: http://tinyurl.com/2z5lk4 Note that Japanese and Koreans are incredibly homogeneous by 21st century standards: Japan's demographic breakdown: Japanese 98.5%, Koreans 0.5%, Chinese 0.4%, other 0.7%; Korea's demographic breakdown: Koreans 100% or "homogeneous", except for about 20,000 Chinese (0.04% of the population)

commentary. The authors concentrated on the quality of teachers as an essential key ingredient to student performance. Training quality teachers should therefore be a high priority, and a logical step towards a better education system. Yet the characteristics of good teachers are not well-described or well-defined. It is also not known how different regulations and education structures will affect what constitutes a 'high quality teacher' due to the various heterogeneous local politico-cultural conditions across developing nations. This author submits that while there are some qualities that have been universally acknowledged as important – such as giving timely, responsive, targeted and individual feedback, setting appropriate and realistic goals for students, having a good attitude towards education and caring for students – , one irreplaceable quality that is and should be a *prerequisite* for any potentially good teacher is that he or she must be highly knowledgeable and be up-to-date on the subject-matter at hand. A good teacher *must* have a good conceptual grasp of the material involved before he or she will be able to impart knowledge to students in a efficient and meaningful way. Yet this knowledge base, this ability to have a firm grasp and conceptualization and subsequent synthesis of knowledge, is itself predicated on cognitive skills and cognitive ability itself. A school system that does not educate its youngsters well will likely see a dearth of informed, educated, and competent instructors and teachers. Likewise a school system, no matter how efficient and educational, will likely not produce bright students and hence bright teachers if the students themselves lack cognitive capital. Based on worldwide intelligence studies as well as results from educational indices and IQ scores of expatriates to countries such as the United States and the United Kingdom, this latter explanation should at least be discussed as a possibility and not be dismissed as an impossibility for fear of political correctness.

Hanushek and Wößmann (2007) pointed to other potential areas for improvement, such as having proper incentives for improved student performance and having strong accountability systems. Yet these proposals seem to be themselves dependent upon prevailing operating conditions of those who have seemed "triumphant" in the late 20th century – namely American and Northwest European politico-economic

institutions, the rule of law, democracy, and economic freedom (e.g. Fukuyama, 1992). Yet once again, these conditions may themselves require a certain level of education and intelligence amongst voters and the populace (Rindermann, in press). Lynn and Vanhanen (2006) found the correlation between IQ and economic freedom ratings to be 0.61, while that between IQ and Index of Democratization in 2002 is 0.58. The entire question therefore is a chicken-and-egg one. It is not known if underdeveloped countries do in fact have the critical mass of above-average intelligence people to support advanced knowledge and information-based post-industrial societies, such as having the critical mass of professionals, professors, and innovators.[16] Moreover, even at the more proximate level of *culture*, it is quite obvious that not all people in the world place equal emphasis on the idea of education, let alone value "Western institutions" or the ideals of a civilized democratic society equally. It seems to this author that the blanket prescriptions and recommendations of the World Bank report, as in "the binding constraint seems to be institutional reform", – which implicitly assumes that all populations have similar cognitive abilities or capital and that underdeveloped countries' interests are somehow coincident with those of the Western first world nations (which many see as their former colonizers) – is well-meaning but ultimately naïve and *ad hoc*. The idealism of the recommendation flies in the face of what is politically feasible and practically achievable.

Hanushek and Wößmann cited evidence that:

> School autonomy regarding teacher salaries is negatively associated with student performance in systems without central exams. In systems with central exams, student performance is generally higher than in systems without central exams, reflecting the increased accountability. In addition, the effect of school autonomy is turned completely around in systems with central exams: Salary autonomy of schools has positive effects on student performance in central-exam systems.[17]

[16] For example, a college graduate with an IQ of 115, who is one standard deviation above the mean in developed countries, will be *three* standard deviations above the mean in an underdeveloped country with average IQ of 70 and a standard deviation of 15.

[17] page 75 of http://tinyurl.com/35msgg

While the above may conceivably 'break the cycle' of poverty, as it offers school choice and competition as well as incentive, the *bete noire* that remains is where the majority of students locally or nationally underachieve on centralized standardized exams by international standards. No nation will allow a majority of students to fail; local students will likely be graded based on their percentiles relative to their peer group. In other words, while it may be true that having central exams and school autonomy over teacher salaries will likely have a salutary effect on test scores as they provide incentive for achievement, the above does not address the question of whether this measure will bring nations with low standardized test scores to an acceptably close range to nations with high standardized test scores. Nor does it take into account the many parts of the developing world that have diverse cultural norms and hence diverse attitudes towards school achievement and intellectual skill acquisition. It is important not to succumb to the naive illusion that having centralized tests will therefore somehow magically allow students of all nations to achieve parity or near parity on internationalized measures, and by implication, dramatically diminish the extent of global cognitive disparities and thus economic inequalities in the near future.

In fact, Hanushek and Wößmann admitted that the issue of choice and competition was still "the limited experience". They exhorted that "a program of *experimentation and evaluation* – a key missing aspect of policymaking in most developing countries" would be needed given current levels of uncertainty. And while there was anecdotal evidence that decentralization, school autonomy and community involvement might improve test scores in areas as diverse as the Philippines to El Salvador and Mexico, they lamented that support for autonomy strongly "[rested] on a conceptual basis".

Taken in totality, it appears to this author that while Hanushek and Wößmann wrote that "the binding constraint [for education quality] seems to be institutional reform", evidence points to the ultimate binding constraint's being cognitive capital, and to this being captured quite succinctly by the intelligence quotient. A consilient paradigm should take into account the possibility that current inequalities are not especially due to deficiencies in the prevailing local politico-

socio-economic milieu, such as “quality of teachers” or “years of schooling” or “lack of resources” or “lack of school autonomy” or “lack of central exams”. These are often attributed to “institutional imperfections” that seem to somehow all cluster around nations with documented low cognitive abilities. Current inequalities and differential levels of achievements may be more parsimoniously explained by an underlying differential in individual and group abilities and cognitive capital, qualities that have a substantial biological basis and heritability.

Unfortunately the shroud of political correctness continues to obfuscate matters. Kofi Annan, former United Nations Secretary General, boldly asserted in 2000 that intelligence "is one commodity equally distributed among the world's people". This type of utopian thinking and unrealism is very unhelpful in the context of the above discussion. If one ignores the role of cognitive ability, one will err: the residual incomplete model will overstate the marginal effects of other variables, leading to inefficiencies, misuse, and perhaps squandering of precious resources that could have been used more productively. Formulating workable solutions requires first and foremost a realistic appraisal of the causes of global inequality. The first step towards that goal is to provide an analysis that is not shackled by wrong facts, erroneous assumptions, or false ideology.

The overall situation may be interpreted by some as almost a counsel of despair. Yet as novelist, playwright, and poet James Baldwin wrote, “not everything that is faced can be changed, but nothing can be changed unless it is faced.” Steve Pinker (2002) wrote in his bestseller *The Blank Slate: The Modern Denial of Human Nature* (page 293-294) that what science in the 21st century may reveal is that the “Tragic Vision” might have science on its side, as against the “Utopian Vision”. Thomas Sowell calls this the “Constrained Vision” versus the “Unconstrained Vision”. According to Pinker:

> My own view that led to new sciences of human nature really do vindicate some version of the tragic version and undermine the utopian outlook that until recently dominated large segments of intellectual life. The scientists say nothing, of course, about differences in values that are associated with particular right-

wing or left-wing positions (such as in the trade-offs between unemployment and environmental protection, diversity and economic efficiency, or individual freedom and community cohesion). Nor do they speak directly to policies that are based on a complex mixture of assumptions about the world. But they do speak to the part of divisions that are general claims about how the mind works. Those claims may be evaluated against the facts, just like any empirical hypothesis. The utopian vision that human nature might radically change in some imagined society of the remote future is, of course, literally unfalsifiable, but I think that many of the discoveries recounted in preceding chapters make it unlikely. Among them I would include the following:

The primacy of family ties in all human societies and the consequent appeal of nepotism and inheritance. The limited scope of communal sharing in human groups, the more common ethos of reciprocity, and the resulting phenomenon of social loafing and the collapse of contributions to public goods when reciprocity cannot be implemented.

The universality of dominance and violence across human societies (including supposedly peaceable hunter gatherers) and the existence of genetic and neurologic mechanisms that underlie it.

The universality of ethnocentrism and other forms of group against group hostility across societies, and the ease with which such hostility can be aroused in people within our own society.

The partial heritability of intelligence, conscientiousness, and antisocial tendencies, implying that some degree of inequality will arise even in perfectly fair economic systems, and that we therefore face an inherent trade-off between equality and freedom.

The prevalence of defense mechanisms, self-serving biases, and cognitive dissonance reduction, by which people deceive themselves

about their autonomy, wisdom, and integrity.

The biases of the human moral sense, including the preference for kin and friends, a susceptibility to a taboo mentality, and a tendency to confuse morality with conformity, ranks, cleanliness, and beauty."

Pinker went on and quoted E.O. Wilson, noting that he may have the last laugh in his verdict of Marxism: "Wonderful theory, wrong species." To the extent that inherent biological inequality contributes to educational quality as measured by international test scores which in turn correlate with economic growth and other valued outcomes, the view that somehow all nations will achieve similarly in the near or not-so-distant future reflects a type of cognitive egalitarianism or epistemological Marxism. The psychological thrust of the enterprise seems perfectly in-line with the Utopian Vision itself. Yet this vision is itself increasingly at odds with new interdisciplinary information and knowledge.

Future Directions

The practical direction in the future is likely one where population cognitive abilities can be improved in a meaningful way, leading to downstream changes. Yet raising intelligence has not been easy. For example, it appears that some earlier claims of IQ gains through early intervention and environmental supplementations have been exaggerated. Interventions such as breastfeeding have now been shown not to boost IQ as previously thought, or at least as much as previously thought, as the confounding variable of maternal intelligence was previously not taken into account in previous research.[18] Iron supplementation during pregnancy, while reducing the incidence of iron deficiency anemia, has had no effect on IQs of children at 4 years of age.[19] While a recent study revealed that the maternal intake of very long chain n-3 fatty acids may increase IQ by up to 4 points at 4 years of age,[20] an earlier systemic review revealed little evidence from randomized trials that n-3 and n-6 long chain polyunsaturated fatty acids supplementation conferred any visual or cognitive development benefits.[21] A small study in 2007 demonstrated that supplementation with docosahexaenoic acid and arachidonic acid in infant formula resulted in the formula group having similar visual acuity compared to the breast-fed group, but both the control formula and the long-chain

[18] Der et al., 2006.
[19] Zhou et al., 2006.
[20] Helland et al., 2003.
[21] Simmer, 2000.

polyunsaturated fatty acid supplement groups actually had *poorer* verbal IQ scores compared to the breast fed group.[22] One may extrapolate from a study of malnourished primarily Hispanic American "working class" children to all of the developing world's children and, in doing so, note a modest 2-3 nonverbal IQ point gain with vitamin-mineral supplementation at 50% the US daily recommended allowance for three months (the authors in the study noted that nonverbal intelligence was closely associated with academic performance.)[23] Yet considering the overall global picture where countries may differ in IQs by 30-40 points or sometimes more, all these attempted measures to effect IQ increases are unlikely to substantially bridge the cognitive gulf between top developed and bottom undeveloped nations. The ability to dramatically raise global IQs by relatively simple measures such as breastfeeding or simple nutritional supplements has been somewhat disappointing.

But to appreciate the magnitude and intractability of the problem, evolutionary conservative Steve Sailer (in a different context) examined the differential IQ scores between China and India and noted that based on somewhat limited data China seems to have a lead over India with an average IQ difference of about 23 points, or 1.5 standard deviations. For the purposes of this discussion he assumed a difference of only 15 points or 1 standard deviation, roughly the African-American and white American gap in the United States. He also imagined that, as a thinking exercise, IQ differences between all babies being born in India and China would miraculously disappear overnight. The time needed for subsequent *workforce* IQ gap closure is illustrated in Figure 10.

The above was written in 2006. Sailer (2006) concluded that "a subsequent narrowing of the workforce disparity assuming *immediate* closure would not even begin to appear until they start their careers at age 18 in 2024. If the retirement age is 65 and the population remains stable, then the gap would only be half-closed by 2047, and wouldn't disappear until 2071."[24]

---

[22] Birch EE et al., 2007.
[23] Schoenthaler SJ et al., 2000.
[24] Archived at: http://www.vdare.com/sailer/060423_lynn.htm

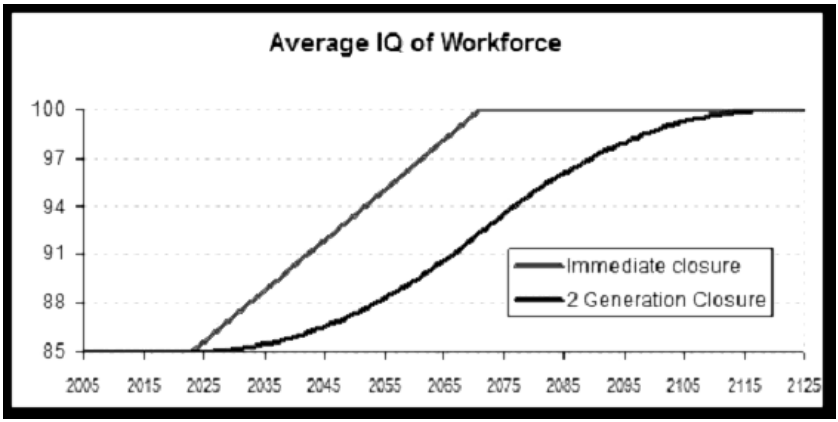


Figure 10:
Average IQ Of A Workforce Assuming Immediate Closure Of Two Populations With A 1 Standard Deviation IQ difference (85 vs. 100). The Left Line Represents Immediate Closure; The Right Line Represents A 2 Generation Closure. Immediate Closure Denotes That All Babies Being Born Tomorrow To The Lower IQ Population Will Suddenly Have Identical Intelligence As That Of The Higher IQ Population

Of course, the idea that Mbuti Pygmies can somehow suddenly be as intelligent as Ashkenazi Jews overnight is implausible. And the differences in cognitive abilities between Western and Pacific Rim first world nations versus sub-Saharan African nations are much more pronounced than 15 IQ points. Furthermore, raising individual (let alone population) IQs by more than a few points seem to be the best what one can hope for at present.

Short of major genetic engineering breakthroughs in the near future that may allow some governments (with congenial cultural requisites) and their general public to reliably and *cost effectively* improve the intelligence of the offspring of their population, one public policy that may in fact have a good chance of effecting real change at raising aggregate IQ may be one geared towards policies aimed at a differential fertility across different segments of the population with differing cognitive abilities. Yet an effective eugenics program, especially if it's a government-mandated and enforced one, is currently

taboo for many Western governments and their populations. And at the same time, given the current low levels of education in the third world, it is not conceivable how voluntary birth-control measures will or can be effective at the population level (cf. the *Tragedy of the Commons* scenario). Oesterdiekhoff and Rindermann (2007) illustrated the preoperational mode of magical-animistic thinking with respect to the fast spread of HIV/AIDS in the Third World. HIV is seen not so much as a physiological or infectious phenomenon, but as a mystical phenomenon. It is this author's opinion that uneducated populations that view HIV and AIDS as 'magical' will have a very difficult time conceptualizing the larger picture of global inequality, fertility patterns, cognitive capital, economic growth, and hence the necessity for self-restraint.

Within such a social framework, effective practical and voluntary eugenics programs for many developing countries are unlikely to be found. Perhaps oligarchic rule, however transient, may be required to achieve the desired goal, but this is obviously not the direction that first world Western governments or the United Nations want developing countries to head toward in the 21st century. And there are also no politically viable possibilities where Western nations can impose a template model on the vast numbers of third world nations, as these will be seen not as a type of beneficent aid but as a type of neo-cultural imperialism. One may be left with the uncomfortable possibility that third world economic development (via the putative model of freedom and democracy) vis-à-vis global equality and equity are incompatible and in fact antonymic, within the overall context of huge and possibly unbridgeable differentials of cognitive ability and human capital.

In summary, the 2007 World Bank Report *Education Quality and Economic Growth* demonstrates that education quality and cognitive skills, measured by international standardized test scores, is a stronger predictor for national economic growth than educational quantity, measured by years of schooling and enrollment rates. The intelligence quotient, as measured by intelligence tests, is in turn very highly correlated with international standardized test scores and other biological indices that complement income levels as indicators of national well-being. As IQ is substantially heritable, blunt strategies

directed at simple resource expansions or institutional changes to effect outcome changes in education quality are unlikely to be effective at reducing disparities in international cognitive skills. Common sense cost-effective measures such as breastfeeding or nutritional supplements have shown either no or small benefits in long-term cognitive ability scores. Short of undemocratic eugenic measures, there seem to be no imminent workable solutions that will reduce global cognitive disparities and hence educational quality and economic inequalities in the near future. Accepting the fact that global inequalities are persistent, massive human migrations will likely continue in the 21st century. These migration patterns will in turn have profound effects of brain drain and attrition of cognitive capital on selected third world donor nations. They will also cause seismic demographic shifts that are often accompanied by negative economic and social outcomes in the first world recipient nations. Investing in human capital and in robotic technology may be an alternative and probably viable Northeast Asian approach at dealing with this first world dilemma. A sociobiological paradigm that takes into account human cognitive ability and IQ may be the first step towards adopting and adapting practical policies geared towards realistic, practical, and achievable goals.

References

American Psychological Association (APA).
1995. *Intelligence: Knowns and Unknowns*. Report of a Task Force established by the Board of Scientific Affairs of the American Psychological Association. Separately published in 1996. *American Psychologist*. 51:2:77-101

Arvey et al.
1994. "Mainstream Science on Intelligence." *Wall Street Journal*, Tuesday, December 13, 1994.

Becker, Gary S.
1964 & 1993 (3rd ed). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. Chicago, University of Chicago Press.

Birch EE, Garfield S, Castañeda Y, Hughbanks-Wheaton D, Uauy R, Hoffman D.
2007. *Visual acuity and cognitive outcomes at 4 years of age in a double-blind, randomized trial of long-chain polyunsaturated fatty acid-supplemented infant formula*. Early Hum Dev. 2007 May;83(5):279-84.

Central Intelligence Agency.
2007. *Field Listing – Net Migration Rate*.

Central Intelligence Agency.
2007. *The World Factbook. Rank Order – Life expectancy at Birth.*
Central Intelligence Agency.
2007. *The World Factbook. Rank Order – Infant Mortality Rate.*
Coulombe, S., J. F. Tremblay and S. Marchand
2004. *Literacy scores, human capital and growth across fourteen OECD countries.* Statistics Canada.
Davies, James B; Sandstrom, Susanna; Shorrocks, Anthony; Wolff, Edward N.
2006. *The World Distribution of Household Wealth.* World Institute for Development Economics Research of the United Nations University (UNU-WIDER).
De la Fuente, Angel.
2006. *Education and economic growth: a quick review of the evidence and some policy guidelines* from project *Globalization Challenges for Europe and Finland.* Prime Minister's Office: Economic Council of Finland. Project from Globalization Challenges for Europe and Finland.
Deary, Ian J., Der, Geoff.
2005. "Reaction time explains IQ's association with death." *Psychological Science* 16(1):pp. 64-69.
Der G, Batty, GD, Deary, IJ.
2006. "Effect of breast feeding on intelligence in children: prospective study, sibling pairs analysis, and meta-analysis." *British Medical Journal.* 2006 Nov 4;333(7575):945.
Derbyshire, John.
2006. "Robotics vs. Helotics. (Will Japan be the mid-21st century superpower?)" *New English Review* (on-line).
Diamond, Jared.
1998. *Guns, Germs and Steel: A Short History of Everybody for the Last 13,000 Years.* London: Vintage.
Economist Intelligence Unit.
2007. *Innovation: Transforming the Way Business Creates (includes a global ranking of countries).* EIU white paper. Cisco Systems
Freyl Meredith C., Detterman Douglas K.
2004. *Scholastic Assessment or* g*? The Relationship Between the Scholastic Assessment Test and General Cognitive Ability.* Psychological Science 2004: 15(6), 373 – 378.
Fukuyama Francis.
1992. *The End of History and the Last Man.* New York: Free Press.
Gonzales P et al. 2004. *Highlights From the Trends in International Mathematics and Science Study (TIMSS)*
2003. National Center for Education Statistics.
Gottfredson, Linda S. 2006. *Social consequences of group differences in cognitive ability* (Consequencias sociais das diferencas de grupo em habilidade cognitiva). In C. E. Flores-Mendoza & R. Colom (Eds.), *Introducau a psicologia das diferencas individuais* (pp. 433-456). Porto Allegre, Brazil: ArtMed Publishers.
Green, Andy.
1997. Education, Globalization, and the Nation State. London: Macmillan

Hall, Robert E., and Charles I. Jones. 2004. *The Value of Life and the Rise in Health Spending*. U.C. Berkeley Working Paper.
Hanushek Eric A., Kimko Dennis D.
2000. „Schooling, Labor-Force Quality, and the Growth of Nations." *American Economic Review*. 90:5 p.1184-1208
Hanushek, Eric A., Wößmann, Ludger.
2007. *Education Quality and Economic Growth*. The International Bank for Reconstruction and Development. The World Bank. Washington DC 2043
Hanushek, Eric A., Wößmann, Ludger.
2007. *The Role of Education Quality in Economic Growth*. Policy Research Working Paper 4122, World Bank, Washington, D.C.
Harrison, Frances.
2007. *Huge Cost of Iranian Brain Drain*. BBC News.
Helland IB, Smith L, Saarem K, Saugstad OD, Drevon CA.
2003. "Maternal supplementation with very long-chain n-3 fatty acids during pregnancy and lactation augments children's IQ at 4 years of age." *Pediatrics*. 2003 Jan;111(1):e39-44.
Helpman, Elhanan.
2004. *The Mystery of Economic Growth*. Harvard University Press.
Horvat Vedran.
2004. *Brain Drain. Threat to Successful Transition in South East Europe?* Southeast European Politics V(1):76-93
Hunt, E., Wittmann, W.
2007."National intelligence and national prosperity." *Intelligence*. (In Press)
International Organization for Migration. *About Migration*. On-line website.
Jamison Eliot A., Jamison, Dean T., Hanushek Eric A.
2006. *The Effects of Education Quality on Income Growth and Mortality Decline*. NBER Working Paper No. 12652.
Jensen Arthur R.
1998. *The* g *Factor: The Science of Mental Ability*. Praeger.
JETRO Japan Economic Monthly.
2006. *New Possibilities for Japan's Robot Industry*.
Jones Garett, Schneider, W. Joel.
2006. *IQ in the Production Function: Evidence from Immigrant Earnings*. Presentation at McGill University, November 2006, and George Mason University, January 2007.
Jones, Charles I.
2005. *More Life vs. More Goods: Explaining Rising Health Expenditures*. Federal Reserve Bank of San Francisco (FRBSF) Economic Letter. May 27, 2005.
Kamarck, Andrew M.
1976. *The Tropics and Economic Development: A Provocative Inquiry into the Poverty of Nations*. Baltimore and London: The Johns Hopkins University Press.
Kanazawa, Satoshi.
2006. "Mind the gap…in intelligence: Re-examining the relationship between inequality and health". *British Journal of Health Psychology* 11(4):Nov 2006:623-642
Lee, Charles S.
2002. *Tin Men*. TIME. CNN.

Lee, Wing O.
1995. *Japan*. From Morris and Sweeting (eds). 1995. *Education and Development in East Asia*. Taylor & Francis.
Lynn, Richard; Vanhanen, Tatu.
2002. *IQ and the wealth of nations*. Westport, CT: Praeger.
Lynn, Richard, Vanhanen, Tatu.
2006. *IQ and Global Inequality*. Washington Summit Publishers.
Lynn, Richard, Mikk, Jaan.
2007. "National differences in intelligence and educational attainment." *Intelligence*, 35, 115-121
Meisenberg, Gerhard.
2007. "Does Multiculturalism Promote Income Inequality?" *Mankind Quarterly*, Vol. 47, No. 4 (Summer 2007) pp. 3-39
Miller Edward M.
1999. "Income, Intelligence, Inequality." *Mankind Quarterly*, Vol. 39 (Spring 1999) No. 3, 337-354
Miller, Edward M.
1994. "The Relevance of Group Membership for Personnel Selection: A Demonstration using Bayes' Theorem." *The Journal of Social, Political, and Economic Studies* Vol. 19 (Fall 1994) No. 3, 323-359.
Murray Charles, Herrnstein Richard.
1994. *The Bell Curve: Intelligence and Class Structure in American Life*. Free Press.
New Century Foundation.
2006. *Hispanics: A Statistical Portrait*.
Newhouse, Joseph P.
1992. "Medical Care Costs: How Much Welfare Loss?" *Journal of Economic Perspectives* 6(3) (Summer) : p.3-21.
Oesterdiekhoff, G. & Rindermann, H.
2007."The Spread of AIDS in Developing Countries: A Psycho Cultural Approach." *The Journal of Social, Political, and Economic Studies*. 32(2):2007.
Onishi, Norimitsu.
2007."This Chinatown lacks only one thing – Chinese." March 1st, 2007. *International Herald Tribune*.
Padmanabhan C.B.
2001. *Human resource development in East Asian countries*. The Hindu.
Page, Lewis.
2007. "Korean Schools to Deploy Robot Chaperones" *The Register*.
Page, Lewis.
2007. "South Korea to Field Gun-Cam Robots on DMZ." *The Register*.
Pew Hispanic Center.
2005. "A Statistical Portrait of Hispanics at Mid-Decade." *Educational Attainment by Race and Ethnicity* (table 19): 2005.
Pinker, Steven.
2002. *The Blank Slate: The Modern Denial of Human Nature*. Viking Adult.
Putnam, Robert D.
2000. *Bowling Alone: The Collapse and Revival of American Community*. Simon & Schuster. 2000.

Putnam Robert D.
2007. E Pluribus Unum: *Diversity and Community in the Twenty-first Century*. The 2006 Johan Skytte Prize Lecture. Scandinavian Political Studies 30 (2), 137 – 174.
Rindermann Heiner.
2007. "Relevance of education and intelligence at the national level for the economic welfare of people." *Intelligence*. In Press.
Rushton, J Phillipe; Bons, Trudy Ann; Vernon, Philip A.; Cvorovic, Jelena.
2007. *Genetic and Environmental Contributions to Population Group Differences on the Raven's Progressive Matrices estimated from Twins Reared Together and Apart*. Proceedings of the Royal Society of Britain. 274:1773 1777.
Rushton, J Phillipe; Jensen, Arthur R.
2005. *Thirty Years of Research on Race Differences in Cognitive Ability*. Psychology, Public Policy, and Law 11(2):235-294
Sailer, Steve.
2004. *IQ and the Wealth of Nations, Lynn and Vanhanen: data table of national mean IQ*
Sailer, Steve.
2006. *Lynn's Race Differences in Intelligence: PC Won't Make Them Go Away*. VDARE.com.
Sailer, Steve.
2007. *Diversity Is Strength! It's Also…Oh, Wait, Make That "Weakness"*. VDARE.com.
Scheffler, Richard M.
2004. "Health Expenditure and Economic Growth: An International Perspective." *Occasional Papers on Globalization*: 1(10). University of South Florida.
Schoenthaler SJ, Bier ID, Young K, Nichols D, Jansenns S.
2000. *The effect of vitamin-mineral supplementation on the intelligence of American schoolchildren: a randomized, double-blind placebo controlled trial*. J Altern Complement Med. Feb;6(1):19-29.
Shore Bill.
2007. *Medical Students Beyond Borders*. Sharing witness: Social problems, unique perspectives, innovative solutions.
Simmer, K.
2000. *Long chain polyunsaturated fatty acid supplementation in infants born at term*. Cochrane Database Syst Rev. 2000;(2):CD000376.
Statistics Canada,
2005. *A Portrait of Early Settlement Experiences*. Catalogue number 89-614-XWE2005001.
Tabuchi, Hiroko.
2006. *Robots Take Honors in Japan*. Associated Press. December 21, 2006.
Tallman, Ellis W, Wang, Ping.
1994. "Human Capital and Endogenous Growth: Evidence from Taiwan". *Journal of Monetary Economics* 34: 101-24.
Tilak, Jandhyala B.G.
2002. *Building Human Capital in East Asia: What Others Can Learn*. The International Bank for Reconstruction and Development/The World Bank.

Whetzel, Deborah L., McDaniel, Michael A.
2006. „Prediction of national wealth." *Intelligence*, 34(5), 449-458.
Wikipedia.
2007. Brain Drain.
Wikipedia.
2007. Consilience. Wikipedia: The Free Encyclopedia.
Wikipedia.
2007. Immigration to the United States.
Wikipedia.
2007. *PaPeRo robot.*
Wikipedia.
2007. *Wakamaru.*
Wikipedia.
2007. *Humanoid Robot.*
The World Bank.
2006. *06 World Development Indicators.* The International Bank for Reconstruction and Development, The World Bank. Washington, D.C. 20433. USA.
Wilkinson, Richard G.
2005. *The Impact of Inequality: How to Make Sick Societies Happier.* New Press.
Zhou SJ, Gibson RA, Crowther CA, Baghurst P, Makrides M.
2006. "Effect of iron supplementation during pregnancy on the intelligence quotient and behavior of children at 4 y of age: long-term follow-up of a randomized controlled trial." *American Journal of Clinical Nutrition*. 2006 May;83(5):1112-7.