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RESEARCH ARTICLE

Does national culture change as countries develop? Evidence from generational cleavages

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Abstract

Development scholars have identified several Hofstede (1980, 2001) cultural dimensions as critically important determinants of long-run economic development across countries. Does economic progress, in turn, shape culture in a predictable direction? This paper investigates whether economic change since 1970 has induced shifts in five of the Hofstede value orientations in a sample of up to 72 countries. To achieve identification, we employ a unique data set on country-level cleavages in the values of two non-overlapping age cohorts approximately one generation (30 years) apart, on average. We find evidence that faster-growing countries during the period of coming of age and personality development of the younger cohort witnessed the rise of more individualistic and politically egalitarian generations, suggesting the existence of a self-perpetuating cycle between certain "good-for-development" cultural attitudes and economic development.

Keywords: culture; cultural change; economic development; Hofstede

1. Introduction

Institutions, broadly defined as "humanly devised constraints that structure political, economic, and social interactions" (North, 1991), have recently re-entered economic analysis as a key determinant of the wealth of nations. In contrast to formal institutions, which denote state-enforced rules of the game, informal institutions are often referred to as society's *culture* – here defined as *the set of values, beliefs, and attitudes that distinguish one social group from another, shape collective preferences, and determine corresponding norms of behavior*.[1] Despite culture's role in explaining comparative levels of economic development (see e.g. Landes, 1998), relatively little attention has been paid to the sources of cultural dynamics across countries, largely owing to vague definitions of culture and relative paucity of data (Guiso *et al.*, 2006; Roland, 2015).[2]

Culture has a rich history as the centerpiece in theories explaining economic development of nations (e.g. see works by Karl Marx and Max Weber). Owing to the seminal contributions of Douglass North (1990, 1991), culture and institutions more generally have gained renewed prominence in the studies of political and economic phenomena. Today, identification of causal mechanisms within the institution–development nexus remains the next major task in new institutionalist and development literatures. This relatively new body of work has focused mostly on the relationship between culture and institutions, as well as the impact on cross-national income levels and the growth

[1]For a detailed discussion of the view of culture as preferences, see de Jong (2009), Chapter 3. Also see Gorodnichenko and Roland (2017: 402) for a related view.

[2]See Voigt (2018) for further discussion on the challenges associated with measuring informal institutions.

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of institutional quality (often proxied by measures of political and economic freedoms) and various aspects of cultural attitudes.[3]

However, few studies to date have attempted to examine the drivers of *cultural* change across countries and time. Though highly persistent, culture is seldom static; given enough time, it can and does change in response to exogenous events and endogenous socio-economic pressures. To explore one potential mechanism, we empirically investigate the impact of economic development – improvements in existential security – on *intergenerational* cultural shifts within countries. To this end, we use a novel data set on replicated Hofstede (1980, 2001) dimensions of national culture disaggregated by two non-overlapping age cohorts to study whether long-run increases in real GDP per capita incited generational cultural change in up to 72 countries. Some of these dimensions, in particular individualism, were causally linked to economic and institutional development in a number of cross-country studies. To address reverse causality of culture, this paper focuses on the changes in economic circumstances during the coming-of-age period of the younger cohort, to whom these changes come as plausibly exogenous.

The main finding is that more rapid economic growth during the examined period is associated with a more pronounced rise of individualistic and egalitarian values in younger generations around the world. This finding provides some of the first direct evidence on the impact of development on generational cultural shifts within countries, and suggests the existence of a self-perpetuating cycle in which faster-developing countries tend to promote cultural values conducive to long-run growth among youth who, once of age, use those values to further shape their economic and institutional environment. The findings are consistent with the results of a growing empirical literature, as well as theoretical considerations.

The paper proceeds as follows. Section 2 reviews relevant literature on culture and cultural change. Section 3 describes the data. Section 4 discusses the empirical approach. Section 5 develops hypotheses, while section 6 presents empirical results. Section 7 outlines the limitations of the study and offers concluding remarks.

2. Related literature

A vast body of economic literature has argued that culture plays a critical role in development, either by directly influencing economic behavior or by social legitimization of certain formal institutions. For example, trust and civic cooperation – traits often combined under the umbrella term *social capital* – have theoretically and empirically been linked with higher incomes and growth across countries. Social capital encompasses the set of beliefs and behaviors that facilitate interpersonal interaction and contracting, and thus promote economic activity (Tabellini, 2010). Guiso *et al.* (2006) also find that religiosity and certain religious beliefs promote interpersonal trust, but also the propensity to save, an important correlate of long-run growth. Culture can likewise affect development through formal institutions, by providing a foundation upon which different economic and political rules of the game emerge and "stick" within societies (see e.g. Acemoglu and Jackson, 2017).[4]

Dutch sociologist Geert Hofstede is widely regarded as a pioneer in operationalizing cultural *profiles* of countries – the broad and stable core values with consistent meaning across societies. In 1968 and 1972, Hofstede surveyed thousands of IBM employees living and working in about 30 countries to gauge cross-national cultural differences in work-related attitudes. Using factor analysis on individuals' survey responses to 60 value questions, Hofstede (1980, 2001) and collaborators uncovered four – later

[3]For the impact of formal institution on development, see Acemoglu *et al.* (2001, 2005, forthcoming), BenYishay and Betancourt (2010), and Hall and Lawson (2014).

[4]For more on social capital and its relationship to innovation, institutions and growth, see Berggren *et al.* (2016), Durlauf and Fafchamps (2005), Guiso *et al.* (2004), Knack and Keefer (1997), Zak and Knack (2001), Kostis *et al.* (2018). Tabellini (2010). For the relationship between religion and development see Barro and McCleary (2003), Campante and Yanagizawa-Drott (2015), and Guiso *et al.* (2003), For the review of literature on culture and institutions, see Alesina and Giuliano (2015).

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six – mutually orthogonal cultural dimensions that characterize nations' "collective programming of the mind:" (1) individualism *versus* collectivism (2) power distance (3) uncertainty avoidance (4) indulgence *versus* restraint (5) long- *versus* short-term orientation, and (6) masculinity *versus* femininity. The resulting cross-sectional indices, aggregated to the national level and measured on a 0–100 scale, gauge the relative prevalence of these value orientations across countries.[5]

Individualism relates to a heightened sense of personal responsibility, a desire for self-actualization, and a proclivity for personal choice. Its opposite pole, *collectivism*, emphasizes a need for in-group embeddedness and prioritization of communal over individual interests. *Power distance* denotes the levels of acceptance and tolerance of unequal power hierarchies by the less powerful members of society. *Uncertainty avoidance* gauges societies' level of tolerance and comfort for uncertain, novel, or unpredictable situations. *Indulgence/restraint* denotes the degree of gratification a society allows itself. *Masculinity/femininity* denotes the level of preference for achievement and assertiveness as opposed to cooperation, modesty, and care for others. Since being expanded to nearly 80 countries, Hofstede's research on cultural typologies "constitutes by far the most used and cited cultural framework in international business, management, and applied psychology" (Alesina and Giuliano, 2015: 907).

Of the named Hofstede cultural dimensions, uncertainty avoidance, power distance, and especially individualism have been identified in a growing number of empirical studies as causal determinants of economic development. Gorodnichenko and Roland (2011, 2017) find that individualistic societies experience higher rates of innovation and long-run economic growth. Ang and Fredriksson (2018) and Tarabar (2017) present evidence that individualism promotes efficiency-enhancing reform across countries.[6] Klasing (2013), Kyriacou (2016), and Licht *et al.* (2005, 2007) show that individualism and/or low power distance are conducive to the rule of law, the absence of corruption, and the quality of governance. Licht *et al.* (2005) further find that societies that tolerate uncertainty are better able to resolve disputes through assertive legal means, resulting in stronger legal protections of creditor rights.[7]

Although a two-way causal relationship between culture and development has long been recognized in social sciences, only a handful of empirical studies to date have investigated whether and how economic change translates into cultural change. In one pioneering article, Inglehart and Baker (2000) use three waves of World Values Survey (WVS) data at three snapshots in time, 1981–1982, 1990–1991, and 1995–1998, to show that increases in economic well-being, proxied by GDP per capita, induced a shift toward more rational, tolerant, and trusting norms in a sample of 65 countries comprising 75% of the world's population. They also find that culture is heavily shaped by tradition and heritage, and that national cultures follow parallel trajectories rather than converging over the course of economic development.

Tang and Koveos (2008) extrapolate cultural evolution in a cross-section of 48 countries by obtaining fitted values of Hofstede indices predicted by GDP per capita levels. They argue that the pattern of development captures the aggregate dynamics of inequality, savings, and ecological pattern that induce cultural change. In particular, mass industrialization and the rise in income disparities in developing countries are hypothesized to promote tolerance for inequalities (power distance) and collectivist attitudes. Once economies become more service-oriented, more emphasis is placed on individualization and self-expression, and further prosperity is associated, in line with the Kuznets hypothesis, with lower inequalities and smaller power distance.

Using a sample of up to 71 countries, Kyriacou and López Velásquez (2015) investigate the effect of interpersonal income inequalities on an aggregate cultural indicator comprised of traits conducive to

[5]For an alternative set of cultural dimensions, see Schwartz (1992).

[6]Also see Pitlik and Rode (2017), who find an inverse relationship between related measures of individualism ("economic individualism") and interventionist preferences in a wide sample of countries.

[7]In addition, Franke *et al.* (2002) find a positive association between long-term orientation, a correlate of thriftiness, and long-run economic growth.

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economic development: trust, control, respect, and non-obedience. The idea is that more pronounced interpersonal inequalities cause mistrust and disrespect between people, who cluster more tightly into smaller social circles of relatives that teach obedience to children and descendants. The Gini measure for inequality is averaged over a 60-year period (1944–2003), while the cultural indicator covers the 1990–2005 period. Consistent with their hypotheses, the authors find evidence of a negative impact of inequality on trust, sense of control, and respect, and a positive impact on obedience.

The above studies provide empirical evidence that the variation of cultural values and attitudes along several different dimensions is consistent with certain patterns of income dispersion *between* countries. However, the lack of a clear time dimension in culture data may obscure the variation of cultural change across generations *within* countries and *over time*, and thus more proximate evidence of any causal relationships. Building on the above works, this paper takes a step in this direction by providing, to my knowledge, a first-time account of generational value shifts in Hofstede dimensions in response to economic change, and thus direct evidence of within-country cultural change.

3. Data

The original Hofstede country scores have received criticism on grounds that they fail to capture the malleability of culture and that, as a result, they may not be representative of contemporary societies (Kirkman *et al.*, 2006). To put the validity of Hofstede measures to the test, Beugelsdijk *et al.* (2015) replicate five of the six Hofstede dimensions using value response data on over 340,000 individuals around the world, surveyed over several waves of World and European Values Surveys between 1981 and 2008.[8] They identify two non-overlapping age cohorts in nearly 100 countries approximately one generation (∼30 years) apart. The older cohort comprises individuals born between 1902 and 1958 and on average in 1941, roughly encompassing working-age adults at the time of original Hofstede studies. The younger cohort comprises of individuals born after 1958 and on average in 1971.

Using correlation, factor, and reliability analyses on national samples of survey responses, Beugelsdijk *et al.* (2015) reconstruct national scores of Hofstede dimensions for each generational cohort along the original 0–100 scale, concluding that "Hofstede's data … is as relevant now as it was when his work was first published," and that while intergenerational cultural change can be observed within countries, cultural differences between countries remain overall stable (Beugelsdijk *et al.*, 2015: 224). The absolute difference between generational value indices captures the change in national culture within countries, enabling testable hypotheses on factors explaining cultural divergence between two age groups – "young" and "old" – by country.

Based on their data, in the widest available sample of countries the younger generations are on average more individualistic ($\Delta IND = +9.0$; $N = 77$), more indulgent and less restrained ($\Delta IR = +8.2$; $N = 88$), more future-oriented ($\Delta LTO = +4.1$; $N = 35$), while also less power-distant ($\Delta PDI = -11.7$; $N = 75$) and more intolerant of uncertainty ($\Delta UA = +2.6$; $N = 55$).[9] Of these absolute shifts, individualism, power distance, and indulgence dimensions exhibit highest relative (percentage) changes. This paper is an attempt to explain these generational deviations by relating them to long-run change in real GDP per capita in a cross-country regression framework.

The source of data for GDP is Penn World Tables (version 9.0), and population data are drawn from World Bank's World Development Indicators. Control variables account for geographic, historical, and institutional differences that have conceivably influenced the trajectory of cultural change. Data on ethnolinguistic heterogeneity are taken from the widely used data set provided in Alesina *et al.* (2003), and data on latitude and legal origins come from La Porta *et al.* (1999). Table 1 reports summary statistics of the variables from largest regression subsamples, and appendix Table A1 lists countries in the data set.

[8]For masculinity/femininity, insufficient data exist for replication.

[9]Data and a more detailed description of the methodology in constructing the replicated scores can be found in the working paper version, Beugelsdijk *et al.* (2013).

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Table 1. Summary statistics of regression variables

Variable	*N*	Mean	Std Dev.	Min.	Max.
Cultural					
Δ Individualism (*IND*)	61	7.72	7.65	−4	30
Δ Power distance (*PDI*)	59	−11.97	8.12	−33	3
Δ Uncertainty avoidance (*UA*)	40	2.13	4.50	−5	12
Δ Indulgence vs. restraint (*IR*)	72	6.04	6.44	−6	23
Δ Long-term orientation (*LTO*)	32	4.03	5.60	−9	22
Economic					
% growth real GDP per capita, 1970–2010	72	162.8	179.0	−13.2	1,116.9
% growth real GDP per capita, 1970–1990	72	56.3	67.0	−35.6	366.4
Real GDP per capita, 1970 (2011 USD)	72	$10,124	$9,580	$657	$53,316
Real GDP per capita, 1990 (2011 USD)	72	$15,077	$13,108	$658	$$55,683
Real GDP per capita, 2010 (2011 USD)	72	$22,065	$17,622	$1,086	$80,907
Controls					
Latitude	72	0.340	0.197	0.011	0.722
Landlocked	72	0.166	0.375	0	1
Communist heritage	72	0.083	0.278	0	1
Protestant	72	0.208	0.408	0	1
Catholic	72	0.305	0.463	0	1
Muslim	72	0.222	0.418	0	1
Roman heritage (Romance-speaking)	59	0.237	0.429	0	1
Chinese heritage (Chinese-speaking)	59	0.068	0.254	0	1
British legal origin	40	0.225	0.423	0	1

4. Empirical framework

The departing assumption is that the cultural formation of individuals is determined by two distinct factors: (1) familial, accounting for the vertical transmission of culture from parents to children either through hereditary traits or upbringing ("nature"), and (2) external, relating to culture-shaping forces outside one's immediate environment ("nurture"). This distinction follows the concepts of vertical and horizontal socialization developed in Bisin and Verdier (2011, 2001). Vertical socialization refers to the transmission of values inside the family, and horizontal to the transmission arising from children's interactions with the members of their own as well as their parents' generations.

The stylized model, first outlined in Cavalli-Sforza and Feldman (1981), gives the probability of a child fully adopting its parents' dichotomous trait i as:

$$P^{ii} = d^i + (1 - d^i)q^i, \tag{1}$$

where $0 \leq d^i \leq 1$ is the probability of successful vertical socialization and $0 \leq q^i \leq 1$ is the fraction of population with trait i. In that respect, the likelihood of full socialization to the parents' trait is

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determined by a convex combination of parental and social influences. Alternatively, the probability of a child adopting trait $j \neq i$ is given by:

$$P^{ij} = (1 - d^i)(1 - q^i). \tag{2}$$

Assuming society is not culturally monolithic ($1-q^i > 0$), equation (2) describes the process of generational cultural divergence $i \rightarrow j$ as the function of the exogenously determined success of vertical transmission and the fraction of the population with trait j (from which a role model is selected at random).[10] Taken together, the above equations imply that without any exposure to the rest of society (equivalent to $1 - q^i = 0$), parents transfer their traits to children with probability 1, resulting in no cultural change within the population.

In line with the above equations, cultural values of individuals may be represented by:

$$HOFSTEDE_d^{CHILD} \equiv HOFSTEDE_d^{PARENT} + f\,(EXTERNAL) + \varepsilon, \tag{3}$$

where *HOFSTEDE* represents the Hofstede dimension of interest d, $f(EXTERNAL)$ with $f(0) = 0$ is a function that captures external (non-familial) influences on cultural formation, and ε is a random personality attribute. In line with theoretical considerations, equation (3) implies that absent external experiences, the cultural values of all parents and their children within a country would be, on average, identical.

In the context of the present study, the approximately single-generation age gap between the cohorts in question bolsters the argument that individuals in the 1971 cohort are likely to be, *on the aggregate*, immediate descendants of the 1941 cohort. To focus specifically on the change in culture within countries, equation (3) can be econometrically re-specified as:[11]

$$\Delta HOFSTEDE_{d,i} \equiv HOFSTEDE_{d,i}^{1971} - HOFSTEDE_{d,i}^{1941} = \mathbf{X}'\theta + \alpha + \varepsilon_i, \tag{4}$$

where i indexes country, α is a constant term, and $\Delta HOFSTEDE_{d,i}$ represents cultural distance between younger and older generations and, implicitly, cultural *change* over the long-run and after generational replacement.

Abstracting from familial influences, equation (4) expresses cultural change as the function of only the non-familial factors in $\mathbf{X}$ that induce cultural divergence between "child" and "parent" cohorts. In later econometric analysis, horizontal cultural influences stemming from the non-parental population are implicitly controlled for by countries' population size, religion, and ethnic, religious, and linguistic heterogeneity. Any residual deviation in cultural values between parents and children is then related to country-specific changes in economic conditions, set during the period of adulthood of the 1941 cohort, and youth and personality development of the 1971 cohort.

Operationalizing cultural change in this way allows for two key assumptions to be made for empirical analysis. First, as the cultural values of youth are significantly more malleable to external influences, divergence in generational values will be primarily driven by the cultural formation of the 1971 cohort. In that respect, the values of the 1941 cohort are taken as given, since belief formation tends to slow down significantly during adulthood (Inglehart, 2008). Second, because a large fraction of the 1971 cohort only came of age between 1970 and the 2000s, economic changes since about 1970 are assumed to come as mostly exogenous to this generation's cultural formation, depending on the chosen end period. In other words, the cultural formation of children and adolescents is unlikely

[10]The dynamics of cultural change within a population toward trait i over time is then endogenously given by $\frac{\partial q^i}{\partial t} = q^i(1 - q^i)(d^i - d^j)$.

[11]For clarity, by *within* we do not mean that the study focuses on any particular subnational data, but that cultural (and economic) changes can be observed over time at the entire country level using given data.

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to feed back into society-wide economic changes. These assumptions are in line with the *socialization hypothesis* of generational value change (Inglehart, 2008), which states that adults' cultural values are determined by socio-economic conditions during one's early years.

Based on the above, we begin with OLS estimation of the following specification:

$$\Delta HOFSTEDE_{d,i} = \beta \log\left(\frac{GDPpc_t}{GDPpc_{1970}}\right)_i + \phi \log(GDPpc_{1970})_i + \mathbf{X}'\theta + \alpha + \varepsilon_i, \quad (5)$$

where *GDPpc* is real GDP per capita and (natural) $\log(GDPpc_t/GDPpc_{1970})$ is the "long difference" between per capita income in year t >1971 and 1971, the year of birth of the average member of the younger cohort. The unit of analysis is a country indexed by i.

The parameter of interest β captures the effect of widening of the per capita real income gap between 1970 and t by a factor of $e \approx 2.71$, or by 171%, on the cultural distancing of the younger cohort, holding constant for the initial levels of wealth into which the younger cohort was born.[12] The idea is that if economic change up to year t is at all causally related to generational cultural cleavages, then more extensive development should be consistent with more pronounced cultural deviations between cohorts. Two years in t are selected as thresholds of interest: 2010 in benchmark models, and 1990 in more "restrictive" models. The year 2010 gives the broadest possible view of the impact of development, but it also allows for grown members of the 1971 cohort to take part in economic activity, potentially confounding the results. To address this concern, 1990 is likewise chosen as another threshold year below which the average member of the 1971 cohort is likely to be either in school or too young to significantly take part in economic activity.

To isolate cultural change from changes in population dynamics and composition, all specifications hold constant for (log) population size averaged over all years between 1970 and t, as well as the time-invariant index of average fractionalization that increases the level of ethnic, linguistic, and religious heterogeneity within countries.[13] Other time-invariant control variables for geographic, religious, and institutional legacies capture the enduring effect of traditional value systems and collective memories on cultural change. These legacies influence the path dependency ("stickiness") of culture and the strength of family ties, and thus moderate the impact of different processes on the extent of transmission of cultural values across generations. This line of reasoning is consistent with the idea that national cultures follow parallel trajectories rather than converging over time (Inglehart and Baker, 2000), as well as with the finding of stable cultural distances between countries (Beugelsdijk *et al.*, 2015).

For example, Protestantism is associated with greater secularism and interpersonal trust (Guiso *et al.*, 2006; Inglehart and Baker, 2000), which allows individuals to more readily interact with members of the out-group and facilitate the move away from collectivism. In a similar vein, the common law system allows for greater freedom to enter contracts and ease of development of stronger out-group relationships. Geography determines exposure to foreign populations and ideas, as well as migration costs away from family and social groups, reinforcing or hindering generational cultural transmission. Climate determines nature's hostility or abundance, and establishes an enduring sense of dependency on the self *versus* others (Hofstede *et al.*, 2010: 85). The legacies of great ancient empires (i.e. Chinese and Roman) reverberated through time in the form of cultural ideas about the nature of relationships between parents and children (via inheritance laws and the power of the father in the family), and people and authority (via regard for codified universal laws *versus* broad principles) (Hofstede, 2001: 119–121; Hofstede *et al.*, 2010: 84, 232).

[12]A unit increase in $\log(GDPpc_t/GDPpc_{1970})$ is tantamount to $\log(GDPpc_t/GDPpc_{1970}) + 1 = \log(GDPpc_t/GDPpc_{1970}) + \log(e \approx 2.71) = \log(2.71\ GDPpc_t/GDPpc_{1970})$, which translates into a 2.71-fold increase, or an increase by about 171% over the given period.

[13]Each sub-index is computed as one minus the Herfindahl index of group shares, indicating a probability that two randomly selected individuals within a country belong to different ethnic, linguistic, or religious groups.

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5. Hypotheses

According to the World Bank, world real GDP per capita between 1971 and 2010 nearly doubled from $5,280 to $9,516. In line with the *modernization hypothesis* (Inglehart and Baker, 2000), economic progress led societies to adopt values that are "rational, tolerant, trusting, and participatory." The early stages of economic development during the industrialization stage coincided with mass migration to cities, occupational specialization, transformed gender roles, a better educated public, and broader political participation (Inglehart and Baker, 2000: 21). These processes induced early industrializing societies to adopt more materialistic and secular–rational worldviews according to which individuals are to be the masters of their own fate and no longer at the mercy of nature's capriciousness.

Once a sufficiently high standard of living is attained, additional improvements in economic circumstances give rise to post-materialist values, which emphasize "quality of life, environmental protection, and self-expression" over existential and material survival (Inglehart and Baker, 2000: 21). Consequently, citizens of more affluent countries began spending less effort on producing material wealth and more on creating living environments in which freedom of expression and individual judgement were becoming increasingly relevant (Inglehart and Baker, 2000: 22).

How did economic progress affect the change in Hofstede dimensions? In individualistic societies, people tend to be responsible primarily to self and closest kin, valuing "individual freedom, opportunity, achievement, advancement, and recognition" (Gorodnichenko and Roland, 2011: 492). The rapid industrialization and the subsequent move toward the post-industrial society in the latter half of the 20th century saw the younger generations growing up in an increasingly affluent world, leading to economic and personal empowerment and enabling individuals to pursue own avenues for life's fulfilment. Hence, the prior expectation is that development gives rise to personal autonomy and individualism.

Power distance represents the degree to which inherently unequal distribution of power is expected, accepted, and even *desired* by the less powerful members of society. In high power distance countries, strict hierarchies of power at work (boss–subordinate), school (teacher–student), and family (parent–child), as well as one's status in life are taken as largely given and immutable. In these societies, superiors can exercise considerable influence over the behavior of subordinates, who accept such a state of affairs and view their need for security and dependence on authority as the very basis of social order (Hofstede, 2001: 97).

Improvements in living standards can play a multifaceted role in the change in this dimension. Greater wealth and economic opportunity diminish concerns over existential security and increase the bargaining power of subordinates, dismantling the notion of immutability of one's station in life and diluting *de facto* existential inequalities in hierarchical labor relationships. Parents can afford more and better education for their children, who are taught to associate skills with wealth, and wealth with power. Youth maturing in faster-growing economies observe realizations of *in*dependence among adults with higher frequency and clarity, which stimulates determination and imagination about their future, and ultimately the desire for assertiveness and "power striving," reducing tolerance of rigid hierarchies (Hofstede, 2001: 83, 98).

A related argument suggests that economic growth translates not just to higher purchasing power, but also greater *de facto* political power (Acemoglu and Robinson, 2000; Acemoglu *et al.*, 2005). As individuals command a greater share of economic resources, they become better able to influence political institutions and to themselves determine the allocation of political power and authority. Therefore, the expectation is that economic progress leads individuals to be more cognizant of their potential for political and social mobility, leading to increases in egalitarian sentiments and a fall in power distance.

The *uncertainty avoidance* dimension gauges countries' level of tolerance for ambiguity in life. Societies ranking high on this dimension generally feel powerless when facing unknown or unstructured situations, and react to such uncertainty with greater anxiety, stress, and demand for greater

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structure or regulation at work, institutions, and relationships. The observed change in this dimension across generations, however, has been small. One reason for this may be that the desire to escape ambiguity is a basic fact of human nature (Hofstede, 2001: 148).

Modernization can have a disparate impact on the change in this dimension. On the one hand, economic development leads to diminished concerns about personal livelihood and greater liberation of individuals from the stresses of economic insecurity. Youth growing up in rapidly developing economies may note that "the future is bright," and that satisfaction, security, and stability are more often derived from personal ability and achievement than from unquestioning adherence to superiors, well-structured relationships, or "Truths with a capital T" (Hofstede, 2001: 162).

Although improvements in living standards and the adoption of new technologies a provide means to guard against uncertainty, they also bring new risks and challenges (Hofstede, 2001: 148). Faster development over a fixed time period also implies a more rapidly changing economic landscape and arguably higher stress levels. Some processes commonly associated with economic development, such as mass privatization, exposure to international goods and factor flows, and a shifting industry structure can incite a reaction against instability and greater demand for structure.

Long- versus *short-term orientation* refers to the variation in goal-oriented mentality with a focus on the future. Long-term oriented societies broadly value patience, hard work and thrift, and small socio-economic differences, while short-term orientation values leisure, personal autonomy and achievement, and a meritocratic reward system (Hofstede *et al.*, 2010: 251). Modernization may likewise impact the change in long-term orientation in differing ways. On the one hand, economic enrichment decreases immediate physiological needs and increases life expectancy, which may foster a longer-term view of life and of pursuit of gratification (Hofstede *et al.*, 2010: 240). Moreover, longevity may induce pro-saving behavior to finance retirement spending (Tang and Koveos, 2008: 1051), while higher wages increase the opportunity cost of leisure and therefore raise the value of hard work (although on net, this is subject to the strength of the income effect). On the other hand, economic opportunity often requires urgency and competitiveness in order to be seized and the drive to spend (and save less) is more pronounced in societies anticipating higher growth. The latter argument is similarly raised in Tang and Koveos (2008: 1051).

The last dimension considered is *indulgence* versus *restraint*. Though conceptually distinct, this dimension exhibits strong negative correlation with long-term orientation: more indulgent societies allow themselves higher gratification and leisure. They also report higher levels of subjective well-being, extraversion, optimism, and looser social norms (Hofstede *et al.*, 2010: 291). To the extent that pleasure-inducing activities and happiness are normal goods, economic prosperity endows individuals with both the means and the leverage to consume a larger quantity and variety of goods in accordance with individual preferences and sometimes in opposition to social norms. As people prosper, such indulgent behaviors are more likely to become accepted by the broader society. An alternative argument is that development and transition to a service-based economy liberates individuals from the stresses of intensive agriculture and the cynical beliefs that starvation, epidemics, and territorial wars are a regularity of life (Hofstede *et al.*, 2010: 297).

6. Results

Table 2 reports parameter estimates for initial levels and "long difference" in per capita income between 1970 and 2010, and 1970 and 1990, respectively. Odd-numbered specifications include population variables described in the above, and even-numbered specifications include the full set of population, geographic, religion, and institutional controls. In individualism specifications with the end year $t = 2010$, a unit increase in the log difference of GDP per capita is associated with 2.97 and 2.60 point increases in cultural distance between young and old cohorts in baseline and full control models, respectively. These estimates are both statistically (at the 10% level) and economically significant, amounting to 34% of the regression sample standard deviation of ΔIND. The specifications with the end year $t = 1990$ restrict the sample to the period of childhood and adolescence of the average

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Table 2. Cultural change and economic development, 1970–1990 and 1970–2010, OLS estimates.

	ΔIndividualism		ΔPower distance		ΔUncertainty avoidance		ΔLong-term orientation		ΔIndulgence vs restraint	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					End period: 2010					
log (GDP*pc*2010/GDP*pc*1970)	2.967*	2.602*	−4.709***	−3.028*	2.034	4.608**	−0.807	−1.440	2.844	1.269
	(1.727)	(1.492)	(1.740)	(1.657)	(1.489)	(2.075)	(1.571)	(1.937)	(1.721)	(1.604)
log (GDP per capita 1970)	3.505***	1.969**	−4.078***	−2.580*	−0.013	2.758*	1.949	2.745	1.283	0.678
	(0.879)	(0.890)	(1.194)	(1.353)	(0.836)	(1.472)	.940	(1.610)	(0.778)	(0.932)
N (countries)	61	61	59	59	40	40	32	32	72	72
R^2	0.328	0.612	0.363	0.636	0.144	0.446	0.267	0.471	0.184	0.449
					End period: 1990					
log (GDPpc1990/GDPpc1970)	5.006**	3.698**	−7.726***	−5.275**	1.511	2.457	−0.488	−1.093	3.836*	2.158
	(2.331)	(1.701)	(1.993)	(2.135)	2.046	(2.149)	(2.113)	(2.242)	(2.297)	(1.831)
log (GDP per capita 1970)	3.225***	1.738**	−3.487***	−2.310*	−0.445	1.448	2.081**	3.028*	0.976	0.624
	(0.827)	(0.825)	(1.050)	(1.216)	(0.709)	(1.248)	(0.921)	(1.621)	(0.678)	(0.857)
N (countries)	61	61	59	59	40	40	32	32	72	72
R^2	0.350	0.619	0.415	0.656	0.131	0.398	0.265	0.468	0.192	0.456
Population controls	X	X	X	X	X	X	X	X	X	X
Geographic controls		X		X		X		X		X
Religion controls		X		X		X		X		X
Institutional controls		X		X		X		X		X

Notes: Robust standard errors in parentheses. *Population controls* include the natural log of population averaged over all years between 1970 and $t = \{1990, 2010\}$, and the average of ethnic, linguistic, and religious fractionalization. *Geographic controls* include latitude and the landlocked dummy. *Religion controls* include dummies for predominantly Protestant, Catholic or Muslim populations. *Institutional controls* include a dummy when Romance or Chinese languages are either dominant or widely spoken (*PDI* specifications only) and British legal origins *(UA* specifications only).
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

member of the 1971 cohort. Statistical and economic significance is even greater in these models: a unit increase in log difference in GDP per capita income between 1970 and 1990 is associated, at the 5% level, with a 3.7-point increase (about half of standard deviation of ΔIND) in individualism distance between younger and older generations in the full control specification.

In power distance specifications, the impact of development is statistically significant and in line with the priors. In full control specifications, a unit increase in the log difference in GDP per capita between 1970 and 2010 is associated with the move away from power distant to more egalitarian attitudes in younger generations by 3.03 points, and by 5.30 points between 1970 and 1990. The effect of development is sizeable, amounting to 66% of the in-sample standard deviation of ΔPDI in full control specification with $t = 1990$.

Results from uncertainty avoidance specifications show mixed results. In the specification with 2010 as the end year, economic progress is associated with an *increase* in uncertainty avoidance among younger generations. However, the significance of the effect disappears in the restricted 1970–1990 sample. Similarly, no significant results are found for indulgence *versus* restraint and long-term orientation dimensions, although coefficients on growth show negative association with long-term orientation, and positive with indulgence (for this dimension, simple correlation equals + 0.37 for 1970–1990).[14] Thus far, the findings in Table 2 suggest a robust effect of economic growth on cultural change in two dimensions, individualism and power distance.

To further control for the confounding influence of the influx of younger generations into economic activity, we consider only the 1970–1990 growth in GDP *per engaged person* (aged 15 and above), defined as individuals who performed any work during the reference period (data drawn from Penn World Tables 9.0). To this end, real GDP per capita is decomposed into two components according to the formula:

$$GDPpc = \left(\frac{GDP}{Population}\right) \times \left(\frac{Workers}{Workers}\right) = \left(\frac{GDP}{Workers}\right) \times \left(\frac{Workers}{Population}\right). \tag{6}$$

The corresponding growth rate in real GDP per capita equals the sum of growths of real GDP per worker and fraction of working age population. We then estimate the following equation:

$$\begin{aligned} \Delta HOFSTEDE_{d,i} = {} & \beta \log\left(\frac{GDPpw_{1990}}{GDPpw_{1970}}\right)_i + \phi \log(GDPpw_{1970}) \\ & + \varphi \log\left(\frac{[Workers/Population]_{1990}}{[Workers/Population]_{1970}}\right)_i + \mathbf{X}'\theta + \alpha + \varepsilon_i, \end{aligned} \tag{7}$$

where *GDPpw* is GDP per engaged person (worker).[15]

Table 3 reports results for equation (7). The magnitude and statistical significance of estimates is mostly retained for individualism and power distance: a unit increase in the log difference in GDP per worker is associated with the increase by 4.12 points (54% of standard deviation of ΔIND) in individualism and with a reduction of about 7 points (85% of standard deviation of ΔPDI) in power distance among younger generations in full control specifications.

[14]In a set of unreported full-control regressions (available upon request), we collapse regression samples to the largest possible set of common countries in line with *UA* dimension ($N = 37$), for both periods under consideration (1970–2010 and 1970–1990). The finding is that no significant results were found for *IND* or *PDI* in 1970–2010, while results hold for *UA* ($\beta = +4.7^{**}$). Furthermore, the effect on *IR* dimension becomes strong and significant ($\beta = +5.06^{**}$). For 1970–1990, only results for *PDI* ($\beta = -7.43^{**}$) and *IR* ($\beta = +7.1^{***}$) dimensions hold. The largest common sample with *LTO* leaves too few observations for meaningful statistical inference.

[15]On average, GDP per worker level increased by 44% in largest sub-sample ($\sigma = 52\%$; max. = 221%).

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Table 3. Cultural change and worker productivity, 1970–1990, OLS estimates.

	ΔIndividualism		ΔPower distance		ΔUncertainty avoidance		ΔLong-term orientation		ΔIndulgence vs restraint	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
log (GDP*pw*1990 / GDP*pw*1970)	6.517**	4.125*	−10.349***	−6.949***	1.065	2.010	1.065	0.786	4.808**	2.303
	(2.688)	(2.259)	(2.527)	(2.420)	(2.400)	(2.274)	(2.743)	(2.381)	(2.392)	(1.972)
log GDP per capita in 1970	2.532**	1.171	−3.854***	−2.504**	−0.218	1.577	2.172**	3.523**	0.388	0.219
	(0.962)	(0.892)	(1.085)	(1.088)	(0.851)	(1.329)	(0.809)	(1.598)	(0.832)	(0.842)
Labor force growth, 1970–1990	−6.398	−1.846	1.675	5.773	4.059	5.679	−6.790	−10.776*	−6.934	−0.633
	(6.028)	(5.419)	(4.984)	(5.233)	(4.855)	(6.053)	(5.464)	(5.921)	(5.197)	(4.757)
Population controls	X	X	X	X	X	X	X	X	X	X
Geographic controls		X		X		X		X		X
Religion controls		X		X		X		X		X
Institutional controls		X		X		X		X		X
N (Countries)	58	58	58	58	39	39	31	31	69	69
R^2	0.301	0.625	0.440	0.676	0.125	0.413	0.270	0.516	0.232	0.481

Notes: robust standard errors in parentheses. *Population controls* include the natural log of population averaged over all years between 1970 and *t*, and the average of ethnic, linguistic, and religious fractionalization. *Geographic controls* include latitude and the landlocked dummy. *Religion controls* include dummies for predominantly Protestant, Catholic or Muslim populations. *Institutional controls* include a dummy when Romance or Chinese languages are either dominant or widely spoken (*PDI* specifications only) and British legal origins (*UA* specifications only).
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

As with baseline results, no robust significant effect is found for uncertainty avoidance, long-term orientation, or indulgence dimensions.[16] These null results may be due to the diverging impact of development on these dimensions as outlined previously, or to non-linear dynamics in the process of development as argued in Tang and Koveos (2008). It is also suggested that these cultural orientations were largely determined by deep historical factors, which explains their relative constancy (Hofstede *et al.*, 2010). Moreover, it is possible that non-economic factors play a major role in the change along these dimensions. For example, uncertainty avoidance significantly increases with age (Hofstede, 2001: 185), showing that for each year increase in each country's average age, uncertainty avoidance score increases by 7 points. Overall, the empirical results report that in faster-growing economies, the rise of individualistic and (politically) egalitarian attitudes among younger generations is significantly more pronounced, independently of different socio-economic controls, time frames considered, and an alternate measure for economic growth.

7. Conclusion

This paper empirically investigates the consequences of long-run economic development on intergenerational cultural change in up to 72 countries. Using country-level data on generational cleavages in five replicated Hofstede (1980, 2001) cultural dimensions across two non-overlapping age cohorts, we present evidence that increases in real GDP per capita during the coming-of-age period of the younger cohort are associated, at statistically and economically significant levels, with the observed generational value shifts toward greater individualism and egalitarianism (less power distance) around the world. The results are robust to a number of historical, geographic, and institutional controls, different periods under consideration, and an alternate measure of economic growth.

The findings of this paper are consistent with a small but growing literature on the effects of economic on cultural change. Existing research supports the notion that greater economic prosperity and equality, in the long run, gives rise to more tolerant, egalitarian, autonomous, and trusting norms across countries (Inglehart and Baker, 2000; Kyriacou and Lópes Velásquez, 2015; Tang and Koveos, 2008). This paper complements the above studies by focusing the analysis on its impact on cultural change *within* countries. In that respect, one central contribution of this paper has been to exploit the temporal dimension of cross-generational value orientations, and thus provide supportive arguments in favor of a causal relationship between development and cultural change. In doing so, we found suggestive evidence of a self-perpetuating cycle in which development promotes the rise of certain "pro-development" cultural values.

Some caveats apply. One limitation of the study's data is that the cohort-based view of cultural change does not preclude the possibility that younger cohorts adopt similar cultural values to those of their elders as they age (see e.g. Beugelsdijk *et al.*, 2015: 237). In that regard, a greater number of generational cohorts must be observed longitudinally to clarify the impact on cultural change. Furthermore, the speed and magnitude of actual cultural change within a country is difficult to quantify without accounting for the relative changes in the age structure of the population over time, as well as fertility and mortality rates. Also, since different mental models cannot be considered in isolation, the direction of overall cultural change is impossible to characterize by focusing on individual cultural dimensions.

Finally, it is important not to interpret the results in a normative way. There is no one set of "best" cultural values that economic development "should" promote. Although improvements in living standards exhibit a two-way relationship with individualism and low power distance, the rise of these value norms due to development could entail hidden costs to social and political structures. Cultural change in the form of generational distancing can increase fractionalization and raise tensions within a society.

[16]For *PDI*, results remain robust (and are even stronger; $\beta = -9.91^{***}$) when sample is restricted to the common countries with *UA* ($N = 38$) in full-control regressions. For *IR*, results are significant only in this restricted sample ($\beta = 7.97^{***}$), while there is no statistical significance in *IND, UA*, or *LTO* specifications.

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Moreover, short-run economic trade-offs can occur: while the move away from collectivism to individualism promotes long-run growth, it also discourages collective action owing to self-interested pursuits (Gorodnichenko and Roland, 2017: 402). Future research may examine more closely the socio-economic consequences of generational cultural divergence, as well as the non-economic drivers of cultural change across countries.

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Appendix

Table A1. Countries used in regressions.

	Africa	Asia	Americas	Europe	Oceania
1	Algeria	Armenia	Argentina	Albania	Australia
2	Burkina Faso	Azerbaijan	Brazil	Austria	New Zealand
3	Egypt	Bangladesh	Canada	Belarus	
4	Ethiopia	Georgia	Chile	Belgium	
5	Ghana	India	Colombia	Bulgaria	
6	Mali	Indonesia	Dominican Rep.	Croatia	
7	Morocco	Iran	El Salvador	Cyprus	
8	Nigeria	Iraq	Guatemala	Czechia	
9	Rwanda	Israel	Mexico	Denmark	
10	South Africa	Japan	Peru	Estonia	
11	Tanzania	Jordan	Trinidad & Tobago	Finland	
12	Uganda	Kyrgyzstan	United States	France	
13	Zambia	Malaysia	Uruguay	Germany	
14	Zimbabwe	Pakistan	Venezuela	Greece	
15		Philippines		Hungary	
16		Saudi Arabia		Iceland	
17		Singapore		Italy	
18		South Korea		Latvia	
19		Thailand		Lithuania	
20		Turkey		Luxembourg	
21		Vietnam		Macedonia	
22				Malta	
23				Moldova	
24				Netherlands	
25				Norway	
26				Poland	
27				Portugal	
28				Romania	
29				Russia	
30				Slovakia	
31				Slovenia	
32				Spain	
33				Sweden	
34				Switzerland	
35				Ukraine	
36				United Kingdom	

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