On the Historical Association between National IQ and GDP per capita

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1. Introduction and summary of results
A remarkable, unquestioned assumption in (1–3) and subsequent studies measuring the association between national average Intellectual Quotients (IQ) and Gross Domestic Products (GDP) per capita is that a supposedly immutable\textsuperscript{1} genetic factor (IQ) may be correlated with a markedly fluctuant one (the wealth of nations). This short paper questions this assumption and presents the following results:

1. Using historical GDP per capita data produced by the Maddison project (5, 6), we find that, over history, the (Pearson product-moment) correlation coefficient (r) between average IQ and GDP per capita is highly variable and ranges from strong negative values to strong positive values. The correlation between national IQ and GDP per capita is a snapshot of the world order at some point in time, and historical data allow us to identify several other eras.

2. The reported positive correlation between national average IQ scores and GDP per capita thus only concerns "today's GDP". However, today's GDP was never difficult to explain and predict in the first place. We show that arbitrary ad-hoc scores based on a country's continental location present a more significant correlation with contemporary GDP per capita. As an economic variable, the predictive value of IQ is thus lesser than that of the common sense observation that North-America is, currently, richer than Europe which is in turn richer than Africa, etc.

3. We conclude this paper by questioning the purpose of IQ studies in Macroeconomics. If this purpose is explaining the wealth of nations then confounding variables such as literacy cannot be ignored, and the Pearson product-moment correlation cannot be considered as a sole criterion to draw causal conclusions. If, on the other hand, the purpose is predicting the wealth of nations then simply using the geographical location of countries, which is no less circular than the use of IQ due to the confounding role of literacy, would be a better predictor of GDP.

2. Related work and data sources
General knowledge regarding average national Intellectual Quotients (IQ) and their association with economic outcomes is largely based on two books by Richard Lynn and Tatu Vanhanen, "IQ and the Wealth of Nations" (1) and its follow-up "IQ and Global Inequality" (2), as well as a dataset (3) by the same authors. With these publications, IQ gained entry into macroeconomic research and started being considered a valid independent variable to explain and predict the Gross Domestic Product (GDP) of nations, because of the high reported correlation of .82\textsuperscript{4}. Since then, the confounding role of literacy in the association between IQ and GDP has been thoroughly established. Indeed, Marks has shown that IQ variations across time and race are explained by literacy differences (7) and that literacy, not intelligence, is in fact the key predictive factor for economic development (8).

A recent (June 26, 2020) retraction of a publication by Clark et al. in Psychological Science (9), based on data from (3) notes that the above data are "plagued by lack of representativeness of the samples, questionable support for some of the measures, an excess of researcher degrees of freedom, and concern about the vulnerability of the data to bias".

In this work, we overlook these shortcomings, as well as inherent shortcomings of IQ tests as a measure of an individual's intelligence (10), and question the idea that a fairly static racial factor is associated with the historically variable variable that is GDP per capita.

For historical GDP per capita data, we rely on the 2020 release of the Maddison project dataset (5). Building up on the work of the late Angus Maddison, this collaborative research project publishes estimates of the GDP and population in the world economy between Roman times and year 2018, adjusted for territorial and political change, and expressed in 2011 US dollars. Table 1 presents a subset of the Maddison project data, presented in (6), and focusing on 38 nations. We have additionally included the associated national average IQ from (2) in the last column, and computed the corresponding coefficient of correlation (r) in the last row.

3. Historical association between GDP per capita and national IQ
Figure 1a shows the variations of the coefficient of correlation between national IQ scores and GDP per capita for the subset of 38 nations considered in ?? with the data reproduced in Table 1, while Figure 1b shows these variations for the 169 nations covered by the complete Maddison 2020 database for years 1280 to 2018. Both Figures show that the association between the two variable is largely negative before the modern era (11), positive association starting from 1300 and more

\textsuperscript{1}The Flynn effect, an intra-population effect, indiscriminately applies to all countries (4).

\textsuperscript{2}In the line of research of (1–3), IQ is not just intrinsic to nations but to races, as evidenced by the extrapolation of missing data on a racial basis in (1).

\textsuperscript{3}We incidentally find that this correlation, when considering all countries, for the year of study of GDP in (1) is in fact much lower.

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Nations | 1700 | 1820 | 1850 | 1870 | 1910 | 1930 | 1940 | 1958 | 1970 | 1980 | 1990 | 2000 | 2010 | 2016
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
Belgium | 650 | - | - | - | - | - | - | - | - | - | - | - | - | -
Germany | 582 | 640 | 693 | 746 | 799 | 852 | 905 | 958 | 1011 | 1064 | 1117 | 1170 | 1223 | 1276
Netherlands | 600 | - | - | - | - | - | - | - | - | - | - | - | - | -
Russia | - | - | - | - | - | - | 853 | 906 | 959 | 1012 | 1065 | 1118 | 1171 | 1224
Spain | 158 | - | 593 | 646 | 699 | 752 | 805 | 858 | 911 | 964 | 1017 | 1070 | 1123 | 1176
Sweden | 600 | - | - | - | - | - | - | - | - | - | - | - | - | -
Switzerland | 600 | 1167 | 1220 | 1273 | 1326 | 1379 | 1432 | 1485 | 1538 | 1591 | 1644 | 1697 | 1750 | 1803
United Kingdom | 600 | 1167 | 1220 | 1273 | 1326 | 1379 | 1432 | 1485 | 1538 | 1591 | 1644 | 1697 | 1750 | 1803
United States | 600 | 1167 | 1220 | 1273 | 1326 | 1379 | 1432 | 1485 | 1538 | 1591 | 1644 | 1697 | 1750 | 1803

Fig. 1. Historical association between GDP per capita and national IQ

(a) Pearson Product-moment coefficient of correlation \( r \) between GDP per capita and national IQ for the subset of nations considered in (6)

(b) Pearson Product-moment coefficient of correlation \( r \) between GDP per capita and national IQ for the complete Maddison 2020 database (5) of 169 nations

4. Modern GDP per capita was never difficult to predict

We divide the world in 13 regions and assign an ad-hoc integer score from 1 to 10 reflecting the wealth of the region (1 for Subsaharan Africa, 10 for North America), according to table 2. Each country is assigned the score of the region it belongs to. Figure 3 compares the coefficient of correlation of this lazy ad-hoc score with that of national IQ.

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2011 $ (in) GDP per capita clearly after year 1500. The modern era itself can be broken down into several cycles of stability in the value of the positive correlation (ranging from 0 to periods of stability around 0.5). The beginning of new cycles can be linked to important historical changes (industrial revolution, postmodernism starting after the second World War, decolonization).

| Table 1. GDP per capita (in 2011 $) over history, for the subset of nations considered in (6) |
| --- |
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Fig. 2. GDP per capita of four middle-income economies over time

A. The case of Romania, Thailand, Botswana, and Togo. Let us consider four comparable middle-income economies, Romania (IQ=94), Thailand (IQ=91), Botswana (IQ=72), and Togo (IQ=66), covering a range of 3.31 standard deviations of national IQ. Figure 2 presents the historical GDP per capita, for years 1960 (independence of Togo) to 2018. The correlation of IQ with 2018 GDP for these four countries is .51, and comparable to the global correlation. The economies of Botswana and Thailand have been growing steadily at a rather stable rate, whereas changes in the growth rate of GDP per capita of Gabon can be linked to the discovery of important offshore fossil fuel reserves, and the effect of the 2007 enlargement of the European Union can be similarly seen in the growth of Romania’s GDP. This example illustrates the fluctuating nature of both GDP per capita as well as its growth rate. Any treatment other than as a time-series is bound to be inadequate.

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Table 2. Ad-hoc score assigned to each of 13 geographical regions of the world

| Continent         | Score |
|-------------------|-------|
| North America     | 10    |
| Western Europe    | 9     |
| Oceania           | 8     |
| East Asia         | 7     |
| West Asia         | 7     |
| Eastern Europe    | 5     |
| South-East Asia   | 4     |
| South America     | 3     |
| North Africa      | 2     |
| Central Asia      | 2     |
| Caribbean         | 2     |
| South Asia        | 1     |
| Subsaharan Africa | 1     |

Table 2. Ad-hoc score assigned to each of 13 geographical regions of the world

Fig. 3. A lazy geographical score with nine possible values shows a better correlation with modern GDP per capita than national IQ for the complete Maddison 2020 database (5) of 169 nations

5. Conclusion

The purpose of IQ research in Macroeconomics is unclear. If it is an attempt at explaining the wealth of nations, e.g. to predict the value of investment in increasing intelligence, then this type of analysis cannot avoid controlling for literacy rates and other confounding variables (nourishment, health, etc.). If on the other hand, it is an attempt at predicting the wealth of nations based on an independent variable (notwithstanding the poor test-retest correlation of IQ test), e.g. to inform immigration policies, with correlation as the only criterion, then assigning lazy 1 to 10 scores to different continents based on their current wealth would be a better model than national IQ. The wealth of nations (and of anyone for that matter) is best studied as a time-series. Any association with a static variable is bound to be uninformative.

References

1. Lynn, R., Vanhanen, T. (2002) Human evolution, behavior, and intelligence: IQ and the wealth of nations. Praeger Publishers/Greenwood Publishing Group.
2. Lynn, R., Vanhanen, T. (2006) IQ and Global Inequality. Washington Summit Publishers.
3. Lynn, R., Vanhanen, T. (2012) Intelligence: A unifying construct for the social sciences. Ulster Institute for Social Research.
4. Flynn, J. R. (2012) Are We Getting Smarter? Rising IQ in the Twenty-first century. Cambridge: Cambridge University Press.
5. Various authors (2020) Maddison Historical Statistics, Maddison Project Database 2020. Retrieved from https://www.rug.nl/ggdc/historicaldevelopment/maddison/releases/maddison-project-database-2020 on November 25 2020.
6. Bolt, J, Van Zenden, J. L. (2014) The Maddison Project: collaborative research on historical national accounts. Economic History Review, 67(3): 627–651
7. Marks, D. (2010) IQ variations across time and race are explained by literacy differences. Psychological Reports, 106(3): 643–64.
8. Marks, D. (2007) Literacy not intelligence moderates the relationships between economic development, income inequality and health. British Journal of Health Psychology 12: 179–184.
9. Clark, C. J., Winegard, B. M., Baumeister, R. F., Shanoff, A. F. (2020, June). Retraction of ‘Declines in Religiosity Predict Increases in Violent Crime—but Not Among Countries With Relatively High Average IQ’, Psychological Science. https://doi.org/10.1177/0956797620941437.
10. Sternberg, R. J., Wagner, R. K. (1993). The g-ocentric view of intelligence and job performance is wrong. Current directions in psychological science, 2(1): 1–5.
11. Giddens, A. (1990). The Consequences of Modernity. Stanford: Stanford University Press. ISBN 0-8047-1762-1