

## Macroeconomics, sharia, and economic inequality in The Organization of Islamic Cooperation (OIC): An empirical study

### Makroekonomi, syariah, dan ketimpangan ekonomi di Organization of Islamic Cooperation (OIC): Sebuah kajian empiris

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#### ABSTRACT

*This study aimed to determine the factors that influence the level of income inequality in member countries of the Organization of Islamic Cooperation (OIC). The research period used was from 2012 to 2021, using the System Generalized Method of Moment (GMM) analysis tool. The variables used consist of the Gini ratio (proxy of income inequality), economic growth, Foreign Direct Investment (FDI), inflation, the average length of schooling (human capital proxy), and corruption perception index (sharia proxy). The results showed that sharia, human, and inflation variables had a negative effect, while economic growth and FDI had a positive and significant effect on income inequality in OIC countries. These results show that in addition to economic factors and human capital, sharia elements cannot be released in overcoming income inequality in OIC countries. Sharia is a driving factor in a more even distribution of income.*

**Keywords:** *Income Inequality, Organization of Islamic Cooperation (OIC), System Generalized Method of Moment (GMM), Sharia*

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#### ABSTRAK

Penelitian ini bertujuan untuk mengetahui faktor-faktor yang mempengaruhi tingkat ketimpangan pendapatan di negara anggota Organization of Islamic Cooperation (OIC). Periode penelitian yang digunakan adalah dari tahun 2012 sampai dengan tahun 2021, dengan menggunakan alat analisis System Generalized Method of Moment (GMM). Variabel yang digunakan terdiri dari rasio gini (proksi ketimpangan pendapatan), pertumbuhan ekonomi, Foreign Direct Investment (FDI), inflasi, rata-rata lama sekolah (proksi human capital), dan indeks persepsi korupsi (proksi syariah). Hasil penelitian menunjukkan bahwa variabel syariah, human, dan inflasi berpengaruh negatif, sedangkan pertumbuhan ekonomi dan FDI berpengaruh positif dan signifikan terhadap ketimpangan pendapatan di negara-negara OIC. Hasil ini menunjukkan bahwa selain faktor ekonomi dan human capital unsur syariah tidak bisa dilepaskan dalam mengatasi ketimpangan pendapatan di negara OIC. Syariah menjadi faktor pendorong dalam distribusi pendapatan yang lebih merata.

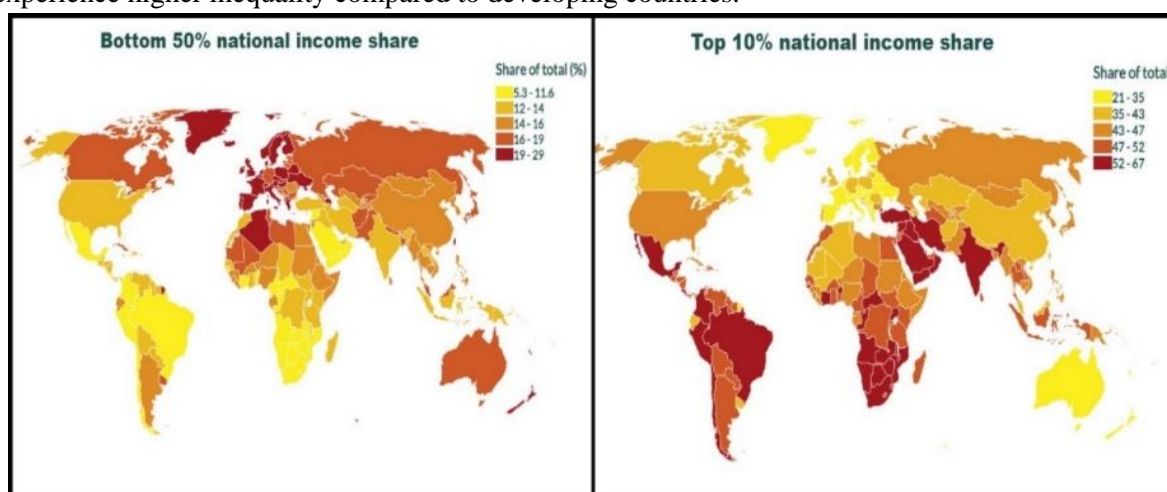
**Kata kunci:** *Ketimpangan Pendapatan, Organization of Islamic Cooperation (OIC), System Generalized Method of Moment (GMM), Syariah*

## I. INTRODUCTION

Income inequality is an important issue in the study of economic development. Development activities cannot be separated from increasing economic growth and equitable distribution of the results of growth, this is the goal to be achieved in the development process. If the goal of development only focuses on high economic growth, then it will ignore equity. When economic growth is only created by a handful of rich people, in the end only the rich enjoy the results of this growth. Meanwhile, other classes of society who do not participate in creating growth, do not get the benefit (Badriah, 2019).

Increasing income inequality has become a global problem, not only for poor or developing countries but also for developed countries. Therefore inequality has become the most discussed economic, social, and political problem. Income inequality in this decade has increased i.e. the richest 10% of people own up to 52% of global income, while the poorest half of the population earns only 8.5%. Global wealth inequality is even more pronounced than income inequality. The poorest half of the global population has almost no wealth at all, owning only 2%. In contrast, the richest 10% of the global population owns 76% of all wealth (Chancel et al., 2022).

Inequality between the rich and the poor has been at its highest level in decades in developed countries, while in developing countries income inequality shows a more mixed trend (Dabla-Norris et al., 2015). The same thing applies to countries that are members of the Organization of Islamic Cooperation (OIC), where income inequality in these countries is more diverse. Developed countries experience higher inequality compared to developing countries.



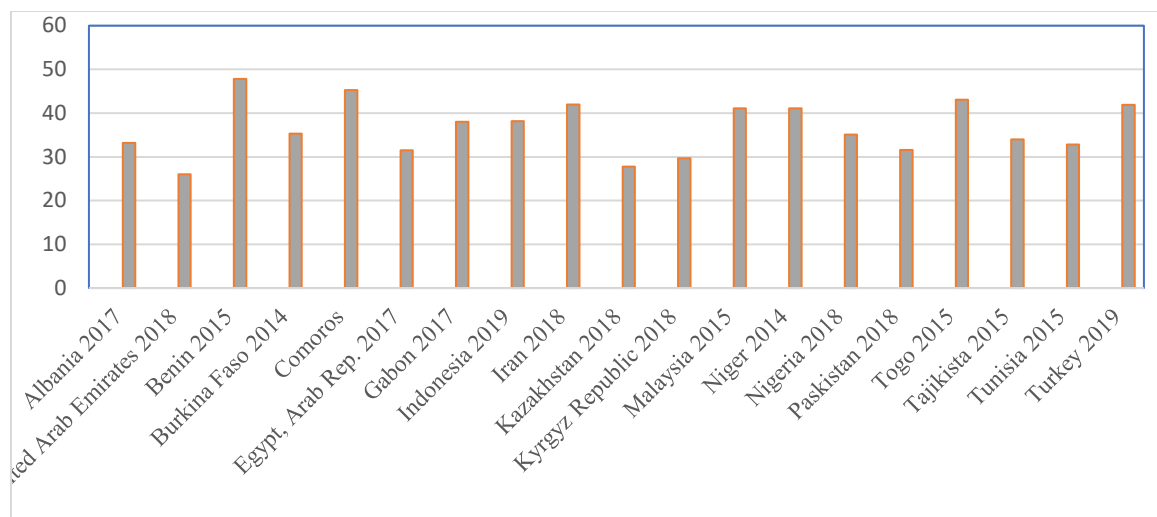
Source: World Inequality Database (2020)

**Figure 1:** National Income Share 2019

In 2019 the income share that occurred in the Organization of Islamic Cooperation (OIC) showed inequality between people. The richest ten percent of people in Organization of Islamic Cooperation (OIC) countries get 52% to 65% of national income. Meanwhile, the bottom 50% of society only earn 5% to 20% of national income. This condition is experienced by Islamic countries in the Middle East and North Africa region. While countries in the Central Asian region have a more even income share.

Income inequality results in a small number of groups enjoying the majority of the income earned. We can see this from the Gini ratio, as an indicator of income inequality experienced by the community. The Gini ratio describes the severity of income inequality between rich and poor in a country whose value is between 0 and 1 (M. P. Todaro, 2003a).

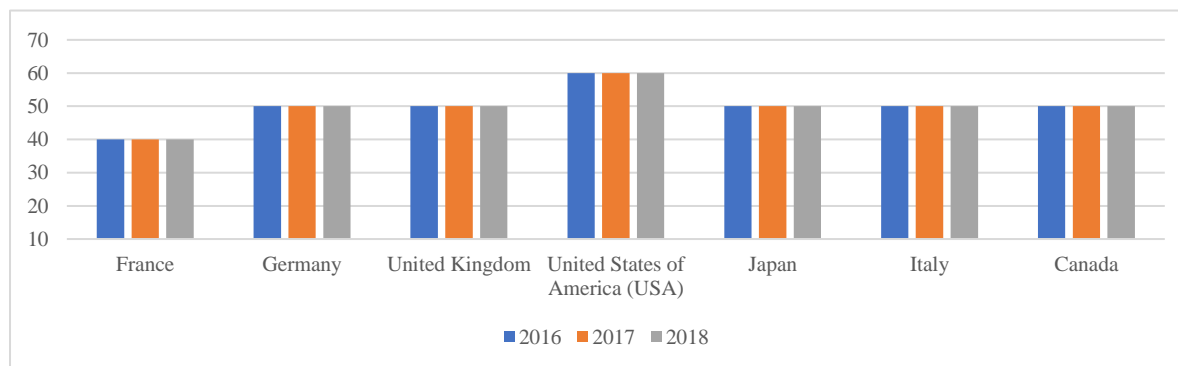
The division of the categories is as follows: below 0.35 means low inequality, this category is Kazakhstan, Albania, Egypt, Kyrgyz, Pakistan, Tajikistan, Tunisia, and the United Arab Emirates (UAE). The Gini ratio value between 0.35 and 0.5 means moderate inequality in the figure, the countries included in this category are Benin, Burkina Faso, Gabon, Comoros, Indonesia, Iran, Malaysia, Nigeria, Togo, and Turkey. This shows that there are problems with those who enjoy increased economic growth.



Sources: World Bank (2022); World Inequality Database (2020)

**Figure 2:** Gini Ratio of the Organization of Islamic Cooperation (OIC) Member Countries

Inequality conditions in OIC countries are better than in developed countries that are members of the G7. From 2016 to 2018, the Gini ratio of G7 members has not changed much at all. Of the 7 member countries, only France has a Gini ratio below 0.4, the rest average around 0.5, and even the USA is around 0.6. This indicates that income inequality in developed countries such as the G7 is relatively high.



Source: World Bank (2022); World Inequality Database (2020)

**Figure 3:** Gini Ratio of G7 Member Countries

Widespread income inequality, primarily due to unequal opportunities in society, is undesirable from a social justice perspective. In addition, persistent income inequality could jeopardize sustainable economic growth. Therefore, income inequality is not solely influenced by economic factors but also non-economic factors (such as moral, intellectual, social, political, and even sharia decline). Therefore, in the context of the development of a country, it cannot be separated from the elements of human resources, justice, sharia, and the country's economic resources (Chapra, 1993). Thus, all, including member countries of the Organization of Islamic Cooperation (OIC), seek to ensure basic livelihoods for the poor and disadvantaged by establishing social protection systems and reducing inequalities in wealth and income through the implementation of redistributive policies (Lee & Lee, 2018).

Factors that affect the level of income inequality are influenced by the economic sector as evidenced by the results of the research by Bucevska (2020) and Bouincha & Karim (2018) who found economic growth encourages increased income in lower class society and reduces inequality levels. Some other studies argue that increasing human resources through education is a key factor (Cram, 2017; Lee & Lee, 2018). Education is a means of creating innovative and creative human resources, this cannot be separated from the government's role through fiscal policy (Kharlamova et al., 2018; Ulu, 2018; Wicaksono et al., 2017), especially in developing countries.

Other studies that focus on examining income inequality in OIC member countries find that the financial sector is a determining factor in reducing income inequality. Increasing access to finance for the community has an impact on more equitable income (Abdulkarim & Ali, 2019; Linawati et al.,

2021). Mohamad et al., (2020) presented the results of their research that the existence of Islamic banking has had an impact on reducing inequality through Corporate Social Responsibility (CSR) funding channels.

Based on the background and previous research on income inequality, a lot has indeed been done before. Including the Organization of Islamic Cooperation (OIC) countries, but previous research only focused on economic factors or human capital factors and fiscal policy. In fact, in the case of OIC countries where the majority are Islam, sharia factors should be a concern in looking at income inequality (Esmaeili et al., 2011; Fauziana et al., 2022; Sheikh et al., 2022). Because sharia is a value that cannot be released in social, political, and even economic life for Islamic societies. Sharia values are seen as a manifestation of Allah's will in guiding the lives of Muslims. The main objective of implementing sharia values is to achieve obedience to Allah, creating social justice.

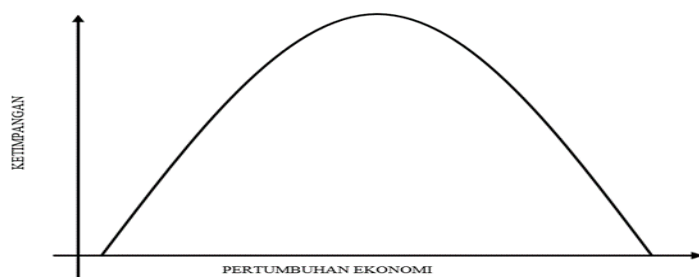
Individuals and Islamic society are required to live in accordance with Islamic values and principles contained in sharia. It involves obedience to Allah, devotion to oneself, and carrying out actions according to Islamic teachings in all aspects of daily life. In the end, it is reflected in the behavior of the people who should be far from corrupt practices, fraud, and all kinds of abuse of power (Anto, M., 2011). In the context of economic development, this manipulative behavior can have a detrimental impact on the growth and stability, and progress of a country's economy (Gründler & Potrafke, 2019). So to see the factors that influence inequality, the Sharia factor cannot be ignored, so this study tried to answer this. Thus providing a broader picture of viewing inequality in OIC countries.

## II. LITERATURE REVIEW

### Income Inequality and Economic Growth

The trickle-down effect theory explains that economic progress achieved by certain groups in society will automatically flow downwards, creating jobs and economic opportunities which will ultimately result in a more even distribution of economic growth results. This theory implies that economic growth will be followed by a vertical flow from rich individuals to poor individuals that occurs spontaneously (M. P. Todaro, 2003a). This implies that economic progress will flow to the poor evenly.

Kuznet (1955) in Jhingan (2018) explained that there is a relationship between income inequality and economic growth. Economic growth is a long-term increase in the capacity to supply various economic goods to its population, this growing capacity is based on technological progress and institutional and ideological adjustments. Sectors that generate high incomes, such as industry and the modern sector, are growing faster than traditional sectors which involve the majority of the population with low incomes. The impact is increasing income inequality. However, as time goes by and national income increases, traditional sectors also experience growth, so that the gap between these sectors begins to narrow and as a result income inequality decreases, income distribution will become more even, and is described as an inverted U shape.

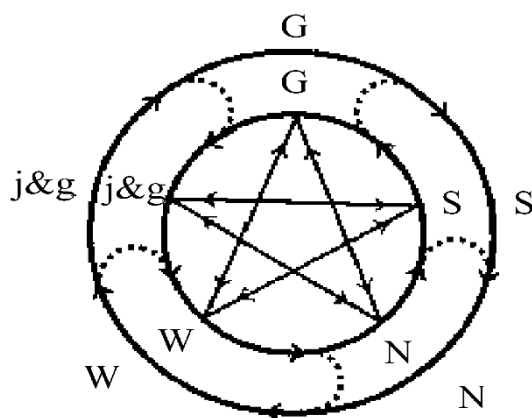


Source: M. Todaro & Smith (2012)

**Figure 4:** Simon Kuznets curve

### Construction of Ibn Khaldun

From Ibn Khaldun's perspective, the development consists of five socioeconomic and political variables that are interrelated and interrelated. These variables include a sovereign or political authority (G), rules of belief and conduct or Sharia (S), people (N), wealth or resource stocks (W), development (g), and justice (j), which circle and interdependent, each influencing the others and in turn, being influenced by them (Chapra, 2008).



Source: Chapra (2008)

**Figure 5:** Variable Relations in Ibn Khaldun's Theory

In the picture shown, the explanation is as follows: 1. Sovereign or government authority (G) cannot be achieved except through the implementation of sharia or rules of conduct (S); 2. Sharia (S) cannot be realized without the existence of the government/ruler (G); 3. The government (G) cannot gain power except with the support of the community (N); 4. A strong and stable government (G) will not materialize without a strong economic presence (W); 5. Society (N) will not be achieved without economic existence/wealth (W); 6. Wealth (W) will not be obtained without development (D); 7. Development (D) cannot be achieved unless there is justice (J); 8. The government/ruler (G) is responsible for realizing justice (J); 9. Justice (J) is a mizan or measure that will be evaluated by Allah (Chapra, 2008; Rusydiana, 2018).

### Human Capital

Human capital is closely related to investment in humans and their development so that they can become creative and productive resources (Harbison (1962) in Jhingan, (2018)). For a long time, economic growth has only focused on increasing the accumulation of physical capital which has caused economic growth in developing countries to be sluggish. This happens because the development of education and skills that support the workforce is lacking, so the level of productivity is low (Jhingan, 2018).

This condition shows that the development of human resources has an important meaning in improving the economy through education which leads to increased creativity and productivity of workers. This creates a skilled population for more secure employment opportunities and ultimately increases income (M. P. Todaro, 2003b).

### Foreign Direct Investment (FDI)

Foreign Direct Investment, is an international capital flow in which a company from a country establishes a company in another country, intending to expand its reach or business network in a particular country. One feature of Foreign Direct Investment (FDI) that stands out is the transfer of resources and control by foreigners over this model (R. Krugman &, 2004).

Modernization theory argues that Foreign Direct Investment (FDI) is an ideal mechanism for the diffusion of capital, markets, and knowledge, leading to the development of a new, independent economy (King & Váradi, 2002). Foreign Direct Investment (FDI) is a stimulus for growth in several leading sectors and regions and provides benefits to several skilled elites. Growth in leading sectors and regions facilitates a more equal distribution of income within a country in the long term (Pan-Long, 1995).

### Inflation

In the economics literature, inflation refers to a sustained and general increase in the price of goods and services. Inflation does not occur if there is only an increase in the price of one or two goods unless the increase has an impact on the increase in the price of other goods in general. In addition, price increases that occur only once or are seasonal, even with a significant percentage, cannot be called inflation (Boediono, 2011; Kuncoro, 2013).

Inflation that occurs in a country results in 2 things: first is the different redistribution of income and wealth among various groups. The main effect of inflation on the distribution of wealth is that it arises as an unavoidable effect on the real value of people's wealth. The second is, disturbances to non-

absolute prices and the output of various goods or sometimes there is output and use of labor. In times of rising and unpredictable inflation, labor usage and output are usually high; where supply soars, investment increases, and employment opportunities also increase, in the end, inflation rises (Samuelson & Nordhaus, 1985).

### **Hypothesis Development**

#### **Economic Growth With Income Inequality**

Kuznetz (1955) in Jhingan (2018) found the relationship between income level and income distribution is inverted U-shaped. According to him, in the early stages of development, inequality in income distribution increased due to urbanization and industrialization. At the end of construction, it was found that income inequality had gradually decreased. In several studies on countries with high incomes, higher economic growth improves income inequality, whereas for countries with lower middle incomes economic growth further exacerbates inequality, because they are still in the early stages of economic development (Alamanda, 2021; Luan et al., 2017). Seeing these results, OIC countries are in the same stage, so economic growth has the potential to widen the level of inequality.

H1: Economic growth has a positive effect on economic inequality

#### **Sharia with Income Inequality**

According to Khaldun (2013), economic decline is caused by a decline in society that is influenced by corrupt political practices, due to the lack of good democratic principles and attitudes, which lead to the emergence of various criminal acts. The process of economic development from an Islamic perspective is based on maqasid shari'ah (Chapra, 1993) by incorporating moral and spiritual values in addition to the factors of economic development that exist in the embodiment of developed countries. Sharia as the rule of Muslim life will minimize negative behaviors that conflict with Islamic teachings. So the sharia variable is approached by proxy for the Corruption Perception Index (IPK) (Anto, M., 2011). Low GPA illustrates the obedience of officials and state apparatus to Sharia.

H2: Sharia has a negative effect on income inequality

#### **Human Capital with Income Inequality**

Human capital is a very important factor in increasing economic growth and income distribution. Human capital can be seen in the fields of education and health. Good education in forming quality human resources. Thus, the formation of a workforce that has quality skills and expertise will have an impact on increasing labor productivity. This will have a positive impact on the increase in income generated by these workers. If an individual's income increases because of a higher level of education, then this will also have an impact on higher economic growth. Higher economic growth will affect better income distribution and have an impact on reducing social inequality and poverty (M. P. Todaro, 2003a).

H3: Human capital has a negative effect on income inequality

#### **Foreign Direct Investment (FDI) with Income Inequality**

Investment activities enable an increase in economic activity by opening jobs and ultimately increasing the income and level of community prosperity (Sukirno, 2013). Foreign Direct Investment (FDI) increases income in recipient countries (developing and poor countries), but this income is not distributed evenly (Kuncoro, 2010). Several studies have confirmed that Foreign Direct Investment (FDI) has exacerbated people's income levels (Le et al., 2021; Mihaylova, 2015; Thalassinou et al., 2012).

H4: Foreign Direct Investment (FDI) has a negative effect on income inequality

#### **Inflation with Income Inequality**

An increase in inflation is a positive or negative sign in the economy. Low inflation is a sign of good economic activity by increasing people's purchasing power and increasing income. However, high inflation will drain people's income, especially low-income people. So that income can no longer be allocated to productive sectors such as saving and investing. The impact of inflation on income inequality widens the level of income inequality (Bucevska, 2020; Deysappriya, 2017; Mihaylova, 2015). However, some research found the opposite result which inflation reduces the level of income inequality (Coibion et al., 2012; Maestri & Roventini, 2012).

H5: Inflation has a negative effect on income inequality.

### III. RESEARCH METHODS

This study used a quantitative approach. The data used in this research was secondary in the form of panel data. Panel data was combined data between time series data from 2012 to 2021 and crossed sections of 44 countries that were members of the Organization of Islamic Cooperation (OIC). The distribution of OIC countries in this study was 24 countries in Africa, 18 in Asia, and 2 countries in Europe. The details are as follows:

**Table 1:** Distribution of Countries Organization of Islamic Cooperation (OIC)

Continent	Countries
Africa	Algeria, Benin, Burkina Faso, Cameroon, Chad, Comoros, Egypt, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Mali, Mauritania, Morocco, Mozambique, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Tunisia, and Uganda.
Asia	Azerbaijan, Bahrain, Bangladesh, Indonesia, Iran, Iraq, Jordan, Kazakhstan, Kyrgyzstan, Lebanon, Malaysia, Oman, Pakistan, Qatar, Saudi Arabia, Tajikistan, United Arab Emirates, and Uzbekistan.
Europe	Albania dan Turkey

Meanwhile, the variables used in this study can be seen in the table below:

**Table 2:** Variable Operational Definitions

Dependent Variables	Definition	Source
Income Inequality	Income inequality is measured using the Gini Ratio (RG). The Gini ratio ranges from 0 to 1, where 0 indicates perfect equality (income or wealth is evenly distributed) and 1 indicates extreme inequality (all income or wealth is concentrated in one group) (M. P. Todaro, 2003a).	World Inequality Database.
Independent Variable		
1. Economic growth (PE)	The annual percentage rate of GDP growth at market prices on a constant local currency basis. Aggregate is based on constant 2015 prices, expressed as a percentage.	World Bank
2. Sharia	The Sharia variable used in this study is approximated by a proxy for the Corruption Perception Index (CPI) developed by Anto, M. (2011), this is based on Islamic teachings (Sharia) which prohibit fraudulent practices and abuse of power. The Corruption Perceptions Index scale covers the range from 0 (high levels of corruption) to 100 (low levels of corruption). Thus, the higher the score of perceptions of corruption in a country, the lower the level of corruption that occurs in that country (Transparency International, 2023).	Tansparacy Internasional.
3. Human Capital (HC)	$MYS = \sum_I HS_I \times YS_I \quad (1)$ <p><i>MYS</i>: Average length of school  <i>HS<sub>I</sub></i>: The proportion of the population whose educational level <i>i</i> is the highest attained level  <i>YS<sub>I</sub></i>: Official duration of educational level <i>i</i></p> The human capital variable is presented from the average length of schooling for adults aged 25 years and over, this reflects the educational situation in society (UNESCO Institute For Statistics, 2013).	Global Data Lab
4. Inflation (INFL)	The inflation data used is annual inflation.	World Bank
5. Foreign Direct Investment (FDI)	FDI is the new inflow of investment that has been reduced by having to go out in a country's economy and divided by GDP which is expressed as a percentage.	World Bank

The panel data estimation model used in this study is as follows:

$$RG_{it} = \beta_0 + \beta_1 PE_{it} + \beta_2 IPK_{it} + \beta_3 HC_{it} + \beta_4 FDI + \beta_5 INFL_{it} + u_{it} \quad (2)$$

RG is the dependent variable measured using the Gini ratio. While the independent variables consist of; PE as economic growth; GPA as an indicator of sharia; HC as human capital; FDI as a

foreign direct investment; INFL as inflation.  $\beta_0, \dots, \beta_5$  is the regression coefficient of each variable. While  $t$  is the time series and  $i$  is the cross section.

The method used in this research was panel data regression with the system-generalized method of moment (GMM) approach developed by Arellano & Bond (1991, 1998) and Blundell & Bond (1998) and follows the steps described by Roodman (2009) and Mileva (2007). Empirical research also uses many similar methods such as Abdulkarim & Ali (2019); Dendo et al., (2021; Dilmaghani & Tehranchian (2015). This method is used to produce unbiased, consistent, and efficient models (Saputri & Wibowo, 2018). Blundell & Bond (1998) show the importance of using initial conditions in producing an efficient estimator for data models dynamic panel with a small amount of time. The method used to combine the first difference moment and the level state moment is the GMM system. Then the one step consistent estimator GMM system model is as follows (Dendo et al., 2021):

$$\widehat{\delta}_{sys} = \left[ \left( N^{-1} \sum_{i=1}^N \varphi_{i-1} Z_{sys} \right) \widehat{W} \left( N^{-1} \sum_{i=1}^N Z_{sys} \varphi_{i-1} \right) \right]^{-1} \left[ \left( N^{-1} \sum_{i=1}^N \varphi_{i-1} Z_{sys} \right) \widehat{\Lambda}^{-1} \left( N^{-1} \sum_{i=1}^N Z_{sys} \varphi_i \right) \right] \quad (3)$$

In the one step consistent estimator stage, the selection of  $\widehat{W}$  will not affect the consistency of the estimates, but choosing  $\widehat{W}$  the optimal one will produce an efficient estimate. Blundell & Bond (1998) adapted  $\widehat{W}$  which was obtained in one step consistent estimator by replacing  $\widehat{W} = \widehat{\psi}^{-1}$ :

$$\psi^{-1} = N^{-1} \sum_{i=1}^N Z'_{sys} \widehat{q}_i \widehat{q}'_{i Z_{sys}} \quad (4)$$

So that the two step efficient Blundell and Bond GMM System estimator stage is produced as follows (Dendo et al., 2021):

$$\widehat{\delta}_{sys} = \left[ \left( N^{-1} \sum_{i=1}^N \varphi_{i-1} Z_{sys} \right) \widehat{\psi}^{-1} \left( N^{-1} \sum_{i=1}^N Z_{sys} \varphi_{i-1} \right) \right]^{-1} \left[ \left( N^{-1} \sum_{i=1}^N \varphi_{i-1} Z_{sys} \right) \widehat{\psi}^{-1} \left( N^{-1} \sum_{i=1}^N Z_{sys} q_i \right) \right] \quad (5)$$

In conducting the system-generalized method of moment econometric test in this study, several tests were carried out. The first was a stationary test on research variables using the Lavin-Lin\_Chu (LLC) test. Both cointegration tests were used to determine whether there is a long-term relationship between the variables tested. Meanwhile, the three model feasibility tests, namely the Sargan test and the Arellano-Bond test, were used to detect the presence of autocorrelation at levels (Mileva, 2007) and the unusualness of the GMM model by comparing the PLS estimator and FEM estimator (Firdaus, 2020).

#### IV. RESULTS AND DISCUSSION

##### Results

The stationary test was carried out before the model estimation test (Dilmaghani & Tehranchian, 2015). For this reason, the Lavin-Lin\_Chu (LLC) panel unit root test was used.

**Table 3:** Lavin-Lin-Chu stationary test

Variable	Statistic	P-Value	Stationer
RG	-23897.6	0.0000	Level
PE	-3.4352	0.0003	Level
IPK	-4.7436	0.0000	Level
HC	-10.0129	0.0000	Level
FDI	-4.1249	0.0000	Level
INFL	-6.3924	0.0000	Level

From the table 3, RG has a statistical value of -23897.6 with a p-value of 0.000, PE with a statistical value of -3.4352, and a p-value of 0.003. GPA statistic value -4.7436 and p-value 0.000, HC statistical value -10.0129 with p-value 0.000. While the FDI and INFL variables have statistical values of -4.1249 and -6.3924 respectively with p-values both 0.000. Therefore, it is concluded that all the variables used are stationary at the level.



Furthermore, the cointegration test was used to test whether there is a long-term relationship between variables or not. In this recent stud, the cointegration test used the Kao test and the results are as follows:

**Table 4:** KAO Cointegration Test

	Statistic	p-value
Modified Dickey–Fuller t	2.9804	0.0014
Dickey–Fuller t	4.0570	0.0012
Augmented Dickey–Fuller t	1.7101	0.0436
Unadjusted modified Dickey–Fuller t	1.1431	0.1265
Unadjusted Dickey–Fuller t	2.1260	0.0168

The results of the cointegration test with the KAO test approach yielded an ADF statistical value of 1.7101 with a p-value of 0.0436. This shows that the results of H0 are rejected and Ha is accepted. This means that all panels in this study are cointegrated, in other words, have a long-term relationship.

The estimation results using the system generalized method of moments two step model can be seen in the table below.

**Table 5:** GMM System Estimation

Variable	Coefficient	Std. err.	z	P> z	[95% conf. interval]
RG L1.	.8903558	.0031484	282.80	0.000	.8841851 .8965266.
PE	.000274	7.96e-06	34.44	0.000	.0002584 .000015
IPK	-4.24e-06	.0000257	-0.16	0.869	-.0000547 .000525
HC	-4.82e-06	.0001471	-0.03	0.974	-.000293 .0002896
FDI	.0004766	.0000247	19.32	0.000	.0004283 .5364872
INFL	-6.30e-06	.0000109	-0.58	0.562	-.0000276 .0002834
_cons	.0611047	.0033037	18.50	0.000	.0546295 .0675798

The estimation results in table 5 show that the coefficient of the RG L1 variable was .8903558 and had a positive value. The Gini ratio in the previous year increased by 1%, it will increase the Gini ratio by 0.89%. The PE coefficient was .000274 and was significant at the 5% level. The coefficient of GPA was -4.24e-06 and was not significant at the 5% level. The HC coefficient was -4.82e-06 and was not significant at the 5% level. While the FDI coefficient was .0004766 and was significant at the 5% rate and INFL was -6.30e-06 and not significant at the 5% level.

After testing the significant parameters, the feasibility test of the model used was carried out. The Arellano-Bond GMM dynamic panel data method can be said to be good if it meets the criteria for consistency and instrument validity. The results of model testing can be seen in the table:

**Table 6:** Arellano Bond test

	Ord	z	Prob > z
FDGMM	1	-2.3082	0.0210
	2	-.47682	0.6335
SYSGMM	1	-2.3357	0.0195
	2	-.46712	0.6404

The results of the comparison between FDGMM and SYSGMM from the Arellano Bond test for the consistency of the income inequality model (RG) were shown by AR2. In the FDGMM model, the statistical value of AR2 was -.47682 and the probability was 0.6335. Meanwhile, the SYSGMM model had a statistical value of -.46712 and a probability value of 0.6404. These two models were not significant at the 5% level so the model used is valid.

Meanwhile, for the validity of the instrument, the Sargan test was used. The FDGMM model had a chi2 value of 37.7322 and a probability of 0.3454. The SYSGMM model with a chi2 value of 39.61375 and a probability of 0.6190 was not significant at the 5% level. This means that the H1 hypothesis is rejected and the H0 hypothesis is accepted. With such results, the validity test of the model used is valid.

The two GMM models (FDGMM and SYSGMM) both show valid results and meet the consistency criteria. So to ensure the validity of the model, the third test with the lag coefficient value depending on the GMM System variable with the fixed effect model (FE) and panel least squares (PLS) was carried out. If the lag of the dependent GMM variable is below FE and above PLS then the model is said to be

biased. So for the lag of the GMM model meets the validity and unbiased criteria, it must be below PLS and above FE (Firdaus, 2020).

**Table 7:** Model Comparison Table

Variable	fdgmm	sysgmm	fem	pls
RG L1.	.5809075***	.8903558***	.7745114***	.97302335***
PE	.00025772***	.000274***	.00022096	.00024393
IPK	.00012263***	-4.24e-06	5.653e-06	00003043
HC	-.00067002***	-4.82e-06	-.00002633	.00004057
FDI	.00017742***	.0004766***	.00006771	.00023272
INFL	-.00001732	-6.30e-06	4.885e-08	.00001
_cons	.24412766***	.0611047***	.13006191***	.01216666*
N	352	396	396	396

Description: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

From the table 7 it can be seen that the lag value of the dependent variable (RG L1) of FDGMM was .5809075 and is significant at the 0.001 level and the lag value of the dependent variable SYSGMM is .8903558 and is significant at the 0.001 level. Meanwhile, the lag value for the dependent variable FE is .7745114 and PLS is 97302335 with a significant level of 0.001. So it can be concluded from the two GMM models used, the model with SYSGMM is unbiased. This can be seen from the value of the dependent variable lag which is between the FE and PLS dependent variable lags.

As explained above, the data processing method was a dynamic panel. Based on the results of the cointegration test, the variables had a long-term relationship. The results of the long-term estimation are as follows:

**Table 8:** Long-Term Relationship

Variable	Coefficient	Std. err	z	P> z	[95% conf. Interval]
PE	.0024994	.0001059	23.60	0.000	.0022918 .0004212
IPK	-.000038	.0002347	-0.16	0.869	-.0004986 -3.375064
HC	-.0000439	10.71031	0.91	0.364	-11.26832 30.71532
FDI	.004347	.0002811	15.46	0.000	.003796 .004898
INFL	-.0000574	.0013405	-0.03	0.974	-.0026712 .0025833

From the table 8 it can be seen that the economic growth variable had a coefficient of .0024994 with a p-value of 0.000. This means that economic growth has a positive and significant influence at the 0.5% level. The GPA variable had a coefficient of -.000038 with a p-value of 0.869. This shows that the GPA has a negative but not significant effect. While the HC variable has no significant negative effect at the 0.5% level. The FDI variable had a coefficient of .004347 and a p-value of 0.000. This means that FDI has a positive effect on income inequality and the effect is significant in the long run. Meanwhile, the INFL variable has a negative but not significant effect on income inequality in the long run.

Member countries of the Organization of Islamic Cooperation (OIC), spread over 3 continents, Africa is the majority continent with a spread of OIC member countries, as many as 24 countries, Asia with 18 countries, and Europe with 2 countries. The results of econometric testing of factors that influence income inequality by continent are as follows:

**Table 9:** GMM System Estimation Based on Continent of OIC Countries

Variable	Africa	Asia	Europe
RG L1.	.9391183***	.9774361***	.9868509***
PE	.0003613	.000216	.0006427
IPK	.0003318	.0002771	-.0020671**
HC	-.001427	.0011853	-.0119672
FDI	.0003759	.0009367	.0003328
INFL	-.0000287	8.22e-06	-.0015858
cons	.0286425	-.0119358	.2098604

Description: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

From the table 9, the variables of economic growth, IPK, and FDI in OIC countries on the African continent had a positive effect. An increase in this variable will exacerbate the level of income inequality, even though it is not significant. The HC and INFL variables, on the other hand, had a negative effect on income inequality. Asia continent all the variables in this study had a positive but not significant effect. Whereas for the European Continent, the GPA variable had a coefficient of  $-0.0020671$  with a significant p-value at the 5% level. This means that an increase in the GPA variable improves inequality in OIC countries in Europe. HC and INFL variables also have a negative effect but are not significant at all significance levels.

## Discussion

### The Effect of Economic Growth on Inequality

In testing the GMM System for economic growth has a short-term coefficient of  $.000274$  with a p-value of  $0.000$  while for the long-term it is  $.0024994$  with a p-value of  $0.000$ . This shows that economic growth has a positive and significant effect on income inequality in the short term and the long term. This indicates that the increasing economic growth in OIC member countries in the short and long term has a significant impact on widening income inequality. These results are consistent with the model formed based on the continental distribution of OIC countries. OIC countries in Africa, Asia, and Europe, increased economic growth widens income inequality, although the effect is not significant.

This research is in accordance with Kuznet's (1955) hypothesis in Jhingan, (2018) which stated that the relationship of economic growth is in the form of an inverted U. In the early stages of economic growth, it has an impact on increasing income inequality, and in the long term, it reduces inequality. Based on this hypothesis, OIC countries are still in the early stages of development. It can be understood that most of the OIC countries are developing countries. Other empirical studies show that economic growth also exacerbates inequality (Alamanda, 2021; Balseven & Tugcu, 2017; Bouincha & Karim, 2018).

The benefits of economic growth to reduce income inequality are to be felt more significantly, various efforts are needed so that low-income people benefit from economic growth. This can be realized by maximizing the government's role in redistributing income through the tax mechanism (Mangkoesobroto, 1993).

Governments can design policies to balance saving, consumption, and investment. Such government policies cover government spendings, such as social security programs, subsidies, and welfare spending that can affect low-income households. In addition, the government's ability to create jobs through means such as public works projects and government-owned industries can also reduce unemployment rates and ultimately reduce income inequality (Stack, 1978).

### The Influence of Sharia on Income Inequality

In the GMM System test, the growth of the sharia variable had a short-term coefficient of  $-4.24e-06$  with a p-value of  $0.869$  while for the long term was  $-8.353227$  with a p-value of  $0.869$ . This shows that the sharia variable using the corruption perception index proxy shows a negative and significant effect. There are differences in the influence of Sharia variables between countries in Africa and Asia compare to Europe. In countries on the continents of Africa and Asia, Sharia has a positive but not significant effect. Meanwhile, in countries on the European continent, the effect is negative and significant. This indicates that in the short and long term better the level of the corruption perceptions index will improve the level of income inequality.

This also explains that the absence of Sharia values will lead to economic decline and social disintegration (Khaldun, 2013) and will eventually lead to inequality and poverty (Fatoni et al., 2019). So that it can be said that sharia is a tool in preventing actions that harm other people, in this case, corruption in state institutions as management, which will ultimately reduce the level of income inequality.

Similar results were also found in Rego (2021) which showed that corruption in Latin American and European countries is associated with low levels of inequality. This finding implies that policies that focus on controlling and eradicating corruption are likely to reduce inequality and poverty (Gupta et al., 2002).

### The Effect of Human Capital on Income Inequality

In testing the human capital GMM System, it had a short-term coefficient of  $-4.82e-06$  with a p-value of  $0.974$ , while for the long term was  $-0.000439$  with a p-value of  $0.364$ . This indicates that in the short term and more felt in the long term, increases in human capital improve income inequality in each

African and European country. However, it is a different matter for countries in Asia, the increase in human capital is the cause of widening inequality.

This is different from the findings of Coady & Dizioli (2017) and Wang & Li (2017) that human capital by proxies for school level and proxies for the average length of schooling has a positive but small effect and is not always statistically significant (Munir & Kanwal, 2020). On the other hand, the increase in income inequality caused by an increase in human capital is due to the imbalance in education received by the community (Mahmooda & Noorb, 2015). However, it is different from Bucevska (2020); Checchi (2001); Lee & Lee (2018) who argued that population education can lead to a more even distribution of income.

#### **The Effect of Foreign Direct Investment (FDI) on Income Inequality**

In testing the GMM System, the Foreign Direct Investment (FDI) variable has a short-term coefficient value of .0004766 with a p-value of 0.000 and a long-term of .004347 with a p-value of 0.000. This interprets that the greater the flow of FDI in OIC countries will also increase the gap in income inequality. There is no difference in the test results in countries in Africa, Asia, or in Europe.

These results indicate that FDI has a negative impact on income distribution, due to the nature of FDI increasing the demand for a relatively skilled workforce, and ultimately widening the income gap between skilled and unskilled workers, which then increases inequality. (Jensen & Rosas, 2007). So as to reduce this impact and so that countries receiving FDI flows can still benefit, this can be done by providing adequate support to realize educational potential and create a quality skilled workforce (Suanes, 2016). On the other hand, improving the workforce will attract FDI as an instrument for improving income inequality (Ravinthirakumaran & Ravinthirakumaran, 2018). Research conducted by Le et al., (2021) using the GMM method, found that FDI tends to increase income inequality in Vietnam and the effect of FDI and its effects vary depending on the level of education and institutions in Vietnam. FDI also differs according to the level of development between developed and developing countries (Figini & Gorg, 2006).

#### **Effect of Inflation on Income Inequality**

The GMM System statistical test results show that inflation has a short-term coefficient value of  $-6.30e-06$  with a p-value of 0.562, while for the long term  $-.0000574$  with a p-value of 0.974. This shows that the effect of inflation in the short term and long term is not significant. This is different from the initial hypothesis, that an increase in inflation will exacerbate inequality in OIC countries. Meanwhile, the results of the inflation study corrected the level of inequality to a certain extent. There are differences in the effect of inflation for each country. Countries in the African and European Regions have a negative effect on inflation, while for countries in the Asian hemisphere, it shows the opposite, but not significant. A similar result was also found by Auda (2013); Pulir (1998); Galli & Hoenen (2001); Thalassinou et al., (2012), that the relationship between inflation and income inequality, inflation initially improves the level of inequality but will further exacerbate inequality. In contrast to Balseven & Tugcu (2017), inflation has a positive impact on income inequality. This means that inflation worsens income inequality.

### **V. CONCLUSION**

The results of the econometric study show that income inequality occurs in 44 OIC countries from 2012 to 2021. Based on the Syariah variable as measured by the corruption perception index, human capital, and inflation are statistically negative variables, an increase in which leads to a decrease in income inequality. This influence has differences for each OIC country region. Two other macroeconomic variables, namely economic growth and FDI, have a statistically significant and positive effect. This variable has a strong influence on increasing income inequality in OIC member countries.

Based on the results discussed above, this research has several important policy implications. First, increased economic growth and FDI have become determinants for increasing inequality. Therefore policies that lead to the distribution of income resulting from economic growth through the tax mechanism, should be carried out more fairly by the government, as well as government spending in the public sector which is oriented towards increasing people's income. FDI flows must also be a means of the increasing income distribution, so a skilled workforce must be prepared with policies for easy access to education and training, as well as increased supervision and regulation to ensure that FDI contributes to society.

Second, an increase in Sharia as measured by GPA has the effect of reducing income inequality. Therefore, it is necessary to encourage public awareness, especially among government employees of OIC countries through effective education. In addition, it is necessary to strengthen ethical and moral values in education and society in general, by integrating religious and ethical education in the education curriculum and promoting awareness of the importance of integrity, honesty, and responsibility in various aspects of life. Inflation also plays a role in reducing the level of inequality, so the monetary policy that leads to inflation stability is very important. Finally, for further research, to understand income inequality in OIC countries, the focus can be explored by considering political and socio-cultural factors.

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