

Impact of Financial Engineering tools on the Performance of the Saudi Stock Market for the Period (2020-2024)

Alia Abdelbasset Abdessamed^{1*}

¹ Institute of Economic Sciences, Business, and Management, Abdelhafid Boussouf University Center, Mila, Algeria, a.alia@centre-univ-mila.dz

Abstract: The purpose of this study is to analyse the relationship between the financial engineering instruments of Islamic investment funds and the stock market, which were represented by the general index of the Saudi stock market, using the self-degradation model of the distribution of ARDL for the period 2020-2024. The main findings of the study are the existence of a long-term and short-term reverse and moral relationship between the KP and the general index of the Saudi stock market, and the existence of an exogenous and moral relationship between the BP and TASI fund and the TASI index, the remaining variables of the IP and ATP and the ASP community trading fund. We have noted that there is no relationship between them and the TASI index, which means that these funds are affected by special factors outside the financial market or what is known as irregular risks

Keywords: (Financial market; financial engineering; Islamic investment funds).

(JEL) Classification : G23 ·F32·G15

1 Introduction:

Financial markets are among the most important financial channels that support the economy, increase its growth rate and create a favourable climate and a basis for enterprises in all their branches. However, they sometimes experience fluctuations that pose a risk to enterprises, companies and their clients. As a result, in order to reduce these risks, changes in financial products, their management, or the inclusion of new financial products, known as financial engineering, are resorted to.

The main objective of financial engineering is to create new financial products that make markets more integrated, liquid and deeper, thus increasing their stability and efficiency. These factors are considered to be indicators of the success and strength of financial markets, if markets are stable and effective, reflecting fair stock prices, thanks to the availability of accurate information and data on corporate activities.

In this context, Saudi experience is a pioneer in the use of various methods of financial engineering to develop and strengthen the traditional Saudi financial market. By adopting these innovations and mechanisms, the effectiveness of the market can be improved and the risks of price volatility reduced.

The purpose of this study is to bridge this gap by analysing the relationship with financial engineering tools and the general index of the Saudi stock market from 2020 to 2024.

1.1 Study Problematic:

In light of the above research gap, we formulate the central question guiding this investigation:

How does the financial engineering instruments affect the performance of the Saudi Stock Exchange from 2020 to 2024?

1.2 Study Aim:

Assuming a relationship between financial engineering tools and the Saudi stock market, we are seeking to answer the following questions:

- How the short-term volatility of financial engineering products affects the Saudi stock market?.
- What is the speed of adjustment to the long-term balance of the Saudi financial market after shocks?

* Alia Abdelbasset Abdessamed

To answer these questions, we use econometric techniques, specifically the analysis of common integration and the self-degradation model (ARDL) with the error correction mechanism. This approach allows us to deepen both the short-term dynamics and the long-term balance between the financial engineering tools of the Islamic Investment Funds and the Saudi Financial Market, taking into account the potential internal homogeneity and instability of variables.

This research offers many potential contributions. First, a comprehensive relationship analysis presents the Saudi financial engineering and financial market tools, filling a gap in existing literature. Secondly, it uses strong econometric methods to address the complexities of this relationship. Thirdly, it provides clear insights for policy makers dealing with the challenges of financial market management in the face of current volatility.

The paper is organized as follows: Section 2 accurately reviews the relevant literature, summarizes the critical studies on the relationship between financial engineering tools and the paper market and highlights the research gap that we are addressing. Section 3 illustrates the methodology and data used in our analysis. Section 4 presents the empirical results, including joint integration tests, long-term ARDL estimates, and the results of the error correction model. Section 5 discusses the implications of our outcomes and provides clear insights for policymakers in the financial market. Finally, section 6 concludes with recommendations and suggests new perspectives for future consideration.

2 Literature review:

The interaction between financial instruments and the stock market presents a challenge at the international economic level, particularly with increased technological developments, making it imperative to understand the dynamics between the variables and to propose controls that contribute to financial stability at the financial market level. This review examines the main research into this relationship, focusing on the experience of Saudi Arabia.

Many studies have explored how the financial market is affected by the outside environment and are therefore affected by financial instruments involved in market formation or what are known as systemic risks. (Richard & Pinar , 2022) have revealed the increasing importance of investment funds in capital flows. The results have shown that ESG funds in European countries tend to invest mostly in domestic markets, while ESG investment and governance in emerging market economies originate largely from foreign investment funds. Similarly (Marija , Milan , & Miloš , 2017) the impact of investment funds as institutional investors on the development of financial markets, as well as their role in the privatization process, point to the problems and possibilities for the development of investment funds in countries in transition, and the results have emphasized that investment funds in developed countries and countries in transition play a significant role in corporate governance and thus affect the competitiveness of the economy and risk diversification. In the countries in transition, they emerged at the beginning of the transition period and were preferred, but did not lead to the expected development of financial markets.

In Saudi Arabia, researchers deepened the relationship between the stock market and the financial instruments in circulation. (Attia & bensmaine , 2019) played the role of investment funds in stimulating and increasing the efficiency of the Saudi stock market. They found that the number of participants in investment funds associated with the number of investors in the financial market as the number of investors in the market decreased, with the number of participants in investment funds being reduced, (Bogar, 2019) The relationship between financial development and the quality of financial institutions and economic growth in Saudi Arabia was revealed. Specifically, the results showed and confirmed the relationship between the impact of economic growth on Saudi Arabia's financial development and the existence of an important and positive relationship between the quality of financial institutions and economic growth.

Other researchers who studied the nature of the relationship, (Felix , Rebecca, & Onyeisi , 2021), assesses the role of financial engineering in the growth of the financial market, examining the effects of these relationships between financial engineering and the financial market and the growth of the financial market, the role of corporate governance as financial engineering, the growth of the derivatives market, mergers and acquisitions, the paper notes that the financial market enjoyed accelerated growth with a systemic shift when the objectives of decision makers were appropriately defined, (LABANI, 2021), the aim of which is to demonstrate the impact of financial engineering on capital market development, and to reveal the importance of financial engineering products such as derivatives in giving greater importance to the financial market, (Ao , Xiangyu , & Yuqi , 2020). research on the advantages and applications of financial engineering in enterprise financial risk management. The results revealed that financial engineering has advantages in providing financial instruments, managing financial risks and supporting the financial stability of financial institutions.

To study the relationship between financial products and the financial market in many ways, especially with the increasing importance of the financial market in providing adequate and appropriate financing, in this context research into understanding the nature and dynamics of the relationship between the financial market and financial instruments capable of coping with changing objectives and unstable policies is more than necessary.

3 Standard study of the impact of financial engineering tools on Saudi stock market performance for the period 01/01/2020-17/01/2024)

In order to determine the effect of the dynamics of financial engineering instruments on the Saudi stock market, the ARDL model is used. The general formula of the model consists of a Y variable and a K number of interpreted or independent variables. $X_1, X_2, \dots, X_K$ as follows (Mahmoud , 2012):

$$\Delta Y_t = \beta_{0i} + \sum_{i=1}^p \beta_{1i} \Delta y_{t-1} + \sum_{i=1}^{q_i} \beta_{2i} \Delta X_{t-1} + \delta_1 Y_{t-1} + \delta_2 X_{t-1} + \varepsilon_{1t}$$

Where:

β_{0i} : Fixed limit;

β_{1i} : Affiliation factor for the short-term relationship of the Y variable;

β_{2i} : short-term correlation coefficient for interpreted variables $X_1, X_2, \dots, X_K$;

δ : A long-term correlation factor;

P: Slow-down period for Y-variant;

q_i : Slow period for interpreted variables $X_1, X_2, \dots, X_K$;

Δ : First class difference; ε : The threshold of the vascular error.

In order to conduct the study in accordance with the ARDL test methodology, the following steps must be followed:

- Conduct of stabilising tests of the time series;
- Assessment and ranking of the ARDL model according to the AIC standard;
- The Bound Test procedure;
- Extracting the short-term relationship, the long-term relationship and the error correction factor.

3.1 data:

Through this study, weekly data were used for the period from 01/01/2020 to 17/01/2024 for the real return of financial engineering instruments in investment funds. The most significant financial instruments were selected in terms of both the volume of deliberations and the rate of return achieved. In addition to the general indicator of the Saudi stock market, the latter was selected as the largest financial market in the Arab region in terms of the volume of trades and the inclusion of a variety of financial instruments active in the region.

Table 1 - Definition of the variables

Type	Definition	Label	Unit
Dependent variable	The general index of the Saudi market	TASI	%
Independent variable	AlAhli Saudi Riyal Trade Fund –	ATP	
	AlAhli Saudi Sunbullah Fund	ASP	
	Bakheet Fund	BP	
	Riyad Emaar Fund	IP	
	ALKHAIR CAPITAL IPOs Fund	KP	

Source: Prepared by the researcher

Table 1 shows the study variables, where the data were obtained from a Saudi stock market trading site on the link (<https://www.saudiexchange.sa>, 2024):

The real return of study variables has been relied upon through the following equation (Ian , Frédéric , & Christopher , 2015):

$$R_i = LN(P_t/P_{t-1})$$

R_i : Real return;

P : The price of the securities.

Thus, the general formula of the ARDL model according to the variables studied is as follows:

$$\begin{aligned} \Delta TASI_t = & \beta_{0i} + \sum_{i=1}^p \beta_{1i} \Delta TASI_{t-1} + \sum_{i=1}^{q_1} \beta_{2i} \Delta KP_{t-1} + \sum_{i=1}^{q_2} \beta_{3i} \Delta IP_{t-1} \\ & + \sum_{i=1}^{q_3} \beta_{4i} \Delta BP_{t-1} + \sum_{i=1}^{q_4} \beta_{5i} \Delta ASP_{t-1} + \sum_{i=1}^{q_5} \beta_{6i} \Delta ATP_{t-1} \\ & + \delta_1 TASI_{t-1} + \delta_2 KP_{t-1} + \delta_3 IP_{t-1} + \delta_4 BP_{t-1} + \delta_5 ASP_{t-1} \\ & + \delta_6 ATP_{t-1} + \varepsilon_{1t} \end{aligned}$$

Where:

- β_{0i} : Fixed limit;
- β_{1i} : TASI short-term relationship correlation coefficient;
- β_{2i} : Affiliation coefficient for short-term relationship of explained variables KP, IP, BP, ASP, ATP;
- δ : A long-term correlation factor;
- P : TASI & s slow-down period;
- q_i : Slow-down period for interpreted variables KP, IP, BP, ASP, ATP;
- Δ : First class difference; ε : The threshold of the vascular error.

3.2 Meta-statistical analysis of variables

The table below shows the output of the statistical descriptive analysis of the study sample data.

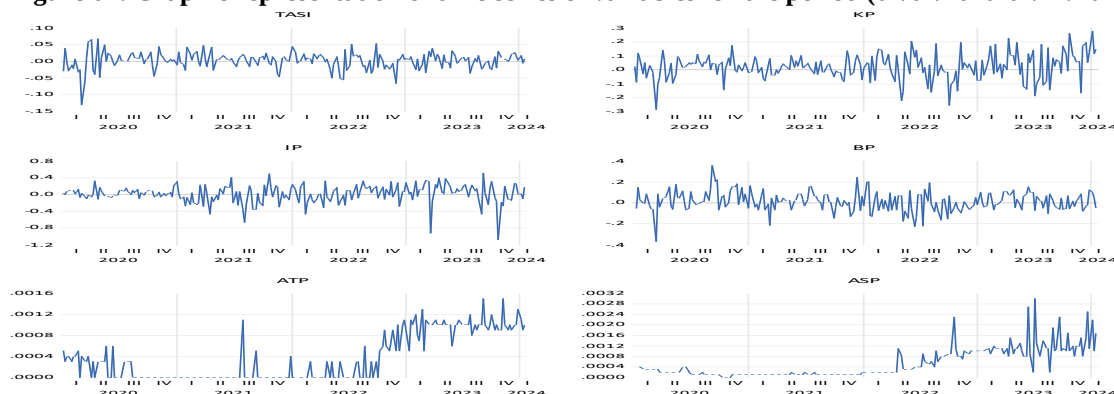
Table (02): Results of descriptive statistical analysis of the variables studied

ASP	ATP	BP	IP	KP	TASI	
0.000527	0.000364	0.015470	0.012620	0.021958	0.002069	Mean
0.000200	0.000000	0.015750	0.023750	0.025250	0.004450	Median
0.003000	0.001500	0.359500	0.507800	0.274500	0.067900	Maximum
0.000000	0.000000	-0.370400	-1.075000	-0.285100	-0.129200	Minimum
0.000554	0.000443	0.092295	0.209708	0.089056	0.024217	Std. Dev.
1.627248	0.750282	-0.108756	-1.228638	-0.220474	-0.831458	Skewness
6.081553	2.025551	4.616042	7.537782	3.874829	6.824650	Kurtosis
177.4414	28.27765	23.48697	235.2288	8.477897	153.6403	Jarque-Bera
0.000000	0.000001	0.000008	0.000000	0.014423	0.000000	Probability
0.111800	0.077100	3.279600	2.675400	4.655200	0.438700	Sum
6.48E-05	4.14E-05	1.797360	9.279270	1.673425	0.123745	Sum Sq. Dev.
212	212	212	212	212	212	Observations

Source: from database using Eviews 13.0

The data obtained from table (02) indicate that all variables have an average positive return, indicating that the variables follow the same trend. With regard to the standard deviation, the (IP) has achieved the highest deviation, making it the most vulnerable to fluctuations than other variables. In contrast, the ATP has achieved the lowest standard deviation, making it the least volatile variable.

Figure 01: Graphic representation of time series of variables for the period (01/01/2020-01/17/2024)



Source: from database using Eviews 13.0

iven figure 01, it is clear that all variables fall on the upper side of the curve, which explains the positive values of the average, while all (KP), IP (BP), have positive negative and other rates. However, they are characterized by stability unlike both ASP (ATP), where the figure shows that all rates are positive and yet there is some degree of instability.

3.3 Time series stability test:

The application of the ARDL model must ensure that one of the following conditions is met (Helmut , 1989):

- Study variables are stable at zero grade I(0);
- Study variables are stable at one grade I(1);
- Study variables are stable at zero and one grade I(1) and I(0);
- Study variables aren't stable at grade level.I(2).

Table (03): Test results(Phillips-Perron test)

Null Hypothesis: the variable has a unit root						
At Level						
ASP	ATP	BP	IP	KP	TASI	t-Statistic With Constant
1.3947	-0.1401	-12.7070	-12.9646	-13.1623	-12.6459	0.0000
0.9990	0.9423	0.0000	0.0000	0.0000	0.0000	Prob.
n0	n0	***	***	***	***	
-1.9766	-2.0659	-12.8188	-12.9687	-13.3843	-12.6219	t-Statistic With Constant & Trend
0.6101	0.5613	0.0000	0.0000	0.0000	0.0000	Prob.
n0	n0	***	***	***	***	
2.6246	0.4642	-12.4192	-12.9530	-12.5050	-12.5817	t-Statistic Without Constant & Trend
0.9980	0.8141	0.0000	0.0000	0.0000	0.0000	Prob.
n0	n0	***	***	***	***	
At First Difference						
d(ASP)	d(ATP)	d(BP)	d(IP)	d(KP)	d(TASI)	t-Statistic With Constant
-4.8531	-11.0759	-13.0834	-12.6755	-14.7948	-13.6555	0.0000
0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	Prob.
***	***	***	***	***	***	
-7.1666	-11.2395	-13.0504	-12.6460	-14.7788	-13.6217	t-Statistic With Constant & Trend
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Prob.
***	***	***	***	***	***	
-12.7663	-11.0471	-13.1160	-12.7068	-14.8284	-13.6887	t-Statistic Without Constant & Trend
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Prob.
***	***	***	***	***	***	

Source: from database using Eviews 13.0

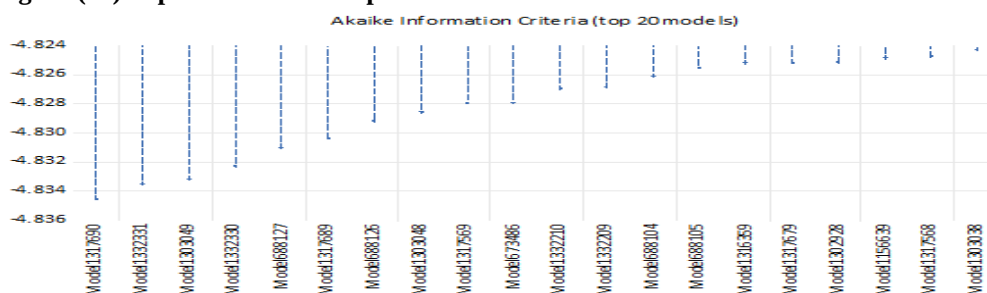
The results of table (03) show that both the ALKHAIR CAPITAL IPOs Fund (KP), the Riyadh Emaar Fund (IP), the BP Fund and the General Index of the Saudi Financial Market (TASI) are stable or integrated in degree I(1) and I(0), while AlAhli Saudi Riyal Trade Fund (ATP) and the AlAhli Saudi Sunbullah Fund (ASP) are stable in degree I(1), thus the ARDL methodology can be applied once the second requirement of stability in grade I(1) has been established at a level of 5%.

3.4 The Bound Test to Co-integration

3.4.1 Determination of the period of the same length of time:

To determine the optimal time lags according to the ARDL model for study variables (q1, q2, q3, q4, q5), the Akaike standard, which is the most used standard, has been used, and to determine the appropriate model in the study, the lowest statistical value is selected for this criterion.

Figure (02): Optimal slow-down periods of the ARDL model



Source: from database using Eviews 13.0

The figure above shows that ARDL (2.9.0.0.0) is the most appropriate of the 1332331 models tested by the programme, with the lowest statistical value being taken for the Akaike standard. (4.834613-).

3.4.2 Results of choosing limits for joint integration The Bound Test to Co-integration:

In order to detect a long-term equilibrium relationship between study variables, the ARDL methodology, based on F-statistics, which is compared with the scale values, uses the border test for joint integration. The joint integration relationship is tested through two hypotheses (Santos , 2014):

- Zero Hypothesis H_0 : Lack of a common integration relationship between study variables

$$H_0: \delta_0 = \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = 0$$

- Alternative Hypothesis H_1 : a common integration relationship between study variables

$$H_1: \delta_0 \neq \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq 0$$

$$F - \text{statistic} = \frac{(SSER - SSEU)/M}{SSEU(N - K)}$$

Where:

- SSER: Total condom squares of the restricted model (application of the no-fault hypothesis);
- SSEU: Total condom squares of the non-restricted model (application of alternative hypothesis);
- M: Number of female teachers of the restricted model;
- K: Unrestricted number of female teachers of the model;
- N: Number of views.

Here we distinguish between three cases:

- Fupper critical < F-statistic: The alternative hypothesis is accepted to mean that there is a common integration of variables;
- Fupper critical > F-statistic: The zero hypothesis is accepted, meaning that there is no common integration of variables;
- Fupper critical > F-statistic > Flower critical: The outcome of the test is not specified for being in the area of doubt.

As shown in the next table:

Table (04): Results of the selection of limits for joint integration The Bound Test to Co-integration:

Null hypothesis: No levels relationship Number of cointegrating variables: 5 Trend type: Rest. constant (Case 2) Sample size: 203	
Test Statistic	Value
F-statistic	16.783299

3 Bounds Critical Values

	10%		5%		1%	
Sample Size	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Asymptotic	2.080	3.000	2.390	3.380	3.060	4.150

* I(0) and I(1) are respectively the stationary and non-stationary bounds.

Source: from database using Eviews 13.0

The results of the table show that the calculated value of the F test (F-statistical = 16.783299) is greater than the highest scale critical values at moral levels of 1%, 5%, 10%, as a result of which the zero hypothesis H0 is rejected, and the alternative hypothesis H1 that there is a long-term equilibrium relationship between the TASI index as a follow-on variable and indicators (KP, IP, BP, ATP, ASP) is accepted as independent variables.

3.5 An estimate of the return function of the stock market using the ARDL model:

To assess the model and ascertain its integrity and ability to interpret the results by conducting the following standard tests:

3.5.1 Decline in joint integration:

The results obtained from table (05) show that the identification factor was of value.($R^2=0.19674$), which means that the independent variables (KP, IP, BP, ATP, ASP) explain only 19.67% of the changes in the market index (TASI), while the remaining proportion is for other factors not included in the model. For the total objectivity, Fisher ' s calculated value was(Fstatistic =2.0847), which is moral (P=0.000), meaning that, the estimated model has total meaning and this justifies the reliability of the relationship between the investment funds in question and the Saudi stock market.

Table 05: Estimated decline in joint integration of the ARDL model

Dependent Variable: TASI Method: ARDL Date: 07/23/24 Time: 10:55 Sample: 3/04/2020 1/17/2024 Included observations: 203 Dependent lags: 10 (Automatic) Automatic-lag linear regressors (10 max. lags): KP IP BP ATP ASP Deterministics: Restricted constant and no trend (Case 2) Model selection method: Akaike info criterion (AIC) Number of models evaluated: 1610510 Selected model: ARDL(2,9,0,0,0,0)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
TASI(-1)	0.034470	0.077060	0.447323	0.6552
TASI(-2)	-0.105315	0.070329	-1.497459	0.1360
KP	0.018451	0.018490	0.997888	0.3196
KP(-1)	-0.021057	0.018523	-1.136768	0.2571
KP(-2)	-0.008127	0.018607	-0.436804	0.6628
KP(-3)	0.021141	0.018523	1.141285	0.2552
KP(-4)	0.012542	0.018889	0.663985	0.5075
KP(-5)	0.065012	0.019031	3.416104	0.0008
KP(-6)	0.011297	0.019312	0.584978	0.5593
KP(-7)	-0.000360	0.019219	-0.018710	0.9851
KP(-8)	0.052209	0.019026	3.269630	0.0013
KP(-9)	-0.029625	0.019610	-1.510700	0.1326
IP	-0.007804	0.007815	-0.998637	0.3193
BP	0.051727	0.019759	2.617958	0.0096
ATP	1.596680	5.635135	0.283344	0.7772
ASP	-2.894227	4.590565	-0.630473	0.5292
C	0.001760	0.002318	0.759548	0.4485
R-squared	0.196740	Mean dependent var	0.002666	
Adjusted R-squared	0.127643	S.D. dependent var	0.024156	
S.E. of regression	0.022562	Akaike info criterion	-4.665096	
Sum squared resid	0.094680	Schwarz criterion	-4.387636	
Log likelihood	490.5073	Hannan-Quinn criter.	-4.652847	
F-statistic	2.847281	Durbin-Watson stat	1.924722	
Prob(F-statistic)	0.000363			

*Note: p-values and any subsequent test results do not account for model selection.

Source: from database using Eviews 13.0

3.5.2 Model diagnostic tests:

Several tests are carried out to ensure that the model is sound and free of economic problems, including:

A. Breusch-Godfrey Serial Correction LM Test:

Table 06 shows that the Fstatistical value is 6.169016, which is above the moral level of 5%. This means that the model does not have the problem of self-connectivity.

Table (06): Results of self-connection tests

Breusch-Godfrey Serial Correlation LM Test
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	6.169016	Prob. F(2,184)	0.0026
Obs*R-squared	12.75668	Prob. Chi-Square(2)	0.0017

Source: from database using Eviews 13.0

B. Non-fixion test for condoms:

Table (07): Results of homogeneity tests

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

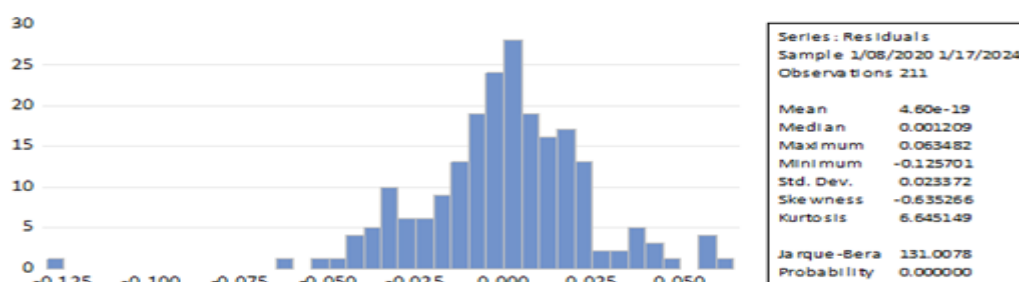
F-statistic	1.068814	Prob. F(16,186)	0.3878
Obs*R-squared	17.09252	Prob. Chi-Square(16)	0.3796
Scaled explained SS	44.79672	Prob. Chi-Square(16)	0.0001

Source: from database using Eviews 13.0

Table (07) shows the results of the heterocedasticity test used to verify a heterogeneity discrepancy in the linear regression model, where the test results indicate that the value of the F test (1.068814) is higher than the moral level of 5%, and that the K-square test values(17.09252) are greater than the moral level of 5%. This means that the discrepancy of errors is not consistent, thus confirming that the model does not have a problem with the homogeneity of errors.

C. Natural distribution test for condoms

Figure (03) : Results of natural distribution test for condoms (Jarque-Bera Test)



Source: from database using Eviews 13.0

The results of the analysis of the natural distribution of condoms indicate that the Jack-Bera test (Jarque-Bera=131.007), which is above the moral level of 5%, follows the natural distribution.

3.6 Assessment of the error correction model and the short- and long-term relationship according to the ARDL model:

To ensure a short-term relationship, the ARDLECM error correction factor must be moral at 5% and negative at the same time.

Table (08): Assessment of the error correction model and short- and long-term relationship

Dependent Variable: D(TASI) Method: ARDL Date: 07/23/24 Time: 11:07 Sample: 3/04/2020 1/17/2024 Included observations: 203 Dependent lags: 10 (Automatic) Automatic-lag linear regressors (10 max. lags): KP IP BP ATP ASP Deterministics: Restricted constant and no trend (Case 2) Model selection method: Akaike info criterion (AIC) Number of models evaluated: 1610510 Selected model: ARDL(2,9,0,0,0,0)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ*	-1.070845	0.097240	-11.01240	0.0000
D(TASI(-1))	0.105315	0.067639	1.557016	0.1211
D(KP)	0.018451	0.017313	1.065688	0.2879
D(KP(-1))	-0.134088	0.023187	-5.782773	0.0000
D(KP(-2))	-0.142215	0.026257	-5.416180	0.0000
D(KP(-3))	-0.121074	0.027737	-4.365061	0.0000
D(KP(-4))	-0.108533	0.027956	-3.882284	0.0001
D(KP(-5))	-0.043521	0.027272	-1.595812	0.1122
D(KP(-6))	-0.032224	0.025324	-1.272430	0.2048
D(KP(-7))	-0.032583	0.022715	-1.434427	0.1531
D(KP(-8))	0.029625	0.017855	1.659205	0.0987
R-squared	0.534208	Mean dependent var	0.000165	
Adjusted R-squared	0.509948	S.D. dependent var	0.031722	
S.E. of regression	0.022206	Akaike info criterion	-4.724210	
Sum squared resid	0.094680	Schwarz criterion	-4.544676	
Log likelihood	490.5073	Hannan-Quinn criter.	-4.651578	
F-statistic	22.02011	Durbin-Watson stat	1.924722	
Prob(F-statistic)	0.000000			

* p-values are incompatible with t-Bounds distribution.

Source: from database using Eviews 13.0

Table 08 shows the results of the Kointification Test (TASI) test with each of the independent variables (KP, IP, BP, ATP, ASP), where this analysis is aimed at determining whether there is a long-term relationship between variables. The results have shown that the value (Prop=0.0000) means that there is a statistically significant correlation between variables. In addition, the statistical value of T(-11.0124) is large enough to reject the assumption that there is no relationship (H_0) at a level of 5%. The results have also shown that the value of the CoINTEQ*=-1.070845) coefficient is a moral negative value at a level of 5%. This finding indicates that, in the event of disruption or deviation of the dependent variable from the equilibrium value in the period t, this deviation will be corrected by 107%.

To analyse the long-term relationship that can be expressed as an equation through the next scale:

Table 09: Long-term relationship assessment

⇒ Cointegrating Specification

Deterministics: Rest. constant (Case 2)	
$CE = TASI(-1) - (0.122783 \cdot KP(-1) - 0.007288 \cdot IP + 0.048305 \cdot BP - 1.491047 \cdot ATP - 2.702751 \cdot ASP + 0.001644)$	

⇒ Cointegrating Coefficients

Variable *	Coefficient	Std. Error	t-Statistic	Prob.
KP(-1)	0.122783	0.049821	2.464477	0.0146
IP	-0.007288	0.007363	-0.989841	0.3235
BP	0.048305	0.017476	2.764016	0.0063
ATP	-1.491047	5.258071	-0.283573	0.7770
ASP	-2.702751	4.289199	-0.630129	0.5293
C	0.001644	0.002169	0.757794	0.4495

Note: * Coefficients derived from the CEC regression.

Source: from database using Eviews 13.0

The mathematical formula for a long-term relationship can be derived according to the output of Table 09 as follows:

$$CE = TASI(-1) - (0.122783 \cdot KP(-1) - 0.007288 \cdot IP + 0.048305 \cdot BP - 1.491047 \cdot ATP - 2.702751 \cdot ASP + 0.001644)$$

Through the long-term relationship estimated for study variables, we note that:

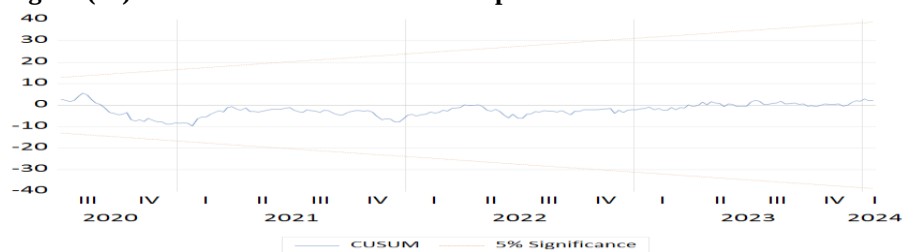
- The ALKHAIR CAPITAL IPOs Fund has a negative and immoral impact on the Saudi stock market in the long term, as the single-unit increase in the welfare fund leads to a reduction in the return of the financial market by 0.122783;

- The financial market is negatively and unethically affected by the Riyadh Emaar Fund, since the single-unit increase in the return on the Riyadh Emaar Fund leads to a reduction in the return on the financial market by 0.007288;
The Bekhit Fund with a statistical index ($p = 0.0063$) has a positive moral impact on the Saudi financial market, since the increase in the return of a single Bekhit Fund leads to an increase in the return of the financial market by 0.048305;
- The non-statistical AlAhli Saudi Riyal Trade Fund ($p = 0.777$), thus there is no moral impact on the Saudi financial market by the local AlAhli Saudi Riyal Trade Fund;
The AlAhli Saudi Sunbullah Fund is an unstatistical fund ($p = 0.5293$) and therefore there is no moral impact of the AlAhli Saudi Sunbullah Fund on the Saudi financial market;

3.7 Structural stabilization test

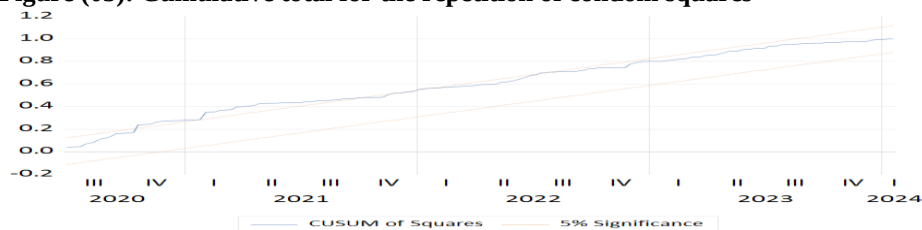
CUSUM and CUSUM of Squares are used to test the structural stability of the estimated long- and short-range parameters according to the ARDL model, where the zero assumption is accepted that all estimated parameters are stable if the graph is within the limits of the confidence field at 5% moral level.

Figure (04): Cumulative total of condom repeaters



Source: from database using Eviews 13.0

Figure (05): Cumulative total for the repetition of condom squares



Source: from database using Eviews 13.0

Through the above two figures, we note that the cumulative total of CUSUM and the cumulative total of CUSUM squares of Squares are within the limits of the area of confidence at 5% moral level, thus accepting the zero assumption that all estimated parameters are stable, meaning that a model has structural stability during the study period.

4 Conclusion

This study examined the relationship between Islamic investment funds, one of the most important tools of Saudi financial engineering and market from 2000 to 2024, revealed a negative correlation between KP and TASI and a positive correlation between BP and TASI, and the analysis of joint integration confirmed a long-term balance, indicating that changes in BP and KP result in a change in Saudi financial market return over time.

The ARDL model also measured this relationship, indicating that the BP and KP increase is leading to a change in the Saudi financial market. In addition, the error correction model highlighted the complex dynamics in the short term, where previous investment funds have an interactive effect on financial market returns.

The rest of the Islamic investment funds studied, IP, ATP and ASP, while effective in achieving balance during the study period, revealed a lack of correlation with the financial market index, as these variables are variables with irregular risks and therefore the factors that control both variables are not the same.

These results have important implications for investment fund managers and officials of the Saudi financial market in order to maintain a stable financial environment by drawing on the experiences of Islamic investment fund managers by adopting appropriate fiscal policies that have enabled them to maintain financial stability in periods of economic volatility.

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