

## **Exploring Determinants of GDP Growth: The Significant Role of Religion**

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### **ABSTRACT**

*Economic growth is crucial for enhancing living standards and national prosperity. This paper aims to investigate the determinants of economic growth, focusing on the novel inclusion of religion as a significant factor. Existing literature extensively covers traditional determinants but few observed the potential impact of religious variables. Our study addresses this gap by incorporating religion into the economic growth model. The findings reveal that adding different religious affiliation variables, such as Catholics, other Christians, Jews, and Muslims, into a model with GDP growth can significantly improve the model's explanatory power, as indicated by a higher  $R^2$  value. Furthermore, we find that the direction of correlation is positive for Catholics and Jews, but interestingly negative for other Christians and Muslims. This research contributes to the broader understanding of economic growth determinants and provides valuable insights for policymakers and economists.*

**Keywords:** GDP growth, religion, regression analysis

### **Introduction**

Economic growth is an important factor in enhancing a country's standard of living and overall prosperity. Understanding the determinants of economic growth is essential for policymakers as it informs the development of effective strategies to foster sustainable economic development. Traditional determinants of economic growth include factors such as Foreign Direct Investment (FDI), health expenditure, and Gross Domestic Product (GDP) growth; however, there is a growing interest in exploring how non-traditional factors, such as religion, might influence economic outcomes. Therefore, the purpose of this paper is to investigate the determinants of economic growth, with a specific focus on introducing religion as a new determinant. By incorporating religion into the analysis, this study aims to provide a more comprehensive understanding of the factors that drive economic growth, and the contribution of this paper lies in its extension of previous work by including religion as a variable in the economic growth model.

In our analysis, we initially ran a traditional economic growth model using predetermined determinants. Upon adding religion as a new variable, our empirical evidence demonstrates that the inclusion of religion increases the explanatory power of the growth model, as evidenced by a higher  $R^2$  value. Such a notable increase in the  $R^2$  value indicates that religion significantly impacts economic growth. Specifically, we find statistically significant results for four religious variables—positive and negative impacts of Christianity, Other Christians, Jews, and Islam—on economic growth. Data for this study were collected from a variety of sources (see Table 1), providing a broad dataset that allows us to robustly test the impact of religion on economic growth. This paper proceeds as follows: Section 2 provides background information on the existing literature, Section 3 highlights the empirical findings, and Section 4 concludes the paper.

### **Literature review**

Economic growth is influenced by a variety of determinants, ranging from human capital and institutional quality to geographical factors. Barro (2003) and Barro (1996) emphasized the importance of human capital, particularly educational attainment, as a significant positive determinant of economic growth. These studies demonstrate that higher initial schooling and life expectancy are associated with higher growth rates. Chirwa and Odhiambo (2016) also highlight human capital's role in developing and developed countries. Additionally, Barro (2003) finds that the rule of law and political stability are critical for economic growth. Noland (2005) identifies population density, urbanization, and geographic proximity as key determinants of GDP growth. Ciccone and Jarociński (2008) further show that geography, demographic factors, trade openness, and health are essential determinants of growth.

Besides, both Ciccone and Jarociński (2008) and Chirwa and Odhiambo (2016) emphasize the importance of trade openness in facilitating economic growth. Increased trade openness allows countries to benefit from larger markets, technology transfer, and economies of scale. Barro (2003) and Chirwa and Odhiambo (2016) also identify investment in physical capital as a key determinant of growth, with higher investment ratios positively correlated with higher growth rates.

Beed (2006) and Loibl et al. (2009) argue that religion significantly influences social capital, trust, and cooperation, which in turn affect economic performance. Protestant work ethics and values, for instance, are associated with positive economic outcomes. Guiso, Sapienza, and Zingales (2002) find that religious beliefs influence attitudes toward cooperation, trust, and confidence in institutions, which are essential for economic development. Jackson and Fleischer (2007) and Sanders (1995) both highlight that religious beliefs shape economic attitudes and behaviors, impacting development. However, there are study that shows countering effect. For example, Chaudhary and Rubin (2011) show that Muslim religion is negatively correlated with

literacy with extensive evidence in India, which could potentially slow down economic growth. Though the nature of these religious influences varies across different religious contexts and affiliations, various evidences with different insights adds to the ambiguity of religion's true impact on economic growth, emphasizing the necessity of a more comprehensive study.

Furthermore, Akhunjonov, Obrenovic, and Chase (2016) suggest that higher levels of freedom of religion and religiosity are associated with higher GDP per capita, indicating that religious freedom can foster an environment conducive to economic growth. Barro and McCleary (2003) find that economic growth responds positively to religious beliefs but negatively to church attendance. They suggest that while religious beliefs can motivate economic activities through ethical behaviors and social cohesion, frequent religious observance may divert time from productive activities. Durlauf, Kourtellos, and Tan (2006) confirm the significant effect of beliefs in heaven and hell on growth, emphasizing the relationship between religious denominations and economic performance. Noland (2005) highlights the relationships between religion and economic performance. Blum and Dudley (2001) demonstrate that Protestant regions in Northern Europe experienced rising wages and economic growth between 1500 and 1750.

The determinants of economic growth are diverse and interconnected. Human capital, institutional quality, geographic and demographic factors, trade openness, and investment are consistently highlighted as the main determinants of growth. Religion plays a significant role in influencing economic performance through beliefs, social capital, and institutional frameworks. Understanding these determinants is important for relating policies that promote sustainable economic development, thus it is clear that the determinants of growth have been extensively studied in the literature with numerous factors.

Religion has also been examined, particularly its impact on variables such as social capital, trust, and cooperation. However, there are relatively few studies that used religion as a new determinant of growth. Therefore, this study is expected to contribute to the literature by using religion as a new growth determinant. The comprehensive literary summary table (table 5) is presented in the attachment. The table provides extensive evidence on the method used in existing studies, the period, countries, samples, and the determinant of growth.

## **Empirical Finding**

### **Data**

Table 1 in the appendix presents various economics and religion variables sourced from World Bank World Development Indicators and Robert J Barros's religious data set. The economics variable includes annual GDP growth rate (GDPgrowth), foreign direct investment as a

percentage of GDP(FDI), the total labor force(Laborforce), annual growth in final consumption expenditure (FinalExpenditure), consumer price index CPI), and current health expenditure as a percentage of GDP (HealthExpenditure).

GDP growth is the yearly percentage growth in GDP, while FDI net investment inflows relate to GDP, the labor force includes individuals aged 15 and old participating in the labor market, and final expenditure tracks the growth rate of household and government spending. CPI indicates consumer prices and health expenditure captures the proportion of GDP spent on health.

The religious variables detail the percentage of the population identifying with various religions in 1970, including Catholic (CATH70), Protestant (PROT70), Other Christian denominators (OTHCHRIST70), Eastern Orthodox (ORTH70), Jewish (JEWs70), Muslim (MUSLIM70), Hindu (HINDU70), Buddhist (BUDDIS70), Eastern religions (EASREL70), and other religions (OTHREL70). These variables provide insight into the religious composition of the population.

**Decriptive Statistic**

**Table 1 Descriptive Statistic**

	Obs	Mean	Std. Dev.	Min	Max
GDP Growth	192	5.275268	6.38257	-20.73884	37.68719
FDI	180	4.383136	6.81485	-17.96555	32.75221
Labor Force	179	18.98517	72.79809	0.03674	780.3707
FinalExpenditure	146	5.888143	5.465893	-24.97654	28.51272
CPI	161	305.2336	1335.021	99.39928	16245.89
HealthExpenditure	178	7.196533	3.205572	2.204867	21.82795
CATH70	184	0.3004783	0.3514236	0	0.982
PROT70	184	0.1367337	0.2245107	0	0.974
OTHCHRIST70	184	0.0702011	0.1057195	0	0.503
ORTH70	184	0.0517826	0.1531946	0	0.942
JEWS70	184	0.0062609	0.0629828	0	0.854
MUSLIM70	184	0.2187391	0.3421785	0	1

HINDU70	184	0.0226902	0.1059113	0	0.881
BUDDIS70	184	0.0331739	0.1470269	0	0.921
EASREL70	184	0.015212	0.0738943	0	0.588
OTHREL70	184	0.0739076	0.1460811	-0.002	0.671
NONREL70	183	0.0708087	0.1527367	0	0.644
HERFREL70	184	0.5870202	0.2405638	0.177126	1

This table provides descriptive statistics for various economic and religious variables used in the analysis. The GDP growth rate has 192 observations with a mean of 5.28 and a standard deviation of 6.38, ranging from a minimum of -20.74 to a maximum of 37.69. Foreign Direct Investment (FDI) as a percentage of GDP, with 180 observations, has a mean of 4.38 and a standard deviation of 6.81, ranging from -17.97 to 32.75. The labor force, which includes individuals aged 15 and above participating in the labor market, has 179 observations with a mean of 18.99 and a standard deviation of 72.80. Final expenditure, representing the growth rate of household and government spending, is observed 146 times, with a mean of 5.89 and a standard deviation of 5.47, ranging from -24.98 to 28.51. The Consumer Price Index (CPI), indicating consumer prices, has 161 observations with a mean of 305.23 and a substantial standard deviation of 1335.02, reflecting considerable inflation variability. Health expenditure as a percentage of GDP is observed 178 times, with a mean of 7.20 and a standard deviation of 3.21. The religious variables, which detail the percentage of the population identifying with various religions in 1970, show diverse means and standard deviations, highlighting the varied religious compositions of the sampled countries

Regarding religious variables, the percentages of populations identifying with various religions in 1970 are presented. Catholic (CATH70) has 184 observations with a mean of 0.30 and a standard deviation of 0.35, ranging from 0 to 0.98. Protestant (PROT70) also has 184 observations, a mean of 0.14, and a standard deviation of 0.22, ranging from 0 to 0.97. Other Christian denominations (OTHCHRIST70) have 184 observations, a mean of 0.07, and a standard deviation of 0.11. Eastern Orthodox (ORTH70) has 184 observations, a mean of 0.05, and a standard deviation of 0.15. Jewish (JEWS70) has 184 observations, a mean of 0.006, and a standard deviation of 0.063. Muslim (MUSLIM70) has 184 observations, a mean of 0.22, and a

standard deviation of 0.34, with values ranging from 0 to 1. Hindu (HINDU70) has 184 observations, a mean of 0.02, and a standard deviation of 0.11. Buddhist (BUDDIS70) has 184 observations, a mean of 0.03, and a standard deviation of 0.15. Eastern religions (EASREL70) have 184 observations, a mean of 0.015, and a standard deviation of 0.074. Other religions (OTHREL70) have 184 observations, a mean of 0.07, and a standard deviation of 0.15. Furthermore, the percentage of the non-religious population (NONREL70) has 183 observations, a mean of 0.07, and a standard deviation of 0.15. Lastly, the Herfindahl index of religious concentration (HERFREL70) has 184 observations, a mean of 0.59, a standard deviation of 0.24, and ranges from 0.18 to 1.

Table 3 shows the correlation coefficient between the variables while figure 1 illustrates the correlation relationship between GDP growth and religious variables using scatterplots.

**Table 3 Corelation Analysis**

	Gr	FDI	Laborforce	FE	CPI	HealthExpe~e
Gr	1,00					
FDI	0,22	1,00				
Laborforce	0,08	-0,10	1,00			
FinalExpen~e	0,51	0,05	0,07	1,00		
CPI	-0,15	-0,06	-0,02	-0,13	1,00	
HealthExpe~e	0,18	0,02	-0,08	0,04	-0,18	1,00
CATH70	0,27	0,05	-0,11	0,09	-0,09	0,28
PROT70	-0,08	-0,09	-0,09	0,03	-0,04	0,31
OTHCHRIST70	-0,15	-0,20	-0,03	0,07	0,05	0,04
ORTH70	0,11	0,12	-0,06	0,03	-0,03	0,14
JEWS70	0,08	0,00	-0,02	0,07	-0,02	0,05
MUSLIM70	-0,24	-0,03	-0,03	-0,05	0,13	-0,45
HINDU70	0,01	-0,07	0,31	0,00	-0,02	-0,17
BUDDIS70	-0,14	0,01	0,03	-0,21	-0,03	-0,08
EASREL70	0,00	0,25	0,31	-0,06	-0,03	-0,11
OTHREL70	-0,07	-0,15	-0,08	-0,03	0,11	-0,32
NONREL70	0,12	0,13	0,20	0,00	-0,05	0,19
HERFREL70	0,16	0,12	-0,03	0,08	-0,06	0,05

Figure 1a Scatter Plot

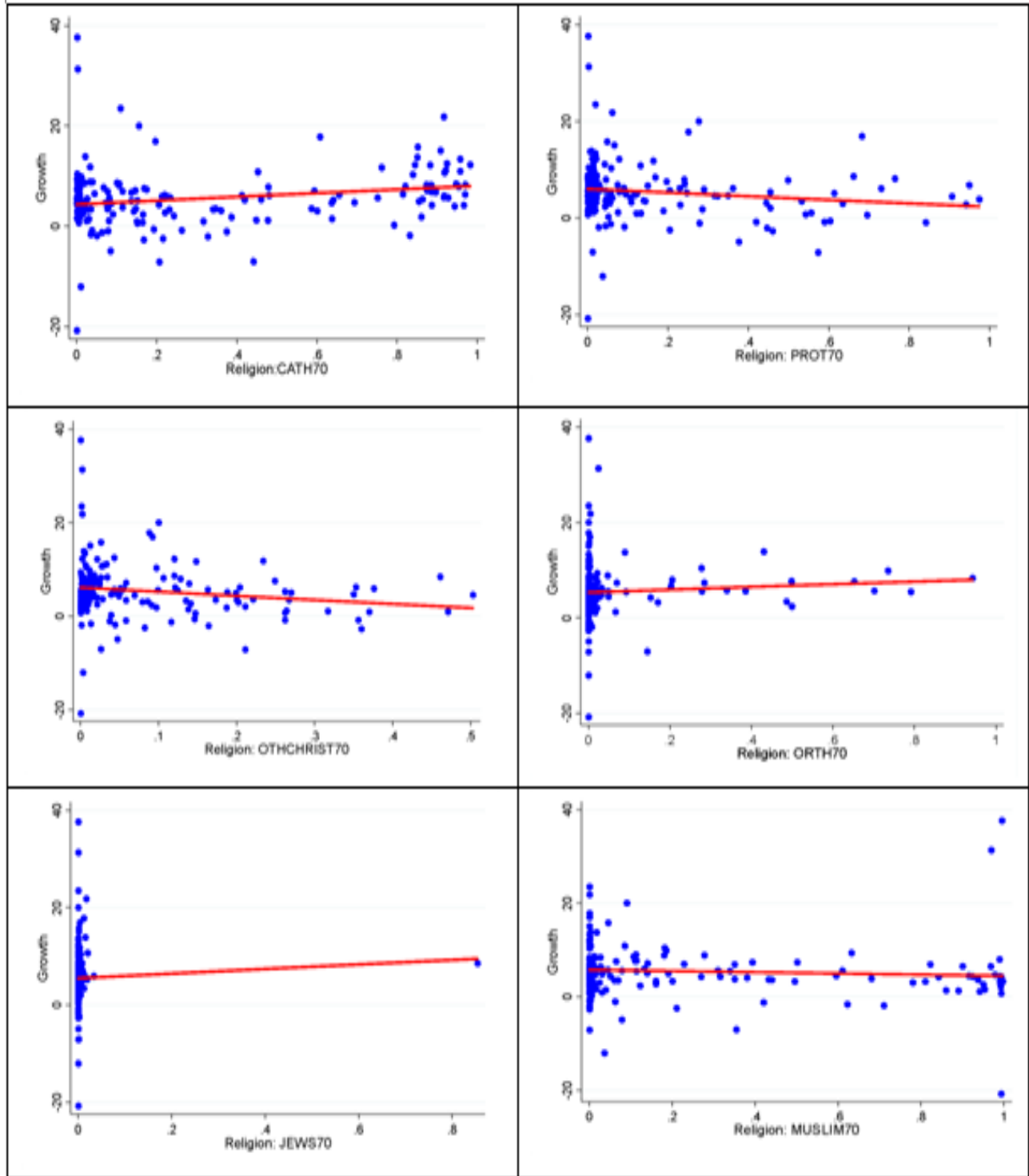
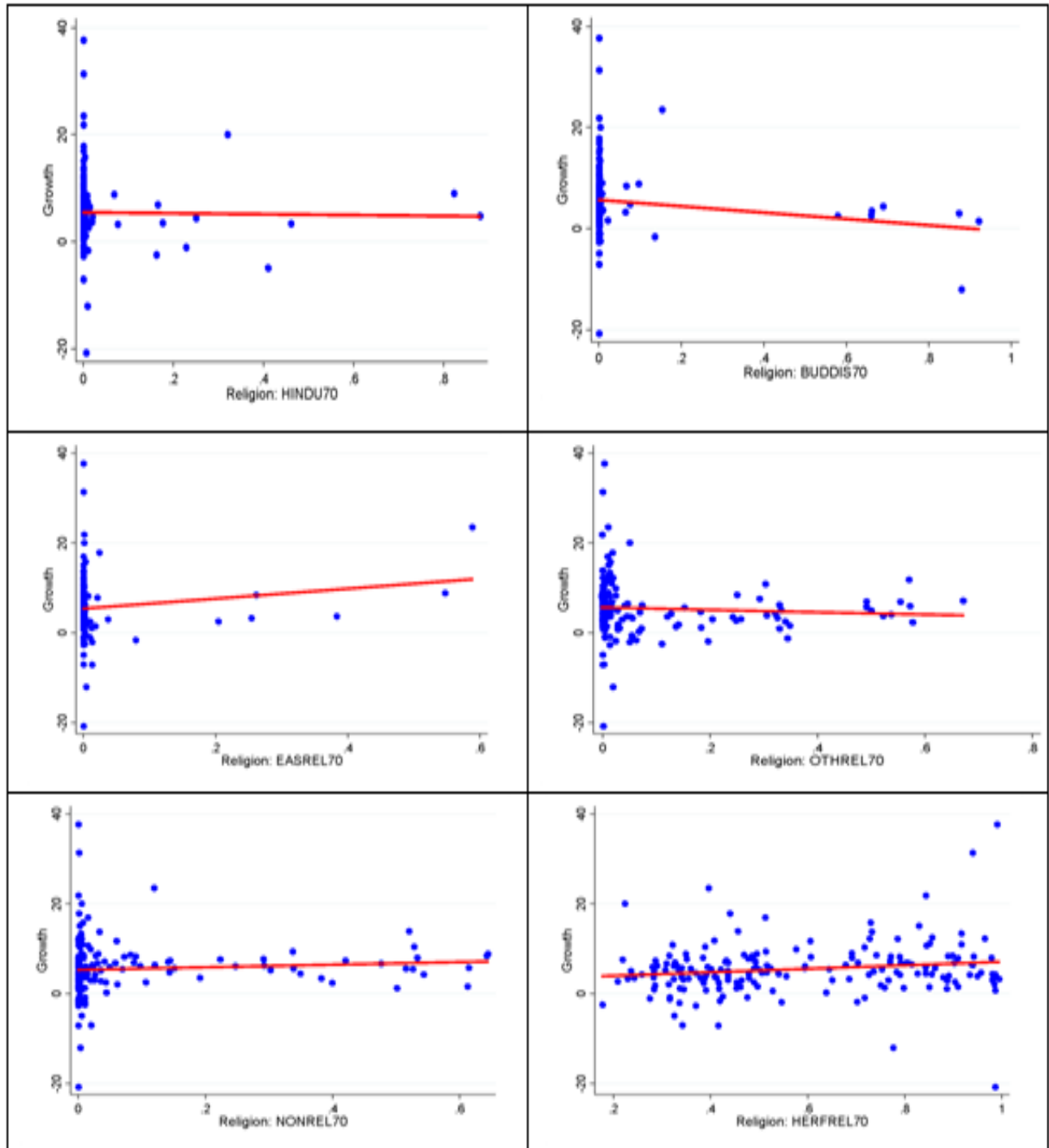


Figure 1b Scotter Plot





Both the correlation analysis and the scatterplots reveal several noteworthy relationships between various economics and religious variables and economic growth, denoted as "Gr" in the table and "Growth" in the scatterplots. The correlation analysis indicates the effect of the economic variables: Foreign Direct Investment (FDI) positively correlates with economic growth (0.22), suggesting that higher levels of FDI might contribute to higher economic growth. Comparably, final expenditure (FinalExpenditure) shows a stronger positive correlation with economic growth (0.51), implying that increased spending by the government or households is significantly associated with economic growth.

For religious variables, notably, Catholicism (CATH70) shows a positive correlation with economic growth (0.27), suggesting that regions with higher proportions of Catholics tend to experience more robust economic growth. Also, the Herfindahl index of religious concentration (HERFREL70), including non-religion and measuring religious diversity, shows a positive correlation with economic growth (0.16), indicating that greater religious homogeneity might be associated with higher economic growth. On the scatterplot (Figure 1a and 1b), there is also a visual positive, moderate pattern that supports the positive correlation coefficient for the mentioned religions, suggesting that Catholic-dominant and Herfindahl-dominant regions tend to experience robust economic growth. Besides, EASREL70, ORTH70, and JEWS70 all show a positive linear relationship on the scatterplot yet without statistical significance.

In contrast, Muslim populations (MUSLIM70) demonstrate a substantial negative correlation with economic growth (-0.24). The Scatterplot in Figure 1a supports this by showing how Muslim and Economic Growth shows a negative, moderate, and linear relationship. This highlights a potentially significant inverse relationship with economic developments. Similarly, Buddhism (BUDDIS70) displays a slight negative correlation with economic growth (-0.14), suggesting that areas with higher proportions of Buddhists might also experience slower economic growth. The Scatterplot in Figures 1a and 1b supports this by showing how Muslims and Buddhism both display a negative and linear relationship with Economic Growth. Besides Islam and Buddhism, other religious variables such as OTHCHRIS70 and PROT70, BUDDIS70, and OTHREL70 also show a negative relationship with economic growth on the scatterplot.

The result of the regression analysis is presented in Table 4

**Table 4a Regression Analysis**

VARIABLES	GDPgrowth	GDPgrowth	GDPgrowth	GDPgrowth	GDPgrowth	GDPgrowth	GDPgrowth
FDI	0.128*** (0.040)	0.124*** (0.041)	0.118*** (0.039)	0.106*** (0.037)	0.123*** (0.041)	0.128*** (0.040)	0.125*** (0.041)
Laborforce	0.004** (0.002)	0.005*** (0.002)	0.003** (0.002)	0.003** (0.002)	0.004** (0.002)	0.004** (0.002)	0.003** (0.002)
FinalExpenditure	0.429*** (0.131)	0.415*** (0.126)	0.432*** (0.136)	0.442*** (0.135)	0.427*** (0.131)	0.426*** (0.132)	0.425*** (0.125)
CPI	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)
HealthExpenditure	0.212** (0.086)	0.140 (0.093)	0.275*** (0.102)	0.223** (0.085)	0.202** (0.085)	0.210** (0.087)	0.107 (0.105)
CATH70		2.238*** (0.855)					
PROT70			-2.553 (1.559)				
OTHCHRIST70				-6.267* (3.641)			
ORTH70					1.292 (1.121)		
JEWS70						1.947** (0.831)	
MUSLIM70							-2.124** (1.034)
Constant	0.868 (0.967)	0.756 (0.942)	0.770 (0.993)	1.220 (0.938)	0.877 (0.966)	0.880 (0.971)	2.058* (1.234)
Observations	128	128	128	128	128	128	128
R-squared	0.333	0.368	0.350	0.356	0.336	0.334	0.355

Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 4b Regression Analysis**

VARIABLES	GDPgrowth	GDPgrowth	GDPgrowth	GDPgrowth	GDPgrowth	GDPgrowth	GDPgrowth
FDI	0.128*** (0.040)	0.128*** (0.040)	0.128*** (0.040)	0.134*** (0.045)	0.132*** (0.041)	0.122*** (0.041)	0.121*** (0.038)
Laborforce	0.004** (0.002)	0.003** (0.001)	0.004** (0.002)	0.004** (0.002)	0.004** (0.002)	0.003* (0.002)	0.004** (0.002)
FinalExpenditure	0.429*** (0.131)	0.429*** (0.132)	0.421*** (0.136)	0.426*** (0.133)	0.429*** (0.136)	0.428*** (0.131)	0.422*** (0.131)
CPI	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)
HealthExpenditure	0.212** (0.086)	0.218** (0.089)	0.207** (0.086)	0.207** (0.086)	0.232** (0.111)	0.206** (0.090)	0.209** (0.086)
HINDU70		0.971 (0.942)					
BUDDIS70			-1.036 (1.285)				
EASREL70				-2.111 (2.547)			
OTHREL70					1.234 (3.344)		
NONREL70						1.393 (1.269)	
HERFREL70							1.581 (1.224)
Constant	0.868 (0.967)	0.803 (0.989)	0.977 (1.020)	0.911 (0.974)	0.609 (1.428)	0.855 (0.966)	0.022 (1.092)
Observations	128	128	128	128	128	127	128
R-squared	0.333	0.333	0.334	0.334	0.334	0.335	0.341

Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The regression analysis in Table 1 indicates that Foreign Direct Investment (FDI), labor force participation, and final expenditure have a consistently positive and statistically significant impact on GDP growth, with p-values below 0.01 across all models, highlighting their robust contributions to economic growth. Health expenditure also shows a positive effect, though its significance varies, being notable at the 5% level in several models. Conversely, the Consumer Price Index (CPI) appears largely insignificant, suggesting a minimal impact of inflation on GDP growth within this dataset.

The religious demographics from the table reveal mixed effects: Catholic (CATH70) and Jewish (JEWS70) populations exhibit significant positive associations with GDP growth, with p-values below 0.01 and 0.05, respectively, while the Muslim population (MUSLIM70) shows a significant negative association (p-value < 0.05). Other religious variables such as Protestant (PROT70), Orthodox (ORTH70), and other Christians (OTHCHRIST70) are not consistently significant, though other Christians (OTHCHRIST70) have a marginally significant negative association (p-value < 0.1).

Table 2, however, shows that none of the religious variables including Hinduism, Non-religious, Other religions, Eastern religions, and Buddhist exhibit statistically significant relationships with GDP growth, as indicated by their p-values exceeding 0.1, despite positive coefficients for Hinduism (HINDU70) and other religions (OTHREL70).

## **Conclusion**

The determinants of GDP growth are crucial for understanding the dynamics of economic development and for formulating effective economic policies. Among the various factors influencing GDP growth, traditional economic indicators such as FDI, health expenditure, and labor force participation play a significant role. However, this study emphasizes the importance of incorporating non-traditional determinants, particularly religious variables, into growth models to achieve a more comprehensive analysis.

The purpose of this study was to examine how different religious affiliations and the overall religious diversity within a country impact economic growth, and our results indicate that religious variables significantly affect GDP growth. Specifically, Catholicism and Judaism exhibit a positive relationship with GDP growth; other Christianity and Muslim, however, exert notable negative influences on GDP growth rates.

The contribution of this study lies in its novel integration of religious factors into economic growth analysis, thereby broadening the scope of traditional economic models. By demonstrating the substantial impact of religious composition and diversity on economic growth, this research provides valuable insights for policymakers, investors, and economists. Policymakers can use

these findings to craft policies that consider cultural and religious contexts, while investors and economists may better understand the socio-cultural dynamics that influence market environments and countries' economies.

Further studies should explore the interaction between religion and other cultural, social, and political factors. Additionally, longitudinal studies could help determine the long-term effects of religious diversity on economic development.

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**Appendix 1. Defination of Variables**

<b>Sembol</b>	<b>Source</b>	<b>Variable</b>	<b>Lon Defination</b>
<b><i>GDPgrowth</i></b>	World Bank: WDI	GDPgrowth (annual %)	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.
<b><i>FDI</i></b>	World Bank: WDI	Foreign direct investment, net inflows (% of GDP)	Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP.
<b><i>Laborforce</i></b>	World Bank: WDI	Labor force, total	Labor force comprises people ages 15 and older who supply labor for the production of goods and services during a specified period. It includes people who are currently employed and people who are unemployed but seeking work as well as first-time job-seekers. Not everyone who works is included, however. Unpaid workers, family workers, and students are often omitted, and some countries do not count members of the armed forces. Labor force size tends to vary during the year as seasonal workers enter and leave. The variable scaled for 1000.000
<b><i>FinalExpenditure</i></b>	World Bank: WDI	Final consumption expenditure (annual % growth)	Average annual growth of final consumption expenditure based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars. Final consumption expenditure (formerly total consumption) is the sum of household final consumption expenditure (formerly private consumption) and general government final consumption expenditure (formerly general government consumption). This estimate includes any



			statistical discrepancy in the use of resources relative to the supply of resources.
<b>CPI</b>	World Bank: WDI	Consumer price index (2010 = 100)	Consumer price index reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used. Data are period averages.
<b>HealthExpenditure</b>	World Bank: WDI	Current health expenditure (% of GDP)	Level of current health expenditure expressed as a percentage of GDP. Estimates of current health expenditures include healthcare goods and services consumed during each year. This indicator does not include capital health expenditures such as buildings, machinery, IT and stocks of vaccines for emergency or outbreaks.
<b>CATH70</b>	<a href="https://scholar.harvard.edu/barro/data_sets">https://scholar.harvard.edu/barro/data_sets</a>	The percentage of the population that identified as Catholic	According to Robert J. Barro's religious data set, "CATH70" refers to the percentage of the population that identified as Catholic in the year 1970. If a country had a "CATH70" value of 50, this would mean that 50% of the country's population identified as Catholic in 1970.
<b>PROT70</b>	<a href="https://scholar.harvard.edu/barro/data_sets">https://scholar.harvard.edu/barro/data_sets</a>	The percentage of the population that identified as Protestant	In Robert J. Barro's religious data set, "PROT70" refers to the percentage of the population that identified as Protestant in the year 1970. If a country had a "PROT70" value of 30, this would mean that 30% of the country's population identified as Protestant in 1970.
<b>OTHCHRIST70</b>	<a href="https://scholar.harvard.edu/barro/data_sets">https://scholar.harvard.edu/barro/data_sets</a>	The percentage of the population that identified with other Christian denominations (i.e., Christian groups other than Catholic and Protestant)	In Robert J. Barro's religious data set, "OTHCHRIST70" refers to the percentage of the population that identified with other Christian denominations (i.e., Christian groups other than Catholic and Protestant) in the year 1970. If a country had an "OTHCHRIST70" value of 10, this would mean that 10% of the country's population identified with other Christian denominations in 1970.
<b>ORTH70</b>	<a href="https://scholar.harvard.edu/barro/data_sets">https://scholar.harvard.edu/barro/data_sets</a>	The percentage of the population that identified as Eastern Orthodox	In Robert J. Barro's religious data set, "ORTH70" refers to the percentage of the population that identified as Eastern Orthodox in the year 1970. If a country had an "ORTH70" value of 20, this would mean that 20% of the country's population identified as Eastern Orthodox in 1970.
<b>JEWS70</b>	<a href="https://scholar.harvard.edu">https://scholar.harvard.edu</a>	The percentage of the population that identified as Jewish	In Robert J. Barro's religious data set, "JEWS70" refers to the percentage of the population that identified as Jewish in the year 1970. This variable



	du/barro /data_sets		captures the proportion of the population adhering to the Jewish faith during that specific year. If a country had a "JEWS70" value of 2, this would mean that 2% of the country's population identified as Jewish in 1970.
<b>MUSLIM70</b>	<a href="https://scholar.harvard.edu/barro/data_sets">https://scholar.harvard.edu/barro/data_sets</a>	The percentage of the population that identified as Muslim	In Robert J. Barro's religious data set, "MUSLIM70" refers to the percentage of the population that identified as Muslim in the year 1970. This variable represents the proportion of the population adhering to the Islamic faith during that specific year. If a country had a "MUSLIM70" value of 30, this would mean that 30% of the country's population identified as Muslim in 1970.
<b>HINDU70</b>	<a href="https://scholar.harvard.edu/barro/data_sets">https://scholar.harvard.edu/barro/data_sets</a>	The percentage of the population that identified as Hindu	In Robert J. Barro's religious data set, "HINDU70" refers to the percentage of the population that identified as Hindu in the year 1970. This variable indicates the proportion of the population adhering to the Hindu faith during that specific year. If a country had a "HINDU70" value of 80, this would mean that 80% of the country's population identified as Hindu in 1970.
<b>BUDDIS70</b>	<a href="https://scholar.harvard.edu/barro/data_sets">https://scholar.harvard.edu/barro/data_sets</a>	The percentage of the population that identified as Buddhist	In Robert J. Barro's religious data set, "BUDDIS70" refers to the percentage of the population that identified as Buddhist in the year 1970. This variable represents the proportion of the population adhering to the Buddhist faith during that specific year. If a country had a "BUDDIS70" value of 10, this would mean that 10% of the country's population identified as Buddhist in 1970.
<b>EASREL70</b>	<a href="https://scholar.harvard.edu/barro/data_sets">https://scholar.harvard.edu/barro/data_sets</a>	The percentage of the population adhering to Eastern religions	In Robert J. Barro's religious data set, "EASREL70" likely refers to the percentage of the population adhering to Eastern religions in the year 1970. This variable encompasses various religious traditions originating from Eastern regions, such as Hinduism, Buddhism, Taoism, Confucianism, Shintoism, and others. If a country had an "EASREL70" value of 40, this would mean that 40% of the country's population identified with Eastern religions (such as Hinduism, Buddhism, etc.) in 1970.
<b>OTHREL70</b>	<a href="https://scholar.harvard.edu/barro">https://scholar.harvard.edu/barro</a>	The population adhering to other religions (excluding major ones like Christianity, Islam,	In Robert J. Barro's religious data set, "OTHREL70" likely refers to the percentage of the population adhering to other religions (excluding major ones like Christianity, Islam, Hinduism, Buddhism, etc.) in the

	/data_sets	Hinduism, Buddhism, etc.)	year 1970. This variable encompasses various religious traditions that may not fall under the major categories but still have a presence within the population. If a country had an "OTHREL70" value of 5, this would mean that 5% of the country's population identified with religions other than Christianity, Islam, Hinduism, Buddhism, etc., in 1970.
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Appendix 2. The comprehensive literary summary table

Name of Authors	Year	Country/Region	What Variables Does the Paper Use as a Determinant of Growth	Does Religion Use as a Determinant of Growth	What Is the Main Finding	What Method Does the Paper Use	Type of Data	Sample Size	The Time Period of Dataset
Barro, R and McCleary, R	2003	International	Attendance to church and religious beliefs (hell and heaven)	yes	Economic growth responds positively to religious beliefs, and negatively to church attendance.	Regression	Quantitative	41 countries	1981-1999
Durlauf,S, Kourtellos, A, Tan, C	2006	international	Religious beliefs of hell and heaven, religious denominations, and control variables of institutions, geography, and ethnic heterogeneity	yes	Belief in heaven and hell has a statistical significance on economic growth and also confirms the marginal significance of shares of different religious denominations	Bayesian methods	Quantitative	47 countries	1965-1995
NOLAND, M	2005	international	GDP per capita, population density, female literacy rates, religious affiliation, government share of GDP, investment share of GDP, openness, education, urbanization, temperature, latitude, Nobel Prize data, political institutions and distance to Mecca.	yes	Complex relationship between religion and economic performance. Some religious affiliation correlates to economic performance, some other factors such as education and government policies	Regression analysis	Quantitative	78-country sample except Hungary and Morocco	-
Blum, U. and Dudley, L	2001	Northern and Southern Europe	literacy rates, distance from central trade points, urban population growth, and the Protestant/Catholic distinction	yes	Protestant cities experienced rising wages and economic growth, while Catholic cities saw declining wages between 1500 and 1750. This is attributed to the formation of cooperative networks among Protestants, facilitated by a small change in the subjective cost of cooperating with strangers, supporting a reformulation of Weber's thesis with network effects.	Regression analysis	Quantitative	316 cities	1500 to 1750.
Beed C	2006	Australi, the United States, and other unspecified regions.	GDP per capita Income distribution Education levels Health indicators Political stability Employment rates Social capital and trust	yes	religion significantly influences economic development. The authors argue that religious beliefs and practices shape social capital, trust, and cooperation, which in turn affect economic performance. The study supports the notion that Protestant work ethic and values contribute positively to economic growth, while other religious affiliations may have different impacts.	theoretical discussions, literature reviews, and empirical analysis	both qualitative and quantitative methods	-	-
Barro, Robert J.	2003	The study covers a panel of 113	Initial level of real per capita GDP Human capital (educational attainment and	no	Differences in per capita growth rates across countries can be systematically	Regression	Quantitative	The sample includes countries with	113 data

		countries globally, focusing on both developing and developed nations.	health) Rule of law Investment ratio Fertility rate Ratio of government consumption to GDP Inflation rate Terms of trade International openness		related to quantifiable explanatory variables. Growth depends positively on the rule of law and the investment ratio, and negatively on the fertility rate, the ratio of government consumption to GDP, and the inflation rate. Growth also increases with favorable movements in the terms of trade and with increased international openness, although the latter effect is weak.			available from 1965 to 1995, and the regression analysis covers 87 countries over three ten-year intervals, constituting 240 observations.
Robert J. Barro	1996	a panel of around 100 countries.	Initial level of real per capita GDP Initial schooling and life expectancy Fertility rates Government consumption Rule of law Inflation Terms of trade	no	Key determinants of economic growth include higher initial schooling and life expectancy, lower fertility, lower government consumption, better maintenance of the rule of law, lower inflation, and improvements in the terms of trade. Political freedom has a nonlinear relationship with growth, initially stimulating growth but potentially hindering it once a moderate level of democracy is achieved. Economic development positively influences a country's propensity to experience democracy.	empirical	Quantitative	100 countries. 1960-1990
Antonio Ciccone and Marek Jarociński	2008	Global data set	Trade Openness Religion Geography Demography Health	no	the determinants of economic growth identified in cross-country growth regressions are highly sensitive to the choice of dataset and the econometric methodology used. This casts doubt on the robustness of some previously identified growth determinants.	Bayesian Model Averaging	Quantitative	primary time periods analyzed are 1960-1996 and 1975-1996.
Themba G. Chirwa, Nicholas M. Odhiambo	2016	both developing and developed countries globally.	Developing countries: Foreign aid Foreign direct investment (FDI) Fiscal policy Investment Trade Human capital development Demographics Monetary policy Natural resources Reforms Geographic, regional, political, and financial factors  Developed Countries: Physical capital	no	the determinants of economic growth differ between developing and developed countries, with various factors like foreign aid, investment, and human capital playing distinct roles in different contexts.	Qualitative narrative appraisal of existing empirical literature on economic growth determinants	Quantitative	The paper reviews 14 empirical growth studies focused on different countries and regions, ranging from the 1960s to the 1990s and beyond.

			Fiscal policy Human capital Trade Demographics Monetary policy Financial and technological factors					
Jun-ki Park, Deockhyun Ryu, and Keun Lee	2019	Global	Share of each nation in the world population Investment Human capital Exports R&D investment Financial capital flows Currency undervaluation	no	The determinants of GDP share of a nation and per capita GDP growth are different. Variables representing a nation's share in the world (population, investment, human capital, exports, R&D investment, and financial capital flows) determine the GDP share. Currency undervaluation promotes per capita GDP growth by increasing exports but tends to reduce a country's share in world GDP because it depreciates GDP at market exchange rates.	econometric analyses.	Quantitative	
Luc Renneboog and Christophe Spaenjers	2012	Netherlands.	religious denomination (Catholic, Protestant, other religion), economic attitudes (thrift, risk aversion, internal locus, low responsibility, distrust, bequest motive, time horizon), financial decisions (saved, stocks, percentage of stocks), and control variables (age, sex, partner, children, health, employment status)	yes	The main finding is that religious beliefs significantly impact economic attitudes and financial decisions. Catholics and Protestants differ from non-religious households in their economic beliefs and preferences, which in turn affect their financial behavior. For instance, Catholics have a higher propensity to save and lower participation in the stock market due to their economic attitudes	Regression	Quantitative	The exact sample size is not mentioned in the provided text, but the data spans from 1995 to 2008
Luigi Guiso, Paola Sapienza, and Luigi Zingales	2002	The study covers 66 independent countries from the World Values Survey data.	Measures of attitude toward cooperation (trust, intolerance toward other races, intolerance toward immigrants, average intolerance) Measures of attitude toward government institutions Confidence in institutions (government, police, armed forces) Views on gender roles in employment	yes	religious beliefs significantly influence various economic attitudes, including trust, cooperation, and confidence in government institutions. People with different religious affiliations and intensities of belief exhibit systematically different economic attitudes.	regression	Quantitative	Respondents from 66 independent countries across three waves of the World Values Survey (1981-1984, 1990-1993, and 1995-1997)
Authors are Jackson and Fleischer.	2007	various countries as it references international surveys like the World Values Survey	religious beliefs and practices, economic development indicators, and socio-economic behavior influenced by religious affiliation as determinants of growth.	yes	religion significantly influences economic behavior and development. However, the exact nature of this influence can vary based on different religious beliefs and contexts.	literature review method	Quantitative and qualitative	The average national sample size mentioned for surveys like the World Values Survey is 1,400 respondents per country.  The World Values

								Surveys are mentioned to have been conducted in 1981-82, 1990-91, and 1995-98, indicating that the data spans these periods.
T.H. Sanders	1995	Various countries (International perspective on economic growth determinants)	Economic factors (e.g., GDP, investment rates) Social factors (e.g., education, health) Political factors (e.g., stability, governance) Cultural factors (including religion)	yes	there is a significant relationship between cultural factors, including religion, and economic growth. It suggests that religious beliefs and practices can have both positive and negative impacts on economic performance, depending on various contexts and how these beliefs influence economic behavior.	Regression	Quantitative	-
Jared Rubin and Chaudhary, L	2010	Colonial India	literacy rates, the proportion of Muslims in a district, the period of Muslim political collapse, and the presence and funding of religious versus state schools.	yes	Muslim literacy is negatively correlated with the proportion of Muslims in a district, attributed to the historical persistence of religious institutions that were less effective at promoting literacy compared to state schools.	econometric analysis	Quantitative	includes all districts in the provinces of Assam, Bengal, Bihar, and Orissa, Bombay, Central Province and Berar, Madras, Punjab, and United Provinces, covering more than 95% of the population of British India.
Nigel Tomes	1984	region of Canada	religion, denomination, and human capital (including education and experience) as determinants of earnings growth.	yes	there are significant differences in earnings and returns to human capital across different religious denominations. These differences persist even after controlling for various human capital variables.	econometric analysis, specifically using regression models to analyze the impact of religion and denomination on earnings and the returns to human capital.	Quantitative	
Kang and Michele Fratianni	2006	OECD countries as well as other international regions for comparative	religion, OECD membership, GDP, distance between countries, and regional trade agreements as determinants of trade growth.	yes	religion significantly affects the cost of trade between countries. Trade costs are highest between Christian and Islamic countries. Pairs of religious industrial	econometric analysis, using regression	Quantitative	

		purposes.				countries trade more compared to pairs of non-religious industrial countries.	models to analyze the impact of religion and other variables on international trade.		
Umidjon Akhunjonov, Bojan Obrenovic, Gregory Chase	xf	Various countries	Freedom of religion, religiosity, GDP per capita	yes		Higher levels of freedom of religion and religiosity are associated with higher GDP per capita.	Empirical analysis using cross-country data	Quantitative	