The Alleged Connection between Genetic Diversity and Economic Growth: The Out-of-Africa Theory and the Idea of an Economic Super-Race as an Abuse of Biology

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Abstract

The paper "THE "OUT OF AFRICA" HYPOTHESIS, HUMAN GENETIC DIVERSITY, AND COMPARATIVE ECONOMIC DEVELOPMENT" by Quamrul Ashraf and Oded Galor deals with the hypothesis of an alleged direct connection between genetic diversity of society and economic growth. The article claims that genetic diversity has created a fundamental long-lasting economic effect ever since, like to any other factor like geography, institutions, economic system and culture. Ashraf and Galor conclude that balanced levels of heterozygosis lead to a productive equilibrium of social expenses of high diversity and the creative benefits of higher variance in cognitive skills. The explanation of economic growth as such by a reduction to genetic diversity in a biological sense is neither just an improper attempt to base the social phenomenon economy on scientific biology nor does it lead just automatically to probable claims for ethnical cleansing; it is a direct misuse of scientific biology for an possibly politically motivated work-out from within Humanities, fully comparable e.g. to formerly popular "transfer-theories" of so-called Social-Darwinism or Eugenics. This broadly discussed paper has to be called highly problematic due to its defective methodology, its insufficient and partially illogical and inconsequent conclusions of analogy, leading to fatal errors caused by the direct transfer of biological facts to socio-economic circumstances. Finally, the article has to be called an example for a growing number of publications receiving enormous attention in the science world by their controversy claims and unfounded hypotheses that are finally not tenable.

Keywords: Out-of-Africa theory, economic growth, genetic diversity, biology, economy

Abbreviations

NSF - National Science Foundation (U.S)
NBER - National Bureau of Economic Research

1. Case Report

Published on the website of the National Bureau of Economic Research (NBER), a private, nonprofit, nonpartisan research organization in the U.S and supported by the American National Science Foundation (NSF), the paper "THE "OUT OF AFRICA" HYPOTHESIS, HUMAN GENETIC DIVERSITY, AND COMPARATIVE ECONOMIC DEVELOPMENT" by Quamrul Ashraf and Oded Galor has caused a discussion on scientific methodology, limits of interdisciplinary, misinterpretation and misuse of scientific theories from biology for political reasons.

The main hypothesis of the paper, claiming a fundamental causality between genetic diversity of human societies and economic growth stands on weak ground, due to the fact that the argumentation line is built of connections of independent versatile ideas, data, hypotheses and theories from both, economy and biology.

2. Discussion

The authors try to support their idea with other articles and scientific theories; however, they clearly misuse the findings and over-interpret them. Ashraf and Galor want to join information from bioscience and economy. However, it must be stressed that there is no logical connection between presented data, although the authors really would like to convince readers to their "innovative" idea about the direct connection between genetic diversity and comparative economic development.

Ashraf and Galor's theory on genetic diversity and economic development is rested on "two fundamental building blocks"[1]. The first one is "migratory distance from the cradle of humankind"[2], and the other is a hypothesis that "there exists an optimal level of diversity for economic development"[3]. It is not clearly stated if it is an optimal level of genetic diversity, or diversity in terms of culture, religion, what makes a big difference, because relation between e.g. cultural diversity and economic growth already has been examined[4].

Another inconsistency concerns a list of 53 ethnic groups ([1], Appendix F) which is used to conduct the research (mainly via migratory distance). Interestingly there are none ethnic groups from Bolivia, therefore the basis for the research lacks data or the data is taken from different, unknown for the reader source. That creates possibility of "adjustment of the data" for own needs- simply saying speculation of data and therefore speculation with the results. Later on in the article we read: "… adopted initially to examine contemporary impact of genetic diversity, along with the transition timing and land productivity". The relation pointed out by the authors seems very slim, as often they use words "along with", which do not constitute cause-and-effect relation.

Authors state that diversity (again not clear if they mean genetic diversity) has a direct impact on economic growth in opposition to indirect factors – geographical, institutional and cultural: "... migratory distance (…) has had a long-lasting effect on the pattern of comparative economic development that could not be captured by contemporary geographical, institutional and cultural factors" [1]. "The current specification, however, is further explained with controls for institutional, cultural, and additional geographical factors (…).This permits the examination of direct impact of the diversity channel, as opposed to its overall impact that additionally captures indirect effects, potentially correlated with these other determinants"[5]. However explanation of how diversity is connected or dependant on factors like geography, culture or institutional regulation is nowhere to be found in the text of the article. Additionally, if the relation (between genetic diversity and comparative economic development) could not be captured by cultural, geographical and institutional factors, shall it be possible that those factors are used as an argumentation to back up the main idea of the paper.

The authors claim that the intermediate level of genetic diversity produces the background for human society, needed to push forward economy; a relatively high level (expected heterozygosity – 0.722) of genetic diversity should provide the adequate number of individuals being able to create new, various innovations, whereas quite remarkable relatedness should help people to communicate, trust each other and create the feeling of community due to kin selection. However, there is no evidence that the alleged relationship occurs at all.

[1] [1], page 1.
[2] Op. cit.
[3] Op. cit.
[4] For evaluation of the role and impact of cultural factors on economic growth, see: Mark Casson, Andrew Godley. (2000).Cultural Factors in Economic Growth, Springer
[5] [1], part 4.1.2.

The authors quote articles investigating solely animal behavior, mainly bees (for example [2], [3], [4], [5]). Although the findings are interesting in evolutional studies, it is impossible to rely on them when creating anthropological behavior studies – which were ignored by the authors. Ashraf and Galor do not present any data which would link the genetic background of human population with social behavior and dealing with difficulties. It appears that for a direct transfer from biology to economy respective research in psychology and genetics has to be enforced, to have a scientific basis for finding any connection between genetic similarity and altruism, as well as if different genetic background influences the variety of mental possibilities. Quoted data on the subjective level of trust[6] and the average number of published scientific articles per capita[7] in investigated countries put simply together with genetic diversity analysis obviously do not fulfill this aim. In addition, cultural, historical and other factors not being connected to biological inheritance would have to be excluded if any connection between mentioned criteria and genetic diversity was tried to be demonstrated. Ashraf and Galor ignore these facts and follow their idea, building the entire theory on probably random coincidences.

What is more, the authors do not appreciate sufficiently a cultural influence on relationship between subgroups in one population, although it is briefly mentioned in the article [1][8]. Some other researchers [6] notice that genetic comparison between human populations can coincidentally correspond with sociocultural distances (as both of them are dependent on time when the ancestor groups split) and therefore genetic diversity measures could help to evaluate cultural similarities, also in the context of economic exchange. Ashraf and Galor refer in an unclear way to this finding, once more misuse the conclusions and try to support their idea of direct genetic diversity influence on economy with the observation described above. Under methodological aspects this is highly problematic, as avoiding mixing coincidences with causal relationship is one of the most important parts of science.

On the economic side the most popular and common measure of the state of the economy and therefore also a measure of the economic growth is a country's GDP [7] (Gross Domestic Product, which simply saying is an economic output of a given country) which is determined by two components: labor productivity and population growth. The authors of "Out of Africa" capture two conflicted effects of diversity corresponding to land productivity and population growth:. "On the one hand genetic diversity has a negative relationship with the prevalence of trust but positive one with scientific productivity"[9]. From economic theory we know that labor productivity can be improved mainly by introducing innovation[10] and this would be the only, logically possible link between genetic diversity and increase in economic development. In the paper however authors do not provide a consistent logical algorithm of how one goes from point A, being the genetic diversity, to point D which is increase in economic development. Point C in this logical algorithm would stand for innovations which we already know can increase economic growth, and point B connecting Genetic diversity to development of innovations within the society is not explained.

As earlier mentioned, authors refer to an optimal level of genetic diversity. They established that optimal level of genetic diversity is one of USA: 0,72 (while 0,722 is perfect one, counted by the authors). Bolivia and Ethiopia are on the outskirts of this classification. Bolivia is the country with the most homogenous population, whereas in Ethiopia there is the highest level of genetic diversity, amongst all other countries in the Ashraf and Galor's study. The authors claim that genetic diversity is one of the causes for Bolivia and Ethiopia's enormous economic gap between them, and US economy. One can list many reasons, much more significant including geographical, political, institutional, cultural factors, that influence an economy and has made the US economy the biggest in the world. Furthermore US' economy is not as strong as it used to be in 1950s, and 1960s, and ever since the fall of Bretton Woods in early 1970s the US' role as global economic leader is fading. One can argue that soon, it will be one of the BRIC countries (Brazil, Russia, India, China) that overtakes that role from the USA, most probably it will China.

As known, China's economy bases on population growth, and labor productivity is relatively small (in comparison to the US).

[6] World Values Survey, 1981-2008; Respondents answering question about how much one can trust others.
[7] From World Bank's *World Development Indicators*, 1981-2008
[8] [1], page 8 ["The paper is also unique in its attempt to establish the role of genetic (rather than ethnic) diversity within a society as a significant determinant of its development path (…)."].
[9] [1], page 37.
[10] "Product and process innovations clearly are crutial for productivity increases and economic growth" [8].

Therefore, following the logic presented in the article, China should benefit from decreasing genetic diversity level, due to higher (economic) significance of population growth factor (in the economic sense) corresponding to negative effect of the genetic diversity- trust decrease amongst people. On the other hand increase in genetic diversity level would also be beneficial, as it would strengthen the weaker point of Chinese economy by increasing innovation. The real question is which of presented options would be more beneficial for China, and to that there can be great number of reasons for and against each option. Moreover those reasons depend not only on the factors that we can express in reasonable way or with a hard data numbers and equations (use of statistics, economic forecasts, econometric models- which base on historical/ statistical data but still cannot predict future behavior of people or markets[11]), but also on human differences, e.g. political views on the way of Chinese economic development. These views develop under an influence of many factors including family influence, education, culture etc. It is very hard to say in what weight those components influence us now (way of thinking, decisions). Just like it is hard to single out genetic diversification influence on the economic development of a country. Is it justified to say that every country, regardless of the cultural composition or the political situation will benefit from the same level of genetic diversity, which has been set as optimal? Generally speaking there are too many factors, which spread into sub-factors and so on to conduct a research on influence of that factor solely.

It is postulated in the article[12] that increasing the genetic diversity by 1% in Bolivia (the most homogeneous country from the investigated ones) or decreasing by the same rate in Ethiopia (the most heterogenous one) would significantly have helped – by a couple dozen of percentages – to increase the income in the year 2000 CE in these countries. Alike predictions are also done for population densities in the pre-colonial Malthusian era[13,14]. Also the level of trust and the number of scientific articles per capita are said to be affected if genetic diversity have changed[15].These postulates are both irrelevant, because of ignoring other economic factors (for example – institutional regulation), and dangerous, as they could become the basis for eugenic theories and discriminative actions on an ethnic level, which would aim to increase economic development with the manipulation of population structure. Claiming that changes in a genetic diversity level would result in improving the mentioned factors so significantly, even if there was any connection between them (and, as previously mentioned – there is no evidence for this), is very naïve, as the economic growth depends on many components that restrict other influences – like historical legacy, law or biogeographical aspects. The authors miss to say how this approaching for the "optimal" level of genetic diversity should occur – by mutations, migrations or the extermination of some subgroups? Also the time of these events is not mentioned, both when the shift towards the "best" level should occur and how long it would last till the optimal level of economical growth was observed. If governments followed this idea and decided that it is possible to improve economy by manipulating with the given national genetic diversity, we could observe breaking human rights on a large scale. Among possible "solutions" we could imagine ethnical cleansing, compulsory migrations or physical exterminations. Though it sounds impossible, we must remember that in the past similar situations took place – it is enough to mention the tragedy of Holocaust during World War II or compulsory sterilization lead by many countries in the XX century. Both of them relied on negative eugenic theories which were adopted to "improve" the condition of societies.

The authors of the article misuse biological data in order to convince readers to their theory about the alleged correlation between genetic diversity and economic development. However, analyzing the attempts of making the connection reveals that the researchers manipulate the facts. They create new hypotheses basing on random examples from different branches of science – genetics, evolution, psychology, economy – and try to link them without any investigation. Such attitude is contradictory to every reliable scientific research, especially when followed by subsequent findings and suggestions.

Conclusions

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[11] Numerous unexpected shocks (positive/negative), crashes, bubbles etc.
[12] [1], pages 6-7, 35.
[13] [1], pages 4, 6, 19-20.
[14] According to Malthusian theory, in the pre-industrial era populations became larger instead of getting richer per capita.
[15] [1], pages 37-38.

They create new hypotheses basing on random examples from different branches of science – genetics, evolution, psychology, economy – and try to link them without any investigation. Such attitude is contradictory to every reliable scientific research, especially when followed by subsequent findings and suggestions.

This article stands in worst tradition misusing biological knowledge and facts for political purposes, e.g. the so-called social-Darwinism. In order to make the connection of genetic diversity and economic growth appear to be a factual truth, Ashraf and Galor, use versatile scientific material from Biology in inconsistent and incoherent ways. For the main hypothesis of the article can impossibly derived from the eclectic data, theories and hypotheses the authors work with, the question for the motivation for this article has to be asked, and it appears obvious that the postulation of a genetically determined economic super-race is the goal of this publication.

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