Cultural Distance and Economic Divergence over Time

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Abstract

Instead of featuring a long-awaited convergence process, the second half of the twentieth century witnessed a dramatic income divergence across countries. We propose cultural distance between countries as a determinant of this economic divergence. Cultural similarity makes it easier for societies to interact, learn and adopt from one another. Consequently, cultural differences may lead to economic divergence over time as they slow down the adoption of technological and institutional innovations from the frontier countries. We show that the overall economic divergence observed in the world since the 1950s is driven by countries with high relative cultural distance to the technological frontier. In contrast, the income gap among countries with low relative cultural distance remained unchanged over time. Further analysis reveals that a one-unit rise in relative cultural distance to the frontier is associated with an increased income divergence of almost seven units.

Keywords: culture, cultural distance, economic divergence, income divergence.

JEL classification codes: O10, O47, Z10.

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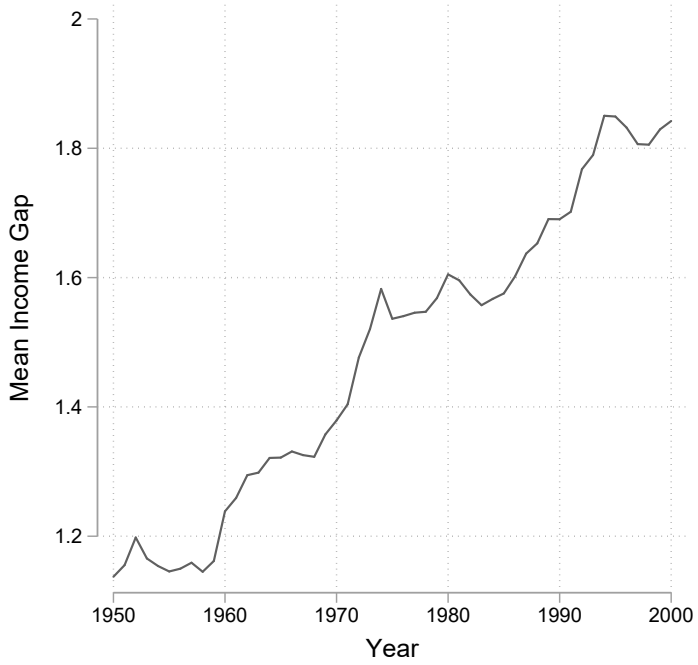
1 Introduction

Average person in the world is four times richer now than in 1950. Continued improvements in living standards in most of the world and the potentials of global convergence inspired optimism among economists that the incomes of developing and advanced economies would eventually converge (Rodrik, 2011). Yet, the gap between rich and poor countries has actually grown over time. Average income gap across countries in 1950 has more than doubled by the end of the century (Figure 1). For example, in 1950, GDP per capita of the US was nine times that of Bolivia, while it became 15 times larger by 2000. There are exceptions, however, and the ratio of per capita incomes between, for example, the US and Australia or Canada remained fairly constant over the same period, at around 1.2.

Figure 1: Mean income gap over time



This figure plots the mean income gap across countries in a given year from 1950 to 2000. Mean income gap is the average of the absolute per capita income gap ($|Log\ Y_i - Log\ Y_j|$) across all countries.

The question then is why income differences between some countries continued to widen over time while for others the gap remained stable. Although economic development among nations is often described as a consequence of global integration of markets (Barro and Sala-i Martin, 1992), structural change (Bils and Klenow, 2000), industrial policies, trade, and protection of private property rights (Rodrik, 2011), the causes of economic divergence over time received

significantly less attention. Against this background, this paper contributes to the discussion of divergence by building on culture-based explanations of socio-economic outcomes (Alesina and Giuliano, 2015). In particular, we propose that cultural distances between countries are partly responsible for the persistent and growing economic divergence. We document that the overall economic divergence observed in the world since the 1950s is driven by countries with high relative cultural distance to the technological frontier. In contrast, income gap among countries with low relative cultural distance remained unchanged over time. Further analysis reveals that a one-unit rise in relative cultural distance to the frontier country is associated with an increased income divergence of almost seven units over 1950 to 2000.

The literature suggests that cultural differences between and within societies can act as a barrier to the diffusion of development through various channels (Alesina and Giuliano, 2015; Nunn, 2012; Spolaore and Wacziarg, 2009). Cultural differences delay and hamper the diffusion and adoption of technological and institutional innovations from the economically leading frontier nations (Spolaore and Wacziarg, 2009), the exchange of goods and services (Gokmen, 2017), capital investment and credit (Burchardi et al., 2018; Fisman et al., 2017) as well as political and economic institutions conducive to economic activity (Alesina and Giuliano, 2015; Greif and Tabellini, 2010; Nunn, 2012).

Moreover, cultural distance retards the income convergence potential of bilateral economic exchange (Bove and Gokmen, 2018; Gokmen, 2017) and integration (Ben-David, 1993).[1] Consequently, culturally closely related societies find it easier to interact and learn from each other, and in turn, adopt innovations developed by one or the other. Thus, highly developed and culturally proximate countries share the most recent technologies and developments, as technological and institutional innovations diffuse first among culturally closer societies. At the same time, more economic exchange and interaction potentially lead to a further reduction in cultural differences among these countries (Maystre et al., 2014). Then, in the past century, countries that were culturally closer to the technological frontier must have had greater economic interaction, reduced their income gap as a result, and also become culturally even closer. In comparison, culturally distant countries must have had less interaction with the technological frontier, lagged behind in terms of income, and become culturally even more distant. This ultimately results in a feedback loop where cultural distance accelerates economic divergence over time between

[1] Lest cultural distance should lead to conflict (Bove and Gokmen, 2016; Gokmen, 2019).

culturally closer, richer countries and culturally distant, poorer countries.[2]

2 Data and Estimation

Genetic distance has been established in the literature as a measure of longer-run cultural differences. It measures the distance to the most recent common ancestry and relatedness of two populations (Spolaore and Wacziarg, 2009; Cavalli-Sforza et al., 1994). By estimating when two populations shared common ancestors, genetic distance provides us with a summary of slowly-changing cultural traits that are transmitted intergenerationally within populations over the long run (including norms, habits, customs).[3] Therefore, we employ genetic distance to capture the long-term relative cultural distance of countries to the technological frontier, the US.[4] Income data are from the Penn World Tables. Control variables are from CEPII.[5,6]

Income divergence over 1950-2000 is the change in absolute income per capita gap between 1950 and 2000: $|Log\ Y_i - Log\ Y_j|_{2000} - |Log\ Y_i - Log\ Y_j|_{1950}$. Cultural distance relative to the technological frontier, the US, is the absolute difference in genetic distance of countries i and j from the US: $Relative\ Cultural\ Distance_{ij,US} = |Genetic\ Distance_{US,i} - Genetic\ Distance_{US,j}|$.

We regress income divergence between 1950-2000 on relative cultural distance to the technological frontier, the US, conditional on controls.

$$Income\ Divergence_{ij,2000-1950} = \gamma Relative\ Cultural\ Distance_{ij,US} + \alpha_k \tau_{kij} + \epsilon_{ij} \quad (1)$$

where τ_{kij} represents the k bilateral controls; and ϵ_{ij} is the error term.

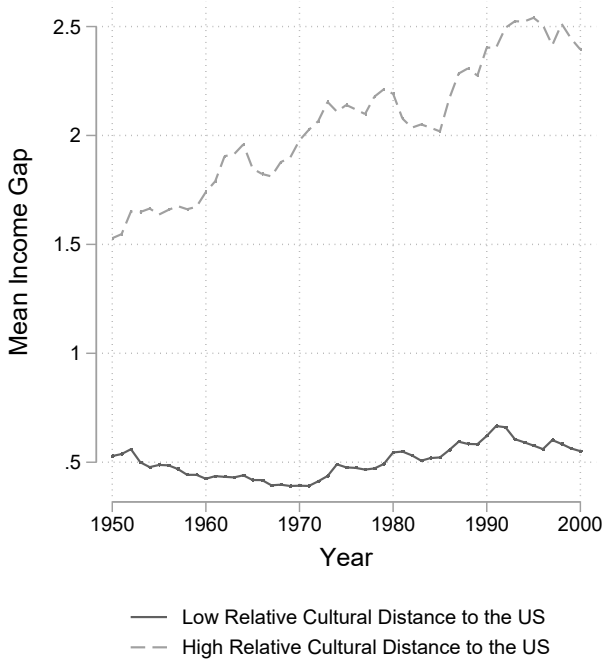
3 Results

Figure 2 plots the evolution of mean income gap over time for countries with high and low relative cultural distance to the US. Low relative cultural distance group includes countries within the first decile of relative cultural distance to the US, while high relative cultural distance subsample comprises of countries within the tenth decile (the sample is restricted to the 1950 countries). We observe that, already in 1950, the average income gap was three times larger

[2] See Appendix A for an illustration.
[3] See Spolaore and Wacziarg (2009) for details.
[4] Data on genetic distance is weighted by the share of population belonging to each distinct ancestral group in each country.
[5] http://econ.sciences-po.fr/node/131.
[6] Table B1 presents summary statistics.

across countries with high relative cultural distance to the US than the ones with low relative cultural distance. Nevertheless, this difference in income gaps further widened in the second half of the twentieth century. While the average income gap among countries with low relative cultural distance to the US remained stable over time, that of countries with high relative cultural distance to the US more than doubled. Thus, the observed overall income divergence in Figure 1 is primarily driven by countries with high relative cultural distance. Note that high relative cultural distance pairs are comprised of two countries with low and high cultural distances to the US (e.g. Belgium-Ethiopia), where the former more easily adopts from and interacts with the US compared to the latter, and develops more rapidly as a result.

Figure 2: Mean income gap over time for countries with low and high relative cultural distance to the US

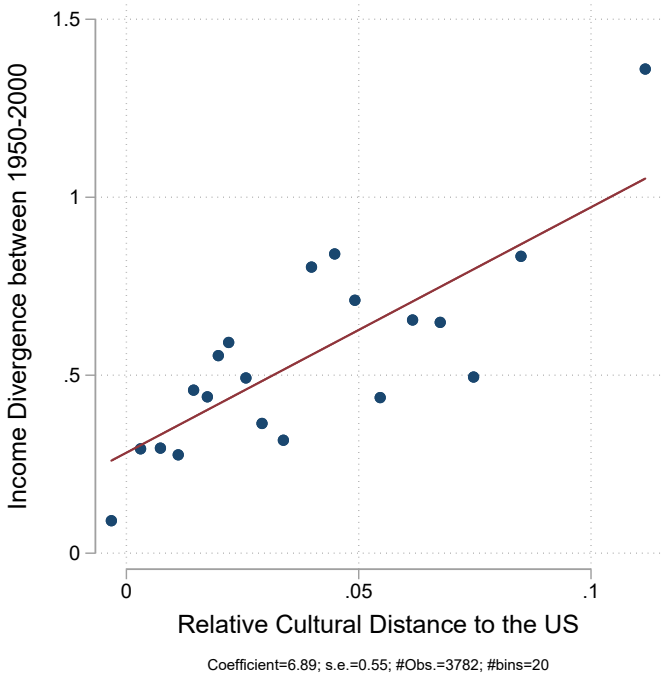


Mean income gap is the average of the absolute per capita income gap ($|Log\ Y_i - Log\ Y_j|$) across countries. Low relative cultural distance countries are within the first decile of relative cultural distance to the US. High relative cultural distance countries are within the tenth decile of relative cultural distance to the US.

Figure 3 and Table 1 provide more compelling evidence on the relationship between income divergence and cultural distance relative to the US over 1950-2000. Figure 3 shows the fitted regression line with a slope of 6.89, suggesting that a one-unit change in relative cultural distance is associated with an expected increase in income divergence of almost seven units (where incomes are log-transformed). Alternatively, if relative cultural distance between countries increases by one standard deviation, income divergence increases by 0.2 standard deviation. Table 1 presents

the remaining regressions of income divergence on relative cultural distance to the US with various controls of geographic isolation and physical barriers.

Figure 3: Income divergence and relative cultural distance to the US



This figure plots the binscatter and the fitted regression of income divergence between 1950-2000 on cultural distance relative to the US, conditional on distance and contiguity.

Table 1: Income Divergence between 1950-2000 and Cultural Distance

	(1)	(2)	(3)	(4)	(5)
Cultural Distance Relative to the US	6.604***	6.875***	6.896***	7.742***	6.933***
	(0.537)	(0.558)	(0.557)	(0.585)	(0.579)
Log Distance		yes	yes	yes	yes
Contiguity			yes	yes	yes
Absolute Difference in Latitude				yes	yes
Absolute Difference in Longitude					yes
N	3782	3782	3782	3064	3064

Regressand: Income Divergence between 1950-2000 is the change in absolute income gap between 2000 and 1950: $|LogY_i - LogY_j|_{2000} - |LogY_i - LogY_j|_{1950}$.

Cultural Distance Relative to the US: $|GeneticDistance_{US,i} - GeneticDistance_{US,j}|$.

Robust standard errors in parentheses. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Note that the relation between relative cultural distance and income divergence grows over time –1950 as benchmark– with an increase in the magnitude over time (Table B2). Thus, the effect of relative cultural distance as a barrier to development keeps increasing over time.

3.1 Robustness

As geography might capture the spread of innovation and development via travel and communication costs, we control for measures of geographic isolation, physical and environmental barriers (Table B3).

Results are robust to dyadic trade controls of institutional and historical links (Table B4).

To address endogenity, we instrument current genetic distance with genetic distance in 1500 (Table B5) and also show the reduced-form relationship (see Table B6).

4 Conclusions

Findings suggest that cultural differences across countries contributed to income divergence over time.

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— Online Appendix —

A An Illustration

To illustrate, consider the following example with the rich, technological frontier country, i.e. the US, and two less-developed economics, A and B. Country A is culturally close to the US, whereas country B is culturally distant from the US. Assume that the income levels of the less-developed countries A and B were the same at the beginning of the period, and hence, they had the same income gap with respect to the US ($|income_{US} - income_A| = |income_{US} - income_B|$). As a consequence of its closer cultural ties (Spolaore and Wacziarg, 2009), country A engages in more economic exchange with the US and adopts technologies more easily from it than country B does. Greater economic exchange and technology adoption might shrink the income gap between country A and the US, while the income gap between country B and the US gets larger. This eventually leads to economic divergence between countries A and B who initially had similar income levels. Over time, through greater interaction and exchange, country A and the US become culturally ever closer, while country B and the US become culturally even more distant. And, this, in turn, leads to even greater economic divergence.

B Appendix Tables

Table B1 : Summary Statistics

	Mean	Std. Dev.	Min	Max	Obs
Income Divergence (1950-2000)	0.487	0.930	-2.2	4.1	3064
Cultural Distance Relative to the US	0.039	0.031	0.0	0.1	3064
Log Distance	8.740	0.871	5.3	9.9	3064
Contiguity	0.033	0.179	0.0	1.0	3064
Absolute Difference in Latitude	32.432	24.526	0.0	104.4	3064
Absolute Difference in Longitude	77.987	59.124	0.1	273.9	3064

Table B2 : Evolution of Income Divergence between 1950 and Various Years, and Cultural Distance

	Income Divergence between 1950 and:					
	1960	1970	1980	1990	2000	2005
	(1)	(2)	(3)	(4)	(5)	(6)
Cultural Distance Relative to the US	2.297***	4.932***	5.057***	6.731***	6.933***	7.171***
	(0.288)	(0.379)	(0.503)	(0.603)	(0.579)	(0.707)
Controls	yes	yes	yes	yes	yes	yes
N	3176	3176	3176	3176	3064	2957

Regressand: Income Divergence between 1950 and various years as defined in each column, defined as the change in absolute income per capita gap between $Year\ t$ and 1950: $|LogY_i - LogY_j|_{Year\ t} - |LogY_i - LogY_j|_{1950}$.

Cultural Distance Relative to the US: $|GeneticDistance_{US,i} - GeneticDistance_{US,j}|$.

Controls are Log Distance, Contiguity, Absolute Difference in Latitude, and Absolute Difference in Longitude.

Robust standard errors are in parentheses. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table B3 : Income Divergence between 1950-2000 and Cultural Distance, Robustness to Further Geographic and Climatic Controls

	(1)	(2)	(3)	(4)	(5)
Cultural Distance Relative to the US	6.882***	6.866***	7.012***	6.929***	6.706***
	(0.581)	(0.585)	(0.587)	(0.580)	(0.540)
Log Distance	yes	yes	yes	yes	yes
Contiguity	yes	yes	yes	yes	yes
Absolute Difference in Latitude	yes	yes	yes	yes	yes
Absolute Difference in Longitude	yes	yes	yes	yes	yes
Number of Islands	yes	yes	yes	yes	yes
Number of Landlocked Countries		yes	yes	yes	yes
Log Absolute Difference in Elevation			yes	yes	yes
Log Absolute Difference in Distance to Coast				yes	yes
Abs. Dif. in Polar Land Percentage					yes
Abs. Dif. in Boreal Land Percentage					yes
Abs. Dif. in Temperate Desert Percentage					yes
Abs. Dif. in Tropical Desert Percentage					yes
Abs. Dif. in Dry Land Percentage					yes
Abs. Dif. in Wet Land Percentage					yes
Abs. Dif. in Subtropical Land Percentage					yes
Abs. Dif. in Tropical Land Percentage					yes
N	3064	3064	3064	3064	3064

Regressand: Income Divergence between 1950-2000, defined as the change in absolute income per capita gap between 2000 and 1950: $|LogY_i - LogY_j|_{2000} - |LogY_i - LogY_j|_{1950}$.

Cultural Distance Relative to the US: $|GeneticDistance_{US,i} - GeneticDistance_{US,j}|$.

Robust standard errors are in parentheses. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table B4 : Income Divergence between 1950-2000 and Cultural Distance, Robustness to Trade Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cultural Distance Relative to the US	6.897***	6.883***	6.783***	6.888***	6.899***	6.866***	6.651***
	(0.557)	(0.557)	(0.559)	(0.557)	(0.557)	(0.555)	(0.552)
Log Distance	yes	yes	yes	yes	yes	yes	yes
Contiguity	yes	yes	yes	yes	yes	yes	yes
Common Official Language	yes	yes	yes	yes	yes	yes	yes
Common Legal Origin		yes	yes	yes	yes	yes	yes
Colonial Link			yes	yes	yes	yes	yes
Free Trade Agreements				yes	yes	yes	yes
GATT/WTO Membership					yes	yes	yes
Common Currency						yes	yes
Generalized System of Preferences							yes
N	3782	3782	3782	3782	3782	3782	3782

Regressand: Income Divergence between 1950-2000, defined as the change in absolute income per capita gap between 2000 and 1950: $|LogY_i - LogY_j|_{2000} - |LogY_i - LogY_j|_{1950}$.

Cultural Distance Relative to the US: $|GeneticDistance_{US,i} - GeneticDistance_{US,j}|$.

Robust standard errors are in parentheses. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table B5 : Income Divergence between 1950-2000 and Cultural Distance Instrumented with Cultural Distance in 1500

	(1)	(2)	(3)	(4)	(5)
Cultural Distance Relative to the US (Instrumented)	4.693***	6.544***	6.878***	6.635***	7.217***
	(1.272)	(1.571)	(1.567)	(1.569)	(1.532)
Log Distance		yes	yes	yes	yes
Contiguity			yes	yes	yes
Absolute Difference in Latitude				yes	yes
Absolute Difference in Longitude					yes
N	3080	3080	3080	3064	3064

Regressand: Income Divergence between 1950-2000, defined as the change in absolute income per capita gap between 2000 and 1950: $|LogY_i - LogY_j|_{2000} - |LogY_i - LogY_j|_{1950}$.

Cultural Distance Relative to the US: $|GeneticDistance_{US,i} - GeneticDistance_{US,j}|$.

Cultural distance is instrumented with cultural distance in 1500.

Robust standard errors are in parentheses. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table B6 : Income Divergence between 1950-2000 and Cultural Distance in 1500

	(1)	(2)	(3)	(4)	(5)	(6)
Cultural Distance Relative to the US in 1500	0.684***	1.058***	1.154***	1.165***	1.075***	1.016***
	(0.189)	(0.241)	(0.239)	(0.240)	(0.239)	(0.226)
Log Distance		yes	yes	yes	yes	yes
Contiguity		yes	yes	yes	yes	yes
Absolute Difference in Latitude			yes	yes	yes	yes
Absolute Difference in Longitude			yes	yes	yes	yes
Number of Islands				yes	yes	yes
Number of Landlocked Countries				yes	yes	yes
Log Absolute Difference in Elevation					yes	yes
Log Absolute Difference in Distance to Coast					yes	yes
Abs. Dif. in Polar Land Percentage						yes
Abs. Dif. in Boreal Land Percentage						yes
Abs. Dif. in Temperate Desert Percentage						yes
Abs. Dif. in Tropical Desert Percentage						yes
Abs. Dif. in Dry Land Percentage						yes
Abs. Dif. in Wet Land Percentage						yes
Abs. Dif. in Subtropical Land Percentage						yes
Abs. Dif. in Tropical Land Percentage						yes
N	3080	3080	3064	3064	3064	3064

Regressand: Income Divergence between 1950-2000, defined as the change in absolute income per capita gap between 2000 and 1950: $|LogY_i - LogY_j|_{2000} - |LogY_i - LogY_j|_{1950}$.

Cultural Distance Relative to the US in 1500: $|GeneticDistance_{US,i} - GeneticDistance_{US,j}|_{1500}$.

Robust standard errors are in parentheses. $*p < 0.10, **p < 0.05, ***p < 0.01$.