

Interplay of Islam and Economic Growth: Unveiling the Long-Run Dynamics in Muslim and Non-Muslim Countries

Abstract

This study delves into the intricate relationship between Islam and economic growth, examining how Islamic teachings impact economic policies and developmental outcomes. Using data from 47 countries over the period 2010-2021, and to achieve our research objectives the CS-ARDL estimating technique by Chudik et al. was employed. The research reveals that Islam positively influences economic growth in Muslim countries in the long run, with a less significant impact in non-Muslim countries. The study emphasizes the role of Islamic education in shaping the behavior of the Muslim population and its subsequent impact on economic growth. Recommendations include prioritizing investment in Islamic education to enhance human capital, fostering long-term economic plans that align with the positive influence of Islamic teachings, and leveraging education to contribute to sustained economic growth.

Keywords: Islam, Economic Growth, Islamic Education, Muslim Countries, and CS-ARDL

JEL Classifications: C33, O47, P47

1.0 Introduction

The intricate connection between Islam and economic growth within countries where Islam is the predominant religion has sparked extensive debates among economists and scholars. Determining whether Islam facilitates economic growth lacks a straightforward answer due to the complexity of factors involved, including historical, cultural, political, and institutional contexts (Khalifaoui 2015; Fachini 2007; Kuran 2004).

Some scholars argue that certain principles and values within Islamic teachings, such as the emphasis on social justice, ethical business practices, and the prohibition of interest (riba), can promote economic stability and equity. Additionally, concepts like waqf (endowment), zakat (charitable giving), and sadaqah (voluntary charity) are seen as potential means for wealth redistribution and poverty alleviation, which could have positive implications for economic development (Imam & Kpodar, 2016; Uddin and Masih, 2015).

On the other hand, others suggest that certain interpretations of Islamic principles may pose challenges to economic growth, particularly in the context of global competitiveness. For instance,

the strict adherence to Islamic finance principles may limit access to capital, and restrictions on certain financial practices might hinder the development of financial markets and institutions (Kammer, et al., 2015; Al-Maraj 2014; Ernst and Young 2014; Askari, Iqbal, and Mirakhor 2010).

Moreover, the varied characteristics of countries where Islam is the predominant religion, encompassing differences in cultural norms, economic frameworks, and political structures, preclude the ability to make broad generalizations about the correlation between Islam and economic growth. Certain nations with a Muslim majority have witnessed notable economic expansion, whereas others have encountered difficulties in attaining enduring development.

In summary, the influence of Islam on economic growth in countries where it is the predominant religion is shaped by a range of factors extending beyond religious dimensions. It involves intricate connections encompassing economic policies, institutional frameworks, governance systems, human capital development, technological progress, and global economic trends. This study aims to fill this gap by examining the potential impact of Islamic teachings on economic growth, exploring the intersections of religious beliefs, economic policies, and developmental outcomes. Specifically, the research seeks to scrutinize the moderating role of Islamic principles (teachings and education) in the correlation between economic growth and human capital in the selected countries. Ultimately, this contributes to a more nuanced comprehension of the relationship between Islam and economic growth.

Therefore, the subsequent sections of the document are organized as follows: Section II conducts a review of the literature, concentrating on both empirical and theoretical perspectives. Section III outlines the research methodology, encompassing the theoretical and analytical framework. Section IV addresses the results and discussion, while Section V provides the conclusion along with policy recommendations.

2.0 Literature Review

2.1 Empirical Review

Khalfaoui (2015) investigated the influence of Islam, measured as a percentage of the Muslim population, on economic growth and explored factors impacting this relationship using panel data from twenty Muslim countries (1990-2014). The findings suggested that Islam does not foster economic growth; its effect is relatively lower and negative, possibly due to high rates of illiteracy and unemployment in Muslim countries.

Uddin and Masih (2015) examined the interplay of finance, growth, and human development in Malaysia from an Islamic economic development perspective, utilizing the ARDL technique. They identified a long-term relationship between finance, growth, and human development in Malaysia.

Mifrahi&Tohirin (2020) investigated QISMUT countries using annual panel data (2005-2015) and multiple mediating analysis models. The study revealed that Islamic banking financing does not

directly impact economic growth significantly but could potentially influence it indirectly through investment and consumption spending.

Chani et al. (2021) explored the long-run relationship between human capital investment and economic growth in 12 selected countries from SAARC and ASEAN regions (2001-2015) using FMOLS econometrics methods. The study found a positive link between education expenditure and economic growth.

Awan and Kamran (2017) analyzed the nexus between human capital investment and economic growth in Pakistan with annual data spanning 1985 to 2014, employing the Autoregressive Distributive Lag (ARDL) method. The results indicated a positive influence of human capital on the economic development of Pakistan.

Ali et al. (2018) investigated the relationship between human capital, social capabilities, and economic development using 15 years of data (1996-2011) from 132 countries. The Panel ARDL technique revealed inclusive results, emphasizing the positive impact of both human capital and economic development.

Alataş and Çakir (2016) explored the connection between education expenditure, spending on health, and economic development in a panel of 65 nations (1967-2011). FEM and REM were used for estimation, and the researchers concluded that investments in health and education have a positive and statistically significant effect on economic development.

2.2 Theoretical Review

2.2.1 Human Capital Development Hypothesis

The impact of religion on educational attainment, which has a substantial impact on the development of human capital, is presented in this theory. Higher religious beliefs are seen to promote growth because they have an impact on personal behaviors that improve productivity, like work ethic or thrift, through human development capital, according to Bednarik and Filipova (2009). The idea is supported by an analysis of the interdependence between economic growth and human capital. On the one hand, human capital is one of the key drivers of economic growth, while on the other, the demand for human capital is influenced by economic growth (Abalaka et al., 2023). Technological advancement drives demand for more human capital, or people with more education, which in turn drives economic growth. Higher demand for education and its increased significance for society are results of a more developed economy. This connection was particularly clear in history during the industrial revolution, when the importance of education for economic expansion expanded considerably.

Technological advancement, physical capital, and human capital are not the only elements that affect economic growth (Olaniyi et al., 2013). The neoclassical approach, which assumes an economy with no limitations and perfect competition, is the foundation of contemporary growth models. The truth, though, is the exact reverse. The environment in which economies operate has a big impact on them (Olaniyi et al., 2023). Every economy has unique qualities that may have an impact on how human capital, physical capital, and technical advancement interact in ways that do not require the growth theory to be accurate in its entirety (Adigwe et al., 2023).

According to Bednarik and Filipova (2009), religion is frequently referred to as one of the institutional components of economic growth and has an integral role among these attributes. For instance, the Judaic-Christian tradition has been highlighted as a crucial component of the economic growth of Europe from the standpoint of history. The idea of rights to property has existed from the time of the Bible, and Christianity preserved and changed it (Landes, 2004). The crises that resulted in Christianity's division were often tied to attempts to achieve political power. In the sixteenth century, the third and final break led to the development of Protestantism as a critique of Roman-Catholic Christianity, which had a positive impact on not only political regimes but also supported private property and individual freedom.

On the other hand, Islam is frequently seen as a hindrance to economic progress. Everything was ruled and controlled by religion, and the ideal government was that of holy men. The so-called eastern despotism was defined by the belief that the ruler, who was regarded as God, had the right to dispose of the lives and property of his servants. Limited or nonexistent property rights and a lack of freedom naturally stifle business, competition, and economic growth. The contrary viewpoint, on the other hand, argues that Islam is not to blame for the economic underdevelopment of the Muslim world. They emphasize the importance of institutions (Bednarik and Filipova, 2009).

In conclusion, one set of scholars and scientists, such as (Huntington, 2001), (Landes, 2004), or (Weber, 1930), contends that religion has a significant impact on the growth of the economy by influencing individual morals and values like honesty, frugality, the desire to work hard, and others. This argument is based on the disparity between the economies and living conditions of the Muslim world and those of Western Europe, North America, and other cultural outgrowths of Western Europe. The opponents of this strategy attempt to provide more comprehensive justifications by using Muslim views as dependent variables (Kuran, 2004, 2007; Lewis, 2002).

3.0 Theoretical Framework and Methodology

3.1 The Endogenous Growth Model

This work distinguishes itself from neoclassical growth theories by emphasizing that economic growth is an inherent outcome of an economic system, not a result imposed from external forces. Romer (1996) specifies that the modeling of endogenous growth theory incorporates four variables: labor (L), capital (K), technology (A), and output (Y). The model is formulated in continuous terms.

A fraction a_L of the labor force is allocated to the R & D sector, while the fraction $1-a_L$ is devoted to the goods-producing sector. Similarly, a fraction a_K of the capital stock is utilized in R & D, with the remainder used in goods production. Both sectors utilize the complete stock of knowledge, A, as the utilization of knowledge in one sector does not preclude its use in another. The quantity of output produced at time t is thus:

$$Y(t) = [(1 - a_K)K(t)]^\alpha [A(t)(1 - a_L)L(t)]^{1-\alpha}, \quad 0 < \alpha < 1 \quad - \quad - \quad 3.1$$

Apart from the terms $1 - a_K$ and $1 - a_L$, and the constraint of the Cobb-Douglas functional form, it is important to recognize that equation (3.1) indicates constant returns to capital and labor: with a given technology, doubling the inputs results in a doubling of the output.

time. Consequently, it can be deduced that L_Y is directly proportional to x , and the resource constraint can be formulated as:

$$\frac{ag}{\varphi} + b_L x = L \quad (3.8)$$

Therefore, at the steady state, $\frac{(1-\alpha)X\varphi}{\alpha a} + \frac{\dot{w}}{w} - \frac{\dot{K}}{K} = r$ () reduces to $\frac{(1-\alpha)X\varphi}{\alpha a} = g + \rho$ (3.9)

In the equilibrium state, the consumption of each good expands at a rate identical to that of final goods. Consequently, the trade volume increases at this rate, expressed as $\frac{\dot{T}}{T} = \frac{g\beta(1-\alpha)}{\alpha}$. It can be inferred that $\frac{T}{n}$ will either diminish to zero, grow indefinitely, or converge to a constant in the long run, contingent on the following conditions: $\alpha > \beta(1-\alpha)$, $\alpha < \beta(1-\alpha)$, or $\alpha = \beta(1-\alpha)$, respectively.

The model encapsulating the repercussions of Islam on economic growth in selected countries is an amalgamation of the aforementioned theoretical explanations and draws insights from the work of Wu et al. (2021), as cited in Afolabi (2023):

$$Eco_Gro = f(LFPR, HCI, GCFC, ISLAM, TOP) \quad (3.10)$$

Where Eco_Gro , $LFPR$, HCI , $GCFC$, $ISLAM$ and TOP denote economic growth (proxied by Real Gross Domestic Product per Capita), labour force participation rate (to proxy labour), Human capital Index (HCI) to proxy human capital per person, gross consumption of fixed capital (GCFC) to proxy capital, $ISLAM$ proxied by proportion of the total population that are Muslims, and trade openness (TOP) to capture international exposure of the economy; in that order. The determinants are all expressed in logarithms (rep by the prefix "ln"). Thus, elasticity is used to express how the independent variables affect the economic growth.

Equation (3.10) is represented explicitly as:

$$\ln Eco_Growth = \beta_0 + \beta_1 LFPR_{i,t} + \beta_2 \ln HCI_{i,t} + \beta_3 GCFC_{i,t} + \beta_4 \ln ISLAM_{i,t} + \beta_5 \ln TOP_{i,t} + \varepsilon_{i,t} \quad (3.11)$$

where i represents a cross-section of countries; t stands for the years 2010 to 2021; β_0 is the intercept; $\beta_1 - \beta_4$ are each variable's elasticities; and ε is the noise (error).

In this paper, we investigated whether the religion of Islam is actually not conducive to economic growth in the world. Equation (3.12), which provides a rich method of modeling the moderating impact that Islam has on the link between economic growth and human capital Index (HCI) in the selected countries, thereby captures its conditional impacts. The conditional effect is represented by include product of the Islam and HCI as one of the explanatory factors in the equation.

$$\ln Eco_Growth = \beta_0 + \beta_1 LFPR_{i,t} + \beta_2 \ln HCI_{i,t} + \beta_3 GCFC_{i,t} + \beta_4 \ln ISLAM_{i,t} + \beta_5 \ln TOP_{i,t} + \beta_4 \ln HCI_ISLAM_{i,t} + \varepsilon_{i,t} \quad (3.12)$$

where HCI_ISLAM is the interactive term of human capital development and Islamic tenets; and all other factors stay the same as they were before. The total impact of Islam which includes its marginal influence on economic growth is arrived at by taking partial derivatives of equation (3.12):

$$\frac{\partial Eco_Gro_{i,t}}{\partial HCI_{i,t}} = \beta_4 + \beta_5 ISLAM_{i,t} \quad (4)$$

The sign and magnitude of this equation should be considered while interpreting it. Considering the sign, if $\beta_4 > 0$ and $\beta_5 < 0$, HCI deteriorates economic growth due to overbearing tenets of Islam on

HCI, and vice-versa. Meanwhile, if $\beta_4 > 0$ and $\beta_5 > 0$, then the tenets of Islam actually amplify HCI which in turns affects economic growth, and vice-versa. Considering the magnitude, if $\frac{\partial Eco_Gro_{i,t}}{\partial HCI_{i,t}} > 0$, HCI together with ISLAM enhances economic growth but if $\frac{\partial Eco_Gro_{i,t}}{\partial HCI_{i,t}} < 0$, the combination of HCI and ISLAM are not conducive to economic growth in the sampled countries.

3.2 Estimation Technique

This paper relies on the distinctive CS-ARDL estimating technique, developed by Chudik et al. (2016), as the primary analytical method. The CS-ARDL incorporates elements of the Mean Group (MG) and Pool Mean Group (PMG) estimators, utilizing Chudik and Pesaran's (2015) dynamic common correlated effects (DCCCE) approach to address cross-sectional dependence. It takes into consideration heterogeneous slopes, allows for small numbers of samples, concurrently analyzes both long- and short-run models, handles the problem of cross-sectional dependence, and assumes that parameters are expressed by similar characteristics. Additionally, it can be applied if the panel data is uneven and the series contains structural breaks. These are the five explanations for why we selected this estimator over others. Using the panel ARDL/PMG estimator, the validity of the CS-ARDL estimates is evaluated. Equations (2) in the panel ARDL version are expressed as:

$$\Delta y_{it} = w_i + \delta_i(y_{i,t-1} - \theta_i' x_{i,t-1}) + \sum_{j=1}^{p-1} \phi_{ij} \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \alpha_{ij} \Delta x_{i,t-j} + \varepsilon_{it} \quad - \quad - \quad - \quad 5$$

Here, y_{it} denotes the economic growth of country i at time t ; α_{ij} represents a matrix of the regressors (factors); θ_i' establishes a relationship between y_{it} and x_{it} ; in the long-run equilibrium, δ_i represents the error correction term; ϕ_{ij} and α_{ij} depict the connection between y_{it} and x_{it} in the short run; and the terms within parentheses signify the long-run linkage.

Chudik et al. (2016) formulated the CS-ARDL model by incorporating cross-sectional averages into both the dependent and explanatory variables, addressing gradient asymmetry and cross-sectional associations. Equation (5) can be reformulated to express its CS-ARDL counterpart as follows:

$$\Delta y_{it} = \mu_i + \delta_i(y_{i,t-1} - \theta_i' x_{i,t-1} + \delta_i^{-1} n_i \bar{y}_t + \delta_i^{-1} \phi_i' \bar{x}_t) + \sum_{j=1}^{p-1} \phi_{ij} \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \alpha_{ij} \Delta x_{i,t-j} + \sum_{j=0}^{p-1} \tau_{ik} \Delta \bar{y}_{t-j} + \sum_{j=0}^{q-1} \Delta_{ik} \phi_{ik}' \bar{x}_{t-j} + \varepsilon_{it} \quad - \quad - \quad - \quad 6$$

Where \bar{y}_t and \bar{x}_t are the cross-sectional averages of the cause-and-effect factors, respectively.

Before applying the CS-ARDL, preliminary testing was conducted. These tests encompassed the panel unit root test, slope homogeneity test, cross-sectional dependence (CD) test, and panel cointegration test. It is imperative to conduct a CD test in panel data analysis to mitigate potential unclear and biased estimates resulting from variations in spatio-temporal features and spatial effects (Afolabi, 2023; Majeed et al., 2022). The CD test, initially introduced by Pesaran (2004), is characterized as:

$$CD = \sqrt{\frac{2T}{N(N-1)}} (\sum_{i=1}^{N-1} \sum_{j=i+1}^N \rho_{ij}) \quad - \quad - \quad - \quad - \quad - \quad - \quad 7$$

In this context, the variables are defined as follows: T represents time, N represents the size of the panel data, and ρ_{ij} represents the correlation coefficient. The alternative hypothesis posits a

contradiction to the null hypothesis of the CD test, challenging the assertion that there is no cross-sectional dependence in the sampled nations.

Given the variations in both Islamic concentration and economic profiles among these countries, it becomes essential to conduct a test for slope homogeneity across the cross-sectional units subsequent to the CD test. Failing to account for slope heterogeneity can lead to inconsistent estimations (Afolabi, 2023; Zuo et al., 2022). Therefore, this study employs the slope homogeneity test introduced by Pesaran and Yamagata (2008). The test statistic for this analysis is expressed as:

$$\Delta_{SH}^{\sim} = (N)^{\frac{1}{2}}(2K)^{-\frac{1}{2}}\left(\frac{1}{N}\tilde{S} - k\right) \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad 8$$

$$\Delta_{ASH}^{\sim} = (N)^{\frac{1}{2}}\left(\frac{2k(T-k-1)}{T+1}\right)^{-\frac{1}{2}}\left(\frac{1}{N}\tilde{S} - k\right) \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad 9$$

In this equation, $\Delta^{\sim}SH$ and $\Delta^{\sim}ASH$ represent delta tilde and adjusted delta tilde, respectively. The alternative hypothesis of the slope homogeneity test posits that the gradients across cross-sectional units are not uniform, thereby contradicting the null hypothesis.

Following the slope homogeneity and cross-sectional dependence (CD) testing, the next step involved conducting the panel unit root test. First-generation unit root approaches, such as Im, Pesaran, and Shin (IPS) and Levin-Lin Chu, are insufficient in addressing cross-sectional dependence issues (Wu et al., 2021). Consequently, this study employs second-generation cross-sectional augmented CADF and IPS (CIPS) tests introduced by Pesaran (2007). These tests aim to determine the order of integration for each variable and to appropriately account for the observed cross-sectional dependence among the sampled nations. The formula for the CIPS test statistic is expressed as:

$$CIPS = \frac{1}{N} \sum_{i=1}^n \Delta CA_{i,t} \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad 10$$

$$\Delta CA_{i,t} = \lambda_i + \lambda_i CA_{i,t-1} + \lambda_i \overline{CA_{t-1}} + \sum_{l=0}^p \lambda_{il} \Delta \overline{CA_{t-1}} + \sum_{l=0}^p \lambda_{il} \Delta CA_{i,t-1} + \mu_{it} \quad - \quad - \quad 11$$

Where λ_i , $CA_{i,t-1}$, $\Delta CA_{i,t}$, $\overline{CA_{t-1}}$ and $\Delta \overline{CA_{t-1}}$ denotes the intercept, the cross-sectional units, its, first difference, its mean values, and the cross-sectional units' first difference, in that order.

Following the panel unit root test, the analysis proceeds to the panel cointegration test to evaluate the existence of long-term linkages between the variables. In contrast to widely recognized cointegration methods such as Kao and Pedroni, the Westerlund test, developed by Westerlund in 2007, offers more objective results by incorporating considerations for cross-sectional dependence (CD) and heterogeneity. The anticipated test results for the Westerlund test include:

$$\alpha_i(L)\Delta y_{it} = \delta_{1i} + \delta_{2i}t + \alpha_i(y_{it} - \beta_i x_{it-1} + \lambda_i(L)^{vit}) + e_{it} \quad - \quad - \quad - \quad - \quad - \quad 12$$

Where $\delta_{1i} = \alpha_i(1)\varphi_{2i} - \alpha_i\varphi_{1i} + \alpha_i\varphi_{2i}$ and $\delta_{2i} = -\alpha_i\varphi_{2i}$, β_i is the EC coefficient and α_i is the path in which the regressor and regressand cointegrate.

3.3 Data Descriptions and Sources

The study cut-across 47 countries due to the focus and scope of our study. The selected 47 countries (see the appendix) are divided into two strata of Muslim Countries and Non-Muslim Countries. Muslim Countries are those with Muslim proportion of total population of at least 90% in the year 2023, while the Non-Muslim Countries are those with Muslim proportion of total population of less than 1% (Al-Islam Portal 2023). We employed annual secondary data for the period of 2010-2021, in order to focus the study on the recent few years. Table 1 shows the description and the sources of variables:

Table 1: Data Descriptions and Sources

| Variables | Definition | Description | Data Source |
|------------------------|-----------------------------------|--|-----------------------------------|
| <i>Economic Growth</i> | Real <i>GDP per Capita</i> | Captured with RGDP per capita (US\$ Billion 2015 constant) | World development indicator, 2022 |
| <i>ISLAM</i> | Tenets of Islam | Muslim Proportion of Total Population (%) | Al-Islam Portal 2023) |
| <i>LFPF</i> | Labor Factor Participation Rate | Labor force participation rate, total (% of total population ages 15+) | World development indicator, 2022 |
| <i>GCI</i> | Gross Capital Investment | Proxied with gross capital formation(% of GDP) | World development indicator, 2022 |
| <i>TOP</i> | Trade Openness | Captured with trade in % of GDP | World development indicator, 2022 |
| <i>HCI</i> | Human Capital Development | Captured with Index of Human Capital per person | Penn Table 10.0 |
| <i>HCD*ISLAM</i> | Interaction between HCD and Islam | Captured with multiplication HCD and Islam | Derived |

Source: Author's Compilation

4.0 Empirical Analysis and Discussion of Results

4.1 Preliminary Analysis

The full sample (the total of the two groups), Muslim dominated countries (Muslim), and very scanty Muslim countries (Non_Muslim) are all represented by descriptive statistics in Table 2, as well as the important variables of interest. RGDP per capita averaged about US\$7,629.27 across the entire sample, with gross fixed capital averaged US\$26.17billion and HCI of 2.39. Meanwhile, labour participation rate averages 57.38% and trade openness is about 68.27%; surprisingly, the average proportion of Muslim is 51.1%. Among the Muslim countries, RGDP per capita averaged about US\$6,200.13 with gross fixed capital averaged US\$28.87billion and HCI of 2.09. Meanwhile, labour participation rate averages 51.48% and trade openness is about 66.41%; expectedly, the average Muslim population is 95%. Meanwhile, for Non-Muslim countries, RGDP per capita averaged about

US\$9,253.29 with gross fixed capital averaged US\$23.10billion and HCI of 2.74. Meanwhile, labour participation rate averages 64.06% and trade openness is about 70.39%; as expected the average Muslim population is 0.13%. This shows that per capita RGDP, HCI, LFPR and TOP are greater among the non-Muslim countries than in the Muslim countries. This seems pointing that the environmental in the non-Muslim countries is more conducive than in the Muslim countries, all things being equal.

Table 2: Descriptive Statistics

| Full Sample | | | | | |
|--------------------|-----|----------|-----------|----------|-----------|
| Variable | Obs | Mean | Std. Dev. | Min | Max |
| RGDP | 564 | 7629.27 | 11113.045 | 334.708 | 73493.269 |
| GFCF | 564 | 26.172 | 9.28 | 3.466 | 57.161 |
| HCI | 564 | 2.393 | 0.633 | 1.167 | 3.765 |
| LFPR | 563 | 57.377 | 11.974 | 33.707 | 87.89 |
| TOP | 564 | 68.269 | 29.152 | 4.128 | 186.468 |
| ISLAM | 564 | 51.1 | 47.982 | 0.01 | 99.9 |
| H ISLAM | 564 | 106.281 | 106.098 | 0.026 | 305.301 |
| Muslim | | | | | |
| RGDP | 300 | 6200.124 | 12892.744 | 334.708 | 73493.269 |
| GFCF | 300 | 28.871 | 10.899 | 3.466 | 57.161 |
| HCI | 300 | 2.086 | 0.547 | 1.167 | 3.259 |
| LFPR | 299 | 51.48 | 12.609 | 33.707 | 87.89 |
| TOP | 300 | 66.406 | 24.428 | 4.128 | 118.7 |
| ISLAM | 300 | 95.951 | 4.806 | 77.5 | 99.9 |
| H ISLAM | 300 | 199.493 | 50.716 | 114.75 | 305.301 |
| Non_Muslim | | | | | |
| RGDP | 264 | 9253.299 | 8391.718 | 1284.478 | 36138.529 |
| GFCF | 264 | 23.104 | 5.617 | 7.611 | 37.099 |
| HCI | 264 | 2.741 | 0.538 | 1.417 | 3.765 |
| LFPR | 264 | 64.056 | 6.477 | 51.07 | 79.24 |
| TOP | 264 | 70.387 | 33.651 | 15.683 | 186.468 |
| ISLAM | 264 | 0.133 | 0.105 | 0.01 | 0.5 |
| H ISLAM | 264 | 0.359 | 0.313 | 0.026 | 1.637 |

Source: Author's Compilation

4.2 Correlation Analysis

The magnitude and direction of the correlations between the regressand and the relevant regressors are checked using the correlation test. The intensity of the association raises the question of whether multicollinearity exists or not. Table 2's correlation test results show that there are relatively minor correlations between the factors taken into account, with H_Islam having the strongest link with HCI in the Muslim countries. The outcome reveals an absence of multicollinearity in the model and that there is no particularly strong correlation between the variables. As a result, multicollinearity is not a concern when incorporating all the independent variables into the empirical model.

Table 3: Correlation Matrix

| FULL SAMPLE | | | | | | | |
|-------------|--------|--------|--------|--------|--------|--------|---------|
| Variables | RGDP | GCFC | HCI | LFPR | TOP | ISLAM | H ISLAM |
| RGDP | 1 | | | | | | |
| GCFC | 0.068 | 1 | | | | | |
| HCI | 0.536 | -0.136 | 1 | | | | |
| LFPR | 0.365 | -0.222 | 0.176 | 1 | | | |
| TOP | 0.127 | 0.399 | 0.181 | 0.026 | 1 | | |
| ISLAM | -0.181 | 0.312 | -0.527 | -0.561 | -0.073 | 1 | |
| HISLAM | -0.114 | 0.308 | -0.465 | -0.522 | -0.08 | 0.983 | 1 |
| MUSLIM | | | | | | | |
| RGDP | 1 | | | | | | |
| GCFC | 0.092 | 1 | | | | | |
| HCI | 0.464 | -0.031 | 1 | | | | |
| LFPR | 0.553 | -0.145 | -0.039 | 1 | | | |
| TOP | 0.234 | 0.458 | 0.162 | -0.094 | 1 | | |
| ISLAM | -0.737 | 0.072 | -0.259 | -0.683 | -0.052 | 1 | |
| HISLAM | 0.277 | -0.036 | 0.97 | -0.213 | 0.146 | -0.024 | 1 |
| Non_Muslim | | | | | | | |
| RGDP | 1 | | | | | | |
| GCFC | 0.202 | 1 | | | | | |
| HCI | 0.73 | 0.165 | 1 | | | | |
| LFPR | -0.34 | 0.227 | -0.353 | 1 | | | |
| TOP | -0.007 | 0.553 | 0.179 | 0.112 | 1 | | |
| ISLAM | -0.101 | 0.03 | -0.102 | -0.007 | -0.119 | 1 | |
| HISLAM | 0.06 | 0.052 | 0.186 | -0.178 | -0.077 | 0.941 | 1 |

Source: Author's Compilation

4.3 Cross-sectional Dependence

Following the variance in the homogeneous features of the sampled countries, cross-sectional dependence (CD) testing is essential in panel analyses. The Pesaran CD test result is displayed in Table 3, and it shows that the null hypothesis of no CD could not be accepted at the 1% level of significance. As a result, the dynamics of variables (including per capita RGDP, GCFC, HCI, LFPR, TOP, HIslam) could affect other countries in the sample. This suggests that Muslim and Non-Muslim countries are cross-sectionally dependent. Overall, the outcome supports the sampled countries interconnectedness.

Table 4: Cross-Sectional Dependence

| Variable | Full Sample | Muslim | Non-Musli |
|----------|---------------|---------------|---------------|
| LnRGDP | 32.8 (0.000) | 7.71 (0.000) | 28.33 (0.000) |
| lnGCFC | 1.2 (0.228) | -0.72 (0.470) | 5.67 (0.000) |
| lnHCI | 13.24 (0.000) | 26.48 (0.000) | 52.56 (0.000) |

| | | | |
|----------|---------------|---------------|----------------|
| lnLFPR | 64.09 (0.000) | 3.47 (0.001) | 10.61 (0.0000) |
| lnTOP | 19.41 (0.000) | 8.47 (0.000) | 11.33 (0.000) |
| lnHIslam | 77.66 (0.000) | 26.33 (0.000) | 52.56 (0.000) |

Source: Author's Compilation

4.4 Analysis of The Unit Root

Following the CD test, stationarity tests utilizing appropriate techniques must be carried out. The CIPS and CADF unit root techniques, that is capable of successfully manage CD concerns, were introduced by Pesaran (2007). Table 4 presents the results of these two methods and shows that the variables have heterogeneous order of integration throughout the three models. Some of the series become stable at (I(0)), whereas others do not until they have first been differenced (I(1)). This satisfies a prerequisite for using the CS-ARDL framework. This finding raises the prospect that the variables could cointegrate, necessitating the execution of a cointegration test to explore this potential.

Table 5: The Unit Root Tests

| Full Sample | | | | |
|-------------|--------|------------|---------|------------|
| Variable | CADF | | CIPS | |
| | Level | First Diff | Level | First Diff |
| lnRGDP | -1.374 | 22.522 | -1.278 | -2.959 |
| lnGCFC | -1.28 | 2.61 | -2.233 | -2.942 |
| lnHCI | -1.742 | 1.656 | -2.266 | -1.713 |
| lnLFPR | 2.027 | | -2.623* | |
| lnTOP | -1.486 | 2.61 | -2.197 | -3.054 |
| lnIH_SLAM | -1.949 | 1.876 | -3.054 | -1.713 |
| Muslim | | | | |
| lnRGDP | -1.965 | 2.61 | -1.243 | -2.879 |
| lnGCFC | -2.645 | 2.61 | -2.496 | -3.451 |
| lnHCI | 0.174 | 2.033 | -0.322 | -0.748 |
| lnLFPR | | | | |
| lnTOP | -1.375 | 2,61 | -1.907 | -3.088 |
| lnIH_SLAM | -0.38 | 2.106 | 0.029 | -0.748 |
| Non-Muslim | | | | |
| lnRGDP | -2.232 | 2.61 | -1.565 | -2.092 |
| lnGCFC | -1.37 | 2.61 | -1.968 | -2.531 |
| lnHCI | -3.023 | 0.83 | -5.076 | -4.024 |
| lnLFPR | -1.306 | 2.61 | | |
| lnTOP | -1.205 | 2.61 | -1.9 | -2.554 |
| lnIH_SLAM | -3.188 | 2.104 | -5.076 | -3.536 |

Note: *, **, & *** are 1%, 5% & 10% level of sig. respectively

4.5 Analysis of homogeneity slope

In order to ensure the reliability of panel estimators, it is imperative to ascertain the status of slope parameters prior to conducting panel data estimation. Both models, one without an interactive term of HCI and Islam (Model A), and the other with an interactive element (Model B), undergo the slope homogeneity test. As indicated in Table 5, which displays the outcomes of the slope homogeneity test devised by Pesaran and Yamagata (2008), the null hypothesis asserting that the slope parameters are consistent across the three panels is rejected. The variability in slopes across the sampled nations is amply demonstrated by this result. Therefore, among other factors, the selected countries differ in their levels of Islam and economic growth.

Table 6: Testing for slope heterogeneity

| Full Sample | | | | |
|-----------------------------|----------------|------------|----------------|------------|
| | MODEL A | | MODEL B | |
| | SH | ASH | SH | ASH |
| VALUE | 9.179 | 14.24 | 6.402 | 11.108 |
| PROB | 0.000 | 0 | 0 | 0 |
| Muslim Countries | | | | |
| VALUE | 3.721 | 5.778 | 1.956 | 3.399 |
| PROB | 0.000 | 0.000 | 0.05 | 0.001 |
| Non-Muslim Countries | | | | |
| VALUE | 5.881 | 9.11 | 4.014 | 6.953 |
| PROB | 0.000 | 0 | 0 | 0 |

4.6 Analysis of Cointegration

Due to the shortcomings of conventional cointegration test methodologies, the Westerlund (2007) 2nd-generation test was employed. In an attempt to remedy the longitudinal dependency observed across these countries, Table 6's cointegration result shows cointegration in all two of the panels for both Models A and B. This merely suggests that since these variables co-move over time, there is cointegration between RGDP, GCFC, HCI, TOP, LFPR, ISLAM, and H_ISLAM.

Table 7: Cointegration Test

| | MODEL A | | | MODEL B | | |
|-----------|-------------------------|-----------|---------|----------------|---------|---------|
| | FULL SAMPLE | | | | | |
| Statistic | Value | AV-period | P-value | Value | Z-value | P-value |
| Und_DF | 1.074 | 9.979 | 0.142 | 1.074 | 9.979 | 0.142 |
| Und_MDF | -0.267 | | 0.395 | -0.267 | | 0.395 |
| | MUSLIM COUNTRIES | | | | | |

| | | | | | | |
|---------|-----------------------------|------|-------|--------|------|-------|
| Und_DF | -0.756 | 9.96 | 0.225 | -0.756 | 9.96 | 0.225 |
| Und_MDF | -1.66 | | 0.049 | -1.66 | | 0.049 |
| | Non-Muslim COUNTRIES | | | | | |
| Und_DF | 3.356 | 10 | 0.000 | 3.356 | 1.64 | 0.000 |
| Und_MDF | 4.105 | | 0.000 | 4.105 | | 0.000 |

4.7 Presentation and discussion of empirical results

Building on the insights gleaned from the preliminary tests, the CS-ARDL estimator was utilized to illuminate the relationship between Islam and economic growth in a selection of global economies (Model A). Additionally, this analysis aimed to evaluate the moderating effect of human capital development on this relationship (Model B). The results of the analysis, conducted across three panels comprising the complete sample, Muslim countries, and non-Muslim countries, are presented in Table 7. Long-run outcomes follow the short-run estimations, which are detailed in the upper section of the table.

According to the findings of Model A, the long-term analysis reveals a positive and statistically significant impact of Islam on economic growth among Muslim countries, while no significant impact is observed among non-Muslim countries. The positive effect implies that as the practice of Islam increases within the population, economic growth also rises within Muslim countries. This suggests that an enhanced adherence to Islam does not pose a threat to economic growth in the selected group of countries in the long term; however, in the short term, it appears to dampen economic growth. These results align with the conclusions drawn by Çamlıbel (2014), suggesting that Islam, by itself, does not exert a negative effect on economic prosperity in Muslim countries.

In the short term, Model A indicates an unfavorable but statistically insignificant influence of Islam on economic growth in both the full sample and Muslim countries, while a favorable influence is observed among non-Muslim countries. This finding corresponds with the research of Khalfaoui and Guenichi (2022) and Khalfaoui (2015), suggesting that Islam does not inherently promote economic growth. Moreover, in both the short and long term, Model A reveals positive elasticities between gross fixed capital (GFCF) and economic growth (RGDP) as well as labor force participation (LFPR) in the selected countries. This empirical evidence underscores the notion that domestic capital stock and labor participation play integral roles in influencing economic growth in these countries. This result is consistent with the findings of Chani et al. (2021) in Muslim and non-Muslim Asian countries, indicating a positive link between gross fixed capital formation, labor force, and economic growth. Thus, promoting economic growth in these countries hinges on the significant contributions of capital stock and labor force participation.

Table 8: Empirical Analysis

| | MODEL A | MODEL B |
|--|----------------|----------------|
|--|----------------|----------------|

| | Full Sample | Muslim | Non-Muslim | Full Sample | Muslim | Non-Muslim |
|--------------|--------------------|----------------|--------------------|--------------------|--------------------|--------------------|
| D.lnRGDP | Coeff | Coeff | Coeff | Coeff | Coeff | Coeff |
| ECT | - 1.68(0.12)*** | -1.71(0.21)*** | - 1.66(0.11)*** | - 1.68(0.12)*** | - 1.71(0.21)*** | - 1.66(0.11)*** |
| | Short Run Est. | | | Short Run Est. | | |
| lnRGDP(-1) | - 0.68(0.12)*** | -0.71(0.21)*** | - 0.66(0.11)*** | - 0.68(0.12)*** | - 0.71(0.21)*** | - 0.66(0.11)*** |
| lnGFCF | 17.93(17.68)* | 33.68(33.24)* | 0.03(0.13) | 17.92(17.68)* | 33.66(33.23) | 0.03(0.13) |
| lnHCI | -8.82(8.62) | -16.65(16.17) | 0.07(0.99)** | -8.77(8.33) | - 16.04(15.62) | - 0.51(1.45) |
| lnLFPR | 1.36(0.74)* | 1.29(1.21) | 1.45(0.82)* | 1.36(0.74)* | 1.29(1.21)* | 1.45(0.82)* |
| lnTOP | -0.33(0.36) | -79(0.67) | 0.19(0.09)** | -0.33(0.36) | -0.79(0.67) | 0.19(0.09)* |
| lnISLAM | -0.05(0.57) | -0.60(0.88) | 0.58(0.71) | | | |
| lnHCIISLAM | | | | -0.05(0.57) | -0.60(0.87) | 0.58(0.711) |
| | Long Run Est. | | | Long Run Est. | | |
| lnGFCF | 12.56(12.89)* | -23.71(24.24) | -0.06(0.08) | -12.59(12.89) | - 23.72(24.25) | 0.06(0.08) |
| lnHCI | 6.01(6.25) | 11.51(11.74) | -0.23(0.59) | 5.46(6.05)* | 10.82(11.35) | -0.63(0.85) |
| lnLFPR | 1.33(0.52) | 1.61(0.89) | 1.02(0.49) | 1.33(0.52)** | 1.61(0.89)* | 1.02(0.49)** |
| lnTOP | 0.33(0.266) | 0.43(0.49) | 0.21(0.12)* | 0.33(0.27) | 0.43(0.49) | 0.21(0.12)* |
| lnISLAM | 0.33(0.41)* | 0.69(0.61)* | 0.39(0.55) | | | |
| lnHCIISLAM | | | | 0.55(0.41) | 0.69(0.61)* | 0.39(0.55) |
| | Diagnostics | | | Diagnostics | | |
| Obs | 469 | 249 | 220 | 469 | 249 | 220 |
| Groups | 47 | 25 | 22 | 47 | 25 | 22 |
| RMSE | 0.03 | 0.04 | 0.01 | 0.03 | 0.04 | 0.01 |
| CD Statistic | 1.5 | 0.94 | -0.48 | 1.5 | 0.94 | -0.48 |
| P-value | 0.1329 | 0.3471 | 0.6277 | 0.1327 | 0.3468 | 0.6279 |

Note: ***p < 0.01, **p < 0.05, *p < 0.10

The development of human capital through education is recognized for its potential to significantly enhance economic performance. Similarly, Islamic education, encompassing aspects such as fiqh (monotheism), Islamic financing and banking practices (Musharaka, Mudharaba, Ijar, Sukuk, etc.), and principles like taqwa, influences the conduct and behaviors of the Muslim populace in the economy, thereby impacting economic growth in the country (Kahia et al., 2019; Kashem, 2017). Consequently, the human capital index (HCI) and Islam variables were interacted, and the outcomes, presented in Model B, are discussed below.

Specifically, when examining the moderating role of HCI on the relationship between economic growth and Islam in Muslim countries in the long run, the results suggest that Islamic teachings and

education contribute to the sophistication of the Muslim populace, indirectly enhancing economic growth. However, in the short run, Islamic teachings exhibit a dampening effect on economic growth, although this effect is not statistically significant. Meanwhile, in the full sample and non-Muslim results, a mixed indirect impact of Islamic education on economic growth is observed in the short run. However, in the long run, Islamic teachings among Muslims in these countries show a positive, albeit not significant, relationship between economic growth and Islam. This suggests that Islamic teachings, particularly in areas such as Islamic financing and banking, have contributed to economic growth in Muslim countries, rather than causing economic upturns or downturns.

These findings align with the conclusions of Chani et al. (2021), who found that education in Muslim countries has a positive and statistically significant influence on economic development. Similarly, Fauzy et al. (2019) identified a one-way causality relationship between Islamic education and economic growth in Malaysia, further supporting the idea that Islamic education contributes positively to economic development.

5.0 Conclusion and Recommendations

Our findings indicate that, in the long run, Islam positively influences economic growth in Muslim countries but not significantly in non-Muslim countries. The increased practice of Islam correlates with higher economic growth in Muslim countries. In the short run, Islam has a dampening effect on economic growth. In both short and long terms, our result reveals positive elasticities between gross fixed capital and economic growth, as well as labor factor participation, emphasizing their crucial roles in promoting economic growth in these countries, in line with previous empirical studies.

Similarly, Islamic education, encompassing aspects like fiqh and Islamic finance, influences the conduct of the Muslim population, impacting economic growth. The interaction between the human capital index (HCI) and Islam variables reveals a positive, though not significant, relationship between Islamic teachings and economic growth in the long run. However, in the short run, Islamic education exhibits a dampening, yet not significant, indirect effect. In full and non-Muslim samples, a mixed short-term impact is found, while a positive, albeit not significant, relationship is observed in the long term.

Consequently, the following recommendations are advanced:

1. Promote policies that prioritize investment in Islamic education, including fiqh and Islamic finance, to enhance human capital. This can contribute to the sophistication of the Muslim populace, positively impacting economic growth in the long run.
2. Develop long-term economic plans that consider the positive influence of Islamic teachings on economic growth. Align policies with the goal of leveraging Islamic education to contribute to sustained economic development.
3. Integrate Islamic finance principles, such as Musharaka and Mudaraba, into economic policies to support a Sharia-compliant financial system. This can foster economic growth by aligning financial practices with Islamic teachings.

4. Strengthen efforts to enhance the Human Capital Index (HCI) by focusing on education and skills development. A well-educated and skilled workforce, coupled with Islamic teachings, can contribute to economic sophistication.
5. Prioritize policies that encourage investment in domestic capital stock. Given the positive elasticities between gross fixed capital and economic growth, fostering an environment conducive to capital formation can contribute to sustained economic development.
6. Develop initiatives to enhance labor force participation. Recognizing the positive influence of labor factor participation on economic growth, policies should aim to create opportunities for skill development, employment, and workforce engagement.

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Appendix

Descriptive Statistics

| | rgdp | gcf | hci | lfpr | top | islam |
|---------------|-----------|--------|-------|--------|---------|-----------|
| Afghanistan | 570.175 | 49.655 | 1.779 | 46.641 | 103.448 | 34041222 |
| Algeria | 4077.504 | 44.274 | 2.499 | 41.485 | 59.01 | 39575438 |
| Angola | 2845.818 | 24.874 | 1.453 | 77.154 | 72.684 | 86284.351 |
| Azerbaijan | 5294.669 | 22.747 | 2.338 | 63.908 | 79.733 | 9400087.3 |
| Bolivia | 2911.848 | 19.266 | 2.855 | 69.719 | 67.375 | 11169.836 |
| Brazil | 8728.204 | 18.371 | 2.831 | 63.294 | 27.196 | 617430.67 |
| Chile | 13270.647 | 24.968 | 3.071 | 59.147 | 62.595 | 18131.129 |
| Colombial | 6016.479 | 21.861 | 2.510 | 67.847 | 37.197 | 95638.707 |
| Costa Rica | 11615.217 | 18.71 | 2.621 | 61.776 | 65.433 | 4909.268 |
| Cuba | 7434.217 | 10.882 | 2.621 | 55.319 | 37.286 | 11314.362 |
| Dominican Rep | 6970.705 | 24.913 | 2.625 | 61.009 | 53.303 | 10457.93 |
| Ecuador | 5828.159 | 26.328 | 2.737 | 64.332 | 51.271 | 16372.53 |
| Egypt | 3494.976 | 16.407 | 2.546 | 45.844 | 39.012 | 93283211 |
| Estonia | 18016.921 | 26.951 | 3.576 | 62.167 | 153.544 | 1322.672 |
| Gambia | 638.501 | 20.573 | 1.573 | 59.933 | 49.444 | 2203512.8 |
| Guatemala | 3982.687 | 14.711 | 1.868 | 60.402 | 52.283 | 15692.919 |
| Guinea | 819.609 | 26.313 | 1.544 | 55.395 | 89.762 | 10539280 |
| Haiti | 1374.153 | 18.153 | 2.625 | 65.771 | 41.549 | 10637.338 |
| Indonesia | 3370.491 | 33.595 | 2.344 | 66.919 | 42.981 | 2.253e+08 |
| Iran | 5221.241 | 33.647 | 2.338 | 41.765 | 45.283 | 81546054 |
| Iraq | 4411.008 | 18.575 | 2.238 | 41.75 | 66.188 | 36317023 |
| Japan | 34704.712 | 24.758 | 3.551 | 60.335 | 33.489 | 127069.05 |
| Jordan | 4256.632 | 26.353 | 2.850 | 38.732 | 99.608 | 8951777.5 |
| Lao | 2148.236 | 29.937 | 1.883 | 60.089 | 89.52 | 6856.58 |
| Libya | 9314.591 | 16.172 | 2.546 | 47.489 | 71.774 | 6137009.5 |
| Mali | 728.334 | 20.646 | 1.309 | 69.447 | 61.663 | 17951012 |
| Mauritania | 1552.922 | 42.872 | 1.752 | 42.068 | 92.2 | 3895718.2 |

| | | | | | | |
|--------------|-----------|--------|-------|--------|---------|-----------|
| Mexico | 9584.638 | 22.295 | 2.698 | 60.261 | 71.858 | 12039.969 |
| Morocco | 3095.16 | 31.313 | 1.853 | 46.894 | 73.331 | 34492093 |
| Nicaragua | 1947.931 | 27.159 | 2.621 | 64.723 | 101.423 | 6347.325 |
| Niger | 483.336 | 29.661 | 1.199 | 74.93 | 42.459 | 20340308 |
| Paraguay | 5838.161 | 22.102 | 2.540 | 69.931 | 71.543 | 6227.339 |
| Parkistan | 1306.585 | 15.383 | 1.779 | 51.401 | 29.248 | 2.052e+08 |
| Peru | 6041.498 | 22.687 | 2.769 | 76.245 | 49.197 | 31195.734 |
| Poland | 13024.462 | 20.675 | 3.355 | 56.83 | 96.083 | 7595.648 |
| Qatar | 65612.724 | 36.712 | 2.963 | 87.111 | 94.305 | 1835289.2 |
| Romania | 9483.412 | 25.203 | 3.196 | 54.37 | 81.656 | 98617.689 |
| S.Korea | 29091.774 | 31.315 | 3.630 | 62.673 | 85.427 | 50949.317 |
| Saudi Arabia | 19529.465 | 28.548 | 2.625 | 56.515 | 69.362 | 31837768 |
| Senegal | 1276.062 | 27.96 | 1.544 | 48.136 | 59.683 | 14203963 |
| Somalia | 389.752 | 49.391 | 1.377 | 34.234 | 99.385 | 14201665 |
| Sudan | 2126.924 | 13.504 | 1.571 | 48.679 | 20.28 | 37589625 |
| Tajikistan | 1007.568 | 31.991 | 3.070 | 41.937 | 63.477 | 8465025.5 |
| Tunisia | 3910.064 | 21.422 | 2.499 | 46.776 | 95.937 | 11352389 |
| Turkey | 10877.659 | 29.114 | 2.379 | 50.86 | 55.945 | 78015517 |
| Vietnam | 2712.694 | 32.171 | 2.673 | 75.833 | 146.592 | 92560.288 |
| Yemen | 1637.152 | 34.957 | 1.640 | 37.755 | 56.635 | 28075255 |