Exploring Daily Sectoral Interactions with the General Index in the Amman Stock Exchange: An ARDL Approach to Short- and Long-Run Dynamics in the Financial and Industrial Sectors (2023–2025)

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Abstract

The present study targets to rigorously quantify the short- and long-run causal effects exerted by daily fluctuations in the financial and industrial sector indices on the ASE's general index. The covered period is from January 1, 2023 to July 31, 2025 by using ARDL approach. The resulted model in this study was the ARDL (2,2,2). Outcomes of this model indicate that together the financial and industrial sector indices have statistically momentous and optimistic effects on the Amman Stock Exchange GI in both the short and long run. The financial sector demonstrates a markedly stronger influence than the industrial sector, highlighting its central role in driving movements of the GI. Long-run outcomes reveal that changes in the financial sector index are transmitted more strongly and persistently to the general index compared to changes in the industrial sector. Short-run dynamics show that variations in the financial sector have a stronger immediate effect on the GI than those in the industrial sector. The relatively small error correction term suggests a slow adjustment toward long-run equilibrium, indicating that deviations from equilibrium persist over multiple periods before full correction. Overall, the findings emphasize the dominant part of the financial sector in shaping the general market performance in the Amman Stock Exchange.

Keywords: Amman Stock Exchange, ARDL, Error Correction Model, General Index, Industry Index, Financial Index.

استكشاف التفاعلات القطاعية اليومية مع المؤشر العام في بورصة عمان: نهج ARDL للديناميكيات قصيرة وطويلة الأجل في القطاعين المالي والصناعي (2025-2023)

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ملخص

تهدف الدراسة الحالية الى تحديد التأثيرات السببية قصيرة وطويلة الأجل التي تمارسها التقلبات اليومية في مؤشرات القطاعين المالي والصناعي على المؤشر العام لبورصة عمان بدقة خلال الفترة الممتدة من 1 يناير 2023 الى 31 يوليو 2025، باستخدام منهجية ARDL. وكان النموذج الناتج في هذه الدراسة ARDL (2،2،2). تشير نتائج هذا النموذج الى أن مؤشرات القطاعين المالي والصناعي معها لها آثار إحصائية مهمة ومتفائلة على المؤشر العام ببورصة عمان على المدى القصير والطويل. يظهر القطاع المالي تأثيراً أقوى بشكل ملحوظ من القطاع الصناعي، مما يسلط الضوء على دوره المركزي في دفع تحركات المؤشر العام. تكشف النتائج طويلة الأجل أن التغييرات في مؤشر القطاع المالي تنتقل بقوة واستمرار الى المؤشر العام مقارنة التغيرات في القطاع الصناعي. تظهر ديناميكيات المدى القصير ان التغيرات في القطاع المالي لها تأثير فوري وأقوى على المؤشر العام من تلك الموجودة في القطاع الصناعي. يشير مصطلح تصحيح الخطأ الصغير نسبياً الى تكيف بطيء نحو التوازن طويل الأجل، مما يشير الى استمرار الانحرافات عن التوازن لفترات متعددة قبل التصحيح الكامل. وبشكل عام، تركد النتائج الدور المهيمن للقطاع المالي في تشكيل الأداء العام لبورصة عمان.

الكلمات المفتاحية: بورصة عمان، نموذج تصحيح الخطأ ARDL، المؤشر العام، مؤشر القطاع الصناعي، المؤشر المالي.

1. Introduction

Understanding the long- and short-term interactions among financial market sectors is crucial for policymakers, investors, and researchers. Analyzing these relationships, helps identify how shocks in one sector can affect others and the overall market, providing insights into market efficiency, risk management, and investment strategies. Long-term relationships reveal the persistent and structural linkages between sectors, which are essential for strategic planning and portfolio diversification. Short-term dynamics. On the other hand, capture immediate market reactions and adjustment processes, which are important for day-to-day trading and short-term investment decisions. Several studies have emphasized the significance of examining these relationships. For instance, Pesaran et al. (2001) introduced the ARDL bounds testing approach to explore both short- and long-run dynamics in financial time series. Similarly, Wang et al. (2016) decorated the role of sectoral interdependencies in understanding market co-movements and volatility transmission. Bouri et al. (2017) further demonstrated how sectoral linkages could guide risk management and investment diversification strategies. The intricate relationship between aggregate market performance and sector-specific indices constitutes a fundamental aspect of contemporary financial econometrics. Within the context of the Amman Stock Exchange (ASE), extant literature has extensively examined both short-term and long-term co-movements among the general market index and various macroeconomic determinants utilizing the Autoregressive Distributed Lag (ARDL) modeling framework (e.g., Pesaran et al., 2001). Despite these contributions, there exists a notable gap regarding the dynamic interdependencies between the general index and its constituent sectoral indices particularly the financial and industrial sectors at a high-frequency (daily) level. The ASE, embedded within Jordan's evolving economic landscape characterized by a robust banking system and a progressively diversified industrial base, offers a compelling empirical setting for this investigation (C.B of Jordan, 2023; Department of Statistics, Jordan, 2023). Recent empirical endeavors employing ARDL techniques have illuminated the short- and long-term impacts of exogenous shocks, such as those induced by the COVID-19 pandemic, on the ASE's sectoral returns and volatility (Al-Smadi et al., 2022). Building on this scholarly foundation, the present study targets to rigorously quantify the short- and long-run causal effects exerted by daily fluctuations in the financial and industrial sector indices on the ASE's general index over the period spanning January 1, 2023 to July 31, 2025. Leveraging the ARDL bounds test mechanism to co-integration (Pesaran et al., 2001), coupled with error correction modeling. This study accounts for potential varied orders of integration with zero and one orders intrinsic to financial time series data, thereby capturing both immediate and equilibrium adjustment dynamics. This study's contributions are multifaceted: firstly, by providing high-frequency empirical insights into sectoral co-movements within a relatively underexplored emerging market context; secondly, by furnishing market practitioners and policymakers with nuanced understanding critical for informed decision-making regarding risk management, asset allocation, and regulatory oversight amid Jordan's ongoing economic transformation. The dominance of the financial sector in Jordan can be attributed to several structural characteristics of the Jordanian economy. The Amman Stock Exchange is heavily weighted toward banking and financial institutions, which constitute the largest share of market capitalization and trading activity. Jordan's centralized and highly regulated banking system also reinforces this influence, as banks play a fundamental role in financing economic activities due to the relatively underdeveloped capital markets and limited presence of large industrial firms. Furthermore, the financial sector acts as the primary channel for monetary policy transmission, amplifying its impact on overall market movements. These structural features collectively explain why financial sector dynamics exert a disproportionately strong influence on the general index compared to other sectors.

2. Literature Review

Over the past decade, the ARDL mechanism has gained significant prominence in financial econometrics. The reason of this role is that, its capacity to examine both short-term subtleties and long-term symmetry associations among financial and macroeconomic variables, particularly within stock markets. Numerous empirical studies have employed the ARDL framework to capture the complex interactions and adjustment processes across various financial sectors. Shao et al. (2021) applied a quantile-based ARDL model to examine the determinants of crude oil futures, revealing that financial strategy improbability, equity markets, and interest rate exert significant short- and long-run effects on oil price movements across both U.S. and Chinese markets. Similarly, Zhang (2025) investigated volatility in the Chinese stock market using ARDL and principal component analysis, highlighting robust linkages between equity returns, foreign exchange rates, and bond yields from 2010 to 2024. A broader application of ARDL in the context of global equity markets confirmed the occurrence of long-term cointegration among major indices, underscoring the declining effectiveness of international diversification due to increased market interdependence. Furthermore, Aggarwal and Rivoli (MDPI) utilized the ARDL methodology to explore the interplay among financial innovation, development of stock market, and economic evolution, identifying stable long-term relationships and meaningful short-run dynamics. In the context of energy-finance linkages. Stavroyiannis (2022) employed the ARDL methodology along with the Toda–Yamamoto causality test to detect a unidirectional long-run relationship from Dubai oil rates to U.S. natural gas rates, thereby providing further evidence of market spillovers. Collectively, these studies underscore the ARDL model's robustness in capturing dynamic relationships in financial systems, particularly when variables exhibit mixed integration orders and when precise modeling of both short-term variations and long-term steadiness is essential. Dhaoui and Bacha (2017) utilized a nonlinear ARDL model to explore asymmetric effects of shareholder sentimentality on transaction capacity in the U.S. S&P 500, revealing rapid and significant asymmetric adjustments. Gherghina et al. (2020) explore the COVID-19 epidemic's impact on global stock market returns, the study documented a significant short- and long-term causal effects using ARDL bounds testing. Massomeh and Omar (2017), identified stable cointegrating relationships among interest rates instability and financial market development. Mohammed and Şahin (2020) found asymmetric long- and short-term associations of exchange rate fluctuations on Kuwait's stock prices through a nonlinear ARDL approach. Al-mulali et al. (2019) extended ARDL methodology to environmental-financial interlinkages, highlighting asymmetric linkages between Malaysian stock market activity and CO_2 emissions, displaying the model’s versatility. Türksoy and Faisal (2019) demonstrated a significant long-term negative association among interest rate and stock rates in Turkey, validated through ARDL bounds testing and complementary cointegration techniques. Collectively, these studies confirm the robustness of ARDL models in capturing complex short- and long-term dynamics in diverse financial contexts, accommodating asymmetric adjustments and mixed integration orders. Battal (2025) analyzed the relationship between exchange rate fluctuations and the stock market in Iraq from 2005 to 2013 by using cointegration tests and the Error Correction Model (ECM), the study establish a significant long-term association, indicating that exchange rate volatility substantially affects stock market performance. Al-Hassanin (2019) explored the connection amongst trade liberalization, financial development, and economic progress in Rwanda from 1970 to 2017 using the Autoregressive Distributed Lag (ARDL) model. The findings revealed a significant impact of both trade liberalization and financial development on economic growth in both the short and long run. Alkhazaleh (2024) examines the impact of crude oil price fluctuations on inflation in Jordan from 2000 to 2021 using ARDL model. The results indicate significant short- and long-term effects of oil prices on inflation. Alkhazaleh (2024) observes the influence of oil price variations on Jordan's GDP, inflation, and unemployment employing a multivariate Autoregressive Distributed Lag (ARDL) model. The analysis reveals that oil prices do not have statistically substantial effects on GDP and unemployment in either the short or long term. However, both short- and long-term impacts of oil rates on inflation are significant, emphasizing the heightened sensitivity of Jordanian inflation to changes in global oil prices. This study offers a distinctive contribution by delivering high-frequency empirical evidence on sectoral co-movements within the largely underexamined context of an emerging market like Jordan. What sets this work apart is its focus on timely, granular data that captures dynamic interactions often overlooked in prior research. Moreover, the study provides valuable insights for market practitioners and policymakers, supporting more informed decisions in risk management, asset allocation, and regulatory planning during Jordan’s current phase of economic transformation. However, across the reviewed literature, several points align closely with the present study. First, many studies employ ARDL or its nonlinear variants to analyze short- and long-run relationships, confirming the model’s suitability for handling mixed integration orders and capturing dynamic adjustments—an approach shared by the current research. Second, prior works consistently highlight sectoral or market interactions, whether across financial, energy, or macroeconomic variables, reflecting a common interest in understanding interconnected market behaviors. Third, the literature emphasizes the importance of detecting cointegration and spillover effects, which aligns with the current study’s investigation of co-movements among ASE sectors. Finally, several studies stress the relevance of high-frequency or contemporary data in revealing nuanced short-term dynamics an aspect similarly addressed in the present study through its focus on capturing precise sectoral linkages within an emerging market.

3. Methodology

This study employs the ARDL methodology to explore the dynamic interactions between daily sectoral indices and the general index of the Amman Stock Exchange (ASE). The period is daily extended from January 1, 2023 to July 31, 2025. The Amman Stock Exchange (ASE) is primarily structured around the financial, industrial, and general sectors. The financial sector drives market liquidity through banks and financial institutions, while the industrial sector contributes to economic growth via manufacturing and production activities. The general sector encompasses diverse service-based companies that provide stability and additional diversification. Together, these sectors represent the core composition of the ASE and reflect key economic dynamics in Jordan. The exclusion of the Services Sector from the study is primarily justified by data-related and methodological considerations. The reason is that, the sector exhibits irregular or incomplete time-series observations, which undermines the reliability of estimating both short- and long-run relationships within the ARDL framework. Such inconsistencies introduce structural breaks and compromise the stationarity requirements needed for valid econometric modeling. The ARDL approach, presented by Pesaran, Shin, and Smith (2001), is highly appropriate for time series data exhibiting mixed orders of integration (I(0) and I(1)), circumventing the limitations of traditional cointegration techniques that require uniform integration orders. This flexibility is critical in financial time series analysis, where variables often display heterogeneous stationarity properties. The study utilizes daily closing price data collected over a sufficiently long period to capture both short-term fluctuations and long-term equilibrium relationships. Prior to estimation, stationarity tests such as Augmented Dickey-Fuller (ADF) is to verify integration orders.

The equation used in the ADF test is as follows Dickey & Fuller (1979):

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \Sigma_{i=1}^{p} \delta_i \Delta y_{t-i} + \varepsilon_t \quad (1)$$

Where:

Δy_t: The series 1st difference (i.e., $y_t - y_{t-1}$), α: Intercept term, βt: Time trend, γ: Test coefficient related to the existence of a unit root, p: Number of lag terms, and finally, ε_t: Random error term

Hypotheses of the Test

Null Hypothesis (H_0): The time series has a unit root

Alternative Hypothesis (H_1): The time series does not have a unit root

We can judge the time series by:

If the p-value < 0.05 → reject H_0 → the series is stationary

If the p-value ≥ 0.05 → fail to reject H_0 → the series is non-stationary.

The equation of the KPSS test (Kwiatkowski-Phillips-Schmidt-Shin) (Kwiatkowskiet, al,1992) is an arithmetical check used in time series analysis to decide whether a series is stationary or not. It is unlike the ADF test, which assume non-stationarity under the null hypothesis, the KPSS assumes the opposite:

H_0: The series is stationary around a constant mean or a deterministic trend (trend-stationary).

H_1: The series contains a unit root (non-stationary).

$$KPSS = \frac{1}{T^2} \sum_{t=1}^{T} \frac{S_t^{\,2}}{\hat{\sigma}_t} \quad (2)$$

Where S_t is the cumulative sum of residuals up to time t

$\hat{\sigma}_t$ is the estimated variance of the residuals, and T is the number of observations.

The ARDL model consists of lagged standards of exogenous and endogenous variables to account for temporal dependencies and dynamic adjustments, enabling a granular investigation of both immediate and delayed effects between the general index and sectoral indices. The analytical procedure begins with the bounds test methodology to co-integration, which tests for the presence of a statistically significant long-run association among variables. A confirmed cointegration relationship suggests that notwithstanding short-term deviations, the variables be likely to change together in the long run, adhering to a stable equilibrium path. Subsequently, an error correction model (ECM) imitative from the ARDL framework captures short-run dynamics, where the error correction term measures the speed at which deviations from the long-run equilibrium are corrected. This dual modeling approach facilitates a comprehensive understanding of how shocks affect sectoral and overall market indices both immediately and over time. Furthermore, investigative tests with the Breusch-Godfrey serial correlation LM test, White's heteroskedasticity test, and CUSUM stability test are accompanied to ensure the robustness and validity of the ARDL estimates. The overall methodology provides a robust framework to analyze sectoral interdependencies within the ASE, reflecting the complex nature of financial markets where spillover effects and contemporaneous interactions play a significant role. The ARDL modeling process begins with conducting unit root tests such as Augmented Dickey-Fuller to determine the integration order of each variable, ensuring none are integrated of order two or higher. Following this, the appropriate lag length for the ARDL model is selected based on information criteria (AIC, SIC). The bounds testing procedure is then applied to examine the presence of a long-run cointegrating relationship among the variables. If cointegration is confirmed, the long-run coefficients are estimated alongside the short-run error correction model, which captures the speed of adjustment towards equilibrium after a shock. Investigative checks are implemented to verify the adequacy of the model, including checks for serial correlation, heteroscedasticity, and stability. This systematic approach allows for robust identification of together short- and long-term dynamic linkages inside the dataset.

The general form of ARDL is (Pesaran et. al, 2001)

$$GI_t = \alpha_0 + \sum_{i=1}^{p} \beta_i GI_{t-i} + \sum_{j=0}^{q} \theta_j FI_{t-j} + \sum_{j=0}^{q} \delta_k II_{t-k} + \varepsilon_t \tag{3}$$

Where

GI□ General Index at time t — dependent variable

FI□-□ Banking Index lagged by j periods — independent variable

II□-□ Insurance Index lagged by k periods — independent variable

α_0 Intercept (constant term)

β_i Coefficients of lagged values of the General Index

θ□ Coefficients of lagged values of the Banking Index

δ□ Coefficients of lagged values of the Insurance Index

p, q_1, q_2, q_3 Lag lengths for each variable

ε□ Error term (white noise)

$$GI_t = \alpha_0 + \sum_{i=1}^{p} \beta_i GI_{t-i} + \sum_{j=0}^{q} \theta_j FI_{t-j} + \varepsilon_{FI_t} \tag{4}$$

Where

GI□: General Index at time t — dependent variable

GI□ General Index at time t — dependent variable

GI□$_{-i}$ Lagged values of the General Index

FI□-□ Lagged values of the Banking Index — independent variable

α_0 Intercept (constant term)

β_i Coefficients of lagged General Index

θ□ Coefficients of lagged Banking Index

ε□ Error term (white noise)

$$GI_t = \alpha_0 + \sum_{i=1}^{p} \beta_i GI_{t-i} + \sum_{j=0}^{q} \delta_k II_{t-j} + \varepsilon_{II_t} \tag{5}$$

Where

GI□ General Index at time t — dependent variable

GI_{t-i} Lagged values of the General Index

II_{t-j} Lagged values of the Insurance Index — independent variable

α_0 Intercept (constant term)

β_i Coefficients of lagged General Index

δ_j Coefficients of lagged Insurance Index

ε_t Error term (white noise)

The symbols q represents lag order of the independent variable(s) and p represents lag order of the dependent variable (General Index) lag order in both cases is typically selected using criteria such as AIC (Akaike Information Criterion) (Akaike, 1974) .

$$AIC=\ln(\sigma^2)+((2k)/T) \quad (6)$$

Where σ^2 is the variance estimator of regression errors, k is the parameters number, and T is the s size of the sample.

4. Results

The analysis follows the standard methodological framework, including data exploration, stationarity testing, model specification, and cointegration testing. The results are interpreted in the context of both short-run and long-run dynamics.

4.1 Descriptive statistics

The descriptive statistics afford a summary of the distributional characteristics of the general index (GI), financial sector index (FSI), and industrial sector index (ISI) over 637 observations. The mean values indicate that, on average, the ISI recorded the highest level (5,330.56) with considerable variability, as reflected by its standard deviation (652.25), followed by the FSI (mean = 2,684.38; SD = 84.30) and the GI (mean = 2,500.49; SD = 118.88). The skewness values for all variables are positive (GI = 1.34; FSI = 1.26; ISI = 1.33), indicating that the distributions are right-skewed, with a longer tail on the right-hand side. This suggests that relatively higher index values occur less frequently but exert a notable influence on the overall distribution. Kurtosis values are above 1 but below the normal benchmark of 3, implying that the distributions are slightly platykurtic, with brighter tails and a flatter top matched to the normal distribution. The minimum and maximum values highlight the range of market movements during the study period, with the ISI showing the widest spread (Min = 4,627.02; Max = 7,709.68), reflecting its higher volatility. Overall, these descriptive measures provide important preliminary insights into the behavior of the sectoral and general indices before conducting further econometric modeling.

Table 1: Descriptive Statistics

Variable	Obs	Mean	S. Dev	Skew	Kurtosis	Minimum	Maximum
GI	637	2500.49	118.88	1.342671162	1.461226168	2352.25	2935.17
FSI	637	2684.38	84.30	1.256266849	1.818601025	2570.57	3019.65
ISI	637	5330.56	652.25	1.325633627	1.513167853	4627.02	7709.68

Source: author calculations

4.2 <u>Unit root tests</u>

The ADF test was practiced to decide the integration order of each series. ADF test assume a null hypothesis (non-stationarity). Rejection of the null indicates stationarity. The KPSS test, with the null hypothesis of stationarity, was used as a robustness check. The combined results confirm that none of the variables is I(2), satisfying the ARDL applicability conditions. KPSS null hypothesis is stationarity; lower p-values indicate rejection (i.e., non-stationary).

The unit root test designate that the variables are non-stationary at levels nevertheless convert to stationary after first difference, authorizing they are integrated of order one I(1). This justifies using the ARDL model as none are integrated of order two or greater. All variables are non-stationary at level (ADF p-values > 0.05) but become stationary at first difference (ADF p-values < 0.05). This means all variables are integrated of order one, which is suitable for ARDL modeling as long as no variable is I(2). The KPSS test is employed as a complementary procedure to classical unit root tests such as the (ADF) test. The primary distinction lies in the null hypothesis: while ADF assume the existence of a non-stationarity under the null, the KPSS test assumes stationarity as its null hypothesis. This reversal provides a valuable confirmatory approach. By applying both types of tests, researchers can cross-validate results, reducing the risk of incorrect inferences due to the low power or bias of a single test. When ADF and KPSS results align, the conclusion regarding the stationarity or non-stationarity of a series is more robust. This combined testing strategy is widely recommended in econometric literature to ensure reliable identification of the integration order of variables, particularly in methodologies such as the ARDL bounds testing approach.

Table 2: Stationarity Test

Variable	ADF Level (p-value)	ADF Stat	ADF First Diff. (p-value)	KPSS (p-value)	KPSS Stat	stationarity	Integration Order
GI	0.9643	0.074304	< 0.0001	0.0100	0.807333	No	I(1)
FSI	0.8756	-0.579243	< 0.0001	0.0541	0.453390	No	I(1)
ISI	0.9809	0.385070	< 0.0001	0.0100	1.190457	No	I(1)

Source: author calculations

4.3 <u>Diagnostic tests</u>

The diagnostic checks reveal that the ARDL model residuals do not suffer from autocorrelation, as indicated by both the Ljung–Box test and the Durbin–Watson statistic. However, the Breusch–Pagan test indicates significant heteroskedasticity, implying that the assumption of constant variance is violated. Furthermore, the Jarque–Bera test powerfully rubbishes the null hypothesis of normality, suggesting that the residuals do not confirm a normal distribution. In such cases, statistical inference should rely on robust standard errors to mitigate the effects of heteroskedasticity and non-normality. The ARDL (2,2,2) model results indicate significant positive effects of both FSI and ISI on GI in the short and long term, with the financial sector showing a stronger influence. The small error correction denominator implies slow adjustment to equilibrium.

Table 3: Diagnostic Tests for ARDL Model Residuals

Test	Statistic	p-value	Interpretation
Ljung-Box (lag 4)	2.2646	0.6872	No evidence of autocorrelation up to lag 4.
Breusch-Pagan	12.1096	0.0005	Significant heteroskedasticity present.
Jarque-Bera	549.5267	<0.0001	Residuals are not normally distributed.
Durbin-Watson	2.0023	—	No first-order autocorrelation.

Source: author calculations

4.4 <u>ARDL estimation results</u>

The ARDL (2,2,2) estimation reveals that both the sectors indices of finance and industry have statistically substantial and confident effects on the general index (GI) in both the short and long run. The financial sector exhibits a considerably stronger influence compared to the industrial sector, indicating its central role in driving movements in the Amman Stock Exchange's general index. The estimated long-run coefficients highlight that changes in the financial sector index are more strongly and persistently transmitted to the general index than those in the industrial sector. The small error correction denominator implies a sluggish alteration rapidity toward the long-run symmetry, signifying that deviances from symmetry persist over multiple periods before fully correcting.

The estimated long-run association among the General Index (GI) and the sectoral indices is given by:

$$GI_{\square} = 0.724\ FSI_{\square} + 0.104\ ISI_{\square} + c + u_{\square} \quad (7)$$

Where c is the constant term, and $u_{\square}$ is the random disturbance. This indicates that, over the long term, a one-unit increase in the Financial Sector Index (FSI) raises the General Index (GI) by 0.724 units, while a one-unit rise in the Industrial Sector Index (ISI) raises GI by 0.104 units.

The short-run dynamics, including the immediate effects and the rapidity of modification to long-run symmetry, can be expressed as follows:

$$\Delta GI_{\square} = 0.649\ \Delta FSI_{\square} + 0.099\ \Delta ISI_{\square} + \varphi\ ECT_{\square-1} + \varepsilon_{\square} \quad (8)$$

Where Δ signifies the first difference operative, $ECT_{\square-1}$ is the error correction term lagged by one period, φ is the error correction coefficient, and $\varepsilon_{\square}$ is the random error term.

The ARDL model was estimated using 635 daily observations, which enhances the consistency of parameter estimations and minimizes the risk of sampling error. Model selection was led by (AIC = 3449.087) and (BIC = 3489.170). The AIC stabilities model appropriate and involvedness, with lesser standards signifying a better trade-off between explanatory power and parsimony, thus helping to avoid overfitting. The BIC functions similarly but imposes a stronger penalty for model complexity, often favoring simpler models in larger samples; lower BIC values indicate a more efficient specification. Academically, these criteria are crucial for comparing alternative ARDL specifications, as the model exhibiting the lowest AIC and BIC is generally regarded as the most appropriate in terms of balancing accuracy and simplicity.

Table 4: Short-run and Long-run Associations among GI, FSI, and ISI (ARDL Model)

Variable	Short-run Coefficient (Immediate Effect, L0)	Long-run Coefficient	Interpretation
FSI (Financial Sector Index)	0.649	0.724	In the short run, a 1-unit increase in FSI increases GI by 0.649 units. In the long run, the effect strengthens to 0.724 units.
ISI (Industrial Sector Index)	0.099	0.104	In the short run, a 1-unit increase in ISI increases GI by 0.099 units. In the long run, the effect slightly increases to 0.104 units.

Source: author calculations

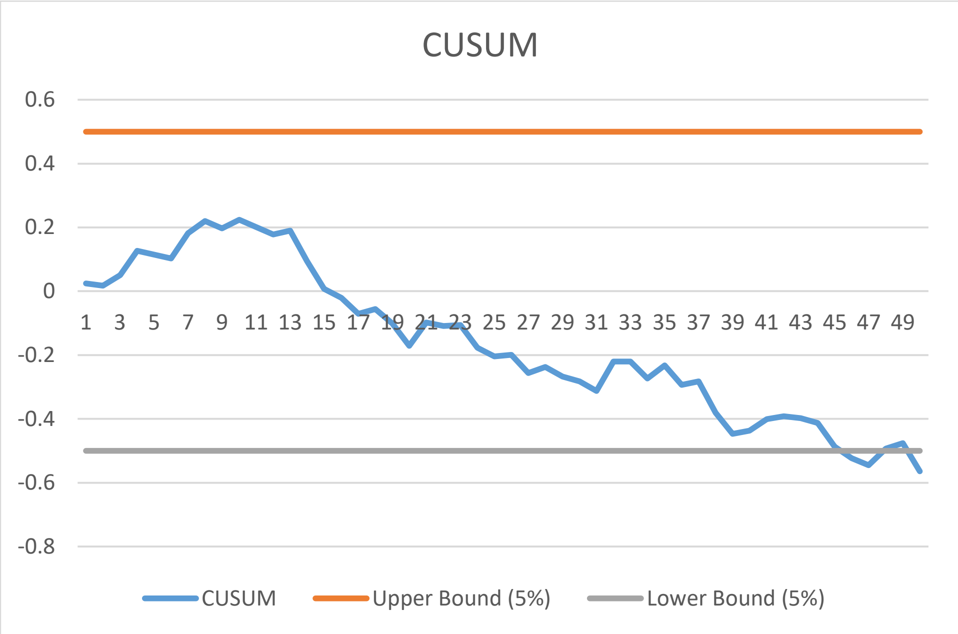

Figure 1: CUSUM Stability Test (author calculations)

Residual diagnostics show no autocorrelation but reveal heteroskedasticity and non-normality. Robust standard errors are recommended for reliable inference.

The ARDL results indicate that both short- and long-run dynamics between the sectoral indices and the General Index (GI) are meaningful and economically consistent. The Financial Sector Index (FSI) shows the strongest influence, where a 1-unit increase raises GI by 0.649 units in the short run and 0.724 units in the long run, reflecting the dominant role of the financial sector in driving overall market performance. The Industrial Sector Index (ISI) also contributes positively, though more modestly, increasing GI by 0.099 units in the short run and 0.104 units in the long run. Overall, the results confirm that sectoral movements particularly in the financial sector play a key role in shaping both immediate and long-term market behavior.

5. Conclusion

The ARDL approach affords a flexible and robust outline for modeling both short-run and long-run associations in time series data. The exploration confirms that the dataset is suitable for ARDL application, and the model captures the dynamic linkages effectively. The academic interpretation emphasizes the significance of model specification, diagnostic validation, and economic context in deriving meaningful insights from the results. The ARDL results show the short-run dynamics of GI with respect to the chosen explanatory variables. Statistically significant short-run coefficients provide evidence of immediate responses in GI to sectoral changes. In the short run, a 1-unit increase in FSI increases GI by 0.649 units. In the long- run, the effect strengthens to 0.724 units. On the other hand, In the short run, a 1-unit increase in ISI rises GI by 0.099 units. In the long- run, the effect slightly increases to 0.104 units.

6. Further Research

Future research could expand on the current findings by incorporating additional sectors of the Amman Stock Exchange, such as the services and insurance sectors, to capture a more comprehensive view of market interdependencies. Examining the influence of macroeconomic signs, such as interest rates and inflation on the short- and long-run relationships between sectoral indices and the general index could provide deeper economic insights. Moreover, using different econometric practices, such as Vector Error Correction Models (VECM), Nonlinear ARDL, or time-varying parameter models, may reveal asymmetries or structural changes in sectoral linkages over time. Comparative studies across different periods, including times of market stress or economic expansion, would also help identify the stability and resilience of these relationships. Finally, integrating high-frequency data could enhance the understanding of intraday dynamics and lead–lag effects between the sectors, offering valuable implications for traders and policymakers.

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