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The Diffusion of Development: Along Genetic or Geographic Lines?

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Abstract

Why are some societies still poor? Recent research suggests that a country's "genetic distance"—a measure of the time elapsed since two populations had common ancestry—from the United States is a significant predictor of development even after controlling for an ostensibly exhaustive list of geographic, historical, religious and linguistic variables. We find, by contrast, that the correlation of genetic distance from the US and GDP per capita disappears with the addition of controls for geography, including distance from the equator and a dummy for sub-Saharan Africa.

Keywords: Genetic Distance, Economic Development, Geography, Climatic Similarity, Technological Diffusion
JEL Classification: O10, O33, O49

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1. Introduction

Why are some societies still poor? To answer this question, economists have begun to investigate the role of genetics in the wealth of nations. In a prominent study, Spolaore and Wacziarg (2009)—henceforth SW—argue that the revolution in technological innovation that began in Lancashire cotton textiles circa 1760 spiraled outwards first to immediate locales, soon to the whole of Britain, then to the entire English-speaking world, and finally to other culturally and *genetically* similar peoples of the world.[1] Today, with the United States at the forefront of the world technological hierarchy, SW find that distance from the United States—measured geographically, culturally, and genetically—is a determinant of a society's level of technology and development.

The authors argue that the significance of their genetic distance variable, a measure developed by Cavalli-Sforza *et al.* (1994) based on the time elapsed since two societies existed as a single panmictic population, does not imply any direct influence of specific genes on income. Instead they argue that genetic distance proxies a divergence in traits "biologically and/or culturally" that provide barriers to the diffusion of technology. SW report that genetic distance "has a statistically and economically significant effect on income differences across countries, even controlling for measures of geographical distance, climatic differences, transportation costs, and measures of historical, religious, and linguistic distance."[2] Were the impact of genetic distance on development robust to an exhaustive array of geographic controls and other barriers, it could be construed as evidence in favor of a direct impact of genetic distance from the US on income. This provocative result would be interesting and important, but it would also be surprising given that genetic distance from the US is strongly correlated with geographic factors (see the world map in Fig. 1 and Table 1).[3]

[Insert Fig. 1]

[Insert Table 1]

In this paper, we find that the evidence offered in support of the theory that genetic distance predicts GDP per capita is sensitive to the inclusion of standard geographic controls, including a dummy variable for sub-Saharan Africa and either latitude or a second dummy

[1] Three other examples are Spolaore and Wacziarg (2013 and 2014), who use the same genetic data and make a similar argument with technology adoption, and Ashraf and Galor (2011), who look at ethnic diversity.
[2] Spolaore and Wacziarg (2009), p. 469.
[3] Continent dummies alone can explain nearly 70% of the variation in genetic distance (versus a still considerable 56% of the variation in income), and a fuller set of geographic variables explain 86% of the variation in genetic distance (vs. 72% of income). These variations come from additional regressions of genetic distance on geographic variables. The results are available on the authors' webpages.

variable for Europe. Of course, with a limited number of observations in cross-country regressions, if one adds in various combinations of a long list of additional controls at random, one is likely to eventually eliminate any result, even if an actual causal relationship exists. It is therefore critical that the controls be well-motivated. In this case, a dummy for sub-Saharan Africa and latitude are both standard controls in the cross-country income literature. In addition, SW themselves motivate the inclusion of both latitude and dummies for large geographic regions as controls. The problem is that they do not control for latitude correctly (this will be discussed in more detail below), and while they do express legitimate concern that sub-Saharan Africa (hereafter SSA) may be driving their results, they do not include a dummy variable for SSA in any of their regressions.[4] While the purpose of our paper is to show that SW's results are in fact sensitive to geographic controls they themselves discuss and motivate, we first discuss at length why we believe these controls are necessary and the potential mechanisms by which these geographic variables may have had a causal impact on both genetics and development.[5]

Our research adds to a small but growing body of literature that has begun to question the apparent impact of genetics on development. In related research, Giuliano, Spilimbergo, and Tonon (2006, 2013) find that after they control for various geographic measures, genetic distance does not explain trade flows within Europe. Angeles (2012) shows that SW's genetic distance proxy is sensitive to the inclusion of various additional linguistic, religious, colonial, and geographic controls, including the percentage of the population with European ancestry (not counting mestizos). Our result builds on previous scholarship by showing that SW's results can also be eliminated with the inclusion of two standard geographic controls, both which were motivated by SW themselves, and by showing that SW's results can be eliminated in a myriad of ways.[6]

2. Theoretical Relation between Genetics, Development, and Geography

Taking the world's technological leader as given, SW argue that technology will diffuse from the leader to other societies based on proximity measured in terms of geography, culture, and genetics. This theory is one of our motivations for the inclusion of both continent dummies and latitude as controls, because countries located on more proximate continents should have an

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[4] Spolaore and Wacziarg (2009), p. 501.

[5] We thank an anonymous referee for suggesting that we discuss the causal impact of geography on genetic distance.

[6] It should be noted that the unpublished 2006 version of Giuliano *et al*. considers incomes, although only for Europe, while the 2013 version does not. Riahi (2013) argues that historical settler mortality explains both genetic distance and incomes.

advantage in development, while some technologies are clearly more suitable for particular latitudes. For example, air conditioning is a technological innovation which is clearly relatively biased toward countries closer to the equator, while home heating technologies tend to be relatively more beneficial to countries located further from the equator. This is merely one concrete example of why we would want to include latitude as a control, but a long line of research, including Crosby (1972), Kamarck (1976), Diamond (1992), Sachs (2001), and Gallup, Mellinger, and Sachs (1999), makes a persuasive case in our view that "climatic similarity" has historically been crucial for the diffusion of various technologies and consequently plays a large role in comparative development. This literature also has implications for the geographic distribution of "genetic distance from the US".

For example, Crosby (1972) notes that European people, plants, animals, and germs all colonized areas of the world with climates similar to Europe (which he terms "Neo-Europes"). Diamond (1992) argues that both diseases and agricultural technology spread more easily east-to-west, helping to give the natives of the relatively large Eurasian landmass an advantage over more isolated areas, such as Australasia, and over those living in continents with a north-to-south axis such as the Americas and Africa. Kamarck (1976) details the extreme difficulty of transplanting agricultural technologies from temperate regions to the tropics. Sachs (2001) discusses the more challenging disease environment in tropical areas and especially in sub-Saharan Africa, which could impact development in a myriad of ways, including directly, or indirectly by inhibiting the diffusion of technology or via institutions, trade costs, or historical migration patterns.

In addition, in a world typified by hysteresis (Campbell 2014), where GDP per capita rankings are very stable across decades (more evidence that history matters), where Malthusian forces have certainly been a strong force historically and are debatably still at play in some developing countries (see Clark, 2008), the nature of historical agricultural technology diffusion and the historical disease environment will necessarily be important for development today. And regardless of the mechanism (even if one prefers a purely institutional story), it has long been known that countries near the equator tend to be less developed, which is why "distance from the equator" is a standard control in cross-country income regressions, and why even SW sought to include latitude as a control.

How might geography determine "genetic distance from the US?" The line of research that emphasizes the importance of climactic similarity also provides a logical explanation for why "genetic distance from the US" would be correlated with distance from the equator and negatively correlated with a dummy for sub-Saharan Africa. This would arise as a byproduct of the "Columbian Exchange" (documented by Crosby, 1972), when, after 1500, European plants, animals, and humans all began colonizing areas of the world with similar climates and areas with less competitive ecosystems due to remoteness relative to the large east-to-west Eurasian landmass. Thus, areas such as the US north and the southern cone countries, which were both relatively remote and had climates similar to that of Europe, were quickly colonized by Eurasian mice, rabbits, bees, grass, weeds, trees, and people. Meanwhile, areas such as sub-Saharan Africa, which was not nearly as remote before 1500 and had a very different climate from Europe, was not colonized by Europeans until much later, and invasive species from Eurasia are still relatively rare (Crosby 1972 and 1986).

Thus, an incidental implication of the "geographic similarity" theory of development is the likelihood of finding a raw correlation between "genetic distance from the US" and development. An alternative theory might posit that temperate areas of the world are rich today precisely because Europeans tended to move there. To figure out which hypothesis is supported by the data, we can test whether the apparent impact of "genetic distance from the US" on GDP per capita survives the inclusion of controls for geographic similarity, including latitude and continent dummies. We find that genetic distance from the US is sensitive to the inclusion of various controls for geographic similarity, including dummies for Europe and SSA. Thus, SW's argument that genetic distance from the US causally determines GDP per capita essentially takes the observation that Europe is rich and Africa is poor, and then leaps to the conclusion that this difference is due to genetics. Yet the evidence within continents contradicts this conclusion, with numerous counterexamples: temperate areas of the world that are genetically distant from Europe, such as Korea and Japan, are rich, while areas in the tropics that are genetically closer, such as East Africa, are desperately poor.

Our findings are instead consistent with the theory that the technologies developed during the Industrial Revolution diffused first to other temperate regions of the world, where European agricultural technology could be deployed and where the disease environment was most favorable to European people and their institutions, technology, seeds, animals and even germs. This theory can also explain why SW found a correlation between genetic distance from the US and income per capita, and why this correlation disappeared with the inclusion of a sparse number of geographic controls.

3. Empirical Analysis

We have reproduced the baseline result from SW's Table 1, which estimates the following equation:

$$\log y_i = \alpha + \beta \cdot gen_{i,US} + \mathrm{X}_{i,(US)} \cdot \gamma + GEO_i \cdot \delta + \varepsilon_i\,, \qquad (1)$$

where $\log y_i$ is the log of country i's GDP per capita in 1995, $gen_{i,US}$ is the genetic distance from the US from country i, and $\mathrm{X}_{i,(US)}$ are vectors of geographic controls from SW. $\mathrm{X}_{i,(US)}$ includes absolute longitudinal and latitudinal difference from the US, distance from the US, contiguity with the US, and it also includes dummies for sharing an ocean, being an island or being landlocked. GEO_i are important climatic and geographic difference controls omitted in SW, including distance from the equator and a dummy for sub-Saharan Africa.

In column (1) of Table 2, we find that "genetic distance from the US," measured as the amount of time elapsed since the populations in these countries separated, is a significant predictor of income per capita even after controlling for various measures of physical distance.[7] Yet, column (1) does not contain any variables which denote differences in climatic endowments. "Absolute difference in latitude" from the US is included, but "absolute difference in absolute latitude"—distance from the equator—is not.[8] The reason why the latter is the appropriate control is that although the Southern Cone countries, South Africa, and Australasia all have very large absolute differences in latitudes with the US, they have similar climates owing to their similar *absolute latitudes* with Europe and the United States.

[Insert Table 2]

Fig. 2.A displays the nonlinear relationship between income and absolute difference in latitude from the US that SW included (linearly) as one of their main geographic controls, while the strong linear relationship between log income and distance from the equator is readily apparent in Fig. 2.B. Note that SW themselves write that latitude could affect income directly, or

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[7] Our sample size is slightly larger than SW's, as their original sample is not publicly available and could not be acquired, and there is one variable, freight rate to the northeastern US, which we could not get because the original website listed as the source in SW appears to be no longer operable. This variable was not significant in SW, and eliminating all of SW's other controls do not change our results (Table 1, Column 5). Our replicated coefficient is slightly larger than that in SW -- -13.5 vs. -12.5.

[8] Hall and Jones (1999) also find a strong correlation between distance from equator and income per capita, although they interpret latitude as a proxy for institutional quality because it is highly correlated with "Western influence," rather than as a geographic or climatic variable.

via technology diffusion, and so it is a relevant control, yet they do not include distance from the equator as a control in their primary results in Table 1 (p.488). When distance from the equator is included in column (2), the marginal effect of genetic distance on income difference decreases by 33%, although the genetic distance coefficient is still significant.

[Insert Fig. 2]

In addition, Figure 2.B displays the fact that most of sub-Saharan Africa (red squares in the Figure) is relatively poor and mostly located within 20 degrees of the equator. It might be that "genetic distance" explains why sub-Saharan Africa is poor or why latitude is so highly correlated with development—that Europeans settled in areas with climates similar to Europe, and these places are now developed owing, according to SW, either to the ease with which European technologies were able to diffuse to populations with similar genetic endowments, or to the special characteristics of those endowments.[9] In column (3) of Table 2, when we include a dummy for the 41 sub-Saharan African nations in our sample, the impact of genetic distance on income falls by nearly 50% as compared with the baseline specification in column (1), although it is still significant at 5% instead of the 1% level. In column (4), however, when we include controls for latitude and a SSA dummy simultaneously—the very first specification we tried after coding up the dataset—the coefficient on genetic distance falls even more, rendering the results insignificant. Thus genetic distance from the US does not seem to help explain poverty in Africa or in the tropics.

SW presciently express concern that sub-Saharan Africa may be driving their results. Yet instead of including it as a control—as is standard in the cross-country growth literature, including Barro (1991), Fisher (1991), Sala-i-Martin (1997) and Lorentzen, McMillan, and Wacziarg (2008)—SW report that their results are robust to excluding sub-Saharan Africa countries in their regressions.[10] Although sub-Saharan Africa is very poor and distant genetically from the US, the richer countries within Africa tend to be genetically remote (see Fig. 1 and Fig. 3). This pattern also holds for other regions such as Asia. In fact, several rich East-Asian nations, such as Japan, Hong Kong, and Singapore, are actually more distant from the US genetically

[9] Bloom and Sachs (1998) emphasize the geographic and climatic characteristics of sub-Saharan Africa in determining poor economic performance in the region, arguing that "Sub-Saharan Africa is by far the most tropical—in the simple sense of the highest proportions of land and population in the tropics—of the world's major regions." Other recent research also considers the multifarious causes of poor economic performance in sub-Saharan Africa, such as the legacy of colonial rule and slave trading, heavy dependence on a small number of primary exports, internal politics and corruption, demographic changes, etc.

[10] Spolaore and Wacziarg (2009), p. 501.

than many very poor sub-Saharan Africa countries, such as Somalia, Ethiopia, and Madagascar (see Fig. 3). Given that evidence within sub-Saharan Africa itself constitutes a clear counterexample, it is legitimate to ask why excluding a group of counterexamples is preferable to including a control for sub-Saharan Africa, as is the standard in the cross-country income regression literature. In addition, SW themselves argue that the impact of genetic distance on income is robust to the inclusion of controls for large geographic regions and latitude combined, but when they implement this robustness check they combine North Africa with SSA.

[Insert Fig. 3]

As distance from the equator is an imperfect proxy for climate, when we include a more precise climatic variable—the percentage of each country's land area in the tropics or sub-tropics in column (5)—the point estimate falls even further. In column (6), we show that controlling for the tropics and a SSA dummy alone eliminates the result even when we omit the other controls from SW.

One worry might be that we can only eliminate SW's result by controlling for two controls simultaneously, an SSA dummy and latitude. We believe this is justified since SW also proclaimed their results to be robust to an ostensibly exhaustive list of geographic and cultural controls, including regional controls and latitude simultaneously. The finding that genetic distance from the US impacts income would be much less interesting if it were only robust to the inclusion of singular geographic controls. However, we also find that regional controls alone eliminate the result. In column (7), when we include indicator variables for Europe and SSA, the impact of genetic distance on income per capita is once again not significant.[11] Additionally, outside of Africa and Europe, even the raw correlation between GDP per capita and genetic distance from the US is not significant (Fig. 4 contains a scatterplot of this relationship).[12]

[Insert Fig. 4]

SW also employ a novel second estimation approach to reinforce their results. They argue that if genetic distance from the US predicts income levels, then the income differential between any two countries should be a function of their relative genetic distance from the US. Thus, SW present pairwise differenced regressions showing that relative genetic distance from the US is correlated with income differences generally (SW's Table IV). The authors differentiate GDP per capita at the dyadic pair level for each combination of 137 countries (145 in our sample),

[11] In a web appendix we also show that our results hold when using different measures of genetic distance and are also robust to expanding the sample to include 20 additional countries, for which we do not have complete data.
[12] In Figure 4, we get a coefficient of -5.3 on genetic distance from the US, but with a standard error of 3.3.

manufacturing 9,316 highly dependent data points (10,296 in our slightly larger sample), and they use this as the dependent variable with the regressor of interest now being relative genetic distance from the US. The other regressors are differences in geographic variables for each bilateral observation. It should be noted that if there is no cross-country relationship between genetic distance from the US and income, then it is unlikely that relative genetic distance from the US could predict income differentials.[13] We include this specification in the interest of being thorough.

The following specification is built on SW's pairwise differenced regressions:

$$|\log y_i - \log y_j| = \alpha + \beta \cdot gen_{ij}^R + \mathrm{X}_{ij}\gamma + \rho_{ij} + \varepsilon_{ij}, \qquad (2)$$

where $|\log y_i - \log y_j|$ is the absolute difference of log income per capita between countries *i* and *j* in 1995, and the relative genetic difference variable is defined as $gen_{ij}^R = |gen_{i,US} - gen_{j,US}|$, where $gen_{i,US}$ is the genetic distance from the US, and X_{ij} is the vector of absolute difference in other geographic variables between countries *i* and *j*. ρ_{ij} are pairwise continent (region) fixed effects, and ε_{ij} is the error term, which are clustered in two dimensions, by country *i* and by country *j*.

[Insert Table 3]

We benchmark SW's Table IV results in column (1) of Table 2, and in column (2) we add in a climatic difference control. These regressions appear to support a role for genetic distance in development. However, while SW correctly stress the importance of including continent dummies in their analysis, they include only six regions (Asia, Africa, Europe, North America, Latin America, and Oceania) and do not separate sub-Saharan Africa from Mediterranean North Africa. They also include a set of six dummies equal to one if both countries in a pair are in the same region and another set of six dummies equal to one if one country belongs to a given region and the other does not. However, using just 12 dummies for six regional pairings with 21 combinations could be problematic. For example, the average absolute income difference between North America and Europe is much smaller than the sum of the average absolute income difference between North America and all other countries plus the average absolute income difference between Europe and all other countries. SW's method of continental dummies thus predicts a large income difference between North America and Europe, which could cause an upward bias on the coefficient genetic distance from the US.

[13] This is because the 9,317 bilateral data points in SW were manufactured using data from just 137 countries. If genetic distance from the US does not predict income levels, then it would be extremely unlikely that, for example, genetic distance relative to Canada could predict income differentials with Canada.

If we instead separate sub-Saharan Africa from the Mediterranean North African countries and include a separate dummy for each regional pairing—*i.e.*, a dummy for North America paired with South America, and a separate dummy for South America paired with sub-Saharan Africa for 28 fixed effects total—then the impact of relative genetic distance shrinks and loses significance. Including these dummies, however, does not render the "absolute difference in absolute latitude" or the "absolute difference in % of land area in the tropics" variables insignificant in columns (4) and (5), while several of the other geographic controls actually increase in significance.

4. Conclusion

The results presented above show that genetic distance loses the ability to explain income after the inclusion of geographic controls, including distance from the equator and a sub-Saharan Africa dummy. Our findings provide additional evidence for the importance of climatic endowment variables, if not the exact mechanism by which these variables impact development. Future research should continue to introduce creative variables with the potential to explain why some peoples are poor and why climatic and geographical similarities have been such a strong force historically—but there is scant evidence that the answer to this mystery lies in our genetic differences.

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Table 1. Correlation between Key Variables

	Log GDP per capita	*F*st Genetic Distance from the US, weighted	Sub-Saharan Africa dummy	Distance from Equator	% of land area in tropics and subtropics	Europe dummy
Log GDP per capita in 1995	1					
*F*st genetic distance from the US, weighted	-0.6107	1				
Sub-Saharan Africa dummy	-0.6132	0.7693	1			
Distance from Equator	0.5639	-0.6623	-0.5378	1		
% of land area in tropics and subtropics	-0.4579	0.556	0.3076	-0.7723	1	
Europe dummy	0.5390	-0.5192	-0.3575	0.7169	-0.4975	1

Table 2. Income Level Regressed on Various Geographic Measures, 1995

Dependent variable: log income per capita, 1995	(1) SW's Baseline Controls	(2) Add Distance from equator	(3) Add sub-Saharan Africa (SSA) dummy	(4) Add Distance from equator & SSA dummy	(5) Add (%) of Land Area in Tropics and Sub-Tropics	(6) Sparse Controls (SSA dummy & Climatic Control)	(7) Two Continent Controls only
F_{ST} genetic distance from the US, weighted	-13.28***	-8.924***	-6.926**	-3.301	-1.261	-3.176	-3.12
	(2.061)	(2.276)	(2.744)	(2.729)	(2.876)	(2.724)	(2.521)
Absolute difference in latitude from US	1.811**	1.085*	2.005***	1.308**	1.643***		
	(0.709)	(0.605)	(0.658)	(0.564)	(0.619)		
Absolute difference in longitude from US	1.130**	0.013	1.100**	0.051	0.473		
	(0.490)	(0.507)	(0.432)	(0.462)	(0.431)		
Geodesic distance from the US (1000s of km)	-0.234**	-0.029	-0.241***	-0.047	-0.143		
	(0.100)	(0.103)	(0.090)	(0.095)	(0.088)		
=1 for contiguity with the US	1.200***	0.521*	1.081***	0.451*	0.487*		
	(0.212)	(0.312)	(0.191)	(0.246)	(0.272)		
=1 if share a common sea or ocean	-0.407*	0.024	0.454	-0.102	-0.135		
	(0.240)	(0.253)	(0.304)	(0.251)	(0.252)		
=1 if the country is an island	0.656**	0.660**	-0.459*	0.473	0.528**		
	(0.315)	(0.317)	(0.241)	(0.294)	(0.258)		
=1 if the country is landlocked	-0.392	-0.469**	-0.516**	-0.527**	-0.517**		
	(0.245)	(0.225)	(0.229)	(0.226)	(0.235)		
Distance from the Equator		0.031***		0.029***			
		(0.007)		(0.007)			
% of land area in tropics and sub-tropics					-1.109***	-0.740***	
					(0.248)	(0.230)	
Sub-Saharan Africa dummy			-1.016***	-0.940***	-1.293***	-1.277***	-1.168***
			(0.247)	(0.228)	(0.245)	(0.270)	(0.248)
Europe dummy							0.985***
							(0.199)
Constant	9.774***	8.294***	9.571***	8.193***	9.480***	9.271***	8.713***
	(0.267)	(0.444)	(0.288)	(0.436)	(0.287)	(0.190)	(0.243)
Observations	145	145	145	145	145	145	145
R^2	0.447	0.503	0.491	0.541	0.552	0.46	0.496

Notes: 1. Robust Standard errors in parentheses; *significant at 10%; **significant at 5%; ***significant at 1%.

2. Genetic distance data from Cavalli-Sforza et al. (1994) via SW (2009). Geographic data is from the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII), Tropics variable from Gallup, Mellinger, and Sachs available at http://www.ciesin.columbia.edu/eidata/, and GDP data is from the World Bank's WDI.

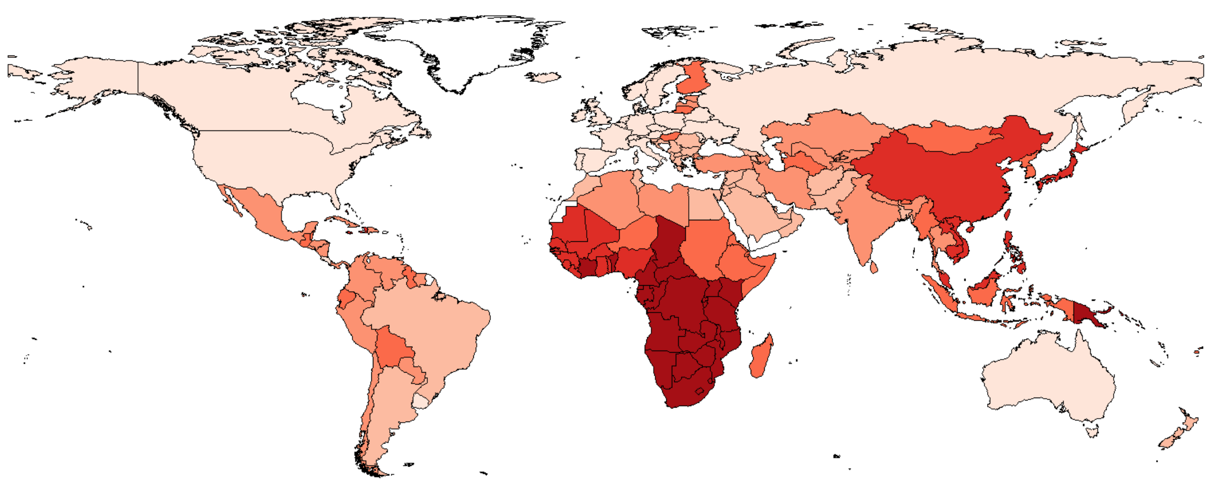
3. The genetic variable (Weighted Fst distance) is the time elapsed between two populations on average.

Table 3. Paired World Income Difference Regression (Two-way Clustering)

Dependent variable: absolute difference of log income per capita between countries *i* and *j* in 1995					
	(1)	(2)	(3)	(4)	(5)
	Replication of SW's column 5 in Table IV	Replication of SW's column 6 in Table IV	7 regions with sub-Saharan Africa and Middle East& North Africa	Adding Abs. Difference in Abs. Latitude	Adding Abs. Difference in % of Area in Tropics and Sub-Tropics
	SW's Regional Dummy	Climate control only	Region-by-Region Fixed Effects		
F_{ST} genetic distance relative to the US, weighted	3.292***	6.489***	1.000	0.645	0.660
	(1.252)	(1.165)	(1.141)	(1.135)	(1.130)
Absolute difference in latitude	-0.170	0.104	-0.031	-0.465*	-0.094
	(0.226)	(0.264)	(0.258)	(0.279)	(0.262)
Absolute difference in longitude	0.258*	-0.02	0.467**	0.228	0.410**
	(0.146)	(0.182)	(0.203)	(0.188)	(0.193)
Geodesic distance (1000s of km)	-0.027	-0.014	-0.041	-0.008	-0.036
	(0.020)	(0.024)	(0.027)	(0.025)	(0.026)
=1 for contiguity	-0.339***	-0.580***	-0.359***	-0.318***	-0.339***
	(0.068)	(0.072)	(0.070)	(0.067)	(0.068)
=1 for either country is island (0 for both are islands)	0.168**	0.149	0.166**	0.159*	0.156*
	(0.083)	(0.095)	(0.082)	(0.082)	(0.084)
=1 for either country is landlocked (0 for both landlocked)	0.161**	0.128*	0.135**	0.153**	0.142**
	(0.073)	(0.075)	(0.067)	(0.065)	(0.066)
=1 if pair shares at least one sea or ocean	0.106*	-0.001	0.051	0.070	0.054
	(0.054)	(0.057)	(0.056)	(0.057)	(0.055)
Absolute difference in absolute latitude				0.010***	
				(0.004)	
Absolute difference in % of land area in tropics and subtropics		0.190*			0.183**
		(0.109)			(0.089)
Observations	10,296	10,296	10,296	10,296	10,296

Notes: 1. Two-way clustered standard errors in parentheses (Cameron *et al*. 2011).
*significant at 10%; ** significant at 5%; *** significant at 1%.
2. All data are from the same sources as in Table 2.
3. Column (1) contains 12 regional dummies as in SW, column (2) contains 21 region-by-region fixed effects based on 6 regions, and columns (3)-(5) include 28 region-by-region fixed effects.

Fig. 1. Chloropleth Map: Weighted Genetic Fst Distance from the US



(Darker countries are relatively more genetically distant from the US.)

Fig. 2. Latitudinal Distance from the US vs. Distance from the Equator

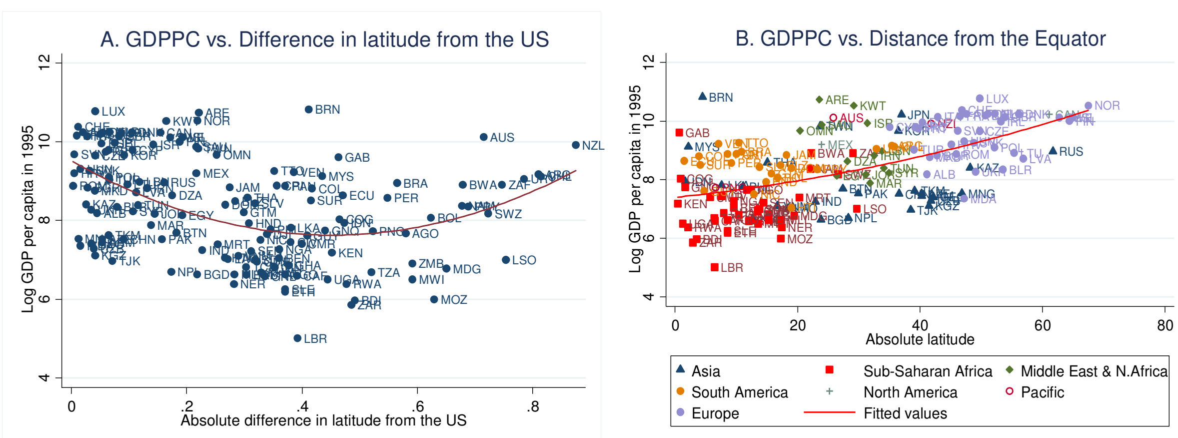


Fig. 3. Income per capita vs. Genetic Distance from the US: Asia and sub-Saharan Africa

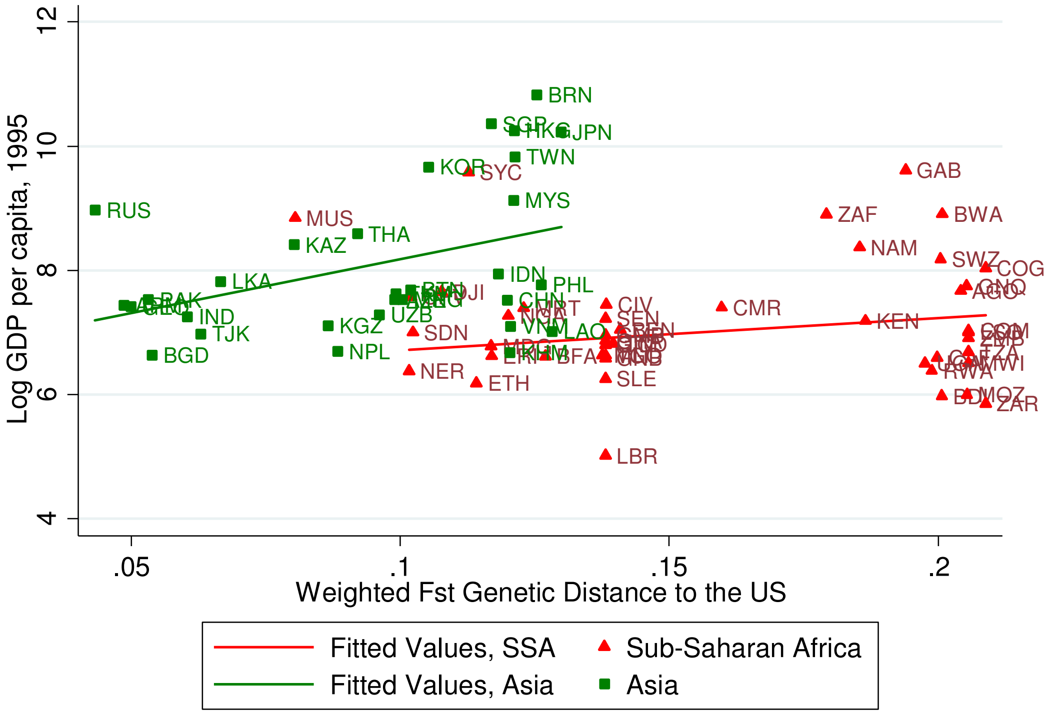


Fig. 4. Income per capita vs. Genetic Distance from the US: World ex sub-Saharan Africa and Europe