The Impact of Interest Rates on The Stock Market Performance: Amman Stock Market Case Study Using ARDL Approach During The Period 1990-2018

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Summary:
This empirical study aims to determine the impact of interest rates on the Amman stock market performance using the Auto-Regressive Distributed Lag (ARDL) approach to annual time series data from 1990 to 2018.
The results indicate a negative impact of the interest rates on the Amman stock market performance. In addition, there is high statistical significance during the period 1990-2018, which is consistent with the economic theory.

. **Keywords:** Interest Rates; Trading Volume; Inflation Rate; Amman Stock Market Performance;

Jel Classification Codes : E40 ; E44

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I- Introduction:

The Stock market as an important financial markets is a crucial entity which enables and provides dealing amenities for stash negotiator and dealer to buy and sell stocks and other financial papers (bonds and equities), and its performance is really one of the leading dynamics which affects the economic progress of any country. In fact, the stock market performance is influenced by a mix of elements and variables, some of which may have a positive effect on their performance and others have a negative effect. On top of that, the interest rates as an important element is a significant variable which affect the performance of the stock market, Where the empirical results testing of the impact of interest rates on the stock markets performance have given us mixed results.

Taking into account the difference in the influence of the variable of interest rates on the performance of stock markets; it is necessary to ask the following question:

What is the impact of the interest rates on Amman stock market performance in (1990-2018)?

Therefore, the important objective of this study is to determine empirically the effect of interest rates on the performance of Amman stock market, by applying the bound testing ARDL to annual data concerning the period of 1990 to 2018.

The organization of the rest of this study will be as follows: Section 1 provides a theoretical frame work, and gives the past literature review on the topic. Section 2 introduces the econometrical methodology and data. The results are in section 03 and discusses them and the conclusion is put in Section 4.

1. The Theoretical Framework: Relationship between Interest Rates and Stock Market performance

Early study by Fama (1981, 1990) claims that the factor of interest rates have inverse relationship with equity prices in the long-term, which stems directly from the present value model through the effect of the long-term interest rate on the discount rate. However, the negative relationship is also based on the point of view that a rise in interest rate will make a higher borrowing costs, lower future earnings, increase in discount rate for share investors; and then stock prices go down. Therefore, increases in interest rates have indirect impact on stock prices. (AL-Naif, 2017, P162)

It can be said that based on to normal economic reasoning, interest rate has negative impact on stock market index. When the interest rate is high, investors will channel their money from higher risk tool which is the stock market to savings or fixed deposit accounts. On the other hand, when the interest rate is too low, investors will take the money out to invest in stock market so as to get a higher yield.

2. Literature review:

There have been a lot of experimental studies regarding the extent of the effectiveness of interest rates on the behavior of the stock market. The most important studies are:

The study of (AL-Naif, 2017), explores both short and long-term connection between interest rate and Arab Monetary Fund indices for five Arabian stock market index: Jordan, Egypt, Oman, Qatar and Kuwait, for the period started from 1st January 2014 to 30th June 2016, and employing various econometrics tests, such as: Augmented Dicky Fuller test, Vector Auto Regression, Johansen test of Coinetgration, Granger causality test, and Variance Decomposition. It is found that a significant negative relationship between interest rate and stock market index in Egypt, while it was insignificant in Qatar and Kuwait. However, a significant positive relationship was found in Jordan and Oman.

The Study of (Hamdan, 2014); it has an attempt to find a model, to uncover the connection involving stock market and interest rate (Pakistani market) and to run certain tests related to statistical analysis. Furthermore these tests work with the aid of month end closing stock prices of Karachi Stock Exchange and interest rates of previous ten years i.e. Jan 2004 to Dec 2013. On top of that, correlation, Regression analysis and descriptive analysis were run to uncover the blow of

interest rate on stock market of Pakistan. In fact, he concluded that the interest rate had a negative impact on the stock market.

The study of (Mohammad & Mohammad, 2014), attempted to extract the most important economic determinants of the conduct and effectiveness of the stock market in Bangladesh. Several economic variables have been used including inflation, interest rate, exchange rate and foreign direct investment. To deal with this relationship, the linear regression was used using an annual time series 2006-2012. The Study reached that interest rate and exchange rate are the most important determinants of the activity of the stock market in Bangladesh.

The study of (Mehwish, 2013), aimed at recognizing the macroeconomic determinants of the activity of the stock market in Pakistan through the multi-linear regression model. Many elements were used to rely on that it affects their performance: foreign direct investment FDI as a percentage of gross domestic production GDP, real interest rate, and the local loans that given by the banking sector and value traded as a percentage of GDP, while the performance of the stock market is measured by market value as a percentage of GDP during 1988-2008, and it concluded that foreign direct investment and value Current has a positive impact on the performance of the stock market. It is also found that there is a negative relationship between the real interest rate and stock market performance, while the development of the banking sector has no significant impact on the performance of the stock market.

The study of (Muktadir, 2013), has investigated how interest rates make an influence on stock market activity by using monthly time series data for the economy of Bangladesh from 1991 to 2012. A set of econometric techniques have been run to examine the relationship between the interest rate and stock market yield. The study exposes a stable and significant long run relationship between the variables. By employing Cointegration technique it is observed that in the long run, a one percent increase in interest rate causes 13.20 % decrease in market index.

In the study of (Md. Mahmudul & Md Gazi, 2009), the two researchers dealt with the relationship between interest rates and share prices using a Panel approach based on the monthly data from January 1988 to March 2003. The sample included fifteen developing and developed Countries; the study concluded that interest rate in all that countries has significant negative relationship with share price.

We can say that our study was different from the previous studies by the fact that the empirical study was on Jordan, and it explored the impact of the most important macro-economic variables (interest rates with trading volume and inflation rate) on the performance indicators of the Amman stock market by ARDL approach.

II– Methodology and Data:

1.Methodology

We relied on the auto regressive distributed lag approach (ARDL) in this study in order to answer the problem presented about the effect of the interest rates on Amman stock market performance during the period (1990-2018).

1.1. An ARDL Approach: this approach is useful to set the long run relationship between series with different order of integration (Pesaran and Shin, 1999, and Pesaran et al. 2001). The reparametrized result gives the short-run dynamics and long run relationship of the considered variables (Emeka & Aham, 2016). This method has decisive advantages in contrast to other cointegration procedures since it can be used regardless of whether the underlying variables are I(0), I(1) or fractionally integrated. Therefore, the bounds test excludes the uncertainty associated with pre-testing the order of integration. Furthermore, it can be used in small sample sizes, whereas the Engle–Granger and the Johansen procedures are not reliable for relatively small samples. Taking into account that our sample size is limited with a total of 29 observations only, conducting bounds test will be suitable. (Cherif & Ali, 2020)

1.2. Variables of Study: Explain the effect of interest rates on the performance of the Amman stock market during 1990-2018, it is required to find the proposed model that relies on the general index of the stock exchange as a dependent variable and on three independent variables (Interest rates, Volume Index, Inflation), we clarify these variables as follows:

- **The general index of the stock exchange(Index):** it exemplifies the dependent variable which is the value of the general index of stock prices expressed in the point. It is a statistical indicator used to measure the overall performance of the market.
- **Interest rates(r):** We relied on deposit interest rates as the best and closest alternative to investing in the share market if high prices in banks. The high interest rate leads to the transfer of capital towards banks in anticipation of the biggest return, the low value of the general index and then the general performance of the market. We expect a negative correlation between this indicator and the dependent variable.
- **Volume Index (Val):** This indicator reflects the total value of securities traded in the market over a given time period(usually a year). It reflects the trading volume in the market, which is directly related to liquidity, the general index of the stock exchange and thus the general performance of the market. We expect a positive correlation between this indicator and the dependent variable.
- **Inflation (INF):** Inflation is one of the crucial indicators of conducting monetary policy expressed as a percentage, where Arving Fischer sees a positive relationship between inflation and the return of shares. This means that stocks are used as a complete hedge against inflation. In other words, there is an inverse relationship between inflation and equity returns, so stocks cannot be used as a full hedge against inflation.

2. Data

It is used annual time series covering the period from 1990(Year of the Gulf crisis in the summer of 1990, which happened in the return of Jordanian workers from the Arab Gulf countries to the Kingdom) to 2018. The data and statistics were obtained from the World Bank statistics and data, and Amman stock market, As shown in Table (1) . The evolution of the interest rate and general index of stock prices during the study period as follows:

2.1. Interest rate (r): This indicator is applied by the central bank to control the volume of money supply. It also plays a large role in increasing savings and thus investment. The figure1 shows that the pre-2000 period was characterized by high interest rates, peaking in 1997 at a rate of 9.09%, which is relatively high and does not stimulate investment. At the beginning of 2000, as part of its development programs and backing up domestic and foreign investments, the Jordanian government has adopted a set of economic reforms aimed at attracting investment. It has issued the Investment Promotion Law, the Income Tax Law and the Non-Investment Regulations, and the gradual reduction of interest rates - as a stimulus - began to finance various economic projects at an appropriate cost, thereby stimulating economic growth. Therefore, interest rates began to decrease from 6.96% in 2000, continuing downward until 2004, where the interest rate was the lowest 2.49% which is the lowest rate experienced by the Jordanian economy in this period, Come back after rising during the period (2005-2008) to exceed sometimes the threshold of 5%, then interest rates recorded a slight decrease to remain oscillating around the average 3% and 4% over the next period.

2.2.The general index of stock prices: this statistical indicator used to measure the overall performance of the market, which consists of the average price of a group of shares that is supposed to be used as a measure of the general movement of the financial market. The figure2, shows that the general index of stock prices in Amman financial market has witnessed a continuous increase throughout the period (1990-2005), with the exception of some years, getting a peak of 8191.5 points in 2005 from 804.3 points in 1990, and this happened due to the commitment of the Jordanian government to implement the economic reform programs, as well as the Gulf War, the repercussions of the return of Jordanian workers from the Gulf to the Kingdom, in addition to increasing the volume of new issues of shares, as well as expansion of investment areas, and implementation of privatization programs, and the positive effects of the Securities Act for the year 2002. In 2006 it was recorded General index of the Stock Exchange declined at an annual negative change was -32.63%, due to the corrective movement defined by the stock market, brought back again in 2007 where it reached 7519.3 points. From the year 2008 until 2018, the general index of

stock prices recorded a continuous decline in value, with a minimum value of 3797,08points in 2018 from 6243.1 points in 2008 due to the 2008 financial crisis, the Arab Spring revolutions, therefore, it generated a reflection on the political and economic situation.

III- Results and discussion :

1.Time series stability test

The test of order of integration for each variable using the Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) tests are conducted. Even though the ARDL framework does not require the pre-testing of variables, the unit root test could help in determining whether or not the ARDL model should be used. (Waliullah, Mehmood, Rehmatullah, & Wakeel, 2010)

Table (2) shows that the index series and trading volume were all non-static at the level I(0) (ie, the root of the unit) according to the ADF test, because the probability values are greater than 0.1 and The equations of the ADF test are in all formulas and become stable when the first differences are taken, which means their integration is first class (I) because the probability values are less than 0.1 in all cases. This means rejecting the null hypothesis and accepting the alternative hypothesis. The time series of inflation (inf) and the ADF test are stable at The original level of data I(0) When the first difference I(1) (ie, the absence of the unit root), where the differences and probability values are less than 0.01 for most As shown in Table 1, the interest rates (R) become stable when the first differences are taken, which means their integration is first class (I) because the probability values are less than 0.1 in all cases. Since the strings contain a combination of I(0) and I(1), the appropriate way to study long-term equilibrium relationships is the ARDL approach.

1.1.Testing appropriate gaps for the model: Among the most commonly used methods for selecting the appropriate gap is the use of information functions. Among these functions is the SIC and AIC function. In this case, Figure3 shows that the model chosen according to the ARDL methodology is (3.4.4.4) According to the optimal delay test and the AIC Standard Time Lag "Akaike". This means that the index variable has three degrees of delay, but is four degrees of the independent variables (inflation, interest rates, and trading volume), The model takes the following form:

$$\Delta Index_t = c + \sum_{i=1}^{3} \beta_{1i}\, \Delta Index_{t-1} + \sum_{i=1}^{4} \beta_{2i}\, \Delta inf_{t-1} + \sum_{i=1}^{4} \beta_{3i}\, \Delta r_{t-1} + \sum_{i=1}^{4} \beta_{4i}\, \Delta Val_{t-1} + \alpha_1\, Index_{t-1} + \alpha_2\, inf_{t-1} + \alpha_3\, r_{t-1} + \alpha_4\, Val_{t-1} + \varepsilon_t \quad \ldots\ldots\ldots\ldots (1).$$

Where: Δ refers to first-order differences, c: constant limit, t: direction of time, ε_t: random error limit. Whereas,) $\beta_1, \beta_2, \beta_3, \beta_4$(represents the short-run dynamics of the model. The parameters $(\alpha_1, \alpha_2, \alpha_3, \alpha_4)$ represent the long-run relationship

The null and alternative hypothesis of the model is:

H0: $\alpha_1 = , \alpha_2 = , \alpha_3 = \alpha_4 = 0$(i.e. the long run relationship does not exist, against the alternative hypothesisH1: $\alpha_1 \neq , \alpha_2 \neq , \alpha_3 \neq \alpha_4 \neq 0$)

1.2. Cointegration test and Error Correction through Model ARDL Method: After determining ARDL (3,4,4,4), we can now derive the long-term equilibrium equation and the short-term response between the independent variables and the dependent variable. As shown in the tables (2 and3).

In order to verify the null hypothesis (the absence of a common integration between the studied variables), we are moving towards a procedure - testing the boundaries -. As shown in table 2, where the results of the bottom of the table indicate the negation of the null hypothesis, which states that there is no common correlation between the variables studied, because the value calculated for the test (F) of (5.532007) is greater than the highest value 4.66 This indicates the existence A common integration between the studied variables, ie, rejecting the null hypothesis and accepting the alternative hypothesis that there is a long-term equilibrium relationship.

The long-term parameters, according to the results of the top of Table (3), indicate a significant effect in the opposite direction between interest rates and performance indicators at the 1% probability level. The increase in interest rates in one unit leads to a decline in performance by more than 515% , Which is consistent with the economic theory as high interest rates make bank

employment a better alternative to investing in the stock market, which leads to the transfer of balances to the investment bank, the demand for shares falls and their prices fall, which negatively affects the performance in the long term, the same thing for the trading volume (significant positive relationship) if this one changes in one unit, the performance changes positively by more than 194% in the long term, as the trading volume is directly related to the liquidity and the general index of the stock exchange (the dependent variable), so the increase in the movement of trading (buying and selling securities in The market) positively affected the general performance of the financial market, while there was no effect of inflation rates (they were not statistically significant) i.e. ,they do not affect the performance indicators of Amman stock market, which is confirmed by the significance rate estimated at 0.2344 which is greater than the level of significance 10%.

The ARDL test shows that there is a significant long-term relationship, and the expression of this relationship along with the short-term relationship shown in Table (4) "The error correction model", and from this table we notice that the error correction coefficient has negative and significant value which reached (-1.312347) and with a significance level more less than 1%, which means that the existence of a joint integration relationship between the studied variables, or rather the existence of a long-term equilibrium relationship between the studied variables in the short term, as shown by the results that the negative and moral value of the error correction coefficient reveals the speed The return of the variable to its long-term equilibrium value in each period (T-1) is estimated at (1.31), which is a relatively high adjustment coefficient. In other words, when the performance indicators over the short term in the previous period deviate from their long-term equilibrium value, correct the equivalent of (131%) of this imbalance in the period (t) until it reaches equilibrium in the long run after less than one year.

The results of the short-term response, therefore, indicate a short-term response from independent variables (interpreted) to the dependent variable. This is in line with reality. Many phenomena do not immediately respond to their determinants but are the result of historical accumulations, which makes the coefficient of determination very large enough to clarify the model by more than 98%.

2. Residual Diagnostics

2.1.The serial correlation of the residues: it may affect the efficiency of parameters, that is, it has no less variance than all estimated parameters available, which influences on the hypothesis test of this model. The most important tests for this problem are Breusch-Godfrey, table (5) shows that the model is free of the serial correlation problem of the serial correlation of the residues, because the probability values of the Fisher test is equal to 0.0895 (which exceed the significance level of 5%), leading to the rejection of the null hypothesis. And therefore, the estimated parameters are efficient; giving reliable results with respect to test hypotheses.

2.2.Residual distribution test: Using Figure(4) and using the Jarque-Bera test, we confirm that the residues are distributed naturally, which is equal to 0.578202, which is greater than the 5% significance level.

2.3.Stability Test: In order to make sure that the data used in this study are free of any structural changes, one of the most appropriate tests should be used. The most important of these are the Cumulative Pool (CUSUM) and the cumulative total of CUSUM of Squares. These two tests are the most important tests to show the stability of parameters in the short and long term, If we use either of the two tests, we will give a graph illustrating the aggregation of errors. In Figs. (5) and (6), we observe that the cumulative values or the cumulative sum is a median line in the sense that capabilities (ie, no different) at a significant level of 5%, ie, we have no more than one equation which confirms that the variables are stable over the period of study. The cumulative sum of the CUSUM of Squares is also - The two lines are parallel (ie, non-spaced) as in the first test, and what can be inferred from these two tests is that there is stability and consistency in the model between long-term results and short-term results.

IV- Conclusion:

In this study, we explained in a standard model the effect of interest rates on performance of Amman stock market in the period 1990-2018, the following empirical results were obtained:

- There is a significant impact of interest rates in the general index of Amman stock market with a very high statistical significance. The increase in interest rates in one unit leads to a decline in performance by more than 515% , Which is consistent with the economic theory.
- There is a significant statistical impact on the performance of Amman stock market in the period 1990-2018, in addition to the trading volume, noting that the effect of the inflation rate on the performance of the market was not significant, and it was confirmed that there is a balance in the long term through the integration Common Study Variables.
- The study variables (interest rates and trading volume) are statistically significant in their previous and current crises.
- There is stability in the long and short term, and this indicates that the independent variables in the model explain the performance of the Amman stock market in the long term and short.
- The coefficient of identification shows that the independent variables explain more than 98% of the changes in the Amman stock market performance during the study period.
- There is a negative impact of interest rates on Amman stock market performance during the period 1990-2018; a high interest rates and the return realized by investors in bank deposits lead many of them to sell part of their shares or all of them, and the orientation towards alternative investments, since depositing their money in banks and high interest rates is better than bearing the risk of investment in shares, in addition to the positive effect of trading volume. The performance was determined mainly by the liquidity of the market (trading volume), leading to an increase in the general index and therefore the stock market performance, while we found that the inflation rate does not affect the stock market performance, that the Amman stock market does not act as a compensator for investors from the high inflation rates in the Jordanian economy - during the study period.

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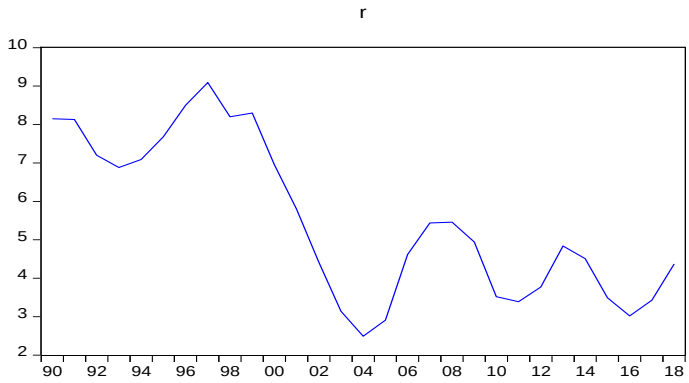
- Appendices:

Table (1) : Statistics used in the study model

the year	Inflation rate%*	Interest rate%*	trading volume** (billion dollar)	general index (Point)***
	Inf	R	Val	index
1990	16,19	8,15	0,41	804,3
1991	8,15	8,13	0,45	1000
1992	3,99	7,2	1,3	1299
1993	3,31	6,88	1,33	1585
1994	3,51	7,09	0,7	1436
1995	2,35	7,68	0,59	1591,7
1996	6,5	8,5	0,35	1534,6
1997	3,03	9,09	0,5	1692,4
1998	3,09	8,2	0,65	1701,3
1999	0,6	8,3	0,55	1673,5
2000	0,66	6,96	0,47	1330,5
2001	1,77	5,8	0,94	1727,2
2002	1,83	4,42	1,34	1700,2
2003	1,63	3,14	2,62	2614,5
2004	3,36	2,49	5,35	4245,6
2005	3,49	2,91	23,82	8191,5
2006	6,25	4,62	19,56	5518,1
2007	4,74	5,44	17,43	7519,3
2008	13,97	5,46	27,19	6243,1
2009	-0,73	4,94	12,91	5520,1
2010	4,83	3,52	8,6	5318
2011	4,16	3,39	3,9	4648,4
2012	4,51	3,77	2,73	4 593,90
2013	4,82	4,84	3,43	4 336,70
2014	2,89	4,51	3,09	4 237,62
2015	-0,87	3,49	3,55	4 229,89
2016	-0,77	3,02	2,58	4 069,72
2017	3,32	3,43	2,33	4 009,44
2018	4,46	4,37	2,36	3 797,09

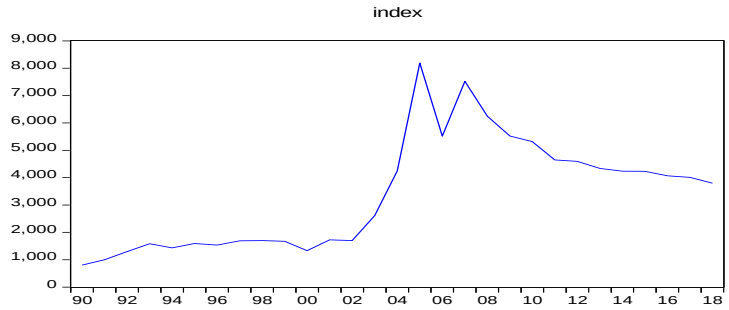
Source: Prepared by researchers using: global development indicators on the site:
* https://data.albankaldawli.org/country/jordan
**https://data.worldbank.org/indicator/CM.MKT.TRNR?locations=BR&view=chart
***Amman Stock Exchange Website, https://www.ase.com.jo/en/historical-indices?historical_indices=58

Figure(1): Evolution of the interest rates in Jordan for the period: 1990-2018



Source: Prepared by researchers depending on the Eviews 10

Figure(2): Evolution of Amman Stock Exchange General Index during the period: 1990-2018



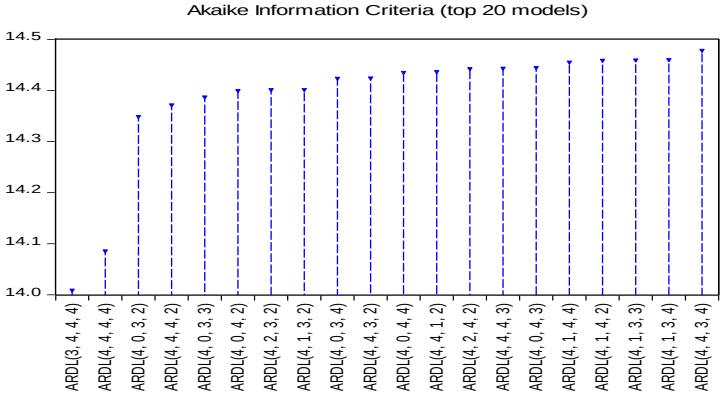
Source: Prepared by researchers depending on the Eviews 10

Table (2): Unit Root Test

Unit Root Test Results Table (ADF)					
Null Hypothesis: the variable has a unit root					
At Level					
		INDEX	INF	R	VAL
With Constant	t-	-1.7199	-5.5616	-2.3765	-1.8848
	Prob.	0.4107	0.0001	0.1574	***0.3342***
		n0	***	n0	n0
With Constant &	t-	-1.7259	-5.2707	-3.2448	-1.7773
	Prob.	0.7126	0.0011	0.0972	***0.6886***
		n0	***	*	n0
Without Constant &	t-	-0.4268	-2.4356	-1.0748	-1.4828
	Prob.	0.5199	0.0169	0.2476	***0.1266***
		n0	**	n0	n0
At First Difference					
		d(INDE	d(INF)	d(R)	d(VAL)
With Constant	t-	-6.7378	-8.5659	-3.9933	-5.6667
	Prob.	0.0000	0.0000	0.0054	***0.0001***
		***	***	***	***
With Constant &	t-	-6.7549	-8.6051	-3.9204	-5.6200
	Prob.	0.0000	0.0000	0.0263	***0.0005***
		***	***	**	***
Without Constant &	t-	-6.7833	-8.6963	-2.7470	-5.7776
	Prob.	0.0000	0.0000	0.0079	***0.0000***
		***	***	***	***

Source: **Prepared by researchers depending on the Eviews 10**

Figure (3): Testing the appropriate gaps



Source: Prepared by researchers depending on the Eviews 10

Table (3):Cointegration Test according to ARDL method

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	-120.5213	91.18694	-1.321695	0.2344
R	-515.4257	49.79023	-10.35195	0.0000
VAL	194.3482	26.76874	7.260269	0.0003
C	5814.553	263.7028	22.04965	0.0000
EC = INDEX - (-120.5213*INF -515.4257*R + 194.3482*VAL + 5814.5530)				
F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	5.532007	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
Actual Sample Size	25		Finite Sample: n=30	
		10%	2.676	3.586
		5%	3.272	4.306
		1%	4.614	5.966

Source: Prepared by researchers depending on the Eviews 10

Table(4): ARDL error correction model

ARDL Error Correction Regression				
Dependent Variable: D(INDEX)				
Selected Model: ARDL(3, 4, 4, 4)				
Case 2: Restricted Constant and No Trend				
Date: 12/11/19 Time: 07:36				
Sample: 1990 2018				
Included observations: 25				
ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INDEX(-1))	0.442891	0.173060	2.559173	0.0430
D(INDEX(-2))	0.614351	0.129419	4.746978	0.0032
D(INF)	-48.42600	30.29614	-1.598421	0.1611
D(INF(-1))	33.11694	30.70711	1.078478	0.3223
D(INF(-2))	-20.37805	24.52213	-0.831006	0.4378
D(INF(-3))	45.25590	13.78819	3.282221	0.0168
D(R)	-154.6648	94.57132	-1.635431	0.1531
D(R(-1))	611.0024	158.3802	3.857821	0.0084
D(R(-2))	495.3011	146.6135	3.378276	0.0149

D(R(-3))	290.3917	94.64651	3.068171	0.0220
D(VAL)	194.3803	11.38786	17.06908	0.0000
D(VAL(-1))	-200.8164	33.68201	-5.962128	0.0010
D(VAL(-2))	-98.55850	26.80517	-3.676847	0.0104
D(VAL(-3))	-104.5841	24.01535	-4.354886	0.0048
CointEq(-1)*	-1.312347	0.193285	-6.789702	0.0005
R-squared	0.988292	Mean dependent var		88.48357
Adjusted R-squared	0.971900	S.D. dependent var		1175.583
S.E. of regression	197.0634	Akaike info criterion		13.68864
Sum squared resid	388339.7	Schwarz criterion		14.41996
Log likelihood	-156.1080	Hannan-Quinn criterion		13.89148
Durbin-Watson stat	2.021867			

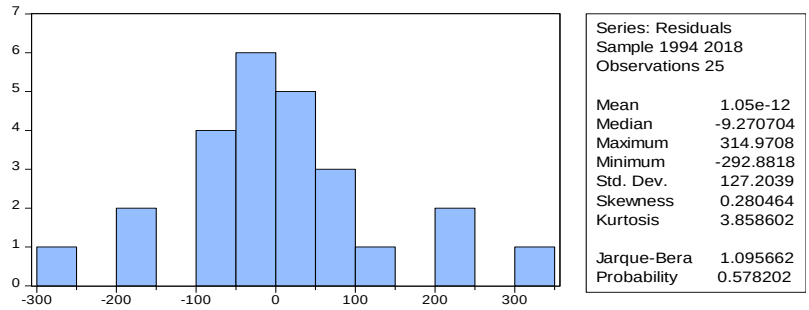
Source: Prepared by researchers depending on the Eviews 10

Table (5): Serial correlation test for residues

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	4.686161	Prob. F(2,4)	0.0895
Obs*R-squared	17.52187	Prob. Chi-Square(2)	0.0002

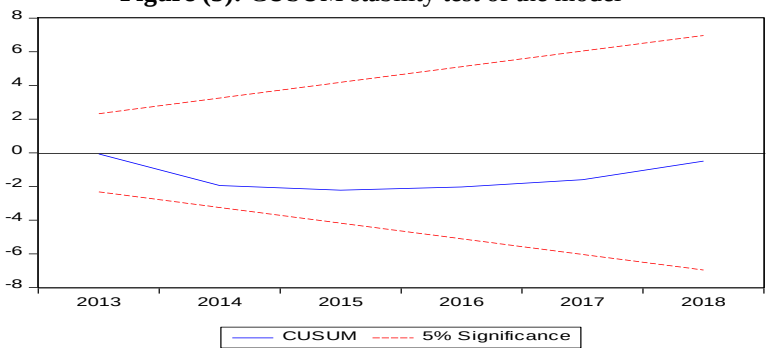
Source: Prepared by researchers depending on the Eviews 10

Figure (4): Residual distribution test



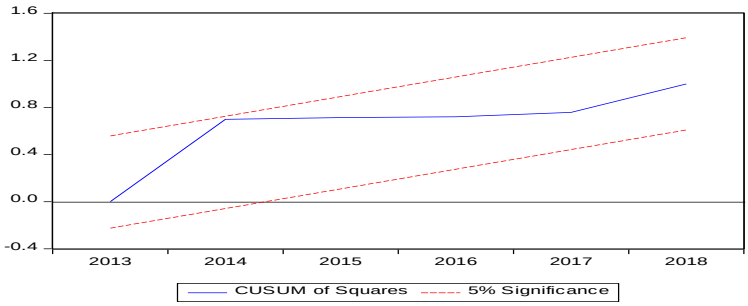
Source: Prepared by researchers depending on the Eviews 10

Figure (5): CUSUM stability test of the model



Source: Prepared by researchers depending on the Eviews 10

Figure (6):CUSUM of Squares stability test of the model



Source: Prepared by researchers depending on the Eviews 10

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