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The Impact of the Islamic Stock Market on Economic Growth - A Study of the Dow Jones Islamic Market Index for a Group of Countries During the Period 2010–2024

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Abstract:

This study aims to measure and analyze the impact of the Islamic stock market on economic growth in Malaysia, Turkey, Japan, the UK, India, China, Canada, and Kuwait during the period from the third quarter of 2010 to the first quarter of 2024. A Panel-ARDL (Distributed Autoregressive Diagram) model, specifically designed for panel data, was used to examine the relationship between variables. The modeling results indicate that the Islamic stock market index positively influences the growth rates of the sampled economies in both the short and long term. Furthermore, a long-term equilibrium relationship was found between Islamic stock market indices and economic growth in Malaysia, Turkey, Japan, the UK, India, China, Canada, and Kuwait during the study period.

Keywords: Islamic stock market ,economic growth ,Islamic dimension ,Dow Jones Islamic Index ,Panel-ARDL model

JEL Classification:G15, O40, Z12,C22.

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INTRODUCTION:

The Islamic stock market is considered one of the fundamental pillars of the financial system compliant with Islamic Sharia, and it has received increasing attention from investors, researchers, and policymakers in recent decades. This market is distinguished by a set of principles that set it apart from conventional markets, as it is based on financial and ethical rules that limit involvement in unlawful activities, prohibit riba and gambling, and encourage transparency and genuine participation in risks and returns. In 1999, one of the major developments in Islamic stock markets was the introduction of Islamic indices, which screen conventional stock market indices to identify securities that comply with the principles of Islamic Sharia. These indices serve as benchmarks for investors who wish to invest in Sharia-compliant securities while maintaining the general objectives of their investment portfolios. By filtering out companies that do not meet the ethical and legal standards set by Islamic Sharia, these indices provide investors with a clear framework for ethical investment. Among the most important of these indices are: the FTSE Islamic Index Series, the Dow Jones Islamic Market Index, the S&P Islamic Index, and the MSCI Islamic Index.

Through this paper, we will attempt to study the impact of the Islamic stock market on economic growth. Accordingly, the research problem of this study was formulated as follows:

How does the Islamic stock market affect economic growth in the countries under study during the period from 2010 to 2024?

Research hypotheses:

- There is a positive and significant effect of the development of the Islamic stock market on economic growth during the study period.
- There is a long-run equilibrium relationship between the indicators of the Islamic stock market and economic growth during the study period.

Research methodology:

The descriptive approach was used to review the various theoretical literature related to the Islamic stock market and economic growth. In addition, an econometric model represented by the Panel Autoregressive Distributed Lag model (Panel-ARDL), specifically designed for panel data, was used to study the applied aspect.

The Theoretical Framework of the Islamic Stock Market and Its Relationship with Economic Growth

Recently, the world has witnessed tremendous economic growth due to developments in capital markets. Since Islamic stock markets are part of financial markets, there is debate about whether Islamic securities financing contributes to economic growth. For this purpose, this study aims to explore whether Islamic securities promote economic growth.

1.1: Definition of the Islamic Stock Market

It has been defined as: “An organized market held in a specific place and at periodic times for trading, buying and selling various securities, aiming to mobilize monetary

savings and direct them toward productive projects" (Ketaf, 2014, p. 09). It is also defined as the market in which medium- and long-term investment and financing opportunities are available in full compliance with the provisions of Islamic Sharia, and free from activities prohibited by Sharia such as dealing in riba, gambling, and gharar transactions, among others. (Madani, 2021, p. 215).

1.2: Sharia Controls for Establishing an Islamic Stock Market

Islam has set controls for Islamic stock markets to ensure their stability and growth, which include the following (Al-Masoudi, 2009, pp. 49-52):

Prohibition of gambling (maysir), as stated in the verse:

"يَا أَيُّهَا الَّذِينَ آمَنُوا إِنَّمَا الْخَمْرُ وَالْمَيْسِرُ وَالأَنْصَابُ وَالأَزْلامُ رِجْسٌ مِنْ عَمَلِ الشَّيْطَانِ فَاجْتَنِبُوهُ لَعَلَّكُمْ تُفْلِحُونَ" سورة المائدة آية 90.

Prohibition of riba, as stated in the verse:

"يَا أَيُّهَا الَّذِينَ آمَنُوا اتَّقُوا اللَّهَ وَذَرُوا مَا بَقِيَ مِنَ الرِّبَا إِن كُنتُم مُّؤْمِنِينَ" سورة البقرة آية 278.

Prohibition of najsh, as reported by Nafi' from Ibn 'Umar (may Allah be pleased with him), who said: "The Prophet (peace be upon him) forbade najsh." Narrated by Al-Bukhari (2142) and Muslim (1516). From Abu Huraira (may Allah be pleased with him), the Prophet (peace be upon him) said: "A town dweller must not sell on behalf of a desert dweller, and do not practice najsh." Narrated by Al-Bukhari (2723) and Muslim (1413).

℘ Prohibition of monopoly and gharar. It was reported from Ma'mar ibn 'Abdullah (may Allah be pleased with him) that the Messenger of Allah (peace be upon him) said: "No one hoards except a sinner." Narrated by Muslim. From Abu Huraira (may Allah be pleased with him): "The Messenger of Allah (peace be upon him) forbade the sale of pebbles and the sale of gharar." Narrated by Muslim.

℘ Freedom of competition, which appears in financial markets through the interaction of supply and demand forces to determine the prices of traded securities.

℘ Disclosure, as periodic disclosure of the financial position has become a necessity in financial relations. Islam has strongly emphasized disclosure, as the Prophet (peace be upon him) said: " البيعان بالخيار ما لم يتفرقا، أو قال حتى يتفرقا ، فإن صدقا وبينا بورك لهما في بيعهما، وإن كتما وكذبا محقـــــــــت بركة بيعهم" رواه مسلم.

1.3: Definition of Economic Growth

The economist François Perroux defined economic growth as: "the continuous increase in total income or the net real value" (Pierre, 2010, p. 02).

Economic growth has also been defined as a process of expansion in production over a given period, which may occur in relation to a preceding period in both the short and medium terms. This means that there are different strategies and measures that can be adopted to achieve expansion in production and develop productive capacity in the short and medium term (Bosserelle, 2010, p. 30).

1.4: The Relationship Between the Islamic Stock Market and Economic Growth (Theoretical Perspective)

The relationship between the Islamic stock market and economic growth, based on endogenous growth theory as an extension of classical concepts, suggests—according to

Paul Romer's theory—that economic growth is influenced by external variables such as financial markets. Many prominent empirical studies confirm that stock markets are external factors within the endogenous growth model (Ledhem & Mekidiche, 2021, p. 122).

Bencivenga and Smith (1991) showed that financial intermediation enhances loans that can finance long-term investments due to the increase in deposits and capital supply, leading to economic growth (Bencivenga & Smith, 1991, p. 196).

On the other hand, Saint-Paul (1992) demonstrated that financial markets promote technical specialization in entrepreneurship, which contributes to economic growth (Saint-Paul, 1992, p. 763).

Moreover, Blackburn and Hung (1998) showed that the development of the financial system and trade liberalization can stimulate the development of intermediation, which in turn stimulates economic growth (Blackburn & Hung, 1998, p. 107).

Several studies such as Malikov (2017), Mitsalianidou et al., Samawi and Nishiyama (2017), and Sari et al. (2018) concluded that the development of Islamic securities encourages economic growth by expanding investment and capital assets. Accordingly, within the framework of endogenous growth theory, Islamic securities are considered an external factor that positively affects economic growth when investments and capital shares are mobilized through Islamic securities financing.

Islamic finance also contributes to improving economic growth at the international level as an external driver according to the concept of endogenous growth. Therefore, since Islamic securities are part of Islamic finance that promotes internal economic growth, it is easy to conclude that the Islamic securities factor is an external variable that enhances economic growth within the meaning of endogenous growth theory (Ledhem & Mekidiche, 2021, p. 122).

The Applied Aspect of the Study

This study aims to determine the causal relationship between the Islamic stock market and economic growth in the countries under study (Malaysia, Turkey, India, the United Kingdom, Japan, China, Canada, and Kuwait) during the period q2 2010–q1 2024. An econometric approach will be used in accordance with the quantitative techniques and methods commonly applied in econometric modeling.

2.1: Study Sample:

The study sample includes 08 countries out of more than 40 countries according to the World Bank classification, namely: Malaysia, Turkey, India, the United Kingdom, Japan, China, Canada, and Kuwait.

2.2: Research Boundaries:

The spatial scope of the study is represented by the Islamic stock markets in Malaysia, Turkey, Japan, the United Kingdom, India, China, Canada, and Kuwait, as they are among the countries that use the Dow Jones Islamic Index. As for the temporal scope, it covers the study period extending from the third quarter of 2010 to the first quarter of 2024.

3.2: Study Variables and Data Sources

Variable	Unit	Source
Economic Growth Rate (GDPG)	%	Database available on Trading Economics website: https://tradingeconomics.com/ Database available at Bank Negara Malaysia website: https://www.bnm.gov.my/
Islamic Market Index (ISLM)	US Dollar	Database available on Investing website: https://sa.investing.com/search?q=dow+jones+islamic+market As well as S&P Global data available on: https://www.spglobal.com/spdji/en/indices/equity/dow-jones-islamic-market-greater-china-index/#overview

Source: Prepared by the researchers

2.4: Specification of the Study Model

This study relies on two variables: a dependent (or target) variable representing the economic growth rates of the sample countries, and a main explanatory (independent) variable representing the Islamic financial market in the targeted countries. This is based on the variables included in previous studies that addressed the research topic wholly or partially, as presented in the chapter on previous studies. The general mathematical formulation of the study model can be written as follows:

$$GDPG_{it} = c + \beta_{1j}\,\mathbf{ISLM}_{j(it)} + \varepsilon_{it}$$

Where:

(β_{kj}) represent the model parameters.

(i = 1……..n) represent the cross-sections (countries).

(t = 1……T) represents time.

ε_{it} represents the random error term.

2.5: Descriptive Statistics and Simple Correlation Coefficients of the Study Variables

In order to provide a preliminary overview and clarify the main characteristics of the data adopted in the study and related to the model under investigation, a set of measures of central tendency was calculated, as shown in the following table:

Table No. (01): Descriptive Statistics of the Study Variables

STATS	ISLM	*GDPG*
Mean	2295.638	*3.641432*
Median	2206.295	*3.6*
Maximum	4649.69	*25.7*
Minimum	740.006	*-23.1*
Std. Dev.	776.1244	*4.982722*
Skewness	0.634509	*-0.62928*
Kurtosis	3.216935	*8.646611*
Sum	1010081	*1602.23*

Sum Sq. Dev.	2.64E+08	*10899.28*
Observations	440	*440*

Source: Prepared by the researchers based on the outputs of EVIEWS 12.

By referring to the previous table, the following results can be noted:

The overall arithmetic mean of the Islamic market index in the sample countries under study (ISLM) reached (2295.638 US dollars). As for the GDP growth rate variable (GDPG), its value reached (3.641432%), which is a good value reflecting the economic recovery experienced by the sample countries in general during the period (2010–2014). The highest value of the Islamic financial market index (4649.69 US dollars) was recorded in India during the first quarter of 2024, while the lowest value (740.006) was recorded in Turkey during the second quarter of (2012). The highest value of GDP growth (%25.7) was recorded in the United Kingdom during the second quarter of 2021, whereas the lowest value recorded was (-23.1%) in India during the second quarter of 2021.

It is worth noting the high standard deviation values of the Islamic financial market index during the study period, which indicates the existence of variation in the observations of this variable across the cross-sections (countries), while relatively low standard deviation values were recorded for the GDP growth rate variable. This variation can be explained by the differences in the units of measurement between the study variables.

Results and Discussion

3.1: Correlation Matrix of the Study Variables

Table No. (02): Correlation Matrix of the Study Variables

Correlations			
		ISLM	GDPG
ISLM	Pearson Correlation	1	0.080
	Sig. (2-tailed)		0.096
	N	440	440
GDPG	Pearson Correlation	0.080	1
	Sig. (2-tailed)	0.096	
	N	440	440

Source: Prepared by the researchers based on the outputs of SPSS 28.

It is clear from the table that the correlation coefficient between GDP growth rates and the Islamic financial market index reached 8%, which is a low and positive value reflecting the direction of the relationship. This value is not statistically significant at the 5% significance level, considering that its SIG value is lower than the critical value (0.09), while this result may be accepted at the 10% significance level. In general, it appears preliminarily that the direction of the correlation relationship between the study variables is positive.

3.2: Results of the Stationarity Test for the Study Variables

What can be concluded from the stationarity tests shown in the following table is that the dependent variable, represented by the GDP growth rate, was integrated of order (0), whereas the Islamic financial market index appeared stationary at the first difference I(1). According to Pesaran and Shin, there is a possibility of a long-run equilibrium relationship between the study variables.

Table No. (03): Results of the Stationarity Tests for the Model Variables at the level.

Model	Tests	PP - Fisher Chi-square	ADF - Fisher Chi-square	Im, Pesaran and Shin W-stat	Result
With intercept	GDPG	120.3660	76.5706	-6.7246	Stationary
		0.0000	0.0000	0.0000	
	ISLM	0.197746	13.64059	16.03369	Non-stationary
		0.578378	0.62547	0.450612	
With intercept and trend	GDPG	-5.4400	57.2863	97.5776	Stationary
		0.0000	0.0000	0.0000	
With intercept and trend	GDPG	-5.4400	57.2863	97.5776	Stationary
		0.0000	0.0000	0.0000	
	ISLM	-1.8015	24.4951	26.20499	Non-stationary
		0.0358	0.0792	0.051211	

Source: Prepared by the researchers based on the outputs of EViews 12.

3.3: Estimation of the Model Using the (MG; PMG) Methods

Based on Appendix No. 01 and 02, which present the estimates of the Mean Group and the Pooled Mean Group estimation methods, and which show the long-run and short-run estimates in addition to the error correction term, the following can be noted:

In the long run:

Based on the results obtained from the estimation according to the MG method, it appears that the estimated coefficient associated with the Islamic financial market index in the long run was not statistically significant at the 5% significance level, considering that the probability value associated with this coefficient was (0.27), which is clearly greater than the critical value (0.05). At the same significance level, according to the Pooled Mean Group (PMG) methodology, the coefficient associated with the Islamic financial market index was statistically significant in the long run, as the probability value of the coefficient associated with this variable reached (0.00), which is less than the critical value (0.05).

In the short run:

Based on the (MG) estimation method, we find that the Islamic financial market index with a lag of one period and two periods was significant at the 5% significance level, whereas the estimation results according to the (PMG) method showed that the Islamic financial market index with a lag of two periods only was significant at the 5% significance level.

Error Correction Term: ECT

It appeared statistically significant for both estimation methods at the 5% significance level.

3.4: Comparison Between the Models Estimated by the (MG; PMG) Methods According to the Hausman Test

The comparison between the results obtained by the two methods was carried out through the Hausman test. Based on Appendix No. 03 and as summarized in the table, the following is shown:

Table No. (04): Comparison Between the MG and PMG Models

PMG Hausman Specification Test				
Null hypothesis: Estimator is statistically similar to the PMG estimator				
Estimator		Stat.	DOF	p-Value
Mean Group		1.235761	2	0.539086

Source: Prepared by the researchers based on the outputs of EVIEWS 12.

The calculated Chi-square statistic value was $\chi^2 = 1.23$, which is lower than the tabulated value (11.07) at the 5% significance level and with (2) degrees of freedom. This leads us to accept the null hypothesis (H0), meaning that the results of the Pooled Mean Group (PMG) estimation method are appropriate and are characterized by more consistent estimators than the Mean Group (MG) method.

CONCLUSION

In light of what has been analyzed in this study regarding the impact of the Islamic stock market on economic growth, through examining the performance of the Dow Jones Islamic Market Index during the period from 2010 to 2024, it is evident that Islamic financial markets have become an active element in the global economic system and are no longer merely a limited-scope traditional alternative.

Through instruments such as sukuk (Islamic bonds), mudarabah (profit-sharing partnerships), and murabaha (cost-plus financing), Islamic finance facilitates the mobilization of capital for large-scale projects while ensuring risk-sharing and accountability among stakeholders. This approach not only mitigates financial instability, but also encourages transparency and ethical practices. Moreover, the Islamic financial market serves as a bridge between investors and companies, fostering entrepreneurship and innovation by providing accessible financing options. In doing so, it empowers local economies, enhances financial inclusion, and supports the socio-economic objectives of Islamic countries, making it a vital driver of economic development and social welfare.

Through the theoretical and applied study of the topic “The Impact of the Islamic Stock Market on Economic Growth: A Study of the Dow Jones Index for a Group of Countries during the Period 2010–2024,” a number of findings were reached, which can be summarized in the following points:

- The stock market is considered an organized and regulated market in which participants meet to carry out the buying and selling of securities, in a specific place, at specified times, and under conditions governed by laws and regulations aimed at ensuring the safety and transparency of transactions and protecting investors' interests. These laws and regulations ensure the existence of sound foundations for التداول and strengthen confidence in the stock market.
- One of the most important Sharia controls for establishing an Islamic stock market is the prohibition of riba.
- The relationship between the Islamic stock market and economic growth, based on endogenous growth theory as an extension of classical concepts, suggests, according to Paul Romer's endogenous growth theory, that economic growth is influenced by external variables such as financial markets under Romer's economic growth model because of investment progress and the rise in human capital.
- Bencivenga and Smith (1991) showed that financial intermediation enhanced loans that could finance long-term investments, due to the increase in deposits and capital supply, which led to economic growth.
- Within the framework of the diagnostic tests of the time series, we relied on unit root tests, and the results showed that the economic growth rates variable is stationary at level, while the independent variable, after taking first differences, appeared stationary at the first difference.
- Based on the (PEDRONI and KAO) tests, it was found that there is a cointegration relationship among the study variables. As a result of the cointegration tests, it can be confirmed that there is at least one long-run equilibrium relationship from the Islamic financial market index toward economic growth rates, and therefore the second hypothesis is accepted: "There is a long-run equilibrium relationship between the indicators of the Islamic stock market and economic growth in the sample countries during the study period."
- From the long-run equation, it was concluded that the Islamic financial market index has a positive effect on the growth rates of gross domestic product (economic growth) in the sample countries, and therefore the first hypothesis is accepted: "There is a positive and significant effect of the development of the Islamic stock market on economic growth in the sample countries during the study period."

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APPENDICES:

Appendix No. (01): Stationarity Tests at Level.

Panel unit root test: Summary
Series: GDPG
Date: 08/15/24 Time: 03:22
Sample: 2010Q3 2024Q1
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-0.34199	0.3662	8	424
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-6.72460	0.0000	8	424
ADF - Fisher Chi-square	76.5706	0.0000	8	424
PP - Fisher Chi-square	120.366	0.0000	8	432

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: GDPG
Date: 08/15/24 Time: 03:22
Sample: 2010Q3 2024Q1
Exogenous variables: Individual effects, individual linear trends
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	1.47989	0.9305	8	424
Breitung t-stat	-7.06025	0.0000	8	416
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-5.43997	0.0000	8	424
ADF - Fisher Chi-square	57.2863	0.0000	8	424
PP - Fisher Chi-square	97.5776	0.0000	8	432

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: ISLM
Date: 08/15/24 Time: 03:23
Sample: 2010Q3 2024Q1
Exogenous variables: Individual effects, individual linear trends
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-0.59769	0.2750	8	424
Breitung t-stat	-1.23540	0.1083	8	416
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.80148	0.0358	8	424
ADF - Fisher Chi-square	24.4951	0.0792	8	424
PP - Fisher Chi-square	26.2050	0.0512	8	432

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: ISLM
Date: 08/15/24 Time: 03:24
Sample: 2010Q3 2024Q1
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	0.66271	0.7462	8	424
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	0.19775	0.5784	8	424
ADF - Fisher Chi-square	13.6406	0.6255	8	424
PP - Fisher Chi-square	16.0337	0.4506	8	432

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Appendix No. (02): Stationarity Tests at the First Difference.

Panel unit root test: Summary
Series: D(ISLM)
Date: 08/15/24 Time: 03:24
Sample: 2010Q3 2024Q1
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-11.3510	0.0000	8	416
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-11.7038	0.0000	8	416
ADF - Fisher Chi-square	154.160	0.0000	8	416
PP - Fisher Chi-square	289.002	0.0000	8	424

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: D(ISLM)
Date: 08/15/24 Time: 03:25
Sample: 2010Q3 2024Q1
Exogenous variables: Individual effects, individual linear trends
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-10.8618	0.0000	8	416
Breitung t-stat	-6.76723	0.0000	8	408
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-10.7635	0.0000	8	416
ADF - Fisher Chi-square	127.905	0.0000	8	416
PP - Fisher Chi-square	260.021	0.0000	8	424

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Appendix No. (03): Estimation Using the Group Mean Method.

Dependent Variable: D(GDPG)
Method: ARDL
Date: 08/15/24 Time: 03:21
Sample: 2011Q3 2024Q1
Included observations: 408
Number of cross-sections: 8
Dependent lags: 4 (Automatic)
Automatic-lag linear regressors (4 max. lags): ISLM
Deterministics: Restricted constant and no trend (Case 2)
Model selection method: Akaike info criterion (AIC)
Number of models evaluated: 20
Selected model: PMG(4,2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Long-run (Pooled) Coefficients				
ISLM	0.001207	0.000380	3.179857	0.0016
C	-0.663286	0.843552	-0.786301	0.4321
Short-run (Mean-Group) Coefficients				
COINTEQ	-0.548313	0.101686	-5.392237	0.0000
D(GDPG(-1))	-0.014588	0.096422	-0.151298	0.8798
D(GDPG(-2))	0.166962	0.092163	1.811599	0.0708
D(GDPG(-3))	0.239334	0.058508	4.090641	0.0001
D(ISLM)	-0.001793	0.001005	-1.784009	0.0752
D(ISLM(-1))	0.002926	0.001031	2.837865	0.0048
Log-Likelihood:	-1060.946			

Appendix No. (04): Estimation Using the Pooled Group Mean Method.

Estimation: Mean Group

Dependent Variable: D(GDPG)
Method: ARDL
Date: 08/15/24 Time: 03:21
Sample: 2011Q3 2024Q1
Included observations: 408

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Long-Run Coefficients				
ISLM	0.000818	0.000743	1.100618	0.2717
C	1.180952	2.337515	0.505217	0.6137
Short-Run Coefficients				
COINTEQ	-0.823699	0.036716	-22.43457	0.0000
D(GDPG(-1))	0.187767	0.049783	3.771718	0.0002
D(GDPG(-2))	0.328535	0.052055	6.311333	0.0000
D(GDPG(-3))	0.347512	0.032174	10.80113	0.0000
D(ISLM)	-0.002913	0.000916	-3.181185	0.0016
D(ISLM(-1))	0.001938	0.000805	2.407728	0.0165

Appendix No. (05): Hausman Tests for Choosing Between Dynamic Models.

PMG Hausman Specification Test
Null hypothesis: Estimator is statistically similar to the PMG estimator

Estimator	Stat.	DOF	p-Value
Mean Group	1.235761	2	0.5391