

# Project Financing and Poverty Trends in the Islamic Development Bank Member Countries

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## Abstract

This paper is an analysis of the empirical relationship between Project financing by Islamic development bank (IsDB) and the poverty trends in the context of countries benefiting from IsDB. Specifically, the study seeks to find out whether there is a statistically significant relationship between the Project Financing dollar amounts by IsDB (PF) and the GNI Per Capita, PPP of 57 countries for the years 2002 to 2021. The research is a longitudinal, desk-top triangulation of correlation, regression, hypothesis-testing employing the linear dynamic panel data GMM model as an estimator of the empirical relationships between the key variables of the study. The study results show that there is a significant positive relationship between the PF dollar amounts from the IsDB and the GNI Per Capita, PPP in these 57 countries. Therefore, countries that receive higher PF dollar amounts from the IsDB, generally have more GNI Per Capita, PPP (less poverty) than their counterparts. It is, therefore, recommendable for countries to formulate policies that facilitate Islamically financed projects to mitigate poverty. This paper develops policy discussions regarding allocation of political attention to the policy topics on poverty mitigation, and their relation to financing projects Islamically, thus generate information on policy choices regarding the Islamic financing alternative.

**Keywords:** Gross-National-Income, IsDB-Project-financing, Public policy, Poverty.

**PAPER TYPE:** Research paper

## I. Introduction

### 1.1 Background and Motivation of the Study

The world has witnessed rising poverty trends resulting from various economic crises including; the great depression of 1929 to 1939, global financial crisis of 2007-2010 (Calvo, 2010), and the 2019 Covid 19 debt crisis, as high interest rates depressed interest-sensitive spending which in turn reduced production consequently reducing incomes (Estevao, 2022; Romer, 2022). Kirchene and Mirakhor (2009) notes that eminent economists during the great depression tried to establish a banking system, based on Islamic financing (zero nominal interest rate), “Chicago Reform Plan”. While some studies have tried to establish the relationship between Islamic project financing and poverty trends, they have not explored the phenomenon exhaustively. In the world today out of the 195 countries only 22 are high income countries, 127 are low and middle income countries and 46 are low income (poor) according to the World Bank groupings (World Bank, n.d.). Several countries, world-over, seek interest-free financing offered by Islamic Development Bank (IsDB) established in 1975 to alleviate poverty through project financing development within the principles and dictates of Islamic law (Chachi, 2005; IsDB, 2004).

Some European entities engaged in Islamic project financing with Egypt in the 1854 to 1956 during the construction of the Suez Canal and this boosted economic activity in the area (Piquet, 2004). Contemporary Islamic financing (Project form) started in Gulf cooperation countries (GCC), North African countries, and a few Asian countries. Today there is an ongoing expansion and growing economic significance of Islamic project financing across many parts of the world, encompassing regions like; Europe (Ainley et al., 2007; Ernst & Young, 2015), Asia (IRTI, 2017; Yordanova, 2018), America (Kimberly, 2006; Zyp, 2009), Africa (Qasaymeh, 2011), Australia (Khanam et al., 2014), and it has been adopted in more the 136 countries (GIFR, 2019; Refinitiv Eikon, n.d.). This development has been strongly welcomed by development organisations such as the World Bank, IMF, and UNDP, who now endorse Islamic project financing as an important instrument for tackling poverty (World Bank & Islamic Development Bank Group, 2017).

Shabbir et al. (2018) and Al-Jarhi (2017) proposed models of Islamic modes of finance through their distinct macroeconomic advantages, as a workable plan to reduce poverty in society. The underpinning theory of the study is the public policy theory were, the tools of economics are used to; promote poverty mitigation with formulating policies of Islamically financing projects, with evidence from the study findings. Study findings develop policy discussions regarding allocation of political attention to the policy topics of poverty mitigation and their relation to Islamic project financing, in order to generate information, that facilitates public policy choices, (Anonymous, 2019; B. D. Jones & Baumgartner, 2005; Mustafa et al., 2021).

The Islamic Development Bank (IsDB) is a multilateral and universal development bank with one of its objectives being poverty alleviation among member countries, through applying the principles of Islamic law. It is in this context that this bank was chosen for the study, since it could provide the most reliable, relevant and comprehensive Project financing study variable at country level. Today it is the biggest financial institution offering Islamic financing worldwide, with operations in 57 countries. Daud and Azam (2011) argues that challenges (including poverty alleviation) confronting the majority of IsDB member countries, could be resolved through its modes of financing. However, for a long time since 1976 (1396H), the Islamic Development Bank has been giving project money to these countries amounting to US\$74 billion by 31st December 2021 (IsDB, 2021), without measuring the impact of this money on the poverty levels of those countries.

Contracts of project financing by the Islamic Development Bank (IsDB) are participatory to all stakeholders, with products based on the zero nominal interest rate model. The stakeholder theory is a view of capitalism stressing the interconnected relationships between a business and its customers, suppliers, employees, investors, communities and others who have a stake in the entire organization for enhanced output efficiency. The theory argues that a firm should create value for all stakeholders, not just shareholders (Freeman & Dmytriyev, 2017). IsDB contracts create interconnections between all stakeholders and create value through enhanced output efficiency. As revealed in section 2 Elden et al. (2019), Lawal & Imam, (2016), and Alsagoff & Surono (2016) conducted studies on project contracts financed by IsDB. Although their findings gave positive relationships their study methodologies had low time and geographical scopes thus calling for a study of higher scope to merit generalisation.

Preliminary findings from previous researchers before analysis of the data retrieved were bidirectional in measuring the relationship between project financing amounts and incomes (poverty levels) (as elaborated in section 2 in: Abba & Ngah, 2020; Boukhatem & B Moussa, 2018; Hassan et al., 2017; Ledhem & Moussaoui, 2021; Mihajat, 2011; Parewangi & Iskandar, 2020; Tabash & Dhankar, 2014). However, all these have used differing; key study variables, geographical scopes, time scopes and research methodologies to the current study.

### 1.2 Research Problem and Justification.

The background presented in section 1, and the literature reviewed in section 2, reveal that the Islamic Development Bank (IsDB) since 1975 has been providing project financing (amounting to US\$ 74billion) to some countries with the aim of poverty alleviation as one of its objectives, through the Profit and Loss Sharing "zero nominal interest rate" model (Al-Jarhi, 2017; IsDB, 2004). Although a number of studies have related Islamic financing with the Poverty trends, only a limited answers have been given, and even some relationships provided are bidirectional. Some of the countries that have been receiving Islamic financing from IsDB are noted to be among the poor

countries while others are not poor, as per the World Bank grouping. For instance, in the period 2006 to 2021, the (GNI per capita PPP) of; Chad, Uganda, Cameroun, Senegal, and Sierra Leone, was ranging between US\$ 890 and 3780 (low income). While,; Saudi Arabia, Turkey, Indonesia, Egypt, and Malaysia, ranged between US\$ 5950 and 47790 (high income) (IsDB, 2020; World Bank Data, n.d.). The variance may be attributed to the variance in the amounts/value of Islamic financing received.

However, no research has been able to measure the relationship of Islamic project financing by IsDB to the poverty trends of the countries benefiting from this financing. Therefore, there is a need to investigate the relationship between the amounts of Islamic project financing by IsDB and the Gross National Income Per capita Purchasing Power Parity.

This study is justified because for a long time, the Islamic Development Bank has been giving money (in form of project contracts) to various countries amounting to US\$74 billion by 31st December 2021 (IsDB, 2021), without measuring the relationship of this money to the poverty trends of those countries. If this continues without knowing how it performing, the bank which is the biggest offering these products in the world, may not be achieving the purpose for which it was established. Therefore, without this study, the bank will not know whether the purpose (of poverty alleviation) for which it was established is being achieved which is not good for the world, because this ignorance could escalate poverty while it could have been mitigated.

### 1.3 Purpose, Objective and Hypothesis of the Study

The main purpose of this study is to analyse the empirical relationships between project financing (measured as value/amount received), and the poverty trends (measured as Gross National Income Per capita Purchasing Power Parity), for countries that receive financing from the Islamic Development Bank for the years 2002 to 2021.

The objective of the study is;

To assess the relationship between the value/amount of Project Financing by IsDB, and the GNI per capita (PPP), for countries that are financed by the Islamic Development Bank for the years 2002 to 2021.

The hypothesis for the study is;

While studies found positive relationships between Islamic project financing and poverty reduction they were based on short-run dynamics of poverty and small geographical scopes. Parewangi and Iskandar's (2020) study that was based on both short-run and long run dynamics of poverty, found out that the structural break in 2006 significantly affects the short-run dynamics of poverty positively, while the impact of the structural break in 2010 based on long run dynamics of poverty is mixed (bidirectional). A hypothesis was made, as a proposal about a solution to a problem ("intelligent" or an "educated" guess tested to answer and solve a problem). A null hypothesis was stated because literature revealed bidirectional relationships between variables being investigated and an alternative hypothesis would have been directional. The objective was addressed with the following null hypothesis;

$H_0$  There is no statistically significant relationship between the value/amount of Project Financing by IsDB, and the GNI per capita (PPP), for countries that are financed by the Islamic Development Bank.

### 1.4 Contribution and Significance of the paper

The paper presents empirical facts and figures that can vitally enlighten and steer the drafting and/or improvement of policies for the mitigation of poverty employing Islamic project financing at national, regional, and global levels. Islamic Development Bank and its (IsDB) beneficiaries will be availed with its performance details, as the research results are a measurement of the performance of products offered by the bank, for the purpose of transforming especially poor communities and countries out of poverty across the world.

Policy makers and regulators may utilize the information processed by the study to guide them in policy and regulation formulation on how they could engage mitigating poverty with Islamic financing.

Financial institutions and practitioners will be informed by the findings about the position of Islamic financing in the financial services industry. This will equip them with the knowledge to formulate appropriate and competitive financial schemes for better services to enhance and strengthen the industry.

Development agencies e.g. United Nations, International Monetary Fund and the World Bank will use the findings of the empirical study to validate their endorsement of Islamic financing as an important instrument for tackling

poverty, and develop programs of profit and loss sharing nature that are resilient in times of uncertainty to avert financial crisis like; the credit crunch 2007-2008, Covid-19 pandemic-related debt problems.

Academia and researchers will use the study for further research in the areas related to; Islamic financing and poverty.

### 1.5 Contextual and Operational Definitions of Core Terms

The core terms of the study are contextually and/or operationally defined as follows:

**Cumulative Islamic financing by IsDB:** as adopted from the Islamic Development Bank annual reports are the accumulated financing approvals of the bank to a particular country/economy in that particular year since the 1396 H (1976). Figures are expressed in United States dollars and are net of cancellation of approvals including; APIF, EFS, IBP, ICD Funds, ISFD, ITFO, SAO, STI, Special Assistance, Trust Funds, and WAQF.

According to Jones J (1964) a **Country** is a distinct part of the world, such as a state, nation, or other political entity. It may be a sovereign state or make up one part of a larger state. According to the Worldometer (2022), there are 195 countries in the world today. This total comprises 193 countries that are member states of the United Nations and 2 countries that are non-member observer states: the Holy See and the State of Palestine (West bank and Gaza).

**Gross National Income (GNI) in Purchasing Power Parity (PPP) per capita:** as adopted from the World Bank, GNI per capita is the average total domestic and foreign output claimed by residents of a country, consisting of Gross Domestic Product (GDP), plus factor incomes earned by foreign residents, minus income earned in the domestic economy by non-residents, divided by the midyear population. While Purchasing power parity (PPP) measures how much a currency can buy in terms of an international benchmark (usually dollars) since the cost of goods and services differs between countries. GNI per capita therefore is a measure of income or poverty trends.

**Islamic financing:** is the provision of financial services involving accepting, safeguarding, and lending out money following Islamic jurisprudence, it is interest-free and advocates for sharing profit and risk. It integrates ethics, moral values, and social welfare within the financing operations. It "is not constructively built from classical jurisprudence", but follows conventional financing and deviates from it "only in so far as some conventional practices are deemed forbidden under Shariah (Islamic law) (as adopted from El-Gamal, 2006; Farooq, 2006; Hussain et al., 2015; Kammer et al., 2015; Khan, 2013; Malik & Hayat, 2014).

**Poverty and poverty mitigation:** we adopt the World Bank's definition of poverty as: "a condition, financial or non-financial, that exposes and/or subjects one to hunger, lack of shelter, being sick and not being able to see a doctor, not having access to school and not knowing how to read, not having a job, fear for the future, living one day at a time, losing a child to illness brought about by unclean water, powerlessness, and lack of representation and freedom." This holistic definition encompasses living conditions, and an inability to meet basic needs because food, clean drinking water, proper sanitation, education, health care, and other social services are inaccessible. Because this broader measure of poverty expands the contributors and causes of poverty, the World Bank developed indicators to assess the non-income facets of poverty as well. These indicators include education, health, access to social services, social exclusion, access to social capital, and vulnerability. Thus, poverty is a complex problem with many aspects, faces, and causes. And poverty mitigation is poverty reduction.

**Project Financing by IsDB:** as adopted from the Islamic Development Bank annual report of 2004 are tangible or intangible developmental activities with a defined scope, specific end results (or deliverables) and assigned resources approved by a designated authority in IsDB group for a given country or region.

**Public policy:** as adopted from Dye (1972) and Birkland (2019) is 'anything a government chooses to do or not to do'.

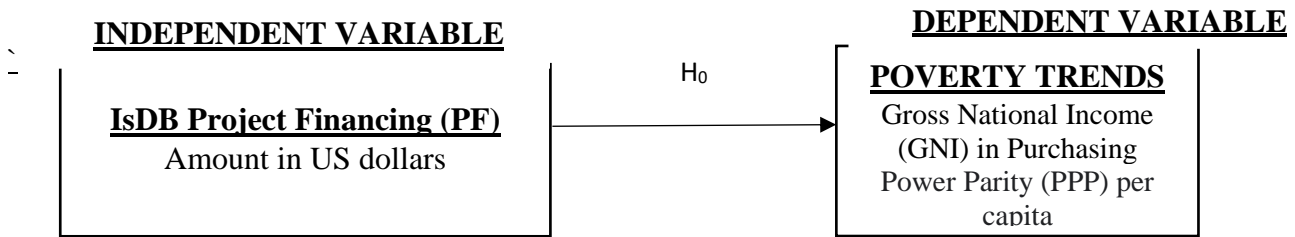
### 1.6 Conceptual and theoretical framework

The conceptual and theoretical framework of the paper ascends from arrays of theoretical and empirical reviews resulting into 2 concepts; Project financing by IsDB (PF) and poverty trends [Gross National Income per capita PPP (GNI PPP)]. These variables and the hypothesized relationships were summarized as shown in the conceptual framework.



A universal comparative overview of the GNI Per Capita, PPP and the Project financing by IsDB amounts ostensibly shows that, generally, countries with high Project financing by IsDB amounts have higher GNI Per Capita, PPP than their counter parts. Thus, the conceptual framework of the study is stemmed from a postulation that the dollar amount/value of Project financing by IsDB, as shown by PF dollar amount/values, has a significant and positive explanatory (causal) relationship with the poverty trends, as indicated by GNI Per Capita, PPP for any country. Apparently, this relationship has not been analysed in the recent past basing on the geographical scope, units of analysis, and key research variables that motivate this study. Thus, the conceptual framework of the study is as shown by Fig. 1 herein:

Fig. 1 Summary of the empirical investigation/model



Source: An overview of the data on GNI Per Capita, PPP and amount of IsDB Project financing, from the IsDB. And a combination of models from previous studies (Al-Jarhi, 2017; Parewangi & Iskandar, 2020; Shabbir et al., 2018)

## 2. Literature review

Islamic project financing is contract-based falling under three categories: Profit-and-loss sharing (PLS), non-Profit-and-loss sharing mark-up contracts, and fee-based products, with three key principles: equity, participation, and ownership (Al-jaberi et al., 2014; Hussain et al., 2015; Mumtaz et al., 2015).

### 2.1 Previous empirical studies

Studies related to Islamic Project financing and poverty have been conducted among these are;

**Hassan et al. (2017)** checked for a positive relationship between Islamic microfinance and the socio-economic welfare of women benefiting from Islami bank Bangladesh limited, used the theory of "added worker effects" of women, triangulated qualitative & quantitative data collection and analysis approaches with open and closed-ended survey questionnaires. Separated the sample of 700 equally into two groups (experimental & comparison) as adopted from Nader (2008) and also held interviews with 5 key microfinance specialists. Findings showed that the growth in women's revenues and resources plays an important role in improving women's financial freedom and sense of self-possession.

**Ledhem & Moussaoui (2021)** by conducting a parametric analysis represented by vector autoregression (VAR) Granger causality and a non-parametric analysis represented in the bootstrapped quantile regression and found that Islamic finance (from a sample of all Islamic banks) is a vital contributor to economic growth through financing entrepreneurial domains in Malaysia's small and medium-sized enterprises, covering a period from 2014 first quarter until 2019 third quarter.

**Brekke (2018)** while finding out whether and how religious norms cause financial exclusion of Muslims in the West, used the Interest-free or Halaal money theory, through mixed quantitative and qualitative approaches, and collected data in Norway during 2015 and 2016. The data included a survey of just over 700 Muslims with a five-point Likert-scale questionnaire; 10 interviews; and three focus groups. Data was collected online, and through self-administration by an assistant and the researcher. Data analysis was mixed quantitative and qualitative. Findings were that: Lack of an Islamic alternative is a real problem in Muslim's lives. And there is a real possibility that religious norms against conventional banking cause financial exclusion.

**Abba & Ngah (2020)** in their exploratory research relied on secondary sources of data such as journals, periodicals, conference proceedings, textbooks, internet searches, and other sources of published data, to relate Islamic banking

to poverty. Their analysis found that the Interest-free service of Islamic banking is indeed a means of alleviating poverty in Abuja, Nigeria.

**Mihajat (2011)** while developing an Islamic microfinance model using the "cooperative among the members" concept for Islamic banking in Indonesia for poverty alleviation, found that group-based lending programs are proven to be among the effective tools to reduce transaction costs and lower exposure to numerous financial risks concerning providing credit to the rural poor.

**Musari (2017)** conducted qualitative research with an explanation approach, through library research, reviewing the available literature and the experience of organizations related to nano finance. This applied research revealed that IsDB's financing relates positively to poverty diminution.

**Tahiri Jouti (2018)** in a paper aimed at defining a methodology to assess the impact of introducing Islamic finance on financial inclusion, used an Islamic Financial model, a qualitative approach to conduct a literature review to understand the link between Islamic finance and financial inclusion and presented a Conceptual framework to assess the impact of introducing Islamic finance on financial inclusion. The findings were that Islamic finance can not only enhance financial inclusion but also create financial migration (to Islamic financing).

**Boukhatem & B Moussa (2018)** while assessing the empirical effect that Islamic banking loans had on the economic growth of 13 countries in the Middle East and North Africa (MENA) region during the 2000 and 2014 period, used panel data from annual country-specific observations, conducted; cross-section dependence (CD) test, Panel unit root tests, Westerlund panel cointegration tests, and pooled fully-modified OLS regressions (FMOLS). Findings revealed strong evidence to suggest that financial system development stimulated economic growth.

**Tabash and Dhankar's (2014)** study used annual time-series data obtained from Islamic banks with Gross Domestic Product values of Qatar, Bahrain, and the United Arab Emirates. Data analysis comprised the unit root test, co-integration test, and Granger causality tests. Results generally signify that in the long run Islamic banks' financing is positive and significantly correlated with economic growth.

**Parewangi & Iskandar (2020)** used annual frequency data of Islamic domestic credit or financing schemes in working capital and investment scheme for Micro, Small, and Medium Enterprises (MSMEs) from the Indonesian statistics office. Analysed the short and long-run asymmetrical relationship between Islamic financing and poverty they applied Autoregressive Distributed Lag model on Indonesian data from 2003 to 2017 and this provided interesting results: first, Islamic financing significantly helps to reduce the poverty both in the short run and also in long run. Second, the role of GDP per capita in poverty reduction is inconclusive. Third, the structural break in 2006 significantly affects the short-run dynamics of poverty, while the impact of the structural break in 2010 is mixed. Fourth, there is evidence that Islamic financing responds to the poverty condition in Indonesia.

**Ledhem and Mekidiche's 2020** study of economic growth and financial performance of Islamic banks in Malaysia, Indonesia, Brunei, Turkey and Saudi Arabia used a dynamic panel system GMM with CAMELS approach. Their findings demonstrated that the only significant factor of the financial performance of Islamic finance, which affects the endogenous economic growth, is profitability through return on equity (ROE).

**Abdu et al. (2018)** examined the effect of the introduction of Islamic banking and finance on financial inclusion in Sub-Sahara Africa and applied the binary Probit regression model, Tobit regression model, and Juhn-Murphy-Pierce decomposition technique to estimate financial inclusion. Used quantitative data from the World Bank's Global Financial inclusion index (Global Findex) dataset of 2015. Findings were that the Islamic banking and finance system in some Organization of Islamic Cooperation (OIC) countries (with Islamic Banking) in Sub-Saharan Africa (SSA) enhanced financial inclusion in the sub-region.

**Elden et al. (2019)** in a case analysis to investigate the impact of the Abu-Halima project, funded by the Islamic Development Bank (IsDB) and executed by the Bank of Khartoum in Sudan as a local partner, relied on quantitative and qualitative approaches of research. Collected data from 125 borrowers and 5 managers of IsDB, using personal structured interviews and semi-structured interviews respectively. Findings revealed that there is an enhanced standard of living and increased expenditure of borrowers who benefit from the project. Alsagoff & Surono (2016) conducted case studies of 4 projects financed by the Bank of Khartoum (IRADA microfinance). Through sharing

risks and profits with the poor, the Bank of Khartoum (IRADA microfinance) has helped thousands of vulnerable people in Sudan to earn a better living by generating jobs thus alleviating poverty. Beneficiaries received more income each, by sharing the venture's profits while being co-owners of the venture.

**Lawal & Imam (2016)** used Islamic banks' financing credited to the private sector through modes of financing as a proxy for Islamic finance, Foreign Direct Investment (FDI) and Trade as an explanatory variable while Real Gross Domestic Product (RGDP) was used as a measure of real economic growth called the dependent variables. Time series data from 2012 to 2015 was used quarterly. Data analysis was by; Ordinary Least Square (OLS), the unit root test, the cointegration test, and the Granger Causality tests. Empirical results revealed that there is a strong positive association between Islamic banks' financing and economic growth in Nigeria. They also found out that, improvement of the Islamic financial institutions in a country would be important for poverty reduction.

**Alsagoff & Ahmed's (n.d.)** Islamic Development Bank publication used track records and successful intervention analysis of providing financial and non-financial services (Technical Assistance through capacity building & trading) to the poor, in the Deprived Families Economic Empowerment Program (DEEP). Findings reveal that the program successfully reduced the poverty of the beneficiaries. DEEP was the winner of the 2011 "Palestine International Award for Excellence and Creativity", as the innovation created 16,042 projects and 52,000 direct and indirect job opportunities. Although most of these studies findings reveal positive relationships between projects financing amounts and poverty trends none considered the IsDB as a key variable. Some took qualitative approaches and developed project financing models that are to be verified by this quantitative approach study. Most of the previous studies were of low scope (geographical, time,) and considered different content to merit generalization. Although Parewangi & Iskandar's (2020) study was longitudinal, it was limited to only Indonesia and findings were bidirectional, therefore calling for a more robust investigation. This study is the only longitudinal, with a wider scope (57 countries) and considering IsDB project financing as one of the variables, constituting a reliable, valid and robust investigation.

### 3. Methodology

The research adopted a positivism paradigm because the investigator was positioned independent from the study to capture as much data as possible from a wider scope in terms of geographical time and content scope, while some studies done with interpretivism paradigms resulted into models and theories as derivatives that require verification, the main purpose of this study. The study is designed as a longitudinal, desk-top triangulation of correlation, regression, hypothesis-testing & comparative approaches to investigate the empirical relationships between the Project Financing dollar amounts by IsDB (PF) and the GNI Per Capita, PPP for the years 2002 to 2021. The units of analysis are countries that are financed by Islamic Development Bank. The units of inquiry were; IsDB reports Of 2002 to 2021 and the World Bank open database on the World Bank website. All relevant ethical protocols were followed during the implementation of this study.

Data on Project Financing dollar amounts by IsDB (PF) was retrieved from IsDB's Data Resources and Statistics Division, and data on poverty trends was derived from the world Development Indicators that are presented by the World Bank as GNI Per Capita, PPP. The main data for the study was predominantly secondary and quantitative.

The targeted study population and sample size is 57 countries, which were purposively selected to cover all the countries that receive financing from the Islamic development bank with the relevant data sets, in order to get the most comprehensive comparative analysis of the key research variables for the years 2002 to 2021.

The main research variables are measured exactly according to their respective sources. The Project Financing dollar amounts by IsDB that serve as the predictor variables for the study are presented in exactly the same way as given by the IsDB's Data Resources and Statistics Division published in the IsDB annual reports 2002 to 2021. And the GNI Per Capita, PPP, considered as the response variable is measured exactly as given by World Development Indicators that are published by the World Bank open databases for the years 2002 to 2021. The reliability and validity of the study emerge from using the most relevant forms of empirical data that were methodically, skilfully, meticulously, diligently and ethically compiled and validated by the IsDB's Data Resources and Statistics Division and the World bank, which area dependable and ethical organizations. For instance, The IsDB's data computing

methodology, on which some of the data in this report is based, has been authenticated by the Islamic development Bank Institute (IsDBI), a globally recognised research organisation.

Panel data were analysed using mainly econometric estimation modelling with the application of the Excel spreadsheet and Stata 13 computer software to emerge with descriptive and inferential statistics.

### 3.1 Estimating model

This econometric activity is intended to deal with empirical description and forecasting, while also quantifying structural or causal relationships, as essentials for policy evaluation and for testing theories. According to the literature reviewed, most studies have agreed to adopt panel regression models such as Panel GMM, Panel regression (fixed-effects), thus, this study applied the panel GMM estimation. This is motivated by the desire of exploiting panel data for controlling unobserved time-invariant heterogeneity in cross-sectional models and the use of panel data to disentangle components of variance and estimating transition probabilities and more generally to study the dynamics of cross-sectional populations while including lagged endogenous regressors, like dealing with missing data which is found in both the datasets of Project Islamic finance and GNI per capita PPP (Arellano, 2009; Williams et al., 2018). The general model that was estimated as in the summary of the empirical investigation (Figure 1) was the linear dynamic panel data (LDPD) and was based on the 2 lagged dependent variable being included as an explanatory/independent variable.

In this case, the model is:

$$y_{it} = \beta_1 + \delta y_{i,t-2} + x_{it}\beta_2 + \mu_i + \varepsilon_{it} \dots\dots\dots 3.1$$

Where:

where  $i$  denotes an observation unit which is a country, in this case,  $t$  denotes a time period, in the year,  $\beta_1$  is the autoregressive coefficient parameter,  $\mu_i$  is the unobserved individual country (fixed) effect for  $i$  and  $\varepsilon_{it}$  is an unobserved error term.  $x_{it}$  is the vector of regressors and  $\beta_2$  is a vector of coefficients of the regressors. Due to the challenges of obtaining efficient estimators in dynamic panel data, most studies have recommended the use of the Generalized Method of Moments (GMM) (Roodman, 2009) and a popular of which is this linear dynamic panel data estimator. In this study, therefore, the linear dynamic panel data estimator was run to eliminate serial correlation in error terms.

The model in real terms is specified as;

$$\ln GNI_{it} = \beta_1 + \delta \ln GNI_{i,t-2} + \ln PF_{it}\beta_2 + \mu_i + \varepsilon_{it} \dots\dots\dots 3.2$$

Generally Islamic financing performance has shown a tendency to persevere over time, due to macroeconomics shocks on GDP (Athanasoglou et al., 2005). Hence, we adopt a dynamic specification of the model by including a 2 lagged dependent variable among the regressors (Arellano, 2003; Croissant & Giovanni Millo, 2018), the regressions of the equations are augmented with two-lagged GNI as in equation 3.1 and 3.2 Where  $Y_{i,t-2}$  is the two-years lagged GNI and  $\delta$  is a coefficient.

### 3.2 Econometric methodology

The estimation problem raised by the potential existence of unobserved individual effects, the endogeneity, and the correlation between regressors and lagged variables, make fixed or random effects unsuitable for the estimation. Such methods generate bias and inaccurate results (Baltagi and Kao, 2001). Arellano & Bond (1991) estimated the specific model for the first difference, which can remove the unobserved individual effect, in which the estimation uses all existing lagged values of the dependent variable and lagged values of the exogenous regressors as an instrument. Blundell and Bond (1998) indicated that when the dependent variable and the explanatory variables are determined across time, the lagged levels of these variables are weak instruments for the regression equation of differences. Later they developed a new method called the GMM system estimator that included lagged stages and lagged differences as instruments. Roodman (2009) specified GMM as a system estimation that can resolve the problems correlated to endogeneity, unseen heterogeneity and autocorrelation. For this study, the system GMM estimator was applied to conduct the empirical investigation. Accordingly, the GMM model is.



$$y = \hat{x}\beta + \varepsilon \quad \forall \hat{E}(\varepsilon|z) = 0 \dots\dots\dots 3.3$$

In which:

$\beta$  is a support vector of coefficients,  $y$  and  $\varepsilon$  are random variables,  $x = (x_1, \dots, x_k)'$  is a column vector of  $k$  regressors,  $z = (z_1, \dots, z_j)'$  is a column vector of  $j$  instruments,  $x$  and  $z$  can share elements and  $j \geq k$ . We use  $X$ ,  $Y$ , and  $Z$  to signify matrices of  $N$  observations for  $x$ ,  $y$ , and  $z$ , and we state  $E = Y - X\beta$ . Given an estimation,  $\hat{\beta}$ , the experimental residuals are  $\hat{E} = (\hat{e}_1, \dots, \hat{e}_N)' = Yx\hat{\beta}$ . We make no statement at this point about  $E(EE' | Z) = \Omega$  excepting that it exists. where  $\Omega(x_1)$  is a symmetric matrix of order  $T - 1$  containing unknown functions of  $x_1$ . The estimator  $\beta$  is unfeasible because  $\Omega(x_1)$  is unknown. Therefore, a nonparametric estimator of  $E(\mu_i^* \mu_i^{*'} | x_i)$  based on within-group residuals is used, as for large  $N$  it can attain same efficiency as the parametric estimator.

**Improved GMM under Heteroskedasticity and Autocorrelation of Unknown Form.**

The basic condition  $E(\mu_i^* | x_i) = 0$  implies that any function of  $x_i$  is uncorrelated to  $\mu_i^*$  and therefore a potential instrumental variable. Thus, any list of moment conditions of the form

$$E[h_t(x_i) \mu_{it}^*] = 0 \quad (t = 1, \dots, T - 1) \dots\dots\dots (3.4)$$

for given functions  $h_t(x_i)$  such that  $\beta$  is identified from (3.4), could be used to obtain a consistent GMM estimator of  $\beta$ .

Arellano's (2009) optimal GMM estimator that can give a linear projection of  $y_i$  on  $x_i$  is;

$$\hat{\beta}_{GMM} = \left[ \left( \sum_i X_i^{*'} Z_i \right) A_N \left( \sum_i Z_i' X_i^* \right) \right]^{-1} \left( \sum_i X_i^{*'} Z_i \right) A_N \left( \sum_i Z_i' Y_i^* \right) \dots\dots\dots (3.5)$$

**4. Presentation, Analysis and Discussion of Results**

**4.0 Presentation of results**

For this study we transformed the data to natural logarithms to base e ,with the aim of producing a reasonably symmetric distribution to provide a good basis for further statistical techniques (West, 2022). The transformed distribution need not be totally normal, although if it is, that would enable more confidence in tests based on smaller samples and might simplify statistical modelling. It is possible to use either natural logarithms to base e or common logarithms to base 10.

**4.1 Descriptive Statistics**

Table 4.1: Summary of data by stata 13

```
. xtsum lnGNI lnPF
```

Variable		Mean	Std. Dev.	Min	Max	Observations
lnGNI	overall	8.773928	1.229007	6.234411	11.79388	N = 1071
	between		1.221081	6.856745	11.56141	n = 56
	within		.245637	7.775487	9.627329	T-bar = 19.125
lnPF	overall	3.66369	1.595621	-3.912023	7.000334	N = 755
	between		.9521066	.5577564	5.131402	n = 57
	within		1.356985	-4.10023	6.916367	T-bar = 13.2456

**4.2 Analysis**

H<sub>0</sub> There is no statistically significant relationship between the value/amount of Project Financing by IsDB, and the GNI per capita (PPP), for countries that are financed by the Islamic Development Bank.

$$\ln GNI_{it} = \beta_1 + \delta \ln GNI_{i,t-2} + PF_{it} \beta_2 + \mu_i + \varepsilon_{it} \dots \dots \dots 3.6$$

Table 4.2: Linear dynamic panel data results on lnGNI and lnPF from Stata 13

```
. xtddpd lnGNI lnPF, dgmmlv(lnGNI, lagrange(2)) vce(robust) artests(2)

Dynamic panel-data estimation      Number of obs      =      723
Group variable: Country           Number of groups   =      56
Time variable: Year

Obs per group:   min =      2
                  avg = 12.91071
                  max =      19

Number of instruments =    160      Wald chi2(1)      =    27.37
                                      Prob > chi2       =    0.0000

One-step results
                                (Std. Err. adjusted for clustering on Country)

+-----+-----+-----+-----+-----+-----+
| lnGNI | Coef. | Robust Std. Err. | z | P>|z| | [95% Conf. Interval] |
+-----+-----+-----+-----+-----+-----+
| lnPF  | .0335422 | .006412 | 5.23 | 0.000 | .020975 .0461095 |
| _cons | 8.501819 | .1589534 | 53.49 | 0.000 | 8.190276 8.813362 |
+-----+-----+-----+-----+-----+

Instruments for differenced equation
GMM-type: L(2/.)lnGNI
Instruments for level equation
Standard: _cons
```

Table 4.3 Results

Hypothesis	Coefficient	P	Statistical Significance	Relationship	Result
H <sub>0</sub>	0.0335422	0.000	Significant	Positive	Reject H <sub>0</sub>

Reject H<sub>0</sub> null hypothesis because at 95% confidence interval (Coeff = 0.0335422, P = 0.000). Project financing by ISDB is significantly and positively associated with GNI per capita (PPP). A unit increase in Islamic project financing increases the GNI per capita (PPP) by about 3.35% (Stata Table 4.2).

**4.3 Discussion of Results**

There is a significant positive (Coeff = 0.0335422, P = 0.000) relationship between Project Financing by IsDB, and the GNI per capita (PPP), which reinforces the idea that a well-functioning Islamic finance and banking system promotes poverty reduction. This disqualifies Parewangi and Iskandar's (2020) findings on the long run dynamics of poverty with Islamic financing in Indonesia, qualifying the positive relationship as in most studies reviewed. Post estimation two-step system GMM diagnostics were performed; the Sargan test of over-identifying restrictions to test the validity of the instruments, and Arellano test for zero autocorrelation in first-differenced errors. In both H<sub>0</sub> was accepted as; over identifying restrictions are valid and no autocorrelation respectively.

**5. Areas for future research**

This study depended on countries that benefit from IsDB financing, as this was the most relevant, reliable and valid at the time in the knowledge of the investigator, due to limitations of time, financial resources Islamic financing geographical coverage. Therefore, future research could focus in these areas: other dimensions of Islamic financing

(Sukuk, Islamic Markets, IsDB prudential and structural parameters, financial performance of Islamic finance variables based on CAMELS model).

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### Institutional Review Board Statement

The present study did not involve humans or animals.

### Informed Consent Statement

Not applicable.

### Data Availability Statement

The datasets used and analysed during the current study are available from the corresponding author upon reasonable request.

### Conflicts of Interest

The author declares no conflict of interest.

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