Research Article

Cross-Cultural Research
2025, Vol. 0(0) 1–44

DOI: 10.1177/10693971251327738
journals.sagepub.com/home/ccr


Modernization and Ideological Polarization on a Global Scale

Francesco Rigoli[1]

Abstract

Research has shown that modernization has changed people's values. Yet, it remains unknown whether modernization has also changed ideological polarization, namely, the variability of values within the population. The paper investigates this question by analysing data from the World Value Survey about multiple countries sampled over multiple waves (339 wave-countries). Once modernization was operationalised as per capita gross domestic product, the analyses reveal that poor countries display greater ideological polarization in the domain of economics, gender equality and immigration. This fits with the idea that poor countries are predisposed to ideological polarization because they are transitioning towards modernity. Still, in domains like abortion and divorce, ideological polarization emerged to be greater in rich countries because here the population is divided between conservative and liberal positions, while most people in poor countries converge on conservative views. These observations clarify the multifaceted implications of modernization and highlight its influence upon political polarization.

[1]City University of London, London, UK

Received: 25 October 2024; accepted: 22 February 2025

Corresponding Author:
Francesco Rigoli, Department of Psychology, City University of London, Northampton Square, London EC1V 0HB, UK.
Email: francesco.rigoli@city.ac.uk

Data Availability Statement included at the end of the article

Keywords
modernization, world value survey, ideological polarization, global

Introduction

First articulated in the writings of influential thinkers such as Karl Marx (1867/1967) and Max Weber (1922/1978; 1927), modernization theory remains one of the most influential frameworks within the social sciences (e.g., Berger, 1986; Cipolla, 1978; Coughenour & Stephenson, 1972; Feldman & Hurn, 1966; Fukuyama, 1992; Inkeles, 1969; Kuznets, 1966; Lerner, 1958; Lipset, 1959; Marsh, 2014; Parsons, 1964, 1971; Polanyi, 1944; Portes, 1976; Rostow, 1960, 1975; Schelkle et al., 2001; Smith & Inkeles, 1966; Welzel et al., 2003). Its main tenet is that modernization processes, encompassing intertwined aspects such as technological progress, scientific development, mass education, industrialization, demographic transition, urbanization and secularization, have revolutionised the way societies work as much as the way people think. Informed by modernization theory, scholars have explored the impact of modernization upon people's motives and values (Feldman & Hurn, 1966; Inglehart, 2018; Inglehart & Welzel, 2005, 2010; Korotayev et al., 2019; Welzel, 2013). Examining survey data from around the world spanning forty years, this endeavour has revealed that modernization is typically accompanied by a shift from materialistic values such as seeking economic security, conformity to tradition, and cultural homogeneity to self-expression values aiming at freedom, tolerance, and creativity.

These observations have offered invaluable insight on how values have changed alongside modernization, yet a fundamental dimension of this change remains to be explored. Virtually all previous studies have focused on how, in response to modernization, values have changed on *average* within the population. It remains to be explored whether modernization is accompanied not only by a change in terms of average, but also in terms of the *variability* of values within the population. In other words, as modernization unfolds, do people's values become more homogeneous or do they become less so? Prior research has already introduced the construct of variability concerning values (DiMaggio et al., 1996; Fiorina & Abrams, 2008), but has not explored its relationship with modernization. The label used in the literature to refer to this construct is *ideological polarization* (Iyengar et al., 2019) – the idea being that a society is more polarised when its members vary more in terms of the values they embrace[1]. Thus, the question above can be reformulated as follows: as modernization unfolds, does ideological polarization increase or decrease? The present paper aims at addressing this question by analysing data from the World Value Survey (WVS) (Inglehart et al., 2022), a large database

encompassing more than one hundred countries sampled multiple times over a forty-years period.

Besides contributing to understand the impact of modernization upon society, the research question addressed here is relevant also because it can shed light on the determinants of political polarization at large[2]. Among scholars, there is growing interest in the topic of political polarization given its potential repercussions in terms of fuelling conflict and discontent (e.g., Jost et al., 2022; Kerr et al., 2021; Kubin & Von Sikorski, 2021; Levin et al., 2021). Although the research on polarization is accumulating fast, most of it has focused on a small set of countries, chiefly the USA. This restricted focus has been criticized as it risks neglecting key factors that are invisible at the scale of single countries but become apparent when multiple countries are compared against each other (Gidron et al., 2020). Some recent works have started to address this by extending the focus to a worldwide context. This research has revealed that ideological polarization is greater in countries that are economically unequal (Gu & Wang, 2022) and in those characterised by low levels of impersonal trust (Rapp, 2016). The purpose of the present paper is to extend this enquiry by looking at the link between ideological polarization and another key variable, that of modernization. Various authors have interpreted modernization as one of the most consequential processes that have affected humanity during its history, with repercussions for virtually every aspect of society. It is not farfetched, therefore, to predict that modernization has also influenced ideological polarization, and indeed some prominent theories make exactly this prediction. Below, we will consider four alternative models that make divergent predictions regarding the relationship between modernization and ideological polarization. From each model, we will derive specific hypotheses that will be tested in subsequent data analyses.

Before delving into the different models, it is important to clarify the precise meaning of the term *modernization* as employed in the paper. In the literature, the definition of this concept often depends on the specific theoretical approach adopted. Some authors, for instance, have advanced an evolutionary outlook claiming that modernization unfolds over stages that follow necessarily one after the another and culminate in a final stage, being it communism (Marx, 1867/1967), bureaucratic capitalism (Weber (1922/1978; 1927), or liberal democracy (Fukuyama, 1992; Rostow, 1960, 1975). Other authors (e.g., Cipolla, 1978; Kuznets, 1966) have distinguished between factors that play a causal role in the modernization process (e.g., economic development, technological progress) and factors that are the product of such causes (e.g., cultural and political outcomes). The definition of modernization used in the present paper is agnostic about the theoretical debate concerning the nature of this process. Our definition is grounded simply on the empirical observation that certain characteristics of society tend to be correlated with each other; these include, among others, economic affluence, technological

progress, scientific development, mass education, industrialization, demographic transition, urbanization and secularization. A society where most of these characteristics are present can be regarded as being relatively modern, while a society where most of these characteristics are absent can be viewed as being little modern. This definition is agnostic about the causal relationship among the variables, as well as about whether modernization follows any rigid or probabilistic stage sequence.

Linked to this discussion is the question of how to measure modernization empirically. There is no consensus about how this should be done. The classical way is to use economic wealth, for example measured in terms of per capita Gross Domestic Product (GDP), as proxy for quantifying modernization (e.g., Inglehart & Welzel, 2005; Korotayev et al., 2019; Marsh, 2014). This is based on the reasoning that wealth is allegedly a key factor underlying modernization, can be calculated straightforwardly, is widely available in datasets, and is easy to compare across societies. Other scholars have preferred different economic indexes, such as the Knowledge Index (e.g., Welzel, 2013), based on the argument that these indexes capture modernization better. Yet another group of scholars has opted for quantifying modernization as a composite index where multiple variables are combined. A prominent example is the Human Development Index adopted by the United Nations Development Program (UNDP, 1990), where per capita income, life expectancy, and years of education are integrated in a single value.

While acknowledging the lack of consensus and the potential drawbacks, the present paper operationalises modernization in terms of per capita GDP - an approach that remains common in contemporary research (e.g., Inglehart & Welzel, 2005; Korotayev et al., 2019; Marsh, 2014). The reasons for our choice are multiple. First, other things being equal, using the most widely used index should be preferred as it promotes comparability and ensures that the chosen index is not ad-hoc. Second, per capita GDP is available for more countries and for more time points than alternatives, enlarging the sample size. Third, any effect exerted by per capita GDP is easier to interpret compared to effects exerted by composite indexes. Taking the Human Development Index as an example, it remains unclear whether any effect exerted by it is due to income, education, or life expectancy – to clarify this, the index needs to be broken down into its constituents, a procedure that ultimately undermines the utility of using a composite index. Fourth, although its unique role in defining modernization has been questioned (e.g., Sagar & Najam, 1998), per capita GDP is still widely considered to be one of the central components of modernization (Marsh, 2014). Fifth, even if the multifactorial nature of modernization is rightly acknowledged today, the variables linked with modernization remain substantially correlated with one another – for example, income, education, and life expectancy, used to calculate the Human Development Index, are substantially correlated. For all these reasons, we

conclude that adopting per capita GDP as proxy for measuring modernisation remains a sensible approach, and hence we follow this approach here.

Now that the key concept of modernization and the approach used to measure it have been clarified, the next section overviews four alternative models that make predictions regarding the relationship between modernization and ideological polarization.

Competing Models

Transition Model

Various scholars have highlighted the dramatic changes occurring when a society transitions from a premodern condition to a modern one (e.g., Marx, 1867/1967; Parsons, 1964, 1971; Polanyi, 1944; Weber, 1922, 1927). During this phase, many people migrate from the countryside to cities and in so doing they abandon jobs in agriculture to join the more remunerative industry and service sectors. This progressively increases average disposable income, offering growing opportunities for consumption. A large number of people enters higher education, the use of technology spreads, and access to national and international media grows, exposing people to a larger variety of ideas and lifestyles. All these changes occur at an unprecedented pace, meaning that there is a substantial number of people who, despite having grown up in a premodern context, have become accustomed to living in a modern one by old age.

Alongside the aforementioned structural changes, research has examined the cultural dynamics charactering the phase of transition from a premodern to a modern society. Several scholars (e.g., Grinin, 2022; Huntington, 1968; Moore, 1966; Tilly, 1973; Wolf, 1969) have argued that this transition often presents a clash between the traditional culture, grounded on life as it was before modernization, and radical new ideas, inspired by the recent changes unleashed by modernization as well as by visions of how society could be reshaped in the future. It is possible to interpret the clash between traditional culture and new ideas as reflecting a marked division in terms of values, that is, as reflecting high ideological polarization. On this basis, a *Transition model* can be formulated asserting that ideological polarization is higher in countries undergoing the transition towards modernity compared to countries where modernization has already reached maturity.

Let us apply the Transition model to the contemporary world. At present, except for a handful of countries that have failed to achieve even minimal levels of development, virtually all countries worldwide have taken the path leading to modernization. Therefore, countries can be classified along a continuum spanning from those that are amid the transition phase, on one side, and those that have reached a mature state of modernization, on the other.

Following prior research (e.g., Inglehart & Welzel, 2005; Korotayev et al., 2019; Marsh, 2014), per capita GDP can be used as a proxy indicating where a country stands within such continuum, with poorer countries being those that are experiencing the transition phase and richer ones being those where modernization has reached maturity. A specific empirical hypothesis can be derived from this line of reasoning: when looking at the contemporary world, per capita GDP can be predicted to be inversely correlated with ideological polarization. In other words, ideological polarization can be predicted to be higher in poorer countries.

Complexity Model

While the Transition model predicts a negative correlation between per-capita GDP and ideological polarization, a different argument can be proposed that makes the opposite prediction, that is, the prediction of a positive correlation between per-capita GDP and ideological polarization. This alternative view is based on the idea that ideological polarization grows when a society becomes more complex – we shall call this *Complexity model*.

Among scholars, there is widespread agreement that modernization enhances the level of social complexity (e.g., De-Sardan, 2008; Durkheim, 1893/1997; Morris, 2010) for the following reasons. Modernization leads to the spread of technology and to job specialization. Production and consumption of goods and services become more dynamic, and innovation becomes the engine of the economy. Greater wealth allows people to pursue more individualistic lifestyles insofar as it endows them with more freedom to choose which products to buy and on how to spend their leisure time.

An influential idea in the literature is that social complexity leads to cultural complexity (De-Sardan, 2008; Divale & Seda, 2001; Durkheim, 1893/1997) and, therefore, to heterogeneity regarding the values embraced by people - that is, it enhances ideological polarization. This is based on two assumptions. The first is that a person's values are partly shaped by the person's social role – for example, based on one's job and consumption/leisure choices. The second assumption is that in complex societies there is greater variety of social roles – for example, in terms of jobs and consumption choices. Greater variety of social roles, according to this view, is reflected in greater variety in terms of values, namely, in greater ideological polarization.

Let us apply this reasoning to the contemporary world. The prediction is that, insofar as it boosts social complexity, modernization is linked with greater ideological polarization. If modernization is operationalised in terms of per capita GDP, the Complexity model hypothesises a positive correlation between per capita GDP and ideological polarization whereby ideological polarization is predicted to be higher in richer countries.

Reorientation Model

The models presented so far view ideological polarization as a monolithic construct. However, the literature demonstrates that values are multidimensional. If such multidimensionality is acknowledged, then one can hypothesise that modernization affects each value dimension differently.

The literature offers multiple perspectives regarding the question of how values are structured. In the present paper, the focus will be on values concerning the political realm. An influential view is that political values can be grouped in two broad domains, one economic and the other social (Ashton et al., 2005; Caprara et al., 2006; Feldman & Johnston, 2014; Kerlinger, 1967; Malka et al., 2019; Rigoli, 2023; Schwartz et al., 2010; Treier & Hillygus, 2009). Encompassing values and attitudes concerning the economic sphere, the first domain opposes people who praise wealth inequality and economic laissez-fare versus people who praise state intervention to regulate the economy and to finance welfare and redistributive policies. The second domain opposes liberal versus conservative views concerning social issues such as gender equality, free choice (e.g., abortion and divorce) and immigration.

Once the distinction between the economic and the social domain is acknowledged, one can ask whether modernization affects ideological polarization differently in the two domains. Let us explore this question. Prior literature has reported that, while modernization unfolds, a shift from materialistic to self-expression values occurs (Feldman & Hurn, 1966; Inglehart, 2018; Inglehart & Welzel, 2005, 2010; Korotayev et al., 2019; Welzel, 2013). The notion of materialistic versus self-expression values has analogies with the distinction between the economic and the social domain outlined above, respectively. If, as the evidence shows, people move from materialistic to self-expression values as modernization progresses, then ideological polarization may likewise shift from the economic to the social domain as modernization progresses. Let us unpack the rationale of this hypothesis below.

The literature about the distinction between materialistic versus self-expression values is grounded on Maslow's theory of motivation (Maslow, 1943). This asserts that humans' motives are organised hierarchically, with materialistic needs being at the bottom and with self-expression needs being at the top (Inglehart, 2018). According to this view, since they are instrumental for survival, materialistic imperatives are inherently prioritized: as long as they remain unfulfilled, people focus on realising them while neglecting self-expression desires. Only when materialistic needs are satisfied, people reorient their goals in the pursuit of self-expression values. It has been argued that modernization has satisfied the materialistic needs of many people, freeing them to seek self-expression goals (Inglehart, 2018). This idea is compatible

with empirical evidence showing a shift from materialistic to self-expression values running parallel to modernization.

The same theoretical framework can be extended to the study of ideological polarization. However, an additional assumption is necessary here, that is, the assumption that ideological polarization is boosted in domains that are particularly relevant within a society, while being suppressed in domains that are less relevant. This assumption is grounded on the notion that people become more radicalised when they care deeply about something and interact with people who endorse opposite views. For instance, according to this argument, in a society where economic concerns are particularly salient, the division between those who strive for economic equality and those who cherish laissez-fair should be magnified.

Since, when modernization is at an early stage, materialistic needs remain unfulfilled for many people, in this phase economic concerns may be of paramount importance for people, while social concerns me be less so. Following the argument above, ideological polarization may therefore be high in the economic realm while being low in the social one. This picture may change at a later stage of modernization, when materialistic needs have been satisfied for many members of society. Now people's priorities may shift from the economic to the social sphere, implying diminished ideological polarization in the economic domain paired with enhanced ideological polarization in the social domain. We shall refer to this argument as *Reorientation model* as it relies on the idea that modernization leads people to reorient their priorities from the economic to the social domain, thereby shifting ideological polarization from the former to the latter.

In short, the Reorientation model asserts that modernization diminishes ideological polarization in the economic domain but increases it in the social domain. If modernization is measured in terms of per-capita GDP, the prediction is that ideological polarization concerning the economic domain is higher is poor countries while ideological polarization concerning the social domain is higher in rich countries.

Conformity Model

One last model we assessed is based on an influential proposal developed to explain the recent rise of right-wing populism in Western countries (Inglehart & Norris, 2017; Norris & Inglehart, 2019) – we refer to this as *Conformity model* as conformity processes are proposed to be central to it. The model asserts that, by eliciting a transfer from materialistic to self-expression values, modernization shifts public opinion in the social sphere from conservative to liberal views. This shift can be broken down into three phases. During phase one, the vast majority of people expresses conservative views. During phase two, the population is split in half between conservative and liberal positions.

During phase three, the vast majority of people embraces liberal views. According to the model, conformity pressures suppress ideological polarization during phase one and three since, during these phases, the vast majority of people stands on either side. Conformity pressures, by contrast, would be absent during phase two in which the population is split, thus boosting ideological polarization during this phase. According to this framework, since most citizens of poor countries still embrace conservative views, these countries are amid phase one and thus, thanks to strong conformity pressures, experience little ideological polarization. By contrast, since citizens of rich countries are split in half between liberals and conservatives and are therefore exposed to mild conformity pressures, rich countries are predicted to be amid phase two and thus to manifest elevated ideological polarization. The rise of right-wing populism in rich countries, the argument goes, is a consequence of the fact that rich countries are undergoing phase two.

Let us explore the implications of the Conformity model in the context of our study. The theory makes the following predictions:

(1) Higher per capita GDP (our proxy of modernization) is associated with more liberal views in the social domain. Although the original theory was not applied to the economic domain, we can extend it to this domain and derive the prediction that high per capita GDP is associated with support for equality and state intervention.
(2) Ideological polarization is higher for countries where the average score is closer to the intermediate score on the scale employed to measure a certain value dimension. For instance, as we shall see below, in the data analysed here the economic dimension is measured on a scale ranging from one to ten. Here the intermediate score is equal to five. It follows that ideological polarization concerning the economic dimension is predicted to be higher in countries where the average score is closer to five.
(3) The average score is closer to the intermediate score in rich compared to poor countries (e.g., in the economic domain, the average score is closer to five in rich compared to poor countries).
(4) Ideological polarization is greater in rich compared to poor countries. This prediction ensues because public opinion is predicted to be closer to the intermediate score in rich compared to poor countries.

In short, the Conformity model makes a set of specific predictions concerning the link between modernization, average score, proximity to the intermediate score, and ideological polarization.

Summary

We have overviewed four models that make divergent predictions regarding the link between modernization (operationalised in terms of per capita GDP) and ideological polarization. The Transition model predicts that ideological polarization is greater is poor countries. The Complexity model and the Conformity model predict that ideological polarization is greater in rich countries. Distinguishing between the economic and social sphere, the Reorientation model predicts that ideological polarization concerning the economic sphere is greater in poor countries while ideological polarization concerning the social sphere is greater in rich countries. The present paper aims at arbitrating among these predictions. To this aim, an analysis of the WVS is presented where, across available wave-countries, the relationship between per capita GDP and ideological polarization was investigated.

Our analyses distinguished between the economic and social domain. The former was derived by summing across three items concerning economic issues (see Methods). To acknowledge the greater complexity of the social domain, we distinguished among three separate aspects thereof: attitude towards free choice (homosexuality, abortion, divorce and suicide), attitude towards gender equality, and attitude towards immigration (see Methods). Thus, overall, we considered four separate domains, one economic and three social. We also added a fifth domain measured by an item asking participants to place themselves on the left-right spectrum in politics – we refer to this as left-right placement. For each wave-country, we calculated the standard deviation regarding each domain, and we used this to quantify ideological polarization in that domain. The relationship between ideological polarization and per capita GDP was thereby assessed.

Once the relationship between ideological polarization and per capita GDP was established, we probed the factors underlying this relationship by examining the role played by demographic variables including gender, age, education and income. This analysis allowed us to address some important questions. For example, as a hypothetical scenario, imagine that ideological polarization emerged to be greater in poor countries. We could clarify why this was the case by asking questions like: is ideological polarization greater in poor countries because the distance between highly educated and poorly educated people is greater in poor countries? Or because the distance between old and young people is greater in poor countries? Or because of both effects? The analysis approach used to examine the role played by age, gender, income and education is described in the Methods section.

Finally, we investigated the specific predictions made by the Conformity model concerning the link between per capita GDP and average score, between ideological polarization and proximity to the intermediate score, and between per capita GDP and proximity to the intermediate score.

Methods

Participants

The analyses were based on data from the WVS (Inglehart et al., 2022). This is a large database encompassing various countries from different regions of the world sampled over seven waves spanning a period of forty years. The samples are representative of the population of each country at the time of testing.

From the whole dataset including all countries and all waves, we focused on participants for which data about value dimensions (economics, immigration, gender equality, free choice, and left-right placement), demographics (gender, age, income and education) and social indicators (per capita GDP, Gini coefficient, population) were available. This resulted in the inclusion of 327 wave-countries for the economic dimension ($n = 489560$) and for the free-choice dimension ($n = 481140$), 339 wave-countries for the gender equality dimension ($n = 542111$), 245 for the immigration dimension ($n = 361157$), and 314 for left-right positioning ($n = 372084$). The sample size and descriptive statistics for each wave-country are reported in the Supplement.

Measures

The precise text of the items analysed in the paper is reported in the Supplement. The economic dimension was calculated as the average across three items (concerning attitudes towards inequality, towards state ownership of businesses, and towards state intervention in the economy, respectively), all ranging on a scale from one to ten. A high score for the economic dimension indicates support for equality and state intervention, a low score indicates support for laissez-faire and inequality.

The free choice dimension was equal to the average across four items (concerning attitudes towards abortion, divorce, homosexuality and suicide, respectively), all ranging on a scale from one to ten. A high score for the free Choice dimension indicates a liberal view on free choice issues, a low score indicates a conservative view.

The gender equality dimension was captured by a single item asking whether men have more right to work than women when jobs are scarce, an item ranging over three levels. A high score reflects a positive attitude towards gender equality, a low score reflects a negative attitude.

The immigration dimension was measured by a single item asking whether one supports restrictive or permissive immigration policies, ranging over four levels. A high score reflects a preference for restrictive policies, a low score reflects a preference for permissive policies.

Left-right positioning in politics was measured by a single item asking a person to place oneself on a one-to-ten interval scale where one corresponds to left-wing and ten to right-wing.

Regarding demographics, age was coded in terms of years, gender as a dummy variable (male = 0; female = 1), income was measured on a one-to-ten interval scale reflecting one's income decile, and education on an interval scale ranging on three levels (lower = 1; middle = 2; upper = 3).

Regarding the variables analysed at the wave-country level, these include per capita GDP at Purchasing Power Parity (in international dollars), the Gini coefficient[3], and the country's population (in millions). These were taken from the World Bank Web site. For the analysis, per capita GDP and population were log transformed.

Analysis

We analysed each value dimension (economics, immigration, gender equality, free choice, and left-right positioning) separately. Each analysis is presented in a separate section and includes two steps. At step one, for each wave-country we calculated the standard deviation across participants relative to the value dimension under scrutiny (note that here each case in the dataset corresponds to an individual participant). This corresponded to our measure of ideological polarization for a specific wave-country relative to the value dimension considered. On this basis, we constructed a dataset where each case corresponded to a wave-country. To acknowledge the fact that wave-countries are nested within countries, we analysed this dataset using multilevel modelling. The model had ideological polarization as dependent variable and included per capita GDP, Gini coefficient, population (note that these variables were relative to each specific country and year) and WVS wave as predictors linked with fixed effects. The intercept was associated with a random effect varying country-by-country. This model was fitted to test the effect of per capita GDP controlling for the other covariates.

At step two of our analysis, we probed the factors that may explain the effect of per capita GDP on ideological polarization. We focused on the role played by gender, age, income and education. To illustrate what sorts of questions could be addressed with this analysis, as a hypothetical scenario imagine that ideological polarization emerged to be greater in poor countries. A possibility is that ideological polarization was greater in poor countries because in these countries the divide between highly and poorly educated people is greater. Testing this sort of hypotheses requires to decompose ideological polarization (mathematically, a quantity indicating variability) in its components. In part, ideological polarization may be explained by the effect exerted by variables such as gender, age, income, and education. In part, ideological polarization may be unexplained by these factors. Based on this

reasoning, we aimed at isolating the effects of gender, age, income and education and separate them from the unexplained part of ideological polarization.

To address this, we proceeded as follows. Taking each wave-country separately, we analysed the data at the level of individual participants (i.e., where each case corresponds to a single participant) by fitting a linear regression model having the value dimension under scrutiny as dependent variable and having gender, age, income, and education as predictors. Once the model was fitted, we extracted the regression coefficients associated with each predictor. Note that a regression coefficient indicates the effect exerted by the associated predictor (e.g., gender) on the value dimension for a specific wave-country. We also extracted the Root Mean Square Error (RMSE) associated with the regression model. This corresponds to the residual error and captures the portion of ideological polarization which remains unexplained. On this basis, we constructed a dataset where each case corresponded to a wave-country and where the regression coefficients (four in total) and the RMSE were included as variables.

Acknowledging the fact that wave-countries are nested within countries, we used multilevel modelling to analyse this dataset. We fitted various models. All included per capita GDP, Gini coefficient, population (note that these variables were relative to each specific country and year) and WVS wave as predictors linked with fixed effects. For all models, the intercept was associated with a random effect varying country-by-country. What varied across models was the dependent variable. Each model had a specific regression coefficient (e.g., the one for gender) as dependent variable, except the last model where the dependent variable was RMSE. As above, these models were fitted to test the effects of per capita GDP controlling for the other covariates. Why is this analysis informative? As a hypothetical scenario, imagine that the results revealed that the effect of gender is stronger in poorer countries. A finding like this would shed light on why, again in a hypothetical scenario, ideological polarization is greater in poorer countries – the finding would show that, in part, this occurs because stronger gender differences characterise poorer countries.

It is important to spell out the rationale of our analysis approach employed at step two. Initially, we considered an alternative approach consisting in fitting a multilevel model of a specific dimension where (i) each case corresponds to an individual participant, (ii) participants are nested within countries (implying a random effect associated with the intercept varying country-by-country), (iii) age, education, income, and gender are included as predictors at level one associated with random effects, (iv) per-capita GDP, Gini coefficient, population, and WVS wave are included as predictors at level two associated with fixed effects, and (v) the two-way interactions between per capita GDP and the predictors at level one are also included as terms in the

model. Testing whether the interaction terms are significant would indicate whether the effect of, say, gender is moderated by per capita GDP. In principle, the approach just described would answer our research questions. However, the problem with this approach is that it requires making an assumption which is unwarranted in our analysis, that is, the assumption that the residual error is constant across wave-countries. Making this assumption is problematic here because one of the purposes of the investigation was indeed to assess country differences in terms of residual error. To establish formally whether the variance across wave-countries is homogeneous, we performed a Levene's test for each value dimension. In all cases, the test indicated that the variance was not homogeneous across wave-countries (economy: $F(326, 489233) = 50.48$, $p < .001$; free choice: $F(326, 480813) = 157.94$, $p < .001$; gender equality: $F(338, 541772) = 390.64$, $p < .001$; immigration: $F(244, 360912) = 85.42$, $p < .001$; left-right positioning: $F(313, 371770) = 71.41$, $p < .001$). This confirms that the multilevel modelling analysis just described is inappropriate here.

Based on these considerations, we reasoned that a sensible approach was to estimate a separate regression model for each wave-country in such a way that the parameters (alongside the residual error) could be estimated separately for each wave-country. The parameters could then be extracted and analysed subsequently. This approach does not require the assumption that the residual error is constant across wave-countries, yet it can answer our research questions concerning whether the residual error varies based on per capita GDP and whether the effects of gender, age, income and education vary based on per capita GDP. Note that, despite being non-standard in some disciplines, this approach is methodologically sound and is commonly used in disciplines such as neuroscience and cognitive psychology (Farrell & Lewandowsky, 2018; Poldrack et al., 2024).

Results

Economic Dimension

Focusing on the economic dimension, Table 1 reports the results of a set of multilevel models all having per capita GDP, Gini coefficient, population and WVS wave as predictors. The dependent variable of Model 1 is ideological polarization. The table shows that, in the economic sphere, ideological polarization is greater in poor countries (see also Figure 1(a)).

The dependent variable of Model 2 is RMSE, which is significantly higher in poor countries, too. This means that, in part, the link between per capita GDP and ideological polarization is due to the residual error[4]. In Model 3, 4, 5 and 6, the dependent variable is the effect of gender, age, education and income, respectively (see also Figure 2). The results show that, while the effect

Table 1. Multilevel Models for the Economic Attitude.

Model	Predictor	Effect	Std. Error	df	t	*p*	95% CI	
Model 1 (DV: SD)	GDP	−.040558	.016252	141.116	−2.496	.014*	−.072687	−.008429
	GINI	.004701	.001817	136.505	2.588	.011*	.001109	.008294
	Population	.002990	.009614	88.767	.311	.756	−.016113	.022094
	wave	−.010174	.008266	321.985	−1.231	.219	−.026436	.006087
Model 2 (DV: RMSE)	GDP	−.041538	.015428	140.023	−2.692	.008*	−.072040	−.011035
	GINI	.005271	.001725	136.501	3.056	.003**	.001860	.008682
	Population	.003466	.009155	87.906	.379	.706	−.014727	.021659
	wave	−.000551	.007792	321.951	−.071	.944	−.015881	.014778
Model 3 (DV: b for Sex)	GDP	.020130	.011720	145.484	1.717	.088	−.003034	.043294
	GINI	−.001676	.001298	127.481	−1.291	.199	−.004245	.000893
	Population	−.008663	.006661	90.899	−1.301	.197	−.021894	.004569
	wave	−.014637	.006548	320.343	−2.236	.026*	−.027519	−.001755
Model 4 (DV: b for Age)	GDP	−.003004	.000655	168.595	−4.590	<.001**	−.004297	−.001712
	GINI	−.000173	.000073	192.883	−2.379	.018*	−.000316	−.000029
	Population	−.000617	.000415	108.582	−1.485	.140	−.001440	.000206
	wave	.000301	.000287	315.914	1.046	.296	−.000265	.000866

(continued)

Table 1. (continued)

Model	Predictor	Effect	Std. Error	df	t	*p*	95% CI	
Model 5 (DV: b for Education)	GDP	.046244	.016081	163.504	2.876	.005*	.014491	.077996
	GINI	.000122	.001792	178.133	.068	.946	−.003413	.003658
	Population	.012045	.010003	106.181	1.204	.231	−.007785	.031876
	wave	.033843	.007352	318.373	4.604	<.001**	.019379	.048307
Model 6 (DV: b for Income)	GDP	−.017075	.004595	158.668	−3.716	<.001**	−.026150	−.008001
	GINI	.000376	.000505	131.502	.745	.458	−.000623	.001375
	Population	−.001638	.002536	100.333	−.646	.520	−.006669	.003393
	wave	.008719	.002746	320.703	3.175	.002**	.003316	.014122

Note. DV: dependent variable; SD: Standard Deviation; RMSE: Root Mean Square Error; GDP: log per capita Gross Domestic Product at Purchasing Power Parity. *$p < .05$ two-tailed; **$p < .005$ two-tailed. Model 1: $\Delta R^2 = 0.07$; Model 2: $\Delta R^2 = 0.07$; Model 3: $\Delta R^2 = 0.08$; Model 4: $\Delta R^2 = 0.14$; Model 5: $\Delta R^2 = 0.06$; Model 6: $\Delta R^2 = 0.33$. ΔR^2 is calculated based on σ_{full} (the variance parameter associated with the intercept's random effect for the model) and σ_{NO-GDP} (the variance parameter associated with the intercept's random effect for an equivalent model without per capita GDP as predictor). The formula is $\Delta R^2 = (\sigma_{NO-GDP} - \sigma_{full})/\sigma_{NO-GDP}$.

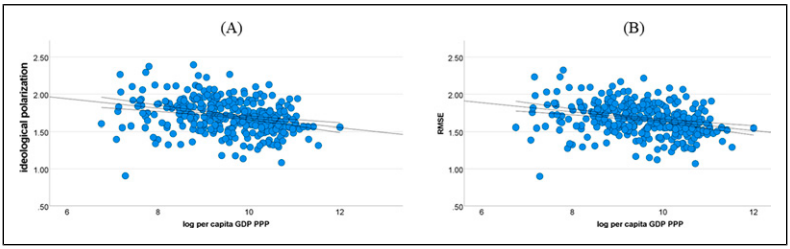

Figure 1. Relationship between per capita GDP and ideological polarization and residual error in the economic domain.

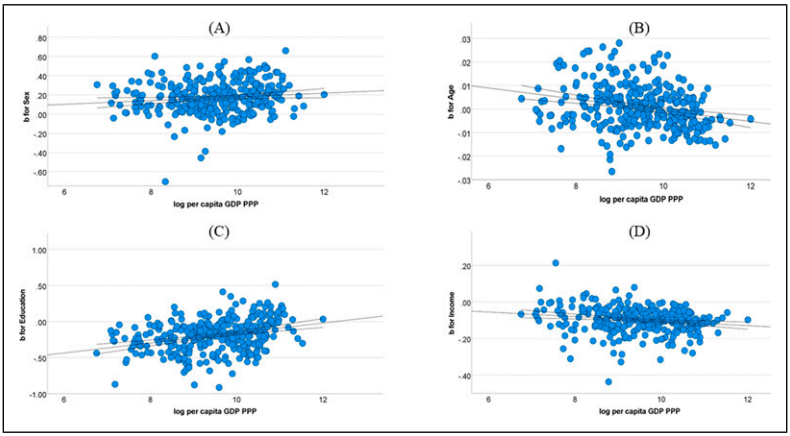

Figure 2. Relationship between per capita GDP and the effect of demographics in the economic domain.

of gender does not change based on per capita GDP, the effect of age, education and income does change based on per capita GDP. Table 2 clarifies the nature of this change (see also Figure 2). The table divides wave-countries in three groups according to their per capita GDP (High-GDP: log per capita GDP >10; Medium-GDP: 9 < log per capita GDP <10; Low-GDP: log per capita GDP <9). Table 2 reveals that the effect of age is significantly negative in High-GDP countries (i.e., here old people praise more economic inequality and laissez-faire), it is non-significant in Medium-GDP countries, and it is significantly positive in Low-GDP countries (i.e., here old people praise more economic equality and state intervention).

Regarding education, Table 2 reports a significant negative effect (meaning that highly educated people praise more economic inequality and laissez-faire)

Table 2. One Sample t-tests for the Economic Attitude.

GDP group	Predictor	Mean b	95% CI		t	df	*p*
High	Sex	0.20401	0.1760	0.2320	14.441	115	<.001**
Medium	Sex	0.14514	0.1137	0.1765	9.155	114	<.001**
Low	Sex	0.15834	0.1245	0.1922	9.287	94	<.001**
High	Age	−0.00285	−0.0041	−0.0016	−4.401	114	<.001**
Medium	Age	0.00168	0.0002	0.0032	2.241	114	0.027*
Low	Age	0.00346	0.0012	0.0057	3.035	95	0.003**
High	Education	−0.12383	−0.1632	−0.0845	−6.237	114	<.001**
Medium	Education	−0.18885	−0.2283	−0.1494	−9.492	114	<.001**
Low	Education	−0.27720	−0.3182	−0.2362	−13.409	95	<.001**
High	Income	−0.11005	−0.1199	−0.1002	−22.073	115	<.001**
Medium	Income	−0.09679	−0.1086	−0.0850	−16.294	114	<.001**
Low	Income	−0.08743	−0.1048	−0.0700	−9.983	95	<.001**

Note. Country-waves are organised in three separate groups based on their log per capita GDP PPP (High: log per capita GDP PPP >10; Medium: 9 < log per capita GDP PPP <10; Low: log per capita GDP PPP <9).

in all three groups, and it indicates that the effect becomes stronger as one moves from High-GDP to Low-GDP countries.

Regarding income, Table 2 reports a significant negative effect (meaning that rich people praise more economic inequality and laissez-faire) in all three groups, and it indicates that the effect becomes weaker as one moves from High-GDP to Low-GDP countries.

In conclusion, considering the economic sphere, ideological polarization is greater in poor countries. This occurs because the residual variability is greater in poor countries and because the effect of education is stronger in poor countries. Moreover, it occurs despite the effect of income being stronger in rich countries. Although age appears to exert different effects based on per capita GDP, the strength of the age effect is similar in High-GDP and Low-GDP countries (see Table 2), implying that eventually age does not contribute to explain why ideological polarization is greater in poor countries.

Free Choice Dimension

Focusing on the free choice dimension, Table 3 reports the results of a set of multilevel models all having per capita GDP, Gini coefficient, population and WVS wave as predictors. The dependent variable of Model 1 is ideological polarization. The table shows that, in the free choice sphere, ideological polarization is greater in rich countries (see also Figure 3(a)).

Table 3. Multilevel Models for the Free Choice Attitude.

Model	Predictor	Effect	Std. Error	df	t	*p*	95% CI	
Model 1 (DV: SD)	GDP	.154775	.030537	152.308	5.068	<.001**	.094444	.215106
	GINI	.000751	.003344	189.270	.225	.822	−.005845	.007347
	Population	.012836	.019453	90.097	.660	.511	−.025811	.051482
	wave	−.010134	.012674	306.735	−.800	.425	−.035074	.014806
Model 2 (DV: RMSE)	GDP	.131429	.028781	149.942	4.566	<.001**	.074560	.188299
	GINI	.002387	.003158	184.305	.756	.451	−.003844	.008618
	Population	.014322	.018236	89.256	.785	.434	−.021910	.050555
	wave	.000847	.012046	307.663	.070	.944	−.022856	.024551
Model 3 (DV: b for Sex)	GDP	.065081	.015411	142.683	4.223	<.001**	.034618	.095543
	GINI	−.003536	.001717	151.459	−2.060	.041*	−.006927	−.000144
	Population	−.011926	.009221	90.299	−1.293	.199	−.030245	.006393
	wave	−.010361	.007174	318.687	−1.444	.150	−.024475	.003754
Model 4 (DV: b for Age)	GDP	−.004834	.000813	146.194	−5.946	<.001**	−.006440	−.003227
	GINI	.000225	.000090	165.845	2.514	.013*	.000048	.000402
	Population	.000394	.000497	91.003	.794	.429	−.000592	.001381
	wave	.002064	.000359	312.549	5.757	<.001**	.001359	.002770

(continued)

Table 3. (continued)

Model	Predictor	Effect	Std. Error	df	t	*p*	95% CI	
Model 5 (DV: b for Education)	GDP	.126528	.018715	152.073	6.761	<.001**	.089554	.163502
	GINI	−.006654	.002082	164.435	−3.196	.002**	−.010765	−.002543
	Population	−.002962	.011295	97.547	−.262	.794	−.025377	.019453
	wave	−.051333	.008558	317.892	−5.998	<.001**	−.068170	−.034495
Model 6 (DV: b for Income)	GDP	.005013	.004662	139.203	1.075	.284	−.004203	.014230
	GINI	.000448	.000512	114.385	.876	.383	−.000565	.001462
	Population	−.000680	.002520	85.637	−.270	.788	−.005689	.004329
	wave	−.005624	.002746	320.932	−2.048	.041*	−.011025	−.000222

Note. DV: dependent variable; SD: Standard Deviation; RMSE: Root Mean Square Error; GDP: log per capita Gross Domestic Product at Purchasing Power Parity. *$p < .05$ two-tailed; **$p < .005$ two-tailed. Model 1: $\Delta R^2 = 0.29$; Model 2: $\Delta R^2 = 0.25$; Model 3: $\Delta R^2 = 0.23$; Model 4: $\Delta R^2 = 0.35$; Model 5: $\Delta R^2 = 0.42$; Model 6: $\Delta R^2 = 0.03$. ΔR^2 is calculated based on σ_{full} (the variance parameter associated with the intercept's random effect for the model) and σ_{NO-GDP} (the variance parameter associated with the intercept's random effect for an equivalent model without per capita GDP as predictor). The formula is $\Delta R^2 = (\sigma_{NO-GDP} - \sigma_{full})/\sigma_{NO-GDP}$.

The dependent variable of Model 2 is RMSE, which is significantly higher in rich countries, too. This means that, in part, the link between per capita GDP and ideological polarization is due to the residual error[5]. In Model 3, 4, 5 and 6, the dependent variable is the effect of gender, age, education and income, respectively (see also Figure 4). The results show that the effect of all these variables except income changes based on per capita GDP. Clarifying the nature of this change, Table 4 indicates that (1) women are more liberal on free choice matters than men, an effect that becomes stronger moving from Low-GDP to High-GDP countries; (2) young people are more liberal on free choice matters than old people, an effect that becomes stronger moving from Low-GDP to High-GDP countries; (3) highly educated people are more liberal on free choice matters than poorly educated people, an effect that becomes stronger moving from Low-GDP to High-GDP countries (see also Figure 4).

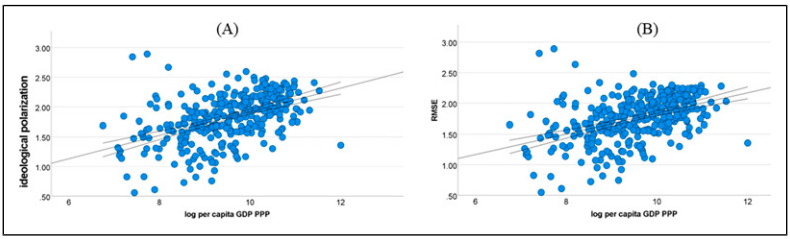

Figure 3. Relationship between per capita GDP and ideological polarization and residual error in the domain of free choice.

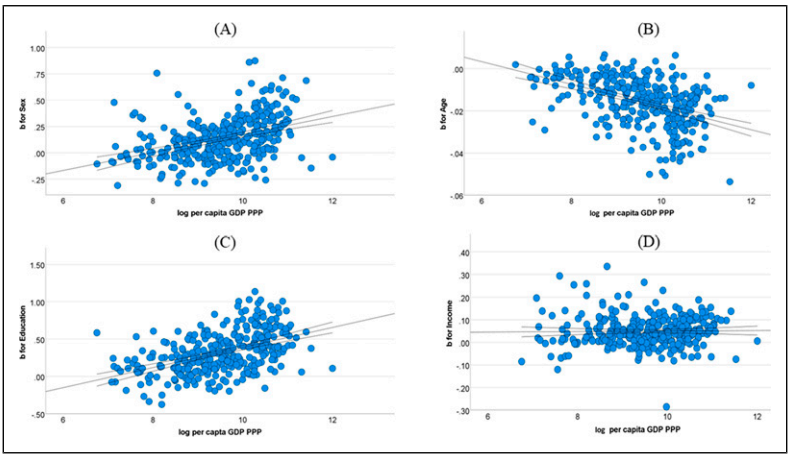

Figure 4. Relationship between per capita GDP and the effect of demographics in the domain of free choice.

Table 4. One Sample t-tests for the Free Choice Attitude.

GDP group	Predictor	Mean b	95% CI		t	df	*p*
High	Sex	.24319	0.2026	0.2837	11.873	120	<.001**
Medium	Sex	.09522	0.0664	0.1240	6.555	112	<.001**
Low	Sex	.04366	0.0058	0.0815	2.290	92	0.024*
High	Age	−.02222	−0.0242	−0.0202	−21.721	120	<.001**
Medium	Age	−.01457	−0.0165	−0.0127	−15.117	112	<.001**
Low	Age	−.00870	−0.0106	−0.0068	−9.269	90	<.001**
High	Education	.48372	0.4357	0.5317	19.963	120	<.001**
Medium	Education	.29783	0.2535	0.3422	13.298	112	<.001**
Low	Education	.15444	0.1100	0.1988	6.907	92	<.001**
High	Income	.05183	0.0419	0.0617	10.378	120	<.001**
Medium	Income	.04124	0.0288	0.0537	6.566	112	<.001**
Low	Income	.05535	0.0390	0.0717	6.710	92	<.001**

Note. Country-waves are organised in three separate groups based on their log per capita GDP PPP (High: log per capita GDP PPP >10; Medium: 9 < log per capita GDP PPP <10; Low: log per capita GDP PPP <9).

In conclusion, considering the free choice domain, ideological polarization is greater in rich countries. This occurs because residual variability is greater in rich countries and because the effect of gender, age and education is stronger in rich countries.

Gender Equality Dimension

Focusing on the issue of gender equality, Table 5 reports the results of a set of multilevel models all having per capita GDP, Gini coefficient, population and WVS wave as predictors. The dependent variable of Model 1 is ideological polarization. The table shows that, with regard to gender equality, ideological polarization is greater in poor countries (see also Figure 5(a)).

The dependent variable of Model 2 is RMSE, which is significantly higher in poor countries, too. This means that, in part, the link between per capita GDP and ideological polarization is due to the residual error[6]. In Model 3, 4, 5 and 6, the dependent variable is the effect of gender, age, education and income, respectively (see also Figure 6). The results show that the effect of gender and age, but neither the effect of education nor of income, changes based on per capita GDP. Clarifying the nature of this change, Table 6 indicates that (1) women favour more gender equality than men, an effect that becomes stronger moving from High-GDP to Low-GDP countries; (2) young people favour more gender equality than old people, an effect that becomes stronger moving from Low-GDP to High-GDP countries (see also Figure 6).

Table 5. Multilevel Models for the Gender Equality Attitude.

Model	Predictor	Effect	Std. Error	df	t	*p*	95% CI	
Model 1 (DV: SD)	GDP	−.040396	.010502	166.931	−3.846	<.001**	−.061130	−.019662
	GINI	.000505	.001159	197.089	.436	.664	−.001780	.002790
	Population	.001884	.006725	103.498	.280	.780	−.011453	.015220
	wave	−.003924	.004460	322.388	−.880	.380	−.012698	.004850
Model 2 (DV: RMSE)	GDP	−.040855	.010039	165.964	−4.070	<.001**	−.060675	−.021035
	GINI	.000540	.001108	195.270	.488	.626	−.001645	.002726
	Population	.002594	.006416	102.996	.404	.687	−.010130	.015318
	wave	−.001820	.004277	322.709	−.426	.671	−.010234	.006594
Model 3 (DV: b for Sex)	GDP	−.071874	.010550	142.474	−6.813	<.001**	−.092730	−.051019
	GINI	.002181	.001174	159.716	1.859	.065	−.000136	.004499
	Population	−.008166	.006560	87.170	−1.245	.217	−.021203	.004872
	wave	.014512	.004722	326.268	3.073	.002**	.005221	.023802

(continued)

Table 5. (continued)

Model	Predictor	Effect	Std. Error	df	t	*p*	95% CI	
Model 4 (DV: b for Age)	GDP	−.001767	.000256	151.603	−6.900	<.001**	−.002273	−.001261
	GINI	.000082	.000029	152.300	2.881	.005*	.000026	.000139
	Population	−.000218	.000153	96.473	−1.42	.158	−.000522	.000086
	wave	.000947	.000124	327.796	7.62	<.001**	.000703	.001191
Model 5 (DV: b for Education)	GDP	.003887	.006777	145.950	.574	.567	−.009506	.017280
	GINI	.000850	.000758	148.290	1.122	.264	−.000647	.002347
	Population	−.002781	.004054	91.901	−.686	.494	−.010834	.005271
	wave	−.003712	.003284	332.491	−1.130	.259	−.010172	.002748
Model 6 (DV: b for Income)	GDP	.000072	.001557	143.339	.047	.963	−.003005	.003150
	GINI	.000187	.000172	120.970	1.089	.278	−.000153	.000527
	Population	−.001157	.000859	88.005	−1.347	.181	−.002863	.000550
	wave	−.002650	.000909	333.008	−2.914	.004**	−.004439	−.000861

Note. DV: dependent variable; SD: Standard Deviation; RMSE: Root Mean Square Error; GDP: log per capita Gross Domestic Product at Purchasing Power Parity. *$p < .05$ two-tailed; **$p < .005$ two-tailed. Model 1: $\Delta R^2 = 0.18$; Model 2: $\Delta R^2 = 0.19$; Model 3: $\Delta R^2 = 0.36$; Model 4: $\Delta R^2 = 0.37$; Model 5: $\Delta R^2 = 0$; Model 6: $\Delta R^2 = 0$. ΔR^2 is calculated based on σ_{full} (the variance parameter associated with the intercept's random effect for the model) and σ_{NO-GDP} (the variance parameter associated with the intercept's random effect for an equivalent model without per capita GDP as predictor). The formula is $\Delta R^2 = (\sigma_{NO-GDP} - \sigma_{full})/\sigma_{NO-GDP}$.

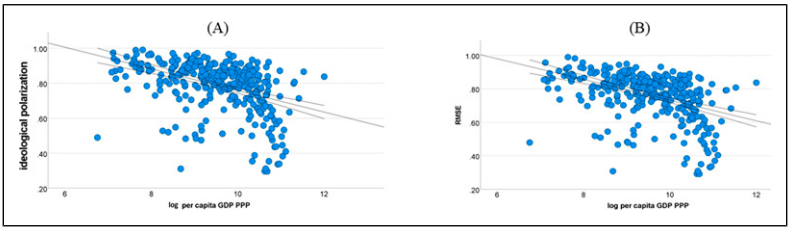

Figure 5. Relationship between per capita GDP and ideological polarization and residual error in the domain of gender equality.

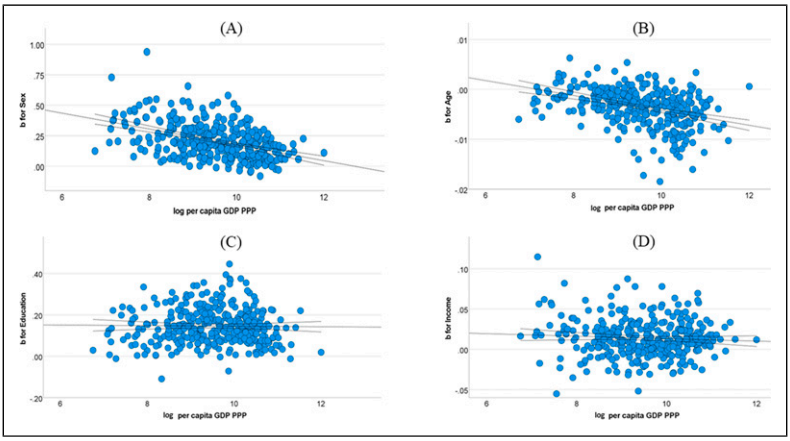

Figure 6. Relationship between per capita GDP and the effect of demographics in the domain of gender equality.

In conclusion, considering gender equality, ideological polarization is greater in poor countries. This occurs because residual variability is greater in poor countries, because the effect of gender is stronger in poor countries, and despite the effect of age being stronger in rich countries.

Immigration Dimension

Focusing on the issue of immigration, Table 7 reports the results of a set of multilevel models all having per capita GDP, Gini coefficient, population and WVS wave as predictors. The dependent variable of Model 1 is ideological polarization. The table shows that, with regard to immigration, ideological polarization is greater in poor countries (see also Figure 7(a)).

Table 6. One Sample t-tests for the Gender Equality Attitude.

GDP group	Predictor	Mean b	95% CI		t	df	*p*
High	Sex	.13591	.1172	.1546	14.363	121	<.001**
Medium	Sex	.21092	.1889	.2330	18.960	118	<.001**
Low	Sex	.28734	.2546	.3201	17.428	97	<.001**
High	Age	−.00534	−.0060	−.0047	−15.476	119	<.001**
Medium	Age	−.00321	−.0039	−.0025	−8.946	117	<.001**
Low	Age	−.00151	−.0020	−.0010	−5.838	95	<.001**
High	Education	.13268	.1190	.1464	19.204	121	<.001**
Medium	Education	.16763	.1504	.1848	19.286	118	<.001**
Low	Education	.13776	.1206	.1549	15.908	97	<.001**
High	Income	.01425	.0107	.0177	8.060	121	<.001**
Medium	Income	.01190	.0077	.0161	5.657	118	<.001**
Low	Income	.01678	.0115	.0221	6.278	97	<.001**

Note. Country-waves are organised in three separate groups based on their log per capita GDP PPP (High: log per capita GDP PPP >10; Medium: 9 < log per capita GDP PPP <10; Low: log per capita GDP PPP <9).

The dependent variable of Model 2 is RMSE, which is significantly higher in poor countries, too. This means that, in part, the link between per capita GDP and ideological polarization is due to the residual error[7]. In Model 3, 4, 5 and 6, the dependent variable is the effect of gender, age, education and income, respectively (see also Figure 8). The results show that only the effect of education changes based on per capita GDP. Clarifying the nature of this change, Table 8 indicates that highly educated people favour more permissive immigration policies, an effect that becomes stronger moving from Low-GDP to High-GDP countries.

In conclusion, considering immigration, ideological polarization is greater in poor countries. This occurs because residual variability is higher in poor countries and despite the effect of education being stronger in rich countries.

Left-Right Positioning

Finally, we analysed left-right positioning. Table 9 reports the results of a set of multilevel models all having per capita GDP, Gini coefficient, population and WVS wave as predictors. The dependent variable of Model 1 is ideological polarization. The table shows that, with regard to left-right positioning, ideological polarization is greater in poor countries (see also Figure 9(a)).

The dependent variable of Model 2 is RMSE, which is significantly higher in poor countries, too. This means that, in part, the link between per capita GDP and ideological polarization is due to the residual error[8]. In Model 3, 4,

Table 7. Multilevel Models for the Immigration Attitude.

Model	Predictor	Effect	Std. Error	df	T	*p*	95% CI	
Model 1 (DV: SD)	GDP	−.046977	.007830	140.120	−6.000	<.001**	−.062458	−.031497
	GINI	.001096	.000892	164.776	1.229	.221	−.000665	.002856
	Population	.010296	.004817	93.258	2.138	.035*	.000731	.019860
	wave	.009822	.003494	239.999	2.811	.005*	.002939	.016706
Model 2 (DV: RMSE)	GDP	−.047647	.007790	139.526	−6.117	<.001**	−.063048	−.032246
	GINI	.001274	.000887	163.945	1.435	.153	−.000478	.003026
	Population	.010159	.004788	92.809	2.122	.037*	.000650	.019667
	wave	.010734	.003482	239.996	3.083	.002**	.003875	.017592
Model 3 (DV: b for Sex)	GDP	−.004962	.004501	111.671	−1.103	.273	−.013881	.003956
	GINI	.000554	.000507	86.067	1.092	.278	−.000454	.001562
	Population	−.001043	.002384	72.335	−.437	.663	−.005794	.003708
	wave	.004058	.002975	233.652	1.364	.174	−.001804	.009920

(continued)

Table 7. (continued)

Model	Predictor	Effect	Std. Error	df	T	p	95% CI	
Model 4 (DV: b for Age)	GDP	−.000041	.000274	131.734	−.151	.880	−.000583	.000500
	GINI	−.000023	.000032	137.218	−.730	.467	−.000085	.000039
	Population	−.000026	.000160	90.987	−.163	.871	−.000345	.000293
	wave	.000351	.000138	236.379	2.550	.011	.000080	.000622
Model 5 (DV: b for Education)	GDP	−.040748	.006582	119.604	−6.191	<.001**	−.053780	−.027715
	GINI	.000741	.000759	111.706	.976	.331	−.000763	.002245
	Population	−.003102	.003704	79.816	−.837	.405	−.010475	.004270
	wave	.023401	.003676	235.237	6.365	<.001**	.016158	.030643
Model 6 (DV: b for Income)	GDP	.001162	.001686	239.000	.689	.491	−.002160	.004484
	GINI	5.366124E-5	.000189	239.000	.284	.777	−.000319	.000426
	Population	−.000594	.000887	239.000	−.670	.503	−.002341	.001153
	wave	−.000247	.001129	239.000	−.218	.827	−.002471	.001978

Note. DV: dependent variable; SD: Standard Deviation; RMSE: Root Mean Square Error; GDP: log per capita Gross Domestic Product at Purchasing Power Parity. *$p < .05$ two-tailed; **$p < .005$ two-tailed. Model 1: $\Delta R^2 = 0.39$; Model 2: $\Delta R^2 = 0.41$; Model 3: $\Delta R^2 = 0$; Model 4: $\Delta R^2 = 0$; Model 5: $\Delta R^2 = 0.55$; Model 6: $\Delta R^2 = 0$. ΔR^2 is calculated based on σ_{full} (the variance parameter associated with the intercept's random effect for the model) and σ_{NO-GDP} (the variance parameter associated with the intercept's random effect for an equivalent model without per capita GDP as predictor). The formula is $\Delta R^2 = (\sigma_{NO-GDP} - \sigma_{full})/\sigma_{NO-GDP}$.

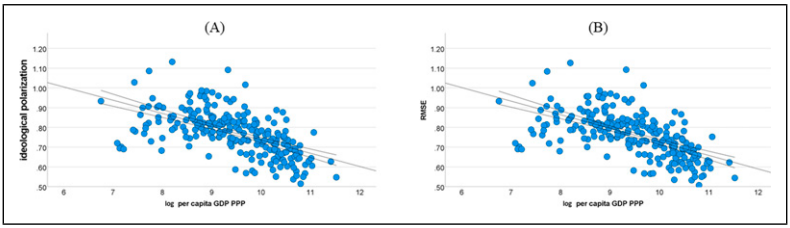

Figure 7. Relationship between per capita GDP and ideological polarization and residual error in the domain of immigration.

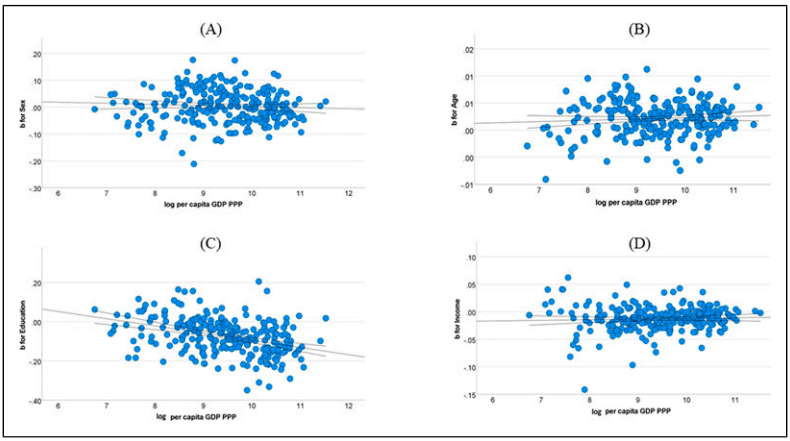

Figure 8. Relationship between per capita GDP and the effect of demographics in the domain of immigration.

5 and 6, the dependent variable is the effect of gender, age, education and income, respectively (see also Figure 10). The results show that only the effect of age changes based on per capita GDP. Clarifying the nature of this change, Table 10 indicates that, while in Medium-GDP countries age and left-right positioning are not related, in High-GDP countries old people are more right-wing than young people and in Low-GDP countries old people are more left-wing than young people.

In conclusion, considering left-right positioning, ideological polarization is greater in poor countries. This occurs because residual variability is higher in poor countries. Although age appears to exert different effects based on per capita GDP, the strength of the age effect is similar in High-GDP and Low-GDP countries (see Table 10), implying that eventually age does not contribute to explain why ideological polarization is greater in poor countries.

Table 8. One Sample t-tests for the Immigration Attitude.

GDP group	Predictor	Mean b	95% CI		t	df	*p*
High	Sex	−.00606	−.0163	.0042	−1.176	82	.243
Medium	Sex	.01403	−.0003	.0284	1.946	82	.055
Low	Sex	.00567	−.0098	.0212	.728	78	.469
High	Age	.00234	.0018	.0029	8.179	81	<.001**
Medium	Age	.00171	.0010	.0024	5.125	81	<.001**
Low	Age	.00244	.0016	.0033	5.784	78	<.001**
High	Education	−.11515	−.1352	−.0951	−11.446	82	<.001**
Medium	Education	−.07766	−.0948	−.0605	−9.003	82	<.001**
Low	Education	−.02839	−.0480	−.0088	−2.881	78	.005*
High	Income	−.00991	−.0134	−.0065	−5.739	81	<.001**
Medium	Income	−.01407	−.0184	−.0097	−6.455	82	<.001**
Low	Income	−.01390	−.0209	−.0069	−3.954	78	<.001**

Note. Country-waves are organised in three separate groups based on their log per capita GDP PPP (High: log per capita GDP PPP >10; Medium: 9 < log per capita GDP PPP <10; Low: log per capita GDP PPP <9).

Predictions of the Conformity model

We concluded our analyses by assessing the key predictions of the Conformity model (Inglehart & Norris, 2017; Norris & Inglehart, 2019). These concern the link between per capita GDP and average score, between ideological polarization and proximity to the intermediate score, and between per capita GDP and proximity to the intermediate score. We tested these predictions in turn.

We began by assessing the link between per capita GDP and the average score – remember that the Conformity model predicts that rich countries display more liberal views in social domains and greater support for equality and state intervention in the economic domain. Considering each value dimension separately, for each wave-country we calculated the average score across participants. The average score was included as dependent variable in a multilevel model having per capita GDP, Gini coefficient, population (note that these variables were relative to each specific country and year) and WVS wave as predictors associated with fixed effects (the intercept was associated with a random effect varying country-by-country; note that, in this analysis, cases correspond to wave-countries). The results of the analyses are reported in Table S1 (see also Figure S1(b), S2(b), S3(b), S4(b), and S5(b)). The table shows that, compared to poor countries, rich countries exhibit greater support for economic inequality and laissez-faire, more liberal views on free choice issues, greater support for gender equality, and greater support for restrictive immigration policies, with no difference concerning left-right positioning.

Table 9. Multilevel Models for Left-Right Positioning.

Model	Predictor	Effect	Std. Error	df	t	*p*	95% CI	
Model 1 (DV: SD)	GDP	−.140272	.027096	138.499	−5.177	<.001**	−.193848	−.086696
	GINI	.015204	.003068	150.509	4.956	<.001**	.009142	.021267
	Population	−.029606	.016564	90.709	−1.787	.077	−.062509	.003296
	wave	.085908	.011900	305.025	7.219	<.001**	.062491	.109325
Model 2 (DV: RMSE)	GDP	−.144722	.026740	136.824	−5.412	<.001**	−.197598	−.091845
	GINI	.015028	.003030	146.424	4.959	<.001**	.009039	.021017
	Population	−.030386	.016266	89.813	−1.868	.065	−.062702	.001929
	wave	.085070	.011876	305.743	7.163	<.001**	.061701	.108439
Model 3 (DV: b for Sex)	GDP	.004669	.018158	128.902	.257	.797	−.031257	.040596
	GINI	.003587	.002060	122.925	1.742	.084	−.000490	.007664
	Population	.004712	.010667	85.169	.442	.660	−.016496	.025919
	wave	−.007081	.008797	308.848	−.805	.422	−.024391	.010230

(continued)

Table 9. (continued)

Model	Predictor	Effect	Std. Error	df	t	*p*	95% CI	
Model 4 (DV: b for Age)	GDP	.004563	.001123	156.552	4.064	<.001**	.002345	.006781
	GINI	7.580987E-5	.000125	194.044	.608	.544	−.000170	.000322
	Population	.001024	.000715	99.724	1.431	.156	−.000396	.002443
	wave	−.001355	.000449	296.089	−3.018	.003**	−.002238	−.000472
Model 5 (DV: b for Education)	GDP	−.035805	.020023	136.984	−1.788	.076	−.075399	.003788
	GINI	−.009508	.002273	137.940	−4.183	<.001**	−.014002	−.005014
	Population	−.006659	.011955	91.331	−.557	.579	−.030406	.017087
	wave	−.010460	.009301	307.965	−1.125	.262	−.028761	.007842
Model 6 (DV: b for Income)	GDP	−.093918	.066334	134.646	−1.416	.159	−.225110	.037274
	GINI	.011655	.006155	128.143	1.894	.061	−.000524	.023833
	Population	−.000011	.000685	101.560	−.016	.988	−.001369	.001348
	wave	.001844	.003409	83.225	.541	.590	−.004937	.008624

Note. DV: dependent variable; SD: Standard Deviation; RMSE: Root Mean Square Error; GDP: log per capita Gross Domestic Product at Purchasing Power Parity. *$p < .05$ two-tailed; **$p < .005$ two-tailed. Model 1: $\Delta R^2 = 0.27$; Model 2: $\Delta R^2 = 0.30$; Model 3: $\Delta R^2 = 0$; Model 4: $\Delta R^2 = .18$; Model 5: $\Delta R^2 = 0.08$; Model 6: $\Delta R^2 = 0.03$. ΔR^2 is calculated based on σ_{full} (the variance parameter associated with the intercept's random effect for the model) and σ_{NO-GDP} (the variance parameter associated with the intercept's random effect for an equivalent model without per capita GDP as predictor). The formula is $\Delta R^2 = (\sigma_{NO-GDP} - \sigma_{full})/\sigma_{NO-GDP}$.

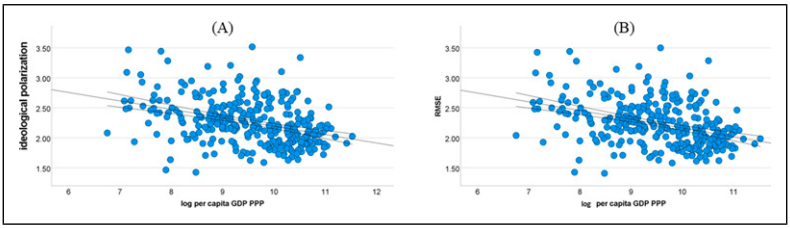

Figure 9. Relationship between per capita GDP and ideological polarization and residual error in the domain of left-right positioning.

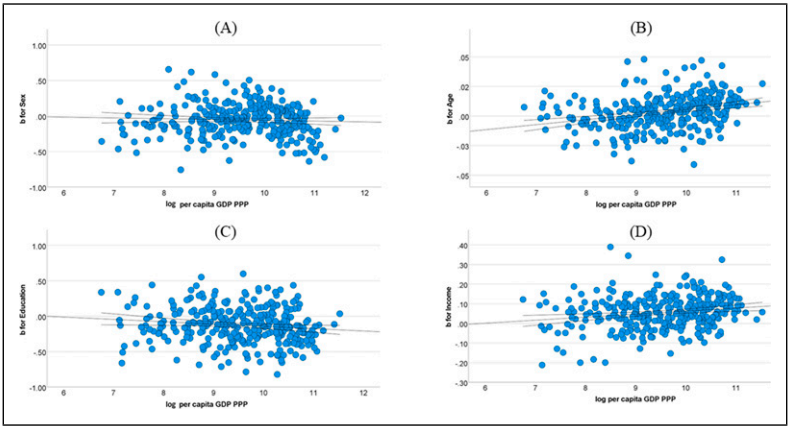

Figure 10. Relationship between per capita GDP and the effect of demographics in the domain of left-right positioning.

Altogether, the picture supports the Conformity model in the domain of free choice and gender equality but not in the domain of economics, immigration and left-right positioning.

Next, we explored the link between ideological polarization and the distance from the intermediate score - remember that the Conformity model predicts that ideological polarization is greater in countries where public opinion is closer to the intermediate score. Considering again each value dimension separately, for each wave-country we calculated the distance between the average score and the intermediate score (the latter being 5, 5, 2, 2.5 and 5 for economics, free choice, gender equality, immigration and left-right positioning, respectively). A multilevel model was fitted having ideological polarization as dependent variable and having the distance from the intermediate score as predictor alongside WVS wave (the intercept was associated with a random effect varying country-by-country; note that, in this

Table 10. One Sample t-tests for Left-Right Positioning.

GDP group	Predictor	Mean b	95% CI		t	df	*p*
High	Sex	−.09981	−.1387	−.0609	−5.084	116	<.001**
Medium	Sex	.00694	−.0325	.0463	.349	106	.728
Low	Sex	−.06996	−.1202	−.0197	−2.767	89	.007*
High	Age	.00868	.0062	.0111	7.049	115	<.001**
Medium	Age	.00285	.0003	.0054	2.187	106	.031*
Low	Age	−.00286	−.0058	.0001	−1.945	88	.055
High	Education	−.15805	−.2019	−.1142	−7.136	116	<.001**
Medium	Education	−.13899	−.1886	−.0894	−5.558	106	<.001**
Low	Education	−.07370	−.1277	−.0197	−2.712	89	.008
High	Income	.07461	.0611	.0881	10.931	116	<.001**
Medium	Income	.04438	.0296	.0592	5.948	106	<.001**
Low	Income	.04362	.0226	.0647	4.117	89	<.001**

Note. Country-waves are organised in three separate groups based on their log per capita GDP PPP (group 1: log per capita GDP PPP >10; group 2: 9 < log per capita GDP PPP <10; group 3: log per capita GDP PPP <9).

analysis, cases correspond to wave-countries). As illustrated by Table S2 (see also Figure S1(b), S2(b), S3(b), S4(b), and S5(b)), higher ideological polarization was associated with smaller distance from the intermediate score in the domain of free choice and gender equality, but not in the other domains.

Finally, we explored the link between per capita GDP and distance from the intermediate score - remember that the Conformity model predicts that the distance from the intermediate score is smaller in rich countries. We fitted a multilevel model having distance from the intermediate score as dependent variable and having per capita GDP, Gini coefficient, population (note that these variables were relative to each specific country and year) and WVS wave as predictors associated with fixed effects (the intercept was associated with a random effect varying country-by-country; note that, in this analysis, cases correspond to wave-countries). Table S3 (see also Figure S1(a), S2(a), S3(a), S4(a), and S5(a)) indicates that the distance from the intermediate score is smaller in rich countries in all domains except gender equality, where it is smaller in poor countries.

Altogether, the Conformity model fits the data well in the domain of free choice. Here, higher per capita GDP is linked with greater liberalism, with greater ideological polarization, and with greater proximity to the intermediate score. Meanwhile, greater ideological polarization in the domain of free choice is associated with greater proximity to the intermediate score. The Conformity model can also be reconciled with data in the domain of gender equality, although here the scenario seems to be one where poor countries are

those undergoing phase two (where society is split and thus more polarized) while rich countries are experiencing phase three (where the vast majority of people embraces a liberal view and polarization is thus smaller). Indeed, consistent with this interpretation, lower per capita GDP is linked with lower support for gender equality, with greater ideological polarization, and with greater proximity to the intermediate score. Meanwhile greater ideological polarization in the domain of gender equality is associated with greater proximity to the intermediate score. Outside the domain of free choice and gender equality, the Conformity model fits poorly the data since one or more of the model's predictions are disconfirmed.

Discussion

Investigating the link between modernization and ideological polarization worldwide, the present paper found greater ideological polarization in poor countries in the domain of economics, gender equality, immigration and left-right positioning, combined with greater ideological polarization in rich countries regarding free-choice issues. At odds with the Transition model and the Complexity model, ideological polarization appears to be higher in rich countries for some domains bur lower for others. Inasmuch as polarization is higher in poor countries for social domains like gender equality and immigration, the Reorientation model is not supported either. Although the Conformity model is consistent with evidence in the domain of free choice and gender equality, it struggles with the data in the domain of economics, immigration, and left-right positioning. Thus, none of the models considered above explains the results in full, requiring a more nuanced interpretation thereof. We propose such interpretation in what follows.

The most striking observation is that, with the notable exception of the free choice domain, ideological polarization appears to be higher in poor countries. This may reflect a predisposition of poor countries towards enhanced ideological polarization. Among the models considered above, the Transition model is the one advocating such predisposition. According to this model, the dramatic social changes occurring when a society transitions to modernity are accompanied by a clash between traditional culture, rooted in the premodern lifestyle, and radical new ideas, inspired by the recent changes and by visions of further change to come (Grinin, 2022; Huntington, 1968; Moore, 1966; Tilly, 1973; Wolf, 1969). The present findings support the Transition model's claim that poor countries, which are those transitioning towards modernity, are predisposed to ideological polarization. Still, the findings indicate that this predisposition is unlikely to be the unique factor at play: additional factors need to be postulated to explain the data in the domain of free choice (see below).

When analysing the question of why ideological polarization is higher in poor countries, we observed that, generally, this does not occur because in poor countries there is a greater divide based on education or income. The economic domain, however, is an exception: here the data reveal that education is more divisive in poor compared to rich countries. Let us examine the data to understand why this may be the case. The data show that, across all countries, the highly educated favour more inequality and laissez faire policies, an observation that can be explained as stemming from self-interest – the idea being that, given their larger cultural capital, the highly educated expect to gain more from inequality and laissez faire. Moreover, the data reveal that the effect of education is moderated by per capita GDP in such a way that, on economic matters, education is more divisive in poor compared to rich countries. This may be caused by differences in the education system (World Bank Group, 2017). In poor countries, high education is typically reserved to the elites at the exclusion of the masses. Given their small number and privileged status, in poor countries the highly educated may focus on promoting their economic values, supporting inequality and laissez-faire. As a country becomes richer, high education typically opens up to the masses. As the number of highly educated people grows, these people may start downplaying their support for inequality and laissez-faire as these become less advantageous. This argument explains why, in the economic domain, the effect of education on ideological polarization appears to be stronger in poor countries.

Although the data are consistent with a general propensity of poor countries to be more polarized, they also indicate that, at least in the domain of free choice, other factors have an impact. In this domain, the Conformity model (Inglehart & Norris, 2017; Norris & Inglehart, 2019) offers a plausible description of the additional factors at play. Consistent with the model, in the free choice domain higher per capita GDP is linked with more liberal views, with greater proximity to the intermediate score, and with greater ideological polarization. Greater proximity to the intermediate score, in turn, is linked with greater ideological polarization. The analyses in this domain also reveal that, in part, ideological polarization is driven by an enhanced effect of education, age, and gender. This can be reconciled with the Conformity model for the following reasons. The data in the free choice domain highlight an effect of education, age and gender across all countries whereby the highly educated, the young, and females express more liberal views. In line with the Conformity model, the effect of these variables may partly be suppressed in poor countries because of a pressure to conform to the majority that embraces conservative views. By contrast, since in rich countries the population is split between people standing on the liberal camp and people standing on the conservative camp, the Conformity model argues that conformity pressures vanish. This may boost the latent divisions between males and females, the old

and the young, and between the highly and poorly educated, in line with the finding of an enhanced effect of gender, age, and education in rich countries, respectively.

The Conformity model appears to be useful also to explain the domain of gender equality, although with the twist that, in this domain, not rich but poor countries appear to be those experiencing greater proximity to the intermediate score, and thus enhanced ideological polarization. Consistent with this interpretation, lower GDP is linked with lower support for gender equality, with greater proximity to the intermediate score, and with greater ideological polarization. Greater proximity to the intermediate score, in turn, is linked with greater ideological polarization. The analyses in this domain also reveal that, in part, ideological polarization is driven by an enhanced effect of gender. This can be explained by an interpretation akin to the one proposed above in the case of free choice. Indeed, the data in the domain of gender equality highlight an effect of gender across all countries. In line with the Conformity model, the gender effect may partly be suppressed in rich countries because of a pressure to conform to the majority that praises gender equality. By contrast, since in poor countries the population is split between people supporting gender equality and people opposing it, the Conformity model argues that conformity pressures vanish. This may boost the latent divisions between males and females, in line with the finding of an enhanced effect of gender in poor countries.

Besides clarifying the link between modernization and ideological polarization, the results presented here also shed light on how the divide between different social groups varies as a function of modernization. We shall briefly discuss this in the context of social class as measured in terms of education and income. Education appears to be more divisive in poor countries in the economic sphere while being more divisive in rich countries in the domain of free choice and immigration. In other words, while in poor countries the highly and poorly educated diverge little on free choice and immigration issues, the highly educated are way more supportive of inequality and laissez faire compared to the poorly educated. Meanwhile, in rich countries there is little difference between the highly and poorly educated in the realm of economic opinions, but the highly educated are way more liberal on free choice matters and more supportive of permissive immigration policies than the poorly educated. Altogether, this documents a reorientation of the education divide from economics to free choice and immigration, occurring as a country becomes richer. As discussed above, this reorientation may be caused by a shift from an elitist education system, typical of poor countries, to a mass education system, typical of rich countries. An elitist system may prompt the highly educated to prioritize economic concerns at the expense of concerns in the domain of free choice and immigration, explaining the greater education divide on economics observed in poor countries. As education opens up to the

masses, the highly educated have less to gain from stressing economic concerns, meaning that they can now focus on promoting their values in other domains including free choice and immigration – in line with a larger education divide in the domain of free choice and immigration observed in rich countries.

With regard to the other component of social class, that is, with regard to income, its effect is generally the same when rich and poor countries are compared. The economic sphere, though, is an exception: here the income divide appears to be larger in rich compared to poor countries. In other words, although in the vast majority of countries the rich support inequality and laissez-faire economics more than the poor (an effect that can be easily explained by self-interest motives), this effect is stronger in wealthier countries. This finding is interesting as it indicates that, as a country accumulates wealth, income differences magnify people's divisions concerning economic attitudes.

In conclusion of this section, it is important to stress an important caveat of the analyses presented in the paper. These rely on a small number of items used to measure each value dimension, with immigration, gender equality, and left-right positioning being based on one item only (see Methods). The choice of using a small set of items was made because it allowed us to maximise the sample size (in the WVS only a small number of items is available for many wave-countries regarding certain value dimensions). Still, it is important to stress that using few items, and especially using only one, is problematic since it may fail to capture the multiple facets characterising a value dimension. Further research is needed to ensure that our results can be replicated when a richer array of items is employed.

Conclusions

In conclusion, our analyses extend research investigating the impact of modernization by shedding light on the link between modernization and ideological polarization. They show that not only people's values change as modernization progresses, but also that ideological polarization, that is, the variability of values within the population, does. Specifically, the analyses reveal that poor countries are characterised by greater polarization concerning economics, gender equality, immigration and left-right positioning, while rich countries are characterised by greater polarization on free choice matters.

By analysing polarisation in a comparative fashion, these findings pinpoint the specific areas where poor countries are more vulnerable to conflict than rich countries, as well as the areas where the opposite is true. In line with previous literature, rich countries emerge as being comparatively more vulnerable on matters of free choice. A compelling argument is that, in part, this vulnerability may explain the recent surge of political tensions observed in

Western countries. Nevertheless, poor countries are ultimately those that are at enhanced risk of conflict in all other domains, perhaps a symptom of a general predisposition towards polarization that may arise because poor countries are experiencing a transition to modernity. These observations may help policy makers to devise effective interventions aiming at mitigating the detrimental consequences of polarization and at fostering social cohesion. They suggest that interventions should take into account the specific vulnerabilities of a country that in part depend on the country's level of modernization.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Francesco Rigoli https://orcid.org/0000-0003-2233-934X

Data Availability Statement

The full data analysed in the paper are available on the Web site of the WVS at https://www.worldvaluessurvey.org/wvs.jsp. The data aggregated at the country-level that were analysed in the paper are available on the Open Science Framework Web site at https://osf.io/3qxhj/?view_only=78d34f5b46db42f4837593fa225d6847.

Supplemental Material

Supplemental material for this article is available online.

Notes

1. In the literature, ideological polarization is defined as a multidimensional construct encompassing measures not only of variability (variance or standard deviation) but also of bimodality (kurtosis) (DiMaggio et al., 1996). For the sake of simplicity, the present paper focuses exclusively on the variability component.
2. The literature defines political polarization in different ways, including (1) to what extent values and attitudes on different issues are sorted within the elites or within the population (Baldassarri & Gelman, 2008), (2) to what extent people of a certain political faction report positive attitudes towards people of the same faction and negative attitudes towards people of opposite factions (Iyengar et al., 2019), and (3) to what extent values and attitudes vary within the population (DiMaggio et al.,

1996). The latter is often referred as ideological polarization, and it is the subject of the present paper.

3. The Gini coefficient is a standard measure of income inequality. This was included in the multilevel model based on recent research showing that, on a global scale, ideological polarization is greater in countries where the Gini coefficient is higher (Gu & Wang, 2022).
4. Figure 1(b) displays the link between per capita GDP and RMSE. The similarity between Figures 1(a) and (b) is evident, hinting to the possibility that the residual error captures a big chunk of ideological polarization. To analyse this, we looked at the coefficient of determination of the regression models (including gender, age, education and income as predictors) fitted to each wave-country. On average, the coefficient of determination was equal to .05 (SD = .04), meaning that 95% of variance corresponded to the residual error.
5. Figure 3(b) displays the link between per capita GDP and RMSE. The similarity between Figures 3(a) and (b) is evident, hinting to the possibility that the residual error captures a big chunk of ideological polarization. To analyse this, we looked at the coefficient of determination of the regression models (including gender, age, education and income as predictors) fitted to each wave-country. On average, the coefficient of determination was equal to .08 (SD = .05), meaning that 92% of variance corresponded to the residual error.
6. Figure 5(b) displays the link between per capita GDP and RMSE. The similarity between Figures 5(a) and (b) is evident, hinting to the possibility that the residual error captures a big chunk of ideological polarization. To analyse this, we looked at the coefficient of determination of the regression models (including gender, age, education and income as predictors) fitted to each wave-country. On average, the coefficient of determination was equal to .07 (SD = .05), meaning that 93% of variance corresponded to the residual error.
7. Figure 7(b) displays the link between per capita GDP and RMSE. The similarity between Figures 7(a) and (b) is evident, hinting to the possibility that the residual error captures a big chunk of ideological polarization. To analyse this, we looked at the coefficient of determination of the regression models (including gender, age, education and income as predictors) fitted to each wave-country. On average, the coefficient of determination was equal to .03 (SD = .02), meaning that 97% of variance corresponds to the residual error.
8. Figure 9(b) displays the link between per capita GDP and RMSE. The similarity between Figures 9(a) and (b) is evident, hinting to the possibility that the residual error captures a big chunk of ideological polarization. To analyse this, we looked at the coefficient of determination of the regression models (including gender, age, education and income as predictors) fitted to each wave-country. On average, the coefficient of determination was equal to .03 (SD = .02), meaning that 97% of variance corresponds to the residual error.

References

Ashton, M. C., Danso, H. A., Maio, G. R., Esses, V. M., Bond, M. H., & Keung, D. K. Y. (2005). Two dimensions of political attitudes and their individual difference correlates: A cross-cultural perspective. In *Culture and social behavior: The Ontario symposium*. (*10*, pp. 1–29). Lawrence Erlbaum.

Baldassarri, D., & Gelman, A. (2008). Partisans without constraint: Political polarization and trends in American public opinion. *American Journal of Sociology*, *114*(2), 408–446. https://doi.org/10.2139/ssrn.1010098

Berger, P. L. (1986). *The capitalist revolution*. Basic Books.

Caprara, G. V., Schwartz, S., Capanna, C., Vecchione, M., & Barbaranelli, C. (2006). Personality and politics: Values, traits, and political choice. *Political Psychology*, *27*(1), 1–28. https://doi.org/10.1111/j.1467-9221.2006.00447.x

Cipolla, C. M. (1978). *The economic history of world population*. Harvester Press.

Coughenour, C. M., & Stephenson, J. B. (1972). Measures of individual modernity: Review and commentary. *International Journal of Comparative Sociology*, *13*(2), 81–98. https://doi.org/10.1177/002071527201300201

De-Sardan, J. P. O. (2008). *Anthropology and development: Understanding contemporary social change*. Bloomsbury Publishing.

DiMaggio, P., Evans, J., & Bryson, B. (1996). Have American's social attitudes become more polarized? *American Journal of Sociology*, *102*(3), 690–755. https://doi.org/10.1086/230995

Divale, W., & Seda, A. (2001). Modernization as changes in cultural complexity: New cross-cultural measurements. *Cross-Cultural Research*, *35*(2), 127–153. https://doi.org/10.1177/106939710103500203

Durkheim, E. (1893/1997). *The division of labour in society.* Free Press.

Farrell, S., & Lewandowsky, S. (2018). *Computational modeling of cognition and behavior*. Cambridge University Press.

Feldman, A. S., & Hurn, C. (1966). The experience of modernization. *Sociometry*, *29*(4), 378–395. https://doi.org/10.2307/2786294

Feldman, S., & Johnston, C. (2014). Understanding the determinants of political ideology: Implications of structural complexity. *Political Psychology*, *35*(3), 337–358. https://doi.org/10.1111/pops.12055

Fiorina, M. P., & Abrams, S. J. (2008). Political polarization in the American public. *Annual Review of Political Science*, *11*(1), 563–588. https://doi.org/10.1146/annurev.polisci.11.053106.153836

Fukuyama, F. (1992). *The end of history and the last man*. The Free Press.

Gidron, N., Adams, J., & Horne, W. (2020). *American affective polarization in comparative perspective*. Cambridge University Press.

Grinin, L. (2022). Revolution and modernization traps. In *Handbook of revolutions in the 21st century: The new waves of revolutions, and the causes and effects of disruptive political change*. Springer International Publishing.

Gu, Y., & Wang, Z. (2022). Income inequality and global political polarization: The economic origin of political polarization in the world. *Journal of Chinese Political Science*, *27*(2), 375–398. https://doi.org/10.1007/s11366-021-09772-1

Huntington, S. P. (1968). *Political order in changing societies*. Yale university press.

Inglehart, R., Haerpfer, C., Moreno, A., Welzel, C., Kizilova, K., Diez-Medrano, J., Lagos, M., Norris, P., Ponarin, E., & Puranen, B. (2022). *World values survey: All rounds – country-pooled Datafile version 3.0*. JD Systems Institute & WVSA Secretariat.

Inglehart, R., & Norris, P. (2017). Trump and the populist authoritarian parties: The silent revolution in reverse. *Perspectives on Politics*, *15*(2), 443–454. https://doi.org/10.1017/s1537592717000111

Inglehart, R., & Welzel, C. (2005). *Modernization, cultural change, and democracy: The human development sequence*. Cambridge University Press.

Inglehart, R., & Welzel, C. (2010). Changing mass priorities: The link between modernization and democracy. *Perspectives on Politics*, *8*(2), 551–567. https://doi.org/10.1017/s1537592710001258

Inglehart, R. F. (2018). *Cultural evolution*. Cambridge University Press.

Inkeles, A. (1969). Making men modern: On the causes and consequences of individual change in six developing countries. *American Journal of Sociology*, *75*(2), 208–225. https://doi.org/10.1086/224767

Jost, J. T., Baldassarri, D. S., & Druckman, J. N. (2022). Cognitive–motivational mechanisms of political polarization in social-communicative contexts. *Nature Reviews Psychology*, *1*(10), 560–576. https://doi.org/10.1038/s44159-022-00093-5

Kerlinger, F. N. (1967). Social attitudes and their criterial referents: A structural theory. *Psychological Review*, *74*(2), 110–122. https://doi.org/10.1037/h0024301

Kerr, J., Panagopoulos, C., & Van Der Linden, S. (2021). Political polarization on COVID-19 pandemic response in the United States. *Personality and Individual Differences*, *179*(1), 110892. https://doi.org/10.1016/j.paid.2021.110892

Korotayev, A., Zinkina, J., Slinko, E., & Meshcherina, K. (2019). Human values and modernization: A global analysis. *Journal of Globalization Studies*, *1*(10), 44–71. https://doi.org/10.30884/jogs/2019.01.04

Kubin, E., & Von Sikorski, C. (2021). The role of (social) media in political polarization: A systematic review. *Annals of the International Communication Association*, *45*(3), 188–206. https://doi.org/10.1080/23808985.2021.1976070

Kuznets, S. (1966). *Modern economic growth: Rate, structure and spread*. Yale University Press.

Lerner, D. (1958). *The passing of traditional society.* Free Press.

Levin, S. A., Milner, H. V., & Perrings, C. (2021). The dynamics of political polarization. *Proceedings of the National Academy of Sciences*, *118*(50), e2116950118. https://doi.org/10.1073/pnas.2116950118

Lipset, S. M. (1959). Some social requisites of democracy: Economic development and political legitimacy. *American Political Science Review*, *53*(1), 69–105. https://doi.org/10.2307/1951731

Malka, A., Lelkes, Y., & Soto, C. J. (2019). Are cultural and economic conservatism positively correlated? A large-scale cross-national test. *British Journal of Political Science*, *49*(3), 1045–1069. https://doi.org/10.1017/s0007123417000072

Marsh, R. M. (2014). Modernization theory, then and now. *Comparative Sociology*, *13*(3), 261–283. https://doi.org/10.1163/15691330-12341311

Marx, K. (1867/1967). *Capital I*. International Publishers.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, *50*(4), 370–396. https://doi.org/10.1037/h0054346

Moore, B. (1966). *Social origins of dictatorship and democracy: Lord and peasant in the making of the modern world*. Beacon Press.

Morris, I. (2010). *Why the west rules-for now: The patterns of history and what they reveal about the future*. Profile books.

Norris, P., & Inglehart, R. (2019). *Cultural backlash: Trump, Brexit, and authoritarian populism*. Cambridge University Press.

Parsons, T. (1964). Evolutionary universals in society. *American Sociological Review*, *29*(3), 339–357. https://doi.org/10.2307/2091479

Parsons, T. (1971). *The system of modern societies* (p. 80). Prentice-Hall.

Polanyi, K. (1944). *The great transformation*. Farrar & Rinehart.

Poldrack, R. A., Mumford, J. A., & Nichols, T. E. (2024). *Handbook of functional MRI data analysis*. Cambridge University Press.

Portes, A. (1976). On the sociology of national development: Theories and issues. *American Journal of Sociology*, *82*(1), 55–85. https://doi.org/10.1086/226270

Rapp, C. (2016). Moral opinion polarization and the erosion of trust. *Social Science Research*, *58*(1), 34–45. https://doi.org/10.1016/j.ssresearch.2016.02.008

Rigoli, F. (2023). Political extremism in a global perspective. *Journal of Global Awareness*, *4*(1), 1–16. https://doi.org/10.24073/jga/4/01/03

Rostow, W. W. (1960). *The stages of economic growth: A non-communist manifesto*. Cambridge University Press.

Rostow, W. W. (1975). *How it all began: Origins of the modern economy*. Routledge. https://doi.org/10.4324/9781315814810

Sagar, A. D., & Najam, A. (1998). The human development index: A critical review. *Ecological Economics*, *25*(3), 249–264. https://doi.org/10.1016/s0921-8009(97)00168-7

Schelkle, W., Krauth, W. H., Kohli, M., & Elwert, G. (2001). *Paradigms of social change: Modernizaton, development, transformation, evolution*. Palgrave Macmillan.

Schwartz, S. H., Caprara, G. V., & Vecchione, M. (2010). Basic personal values, core political values, and voting: A longitudinal analysis. *Political Psychology*, *31*(3), 421–452. https://doi.org/10.1111/j.1467-9221.2010.00764.x

Smith, D. H., & Inkeles, A. (1966). The OM scale: A comparative socio-psychological measure of individual modernity. *Sociometry*, *29*(4), 353–377.

Tilly, C. (1973). Does modernization breed revolution? *Comparative Politics*, *5*(3), 425–447. https://doi.org/10.2307/421272

Treier, S., & Hillygus, D. S. (2009). The nature of political ideology in the contemporary electorate. *Public Opinion Quarterly*, *73*(4), 679–703. https://doi.org/10.1093/poq/nfp067

UNDP. (1990). United Nations development programme. In *Human development report 1990*. Available at: https://hdr.undp.org/sites/default/files/reports/219/hdr_1990_en_complete_nostats.pdf

Weber, M. (1922/1978). *Economy and society*. University of California Press.

Weber, M. (1927). *General economic history*. George Allen & Unwin.

Welzel, C. (2013). *Freedom rising: Human empowerment and the quest for emancipation*. Cambridge University Press.

Welzel, C., Inglehart, R., & Kligemann, H. D. (2003). The theory of human development: A cross-cultural analysis. *European Journal of Political Research*, *42*(3), 341–379. https://doi.org/10.1111/1475-6765.00086

Wolf, E. R. (1969). *Peasant wars of the twentieth century*. University of Oklahoma Press.

World Bank Group. (2017). *World development report 2018: Learning to realize education's promise*. World Bank Publications.

Author Biography

Francesco Rigoli is a social scientist based at City, University of London. His resaerch focuses on exploring the mental processes engaged in important cultural phenomena such as ideology, religion, social media, and cultural evolution.