

INEQUALITY, RELIGION, AND PRODUCTIVITY: HETEROGENEOUS PANEL EVIDENCE

DESIGUALDADE, RELIGIÃO E PRODUTIVIDADE: EVIDÊNCIAS DE PAINEL HETEROGÊNEO

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Abstract

The research focuses on the link between income inequality (Gini) and secularization (non-religion) and labor productivity, using a balanced panel of 119 countries over 1970–2005. Two-way fixed effects, long differences, and income group interactions are estimated with country-clustered errors. Investment is robustly associated with higher productivity across specifications. In pooled panels, coefficients on the Gini and non-religion are small and imprecise. Allowing for heterogeneity reveals sharper patterns – higher inequality is associated with slower productivity growth within upper-middle income economies, while secularization is negatively related to growth in low and high income groups and modestly positive in upper-middle income countries. These patterns are interpreted as consistent with religion functioning as an informal institution where state capacity is limited, and with demographic headwinds in advanced economies.

Keywords: Economic Growth. Income Inequality. Religion. Institutions and Growth. Panel Data.

Resumo

A pesquisa enfoca a relação entre a desigualdade de renda (Gini) e a secularização (não religião) e a produtividade do trabalho, utilizando um painel equilibrado de 119 países entre 1970 e 2005. Efeitos fixos bidirecionais, diferenças longas e interações entre grupos de renda são estimados com erros agrupados por país. O investimento está fortemente associado a uma maior produtividade em todas as especificações. Em painéis agrupados, os coeficientes do Gini e da não religião são pequenos e imprecisos. Levando em conta a heterogeneidade revela padrões mais nítidos: maior desigualdade está associada a um crescimento mais lento da produtividade nas economias de renda média-alta, enquanto a secularização está negativamente relacionada ao crescimento nos grupos de renda baixa e alta e modestamente positiva nos países de renda média-alta. Esses padrões são interpretados como consistentes com a religião funcionando como uma instituição informal onde a capacidade do Estado é limitada e com ventos contrários demográficos nas economias avançadas.

Palavras-chave: Crescimento Econômico. Desigualdade de Renda. Religião. Instituições e Crescimento. Dados de Painel.

1 INTRODUCTION AND RESEARCH QUESTION

Inequality has been a persistent feature of economic systems, shaped by the distribution of control over land, capital, and technology as well as by social norms,



political choices, and globalization. Recent decades have seen rising inequality within many countries alongside declining inequality between countries, driven in part by rapid growth in large emerging economies such as China and India (United Nations, 2013). These trends have renewed interest in whether inequality is conducive to or harmful for long-run growth.

The theoretical and empirical literature on inequality and growth remains divided. One view holds that inequality can foster growth by strengthening incentives to work, save, and invest, and by concentrating capital in the hands of high-saving households (Forbes, 2000; Shin, 2012). A contrasting strand argues that high inequality undermines growth through underinvestment in human capital, weak demand, social conflict, and distortionary redistribution (Stiglitz, 2013; Barro, 2000; Bleaney & Nishiyama, 2004; Alesina & Rodrik, 1994; Persson & Tabellini, 1994; Banerjee & Duflo, 2003). Kuznets (1955) proposed an inverted U-shaped relationship between inequality and development, but subsequent evidence has been mixed and highlights the importance of country context (Deininger & Squire, 1998; Durlauf & Johnson, 1995). Overall, the emerging consensus is that inequality is often harmful for long-run growth, particularly in developing and middle-income economies with imperfect financial markets and weak institutions (Espoir, Ngepah, 2021; Juuti, 2022).

A parallel literature studies the role of religion in economic development. Some contributions find that religious beliefs and traditions can stimulate growth via work ethic, trust, and human capital formation (Weber, 1905/1930; Guiso et al., 2003; Becker & Woessmann, 2009; Cantoni, 2015; Campante & Yanagizawa-Drott, 2015), while others document ambiguous or negative effects through fertility, schooling choices, or time-intensive religious participation (Barro & McCleary, 2003; De la Croix & Delavallade, 2018; Campante, 2015). Religion can also operate as an informal institution providing insurance, social capital, and public goods, especially where formal state capacity is limited (Woolcock & Narayan, 2000; Chen, 2010; Shah et al., 2020). Secularization may therefore interact with institutional development and demographic change in shaping productivity.

This paper examines how income inequality and secularization relate to labor productivity in a global panel of countries. Using a balanced 5-year panel of 119 economies over 1970–2005, it embeds inequality (Gini) and the share of non-religious

individuals in an augmented Mankiw–Romer–Weil (MRW) framework, estimated with two-way fixed effects, long differences, and income group-specific models. The focus is on describing robust patterns in the data rather than identifying causal effects.

The paper contributes to the literature in three ways. First, it brings together the inequality–growth and religion–growth literatures in a unified growth regression framework, jointly examining income inequality and secularization rather than treating them in isolation or in purely cross-sectional settings. Second, it relaxes the assumption of homogeneous effects by combining two-way fixed effects, long-difference specifications, and World Bank income group splits, showing that the associations of inequality and secularization with productivity are strongly conditional on a country’s stage of development and institutional capacity, thereby helping to reconcile mixed empirical findings. Third, it provides new descriptive evidence that higher inequality is associated with slower productivity growth in upper-middle income economies, while secularization is negatively related to growth in low- and high income countries but modestly positive in upper-middle income ones; these patterns are interpreted through the lens of informal institutions and demographic headwinds and suggest concrete margins and data needs for future causal work.

The remainder of the paper is organized as follows. Section 2 reviews the theoretical background and related literature. Section 3 describes the data, methodology, and model specifications. Section 4 presents the empirical results, including the income group heterogeneity analysis. Section 5 concludes.

2 THEORETICAL BACKGROUND

2.1 Fundamental variables

This paper builds on the neoclassical growth framework of Solow (1956) and Mankiw, Romer, and Weil (1992) by following a framework with Cobb-Douglas production function in which human capital augments labor, so in steady state the log of output per worker depends positively on the investment shares in physical and human capital and negatively on the term combining depreciation, population growth and technological growth. MRW assume that the technological growth and depreciation are a

constant of 0.05, whereas in this research this term is separated, technological growth is absorbed by the time demeaning and depreciation from PWT is used. In steady state, higher investment shares in physical and human capital raise the output per worker, whereas the sum of population and technological growth, and depreciation rate lowers it.

Empirically, output relates to either GDP per capita or working age population. The same alternatives are present for population growth, where it could be either the actual growth of the population or the growth of the labor force. This research utilizes the labor force growth. Human capital can be approximated in different ways. One can use the average completed years of schooling across different countries, PISA test results, and even health capital such as life expectancy (Knowles and Owen, 1995).

Numerous extensions of the MRW model incorporate additional covariates, such as government size and inflation, among others. Other modifications entail changing the estimation method with the more famous example of Islam (Islam, 1995) where fixed effect estimation is applied over 5-year periods addressing the country heterogeneity among others. Additionally, one can run the model on different samples again as a measure that counteracts the structural break caused by the country heterogeneity (Durlauf and Johnson, 1995).

2.2 Inequality

The research on the relationship between inequality and economic growth has evolved over time and as it has similarly gone with other subfields of economics, there are contradictory findings. Even though there is a lack of consensus, the dominant and more recent understanding is that inequality of income is harmful in the long run to the economic growth of an economy.

The review of the literature is structured by the mechanisms through which inequality affects economic growth.

2.2.1 Level of economic development

One of the most notable early theories in this field was influenced by the ideas of economists like Simon Kuznetz, who proposed a concept named after himself – The

Kuznetz Curve. The concept he proposed in the 1950s suggested an inverted U-shaped relationship between inequality and economic development. He hypothesized that as a country develops, inequality initially increases and then decreases after reaching a certain level of economic growth. This theory implied that some degree of inequality might be necessary and even beneficial for growth in the early stages of economic development (Kuznetz, 1955), however, it is ignoring country and regional context that can influence this relationship.

While some studies found evidence supporting the Kuznetz Curve in certain contexts, others questioned whether it is applicable in all cases. A seminal study by Deininger and Squire (1998) using a new data set found little support for the inverted U-shaped relationship between inequality and growth. Barro argued that in richer countries, a moderate level of inequality might encourage investment in human capital and entrepreneurship, thereby fostering economic growth (Barro, 2000). His main view is that the effect of inequality on economic growth is conditional on the development of a country. Additionally, he acknowledges that very high levels of inequality in developed countries could hamper growth.

2.2.2 Savings channel

Research around the new millennium found that inequality positively affects economic growth with the rationale that it might motivate individuals to increase their effort and productivity with the hopes of moving up the economic ladder. Also, in societies with notable inequality, there tends to be more available capital for investments in growth-stimulating ventures. This increased effort and productivity can then lead to higher gains in growth (Forbes, 2000). This is in congruence with the “supply-side economics” school of thought, which advocates for reducing taxes and decreasing regulation for the wealthy and businesses as a way to stimulate economic growth as they have higher propensity to save. Shin (2012) demonstrates that redistribution from rich to poor can be harmful to growth when it causes a reduction in the aggregate level of savings. This approach to economics is closely associated with *laissez-faire* capitalism and has been influential in shaping various economic policies around the world.

2.2.3 Political economy of redistribution channel

Through this channel inequality affects growth by shaping political decisions on taxation and redistribution, as well as rent-seeking behavior from the elite and policy capture. For example, when mean income is above the median one (i.e., high inequality), the median voter favors higher taxation and redistribution. Distortive taxation lowers the propensity to invest as it decreases the return of productive endeavors thus harming the economic growth (Alesina, Rodrik, 1994; Persson, Tabellini, 1994). The papers empirically addressing this channel utilize cross-sectional data with OLS and 2SLS which makes it difficult to address the inherent endogeneity. On the other hand, the wealthy elite can lobby against the redistributive policies and taxation leading to corrupt practices. Banerjee and Duflo (2003) show empirically and theoretically that high inequality can drive rent-seeking behavior, misallocation, and inefficient policies. Both variations of the political economy channel have a negative impact of inequality to economic growth.

2.2.4 Imperfect credit markets channel

The key idea behind the imperfect credit markets channel is that high income inequality hinders poor households from investing in education and businesses in the context of shallow financial systems. In underdeveloped economies with weak institutional framework financing decisions depend on borrowers' personal wealth and ability to provide a collateral. This results in aggregate under-investment, lost human capital potential, and thus slower long-term growth (Banerjee, Newman, 1993; Galor, Zeira 1993; Piketty, 1997). This relates to the distinction between inequality of effort and inequality of opportunity. From an incentive perspective, unequal rewards may be viewed as consistent with higher effort and productivity, whereas unequal opportunities arising from credit constraints and institutional weaknesses are typically regarded as growth-reducing. However, the inequality of opportunity which is closely related to the imperfect credit markets channel, underdeveloped institutions and unequal educational prospects is considered as a key factor influencing economic outcomes (Milanovic, 2016).

Recent work confirms that the effect of inequality on growth depends crucially on the depth of financial markets. Juuti (2022) shows that, in non-OECD economies,

inequality is associated with faster per-capita growth only when financial markets are sufficiently developed, while in poorly developed systems the partial correlation between inequality and growth is weak or absent. Similarly, Esposito and Ngepah (2021) find that income inequality significantly reduces total factor productivity in developing countries, consistent with under-investment and misallocation in the presence of credit and institutional frictions.

Overall, the diverse findings have in common that the relationship between inequality and economic growth is not linear and varies significantly based on the context, including the stage of a country's development and its institutional framework. The dominant understanding is that inequality adversely affects growth with few exceptions.

2.3 Religion

Similar to income inequality, religion appears to have ambiguous effects on economic growth, depending on a country's level of development, demographic structure, and religious norms and institutions. A recent comprehensive survey by Becker, Rubin, and Woessmann (2024) synthesizes this literature and emphasizes that religion can affect growth through all elements of a standard production function – physical capital, human capital, labor and demographics, and total factor productivity – by shaping thrift, educational choices, fertility, institutional quality, and technology adoption. Their framework provides a useful backdrop for interpreting the heterogeneous associations between secularization and productivity that emerge in this paper. The remainder of this subsection provides a brief overview of the literature, organized by channel.

2.3.1 Human capital vs. work ethic channel

One of the first contributions to the discussion on the effects of religion on the economic system originates from the famous work of M. Weber named "The Protestant Ethic and the Spirit of Capitalism" which argues that Protestantism, particularly Calvinism, played a significant role in the development of capitalism due to its emphasis on hard work, discipline, and frugality (Weber, 1905). There are more recent empirical works that attempt to prove this theory, with some being successful and others disproving

the Weber's social norms channel. Guiso et al. provide evidence that the Christian religion is positively correlated with attitudes that are favorable for economic growth (Guiso et al., 2002). However, Becker and Woessmann prove that this is because of the superior attention to education and schooling from protestants by instrumenting Protestantism with the distance to Wittenberg, the place where the Reformation took place, which resulted in higher shares of protestants (Becker, Woessmann, 2009). The mechanism is that Protestantism causes more schooling and higher literacy rates which in turn leads to higher economic growth.

2.3.2 Fertility channel

De la Croix and Delavallade (2018) show, using a structural fertility-education model on South-East Asian census data, that major religions are raising fertility especially among educated couples and thereby shifting resources away from schooling per child. In endogenous growth where human capital drives long-run growth, tilt of having more children but less educated, which is particularly strong in Islam, lowers education investment and can reduce long-run economic growth.

Recent demographic work documents that more secular societies tend to have persistently lower fertility, even after accounting for individual religiosity, and that societal secularism is a strong negative predictor of national fertility rates (Schnabel, 2021). This reinforces the idea that secularization can feed into growth via demographic channels such as the pace of population ageing and the evolution of the working-age share.

2.3.3 Savings channel

A popular social norm instilled by religion is thriftiness, which is one of the main channels for economic development from Weber's theory. Norms that discourage lavish consumption can increase aggregate savings and thereby support higher economic growth. Guiso et al. (2002) prove that more religious people have stronger attitudes toward thrift while attending to the identification and reverse causality concerns using an instrumental variable of religious upbringing for the current religious society. On the

other hand, Köbrich León (2013), using US Panel Survey of Income Dynamics data, shows that the positive relationship between religion and savings disappear when she instruments individual religiosity with religious composition of region of ancestry origin. This paper raises skepticism about the robustness of the savings channel, although its evidence is based on a relatively narrow context, and most other studies in this literature continue to find a positive association.

2.3.4 Other channels

One of the important papers by Barro and McCleary find a causal link – the extent of religious beliefs affecting positively economic growth. However, church attendance has a negative contribution to religion which they argue is because the time spend in such activities bears an opportunity cost of other productive endeavors (Barro, McCleary, 2003).

When institutions are underdeveloped, religious groups can act as semi-formal insurance or credit access in times of crisis sustained by the costly participation requirements (Chen, 2010). The role of religion for providing public goods and services is important especially in poor settings and weak formal institutions (Woolcock, Narayan, 2000) and the presence of “religion-dependent social capital” can have positive effect on the economic growth across countries (Shah et al., 2020). Additionally, formal institutions and informal religious institutions are synergistic, one reinforces the other and can substitute in its absence. So, undermining local networks without building capable formal institutions can harm development (Woolcock, Narayan, 2000).

Moreover, some religions tend to have rituals that are not conducive to economic growth such as Muslim Ramadan, however, it ameliorates subjective well-being (Campante, 2015).

Additional mechanisms include the accumulation of social capital and trust, the transmission of cultural norms and values, and the shaping of institutional quality.

3 DATA, METHODOLOGIES AND SPECIFICATIONS

3.1 Model Specifications

The research's main specification will be the levels fixed effects regression with time and country effects. The other specifications are used for robustness and additional exploration of the slow mover variables as well as avoiding the potential structural break that can appear from having different countries in one sample and regression. They will be growth fixed-effect regression, long difference regression, and growth fixed effect regression per World Bank income group. Given the relatively short time dimension and the presence of slow-moving regressors (inequality, schooling, religiosity), dynamic GMM estimators risk weak instruments and finite-sample bias (Blundell, Bond, 1998; Roodman, 2009). All models' standard errors are clustered by country.

3.1.1 Levels fixed-effect regression model specification

The fixed-effect regression will capture the standard growth economics variables such as savings rate (I), labor growth (n) and depreciation rate (δ), where the constant technology growth rate is omitted as it will be absorbed by the time effects, in this case they are separate as opposed to the MRW specification, average years of primary and secondary schooling (h_1) (Mankiw et al., 1992), and additionally the inequality measured through the Gini index (G) and the percentage of non-religious population (N). The specification is presented below:

$$\ln(y_{it}) = \beta_1 I_{it} - \beta_2 n_{it} - \beta_3 \delta_{it} + \beta_4 \ln(h_{1,it}) - \beta_5 G_{it} + \beta_6 N_{it} + \alpha_i + \gamma_t + \varepsilon_{it}, \quad (1a)$$

where:

i are the countries, t is the time period, α is the time-invariant differences across countries, γ are the period fixed effects, and ε is the error term that captures the unexplained portion of the dependent variable. y_{it} is corresponds to GDP per worker in levels, not growth. The first three

variables have the standard expectation on the sign, which is that investment rate (I) and higher levels of education (h_1) in the population should positively contribute to the growth of the output per worker whereas labor growth and depreciation should have a negative influence on the same. Investment is kept in percentage points since the variable used has negative values (explained in detail in section 3.2), keeping the coefficient interpretable. Population (labor force) growth and depreciation should have a negative and/or around zero effect on the GDP per worker as one dilutes the income and the other lowers the net accumulation. The same goes for population (labor force) growth as it can drop period over period. When it comes to inequality measured through Gini (the higher it gets, the higher the inequality), as described in the previous sections, this research hypothesizes that the higher it is, the lower the output per worker, keeping everything else the same. Finally, regarding the share of non-religious populations, the hypothesis is that it will be positively correlated with the dependent variable where the rationale is that the fewer time people spend on religious activities, the more they will be involved in technological endeavors and innovations, therefore contributing to the growth of the economy. The religious variable can have observations around 0 which can make the logarithmic values ill-behaved. However, it is important to emphasize that the effects of those two variables can be ambiguous depending on the state of development of the countries.

3.1.2 Growth fixed-effect regression model specification

The variables enter in the same way in the growth FE specification together with the country and period fixed effects:

$$g_{it} \equiv \frac{\Delta \ln(y_{it})}{\Delta t} = \theta_1 I_{it} - \theta_2 n_{it} - \theta_3 \delta_{it} + \theta_4 \ln(h_{it}) - \theta_5 G_{it} + \theta_6 N_{it} + \alpha_i + \gamma_t + \varepsilon_{it}, \quad (2)$$

where:

g_{it} is the period growth of the GDP per worker. With this specification one can anticipate that there will be fewer observations, thus the variables with weak within-country variation can have more imprecise estimates. The hypotheses on the signs of the variables remain identical to the level's specification.

3.1.3 Long-difference (pooled) regression

The dependent variable in the long-difference regression is the country's average continuously compounded annual growth of log income per worker over the sample window. All other variables are averaged over the same window. The specification is presented in equation 4c:

$$\bar{g}_i \equiv \frac{\ln(y_{iT}) - \ln(y_{i0})}{T-0} = \eta_1 \bar{l}_i - \eta_2 \bar{n}_i - \eta_3 \bar{\delta}_i + \eta_4 \ln(\bar{h}_i) - \theta_5 \bar{G}_i + \theta_6 \bar{N}_i - \rho \ln(y_{i0}) + \varepsilon_{it}, \quad (3)$$

where:

y_{i0} is the initial state (GDP per worker) of the countries. If a country starts below its steady state, capital per worker is relatively scarce, the marginal product of capital is high, and the country tends to grow faster as it moves toward its steady state. Conversely, if it starts above y^* , growth is slower. Holding all other variable constant (conditional convergence), the initial income should have negative effect since the higher it is, the lower the growth. The definition and the expectation on the effect of all other variables to the dependent one remains the same. The role of this specification is to check the slow-moving variables effects as they have mainly between-country variation and can be more informative in this setting.

3.1.4 Growth fixed-effect regression per World Bank income group

In this specification, the analysis further develops equation 1b by running multiple regressions for each World Bank income group defined as $w \in \{\text{Low, LowerMid, UpperMid, High}\}$ where each country i is part of a such group. The groups are treated as time-invariant since the countries are categorizes based on the latest World Bank label. The covariates and dependent variable remain the same. The equation is defined as:

$$g_{it} = \beta^{(w)\top} X_{it} + \alpha_i^{(w)} + \tau_t^{(w)} + \varepsilon_{it}^{(w)}, \quad i \in C_w, \quad (4)$$

where:

C_w is the set of groups that contain the countries except Venezuela which is excluded as it is part of the “Unspecified” category. This specification will help with identifying bias caused by structural break in the data caused by clusters of countries and their different level of development.

3.2 Data description

In this research, a collection of different panel datasets is combined and analyzed. The data comes from a couple of famous datasets such as the Penn World Tables, World Development Indicators, Barro-Lee data, World Religion Project, and Gapminder.

From the Penn World Tables, the research utilizes the real GDP at constant 2017 national prices (in millions 2017US\$), the population in millions, investment share of GDP, and depreciation rate. The investment is derived by subtracting the real domestic absorption (real consumption plus investment) and real consumption and dividing the result by the real GDP all at constant 2017 national prices (in millions 2017US\$).

The percentage of the working age population, people aged between 15 and 64 years, is coming from the World Development Indicators (WDI). To get to an absolute value, it is multiplied by the population from PWT. For constructing labor force growth, the period t and period $t+5$ are divided, and 5th root of the ratio is taken and then subtracted by 1. Additionally, the labor force is used as a denominator in the GDP per worker.

The Barro-Lee Data provides the average years of Total Primary and Secondary Schooling for the whole population aged above 15 years. The sum of both variables will be used for a proxy of education.

Additionally, Gapminder provides a collection of several sources used for Gini index data. The most reliable sources include the Luxembourg Income Study Database and the World Bank's PovcalNet on which the focus will be placed since it matches the timeframe of interest.

When it comes to religion, the data from the World Religion Project (WRP) will be sourced. The WRP conducts an in-depth study of religious adherence worldwide from 1945 to 2010. It offers insights into population's affiliation in religious customs and practices per country. This project gathers and analyzes data regarding the number and

proportion of people associated with various religious groups and those without religious affiliations. The research will focus on the latter group as a simple one variable quantification of religion as social phenomenon. The German Democratic Republic and German Federal Republic are combined and an average of the percentage of the non-religious group in order to increase the match rate with the other datasets. Overall, across the datasets, the standard country 3-digit ISO codes have been used, adjusting the source country codes wherever needed for better match rate. Whenever there has been a significant number of missing observations for a given country after combining the data in one dataset, it is dropped. The remaining number of countries after the manipulations is 119.

The data of the research is available for 50 years between 1970 and 2020. However, since the religious variable is considered, the time period is limited to 2010. The data has been grouped into 5-year periods by using the mean over the years, a standard procedure when working with long panels in growth economics. Since growth variables are created, the period is further decreased with an additional 5-year period.

The continuous variables have been clipped, with no drop in observations, using the 1% and 99% of the distribution as a mild treatment against outliers which can often dominate the results. All variables have been logged except the investment rate, which is kept in levels. The reason is that this variable can have negative values, albeit very close to zero and in rare occasions. One possible explanation is that the real domestic absorption contains change in inventories. The variable is converted from fraction to percentage points improving the interpretability of the coefficient.

Finally, the dataset is additionally enriched with the World Bank's country income group category. This supports the insight on the development of the countries, enabling the exploration of structural breaks within the variables.

The research uses four estimation samples: (i) growth fixed effects (per worker), (ii) levels fixed effects (per worker), and (iii) a long-difference cross-section that relates long-run growth to country-mean covariates and initial income. For each model, observations with missing variables specific to that specification are dropped.

Below Table 1 provides an overview of the descriptive statistics of the main dataset for growth per worker fixed effects.

Table 1*Descriptive statistics*

Variable	N	Mean	SD	P25	Median	P75	Within SD	Between SD	ICC
Growth of log GDP/L	984	0.032	0.029	0.017	0.032	0.047	0.027	0.014	0.214
Investment	984	20.545	11.267	13.562	20.994	27.758	6.762	9.284	0.653
Labor force growth	984	0.021	0.014	0.010	0.022	0.030	0.008	0.012	0.674
Depreciation	976	0.045	0.013	0.036	0.042	0.051	0.006	0.011	0.773
Log of Human capital	984	1.364	0.470	1.138	1.500	1.714	0.212	0.426	0.802
Gini	968	40.262	9.356	32.990	40.000	45.940	3.207	8.849	0.884
Non-religious population	833	0.051	0.086	0.003	0.012	0.067	0.034	0.080	0.848

Source: prepared by the author

The sample comprises 119 countries. The lowest number of available observations for any variable is 833, which is determined by the covariate with the most limited coverage – the share of the population without religious affiliation. The reduction in observations for this variable primarily reflects the absence of one full 5-year period in its series. While the initial dataset contains 1107 observations, the computation of growth rates reduces the effective sample for the growth variables to 984. Further reductions arise from missing data for specific countries: the depreciation variable lacks observations for Guyana, while the Gini index is unavailable for Macao and Hong Kong. The measure of non-religious population is also missing for Macao and Hong Kong, in addition to periodic gaps for Indonesia, Brunei, Namibia, and Belize.

The table provides a within and between standard deviation and the interclass correlation coefficient (ICC), which is helpful for identifying slow-moving variables. The rather high ICC for Gini, religion, and even human capital indicate that they can all be considered as such since most of the variation comes from the countries' differences rather than effects throughout the years. Therefore, the research reports robust standard errors and includes year fixed effects. Additionally, long difference OLS specification over the 5-year periods will be considered for exploring the slow-moving variables.

Table 2*Correlation Matrix*

	Investment	Labor force growth	Depreciation	Log of Human capital	Gini	Non-religious population	Growth of log GDP/L
Investment	1						
Labor force growth	-0.19	1					
Depreciation	-0.02	0.11	1				
Log of Human capital	0.33	-0.42	-0.04	1			
Gini	-0.2	0.36	0.07	-0.17	1		
Non-religious population	0.21	-0.36	-0.17	0.34	-0.3	1	
Growth of log GDP/L	0.19	0.15	0.22	-0.05	-0.01	0.01	1

Source: prepared by the author

In Table 2, a correlation matrix is illustrated, which provides information about the interaction between the variables. The correlations range from low to moderate, without any two variables displaying a high correlation. Interestingly, there is a low negative correlation between the human capital and the growth of GDP per worker which suggests that the lower the years of schooling are associated with a higher growth level, contradicting the theory. The strongest negative correlation is between the human capital variable and the labor force growth indicating that higher labor force growth is linked to less years of schooling which confirms the common knowledge. The income inequality and the religious variable exhibit almost no correlation with growth. A strong positive correlation exists between the percentage of the non-religious population and the human capital, implying that regions with higher percentages of non-religious individuals tend to have higher levels of primary and secondary education. Gini is negatively correlated to investment and human capital which suggests that lower inequality across countries and years is associated with higher level of investment and educational participation.

3.3 Methodology

Two way fixed-effects regression is the methodology used in this research. It will be used to check the significance and signs of each independent variable from above

against the dependent one in the different specifications while controlling for common cross-country trends and for time-invariant characteristics of the different countries such as other cultural factors, geography, etc.

Fixed-effects regression is a statistical method used in panel data analysis, where multiple observations over time are available for the same entities, such as individuals, firms, or countries. As mentioned above, the main feature of this method is that it controls for all time-invariant characteristics of the individual units, thus eliminating the bias caused by omitted time-invariant characteristics. It assumes that something innate within the entity may impact or bias the independent or dependent variables and that this factor should not be correlated with other individual characteristics. In other words, it assumes that those entity-specific characteristics are correlated with the independent variable as opposed to the random effects model. The regression equation for a fixed-effect model can be represented as:

$$Y_{it} = \alpha + \beta X_{it} + \gamma_i + \tau_t + \varepsilon_{it}, \quad (5)$$

where:

Y_{it} is the dependent variable observed for entity i at time t , X_{it} represents one or more independent variables, α is the intercept (can be omitted in identification), as usual β represents the coefficients of the independent variables, γ_i is the fixed effect for each entity i , which captures all time-invariant factors, τ_t obtains all the common trends across the entities, and finally, ε_{it} is the error term. In a two-way fixed-effects model, regressors that do not vary within entities over time are absorbed by the entity effects, and regressors that do not vary across entities at a given time are absorbed by the time effects, so purely time-invariant or purely common-time variables are not identified. However, this will not affect the research as such variables are absent. In summary, these models are designed to control the unobserved heterogeneity in the entities.

Some of the two-way fixed-effect limitations were briefly discussed above like the low power and the unstable estimates of the slow-moving variables because the method removes the between country variation (Wooldridge, 2010). Additionally, the time fixed effects do absorb global shocks, but fail to account for group-specific drifts such as different trends by income group (Bell and Jones, 2015) therefore the research

considers income group specification (1d). A key source of potential bias concerns the strict exogeneity assumption, which requires that past, current, and future error terms be uncorrelated with the regressors. In this context, if variables such as investment or income inequality respond endogenously to growth shocks, the fixed-effects estimates will be biased. A possible remediation is the use of more advanced methods such as GMM (Generalized Method of Moments) which will be beyond the scope of this research.

4 EMPIRICAL RESULTS

4.1 Main results

Table 3 reports estimates from three complementary specifications: a two-way fixed-effects regression in levels (Eq. 1a), a two-way fixed-effects regression for growth of GDP per worker (Eq. 1b), and a long-difference regression that relates average growth over the sample to mean covariates and initial income (Eq. 1c).

Table 3

Main models' results – Eq. 1a, 1b, and 1c

	Eq. 1a	Eq. 1b	Eq. 1c
Dependent variable	<i>log of GDP per worker</i>	Δ <i>log of GDP per worker</i>	<i>Long-diff Δ log of GDP per worker</i>
const			0.019 (0.013)
Initial GDP per worker			-0.001 (0.001)
Investment	0.007 (0.003) *	0.001 (0.0) ***	0.0 (0.0)
Labor force growth	-0.086 (2.873)	0.266 (0.187)	0.389 (0.13) **
Depreciation	9.334 (3.128) **	0.085 (0.269)	0.416 (0.125) ***
Log of Human capital	0.048 (0.112)	-0.012 (0.008)	-0.001 (0.004)
Gini	0.003 (0.005)	-0.0 (0.0)	-0.0 (0.0)
Non-religious population	-0.309 (0.716)	-0.037 (0.031)	0.033 (0.021)
SE clustered by	<i>Country</i>	<i>Country</i>	<i>HCI</i>
Observations	941	826	119
Countries	119	119	119
Period (number of periods)	1970-2005 (8)	1975-2005 (7)	(1)
R-squared	0.1039	0.117	0.239
Within R-squared	0.0575	0.1274	

Notes:

- Significance: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, · $p < 0.1$
- HC1 refers to heteroscedasticity robust standard errors.
- Equations are estimated by OLS.
- Periods go the following way 1970 contains the years 1970-1974, 1975, 1975-1979, etc.

Across all three specifications, the investment rate is positively associated with labor productivity and its growth, consistent with the neoclassical growth framework. The coefficient is precise and robust in the panel models, and close to zero but weakly positive in the long-difference regression, where the smaller cross-section implies larger standard errors and where depreciation may absorb some of the between-country variation captured by investment in the panel specifications.

Depreciation is positively related to the level and long-run growth of GDP per worker. Since the Penn World Tables depreciation rate partly reflects the composition of the capital stock, this pattern is consistent with higher depreciation in economies that use more information and communication technology and other high-productivity capital (Jorgenson & Stiroh, 2000). At the same time, depreciation is a slow-moving variable with high between-country variation, so its within-country effect is imprecisely estimated in the growth fixed-effects specification.

Labor-force growth shows a positive association with long-run growth in the long-difference model but unstable coefficients in the fixed-effects regressions. One interpretation is that the long-run association reflects demographic transitions and labor reallocation—such as the expansion of the working-age population and urbanization—that can raise aggregate productivity (Bloom & Williamson, 1998; McMillan & Rodrik, 2011; Ortega & Peri, 2014). Over shorter 5-year horizons, however, labor-force growth is highly persistent and offers limited within-country variation, which weakens identification in two-way fixed-effects models.

The human-capital proxy based on years of schooling has the expected positive sign in levels but yields small or negative coefficients in the growth specifications. This pattern is compatible with measurement error in Barro–Lee data and with the timing of human-capital accumulation: expansions in schooling temporarily reduce effective labor supply, while the productivity gains materialize when cohorts enter the labor market and accumulate experience (Krueger & Lindahl, 2001). The fact that positive and significant level effects emerge in simpler country fixed-effects models without time dummies

suggests that most variation in years of schooling is between countries and correlated with global shocks. Overall, the results are in line with the broader finding that quality-adjusted measures of human capital, such as test scores, tend to have stronger growth effects than simple attainment indicators (Hanushek & Woessmann, 2008).

In the pooled panel, coefficients on the Gini index and the share of non-religious individuals are small and imprecise across specifications. This is not surprising given that both variables are highly persistent, so most of their variation is between countries and absorbed by country fixed effects. In addition, their effects are theoretically ambiguous and likely context-dependent (Forbes, 2000; Barro & McCleary, 2003; Durlauf & Johnson, 1995; Barro, 2000). When country fixed effects are retained but time fixed effects are omitted, inequality remains insignificant while secularization becomes positively associated with the level of GDP per worker, consistent with the notion that more secular societies tend to be richer. These mixed pooled results motivate the heterogeneity analysis by income group.

4.2 Heterogeneity robustness results

To explore context dependence, Eq. 1b is re-estimated separately for each World Bank income group: low income, lower-middle income, upper-middle income, and high income – Table 4. This yields more structured patterns in the coefficients on inequality and secularization. First, the investment rate remains robustly positive and statistically significant in all income groups. Short-run increases in investment are consistently associated with faster labor productivity growth, which serves as a useful benchmark confirming that the model captures standard growth dynamics.

Table 4

Eq. 1d results

	Low income	Lower-middle income	Upper-middle income	High income
Dependent variable	$\Delta \log \text{ of GDP per worker}$			
Investment	0.002 (0.0) ***	0.001 (0.0) ***	0.001 (0.001) *	0.001 (0.0) ***
Labor force growth	-0.097 (0.413)	0.975 (0.586) ·	-1.141 (0.584) ·	0.329 (0.184) ·

Depreciation	-0.471 (0.674)	-0.067 (0.349)	-0.207 (0.231)	0.785 (0.902)
Log of Human capital	-0.059 (0.02) **	0.01 (0.014)	-0.063 (0.018) ***	-0.005 (0.03)
Gini	-0.001 (0.001)	-0.0 (0.001)	-0.001 (0.001) *	-0.0 (0.001)
Non-religious population	-1.069 (0.367) **	-0.105 (0.164)	0.1 (0.052) ·	-0.073 (0.033) *
SE clustered by	<i>Country</i>	<i>Country</i>	<i>Country</i>	<i>Country</i>
Observations	119	217	189	294
Countries	17	31	28	42
Period (number of periods)	1975-2005 (7)	1975-2005 (7)	1975-2005 (7)	1975-2005 (7)
R-squared	0.1478	0.2069	0.1743	0.1678
Within R-squared	-0.1836	0.2122	0.2113	0.1648

Notes:

Significance: *** p<0.001, ** p<0.01, * p<0.05, · p<0.1

- Equations are estimated by OLS.

- Periods go the following way 1970 contains the years 1970-1974, 1975 – 1975-1979, etc.

Second, the association between inequality and growth is most clearly visible in upper-middle income economies. In this group, higher Gini coefficients are significantly related to slower growth in GDP per worker, whereas coefficients are small and statistically insignificant in the other groups. This pattern is consistent with the idea that in countries with intermediate levels of development and relatively sophisticated but imperfect institutions – such as Brazil, Mexico, South Africa, and others – high inequality can depress productivity through misallocation, rent-seeking, and distortionary redistribution (Banerjee & Newman, 1993; Alesina & Rodrik, 1994; Persson & Tabellini, 1994; Banerjee & Duflo, 2003). The absence of strong effects in low-income and high income groups underscores that the inequality and growth relationship is contingent on institutional and structural conditions rather than universal. This result is consistent with recent cross-country evidence that inequality deters total factor productivity in developing countries (Espoir & Ngepah, 2021) and that its growth effects depend on complementary financial development (Juuti, 2022).

Third, the coefficients on secularization differ markedly across income groups. In low-income countries, increases in the share of non-religious individuals are strongly and negatively associated with productivity growth, although the within-country variation is

limited and the within R-squared is low. One interpretation is that religious organizations in poor settings substitute for weak formal institutions by providing insurance, credit, social capital, and public goods (Woolcock & Narayan, 2000; Chen, 2010; Shah et al., 2020). If secularization erodes these informal institutions faster than formal ones develop, growth may slow. In upper-middle income countries, the coefficient on secularization is modestly positive and borderline significant, suggesting that in these settings the erosion of traditional religious structures may coincide with greater human capital accumulation and institutional modernization. In high income economies, secularization is again negatively associated with growth, which may reflect the interaction between secular attitudes, very low fertility, population ageing, and slower labor force growth (Bloom et al., 2010; Lozano, 2017). This negative association is consistent with evidence that highly secular societies experience low fertility and demographic headwinds that may slow growth (Schnabel, 2021).

Taken together, the income group results indicate that neither inequality nor secularization has a single, uniform relationship with growth. Instead, their associations with productivity vary systematically with levels of income, institutional development, and demographic conditions. The estimates are best interpreted as reduced form descriptions of these heterogeneous patterns rather than structural causal parameters.

Finally, it is important to emphasize the limitations of the empirical approach. The models rely on two-way fixed effects and long differences rather than dynamic panel estimators because the panel is relatively short in time and includes slow-moving regressors for which standard GMM estimators tend to suffer from weak instruments and finite-sample bias (Blundell & Bond, 1998; Bond, 2002; Roodman, 2009). Even so, strict exogeneity of the regressors is unlikely to hold if investment, inequality, or secularization respond to growth shocks, and measurement error in Gini, schooling, and religious affiliation likely attenuates within-country coefficients. The income group splits also reduce statistical power and rely on recent World Bank classifications that may not fully reflect historical transitions. These caveats reinforce the descriptive nature of the findings.

5 CONCLUSION

This paper has examined how income inequality and secularization relate to labor productivity within an augmented MRW framework for 119 countries over 1970–2005. A robust finding across all specifications and income groups is that higher investment is associated with faster growth in output per worker. By contrast, inequality and secularization do not exhibit a single global effect. Once countries are split by World Bank income group, higher inequality is linked to slower productivity growth in upper-middle-income economies, while increases in the share of non-religious individuals are associated with lower growth in low- and high-income countries and modestly higher growth in upper-middle income ones.

These estimates are descriptive rather than causal, as they rely on static panel models with slow-moving regressors with potential measurement error and cannot fully address endogeneity. Future work could employ quality-adjusted human capital measures, alternative inequality and religiosity indicators, dynamic panel methods tailored to persistent covariates, and richer controls for demographic and structural change.

Even so, the patterns suggest some policy priorities. In upper-middle income economies, reducing inequality by broadening access to productive opportunities rather than through distortionary redistribution is likely to support productivity growth. In low-income settings, rapid secularization without a corresponding strengthening of formal institutions may erode informal safety nets and weaken growth prospects.

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REFERENCES

Alesina, A., & Rodrik, D. (1994). *Distributive politics and economic growth*. *The Quarterly Journal of Economics*, 109(2), 465–490. <https://doi.org/10.2307/2118470>

- Banerjee, A. V., & Duflo, E. (2003). *Inequality and growth: What can the data say?* *Journal of Economic Growth*, 8(3), 267–299. <https://doi.org/10.1023/A:1026205114860>
- Banerjee, A. V., & Newman, A. F. (1993). *Occupational choice and the process of development.* *Journal of Political Economy*, 101(2), 274–298. <https://doi.org/10.1086/261876>
- Barro, R. J. (2000). *Inequality and growth in a panel of countries.* *Journal of Economic Growth*, 5(1), 5–32. <https://doi.org/10.1023/A:1009850119329>
- Barro, R. J., & McCleary, R. M. (2003). *Religion and economic growth across countries.* *American Sociological Review*, 68(5), 760–781. <https://doi.org/10.1177/000312240306800505>
- Becker, S. O., & Woessmann, L. (2009). *Was Weber wrong? A human capital theory of Protestant economic history.* *The Quarterly Journal of Economics*, 124(2), 531–596. <https://doi.org/10.1162/qjec.2009.124.2.531>
- Becker, S. O., Rubin, J., & Woessmann, L. (2024). *Religion and growth.* *Journal of Economic Literature*, 62(3), 1094–1142. <https://doi.org/10.1257/jel.20231666>
- Bell, A., & Jones, K. (2015). *Explaining fixed effects: Random effects modeling of time-series cross-sectional and panel data.* *Political Science Research and Methods*, 3(1), 133–153. <https://doi.org/10.1017/psrm.2014.7>
- Bleaney, M., & Nishiyama, A. (2004). *Income inequality and growth—Does the relationship vary with the income level?* *Economics Letters*, 84(3), 349–355.
- Bloom, D. E., Canning, D., & Fink, G. (2010). *Implications of population ageing for economic growth.* *Oxford Review of Economic Policy*, 26(4), 583–612. <https://doi.org/10.1093/oxrep/grq038>
- Bloom, D. E., & Williamson, J. G. (1998). *Demographic transitions and economic miracles in emerging Asia.* *The World Bank Economic Review*, 12(3), 419–455. <https://doi.org/10.1093/wber/12.3.419> (Working paper version: NBER Working Paper No. 6268, 1997.)
- Blundell, R., & Bond, S. (1998). *Initial conditions and moment restrictions in dynamic panel data models.* *Journal of Econometrics*, 87(1), 115–143. [https://doi.org/10.1016/S0304-4076\(98\)00009-8](https://doi.org/10.1016/S0304-4076(98)00009-8)
- Campante, F. R., & Yanagizawa-Drott, D. (2015). *Does religion affect economic growth and happiness? Evidence from Ramadan.* *Quarterly Journal of Economics*, 130(2), 615–658. <https://doi.org/10.1093/qje/qjv002>
- Cantoni, D. (2015). *The economic effects of the Protestant Reformation: Testing the Weber hypothesis in the German lands.* *Journal of the European Economic Association*, 13(4), 561–598. <https://doi.org/10.1111/jeea.12117>

- Chen, D. L. (2010). Club goods and group identity: Evidence from Islamic resurgence during the Indonesian financial crisis. *Journal of Political Economy*, 118(2), 300–354. <https://doi.org/10.1086/652462>
- De la Croix, D., & Delavallade, C. (2018). Religions, fertility, and growth in Southeast Asia. *International Economic Review*, 59(2), 907–946.
- Deininger, K., & Squire, L. (1998). New ways of looking at old issues: Inequality and growth. *Journal of Development Economics*, 57(2), 259–287. [https://doi.org/10.1016/S0304-3878\(98\)00099-6](https://doi.org/10.1016/S0304-3878(98)00099-6)
- Durlauf, S. N., & Johnson, P. A. (1995). Multiple regimes and cross-country growth behaviour. *Journal of Applied Econometrics*, 10(4), 365–384. <https://doi.org/10.1002/jae.3950100404>
- Espoir, D. K., & Ngepah, N. (2021). Income distribution and total factor productivity: A cross-country panel cointegration analysis. *International Economics and Economic Policy*, 18(4), 661–698. <https://doi.org/10.1007/s10368-021-00494-6>
- Feenstra, R. C., Inklaar, R., & Timmer, M. P. (2015). The next generation of the Penn World Table. *American Economic Review*, 105(10), 3150–3182. <https://doi.org/10.1257/aer.20130954>
- Forbes, K. J. (2000). A reassessment of the relationship between inequality and growth. *American Economic Review*, 90(4), 869–887. <https://doi.org/10.1257/aer.90.4.869>
- Galor, O., & Zeira, J. (1993). *Income distribution and macroeconomics*. The Review of Economic Studies, 60(1), 35–52. <https://doi.org/10.2307/2297811>
- Guiso, L., Sapienza, P., & Zingales, L. (2003). *People's opium? Religion and economic attitudes*. *Journal of Monetary Economics*, 50(1), 225–282. [https://doi.org/10.1016/S0304-3932\(02\)00202-7](https://doi.org/10.1016/S0304-3932(02)00202-7)
- Hanushek, E. A., & Woessmann, L. (2008). *The role of cognitive skills in economic development*. *Journal of Economic Literature*, 46(3), 607–668. <https://doi.org/10.1257/jel.46.3.607>
- Islam, N. (1995). *Growth empirics: A panel data approach*. *The Quarterly Journal of Economics*, 110(4), 1127–1170. <https://doi.org/10.2307/2946651>
- Jorgenson, D. W., & Stiroh, K. J. (2000). *Raising the speed limit: U.S. economic growth in the information age*. OECD Economics Department Working Papers, (261). <https://doi.org/10.1787/561481176503>
- Juuti, T. (2022). *The role of financial development in the relationship between income inequality and economic growth: An empirical approach using cross-country panel data*. *Quality & Quantity*, 56, 985–1021. <https://doi.org/10.1007/s11135-021-01163-1>

- Knowles, S., & Owen, P. D. (1995). *Health capital and cross-country variation in income per capita in the Mankiw–Romer–Weil model*. *Economics Letters*, 48(1), 99–106. [https://doi.org/10.1016/0165-1765\(94\)00577-0](https://doi.org/10.1016/0165-1765(94)00577-0)
- Köbrich León, A. (2013). *Religion and economic outcomes: Household savings behavior in the USA*. *Working Paper Series in Economics*, 268. Leuphana University Lüneburg.
- Krueger, A. B., & Lindahl, M. (2001). *Education for growth: Why and for whom?* *Journal of Economic Literature*, 39(4), 1101–1136. <https://doi.org/10.1257/jel.39.4.1101>
- Kuznets, S. (1955). *Economic growth and income inequality*. *American Economic Review*, 45(1), 1–28. <https://doi.org/10.2307/1811581>
- Lee, R., & Mason, A. (2006). *What is the demographic dividend?* *Finance & Development*, 43(3), 16–19.
- Lozano, F. A. (2017). *The rise of secularism and its economic consequences*. *IZA World of Labor*, 2017(384), 1–10. <https://doi.org/10.15185/izawol.384>
- Mankiw, N. G., Romer, D., & Weil, D. N. (1992). *A contribution to the empirics of economic growth*. *The Quarterly Journal of Economics*, 107(2), 407–437. <https://doi.org/10.2307/2118477>
- McMillan, M. S., & Rodrik, D. (2011). *Globalization, structural change and productivity growth*. NBER Working Paper No. 17143. <https://doi.org/10.3386/w17143> (Updated analyses in: McMillan, M., Rodrik, D., & Verduzco-Gallo, Í. (2014). *World Development*, 63, 11–32. <https://doi.org/10.1016/j.worlddev.2013.10.012>)
- Milanovic, B. (2016). *Global Inequality: A New Approach for the Age of Globalization*. Cambridge, MA: Harvard University Press. <https://doi.org/10.4159/9780674969797>
- Ortega, F., & Peri, G. (2014). *Openness and income: The roles of trade and migration*. *Journal of International Economics*, 92(2), 231–251. <https://doi.org/10.1016/j.jinteco.2013.11.008>
- Persson, T., & Tabellini, G. (1994). *Is inequality harmful for growth?* *American Economic Review*, 84(3), 600–621. <https://doi.org/10.2307/2118070>
- Piketty, T. (1997). *The dynamics of the wealth distribution and the interest rate with credit rationing*. *The Review of Economic Studies*, 64(2), 173–189. <https://doi.org/10.2307/2971708>
- Roodman, D. (2009). *A note on the theme of too many instruments*. *Oxford Bulletin of Economics and Statistics*, 71(1), 135–158. <https://doi.org/10.1111/j.1468-0084.2008.00542.x>
- Schnabel, L. (2021). *Secularism and fertility worldwide*. *Socius: Sociological Research for a Dynamic World*, 7, 1–21. <https://doi.org/10.1177/23780231211031320>

- Shah, S. S., Jalil, A., & Shah, S. A. H. (2020). *Growth effects of religion dependent social capital: An empirical evidence*. *Social Indicators Research*, 149(2), 423–443. <https://doi.org/10.1007/s11205-019-02253-2>
- Shin, I. (2012). *Income inequality and economic growth*. *Economic Modelling*, 29(5), 2049–2057. <https://doi.org/10.1016/j.econmod.2012.02.011>
- Solow, R. M. (1956). *A contribution to the theory of economic growth*. *The Quarterly Journal of Economics*, 70(1), 65–94. <https://doi.org/10.2307/1884513>
- Stiglitz, J. E. (2013). *The Price of Inequality: How Today's Divided Society Endangers Our Future*. New York, NY: W. W. Norton & Company.
- United Nations, *Department of Economic and Social Affairs*. (2013). *Inequality Matters: Report on the World Social Situation 2013*. New York, NY: United Nations. (ST/ESA/345). ISBN 978-92-1-130322-3.
- Weber, M. (1905/1930). *The Protestant Ethic and the Spirit of Capitalism* (T. Parsons, Trans.). London: George Allen & Unwin.
- Woolcock, M., & Narayan, D. (2000). *Social capital: Implications for development theory, research, and policy*. *The World Bank Research Observer*, 15(2), 225–249. <https://doi.org/10.1093/wbro/15.2.225>
- Wooldridge, J. M. (2010). *Econometric Analysis of Cross Section and Panel Data* (2nd ed.). Cambridge, MA: MIT Press.

Authors' Contribution

All authors contributed equally to the development of this article.

Data availability

All datasets relevant to this study's findings are fully available within the article.

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