

DETERMINANTS OF FINANCIAL INCLUSION IN THE OIC AND OECD COUNTRIES: ARE THEY DIFFERENT?

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ABSTRACT

Financial inclusion is a pivotal policy tool to help integrate the underprivileged segments of society into the formal financial system. The issue is particularly important within predominantly Muslim nations, where poverty and inequality remain persistent challenges, and where a significant proportion of the populace remains excluded from financial services. This seems to be paradoxical, especially given the substantial expansion of Islamic finance over the previous decade. Therefore, this research aims to investigate the factors that determine financial inclusion within Organisation of Islamic Cooperation (OIC) member states. To put our findings into perspective, we compare our analysis with Organisation of Economic Co-operation and Development (OECD) countries. We used a least squares dummy variable (LSDV) estimator across 35 OIC and OECD countries over the period 2005 to 2021. It was found that in OIC countries income per capita, tertiary education attainment, institutional quality, internet accessibility, population and age dependency have an influence on financial inclusion. Unlike OECD ones, OIC countries need to make significant investment in digital infrastructures, youth and female empowerment, and boosting income levels. Lessons are also drawn for Islamic banking in these countries.

Keywords: Financial inclusion, OIC countries, Income level, Institutional quality, Tertiary education.

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I. INTRODUCTION

Financial inclusion has emerged as a shared objective for mitigating poverty (Ardic et al., 2011; Bruhn & Love, 2009; Galor & Zeira, 1993; Pande et al., 2012; Standard Chartered, 2014) and reducing income inequality (García-Herrero & Turégano, 2015; Karpowicz, 2014; Park & Mercado, 2015; Sarma & Pais, 2011; Wang'oo, 2013). Furthermore, it is an effective policy tool and considered an essential prerequisite for fostering equitable economic growth, as it provides the impoverished with access to a diverse array of financial services, thereby enabling them to initiate entrepreneurial activities, own a home, manage their finances, and benefit from a buffer against financial adversities (Hannig & Jansen, 2010). Recent analysis by Kamalu & Ibrahim (2021) on thirty OIC countries over the period of 2013-2018 further suggests that a one percent increase in Islamic banking assets to gross domestic product (GDP) results in approximately twelve percent of financial inclusion. Nevertheless, the Middle East, Sub-Saharan Africa and South Asia remain fairly low in terms of account penetration, a common measure of financial inclusion.

This study investigates the reasons for persistently low financial inclusion in Muslim-majority countries. According to Demirgüç-Kunt et al. (2022), in low-income OIC countries, only around sixteen percent of individuals hold an account with formal financial institutions, contributing to persistent financial exclusion. At the macro level, structural poverty, pervasive informality, and bank-centric financial systems constrain access to formal financial services, particularly for households and micro-enterprises with irregular income profiles. These structural constraints are further reinforced by regulatory weaknesses, low financial literacy, gender and cultural barriers, and uneven adoption of inclusive digital financial technologies. Building on these factors, the study focuses on important and actionable initiatives that can serve as near-term policy and institutional levers to advance financial inclusion in Muslim-majority countries. While the empirical focus of the study is on OIC member countries, the findings are interpreted from a comparative perspective by benchmarking them against OECD economies. This comparison serves not only to establish a reference point for relative performance, but also to explain policy and institutional gaps that result in the persistent lag in financial inclusion across the Muslim world. By contrasting these experiences, the study provides policy-relevant insights for decision-makers in OIC countries, supporting efforts to enhance economic inclusivity and to better understand the policy instruments and institutional practices underpinning higher levels of financial inclusion in OECD contexts.

The main research question in the study is: What are the primary factors that drive financial inclusion in OIC countries? To answer this, we first constructed an index using Sarma's (2008, 2012) method and then applied the regression models to examine determinants of financial inclusion and its various aspects. In comparison to OECD countries, OIC nations face several fundamental challenges that require urgent attention to improve financial inclusion effectively. Income levels, institutional quality, the availability of secure internet infrastructure, population aging, life expectancy, and tertiary education—across both genders—play a significant role in enhancing financial inclusion within OIC countries. Notably, the female demographic demonstrates a crucial role in extending

financial services geographically through internet usage, a method particularly compatible with domestic responsibilities prevalent among women in Muslim-majority nations. On the supply side, barriers to financial inclusion, alongside limited usage of banking products in OIC countries, are closely linked to the age profile of the population and prevailing unemployment rates. Interestingly, the findings suggest an inverse relationship between income levels and reliance on banking products in OIC countries: as income increases, the usage of formal banking services tends to decline.

The paper is structured as follows. Section 2 reviews the relevant literature and Section 3 discusses the data, empirical models and estimation strategy. Section 4 discusses the findings, while Section 5 provides the conclusion, together with policy recommendations.

II. LITERATURE REVIEW

2.1. Why Financial Inclusion Matters

Financial inclusion is an aspect of financial development (Rasheed et al., 2016; Wang'oo, 2013). A number of studies highlight it as an effective tool that can help reduce poverty and lower income inequality (Beck, Demirgüç-Kunt, et al., 2007; García-Herrero & Turégano, 2015; Jones, 2008; Karpowicz, 2014; Kling et al., 2022; Park & Mercado, 2015; Rewilak, 2013; Swamy Vighneswara, 2010), and also make a significant positive difference in improving poor people's lives (Afonso & Blanco-Arana, 2024; Ardic et al., 2011).

Moreover, financial inclusion has been seen as a mechanism to improve financial resilience, which in turn helps people manage financial emergencies.¹ As a result, well governed financial inclusion will lead to prosperity, a stable financial system and continuous growth. Several studies have found that financial inclusion determines the level of growth (Afonso & Blanco-Arana, 2024; Azimi, 2022; Babajide et al., 2015; Jima & Makoni, 2023; Kim et al., 2018), through bank expansion (Ifediora et al., 2022; Sharma, 2016; Van & Linh, 2019); increases in money supply or credit (Boukhatem, 2016; Iqbal & Sami, 2017; Sahay et al., 2015); savings (Pande et al., 2012); remittances (Anzoategui et al., 2014); government expenditure on infrastructure (Williams et al., 2017); through the use of deposits accounts (Abakaeva & Glisovic-Mezieres, 2009); and raising the standard of living of the poor, rural and unbanked population (Mala & Vasanthi, 2016). Low levels of financial inclusion reduce the level of economic and social development (Cicchello et al., 2021). Realising the importance of financial inclusion, many empirical studies have analyzed its determinants, in addition to identifying the barriers it faces (Causa et al., 2022; Kaligis et al., 2018; G. Kumar, 2019; Ulwodi & Muriu, 2017).²

1 Resilience can be built with access to more sophisticated financial services. For example, individuals with good financial records can acquire more opportunities for access to credit.

2 Financial exclusion has been identified by policymakers as a key barrier to global development (Demirgüç-Kunt et al., 2015). There is a need for coordinated action between banks, governments and other bodies to facilitate access to bank accounts amongst the financially excluded (Swamy Vighneswara, 2010).

2.2. The Factors Influencing Financial Inclusion

Notwithstanding the unidirectional relationship, some studies also show that inclusive growth is positively related to financial inclusion (Sanjaya & Nursechafia, 2016); in some instances, there is also evidence of a bidirectional relationship (Husain et al., 2024; Ben Jedidia et al., 2014; Jima & Makoni, 2023). A study by Sharma (2016) supports the findings of Guillaumont Jeanneney & Kpodar (2008), that financial inclusion promotes growth by efficiently allocating funds to neglected sections in society; see also Bagehot (1862), King & Levine (1993) and Schumpeter (1935). However, prevalent issues such as stringent regulatory constraints on banking operations and market entry, underdeveloped physical infrastructure, institutional trust deficits, and complex delivery mechanisms are recurrent challenges encountered in both developed and developing nations (Ayyagari & Beck, 2015; Beck, Demirgüç-Kunt, et al., 2007; Beck & De La Torre, 2007).

Apart from banking barriers, other factors include involuntary financial exclusion due to poverty (Akudugu, 2013; Wambua & Datche, 2013); high risk profiles; or discrimination, market failures and imperfections. In addition, lack of sufficient funds is cited by two-thirds of the unbanked population as the most common reason for not being in the formal financial system (Demirgüç_Kunt et al., 2018). Age, poor education and insufficient income are also commonly cited as reasons for involuntary exclusion (Ampudia & Ehrmann, 2017; Cámara et al., 2014; Fungáčová & Weill, 2015; Gwalani & Parkhi, 2014; Kaligis et al., 2018; Oke & Adamson, 2023; Soumaré et al., 2016; Tuesta et al., 2015; Zins & Weill, 2016). Although income level may be described as a structural problem, the age factor might reflect the failure to offer appropriate products required by certain age groups.

Furthermore, illiteracy causes usage and awareness of accounts to remain low, meaning that the rural banking market may be untouched and not explored fully (Abel et al., 2018; Joshi & Rajpurohit, 2016; Le, Dang, et al., 2019; Ozili, 2021). In some cases, even innovative distribution channels such as agency banking, e-banking and m-banking are generally underutilized, resulting in long queues, especially at enquiry and customer service counters (Wambua & Datche, 2013). Therefore, the low level of financial literacy is a major concern, causing a considerable proportion of the population to continue to transact in the informal financial sector (Roa, 2015). Hence, it is the centrality of literacy (Khan et al., 2022; Le, Dang, et al., 2019), in particular financial literacy (Abel et al., 2018; Ozili, 2021) among the population that is responsible for greater financial inclusion.

The literature also discusses the effect of gender on financial inclusion. Being a female is said to be a disadvantage (Cámara et al., 2014), as women are one of the groups vulnerable to financial inclusion, with the notable exception of working females who have access to the financial system (Peña et al., 2014). There is consistent evidence of greater male participation in terms of financial inclusion (Fungáčová & Weill, 2015).

To overcome these barriers, various empirical studies have found that providing a better environment that facilitates access to financial services (Allen et al., 2012) is necessary. Such an environment includes an increased bank branch network (Dabla-Norris et al., 2015); strengthened public trust towards financial

institutions (Soumaré et al., 2016); and the removal of financial frictions (Dabla-Norris et al., 2015). Moreover, higher income levels (Chitra & Selvam, 2013; Sarma & Pais, 2011); enhanced education and literacy (Akudugu, 2013; Cámara et al., 2014; Ghosh, 2011; Sarma & Pais, 2008; Tuesta et al., 2015); and higher population sizes³ with more people in the working age group (Fungáčová & Weill, 2015; Zins & Weill, 2016) have a significant positive association with the level of financial inclusion. For example, income and employment lead the public to be more active, aware, and interested in banking activities, all of which contributes towards financial inclusion.

Moreover, studies identify certain segments of society who voluntarily exclude themselves from financial services for religious or cultural reasons, even though they could afford to do so and have access to such services (Adeyemi et al., 2012; Ayyagari & Beck, 2015; Campbell et al., 2012; Demirgüç-Kunt et al., 2008; Demirgüç-Kunt et al., 2013; Naceur et al., 2015; Sen, 2000). Indeed, religiosity is a well-known obstacle to entry into the conventional financial system for Muslims. Demirgüç-Kunt et al. (2013), using data from the Global Financial Inclusion (Global Findex) and Gallup World Poll databases in 2011, found that fewer Muslims had a formal account or saved at a formal financial institution than non-Muslims, and that *Shariah*-compliant banking products were not significantly used in North Africa or Middle Eastern countries, even those with relatively fast growing Islamic finance industries.

Studies have also considered the banking supply side in the search for determinants that contribute to financial inclusion. Kumar (2011) suggests that an increase in bank branch networks could raise the market reach of banking products, in conjunction with the support of literacy (Ghosh, 2011); greater access to financial intermediaries (Dabla-Norris et al., 2015)⁴; strengthened public trust in financial institutions (Soumaré et al., 2016); user-friendly product and service delivery channels; simplified procedures without compromising security; and the availability of suitable products and services for particular age groups. However, as noted earlier, the availability and use of banking services are adversely affected by certain conditions, such as unfavorable labor regulations, lack of documentation and distance. Minimizing such barriers would create a suitable environment for facilitating access to financial services (Allen et al., 2012; Ayyagari & Beck, 2015; Barajas et al., 2020; Karpowicz, 2014; Mukherjee & Sood, 2020).

Numerous studies have aimed to establish the determinants of financial inclusion, especially focusing on developing countries, since most of the unbanked population live in such countries. For example, studies examining the impact of socio-economic factors have found that higher income⁵ (Causa et al., 2022; Chitra

3 Countries with higher populations are expected to have more people involved in the formal financial system compared to smaller populations.

4 Although the alleviation of different financial frictions has different impacts across countries, with country-specific features playing a role in establishing the linkages between financial inclusion, GDP, inequality and the distribution of gains and losses.

5 Income level has a positive impact on both credit and deposit penetrations, which validates the importance of economic conditions for the improvement of financial inclusion. For example, income and employment generating schemes lead the public to be more active, aware and interested in banking activities, which contributes towards financial inclusion.

& Selvam, 2013; Sarma & Pais, 2011); enhanced family education (Yan & Qi, 2021) and literacy (Akudugu, 2013; Causa et al., 2022; Cámara et al., 2014; Ghosh, 2011; Sarma & Pais, 2008; Tuesta et al., 2015); higher populations (Lenka & Barik, 2018) with more people in the working age group (Fungáčová & Weill, 2015; Zins & Weill, 2016) have significant associations with the level of financial inclusion. Naceur et al. (2015) focused on Muslim OIC member countries. They demonstrated that religion being cited as an excuse for not using banking facilities was significantly more frequent compared to other countries in the study.

Studies also highlight the importance of macro-economic variables such as the real GDP growth rate, financial development and trade openness. Financial inclusion is a subset of financial development (Sadi Ali et al., 2016) while trade openness is a variable that has been found to be connected to the development of financial markets (Baltagi et al., 2009; Chinn & Ito, 2006; Law & Azman-Saini, 2012; Rajan & Zingales, 2003). Given the demand-following relationship (in which growth generates demand for financial products), real GDP growth has an impact on promoting financial development (Calderón & Liu, 2003; Demetriades & Hussein, 1996; Law & Azman-Saini, 2012).

Research predominantly centers on identifying the factors influencing financial inclusion within developing nations, where lower levels of financial inclusivity are commonly observed, such as India and Latin American countries. However, apart from a few articles, little attention has been paid to investigating this phenomenon within OIC countries. Therefore, in line with our study, it is important to understand what determines financial inclusion these countries.

III. DATA

We initially considered 57 OIC and 38 OECD countries. However, several countries had incomplete data, with certain variables missing or with too many gaps to allow for reliable interpolation or forecasting. Hence, a final sample of 66 countries was considered, comprising 35 OIC members countries and 31 OECD ones, covering the period 2005 to 2021. The data were obtained from various sources, namely the Financial Access Survey (FAS) 2021 by the International Monetary Fund (IMF) database, the World Development Index (WDI), the Global Financial Development Database (GFDD) and the World Governance Index (WGI). The sample data was balanced. Table 1 shows a list of the countries considered.

A macro level analysis was adopted to study the determinants of financial inclusion, with the dependent variable being the financial inclusion index. The determinants of financial inclusion considered included trade openness, domestic credit to the private sector by banks, GNI per capita, secure internet servers (per 1 million people), male and female unemployment, the age dependency ratio of young and old people, life expectancy, male and female tertiary education, real GDP growth, remittance inflows to GDP, and institutional quality. These variables were chosen based on the importance of factors considered by most researchers to determine financial inclusion (Agyekum et al., 2011; Ampudia & Ehrmann, 2017; Cámara et al., 2014; Sanjaya & Nursechafia, 2016; Tuesta et al., 2015; Zins & Weill, 2016; Zulkhibri & Ghazal, 2017). We extended the exploration by conducting separate regression for the dimensions of financial inclusion; that is, demographics, geographical penetration and banking usage as the dependent variable.

Table 1.
List of Countries

Categories	No.	Countries
OIC	35	Afghanistan, Albania, Algeria, Azerbaijan, Bangladesh, Brunei, Cameroon, Chad, Comoros, Djibouti, Egypt, Guinea, Guyana, Indonesia, Iran, Jordan, Kazakhstan, Kuwait, Kyrgyz, Lebanon, Malaysia, Maldives, Morocco, Mozambique, Nigeria, Pakistan, Qatar, Saudi Arabia, Suriname, Tajikistan, Tunisia, Turkey, Uganda, United Arab Emirates, Uzbekistan.
OECD	31	Australia, Austria, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea Republic, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, the United Kingdom.

For the independent variables, income levels are of importance, on the basis that higher per capita income is associated with increased financial inclusion, as reflected by greater use of formal accounts and borrowing (Evans & Adeoye, 2016; Fungáčová & Weill, 2015). Having lower levels of income may reduce the chances to be included in the formal financial system due to a lack of guarantees for obtaining loan approvals from banks (Roa, 2015). Our second independent variable was the age dependency ratio. This is a percentage of dependents to the working-age population; that is, the population aged <15 and > 64. The argument for this is that a larger demographic group of either too young or too old people would reduce financial inclusion due to their deficiency in terms of financial capability. Likewise, adults in the working age range of 25–64 are more likely to demand credit than those in the 15–24 age range (Soumaré et al., 2016), with such demand declining after they leave their economically active age group (Akudugu, 2013). The third independent variable was the tertiary level of education, as educated people enjoy better standards of living and are therefore sufficiently proficient to utilize financial instruments (Soumaré et al., 2016; Werff et al., 2013). Low levels of education reduce the chances of using financial products (Ampudia & Ehrmann, 2017; Cámara et al., 2014). World governance indicators such as higher institutional quality are often associated with greater financial inclusion. Therefore, in order to increase such inclusion, institutional quality must be improved in terms of political stability and the absence of violence/terrorism, voice and accountability, rule of law, regulatory quality, government effectiveness, and control of corruption. Appendix A provides definitions for all these six dimensions in the World Governance indicators. In our study, we used the average of all six dimensions and refer to as institutional quality⁶.

6 For the purposes of this study, we initially ran regressions for each of the six WGI indicators to identify the significant ones. We found that when we used either the financial inclusion index or its dimensions as the dependent variable, the effect and significance level of each and the individual six WGI indicators varied. Therefore, we decided to include and generalize all six indicators into one index.

In terms of population, higher populations are often considered to be good for financial inclusion, as they reflect a larger market size. However, this dimension has been found to be insignificant in some studies (Evans & Adeoye, 2016). Finally, participation in formal employment indicates participation in the formal financial system due to wages and salaries. Therefore, this proportion would be an important indicator of financial inclusion. However, the unavailability of this type of data compelled us to use unemployment data.

IV. METHODOLOGY

In order to address the research objective, we constructed a robust and comprehensive measure of the financial inclusion index. Briefly, we computed a dimension index for each dimension and then aggregated each index as the normalized inverse of Euclidean distance, with the distance computed from a reference ideal point, and then normalized by the number of dimensions included in the aggregate index (Sarma, 2008). The variables included in the financial inclusion index are listed in Table 2 and were taken from the IMF's Financial Access Survey 2021. Our index consisted of three dimensions: demographic (Demo), geographic (Geo) and usage of banking and services (Usage).

Table 2.
Selected Proxies for the Financial Inclusion Index

Dimension	Proxies	Weightage ⁷	Calculated as
Demographic Penetration (Demo)	a) number of commercial bank branches per 100,000 population	¾	a) (number of institutions + number of branches) *100,000 adult population
	b) number of ATMs per 100,000 population	¼	b) (number of ATMs) *100,000/ adult population
Geographic Penetration (Geo)	a) total number of commercial bank branches per 1000 square kilometres	¾	a) (number of institutions + number of branches) *1,000 square kilometres
	b) total number of ATMs per 1000 square kilometres	¼	b) (number of ATMs) *1,000 square kilometres
Usage of Banking Services (Usage)	a) deposits outstanding to GDP (%)	½	a) (outstanding deposits with commercial banks) *100/ GDP
	b) loans outstanding to GDP (%)	½	b) (outstanding loans from commercial banks) *100/GDP

⁷ For the demographic index, the average ratio of ATM-to-branch per 100,000 population was 2.84. Therefore, on an average, there were three ATMs per bank branch, which implies that a bank branch is an average equivalent to three ATMs. Consequently, the branch index was given a higher weightage of ¾ and the ATM index one of ¼ in the demographic index. The average ratio of ATM-to-branch per 1000 square kilometers was 2.76, which indicates that branches and ATMs in the geographic index have the same weightage as in the demographic index.

For our study, the determinants of financial inclusion for the OIC and OECD countries were evaluated based on the following specification:

$$FII_{it} = \alpha_i + \beta_1 X_{it} + \beta_2 C_{it} + \epsilon_{it} \quad (1)$$

where, FII_{it} is the financial inclusion index; α_i is the time invariant individual specific effect; X_{it} is the matrix of explanatory variables; C_{it} represents macro-economic variables such as GDP growth, trade openness and financial development; ϵ_{it} is the normally distributed error term; and i and t represent cross-section and time-series indexes respectively, where $i=1, \dots, N$ and $t=1, \dots, T$.

To determine the best estimation model for our analysis, we first employed the random effects (RE) panel estimation method. We then proceeded by performing a Breusch-Pagan Lagrangian Multiplier test (Breusch & Pagan, 1980), to distinguish between the pooled ordinary least squares (POLS) and RE models. We found the presence of an individual specific effect, thus signifying the existence of heterogeneity. To accommodate for this, we use the fixed effects (FE) panel estimation method. We then performed the Hausman specification test (Hausman, 1978) and found that the FE model was preferred. In our LSDV estimations, we took into consideration the country-specific fixed effect for the OIC countries and the two-way fixed effects model, which includes the country-specific fixed effect and time effect for the OECD countries. For diagnostic checks, we also examined for multicollinearity and heteroskedasticity. Based on the results shown in Appendix B, a heteroskedasticity problem did exist. Hence, the robust standard errors were used in the FE estimation. The results are consistent with the LSDV method.

For further analysis, we considered each dimension of financial inclusion separately in order to identify the possible different effects the financial inclusion determinants have on the dimensions of financial inclusion index. Second, we tested whether gender made a significant difference in the regressions. Previous studies have highlighted gender as an important determinant of financial inclusion. Since fixed effects exclude time invariant factors, we controlled for male and female life expectancy, tertiary education and unemployment, and ran separate regressions to examine the gender effect in determining financial inclusion. Third, we concurrently ran regressions on both the whole samples and sub-samples for each set of countries. The sub-samples were determined by excluding countries with major contributions to Islamic finance (Baig et al., 2024).

V. EMPIRICAL RESULTS

In an effort to cover as many aspects of financial inclusion as possible and considering the limitations of the data, we calculated our own index, which comprised the number of ATMs per 1,000 sq. km, the number of ATMs per 100,000 adults, the number of commercial bank branches per 1000 sq. km, the number of commercial bank branches per 100,000 adults, and the deposit and usage per GDP ratio. Comparing the OIC and OECD statistics shown in Table 3, we found that the average of the financial inclusion index for the OECD countries (0.65) was higher than that of the OIC countries (0.54). Typically, developed countries with higher

income have higher financial inclusion in comparison to lower income developing countries.

There are also several differences between OIC and OECD countries. First, OIC countries have a higher population facing an underdeveloped information and technology infrastructure compared to in OECD countries. Second, we noted higher remittances in OIC countries, which are due to high migration within these countries themselves, and to developed countries⁸. Indeed, OIC countries accounted for nearly a quarter of global remittance inflows and outflows in 2020. Both tables also show that younger populations are predominant in OIC countries compared to OECD ones, which have an almost equal ratio of young and old. Clearly, there are higher ageing OECD populations compared to OIC countries, which is a huge concern for the OECD in managing their financial needs (OECD, 2022). In contrast, twenty nine percent of the world's youth live in OIC nations, which poses a policy challenge in ensuring that this group is prepared to be part of the world economy (SESRIC, 2022).

In addition, OECD countries enjoy stronger advances in education, trade openness and financial development, all of which clearly define the different socio-economic statuses of the two regions. Moreover, we observed a stark difference in institutional quality between the OIC and OECD. Most OIC countries are below the global average, as reflected by the negative value of the index, while the OECD is above average.

Table 4 presents the estimation results for the OIC sample. It can be noted that average income per capita has a positive and significant impact on aggregate financial inclusion and on its demographic and geographic penetration components. However, it is insignificantly related to the usage of banking services. The low level of funds for using a formal bank account cited by two-third of the unbanked population is a possible reason for this (Demirgüç_Kunt et al., 2018). As average income in OIC countries is far lower than in OECD countries, USD 8,800 compared to USD 39,000, this is probably an obstacle to maintaining accounts, thus explaining why there are increasing number of dormant and inactive bank accounts, even though the World Bank reported that the percentage of adults with formal bank accounts rose from 61% in 2014 to 71% in 2021. Another explanation could be the perception that some Islamic banking products are mere replications of conventional products and services with cosmetic changes through Shari'ah compliance documentation (Rafi & Masih, 2014). As such, some people may choose not to use Islamic banking services. As for OECD countries, our findings support those of Allen et al. (2012), who found that countries with higher levels of income have stronger financial inclusion than lower income ones (refer to Table 6).

In OIC countries, the age dependency ratio for the young (ADRY) positively impacts demographic and geographic penetration (refer to Table 4). Nonetheless,

8 According to the OIC Statistical Outlook (2022), remittance inflows to the OIC countries group increased from 60.1 billion USD in 2005 to 162.6 billion USD in 2019, with a slight fall to 161 billion USD in 2020 due to COVID-19-related cuts in job opportunities. Likewise, remittances sent by OIC countries abroad, including other OIC countries, showed a rapid increase, from 37.4 billion USD in 2005 to 113 billion USD in 2014, but which then decreased to 97.4 billion USD in 2020 due to the COVID-19 pandemic.

in the OIC sub-sample countries (see Table 5), the geographic dimension does not grow in tandem with the size of the young population. In comparison to OECD countries, as shown in Tables 6 and 7, the larger the young population, the greater the expansion of demographic and geographic penetration in fulfilling youth's financial needs.

Table 3.
Descriptive Statistics for OIC Countries

Variable	OIC					OECD				
	Mean	Std. Dev.	Min	Max	No. of Obs	Mean	Std. Dev.	Min	Max	No. of Obs
Financial inclusion index (FI)	.543	0.30	0.028	0.99	595	0.65	0.23	0.21	0.99	527
Institutional quality index (IQ)	-0.55	0.56	-1.78	0.82	595	1.20	0.51	-0.51	1.89	527
Income per capita (US\$) (Income)	8761	14739	250	91130	595	39034	20689	6270	105070	527
Secure internet servers per 1 million people (Internet)	230	1169	0	15598	583	12970	29416	8	277331	527
Unemployment-female (%) (Unemploy_F)	10.10	7.94	0.25	38.10	595	7.48	4.56	2.17	31.68	527
Unemployment-male (%) (Unemploy_M)	6.55	4.72	0.04	23.74	595	6.94	3.82	1.73	25.60	527
Age dependent ratio-young (%) (ADRY)	52.35	22.17	15.97	106.15	595	26.03	6.10	16.64	51.54	527
Age dependent ratio-old (%) (ADRO)	7.03	3.33	0.20	24.06	595	24.90	6.66	9.03	50.97	527
Life expectancy-female (years) (LE_F)	71.46	8.35	49.30	82.65	595	82.99	2.18	74.31	87.71	527
Life expectancy-male (years) (LE_M)	67.02	7.92	47.08	80.06	595	77.61	3.13	66.06	82.10	527
Tertiary-female (%) (Tertiary_F)	29.72	23.46	0.18	126.78	536	78.75	22.42	10.42	156.15	515
Tertiary-male (%) (Tertiary_M)	25.32	19.73	2.03	124.79	536	62.19	19.76	9.31	144.79	515
Population	40.7m	61.9m	0.3m	274m	595	27.5m	33.4m	296734	12.8m	527
Remittance (%) (Remit)	5.73	8.08	0	44.13	562	0.74	0.82	0	3.94	527
GDPG	4.21	5.38	-32.91	43.48	595	1.96	3.57	-14.63	24.48	527
Financial development (%) (FD)	35.88	27.28	2.03	138.42	585	99.12	41.89	13.31	304.58	527
Trade open (%) (TO)	83.63	45.80	16.61	348.00	576	99.71	59.15	24.39	393.14	527

In OIC countries, although they are smaller in size, the age dependence ratio for the old (ADRO) positively affects financial inclusion, particularly geographic penetration and usage of banking services, when controlled for male unemployment and tertiary education (Bloom et al., 2010; Zins & Weill, 2016). This positive relationship shows that in countries where major players of Islamic finance address geographical barriers, this will enable the elderly to use banking services. In contrast, in the OIC sub-samples, while ADRO is positively and significantly related to financial inclusion, it is not significant in any of its components. In OECD countries, ADRO is negatively related to financial inclusion, particularly demographic penetration. While banks may not attract the elderly as their target customers, this group are still users of banking products and services. They are

more stable financially and are able to withdraw their employee provident funds or matured investment funds when they reach retirement age. Therefore, their continuous usage of banking facilities tends to accentuate and strengthen financial inclusion.

Another important determinant of financial inclusion for OIC countries is population size, which is also significant and has a positive effect on financial inclusion, in line with Evans & Adeoye (2016) and Tsouli (2022). In OIC countries, the higher the population, the more scattered the geographic penetration, thus enabling more of the unbanked population to be included in the financial system. Nonetheless, the supply of ATMs and bank branches can be insufficient in highly populated cities. For OECD countries, population has a positive and significant impact on geographic penetration, indicating sound development of their banking systems (Alonso et al., 2020).

The next important variable is secure internet servers. Table 4 shows that an increase in such servers in OIC countries plays a significant role in increasing financial inclusion, but it is not significant in OIC sub-sample countries for all financial inclusion measures apart from geographic penetration. This corresponds to the findings of Beck et al. (2007), Chitra & Selvam (2013) and Sarma & Pais, (2011). Previously, most banking activities were performed at bank branches or by ATMs. More lately, branchless banking has emerged, enabling wider outreach. This has made customers' financial transactions easier through the use of internet connections. With more secure internet providers, online or mobile banking provides an opportunity to make banking transactions regardless of time or place. Indirectly, this addresses geographical barriers by allowing remote transactions and reducing banking costs significantly. Interestingly, the dependency on banking services in OIC countries for services such as deposits and loans has fallen significantly with the increase in secure internet servers, probably due to the wider selection of non-bank digital financial services. Furthermore, Covid boosted the adaption of such practices. Table 6 shows that secure internet providers are significantly and negatively related to financial inclusion in OECD countries; their number per million people in OECD countries is far greater than in OIC countries (refer to Table 3). In addition, the advances in technology and communication allow users to perform banking transactions at their convenience, which has reduced the dependence on ATMs and bank branches, resulting in a fall in their number, thus reducing financial inclusion.

Furthermore, remittance has a positive and significant influence on financial inclusion in OIC countries. Recipients are likely to own a formal bank account, which bodes well for financial inclusion, as account holders can manage their consumption and accumulate savings (Aga & Martinez Peria, 2014; Evans & Adeoye, 2016). With appropriate rules for international remittance, such as transparency and consumer protection, improvements in payment system infrastructure, sound legal environments, competitive market structures, and finally support in terms of governance and risk management practices, remittance is expected to increase financial inclusion (Hawkins, 2011). Note that remittance is more significant in OECD countries, resulting in wider demographic penetration, as shown in Tables 6 and 7. Regular receipt of remittances has been shown to ease access to credit

in some cases, because banks view such payments as a reliable source of income (Demirgüç-Kunt & Klapper, 2012).

Tables 4 and 5 show a positive and highly significant relationship between institutional quality and financial inclusion in OIC countries. Strong institutions enhance financial access by increasing the availability of ATMs and bank branches, and facilitating products such as deposits and loans. These findings align with those of Zulkhibri & Ghazal (2017), who emphasize the role of robust governance in integrating the financially excluded, particularly the poor, into formal systems. Effective institutions foster trust and support economic development through improved infrastructure, education, public services and job opportunities, ultimately improving living standards and financial access. Institutional resilience is also critical in strengthening bank stability during crises (Shabir et al., 2023). Key governance elements—such as effectiveness, political stability and regulatory quality—play crucial roles in promoting financial inclusion (Sadi Ali et al., 2016). Stable governments can allocate resources efficiently for economic development, ensuring equitable opportunities for citizens and fostering trust in government actions. In contrast, Tables 6 and 7 show that institutional quality is negatively significant in influencing financial inclusion in OECD countries, likely due to the already high levels of governance. Such inclusion appears to rely more on macroeconomic policies and financial regulations than on institutional quality.

Life expectancy, a key demographic indicator, has significant implications for social structure, economic policy and financial inclusion. In OIC countries, where the average life expectancy is 69, longer lifespans emphasize the need for enhanced financial retirement planning to support healthcare and living standards. Female and male life expectancy is positively associated with demographic penetration, as shown in Table 4, highlighting the equal importance of women's active participation in financial systems, especially in urban areas. Higher health standards and longer lifespans ensure an extended working age and financial stability post-retirement. Customized financial products, such as life insurance and pension plans, play a critical role in addressing these needs (Luciano et al., 2015). Financial institutions must adapt to the aging population by offering tailored products to maintain inclusion, as noted by Kasprowicz & Rhyne (2013). Interestingly, the longer the life expectancy, the more negative the relationship with financial inclusion in larger land areas with minor Islamic finance players, as shown in Table 5. Better health systems enhance the quality of life and indirectly increase the populations life span. Globally, life expectancy disparities persist, with OECD countries averaging 80 years, compared to 69 years in OIC countries. Most of the elderly require long term healthcare, which is costly (Fahmy & Ghoneim, 2023). Hence, they are eventually end up relying on complex support systems from the government, private providers or from the family, making their contributions towards financial inclusion insignificant, as shown in Tables 6 and 7.

Table 4 indicates the insignificance of the female and male **unemployment rate** in the financial inclusion nexus in the OIC context, apart from that of males lowering the usage of banking services. However, in countries where Islamic finance is less significant (refer to Table 5), higher unemployment among females significantly increases such usage. High unemployment in financially less developed countries may prompt monetary expansion by the government,

which indirectly boosts banking activities. In contrast, Tables 6 and 7 show that unemployment in OECD countries, both amongst men and women, has a negative and significant influence on financial inclusion. Unemployment restricts access to financial products, as individuals often lack the resources to open accounts or qualify for banking services, leading to lower inclusion. Rising unemployment has been linked to account closures, as observed in the United States (Campbell et al., 2012). Similarly, Soumaré et al. (2016) found a negative relationship between unemployment and financial inclusion in West and Central Africa regions.

Education is a critical determinant of financial inclusion, with **tertiary education** often representing a gateway to greater economic participation. In OIC countries, male and female tertiary education has a significant and positive impact on financial inclusion, as shown in Tables 4 and 5, aligning with the findings of Zins & Weill (2016). However, tertiary enrolment remains low in OIC countries, averaging 27% compared to 70% in OECD nations. This gap underscores the need for enhanced educational efforts in OIC countries to reduce illiteracy, improve living standards, and enable access to formal financial products. Higher education levels facilitate sustainable income generation and greater engagement with financial services. Conversely, limited education reduces the ability to engage with financial services, as a lack of understanding of sophisticated banking products erodes trust in modern technologies, such as mobile and online banking. In OECD countries, tertiary education has a limited influence on financial inclusion. Research by Peach et al. (2013) suggests that while education increases banking participation nationally, its significance diminishes in cross-country comparisons due to stronger macroeconomic variables. With higher overall education levels, financial inclusion in OECD countries depends more on financial literacy than formal education. Studies indicate that low financial literacy remains a primary barrier to inclusion, necessitating advanced financial knowledge to navigate complex products and avoid misunderstandings (OECD, 2016). Enhanced financial knowledge equips individuals to recognize risks, seize opportunities and manage financial obligations effectively.

Table 4.
Determinants of Financial Inclusion with the Gender-Specific Effect for Whole Samples of OIC Countries Focussing on FII and FII Sub-indices

	FII		Demo		Geo		Usage	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Income	0.0779*** [0.01]	0.0824*** [0.01]	0.0665*** [0.01]	0.0651*** [0.01]	0.0627*** [0.01]	0.0708*** [0.01]	-0.0178 [0.01]	-0.0186 [0.01]
IQ	0.1103*** [0.02]	0.0671** [0.02]	0.1175*** [0.02]	0.0980*** [0.02]	0.0685** [0.02]	0.0713*** [0.02]	0.1253*** [0.02]	0.1004*** [0.02]
Population	0.0200 [0.03]	0.0781* [0.03]	-0.1867*** [0.03]	-0.1280*** [0.03]	0.1921*** [0.03]	0.2445*** [0.03]	0.3669*** [0.03]	0.4590*** [0.03]
Internet	0.0071** [0.00]	0.0116*** [0.00]	0.0115*** [0.00]	0.0118*** [0.00]	0.0058* [0.00]	0.0054* [0.00]	-0.0140*** [0.00]	-0.0139*** [0.00]
Remit	0.0033** [0.00]	0.0038** [0.00]	0.0017 [0.00]	0.0021 [0.00]	0.0010 [0.00]	0.0005 [0.00]	0.0017 [0.00]	0.0022 [0.00]

Table 4.
Determinants of Financial Inclusion with the Gender-Specific Effect for Whole
Samples of OIC Countries Focussing on FII and FII Sub-indices (Continued)

	FII		Demo		Geo		Usage	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
ADRY	0.0751 [0.04]	0.0242 [0.04]	0.0044*** [0.00]	0.0039*** [0.00]	-0.0008 [0.00]	0.0002 [0.00]	0.0027** [0.00]	0.0024* [0.00]
ADRO	0.0096** [0.00]	0.0157** [0.00]	0.0006 [0.00]	0.0015 [0.00]	0.0069* [0.00]	0.0079* [0.00]	0.0070 [0.00]	0.0134*** [0.00]
Unemploy_F	0.006 [0.00]		0.0016 [0.00]		0.0002 [0.00]		0.0014 [0.00]	
Unemploy_M		-0.0024 [0.00]		-0.0026 [0.00]		-0.0007 [0.00]		-0.0061** [0.00]
Tertiary_F	0.0017** [0.00]		0.0018*** [0.00]		0.0012*** [0.00]		0.0028*** [0.00]	
Tertiary_M		0.0000 [0.00]		0.0022*** [0.00]		0.0014*** [0.00]		0.0023*** [0.00]
LE_F	0.0770 [0.19]		0.8045*** [0.20]		-0.5107** [0.18]		0.0965 [0.21]	
LE_M		-0.2679 [0.19]		0.4605* [0.19]		-0.6946*** [0.17]		-0.1905 [0.20]
GDPG	-0.0002 [0.00]	-0.0002 [0.00]	0.0007 [0.00]	0.0004 [0.00]	0.0001 [0.00]	0.0002 [0.00]	-0.0014* [0.00]	-0.0015* [0.00]
FD	0.0554** [0.00]	0.0644** [0.01]	-0.0121 [0.01]	-0.0077 [0.01]	0.0101 [0.01]	0.0124 [0.01]	0.0571*** [0.01]	0.0658*** [0.01]
TO	0.0313* [0.02]	0.0467** [0.02]	0.0315 [0.02]	0.0366* [0.02]	0.0486** [0.01]	0.0510*** [0.01]	0.0394* [0.02]	0.0396* [0.02]
Constant	-1.4815 [0.84]	-0.9990 [0.81]	-0.8471 [0.87]	-0.3916 [0.79]	-1.6443* [0.80]	-1.9897** [0.73]	-6.8753*** [0.91]	-7.2908*** [0.85]
No. of obs	484	482	485	485	485	485	485	485

Standard errors in brackets. * p < 0.05, ** p < 0.01, *** p < 0.00

Method: LSDV robust for specific country effects

Table 5.
Determinants of Financial Inclusion with Gender-Specific Effect for the Sub-
Sample of OIC Countries Focussing on FII and FII Sub-indices

	FII		Demo		Geo		Usage	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Income	0.0495*** [0.01]	0.0482*** [0.01]	0.0621*** [0.01]	0.0573*** [0.01]	0.0335*** [0.01]	0.0362*** [0.01]	-0.0100 [0.01]	-0.0123 [0.01]
IQ	0.1057*** [0.03]	0.0865*** [0.02]	0.1602*** [0.03]	0.1302*** [0.03]	0.0407 [0.02]	0.0438* [0.02]	0.0841** [0.03]	0.0527 [0.03]
Population	0.0894* [0.04]	0.1381** [0.05]	-0.0060 [0.05]	0.0406 [0.05]	0.0120 [0.04]	0.0290 [0.04]	0.0233 [0.05]	0.0758 [0.05]
Internet	0.0000 [0.00]	-0.0004 [0.00]	0.0040 [0.00]	0.0031 [0.00]	0.0073** [0.00]	0.0057* [0.00]	-0.0047 [0.00]	-0.0030 [0.00]

Table 5.
Determinants of Financial Inclusion with Gender-Specific Effect for the Sub-Sample of OIC Countries Focussing on FII and FII Sub-indices (Continued)

	FII		Demo		Geo		Usage	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Remit	0.0028** [0.00]	0.0031** [0.00]	0.0016 [0.00]	0.0021 [0.00]	-0.0003 [0.00]	-0.0003 [0.00]	0.0008 [0.00]	0.0014 [0.00]
ADRY	0.0023** [0.00]	0.0020* [0.00]	0.0055*** [0.00]	0.0048*** [0.00]	-0.0024** [0.00]	-0.0017* [0.00]	-0.0001 [0.00]	-0.0006 [0.00]
ADRO	0.0097** [0.00]	0.0111** [0.00]	0.0043 [0.00]	0.0049 [0.00]	0.0029 [0.00]	0.0023 [0.00]	-0.0046 [0.00]	-0.0015 [0.00]
Unemploy_F	0.0019 [0.00]		0.0031 [0.00]		0.0023 [0.00]		0.0058*** [0.00]	
Unemploy_M		-0.0019 [0.00]		-0.0002 [0.00]		0.0015 [0.00]		-0.0003 [0.00]
Tertiary_F	0.0014** [0.00]		0.0013* [0.00]		0.0003 [0.00]		0.0020*** [0.00]	
Tertiary_M		0.0022*** [0.00]		0.0025*** [0.00]		0.0014** [0.00]		0.0022** [0.00]
LE_F	0.3581 [0.18]		0.7301** [0.22]		-0.2342 [0.15]		0.3487 [0.21]	
LE_M		0.1460 [0.17]		0.5246** [0.20]		-0.2594 [0.14]		0.0244 [0.19]
GDPG	-0.0006 [0.00]	-0.0007 [0.00]	0.0001 [0.00]	-0.0001 [0.00]	0.0001 [0.00]	0.0000 [0.00]	0.0007 [0.00]	0.0005 [0.00]
FD	0.0677*** [0.01]	0.0757*** [0.01]	-0.0248* [0.01]	-0.0138 [0.01]	0.0300*** [0.01]	0.0321*** [0.01]	0.0931*** [0.01]	0.1079*** [0.01]
TO	0.0225 [0.01]	0.0214 [0.01]	0.0533** [0.02]	0.0545** [0.02]	0.0129 [0.01]	0.0105 [0.01]	-0.0063 [0.02]	-0.0057 [0.02]
Constant	-3.5473*** [0.96]	-3.4804*** [0.91]	-3.7637** [1.15]	-3.6386*** [1.09]	0.7105 [0.80]	0.4456 [0.76]	-1.7258 [1.08]	-1.2618 [1.05]
No. of Obs	351	351	351	351	351	351	351	351

Standard errors in brackets. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.00$

Method: LSDV robust for specific country effects

Note: Sub sampling for OIC countries excluding major players in Islamic finance, such as Saudi Arabia, Malaysia, Indonesia, Iran, Kuwait, Pakistan, Qatar, Turkey and UAE.

Table 6.
Determinants of Financial Inclusion with Gender-Specific Effect for OECD
Countries Focussing on FII and FII Sub-indices

	FII		Demo		Geo		Usage	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Income	0.0812** [0.02]	0.0928*** [0.02]	0.1197*** [0.02]	0.1318*** [0.02]	0.0824*** [0.02]	0.0807*** [0.02]	0.0341* [0.02]	0.0382* [0.02]
IQ	-0.0447 [0.03]	-0.0348 [0.03]	-0.1057** [0.03]	-0.1040** [0.03]	-0.1371*** [0.03]	-0.1555*** [0.03]	0.0006 [0.02]	-0.0004 [0.02]
Population	-0.0012 [0.06]	0.0119 [0.06]	0.0541 [0.07]	0.0634 [0.07]	0.3146*** [0.06]	0.3219*** [0.06]	0.0839 [0.05]	0.0882 [0.05]
Internet	-0.019*** [0.00]	-0.0083** [0.00]	-0.0298*** [0.00]	-0.0278*** [0.00]	-0.0216*** [0.00]	-0.0220*** [0.00]	-0.0039 [0.00]	-0.0043 [0.00]
Remit	0.0296*** [0.00]	0.0290*** [0.01]	0.0424*** [0.01]	0.0414*** [0.01]	0.0106 [0.01]	0.0115 [0.01]	0.0106 [0.01]	0.0083 [0.01]
ADRY	0.0032* [0.00]	0.0027* [0.00]	0.0089*** [0.00]	0.0087*** [0.00]	0.0072*** [0.00]	0.0075*** [0.00]	0.0008 [0.00]	0.0003 [0.00]
ADRO	-0.0059*** [0.00]	-0.0061*** [0.00]	-0.0036* [0.00]	-0.0037* [0.00]	-0.0022 [0.00]	-0.0024 [0.00]	0.0055*** [0.00]	0.0051*** [0.00]
Unemploy_F	-0.0046*** [0.00]		-0.0080*** [0.00]		-0.0053*** [0.00]		0.0007 [0.00]	
Unemploy_M		-0.0027** [0.00]		-0.0065*** [0.00]		-0.0053*** [0.00]		0.0013 [0.00]
Tertiary_F	0.0235 [0.02]		0.0006 [0.00]		-0.0007* [0.00]		0.0005* [0.00]	
Tertiary_M		0.0002 [0.02]		0.0004 [0.00]		-0.0007* [0.00]		0.0002 [0.00]
LE_F	0.3975 [0.28]		-0.0137 [0.38]		0.5216 [0.31]		0.2289 [0.27]	
LE_M		0.0562 [0.19]		-0.1215 [0.26]		0.4198* [0.21]		0.2535 [0.19]
GDPG	-0.0014* [0.00]	-0.0015* [0.00]	0.0005 [0.00]	0.0002 [0.00]	-0.0002 [0.00]	-0.0005 [0.00]	-0.0021*** [0.00]	-0.0015* [0.00]
FD	0.1730*** [0.01]	0.1778*** [0.01]	0.1737*** [0.01]	0.1838*** [0.01]	0.0639*** [0.01]	0.0720*** [0.01]	0.2232*** [0.01]	0.2262*** [0.01]
TO	0.0218 [0.02]	0.0271 [0.02]	0.0926** [0.03]	0.0902** [0.03]	0.0254 [0.02]	0.0336 [0.02]	-0.0474* [0.02]	-0.0391 [0.02]
Constant	-2.7708 [1.54]	-1.5652 [1.33]	-2.3601 [1.82]	-2.1568 [1.47]	-7.3079*** [1.51]	-9.0730*** [1.51]	-2.9805* [1.30]	-3.1689** [1.06]
No. of Obs	504	504	504	504	504	504	504	504

Standard errors in brackets. * p < 0.05, ** p < 0.01, *** p < 0.00

Method: LSDV robust for specific country and time effects

Table 7.
Determinants of Financial Inclusion with Gender-Specific Effect for the Sub-
sample of OECD Countries Focussing on FII and FII Sub-indices

	FII		Demo		Geo		Usage	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Income	0.0939*** [0.02]	0.0482*** [0.01]	0.1632*** [0.02]	0.1066*** [0.02]	0.0906*** [0.02]	0.0882*** [0.02]	0.0432** [0.02]	0.0447** [0.02]
IQ	-0.0472 [0.03]	0.0865*** [0.02]	-0.1144** [0.03]	-0.0419 [0.03]	-0.1345*** [0.03]	-0.1540*** [0.03]	-0.0067 [0.02]	-0.0011 [0.02]
Population	-0.0257 [0.07]	0.1381** [0.05]	-0.0593 [0.09]	-0.0221 [0.07]	0.3174*** [0.08]	0.3244*** [0.08]	-0.0000 [0.06]	0.0244 [0.06]
Internet	-0.0100*** [0.00]	-0.0004 [0.00]	-0.0310*** [0.00]	-0.0068* [0.00]	-0.0209*** [0.00]	-0.0213*** [0.00]	-0.0058* [0.00]	-0.0049 [0.00]
Remit	0.0308*** [0.01]	0.0031** [0.00]	0.0467*** [0.01]	0.0280*** [0.01]	0.0110 [0.01]	0.0115 [0.01]	0.0122 [0.01]	0.0093 [0.01]
ADRY	0.0032* [0.00]	0.0020* [0.00]	0.0092*** [0.00]	0.0030* [0.00]	0.0076*** [0.00]	0.0080*** [0.00]	0.0001 [0.00]	-0.0004 [0.00]
ADRY	-0.0062** [0.00]	0.0111** [0.00]	-0.0019 [0.00]	-0.0064*** [0.00]	-0.0024 [0.00]	-0.0026 [0.00]	0.0067*** [0.00]	0.0066*** [0.00]
Unemploy_F	-0.0043*** [0.00]		-0.0069*** [0.00]		-0.0050*** [0.00]		0.0005 [0.00]	
Unemploy_M		-0.0019 [0.00]		-0.0022* [0.00]		-0.0051*** [0.00]		0.0011 [0.00]
Tertiary_F	0.0003 [0.00]		0.0009** [0.00]		-0.0006* [0.00]		0.0006** [0.00]	
Tertiary_M		0.0022*** [0.00]		-0.0002 [0.00]		-0.0007 [0.00]		0.0003 [0.00]
LE_F	0.2632 [0.31]		-0.3965 [0.42]		0.4372 [0.34]		0.2099 [0.28]	
LE_M		0.1460 [0.17]		-0.0537 [0.21]		0.3656 [0.23]		0.1169 [0.19]
GDPG	-0.0016* [0.00]	-0.0007 [0.00]	0.0008 [0.00]	-0.0016* [0.00]	-0.0002 [0.00]	-0.0005 [0.00]	-0.0019*** [0.00]	-0.0019*** [0.00]
FD	0.1775*** [0.01]	0.0757*** [0.01]	0.1734*** [0.01]	0.1806*** [0.01]	0.0662*** [0.01]	0.0737*** [0.01]	0.2152*** [0.01]	0.2156*** [0.01]
TO	0.0246 [0.02]	0.0214 [0.01]	0.0818** [0.03]	0.0292 [0.02]	0.0295 [0.03]	0.0367 [0.03]	-0.0684*** [0.02]	-0.0635** [0.02]
Constant	-2.0222 [1.60]	-3.4804*** [0.91]	0.2947 [2.11]	-0.8276 [1.34]	-7.1135*** [1.77]	-6.9056*** [1.45]	-1.7821 [1.40]	-1.6717 [1.15]
No. of Obs	445	351	445	445	445	445	445	445

Standard errors in brackets. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.00$

Method: LSDV robust for specific country and time effects

Note: Sub sampling for OECD countries excluding major players in Islamic finance, such as Germany, Luxemburg, Switzerland and the United Kingdom.

Three macro-economic variables were also included in the study. Financial development was positively and significantly related to usage and geographic penetration for OIC countries, and highly significant in enhancing financial inclusion and all of its dimensions for OECD countries, as shown in Tables 4 to 7. Additionally, trade openness was shown to play a significant and positive role in OIC countries with major Islamic finance players. Otherwise, the positive effect of trade only affected demographic penetration in the sub-samples of OIC countries. In contrast, trade openness was only significant in increasing demographic penetration in OECD countries with Islamic finance major players, while negatively affecting usage for OECD countries without Islamic finance exposure.

Throughout our comparison, we found that countries with major Islamic finance players saw some value added in terms of spreading awareness to the public on the options offered by Islamic finance, resulting in the older population (when controlled for male population) and both the male and female youth populations subscribing to Shari'ah-compliant products, hence increasing the usage of banking products and services. With respect to OECD countries, the determinants of financial inclusions for both samples consistently displayed identical results.

VI. CONCLUSION AND POLICY RECOMMENDATIONS

This study highlights the significance of various factors in influencing financial inclusion in OIC countries, such as income per capita, tertiary education, institutional quality, internet access, population size and age dependency. Education is vital in enhancing living standards. An educated society is better equipped to thrive, hence resulting in a financially stable population. Therefore, it is imperative that inexpensive education offering high demand knowledge and skills should be made available. Assistance from the government and government linked institutions in terms of scholarships or loans would make education to be more accessible. With the present state of financial illiteracy, it should be a fundamental policy to introduce financial education at a young age so that young people can manage their finances wisely, appreciate the value of money, and understand the consequences of improper financial planning.

Youth development is key, so there must be emphasis on fostering education, enhancing employment opportunities, and ensuring social inclusion. It is vital to identify several priority areas, including improving access to quality education, addressing youth unemployment, fostering entrepreneurship, and ensuring accessible and quality health services. It is important to understand that female contributions should be further improved through, for example, employment. In addition, greater support for low-income families, single mothers, rural women, and healthcare access are required to strengthen the social well-being of women in OIC countries.

It was found that the provision of secure internet services plays an important role. In appreciation of the trust given by the online and mobile banking population, caution from the banking industry is vital in view of the escalating number of banking scams, especially in developed countries. In support of this, the government should implement strict cyber security laws and regulations to

protect the safety of users. In this way, trust will be engendered, consequently forming social cohesion in the move towards increasing financial stability.

Notwithstanding the above, financial education cannot work alone. To sustain financial inclusion, it must be accompanied by financial customer protection, with relevant rules and regulations. Together, financial education should motivate financial service providers to offer better quality product innovations, made to suit customer demands. Moreover, the banking industry should be more aware of demographic changes by understanding the banking needs of its consumers and providing the most appropriate and relevant products required by the younger population. Offering assistance and ease of banking either at bank branches or in user-friendly bank mobile apps, clearly helps the elderly to be and stay included in the financial system. The banking industry in OIC countries should strive to offer Islamic banking products that are truly in accordance with Shariah and that meet customers' expectations, hence acquiring their trust in using the products. This will open wider opportunities for them to utilize banking services for their personal or business development.

Building on these findings, this study can be extended in several ways. Future research could consider employing additional or alternative proxies to capture broader dimensions of financial inclusion. For example, while this study uses institutional quality indicators from the WGI, future studies could further enhance the analysis by incorporating governance indicators from the International Country Risk Guide (ICRG). The use of ICRG indicators was not feasible in the present study due to data access and cost constraints. Incorporating alternative measures of financial inclusion could provide further insights into the determinants of financial inclusion across OIC and OECD countries.

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APPENDIX

Appendix A.
Definition of the Six Dimensions of the World Governance Index (WGI)

Dimension	Definition
1. Voice and Accountability	Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as issues of freedom of expression, freedom of association, and a free media.
2. Political Stability and Absence of Violence/ Terrorism	Measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.
3. Government Effectiveness	Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures; the quality of policy formulation and implementation; and the credibility of the government's commitment to such policies.
4. Regulatory Quality	Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
5. Rule of Law	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence.
6. Control of Corruption	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

Source: The Worldwide Governance Indicators, 2021 updates

Appendix B.
OLS, Fixed Effects and Random Effects Estimation Results for OIC and OECD Countries

Independent Variable: FII						
	OIC			OECD		
	OLS(1)	FE(1)	RE(1)	OLS(2)	FE(2)	RE(2)
INPC	0.0031 [0.01]	0.0806*** [0.01]	0.0688*** [0.01]	-0.0681** [0.02]	0.0878*** [0.02]	0.0834*** [0.02]
IQ	0.0063 [0.02]	0.1080*** [0.02]	0.1154*** [0.02]	-0.3076*** [0.02]	-0.0413 [0.03]	-0.0704** [0.03]
POP	0.0156* [0.01]	0.0665* [0.03]	0.0258* [0.01]	-0.0026 [0.01]	0.0155 [0.06]	0.0276 [0.02]
INTERNET	0.0189*** [0.00]	0.0065* [0.00]	0.0045* [0.00]	-0.0157*** [0.00]	-0.0094** [0.00]	-0.0125*** [0.00]
REMIT	0.0008 [0.00]	0.0033** [0.00]	0.0038*** [0.00]	-0.0615*** [0.01]	0.0286*** [0.01]	0.0249*** [0.01]
ADRY	-0.1930*** [0.04]	0.0901* [0.04]	0.0153 [0.04]	-0.0080*** [0.00]	0.0028* [0.00]	0.0015 [0.00]
ADRO	0.0107*** [0.00]	0.0098** [0.00]	0.0127*** [0.00]	0.0011 [0.00]	-0.0060*** [0.00]	-0.0047*** [0.00]
UNEMG	0.0004 [0.00]	-0.0019 [0.00]	-0.0014 [0.00]	-0.0093*** [0.00]	-0.0036*** [0.00]	-0.0040*** [0.00]
TERT	-0.0027*** [0.00]	0.0021*** [0.00]	0.0018*** [0.00]	-0.3130*** [0.03]	0.0048 [0.02]	-0.0073 [0.02]
LEG	0.5405*** [0.11]	-0.1148 [0.19]	0.2618 [0.14]	3.4163*** [0.40]	0.1797 [0.24]	0.3937 [0.24]
GDPG	0.0013 [0.00]	-0.0004 [0.00]	-0.0004 [0.00]	0.0042* [0.00]	-0.0015* [0.00]	-0.0014* [0.00]
FD	0.1782*** [0.01]	0.0581*** [0.01]	0.0625*** [0.01]	0.3613*** [0.02]	0.1771*** [0.01]	0.1804*** [0.01]
TO	-0.0522** [0.02]	0.0346* [0.02]	0.0240 [0.01]	0.0967*** [0.02]	0.0274 [0.02]	0.0295 [0.02]
Constant	-1.7012** [0.63]	-1.5004 [0.82]	-2.0052** [0.66]	-13.5473*** [1.73]	-2.0379 [1.40]	-3.0441** [1.03]
No. of Obs	486	486	486	504	504	504
No. of groups		33	33		31	31
Breusch Pagan LM test		1514.61 (0.0000)***			1793.65 (0.0000)***	
Hausman Test		42.93 (0.0000)***			57.24 (0.0000)***	
Multicollinearity (vif)		3.64			3.58	
Heteroskedasticity (chi2)		10522.33 (0.0000)***			12009.03 (0.0000)***	

Standard errors in brackets

* p < 0.05, ** p < 0.01, *** p < 0.001

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