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Impact of financial inclusion on economic growth in secular and religious countries

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Abstract

Empirical research on the relationship between financial inclusion and economic growth has neglected the influence of religion or secularism. We investigate the effect of financial inclusion on economic growth in religious and secular countries. The financial inclusion indicators are the number of ATMs per 100,000 adults and the number of bank branches per 100,000 adults. The findings reveal that bank branch contraction significantly increases economic growth in secular countries. Bank branch expansion combined with greater internet usage increases economic growth in secular countries while high ATM supply combined with greater internet usage decreases economic growth in secular countries. We also find that bank branch expansion, in the midst of a widening poverty gap, significantly increases economic growth in religious countries, implying that financial inclusion through bank branch expansion is effective in promoting economic growth in poor religious countries. It was also found that internet usage is a strong determinant of economic growth in secular countries.

Keywords: financial inclusion, economic growth, ATMs per 100,000 adults, bank branches per 100,000 adults, poverty, internet usage, access of finance, religion, religious countries, secular countries.

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1. Introduction

We investigate the impact of financial inclusion on economic growth in religious countries and secular countries. Financial inclusion is the process of bringing unbanked adults into the formal financial sector so that they can have access to affordable formal financial services (Ozili, 2018). Financial inclusion improves access to finance which increases consumption, production and investment, thereby leading to increase in economic output and higher economic growth (Erlando et al, 2020). Few studies have empirically examined the effect of financial inclusion on economic growth (e.g. Sethi and Acharya, 2018; Erlando et al, 2020; Ozili et al, 2022a). But there is little evidence on this relationship in religious settings.

Understanding the effect of financial inclusion on economic growth in religious countries and secular countries is important because a growing body of research show that religiosity has an effect on the workings of the economic system and can affect aggregate economic outcomes. There is the argument that people in religious countries incorporate their religious beliefs into their personal and business lives and it influences them to be moral, upright and less corrupt when conducting economic activities which in turn enhances economic growth (Chase, 2014). Empirical evidence supports this claim. For instance, Galbraith and Galbraith (2007) examine the relationship between intrinsic religiosity and economic growth. They examine 23 religious Christian countries and find that intrinsic religiosity is positively related to economic growth, which suggests that intrinsic religiosity increases entrepreneurial activity, and entrepreneurial activity then results in economic growth. McCleary and Barro (2003) investigate the effect of religious beliefs on economic growth. They show that religious beliefs influence individual economic decision making which improves economic performance. However, Chase (2014) found that higher religiosity did not lead to positive economic growth. Although the literature documents a positive impact of religiosity on economic growth, there is little evidence for the impact of financial inclusion on economic growth in religious countries and in comparison to secular countries.

Our study is related to studies that examine the relationship between financial inclusion and economic growth in non-religious settings such as Sethi and Acharya (2018), Ratnawati (2020),

Erlando et al (2020), Ozili (2021a) and Van et al (2021). These studies draw conclusions that cannot be generalized to religious countries. Other studies have examined the effect of financial inclusion on economic growth in Islamic countries (such as Banna et al, 2020; Adzimatunur and Manalu, 2021). But these studies focus on a monotheistic religion, Islam, which is not representative of all the major religions in the world. This creates a need for studies that examine the relationship between financial inclusion and economic growth in a more representative religious setting that takes into account the major religions and in comparison to secular countries. Such studies can provide insight that can be generalized to all religious countries. Although existing studies have examined the effect of financial inclusion on economic growth among Islamic financial institutions, these studies did not compare religious Islamic countries with secular countries to determine whether religiosity or secularism influences the relationship between financial inclusion and economic growth. To date, no study has investigated the relationship between financial inclusion and economic growth in a religious country group and in comparison to a secular country group, and no comparative analysis across the two groups has been done in the literature. In this paper, we address this issue by focusing on the impact of financial inclusion on economic growth in religious countries and secular countries.

In this paper, we focus on whether financial inclusion promotes economic growth in religious countries relative to secular countries. Consistent with the findings of Ji (2020), we predict that religiosity or religious beliefs can significantly affect the adoption of formal financial services which in turn will affect the level of financial intermediation and the level of economic activities thereby affecting economic growth. We also predict that secularism will significantly affect the adoption of formal financial services which will affect the level of financial intermediation and the level of economic activities thereby affecting economic growth.

We focus on one dimension of financial inclusion which is the accessibility dimension of financial inclusion. We use financial access indicators based on physical points of service as the measure of financial inclusion. The indicators are the number of ATMs per 100,000 adults and the number of commercial bank branches per 100,000 adults.

Using economic data and financial inclusion data obtained from the Global Financial Development Indicators of the World Bank for a 15-year period from 2006 to 2020, we model financial inclusion as the explanatory variable while economic growth is the dependent variable. The control variables are the extent of internet usage by the population, and the poverty gap which is significant in religious countries relative to secular countries. Our estimations show that bank branch contraction significantly increases economic growth in secular countries. Also, bank branch expansion combined with greater internet usage increases economic growth in secular countries. High ATM supply combined with greater internet usage decreases economic growth in secular countries. The results suggest that greater financial inclusion through bank branch expansion, combined with greater internet usage, is beneficial for economic growth in secular countries. We also find that bank branch expansion, in the midst of a widening poverty gap, significantly increases economic growth in religious countries.

Our study contributes to the existing literature in a number of ways. First, this study is the first to analyze whether religiosity and secularism influence the relationship between financial inclusion and economic growth. This study analyzes the direct impact of financial inclusion on economic growth in religious and secular countries. Second, unlike the previous literature that focus only on Islamic countries or undertake a comparison of Islamic and conventional financial institutions, this study creates a religious countries group and a secular countries group, and assess the dynamics of financial inclusion and economic growth in the two groups. Third, unlike the previous literature that focus only on specific country studies and a non-distinct cross-country sample (e.g., Sharma, 2016; Lenka and Sharma, 2017), this study makes a unique contribution to the literature by analyzing two distinct country groups: secular countries and religious countries. Fourth, by using financial access indicators based on physical points of service, this study is able to offer insight into how financial inclusion through ATM supply and bank branch expansion might affect economic growth in a religious and non-religious setting. This insight is useful because it can assist policymakers in understanding whether their effort in influencing financial institutions to increase ATM supply and expand their branch networks will yield a positive effect for economic growth. Finally, by analyzing financial inclusion in terms of ATM supply and number of bank branches, this study is able to offer insight into the effect of supply-side financial inclusion

on economic growth in religious and secular countries. This analysis is useful because it can assist policymakers in identifying the appropriate supply-side intervention for financial inclusion that is effective to promote economic growth in religious and secular countries.

The remainder of the study is structured in the following way. Section 2 presents the literature review. The research methodology is presented in section 3. Section 4 presents the empirical results. Section 5 concludes the paper.

2. Literature Review

The first subsection presents the conceptual framework. The second subsection presents the theoretical framework. The third subsection presents the literature review on the effect of financial inclusion on economic growth. The fourth subsection presents the literature review on the determinants of financial inclusion. The fifth and sixth subsections presents the literature review on financial inclusion in religious and secular countries. The seventh subsection presents the hypothesis development.

2.1. Conceptual framework

We provide a conceptual background to explain financial inclusion, economic growth, religiosity and secularism. Financial inclusion refers to access to affordable financial products and services that meet the needs of individuals and businesses (Allen et al, 2016; Ozili, 2021a). Financial inclusion is often measured in three dimensions namely: (i) access to financial services, (ii) usage of financial services, and (iii) quality of financial products and services delivery (Demirgüç-Kunt and Klapper, 2012). The indicators of access to financial services include: the percentage of adults that own a formal account; the number of deposit accounts per 1,000 adults; the number of e-money accounts per 1,000 adults; the number of mobile money transactions per 100,000 adults; the percentage of adults that saved money at a bank or other formal financial institution in the past year; the percentage of adults who receive wages or government transfers into an account; the percentage of adults using a debit or credit card to directly make a payment from an account, etc (Demirgüç-Kunt and Klapper, 2012). There are also financial access indicators at physical

points of service. These include: the number of branches per 100,000 adults; the number of ATMs per 100,000 adults; the number of agents of payment service providers per 100,000 adults; the number of mobile agent outlets per 100,000 adults; the number of point-of-sale (POS) terminals per 100,000 adults; the percentage of adults with access to a mobile phone; the percentage of adults with internet access at home; the percentage of adults with a national identity card; the number of debit cards per 1,000 adults, etc (Demirgüç-Kunt and Klapper, 2012).

Some indicators of usage of financial services include: the percentage of Small or Medium Sized Enterprises (SMEs) with an account at a bank or other formal financial institution; the number of SME deposit accounts; the percentage of SMEs with outstanding loan or line of credit from a bank or other formal financial institution; the number of SME loan accounts; the percentage of SMEs that send or receive digital payments from an account, etc (Demirgüç-Kunt and Klapper, 2012). The third dimension of financial inclusion is the indicators of quality financial products and services delivery. They include: the number of people using savings for emergency funding; the existence of formal internal and external dispute resolution mechanisms; the percentage of SMEs required to provide collateral on their last bank loan; the strength of credit reporting systems; the effectiveness of collateral and bankruptcy laws in facilitating lending, etc (Demirgüç-Kunt and Klapper, 2012). Researchers often conduct financial inclusion research using one or more dimensions of financial inclusion.

Economic growth, on the hand, is simply the change in economic output within a specified period of time (Lewis, 2013). It is a common measure of macroeconomic performance. It is often measured both in real and nominal terms. Positive economic growth occurs when the current gross domestic product is greater than the past gross domestic product over a specified period. Negative economic growth occurs when current gross domestic product is less than the past gross domestic product over a specified period of time. There are debates about the most appropriate measurement of economic growth. Some argue that economic growth should be measured in relation to population growth. Proponents of this idea suggest that GDP per capita is an appropriate measure of economic growth (Dipietro and Anoruo, 2006). Others argue that economic growth should be measured in relation to growth in GDP per capita. Proponents of this idea suggest that GDP per capita growth is an appropriate measure of economic growth

(Maddison, 1983). Others argue for a simplistic measure of economic growth such as the percentage change in GDP over time (Ang et al, 2006). These arguments have led researchers to choose the measure of economic growth that is most appropriate for the economic relationship they are investigating.

We also provide a conceptual background about religiosity and secularism. Religiosity is the state of having strong religious feeling or belief. When religious beliefs become widespread among the population, the population will be termed 'religious'. The religiosity of a country can be perceived in many ways. For example, a religious country is a country where majority of the population adopts a single religion or more than one dominant religion (Alper and Olson, 2013). A country is also termed 'religious' if the country has an official State religion (Barro and McCleary, 2005). Also, a country can be loosely termed 'religious' if the top elected public officials of the country publicly invoke a deity or religion in the discharge of their public duties and the citizens are largely pleased with the mix of religion and politics (McCleary and Barro, 2006). In contrast, secularism is a state of being neutral or separate from religious institutions or religious beliefs. When majority of the population choose to be neutral or separate from religious institutions or religious beliefs, the population may be termed 'secular' (Sommerville, 1998). The secularity of a country can be perceived in many ways. For example, a secular country is a country where majority of the population are neutral to religion. A country is also termed 'secular' if the country does not have any official State religion (Ferziger, 2008). Also, a country can be loosely termed 'secular' if the top elected public officials of the country are not allowed to publicly invoke a deity or any religion in the discharge of their public duties.

2.2. Theoretical Framework

The effect of financial inclusion on economic growth can be explained by the theory of finance and growth proposed by McKinnon (1973) and Levine (2005). The theory argues that the activities of financial institutions can influence external financing conditions which in turn can influence the level of investment, production and consumption decisions, and subsequently affect economic output and growth. The theory argues that developing the financial sector will help to ease external financing conditions, and increase lending to deficit units which in turn will

stimulate growth in the economy since financial intermediaries do a better job in allocating credit toward productivity and output growth (Levine, 2005).

The theory of finance and growth partly explains the effect of financial inclusion on economic growth because the financial access decisions of financial institutions and Fintech players can affect the level of financial inclusion. Greater financial access will bring more people and businesses into the formal financial system (Ozili, 2018). Financial institutions can use the deposits they receive from existing and newly banked customers to create loans that will be issued to deficit units which in turn will stimulate production, investment and consumption in the economy and lead to increase in economic output and growth (Ozili et al, 2022a).

Another theory – the system theory of financial inclusion – argue that financial inclusion outcomes are achieved through various segments of the economic system (Ozili, 2020). As a result, financial inclusion outcomes will have a positive effect on the segments of the economic system it relies on, such as the financial system (Ozili, 2020). The implication of the theory is that improvements in the indicators of financial inclusion will positively affect the financial system and improve the performance of formal financial institutions which in turn will improve the level of financial intermediation and ultimately lead to improvements in the economic system through higher economic growth (Ozili, 2020).

2.3. Financial inclusion and economic growth

Existing studies show that financial inclusion is related to economic growth. Ozili et al (2022a) review the existing literature on the impact of financial inclusion on economic growth and found that significant research on the topic emerged in the post-2016 years. It was also found that the most common channel through which financial inclusion affects economic growth is through greater access to financial products and services offered by financial institutions which increases financial intermediation and translates to positive economic growth. Ahmad et al (2021) examine the impact of digital financial inclusion on economic growth in some provinces in China. They find that digital financial inclusion significantly affects economic growth in provincial China. The implication is that high levels of digital financial inclusion is needed to attain higher economic growth in China. In a cross country study, Van et al (2021) find a positive relationship between

financial inclusion and economic growth, as well as a strong positive relationship for countries with low income. In another cross country study, Sethi and Acharya (2018) find a positive long run relationship between financial inclusion and economic growth across 31 countries. They also find a bi-directional causality between financial inclusion and economic growth. Sharma (2016) examined the link between financial inclusion and economic growth in India, and found a positive association between economic growth and several indicators of financial inclusion such as banking penetration, availability of banking services and bank deposits. Makina and Walle (2019) examine the relationship between financial inclusion and economic growth in Africa, and find that financial inclusion has a significant positive effect on economic growth in Africa. Erlando et al (2020) analyzed the contribution of financial inclusion to economic growth, poverty alleviation and income inequality in Eastern Indonesia. They find that socio-economic growth has a positive impact on the level of financial inclusion, while financial inclusion has a positive effect on inequality.

2.4. Determinants of financial inclusion

The determinants of financial inclusion have been extensively investigated in the empirical literature. Existing financial inclusion studies show that the determinants of financial inclusion have micro and macro dimensions. The macro determinants of the level of financial inclusion are per capita income, quality of governance institutions, telecommunication, literacy rate, availability of information and the regulatory environment while the micro determinants of the level of financial inclusion are gender, age, education level, financial literacy rate, income level, and employment status (see, for example, Sarma and Pais, 2011; Chithra and Selvam 2013; Park and Mercado Jr, 2015; Ozili, 2023). Existing research show that financial inclusion has a growth-enhancing effect on the economy (see, e.g. Kim, Yu and Hassan, 2018; Erlando et al, 2020; Ozili, 2021b). Fungáčová and Weil (2016) analysed the determinants of financial inclusion in 12 Asian countries using data from the World Bank's Global Findex database, and find that education and income have a significant impact on the level of financial inclusion. Zins and Weill (2016), using the Global Findex data of 37 African countries, find that the level of financial inclusion in Africa is influenced by gender, age and educational levels. Soumaré et al. (2016) also find that gender, education, age, income, residential area, employment status, marital status, household size and

degree of trust in financial institutions have a significant impact on the level of financial inclusion. Uddin et al. (2017) distinguished between the supply side and demand side determinants of financial inclusion in Bangladesh. They find that bank size, bank efficiency, and the interest rate charged by banks are key supply-side determinants of financial inclusion while financial literacy and age are demand-side determinants of the level of financial inclusion in Bangladesh. Other studies, such as Sarma and Pais (2011), Chithra and Selvam (2013), Tuesta et al. (2015) and Ozili (2021a) identified the following determinants of financial inclusion, namely, income, education, telephone usage, internet usage, adult literacy, population size, financial literacy, deposit and credit penetration. Bekele (2022) compares the micro and macro determinants of financial inclusion in Kenya and Ethiopia using the 2017 Global Findex data. It was found that Kenya has a higher level of financial inclusion than Ethiopia. Some identified macro determinants between the two countries are differences in financial liberalization policy, gross domestic product, percentage of rural population and mobile money service expansion while the identified micro determinants between the two countries are literacy rates and means of receiving payments. Ajide (2021) investigates the relationship between financial inclusion and the shadow economy in some African countries from 2005 to 2015. It was found that financial inclusion reduces the size of the shadow economy. There is also unidirectional causality moving from financial inclusion to shadow economy. Based on the findings, the author argue that financial inclusion can help in reducing the size of the shadow economy. Ofosu-Mensah et al (2021) investigate whether the level of human development improves financial inclusion in frontier markets from 2005 to 2014. They found that human development is a significant determinant of financial inclusion. Their result implies that investment in human development is essential to increase the level of financial inclusion. Generally, the literature identifies an extensive list of determinants of the level of financial inclusion.

2.5. Financial inclusion in religious countries

Religious countries are countries where people's decisions are motivated by their cultural and religious beliefs (Amin et al., 2011). Religious beliefs not only affect personal decisions and values but also influence the economic and financial decisions of individuals and groups. Religious factors have recently been identified as a determinant of the level of financial inclusion. Ben Naceur et al. (2015) examined the link between supply-side and demand-side indicators of financial inclusion in 57 Muslim countries. They find that religion is the main reason people are unbanked in Muslim countries. Religiosity also affects people's willingness to own a formal account or to save money in formal financial institutions. Demirgüç-Kunt et al. (2014) examine at least 65,000 adults from 64 countries, and found that Muslims are significantly less likely to own a formal account or to save at a formal financial institution. Ji (2020) analyzed the US Religious Landscape Survey data by the PEW Forum on Religion and Public Life in 2008, and find that higher levels of religiosity lowered the usage and adoption of formal financial services among religious US citizens. Beck et al. (2019) show that customer religiosity is more important than proximity to an Islamic bank for customers using Islamic banking services.

Other studies document a low level of financial inclusion in some religious countries despite the high level of internet penetration and the large presence of Fintech players in such countries. Ozili et al (2022a) point out that the literature is silent about how religious factors affect the relationship between financial inclusion and economic growth. Ji (2020) argues that religious beliefs can discourage people from using formal financial services, thereby leading to lower levels of financial inclusion that could adversely affect economic growth (Ozili et al, 2022a). Nanda (2017) documents a low level of financial inclusion in India which is considered to be a religious country. Kemal (2018) and Ali and Abdullah (2020) document a low level of financial inclusion in Pakistan which is also a religious country despite the 73 percent mobile phone penetration in Pakistan. In Saudi Arabia, Saviano et al. (2017) showed that although formal account ownership increased among females from 15 percent in 2011 to 58 percent in 2013 in Saudi Arabia, there is still a wide gender gap that hinder women from maximizing the benefits of financial inclusion. In Indonesia, Ali et al. (2020) show that only 11 persons out of 100 persons are getting the benefits of formal Islamic financial products and services due to the low level of financial inclusion in

Indonesia. There is also evidence of low financial inclusion in other religious countries such as Iraq, Egypt, Jordan, and Turkey (see, e.g., Al-Smadi, 2018; Sayed and Shusha, 2019; Dogan et al., 2021). Grabiński and Wójtowicz (2022) investigate the impact of the Catholic religion on the accrual and real earnings management practice of Polish companies. They find that Catholicism encourages firms to engage in accrual earnings management and it discourages them from engaging in real earnings management. Overall, the above studies suggest that religiosity seems to have a negative effect on the level of financial inclusion.

2.6. Financial inclusion in secular countries

A secular state is often considered to be a state that is neutral to religion in all aspects of economic and political life. Secular countries such as China, the United States, Canada and the United Kingdom have high levels of financial inclusion according to data from the Global Findex database. The high levels of financial inclusion in secular countries is attributed to the presence of a system where housing, healthcare and utility expenditures are linked to owning a bank account. This creates an incentive for people to own a formal account in a financial institution in secular countries. In contrast, such a system is relatively absent in most religious countries. In China, for example, Demirgüç-Kunt and Klapper (2013) and Lai et al (2020) show that the level of financial inclusion in China is more than the world average. Connolly et al (2012) and Lewis and Westmore (2021) show that the level of financial inclusion is at 91 percent in high-income countries and 28 percent in low-income countries. Neuberger (2015) shows that Germany has a bank-based financial system and a high level of financial inclusion. The high level of financial inclusion in Germany is attributed to relationship lending by public savings banks, credit cooperatives, public promotional banks and guarantee banks which use the “housebank” model as well as participation by consumer protection and credit reporting regulations and institutions. The above studies suggest that the level of financial inclusion is likely higher in secular countries. Kumar et al (2022) examine whether financial inclusion increases bank profitability in Japan which is a secular country. They examine the case of 122 Japanese banks from 2004 to 2018 and find that financial inclusion through bank branch contraction reduces the profitability of Japanese banks. Generally, the literature has examined financial inclusion in the context of some religious countries and in some secular countries. But no studies have examined how financial inclusion

affects economic growth in the context of religious and secular countries. This is the gap we identified in the literature which we intend to fill in this study.

2.7. Hypothesis development

Religion affects social interaction and it also influence people's decision on how and where to access and use available financial services (Ben Naceur et al., 2015). In the literature, there is a commonly held view that religion promotes the equitable distribution of resources including the distribution of formal financial services to all people so that nobody is left out (Renneboog and Spaenjers, 2012). Also, the moral or spiritual principles espoused by religious institutions often promote fairness and equity in the distribution of resources, including the distribution of formal financial services, to all people so that nobody is left out (Cox et al., 2014). Some religions also encourage adherents to use available financial services to engage in ethical growth-enhancing activities such as to start a small business which is essential to stimulate growth in the economy (Demirguc-Kunt et al., 2014). Therefore, a direct positive relationship between financial inclusion and economic growth can be established in religious countries, and the relationship might be significant.

Notwithstanding, there may be institutional religious beliefs that are anti-modernization in financial services. These institutional religious beliefs can discourage adherents from accessing and using formal financial services, and making them prefer using informal finance sources (Ozili, 2023). When such beliefs become widespread in the population, it can lead to a decline in the demand for cash from ATMs and also lead to low patronage of bank branches among the religious population as a large number of religious adherents will prefer to use non-formal sources of finance to obtain the funds they need to engage in growth-enhancing activities outside the formal financial sector. When this happens, the accessibility dimension of financial inclusion will have a little effect on economic growth or it can significantly decrease economic growth in such countries. Given the two opposite predictions, we hypothesize that financial inclusion will have a significant effect on economic growth in religious countries.

H1: Financial inclusion has a significant effect on economic growth in religious countries.

In secular countries, the distribution of resources, including the distribution of financial services, is not influenced by religious belief. Rather, it is influenced by capitalist motives or market forces of demand and supply, meaning that a growing demand for financial services will be met with increased supply for financial services by financial services providers. And since most secular countries are rich countries with low poverty levels and high level of financial sector development, it is intuitive to expect that financial inclusion will have a significant positive effect on economic growth in secular countries. This is because greater financial inclusion in secular countries will lead to greater access to financial products and services offered by financial institutions for profit. This will lead to increase in financial intermediation for production and investment activities that translate to positive economic growth in secular countries (Ozili et al, 2022a). In spite of this expectation, financial inclusion alone may not be enough to stimulate positive growth in secular countries. Financial inclusion need to be augmented with other factors such as internet usage to stimulate positive economic growth. Therefore, we hypothesize that financial inclusion will also have a significant effect on economic growth in secular countries.

H2: Financial inclusion has a significant effect on economic growth in secular countries.

3. Research Methodology

3.1. Data

Financial inclusion data and economic data were collected from the Global Financial Development Indicators (GDFI) in the World Bank database. Data were collected for 23 countries of which 10 countries are secular countries and 13 countries are religious countries (see table 1 for country classification). The data frequency is annual. The sample period is from 2006 to 2020. Data were not reported for some years due to missing observations. This makes its an unbalanced panel data.

The countries in the sample consist of religious countries and secular countries. We make a distinction between a religious country and a secular country. According to a World Population

Review¹ report, a secular country is one that is (i) neutral to religion, (ii) a country where majority of the population may freely practice any religion but the government and its affiliates are forbidden from highlighting religion in any way in public life, (iii) a country in which a majority of the population declines to practice a religion, or (iv) a country where all belief or non-belief systems are equally accepted and no single religion is favored over the other. In contrast, a religious country is one where (i) there is an official State religion, (ii) a country where majority of the population practice different religions, or (ii) a country in which a majority of the population practices a common religion (see footnote 1).

For the purpose of this study, we identified the top 10 secular countries in the world based on the secular country classification of a 2017 Win-Gallup survey. We also identified the top 13 religious countries in the world based on the rankings of the ‘*World Population Review*’ (see table 1). In table 1, the religious countries are more than the secular countries. The reason for this is because we want to ensure that the selected religious countries are representative of the major religions in the world: Christianity, Islam and Buddhism, as shown in table 1.

Table 1. Country characteristics			
#	Secular Countries	<i>Religious Countries</i>	
		<i>Countries</i>	<i>Dominant Religion</i>
1	China	<i>Israel</i>	<i>Jewish</i>
2	Sweden	<i>Saudi Arabia</i>	<i>Islam</i>
3	Czech republic	<i>India</i>	<i>Hinduism</i>
4	United kingdom	<i>Pakistan</i>	<i>Islam</i>
5	Belarus	<i>Indonesia</i>	<i>Islam</i>
6	Azerbaijan	<i>Yemen</i>	<i>Islam</i>
7	Vietnam	<i>Philippines</i>	<i>Christianity</i>
8	Australia	<i>Bangladesh</i>	<i>Islam</i>
9	Norway	<i>Cambodia</i>	<i>Buddhism</i>
10	Denmark	<i>Bhutan</i>	<i>Buddhism</i>
11		<i>Costa Rica</i>	<i>Catholicism</i>
12		<i>Jordan</i>	<i>Islam</i>
13		<i>Iran</i>	<i>Islam</i>

¹ <https://worldpopulationreview.com/country-rankings/secular-countries>

3.2. Model specification and variable justification

We develop a baseline model to estimate the effect of financial inclusion on economic growth. In the model, we introduced two control variables, namely, internet usage by the population and the poverty gap in a country. The baseline model is specified below in model 1. The model after incorporating the interaction variables are specified below in model 2.

$$\text{Economic Growth (GDPC \& GDPG)}_{i,t} = \beta_0 + \beta_1 BR_{i,t} + \beta_2 ATM_{i,t} + \beta_3 INT_{i,t} + \beta_4 POV_{i,t} + ei,t \dots \dots \dots \text{equation 1}$$

$$\begin{aligned} \text{Economic Growth (GDPC \& GDPG)}_{i,t} \\ = \beta_0 + \beta_1 BR_{i,t} + \beta_2 ATM_{i,t} + \beta_3 INT_{i,t} + \beta_4 POV_{i,t} + \beta_5 ATM * INT_{i,t} \\ + \beta_6 BR * INT_{i,t} + \beta_7 ATM * POV_{i,t} + \beta_8 BR * POV_{i,t} + ei,t \dots \dots \dots \text{equation 2} \end{aligned}$$

Where, i = country. t = year. ATM = number of ATMs per 100,000 adults. BR = number of commercial bank branches per 100,000 adults. GDPG = real GDP growth (annual percentage). GDPC = GDP per capita growth (annual percentage). INT = percentage of individuals using the internet in the population. POV = Poverty gap at \$1.90 a day (2011 PPP in percentage). e = error term. See table 2 for full variable description.

The estimation methodology used to estimate the model is the two-stage least squares (2SLS) regression estimator. We use the 2SLS estimator because it addresses endogeneity problems that arises from the correlation of the independent variables with the error term due to reverse causality from economic growth to those variables. The econometric literature shows that the 2SLS estimator not only addresses the endogeneity problem and the possible causality between financial inclusion and economic growth, it also easily caters for nonlinear and interactions effects, heteroscedasticity and specification error; and the 2SLS estimator performs better in small samples (see. Bollen, 1995; Hashem Pesaran and Taylor, 1999; Bollen et al., 2007; Bollen and Paxton, 2017). In our estimation, we use the lagged explanatory variables as the internal instruments in the 2SLS estimation.

We then proceed to justify the dependent and explanatory variables. Two dependent variables were introduced in the model. The first dependent variable is the real GDP growth variable (GDPG). It measures economic growth or the annual change in gross domestic product of a

country in real terms. The second dependent variable is the GDP per capita growth variable (GDPC). It is an alternative measure of economic growth in a country. These two dependent variables have been used extensively in the economic literature to measure economic growth (see, for example, Kim, 2016; Kim et al, 2018; Ozili et al, 2022a). Regarding the explanatory variables, the BR and ATM variables are the financial inclusion variables. These two financial inclusion variables are widely used in the literature as indicators of access to financial services towards financial inclusion (see. Raza et al, 2019; Le et al, 2019; Emara and El Said, 2021; Ozili, 2021c). High levels of BR and ATM indicate higher financial inclusion through greater bank branch expansion and increase in automated teller machine (ATM) supply. The increase in bank branches and ATM supply is expected to have a positive effect on economic growth through increase in banking activities and increase in the level of financial intermediation which contributes to economic growth (Kim et al, 2018; Ozili, 2021b). Therefore, a positive relationship between financial inclusion and economic growth is expected. The INT variable is a control variable that captures the percentage of individuals using the internet in the population. The higher the number of internet users, the easier it is for people to access financial services remotely using their digital devices and with the aid of internet connectivity. Greater internet usage in a country can help to increase the amount of digital financial transactions, increase digital services in the economy and lead to increase in tax revenue from internet payment services which contributes to economic growth. Therefore, a positive relationship between internet usage (INT) and economic growth is expected. The POV variable is a control variable that captures the poverty gap in countries. The lower the poverty gap, the better. A low poverty gap leads to higher income for every member of society and it improves economic growth. Therefore, a negative relationship between poverty gap (POV) and economic growth is expected.

Table 2. Variable description and source		
Variable	Description	Source
ATM	Number of ATMs per 100,000 adults.	Global Financial Development Indicators (GFDI)
BR	Number of commercial bank branches per 100,000 adults.	Global Financial Development Indicators (GFDI)
GDPG	Real GDP growth (annual percentage)	World Development Indicators
GDPC	GDP per capita growth (annual percent)	World Development Indicators
INT	Percentage of individuals using the internet among the population	World Development Indicators
POV	Poverty gap at \$1.90 a day (2011 PPP in percentage). It reflects the depth of poverty as well as its incidence.	World Development Indicators

3.3. Descriptive statistics: the level of financial inclusion in religious and secular countries

The ATM and BR variables are the two financial inclusion variables. Table 3 and 4 show that the mean statistic of the financial inclusion variables is higher in secular countries and relatively lower in religious countries. For instance, table 4 shows that the average ATM variable (61.1) and BR variable (19.02) are higher in secular countries compared to religious countries which have a relatively low average ATM variable (32.1) and BR variable (13.04). Also, table 3 shows that the average ATM variable is much higher in secular countries such as Australia and the United Kingdom. Meanwhile, the ATM variable is significantly lower in religious countries such as Cambodia, Bangladesh and Pakistan. The average BR variable is also high in secular countries such as Denmark, Australia and the United Kingdom. Meanwhile, the BR variable is significantly lower in religious countries such as Yemen, Cambodia and Saudi Arabia. Overall, the descriptive statistics show that the level of financial inclusion (e.g. the ATM and BR variables) is higher in secular countries and relatively lower in religious countries. This confirms the findings of Ozili (2021a) who argued that religiosity may hinder financial inclusion.

Table 3. Descriptive statistics: Country-specific means							
Countries	Country Type	ATM	BR	GDPG	GDPC	INT	POV
Iran	Religious	45.5	29.4	1.7	0.5	37.7	0.1
Jordan	Religious	25.0	15.7	3.3	-0.4	38.2	0
Costa Rica	Religious	55.6	20.9	3.5	2.3	51.6	0.7
Bhutan	Religious	20.2	15.9	5.8	4.6	18.3	0.7
Cambodia	Religious	9.7	5.2	6.3	4.7	22.4	-
Bangladesh	Religious	4.7	8.1	6.3	5.1	6.2	3.1
Philippines	Religious	20.4	8.2	4.8	3.1	23.5	1.9
Yemen	Religious	3.7	1.8	-1.9	-4.5	15.4	4.2
Indonesia	Religious	33.9	13.2	4.9	3.6	21.1	1.8
Pakistan	Religious	6.3	9.1	3.6	1.4	10.03	0.8
India	Religious	12.7	11.7	5.7	4.4	12.9	6.1
Saudi Arabia	Religious	61.4	8.2	2.6	0.05	61.1	-
Israel	Religious	111.1	19.7	3.7	1.7	68.5	0.2
China	Secular	49.1	8.4	8.3	7.7	42.5	1
Sweden	Secular	38.8	20.5	1.7	0.7	91.03	0.3
Czech Republic	Secular	46.9	22.6	1.9	1.6	70.8	-
Belarus	Secular	43.8	-	3.1	3.3	51.5	-
United Kingdom	Secular	124.1	25.0	0.75	0.03	86.6	0.1
Azerbaijan	Secular	29.3	9.5	6.2	4.9	54.5	-
Australia	Secular	160.8	30.1	2.5	0.9	78.4	0.3
Vietnam	Secular	18.7	3.5	6.1	5.0	42.3	1.5
Norway	Secular	48.9	9.6	1.2	0.2	93.7	0.1
Denmark	Secular	57.8	34.3	1.1	0.5	92.4	0.09
Total statistics:							
	Mean	44.9	15.2	3.6	2.3	48.6	0.6
	Median	34.8	13.6	3.7	2.2	47.5	0.2
	Maximum	170.5	51.8	34.5	33.0	98.04	7.5
	Minimum	0.35	1.62	-27.9	-29.8	0.4	0.0
	Std. Dev.	40.3	9.3	4.7	4.7	32.4	1.1

Table 4. Means and median for the religious country group and secular country group							
	Statistic	ATM	BR	GDPG	GDPC	INT	POV
All countries sample	Mean	44.9	15.3	3.6	2.3	48.6	0.6
	Median	34.8	13.6	3.7	2.2	47.5	0.2
Religious countries sample	Mean	32.1	13.04	3.9	2.1	30.5	1.07
	Median	21.4	10.2	4.8	3.3	20.1	0.6
Secular countries sample	Mean	61.1	19.02	3.3	2.5	70.3	0.3
	Median	46.8	21.2	2.4	1.5	78.8	0.1

3.4. Correlation analysis

The Pearson correlation matrices are reported in tables 5, 6 and 7. We only report the significant results. Table 5 reports the full sample correlation of the variables. It shows that the ATM and BR variables are significant and negatively correlated with the GDPC and GDPG variables in the full sample. This suggests that financial inclusion is inversely correlated with economic growth in the full sample. Table 6 reports the correlation of the variables in the secular countries subsample. It shows that the BR variable is significant and negatively correlated with the GDPC and GDPG variables in the secular countries sub-sample. This suggests that low financial inclusion through bank branch contraction is correlated with higher economic growth in secular countries. Table 7 reports the correlation of the variables in the religious countries subsample. It shows that the ATM and BR variables are significant and negatively correlated with the GDPC and GDPG variables in the religious countries subsample. This suggests that greater financial inclusion is correlated with lower economic growth in religious countries. Also, the INT and ATM variables are highly correlated at 0.913. The high correlation is driven by the high internet penetration in some of the religious countries in our sample which also coincide with high ATM supply in the religious countries.

Table 5. All countries panel data: Pearson correlation matrix

Variable	ATM	BR	GDPG	GDPC	INT	POV
ATM	1.000 -----					
BR	0.449*** (0.00)	1.000 -----				
GDPG	-0.220** (0.01)	-0.377*** (0.00)	1.000 -----			
GDPC	-0.211** (0.01)	-0.321*** (0.00)	0.973*** (0.00)	1.000 -----		
INT	0.508*** (0.00)	0.411*** (0.00)	-0.492*** (0.00)	0.400*** (0.00)	1.000 -----	
POV	-0.449*** (0.00)	-0.435*** (0.00)	0.288*** (0.00)	0.245*** (0.00)	0.615*** (0.00)	1.000 -----

P-value in parenthesis. ***, **, * denote statistical significance at the 1%, 5%

Table 6. Secular countries panel data: Pearson correlation matrix

Variable	ATM	BR	GDPG	GDPC	INT	POV
ATM	1.000 -----					
BR	0.356*** (0.00)	1.000 -----				
GDPG	-0.131 (0.24)	-0.455*** (0.00)	1.000 -----			
GDPC	-0.162 (0.14)	-0.410*** (0.00)	0.990*** (0.00)	1.000 -----		
INT	0.109 (0.33)	0.377*** (0.00)	-0.588*** (0.00)	-0.597*** (0.00)	1.000 -----	
POV	-0.194* (0.08)	-0.308** (0.01)	0.259** (0.02)	0.223** (0.04)	-0.441*** (0.00)	1.000 -----

P-value in parenthesis. ***, **, * denote statistical significance at the 1%, 5% and 10%.

Table 7. Religious countries panel data: Pearson correlation matrix

Variable	ATM	BR	GDPG	GDPC	INT	POV
ATM	1.000 -----					
BR	0.603*** (0.00)	1.000 -----				
GDPG	-0.225* (0.06)	-0.214* (0.08)	1.000 -----			
GDPC	-0.211* (0.08)	-0.163 (0.18)	0.974*** (0.00)	1.000 -----		
INT	0.913*** (0.00)	0.582*** (0.00)	-0.274** (0.02)	-0.257** (0.03)	1.000 -----	
POV	-0.571*** (0.00)	-0.683*** (0.00)	0.196 (0.11)	0.217* (0.07)	-0.571*** (0.00)	1.000 -----

P-value in parenthesis. ***, **, * denote statistical significance at the 1%, 5% and 10%.

4. Empirical results

To generate the empirical results, we divide the full sample into two subsample groups. The first subsample group is the secular countries group consisting of the 10 secular countries. The second subsample group is the religious countries group consisting of the 13 religious countries. Thereafter, we estimate the 2SLS regression estimation for the two subsamples.

4.1. Secular countries group analysis

4.1.1. The baseline result

The baseline result is reported in column 1 of table 8. It shows that the ATM coefficient is insignificant in relation to the GDPC variable. This indicates that ATM supply does not have a significant effect on GDP per capita growth in secular countries. The result remains robust and consistent when we use real GDP growth (GDPR) as an alternative measure of economic growth in column 4 of table 8. The ATM coefficient is also insignificant in column 4. This result is contrary to the findings of Sharma (2016) and Van et al (2021) who find a significant positive relationship between ATM-based financial inclusion and economic growth. This result does not support our hypothesis (H2) which predicts a significant effect of financial inclusion on economic growth in secular countries. A possible explanation for this result is that financial inclusion through ATM supply is not significantly linked to economic growth in secular countries. This might be because ATM supply is a supply-side financial inclusion strategy whose effectiveness in increasing economic growth depends on whether people use ATMs extensively in secular countries. But, as we know, people in secular countries use fewer cash and prefer to use more digital payments; therefore, there would be fewer demand for cash from ATMs in secular countries. This possibly explains why ATM supply has an insignificant effect on economic growth as shown in the empirical analysis in columns 1 and 4 of table 8.

Also, the baseline result in column 1 of table 8 shows that the BR coefficient is negative and significantly related to the GDPC variable. This indicates that bank branch contraction increases GDP per capita growth. The result remains robust and consistent when we use real GDP growth (GDPR) as an alternative measure of economic growth in column 4 of table 8. The BR coefficient

is also negative and significant in column 4. The significance of the BR variable confirms our hypothesis (H2) which predicts a significant effect of financial inclusion on economic growth in secular countries. This result supports the findings of Kumar et al (2022) who show that financial inclusion through bank branch contraction significantly affects bank profitability in Japan which is a secular country. A possible explanation for this result is that bank branch contraction increases economic growth in secular countries possibly because people in secular countries do not patronize bank branches often. Rather, they prefer to use mobile money payments to perform growth-enhancing transactions. The resulting low patronage of bank branches will compel commercial banks to shut down some bank branches in order to improve their efficiency and channel their financial resources to other growth-enhancing banking activities that improve their performance and lead to positive economic growth. This possibly explains why bank branch contraction is beneficial for economic growth in secular countries as shown in the empirical analysis in columns 1 and 4 of table 8.

Regarding the control variables, the POV coefficient is negative and insignificant in column 1 and in all estimations in table 8. The negative POV coefficient for secular countries is consistent with the expectation of a negative relationship between the poverty gap and economic growth. The INT coefficient is negative and significant for the secular countries in column 1 and in all estimations in table 8. The negative coefficient is inconsistent with the expectation of a positive relationship between internet usage and economic growth. The result suggests that greater internet usage alone decreases economic growth in secular countries.

4.1.2. Interaction analysis

Next, we perform two interaction analyses in columns 2 and 3 of table 8. Previous studies have also used interaction variables to assess the impact of financial inclusion on economic growth in different contexts such as Emara and El Said (2021), Chatterjee (2020) and Ozili (2021b). The purpose of the interaction analysis in columns 2 and 3 of table 9 is to determine the moderating effect of internet usage and the poverty gap on the relationship between financial inclusion (BR and ATM) and economic growth in the secular countries subsample. The two analyses are important and necessary because the literature shows that internet usage can enhance the level

of financial inclusion by giving internet users access to mobile money services, digital transfer payments and access to remote banking services which they can use to improve their welfare (Ozili, 2018). Other studies show that a widening poverty gap is not only harmful for financial inclusion (Park and Mercado Jr, 2018; Omar and Inaba, 2020), it also decreases economic growth (Dauda, 2017). Given these expectations in the literature, it is important to gain some insight into how internet usage and the poverty gap might influence the relationship between financial inclusion and economic growth in secular countries. Such analyses can provide valuable insight into whether internet usage and the poverty gap affect the relationship between financial inclusion and economic growth in secular countries. The implication of such analyses is that it can provide policymakers with insights into whether internet usage and the poverty gap moderates the potency of financial inclusion to stimulate economic growth in secular countries.

In the empirical modelling, we perform two interaction analyses to determine the moderating effect of internet usage and the poverty gap on the relationship between financial inclusion and economic growth. The interaction results are reported in columns 2 and 3 of table 8 while the robustness results are reported in columns 5 and 6 of table 8. In the interaction analysis, the ATM*INT coefficient is negative and significant at the 5 percent level in column 2 of table 8. This indicates that greater ATM supply, together with greater internet usage, has a significant and negative effect on GDP per capita growth. This implies that high financial inclusion combined with greater internet usage have a diminishing effect on GDP per capita growth in secular countries. The result remains robust and consistent when we use real GDP growth (GDPR) as an alternative measure of economic growth as shown in column 5 of table 8. The ATM*INT coefficient is also negative and significant at the 5 percent level in column 5. A possible explanation for this result is that greater ATM-based financial inclusion and greater internet usage do not increase economic growth in secular countries possibly because internet users in secular countries reduce people's patronage of ATM cash machines because they prefer a more convenient use of internet banking and digital payments for transactions that improve their welfare. Therefore, the low patronage of ATMs by internet users in secular countries would mean that ATM supply will not increase economic growth rather it will reduce economic growth in the internet age. This possibly

explains why higher ATM supply has an adverse effect on economic growth despite high internet usage in secular countries as shown in the empirical analysis in columns 2 and 5 of table 8.

Also, the BR*INT coefficient is positive and significant at the 5 percent level in column 2 of table 8. This indicates that bank branch expansion, together with greater internet usage, has a significant and positive effect on GDP per capita growth. This implies that high financial inclusion through bank branch expansion combined with greater internet usage increases GDP per capita growth. This result remains robust and consistent when we use real GDP growth (GDPR) as an alternative measure of economic growth as shown in column 5 of table 8. The BR*INT coefficient is also positive and significant at the 5 percent level in column 5. A possible explanation for this result is that greater internet usage in secular countries allows people to become aware of available banking services that they can use to improve their welfare. This will increase their patronage of bank branches to obtain more information about such banking services and will stimulate them to engage in banking transactions that improve their welfare and contribute to economic growth. This explains why bank branch expansion, together with high internet usage, has a complementary effect in increasing economic growth in secular countries as shown in the empirical analysis in columns 2 and 5 of table 8.

Furthermore, the ATM*POV and BR*POV coefficients are insignificant in column 3 of table 8. This indicates that greater ATM supply and bank branches, together with a rising poverty gap, does not have a significant effect on GDP per capita growth. The result remains robust and consistent when we use real GDP growth (GDPR) as an alternative measure of economic growth as shown in column 6 of table 8. The ATM*POV and BR*POV coefficient are also insignificant in column 6.

Table 8. Secular Countries Subsample Analyses
Effect of financial inclusion (ATM and BR) on the indicators of economic growth (GDPC and GDPG)
Two-stage Least Square (2SLS) Regression estimation

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Baseline	Interaction	Interaction	Robustness	Robustness	Robustness
	Dependent variable: GDPC	Dependent variable: GDPC	Dependent variable: GDPC	Dependent variable: GDPG	Dependent variable: GDPG	Dependent variable: GDPG
	Coefficient (T-statistic)	Coefficient (T-statistic)	Coefficient (T-statistic)	Coefficient (T-statistic)	Coefficient (T-statistic)	Coefficient (T-statistic)
c	10.101*** (7.29)	8.275*** (2.78)	10.353*** (6.62)	10.225*** (7.46)	8.659*** (2.93)	10.646*** (6.96)
ATM	-0.003 (-0.46)	0.120** (2.41)	-0.013 (-0.92)	0.001 (0.17)	0.117** (2.37)	-0.013 (-1.01)
BR	-0.056** (-2.09)	-0.382*** (-2.27)	-0.049* (-1.68)	-0.073*** (-2.79)	-0.392** (-2.35)	-0.064** (-2.22)
INT	-0.086*** (-5.33)	-0.064* (1.77)	-0.086*** (-4.53)	-0.078*** (-4.88)	-0.059* (-1.65)	-0.078*** (-4.19)
POV	-0.636 (-0.93)	-0.496 (-0.62)	-1.226 (-1.18)	-0.314 (-0.46)	-0.212 (-0.27)	-1.272 (-1.25)
ATM*INT		-0.002** (-2.46)			-0.001** (-2.33)	
BR*INT		0.004** (2.02)			0.004* (1.99)	
ATM*POV			0.039 (0.68)			0.063 (1.10)
BR*POV			-0.041 (-0.22)			-0.062 (-0.34)
R ²	40.45	46.41	41.08	41.22	46.68	42.85
Adjusted R ²	37.28	42.00	36.24	38.09	42.29	38.15
J-statistic	31.51	9.09	27.79	32.42	7.81	29.50
P(J-statistic)	0.000	0.001	0.000	0.000	0.005	0.000
Instrument Rank	5	7	7	5	7	7
Second-Stage SSR	373.56	336.24	369.64	364.57	330.72	354.47

***, **, * represent statistical significance at the 1 percent, 5 percent and 10 percent level.
The 2SLS instruments are the explanatory variables in each model

4.2. Religious countries group analysis

4.2.1. The baseline result

The baseline result is reported in column 1 of table 9. It shows that the ATM coefficient is insignificant in relation to the GDPC variable. This indicates that ATM supply does not have a significant effect on GDP per capita growth in religious countries. The result remains robust and consistent when we use real GDP growth (GDPR) as an alternative measure of economic growth as shown in column 4 of table 9. The ATM coefficient is also insignificant in column 4 of table 9. This result is contrary to the findings of Sharma (2016) and Van et al (2021) who find a significant positive relationship between ATM-based financial inclusion and economic growth. Our result does not support the hypothesis (H1) which predicts a significant effect of financial inclusion on economic growth in religious countries. A possible explanation for this result might be due to a low demand for cash from ATMs in religious countries, thereby leading to an insignificant effect on economic growth as shown in the empirical analysis in columns 1 and 4 of table 9.

The BR coefficient is also insignificant in relation to the GDPC variable. This indicates that the number of commercial bank branches per 100,000 adults does not have a significant on GDP per capita growth. The result remains robust and consistent when we use real GDP growth (GDPR) as an alternative measure of economic growth as shown in column 4 of table 9. The BR coefficient is also insignificant in column 4 of table 9. The result does not support the hypothesis (H1) which predicts a significant effect of financial inclusion on economic growth in religious countries. A possible explanation for this result is that people in religious countries do not extensively patronize bank branches. Rather, they prefer to use other sources of finance such as informal sources to engage in economic activities or growth-enhancing transactions. This possibly explains why the number of commercial bank branches per 100,000 adults has an insignificant effect on economic growth as shown in the empirical analysis in columns 1 and 4 of table 9.

Regarding the control variables in the baseline result in column 1 of table 9, the POV coefficient is positive and insignificant in column 1 of table 9. The positive POV coefficient for the religious countries is inconsistent with the expectation of a negative relationship between the poverty gap and economic growth. The INT coefficient is negative and insignificant for the religious countries

in column 1 of table 9. The negative INT coefficient is inconsistent with the expectation of a positive relationship between internet usage and economic growth.

4.2.2. Interaction analysis

We also perform two interaction analyses in columns 2 and 3 of table 9. Previous studies have also used interaction variables to assess the impact of financial inclusion on economic growth in different contexts such as Emara and El Said (2021), Chatterjee (2020) and Ozili (2021b). The purpose of the interaction analysis in columns 2 and 3 of table 9 is to determine the moderating effect of internet usage and the poverty on the relationship between financial inclusion and economic growth in the religious countries subsample. The two analyses are important because the literature shows that internet usage can enhance the level of financial inclusion by giving internet users access to mobile money services, digital transfer payments and access to remote banking services which they can use to improve their welfare (Ozili, 2018). Other studies show that a widening poverty gap is not only harmful for financial inclusion (Park and Mercado Jr, 2018; Omar and Inaba, 2020), it also decreases economic growth (Dauda, 2017). Given these expectations from the literature, it is important to gain some insight into how internet usage and the poverty gap might influence the relationship between financial inclusion and economic growth in religious countries. The implication of such analyses is that it can provide policymakers with insights into whether internet usage and the poverty gap moderates the potency of financial inclusion to promote economic growth in religious countries.

In the empirical modelling, we perform two interaction analyses to determine the moderating effect of internet usage and the poverty gap on the relationship between financial inclusion and economic growth. The interaction results are reported in columns 2 and 3 of table 9 while the robustness results are reported in columns 5 and 6 of table 9. The BR*POV coefficient is positive and significant at the 1 percent level in column 3 of table 9. This indicates that bank branch expansion, in the midst of a widening poverty gap, has a significant and positive effect on GDP per capita growth. This implies that high financial inclusion through bank branch expansion increases GDP per capita growth in religious countries where there is a high poverty gap. The result remains robust and consistent when we use real GDP growth (GDPR) as an alternative

measure of economic growth as shown in column 6 of table 9. The BR*POV coefficient is also positive and significant at the 1 percent level in column 6. A possible explanation for this result is that bank branch expansion is an effective way to increase economic growth in religious countries that have a high level of poverty. Bank branch expansion in poor religious countries can create jobs, increase employment and income which leads to increase in economic output, thereby leading to economic growth in religious countries. This possibly explains why bank branch expansion, in the midst of a widening poverty gap, increases economic growth in religious countries as shown in the empirical analysis in columns 3 and 6 of table 9.

Furthermore, the ATM*INT, ATM*POV and BR*INT coefficients are insignificant in columns 2 and 3 of table 9. This indicates that greater financial inclusion (ATM & BR) together with greater internet usage does not have a significant effect on GDP per capita growth in religious countries. The result remains robust and consistent when we use real GDP growth (GDPR) as an alternative measure of economic growth as shown in columns 5 and 6 of table 8. The ATM*INT, ATM*POV and BR*INT coefficients are also insignificant in columns 5 and 6 of table 9.

Table 9. Religious Countries Subsample Analyses
Effect of financial inclusion (ATM & BR) on the indicators of economic growth (GDPC and GDPG)

Two-stage Least Square (2SLS) Regression estimation

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Baseline	Interaction	Interaction	Robustness	Robustness	Robustness
	Dependent variable: GDPC	Dependent variable: GDPC	Dependent variable: GDPC	Dependent variable: GDPG	Dependent variable: GDPG	Dependent variable: GDPG
	Coefficient (T-statistic)	Coefficient (T-statistic)	Coefficient (T-statistic)	Coefficient (T-statistic)	Coefficient (T-statistic)	Coefficient (T-statistic)
c	3.207* (1.89)	1.229 (0.49)	4.028** (2.42)	6.037*** (3.70)	4.187* (1.74)	6.962*** (4.31)
ATM	0.014 (0.55)	0.001 (0.03)	0.019 (0.76)	0.017 (0.67)	-0.004 (-0.11)	0.024 (0.99)
BR	0.015 (0.18)	0.154 (1.04)	-0.084 (-1.01)	-0.038 (-0.50)	0.110 (0.77)	-0.130 (-1.60)
INT	-0.045 (-1.17)	0.023 (0.29)	-0.034 (-0.93)	-0.048 (-1.31)	0.012 (0.16)	-0.039 (-1.09)
POV	0.291 (0.76)	0.443 (1.08)	-1.212* (-1.85)	0.059 (0.16)	0.198 (0.50)	-1.201* (-1.89)
ATM*INT		0.0002 (0.36)			0.0003 (0.62)	
BR*INT		-0.004 (-1.14)			-0.004 (-1.18)	
ATM*POV			-0.031 (-0.98)			-0.047 (-1.54)
BR*POV			0.217*** (2.80)			0.201*** (2.68)
R ²	7.94	9.92	18.79	8.68	10.94	18.54
Adjusted R ²	2.01	7.09	10.67	2.79	2.04	10.39
J-statistic	29.72	6.99	21.34	27.09	7.01	23.65
P(J-statistic)	0.000	0.004	0.000	0.000	0.005	0.000
Instrument Rank	5	7	7	5	7	7
Second-Stage SSR	633.66	620.03	559.02	589.37	574.75	354.47

***, **, * represent statistical significance at the 1 percent, 5 percent and 10 percent level.

The 2SLS instruments are the explanatory variables in each model

4.3. Discussion

The analyses above contribute to the theoretical literature, specifically, the theory of finance and growth. The results contribute to this theory by showing that the finance-growth nexus is stronger in secular countries than in religious countries. This is because the economic system in secular countries allow market forces to freely dictate the demand and supply for formal financial services. It also allows market forces to dictate the terms on which access to financial services is granted for use in consumption, production and investment towards economic growth. Therefore, greater financial inclusion in secular countries makes formal financial services more accessible to support growth without religious barriers that hinder the use of formal financial services.

Regarding the managerial contribution of the results, the results show that financial inclusion alone (i.e., the number of ATM and bank branches) will not promote economic growth in religious countries. Rather, financial inclusion will only stimulate economic growth in poor religious countries. This means that bank managers and other providers of formal financial services should be aware of how high poverty level in the religious environment might influence the adoption and use of formal financial services. Bank managers and other providers of financial services also need to be aware of the specific strategies for financial inclusion that would be most effective in religious countries. Bank managers in religious environments should identify the most effective strategies for financial inclusion that will be widely accepted by the religious population and will contribute to economic growth.

Regarding the policy contribution of the results, the results show that policymakers need to gain insight into how financial inclusion through ATM supply and bank branch expansion can affect economic growth in a religious and non-religious setting. This insight can assist policymakers in understanding whether their effort in influencing financial institutions to increase ATM supply and expand bank branch networks will yield a positive effect for economic growth. The results are also useful in helping policymakers to assess the potential effect of supply-side financial inclusion on economic growth in religious and secular countries. It can assist policymakers in

identifying the appropriate supply-side intervention for financial inclusion that is effective to promote economic growth in religious and secular countries.

5. Conclusion

This paper examined the effect of financial inclusion on economic growth in religious and secular countries. The two-stage least square regression estimation methodology was used to analyse the data. The empirical results revealed that bank branch contraction significantly increases economic growth in secular countries. Also, bank branch expansion combined with greater internet usage increases economic growth in secular countries while high ATM supply combined with greater internet usage decreases economic growth in secular countries. The result suggests that greater financial inclusion through bank branch expansion, combined with greater internet usage, is beneficial for economic growth in secular countries. We also find that bank branch expansion, in the midst of a widening poverty gap, significantly increases economic growth in religious countries.

The implication of the findings is that financial inclusion alone is not sufficient to spur economic growth in secular countries. This means that financial inclusion efforts should be augmented with greater internet usage to stimulate economic growth in secular countries. It is recommended that policymakers in secular countries should provide affordable internet connectivity to members of the population to increase internet usage so that greater internet usage can augment existing national financial inclusion strategies that are put in place to stimulate economic growth.

Also, the findings that bank branch expansion, in the midst of a widening poverty gap, increases economic growth in religious countries imply that bank branch expansion is very effective in promoting economic growth in poor religious countries. Therefore, it is recommended that policy makers in poor religious countries should encourage financial institutions, especially banks, to open more branches in urban and rural areas so that people can use the available banking services to engage in growth-enhancing transactions that contribute to economic growth.

Opening more bank branches can create jobs, uplift communities, increase the level of business activities and lead to economic growth.

One limitation of the study is that the criteria used to select the religious and secular countries included in our sample may exclude other important religious and secular countries. Two, the indicators of financial inclusion used in the empirical analysis are part of the accessibility dimension of financial inclusion. We did not use bank account ownership indicators to measure financial inclusion due to insufficient data. There are other dimensions of financial inclusion that we did not consider in this study. The results may differ if other dimensions of financial inclusion were used. Three, it is possible that the religious countries and secular countries in our sample do not have the same level of financial sector development, wealth, economic system and socio-economic system. This might affect the results when comparing the religious countries subsample with the secular countries subsample. Finally, it is possible that the religious countries in the sample may have wide differences in the level of financial sector development which could affect the results. These limitations create an avenue for future research.

Future studies can investigate the effect of financial inclusion on economic growth in poor religious countries and in comparison to rich religious countries. Such analysis can provide more insight into how income inequality and religiosity affect the relationship between financial inclusion and economic growth. Future studies can also examine whether the type of religion affects the relationship between financial inclusion and economic growth.

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