The Impact of Macroeconomics and Halal Certification on Exports: Evidence of Indonesian Halal Product 2012 – 2022

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Article Info	Abstract
	The global halal market is currently dominated by non-Muslim-majority countries like China, India, Brazil, and the United States. Despite its large Muslim population, Indonesia has not fully capitalized on exporting its halal natural resources. This study examines the impact of macroeconomic factors (inflation, exchange rates, GDP, and FDI) and halal certification on Indonesian halal product exports. This research employs a quantitative method with a causal research design. The data used are quarterly time series data from 2012 to 2022, analyzed with the Autoregressive Distributed Lag (ARDL) method. The results show that in the short term, inflation, GDP, and FDI have a significant negative impact, exchange rates have a significant positive impact, and halal certification has no significant effect on the export of Indonesian halal products. In the long term, neither macroeconomic factors such as inflation, exchange rates, GDP, and FDI, nor halal certification, have a significant effect on the export of Indonesian halal products.

INTRODUCTION

The global halal industry has experienced significant growth. According to the State of the Global Islamic Economy Report 2023, consumer spending in the halal market increased from

$1.62 trillion to $2.29 trillion in 2022. This growth is driven by a rapidly expanding young Muslim population and a broader ethical consumer market (Dinar Standard, 2023).

Indonesia, with a Muslim population comprising 87% of its total population (Susamto et al., 2021), has the potential to significantly increase its halal product exports to the OIC, which stood at only $13.38 billion in 2022. This is notably lower than exports from non-Muslim majority countries like China, India, Brazil, and the USA. Despite ranking 8th in halal product exports, Indonesia ranks 4th in imports at $30.29 billion (Dinar Standard, 2023), revealing a substantial gap between imports and exports. This is significant given that 11.34% of global halal product consumers are Indonesian (Dinar Standard & Indonesia Halal Lifestyle Center, 2021). To bridge this gap and become a leader in the halal market, Indonesia must boost its halal product exports, especially through SMEs, which contributed only 15.7% to total national exports in 2022 (Direktorat Jenderal Bea dan Cukai Kementerian Keuangan, 2023).

According to Mankiw, factors influencing exports include consumer preferences, product prices, exchange rates, consumer incomes, transportation costs, and government policies related to international trade. Investment and GDP also play significant roles in export fluctuations (Mankiw, 2021). However, this study focuses solely on macroeconomic factors affecting Indonesia's exports, such as inflation, exchange rates, GDP, FDI, and halal certification policies, omitting considerations of consumer preferences, incomes, and transportation costs, which are unrelated to its research objectives.

Several studies have identified various factors affecting halal product exports. Erika and Fadly (2022) found that inflation and exchange rates significantly impact halal exports, though these factors account for only 32.06% of the variance. This research aims to explore the remaining 67.94%. GDP and FDI are also significant impact on exports (Dina, 2022; Martikasari, 2022). Hamdi (2020) found that FDI positively affects halal product exports, particularly when investment is aimed at exports and leverages the country's comparative advantages.

The condition of Indonesia's halal product exports is still closely tied to macroeconomic factors, suggesting an opportunity to include variables outside macroeconomics, such as halal certification. Streamlining and accelerating licensing and guidance processes to help SMEs obtain halal certification can boost exports (Susamto et al., 2021). To enhance Indonesia's halal industry, the government offered free halal certification (Sehati Program) for SMEs, with around 300,000 quotas in 2022 (Kasanah & As Sajjad, 2022).

Based on these issues, this research aims to examine the influence of macroeconomic factors, including inflation, exchange rates, GDP, FDI, and halal certification on the performance of Indonesia's halal product exports in both the short and long term.

METHOD

This study utilizes a quantitative method with a causal research design to explore cause-and-effect relationships between variables. The sample is drawn using saturated sampling,

encompassing the entire population and totaling 44 quarterly data samples from 2012 to 2022. By adopting this comprehensive approach, all available data points within the specified timeframe are incorporated, ensuring a robust dataset for analysis.

The data utilized comprises time series data on Indonesia's exports to OIC countries in USD, inflation represented by the Consumer Price Index, the middle exchange rate of USD to IDR, constant price GDP, regional FDI values in USD, and the number of halal-certified products. Secondary data sources include official websites such as the Central Bureau of Statistics, Bank Indonesia, the Ministry of Investment, the Ministry of Trade of the Republic of Indonesia, and the Ministry of Religious Affairs of the Republic of Indonesia, providing reliable and comprehensive data essential for the study.

Data processing techniques are implemented to standardize the number of data samples. Prior to data analysis, descriptive statistics are tested, outliers are detected using z-scores, and the necessity for data standardization for variables with significantly large ranges or different data scales is determined. The data analysis employs the Auto Regressive Distributed Lag (ARDL) model, incorporating past and present values of independent variables and lag values of the dependent variable as explanatory variables. This model effectively distinguishes between short-term and long-term responses (Gujarati, 2003). The following long-term and short-term models are constructed for testing.

$$HPE_t = \alpha + \beta_1 INF_t + \beta_2 ER_t + \beta_3 GDP_t + \beta_4 FDI_t + \beta_5 HC_t + \mu_t \tag{1}$$

$$\Delta HPE_t = \alpha + \sum_{i=1}^{p} \theta_{1i} \Delta HPE_{t-i} + \sum_{k=1}^{q} \varphi_{2k} \Delta INF_{t-k} + \sum_{k=1}^{q} \varphi_{3k} \Delta ER_{t-k} +$$
$$\sum_{k=1}^{q} \varphi_{4k} \Delta GDP_{t-k} + \sum_{k=1}^{q} \varphi_{5k} \Delta FDI_{t-k} + \sum_{k=1}^{q} \varphi_{6k} \Delta HC_{t-k} + \gamma ECT_{t-1} + \varepsilon_t \tag{2}$$

RESULT AND DISCUSSION

Stationary Test

Here are the results of the stationarity test on the variables of halal product exports, inflation, exchange rates, GDP, FDI, and halal certification using the Phillips-Peron (PP) measurement.

Table 1. Unit Root Test Results

Variable	Level		First Difference	
	Prob.	Description	Prob.	Description
HPE (Y)	0,0354	Stationary		
INF (X1)	0,0000	Stationary		
ER (X2)	0,5746	Not Stationary	0,0053	Stationary
GDP (X3)	0,0003	Stationary		
FDI (X4)	0,9690	Not Stationary	0,0001	Stationary
LHC (X5)	0,3324	Not Stationary	0,0288	Stationary

Source: Data processed with Eviews, 2024.

Table 1 indicates that, at a 95% confidence level, halal product exports, inflation, and GDP have achieved stationarity at the level, as their probability values are below 0.05. Conversely, exchange rates, FDI, and halal certification are stationary at the first difference. This variation suggests that the variables exhibit different levels of stationarity, namely I(0) and I(1), meeting the necessary criteria for ARDL testing.

Maximum Lag Determination

Here are the results of determining the maximum lag for the variables of halal product exports, inflation, exchange rates, GDP, FDI, and halal certification.

Table 2. Maximum Lag Determination Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-244.4055	NA	0.015209	12.84131	13.09724	12.93313
1	-106.6899	225.9948	8.45e-05	7.625123	9.416651*	8.267908
2	-65.76697	54.56390	7.52e-05	7.372665	10.69979	8.566408
3	-21.23467	45.67415	7.12e-05	6.935111	11.79783	8.679813
4	78.38430	71.52132*	6.60e-06*	3.672600	10.07091	5.968260
5	146.2506	27.84258	1.00e-05	2.038431*	9.972341	4.885050*

Source: Data processed with Eviews, 2024.

Based on Table 2, the lowest AIC value indicates that the maximum lag is at lag 5. The optimal ARDL model is represented by the smallest lag length as shown below.

Figure 1. Maximum Lag Length
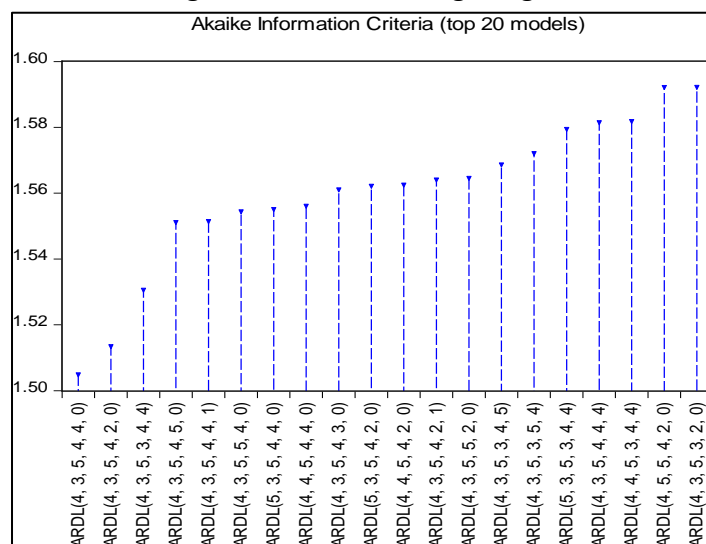
Source: Data processed with Eviews, 2024.

Based on Figure 1, it can be determined that the most appropriate model for the ARDL method in this study is ARDL (4, 3, 5, 4, 4, 0).

ARDL Model Goodness

The goodness of the ARDL (4, 3, 5, 4, 4, 0) model is shown in the following table.

Table 3. ARDL Model Goodness

R-squared	0.934339
Adjusted R-squared	0.808068
Prob(F-statistic)	0.000263

Source: Data processed with Eviews, 2024.

The Adjusted R-Squared value is 0.808068, indicating that the significantly influential variables can account for 80.81% of the current halal product exports, while the remaining 19.19% is explained by other insignificant variables within or outside the model. The high coefficient of determination indicates that the ARDL model constructed is a very good model.

Cointegration Test

The results of the Bound Testing Cointegration are presented below.

Table 4. Cointegration Test Results

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	5.099765	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Data processed with Eviews, 2024.

Based on Table 4 above, the F-Statistic value of 5.099765 is greater than the I(1) Bound value at the 5% significance level, which is only 3.38. This means that there is long-term cointegration between inflation, exchange rate, GDP, FDI, and halal certification on the export of halal products.

Long-Run Coefficient Estimation

The long-term effect of independent variables on the dependent variable is obtained from the Long Run Form output as follows.

Table 5. Long Run Form Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	-5.324433	12.74258	-0.417846	0.6829
ER	14.29660	30.95751	0.461814	0.6518
GDP	-14.67813	31.95285	-0.459368	0.6536

FDI	-7.754121	17.65312	-0.439249	0.6677
LHC	0.680660	3.000029	0.226885	0.8240
C	-2.269230	5.173171	-0.438654	0.6681

Source: Data processed with Eviews, 2024

Based on Table 5, the following is the long-term model equation:

$$HPE_t = -2{,}269230 - 5{,}324433 INF_t + 14{,}29660 ER_t - 14{,}67813 GDP_t - 7{,}754121 FDI_t + 0{,}680660 LHC + \mu_t \tag{3}$$

Short-Run Coefficient Estimation

The short-term impact of current and previous periods' independent variables (X) on the dependent variable (Y) is obtained from the Error Correction Form output as follows.

Table 6. Error Correction Form Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(HPE(-1))	-1.421984	0.139513	-10.19249	0.0000
D(HPE(-2))	-1.202669	0.165438	-7.269627	0.0000
D(HPE(-3))	-0.712928	0.146620	-4.862419	0.0003
D(INF)	-0.011127	0.084057	-0.132372	0.8967
D(INF(-1))	-0.683687	0.136487	-5.009179	0.0002
D(INF(-2))	-0.344700	0.087654	-3.932525	0.0017
D(ER)	-1.592809	0.452134	-3.522867	0.0037
D(ER(-1))	-0.517304	0.470570	-1.099313	0.2916
D(ER(-2))	-0.334288	0.476484	-0.701571	0.4953
D(ER(-3))	0.814760	0.440145	1.851118	0.0870
D(ER(-4))	1.440086	0.483651	2.977534	0.0107
D(GDP)	-0.047543	0.312010	-0.152377	0.8812
D(GDP(-1))	-2.517251	0.458797	-5.486638	0.0001
D(GDP(-2))	-1.792116	0.396911	-4.515154	0.0006
D(GDP(-3))	-1.379706	0.376772	-3.661908	0.0029
D(FDI)	0.367477	0.178445	2.059328	0.0601
D(FDI(-1))	-0.869207	0.226298	-3.840976	0.0020
D(FDI(-2))	-0.101225	0.237133	-0.426869	0.6765
D(FDI(-3))	-0.451837	0.245842	-1.837920	0.0890
CointEq(-1)*	0.117360	0.016248	7.223193	0.0000

Source: Data processed with Eviews, 2024

The estimation results from Table 6 indicate a short-term cointegration relationship, as evidenced by the probability value of CointEq(-1) being less than 0.05. To formulate the short-term ARDL model, the constant (C) value is obtained from the following output.

Table 7. Conditional Error Correction Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.266318	0.436914	0.609542	0.5527

Source: Data processed with Eviews, 2024

Based on Tables 6 and 7, the following is the short-term model equation.

$$DHPE_t = 0{,}266318 - 1{,}421984DHPE_{t-1} - 1{,}202669DHPE_{t-2} - 0{,}712928DHPE_{t-3} - 0{,}683687DINF_{t-1} -$$
$$0{,}344700DINF_{t-2} - 0{,}517304DER_{t-1} - 0{,}334288DER_{t-2} + 0{,}814760DER_{t-3} + 1{,}440086DER_{t-4}$$
$$- 2{,}517251DGDP_{t-1} - 1{,}792116DGDP_{t-2} - 1{,}379706DGDP_{t-3} - 0{,}869207DFDI_{t-1} -$$
$$0{,}10123DFDI_{t-2} - 0{,}451837DFDI_{t-3} + 0{,}117360ECT_{t-1} + \varepsilon_t \tag{4}$$

Diagnostic Tests

Diagnostic tests are conducted to ensure that the ARDL model estimation meets classical assumptions. The diagnostic test results are shown below.

Table 8. Diagnostic Test Results

| Test	Probability	Description
Normality Test	0,318876	Normally distributed
Breusch-Godfrey Serial Correlation LM Test	0,852300	No autocorrelation
White Test (no cross term)	0,495500	No heteroskedasticity

Source: Data processed with Eviews, 2024

Table 8 shows that the Prob. values from the Normality Test, Breusch-Godfrey Serial Correlation LM Test, and White Test (no cross-term) are greater than the 5% significance level (0.05). Therefore, the data meet the assumptions of normal distribution, no autocorrelation, and no heteroscedasticity.

Model Stability Test

The CUSUM Test and CUSUM of Squares Test results are presented below.

Figure 2. CUSUM Test and CUSUM of Squares Test Results
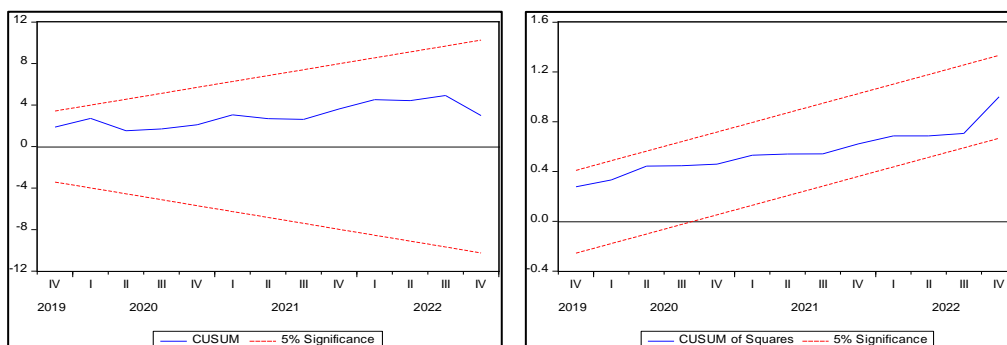
Source: Data processed with Eviews, 2024

Based on Figure 2, it's evident that both CUSUM and CUSUM of Squares values fall within the 5% significance bounds (as shown by the blue line not crossing the red boundaries). Hence, we can infer the stability of the ARDL (4, 3, 5, 4, 4, 0) model.

The Impact of Inflation on Halal Product Exports

Based on Table 6, the coefficient of INF in the first and second lag is negative, namely -0.683687 and -0.3447 with probabilities of 0.0002 and 0.0017, respectively. This indicates that in the short term, inflation has a negative and significant effect on the export of halal products due to decreased product competitiveness caused by higher prices. Consistent with the views of Ball (2005), when inflation rises, the prices of products also increase, making them less competitive in the global market, resulting in a decrease in exports. Similar studies by Fairuz & Hasanah (2022) and Purusa & Istiqomah (2018) also show that inflation has a negative and significant impact on the volume or value of exports due to high production costs resulting from soaring raw material prices, which can reduce a country's competitiveness compared to others.

On the other hand, based on Table 5, the coefficient of INF is -5.324433 with a probability of 0.6829. This means that inflation does not have a significant long-term effect on the export of halal products. Increases or decreases in inflation do not affect the amount of halal product exports. This finding is consistent with studies by Larasati & Budhi (2018) and Rosalina & Titik (2021), which also show that inflation does not significantly affect exports from Indonesia.

The short-term effects of inflation are in line with Mankiw's theory, stating that high inflation can increase production costs, which can then harm product competitiveness in the international market. This increase in prices can also make goods from a country less competitive internationally, leading to a decrease in export volume (Mankiw, 2021). However, this theory does not apply to long-term effects.

The Impact of Exchange Rate on Halal Product Exports

Based on Table 6, the coefficient of ER in the fourth lag is positive, namely 1.440086 with a probability of 0.0107. This indicates that in the short term, the exchange rate has a significant positive effect on the export of halal products. Consistent with studies by Hemert (2016) and Silaban & Nurlina (2022), which state that an increase in the exchange rate increases the value of exports.

However, the long-term results in Table 5 show a coefficient of ER of 14.29660 with a probability of 0.6518. This means that the exchange rate does not have a significant long-term effect on the export of halal products. This is supported by studies by Erika & Fadly (2022) and Zahroh et al. (2019), which state that the exchange rate does not affect exports in the long term in Indonesia.

The short-term research results do not align with Mankiw's theory (2016), which states that a low exchange rate increases exports because domestic goods become cheaper. And when the rupiah weakens, imports tend to increase compared to exports (Rizal & Humaidi, 2019). The long-term testing results in this study also do not align with the theory because factors such as global demand, product quality, and non-price variables also play a significant role, especially considering the high demand for halal products in the global market.

The Impact of GDP on Halal Product Exports

In the short term, GDP negatively impacts halal product exports. Table 6 shows coefficients for GDP in the first to third lags as -2.517251, -1.792116, and -1.379706 with probabilities of 0.0001, 0.0006, and 0.0029, respectively. This suggests that as GDP per capita increases, domestic demand rises, leading to higher domestic production and lower export volumes, as supported by studies from Fihri et al. (2021) and Alim (2019).

Generally, GDP positively affects exports, as found in studies by Risma et al. (2018) and Putri (2020). However, these results are relevant to specific conditions and subjects. Therefore, the researcher will compare the GDP growth rate and the growth rate of halal product exports from 2012 to 2022 to support the findings in this study.

Figure 3. GDP Growth Rate of Indonesia from 2012 to 2022
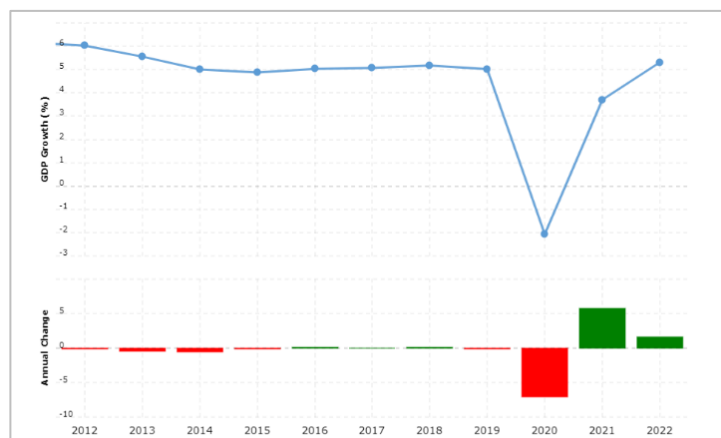
Source: World Bank, processed by macrotrends.net, 2024.

In 2020, the COVID-19 pandemic led to a contraction in GDP growth, significantly affecting most global economies (Melati, 2023). Conversely, the growth rate of halal product exports increased during this time, as illustrated in the graph.

Figure 4. Growth Rate of Halal Product Exports in Indonesia from 2012 to 2022
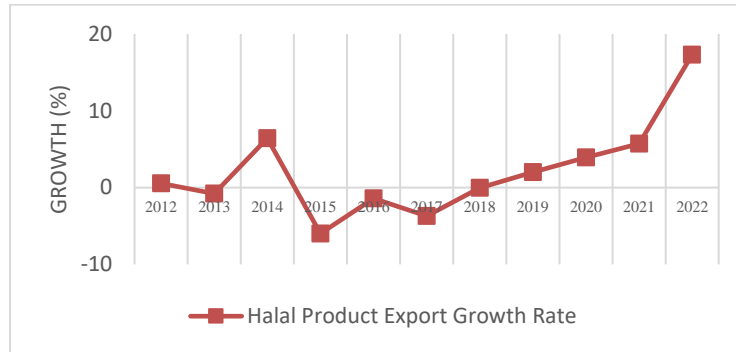
Source: Processed data, 2024.

Figure 4 shows that post-COVID-19, the GDP trend will shift, negatively impacting Indonesia's halal product exports. Thus, in the short term, GDP is likely to decline while exports increase.

However, in the long term, Table 5 indicates GDP does not significantly affect halal product exports to OIC countries, with a coefficient of -14.67813 and a probability of 0.6536. This aligns with research by Suryanto (2016) and Nugraheni et al. (2021), suggesting that changes in GDP have little meaningful effect on exports.

Typically, GDP growth indicates increased goods and services, leading to higher exports (Mankiw, 2016; Todaro & Smith, 2013). However, this study finds a negative short-term relationship and no significant long-term effect of GDP on halal product exports, contradicting the theory and suggesting the model cannot accurately predict halal product exports.

The Impact of FDI on Halal Product Exports

Based on Table 6, the FDI coefficient at the first lag is -0.869207 with a probability of 0.002, indicating a significant negative impact of FDI on halal product exports in the short term. As no similar findings have been identified, this study provides new results that necessitate further analysis by comparing the growth rates between variable X and Y from 2012 to 2022.

Figure 5. Comparison of FDI Growth Rate and Halal Product Export Growth Rate, 2012 – 2022
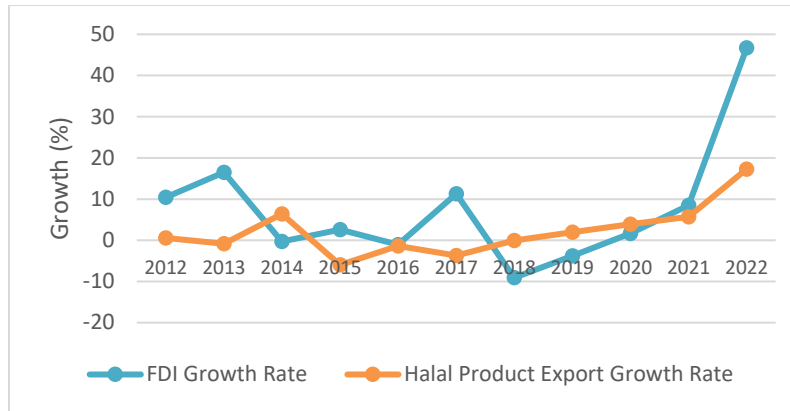
Source: Processed Data, 2024.

From Figure 5, it can be observed that during periods of increased FDI (2013, 2015, and 2017), the export growth rate of halal products decreased. Conversely, during periods of decreased FDI (2014, 2016, and 2018), the export growth rate of halal products increased. This inverse relationship supports the findings of the study.

High FDI may potentially reduce halal product exports because investments often focus on efficiency and profitability rather than compliance with halal standards. Moreover, FDI is often aimed at international markets that do not always prioritize halal products, leading to increased production of products without halal assurance.

Based on Table 5, the FDI coefficient is -7.754121 with a probability of 0.6677, indicating that FDI in the long term does not significantly affect halal product exports. The export volume of halal products to OIC countries does not depend on FDI. This aligns with the findings of Pramita & Budhi (2020) that FDI inflows have not significantly increased domestic industry exports as foreign investors tend to leverage the domestic market for profit.

This study finds that FDI has a significant negative impact on exports in the short term and no impact in the long term, contradicting the Mankiw theory (2016) that high-interest rates suppress investment and demand.

The Impact of Halal Certification on Halal Product Exports

According to the short-term test results, the variable LHC does not appear in the output, indicating that the number of halal-certified products in Indonesia does not impact halal product exports to OIC countries. Long-term results show a LHC coefficient of 0.680660 with a probability of 0.8240, indicating no significant impact. Halal certification mainly assures domestic consumers, with not all certified products intended for export. Yun et al. (2020) states that halal certification is not always necessary for export to Islamic countries but is crucial for verifying halal status for Muslim consumers.

The halal product industry, part of Indonesia's Islamic economy for 30 years, gained serious government attention with the 2014 Halal Product Assurance Law. From 2014 to 2018, Indonesia ranked 10th in the Global Islamic Economy Indicator (GIEI). Here is the data on halal

sector scores in Indonesia from 2014 to 2018 (Kementerian Perencanaan Pembangunan Nasional, 2018).

Figure 6. GIEI Scores of Halal Sectors in Indonesia, 2014 – 2018
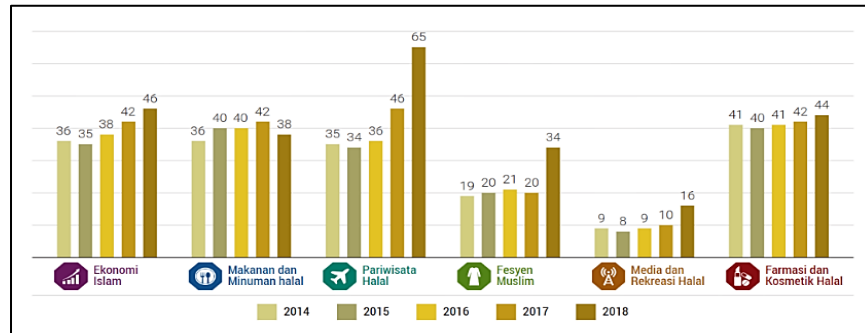
Source: Global Islamic Economy Gateway, 2018

As seen in Figure 6, The halal industry, encompassing Islamic finance, halal food and beverages, halal tourism, Muslim fashion, halal media and recreation, and halal pharmaceuticals and cosmetics, showed growth from 2014 to 2018. This sector contributes USD 3.8 billion to GDP annually, attracts USD 1 billion in foreign investment, and creates 127,000 new jobs each year (Kementerian Keuangan Republik Indonesia, 2019). Therefore, the National Committee for Sharia Economics and Finance (KNEKS) issued the 2019–2024 sharia economy master plan to make Indonesia a global center for the sharia economy, with strategies like accelerating halal certification for SMEs and offering free certification (SEHATI) to boost exports.

Initially voluntary, halal certification became mandatory on October 17, 2019, with the establishment of BPJPH (Adinugraha et al., 2022). The finding that certification does not affect exports is logical given the government's recent push for certification, which began in 2019, and faced challenges in 2020 due to the COVID-19 pandemic and the transition from LPPOM MUI to BPJPH. The government responded by offering free certification to SMEs.

Indonesian producers and exporters with halal certification benefit from greater acceptance by international halal consumers, facilitating broader market access (Adinugraha et al., 2022). The impact of accelerated halal certification on exports is expected to become more evident in the coming years.

CONCLUSION

Based on the research, the ARDL analysis shows that macroeconomic factors such as inflation, exchange rates, GDP, and FDI have a significant impact on Indonesia's halal product exports in the short term, but not in the long term. Inflation, GDP, and FDI have a negative impact, while exchange rates have a positive impact, contrary to the theory which generally shows a positive relationship between GDP and FDI with exports, and a negative relationship between exchange rates and exports. This anomaly may be caused by changes in data patterns due to the COVID-19 pandemic or other specific conditions. Additionally, halal certification does not have a significant impact on exports in the short or long term because the program to accelerate the

halal industry in Indonesia is still in its early stages, so it has not consistently influenced halal product exports.

This study reveals that increasing Indonesia's halal product exports can be achieved through a series of strategic policies. The government is advised to accelerate and expand the halal certification process, maintain commodity price stability and exchange rates, and enhance international promotion to attract foreign investors. Additionally, support for product development, the establishment of halal business incubators, and the provision of tax incentives are crucial to enhancing the competitiveness of Indonesian halal products in the global market. Implementing these policies is expected to boost the growth of halal product exports and strengthen the national economy. Future research is recommended to add intervening variables, increase the sample size, and use a more suitable model to obtain better results.

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