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Can strengthening the stock market affect the value of the national currency? A study of stock-oriented models in the Iranian economy

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Abstract:
Objective: The stock market and the foreign exchange rate market have been sensitive segments of the financial market. These two markets are rapidly affected by fluctuations and business cycles in the economy and quickly reflect economic change. At the same time, turmoil in one or both markets raises concerns among market policymakers. We also address the question of whether the national currency can be strengthened through the stock market.
Methods: This study examines the stock market price on the value of the national currency of Iran using stock-oriented models and the Markov switching method in the period 1995 to 2021. In this study, the **non-linear Markov switching method** was used to estimate the model, and the LR-test method was used to check the linearity or non-linearity of the models. Akaike's test has also been used to determine the number of Markov switching regimes.
Results: The research results show that for every one percent increase in stock prices, the exchange rate has decreased by 0.21 percent. Therefore, the results indicate the approval of stock-oriented models in the Iranian economy. In other words, the capital market is one of the determinants of the exchange rate.
Conclusions: According to this model, lower stock prices reduce the wealth of domestic investors, which leads to lower demand for money with lower interest rates. Lower interest rates cause capital outflows to overseas markets, assuming other conditions remain stable, causing the domestic currency to depreciate and the exchange rate to rise.

1. Introduction

Exchange rate management in the country's economy has always been one of the main challenges and concerns of policymakers and the economic and political managers of the country. There have been challenging discussions about

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determining the exchange rate in academic circles and policy-making. Exchange rate fluctuations lead to a set of various and sometimes contradictory changes in the external and internal sectors of the economy, the result of which can affect the performance of the country's economy positively or negatively. Determination of the optimal exchange rate, On the one hand, plays a significant role in the export and import of goods and adjusts the country's trade balance and balance of payments. On the other hand, it plays an important role in stock market indicators such as stock market returns. Research shows that with the onset of a shock of a standard deviation from the variable exchange rate, the return on assets first reacts positively after six periods, and the effect of the shock decreases. The effect of the shock disappears in the long run (Nazemi Et al., 2020).

In the economies of many countries, the capital market is the most important source of domestic financing and the basis for the accumulation and formation of capital and directing liquidity to high-yield activities and the impact on the value of national currencies. It is possible to cover the risk of exchange rate fluctuations by using the gold futures market and comparing the optimal ratio of risk coverage in the Tehran Stock Market (developing financial market) and the European Stock Market (developed financial market) (Shahabadi Farahani et al., 2020). The first and most important factor that investors face in making investment decisions in the stock market is the price factor (Roshan et al., 2012). The stock price is a signal in guiding the volume of liquidity and effective allocation of capital, which, if matched with the intrinsic value of stocks, becomes a powerful tool in the efficient allocation of resources (Winkelreid, 2014). The real factors whose changes should affect prices are not known to everyone. Establishing fair prices in line with the intrinsic value of stocks is an important goal that requires the development of pricing models in the capital market and the stock exchange. In this regard, action to identify the factors affecting the formation of prices and different levels of price-to-income ratio (P/E) for companies and understanding why this effect can enlighten market participants and drive prices toward effective intrinsic value. Be located. So in the basic valuation method, the stock price is determined by the size and quality of important factors such as income, sales profit, price-to-profit ratio, etc. (Jahankhani and Parsaian, 1997).

Given the above, in this study, we will try to address the issue of whether the government can influence the value of the national currency through the capital market or not. In this regard, we will examine the strategic variable of stock market prices.

2. Literature review

The stock and exchange markets have been sensitive segments of the financial market. These two markets are rapidly affected by fluctuations and business cycles in the economy and quickly reflect economic change. At the same time, turmoil in one or both markets raises concerns among market policymakers. Dynamic interactions between the two markets have encouraged researchers, policymakers, and analysts alike to conduct detailed. Although, there is no theoretical consensus on the interaction between stock prices and exchange rates. It should be noted, that intermediate variables such as wealth, demand for money, and interest rates play an important role in linking them.

Financial markets are affected by various factors as exchange rate fluctuations (Saleh, 2008). However, there is still no general agreement on the dynamic relationship between the exchange rate and stock prices. Three general views can be offered in this regard:

A. Flow-oriented models. These models assume that the current account of the country and the current balance are two significant factors determining the exchange rate. Changes in exchange rates affect international competition, the trade balance, as well as real variables in the economy such as production, income, the current and future liquidity flows of companies, and their stock prices.

B- stock-oriented models; In these models, it is assumed that the capital account is the determining factor of the exchange rate. According to stock-oriented models, there is a negative relationship between exchange rates and stock prices. According to this model, lower stock prices reduce the wealth of domestic investors. This leads to a lower demand for money with lower interest rates. Lower interest rates cause capital outflows to foreign markets, assuming the stability of other conditions will reduce the value of the domestic currency and increase the exchange rate (Heidari and Bashiri, 2012).

C. The third view, which is based on Gavin's monetary model, in contrast to the above two models does not relate between exchange rates and stock prices (Gavin, 1989).

Based on studies, there is no consensus on the interaction effects of exchange rate fluctuations and stock market indices, and the relationships debated between the two markets.

Azman et al. (2006) studied the relationship between stock prices and exchange rates in Malaysia during the period 1993 to 1998. To investigate the causal relationship, the researchers used the Toda-Yamamoto (1995) Granger Causality Test. Results indicate the existence of two-way causality for the pre-crisis period. One-way causality is from the exchange rate to stock prices in the crisis period.

Pan et al. (2007) examine the dynamic relationship between the stock market and the foreign exchange market for seven Southeast Asian countries, including Hong Kong, Japan, South Korea, Malaysia, Singapore, Taiwan, and Thailand for the period 1988-1998, using the Granger causality test. Analysis of variance and reaction function was investigated. Their results show a significant relationship between the exchange rate and stock prices for Hong Kong, Japan, Malaysia, and

Thailand before the 1997 financial crisis. There is also a link from the stock market to the foreign exchange market for Hong Kong, Korea, and Singapore. During the financial crisis, no country showed a significant relationship between stock prices and exchange rates. However, there is a relationship between exchange rates and stock prices for all countries except Malaysia.

Mitra (2017) examines the stock market and foreign exchange market integration in South Africa during the period 1979-1979 using the VECM model. The results show that the total value of stock transactions in South Africa relative to its gross domestic product increased from 2.64% in 1979 to 92.72% in 2014. The effective exchange rate index fell from 140.57 in 1979 to 77.62 in 2014. The results of empirical studies on the relationship between exchange rates and stock trading also have different effects. The results show that there is a long-term positive relationship between the effective real exchange rate and the total value of stock transactions in South Africa.

Bai and Kung (2017) examined oil prices, stock returns, and exchange rates in China and the United States using the diagonal BEKK model as well as the dynamic response function from February 1, 1991, to December 2015. The results show that oil prices respond significantly to demand shocks. The positive effects of oil supply on the Chinese stock market are severely affected and the oil price shock has a continuous and significant negative effect on the trend of the US dollar index. Currency is correlated. There is a significant inverse relationship between the US stock market and the dollar and between the Chinese stock market and the exchange rate. The Chinese stock market has been volatile in recent years due to aggregate demand and oil price shocks to the US stock market.

Delgado et al. (2018) examined the relationship between oil prices, stock markets, and exchange rates: Evidence from Mexico during the period January 1992 to June 2017 using the self-explanatory model (VAR). The results showed that the exchange rate has a negative and statistically significant effect on the stock index; the results also showed that the consumer price index has a positive effect on the exchange rate and a negative effect on the stock index. On the other hand, the effect of oil prices on the exchange rate is statistically significant, and the result is that rising oil prices have increased the exchange value.

Roubaud & Arouri (2018) examined oil prices, exchange rates, and the stock market under uncertainty and the switching regime during the period 1979-2015 using the Markov switch model (MS-VAR). The results showed that the relationship between the variables was linear and varied from one regime to another.

Abbasi Nejad et al. (2017) examined the dynamics of the relationship between macro variables and the stock market index. Using monthly data from 2002 to 2013 and using the GARCH-DCC-VARX model, they concluded that the variables of the exchange rate, inflation, and oil prices, all three, have a positive effect on the stock index in the long run. Also, in the short run, oil price shocks have a greater impact on the stock index than other variables.

Mohantfar et al. (2017) examined the effect of oil fluctuations and exchange rates on the stock price index in Iran. For this purpose, in this study, quarterly data related to the stock price index, exchange rate in the informal market, and oil prices during the years 1991-2014, and also to calculate oil price and exchange rate fluctuations by the autoregressive method of conditional heterogeneity variance Then, the coefficients related to the effect of each variable are obtained using the autoregressive method with distributed lags. It should be noted that in this study, to investigate the existence of a long-term relationship, the edge test was used. The results of this study show that in the period under review, oil price and exchange rate fluctuations had a negative and statistically significant relationship with the stock price index, as well as inflation and money supply, had a positive and significant relationship with the stock price index.

Heidari et al. (2015) investigated the effect of exchange rate on the stock returns of the pharmaceutical industry in the Tehran Stock Market, using monthly data from 2005 to 2015 and using the nonlinear Markov switching approach. For this purpose, from different modes of the Markov switching model, the MSIH (3) - AR (2) model was selected. The results showed that in an optimal model consisting of three regimes, the exchange rate has different effects on the efficiency of the pharmaceutical industry in different regimes; Thus, the exchange rate coefficients in the first regime had a negative effect, but in regimes 2 and 3, the returns of the pharmaceutical industry in the Tehran Stock Market had a positive effect. The effect of the inflation rate on health care was also positive in regimes 1 and 2 but negative in regime 3. In addition, the results show that the efficiency of the pharmaceutical industry efficiency was higher in Regime 1 (high-yield regime) than in Regime 2 (low-yield regime) and Regime 3 (high-yield regime); However, the fluctuations in the efficiency of the pharmaceutical industry in regime 3 were greater than the fluctuations in regimes 1 and 2.

Bazraei et al. (2021) examined the stock price risk coverage of stock exchange industries and exchange rates (industrial disciplines, banking, and investment). The results showed there is a symmetrical correlation between the stock prices of these industries and the exchange rate in both currency crises. The research findings also show that in both currency crises, the highest risk hedging efficiency is related to the multidisciplinary industry and investment, respectively, while the lowest is related to the banking industry. The high values of risk coverage in the first and second currency crises are related to multidisciplinary industries and banks, respectively. The lowest value of risk coverage in both crises is related to the investment industry. The highest weighted average of the optimal portfolio in both currency crises is related to the banking industry. The results of this study provide an opportunity for investors to use risk hedging and asset allocation strategies optimally.

3- Research method and model specification

There are two methods for investigating nonlinear effects and estimating the desired regressions: the threshold method and the Markov switching method. The threshold approach and other methods do not usually provide an exact time change in the strategic exchange rate variable. Our work uses the analysis of the nonlinear Markov Switching model, which expresses the exact time in the strategic parameter of the exchange rate and the number of its regimes. There are two common and important features in switching models that do not exist in the threshold method: First, past states (regimes) can occur over time. Second, the number of modes (regimes) is limited, usually two and a maximum of four. The literature on the exchange rate and stock market dynamics has been reported in several nonlinear studies and articles, which show that the rate of exchange rate transition can be related to some macroeconomic variables (Bosir, 2012, p. 744). Switching-Markov allows us to model long-term fluctuations in data and discrete switches in series dynamics. These models assume that the regimes cannot be observed, but will be determined by an invisible random process.

Markov switching model is presented as follows:

$$y_t = \sum_{i=1}^{Nns} Bi\, X_{i.t}^{n.s} + \sum_{j=1}^{NS} \emptyset i.st\, X_{j.t}^{S} + \varepsilon_t \qquad (1)$$

$$\varepsilon_t \sim p(\varphi_{st})$$

$X_{i.t}^{n.s}$ *Includes explanatory variables that have no switching effect*

$X_{j.t}^{S}$ *Includes explanatory variables that have a switching effect*

Now consider when the model has two explanatory variables $(X_{1.t}.X_{2,t})$ with input s and the normal distribution of the residuals.

$$y_t = \beta_{1.st} X_{1.t} + \beta_{2.st} X_{2t} + \varepsilon_t \qquad (2)$$

$$\varepsilon_t \sim N(0.\sigma_{st}^2)$$

s_t The time state of 1 …… k

k: is the number of loops

σ_{st}^2 New variance in s_t state

$\beta_{1.st}$: Beta coefficient for the explanatory variable in case I changes from 1 to 2.

$\beta_{2.st}$beta coefficient for the explanatory variable in case i is in case 2 and seeks to change to the next case.

ε_t: The residual vector has a normal distribution.

Kuan stated that in the Markov switching model, the y_t properties are jointly determined by the random properties ε_t and s_t.

Markov switching models should be classified according to which part of the model depends on the regime. If the introduced model contains values, 1,2,.. then depending on which component of the equation depends on the state variable? There are several situations. One of the advantages of the Markov switching method over other methods in flexibility is that there is the possibility of a permanent change or several temporary changes. These changes can occur frequently for a short time.

This model endogenously determines the exact time of structural changes and failures. Whatever is most important in economic studies, including the four modes of Markov-switching Markov Switching Mean models (MSM), Intercept Term (MSI), Markov Switching Heteroskedasticity (MSH), and Markov Switching Autoregressive Parameters (MSA) (Ning and Zhang, 2018). In general, different types of autoregressive models can be explained:

$$V=V(St)\rightarrow MSI \quad (3)$$
$$A_i=A_i(S_t)\rightarrow MSA$$
$$VAR(u)=(VAR(u))(S_t)\rightarrow MS$$

Table (1): Different modes of Markov switching model

Model	Equation	Disturbance sentence distribution	Regime-dependent component
$MSM(m)-AR(P)$	$\Delta y_t-\mu(S_t) = c+\sum_{i=1}^{p}\alpha_i\,(\Delta y_{t-i})\mu(S_{t-i})+\varepsilon_t$	$\varepsilon_t\sim IID(0.\sigma^2)$	Mean
$MSI(m)-AR(P)$	$\Delta y_t = c(S_t)+\sum_{i=1}^{p}\alpha_i\,(\Delta y_{t-i})+\varepsilon_t$	$\varepsilon_t\sim IID(0.\sigma^2)$	Intercept
$MSH(m)-AR(P)$	$\Delta y_t = c+\sum_{i=1}^{p}\alpha_i\,(\Delta y_{t-i})+\varepsilon_t$	$\varepsilon_t\sim IID(0.\sigma^2(S_t))$	The variance of error sentences
$MSA(m)-AR(P)$	$\Delta y_t = c+\sum_{i=1}^{p}\alpha_i\,(S_t)(\Delta y_{t-i})+\varepsilon_t$	$\varepsilon_t\sim IID(0.\sigma^2)$	Auto regressive sentence coefficients

Combining the first and second models with the third and fourth models can obtain more detailed models. Table (2) summarizes the different modes of the Markov-switching model. Before estimating the model, it is necessary to consider which component of the regression equation depends on the regime. If the mean of the equation is a function of the regime, it is denoted by MSM. If the intercept term of the origin is a function of the regime, it is shown as MSI. The difference between the first and second cases is that the regime change in the first case is slow, but in the second case, this change occurs quickly. In the third case, the variance of the error statements is a function of the regime variable and is represented as MSH. In the fourth case, the coefficients of the sentences themselves are a function of the explanation of the regime and are shown as MSA. In the third case, the variance of the error sentences is a function of the regime, so the variance is considered a function of.

Determining the number of regimes is based on two approaches: 1- theoretical and 2- statistical. In the first case, it is the theory that determines what behavior and reaction the variable in different situations shows. In other words, the behavior of the variable has different effects in different situations. In terms of statistical approach, the number of regimes is determined based on intelligence statistics. If the number of regimes in a model is equal to 1, the model is ARMA and the variable behaves the same throughout the period under study and is not affected by other variables.

For further explanation in MSMH-AR mode, both the variance of the model and the mean of the model depend on the status variable. In MSMAH-AR mode, the variance and mean, as well as the parameters of the autoregressive model, depend on the situation variable. Because some economic variables have nonlinear behavior based on economic theories and experimental observations, such variables can be modeled nonlinearly using the models in Table (2).

Table (2): Summary of Markov switching models

		MSM		MSI	
		μvariable	μConstant	Cvariable	CConstant
α_iConstant	σ^2Constant	$MSM-AR$	AR Linear	MSI	AR linear
	σ^2variable	$MSMH-AR$	$MSH-AR$	$MSIH-AR$	$MSH-AR$
variable α_i	σ^2Constant	$MSMA-AR$	$MSA-AR$	$MSIA-AR$	$MSH-AR$
	σ^2variable	$MSMAH-AR$	$MSAH-AR$	$MSIAH-AR$	$MSH-AR$

According to previous studies and theoretical foundations and economic theories, the research model of independent variables and dependent variables is as follows:

$$LEXR = F(LOP.LSMP.LINF)$$

In the above equation, LINF indicates the logarithm of the inflation rate (as a percentage of central bank statistics), LOP logarithm of Iranian light oil price (in dollars), LSMP stock market price index (without units), LEXR is the nominal exchange.

4- Estimates and results

The unit root test and the maximum likelihood test are performed, before estimating the Markov switching model

4-1 Unit root test

In the Markov switching model, the significance and nomenclature of the variables used in the research should be examined through the unit root test. Generalized Dickey-Fuller (ADF) or Phillips Prone (PP) tests can be used for unit root tests. The difference between the Phillips-Peron test and the Dickey-Fuller test is that residuals can be self-correlated. The results of the unit root test are given in Table (3). The results of the unit root test show that the logarithm of the inflation rate and changes in oil prices are at a static level and do not need to differentiate, but the logarithm of the exchange rate, the logarithm of stock returns and the logarithm of stock prices are static with one-time differentiation. Since the oil price change data has a negative number, the logarithm of the oil price change variable has not been calculated. Our model is semi-logarithmic. The rate in Rials (the common exchange rate in the Market).

Table (3): Results of the root test of the Augmented Dickey-Fuller unit at the term

No Intercept and no trend		Intercept		Intercept and trend		variable
probability	Dickey-Fuller Statistics	probability	Dickey-Fuller Statistics	probability	Dickey-Fuller Statistics	
0.66	-1.86	0.93	-0.22	0.97	1.60	LRE: Exchange rate logarithm
0.49	-0.51	0.029	-3.10	0.051	3.42	Lp: The logarithm of the inflation rate
0.00	-8.78	0.00	-8.74	0.00	-8.82	Spoil: Oil price changes
0.98	1.89	0.97	0.29	0.67	-1.85	LSMP: Stock price index

Source: Research Finding

Table (4): Augmented Dickey-Fuller unit root test with differentiation

Critical Value					
probability	90	95	99	Dickey-Fuller Statistics	variable
0.00	-2.57	-2.88	-3.47	-5.00	ΔLRE Exchange rate logarithm
0.00	-2.57	-2.88	-3.47	-7.74	ΔLSMP Stock Price Index

Source: Research Finding

4-2 LM test

Markov switching models are classified into different types according to which part of the autoregressive model is dependent on the regime and is transferred under its influence. What is more important in economic studies include the four modes of Markov switching mean models (MSM) intercept term (MSI), autoregressive parameters (MSA), and Markov Switching Heteroskedasticity (MSH).

Autoregressive degrees and moving averages are determined using Akaike statistics as well as likelihood ratio and LR tests. Different MS models are estimated and as a result, the best model is selected from the various models that have the least Akaike. It is necessary to mention here that. To explain the explanatory rate of competing models, two tests of maximum likelihood and Akaike criterion are used. The first test has a disadvantage, therefore, the results related to Akaike statistics are more valid. The likelihood function is not appropriate because it does not calculate the degree of freedom and the Akaike criterion should be used. In addition to explaining the competing model, the Akaike criterion also takes into account the degree of freedom.

Table (5): LM test results

Statistics	Coefficient
research model	
Log-likelihood	208.952

Source: Research Finding

Table (6): AIC-SC test results

AIC	-3.15
SC	-2.85

Source: Research Finding

4-3 Test of the suitability of nonlinear model Linearity LR-test

The most important part of the results is related to whether the nonlinear model used in the research is appropriate and has been able to increase the explanatory power of the model. This test is also for establishing constraints. In the nonlinear model, the mean is different and each regime has an average. The hypothesis of zero equality of means and linearity of the model and the opposite hypothesis of zero is the inequality of means and nonlinearity of the model. If the value of the statistic obtained from this test is greater than the critical value of the X^2 distribution at the level of 0.95, the null hypothesis is rejected and the result is that the nonlinear model is more appropriate. In this regard, the Divis method can be used, according to which, if there are transfer parameters, its approximate distribution should be calculated, which is given in the output under the approximate upper bound.

Also, according to Ang and Bekart's method of this test, due to the transfer parameter in the opposite hypothesis, it is not possible to suffice with the chi-square statistic with 1 degree of freedom and the chi-square statistic with 3 degrees of freedom should be relied on. Plus two transfer parameters. As you can see in Table 4-5, since the value of the statistic is greater than the critical value of the X2 distribution with three degrees of freedom, and based on the probability value, the null hypothesis is rejected at the 5% level, so the nonlinear model is more appropriate. There are two averages in the nonlinear model. The average varies in regime and different situations.

Table (7): Results of Linearity LR-test

Linearity LR-test Chi^2(3) =117.112 [0.0000]** approximate upper bound: [0.0000]**

Source: Research Finding

4-4 Determining the optimal model estimation mode

To choose the optimal research model, the following should be done so that the optimal choice should be based on economic theory. To choose, the best fit and the most explanatory should be done on the data, which is indicated by the high value of Log-likelihood, but since this criterion does not take into account the degree of freedom, the minimum value of the Akaike criterion should be considered. On the other hand, the optimal model should have the most significant coefficients, especially the coefficients of regime-dependent components. The standard deviation should also be minimal. The next criterion should be the selection of the model with the most compliance with the theory and also the selection of the model with the most significant coefficients should be in this case, the significance of regime-dependent components should be considered more and the standard deviation of error components should be minimal. There are different criteria for selecting the optimal model, which is selected based on the minimum Akaike criterion of model 2. But model 3 has been selected based on the highest estimated significant coefficients. In a model in which the standard deviation is a consequence of the regime, we have a separate standard deviation for each regime.

In the Markov switching model, the three basic issues of selecting the optimal state in the absence of theory based on the Akaike criterion, selecting interrupts based on the Akaike criterion, and also determining the regime based on the Akaike criterion should be considered. In this section, we enter and re-estimate different combinations of interrupts and regimes in different modes of estimation, and adjust the Akaike criterion for each combination and mode as in the following tables. Considering the above criteria, the optimal research model of the second case is selected, which is dependent on the regime except for the intercept term. In this case, the classical assumptions must also be established. Based on all 4 cases, the nonlinear model is approved and the nonlinear model is more suitable than the linear method.

Based on Tables 8 and later, different switching models are considered in all 4 cases with a maximum regime of 3 and a maximum lag of 2. Based on this estimate, we consider different combinations of regimen and lag that have the lowest Akaike criterion as well as the highest amount of explanation. Based on this, the second mode is selected as the appropriate mode with the lowest Akaike criteria.

Table (8): Determining the optimal state of estimation based on the Akaike cr iteration in the first case

Regime/lag	2	3
1	-3.10	-3.10
2	-3.25	-3.10

Source: Research Finding

Table (9): Determining the optimal state of estimation based on the Akaike criterion in the second case

Regime/lag	2	3
1	-	-3.52
2	-2.56	-

Source: Research Finding

Table (10): Determining the optimal state of estimation based on the Akaike criterion in the third case

Regime/lag	2	3
1	-3.85	-
2	-3.85	-

•• **Source:** Research Finding

Table (10): Determining the optimal state of estimation based on Akaike criterion in the fourth case

Regime / lag	2	3
1	-2.99	-3.20
2	-2.99	-3.20
3	-2.99	-3.20

Source: Research Finding

The second mode of the model in the research equation is the change in the intercept term. The results show a high level of explanation of the model. If the mean of the equation is a function of the regime, it is denoted by MSM. In this case, the number of regimes that represent the behavior of the variable in each of the situations is considered equal to 2 and does not change. In the next step, the number of self-explanatory lags and the moving average are considered. According to the results, the CONSTANT variable coefficients represent the intercept term in the two regimes. The results of the second case are the same as the results of the first case and the only difference is that the variable CONSTANT in the first case is in the interpretation of the mean and the second case is interpreted as the intercept term.

The results show that the width of the origin is different in the first and second regimes. The results show that the logarithm of the inflation rate is significant and the mean in regimes 1 and 2 is significant. The results show that in exchange for a one percent increase in stock prices, the exchange rate has decreased by 0.21 percent, which is both statistically and theoretically significant. For every one percent increase in inflation, the exchange rate rises by 0.51 percent. The first lag of the dependent variable is significant and the effect of oil price changes on the exchange rate is positive and significant.

Table (12): Mean in two regimes

Regime	Mean	Coefficients	t-value	probability
1	CONSTANT(1)	-0.31	-1.65	0.065
2	CONSTANT(2)	-0.23	-4.56	0.00

Source: Research Finding

Table (13): Results of parameter estimation in the second case

Variable	Coefficients	Standard deviation	t-value	t- prob
(DL2LEXR-1)	0.043	0.008	5.45	0.00
(DL2EXR-2)	0.044	0.018	2.44	0.003
DL2LEXR-2)	-0.079	0.023	-3.43	0.00
(DL2LSPM)	-0.21	0.045	-4.66	0.00
(DL2LINFL)	0.51	0.132	3.85	0.00
(DPOIL)	0.38	0.145	2.62	0.031
CONSTANT(1)	0.21	0.187	-1.12	0.41
CONSTANT(2)	-0.46	0.134	-3.43	0.00

Source: Research Finding

In this method, in addition to the parameters of the main model, the probabilities of transfer and standard deviation of the regime are estimated, and the results are as follows. The standard deviation of the disturbance sentences, the probability of transition from zero to zero regime, and the probability of transition from the one-to-one regime are estimated. The results are presented in Table (14). According to Table (14), the standard deviation in the first case is not a function of the regime and the estimated standard deviation is equal to 0.001.

Table (14): Results of estimation of transfer parameters in case 1

Variable	Coefficients	Standard deviation
SIGMA	0.054	0.001
$p\{0\|0\}$	0.83	0.34
$p\{1\|1\}$	0.54	0.021

Source: Research Finding

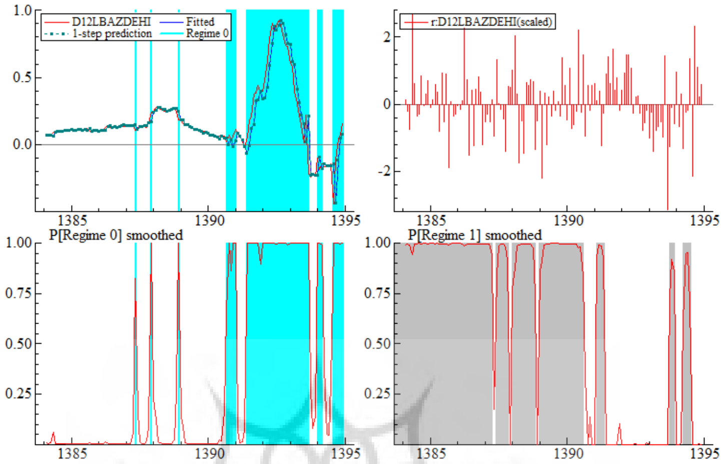
The probability transfer c matrix indicates how likely we are to stay in regime 0 and how likely we are to go to regime 1 if we are currently in regime 0. If we are in regime 0 at time t, we will remain in the same regime 0 with a probability of 0.64 at time t + 1, and we will go to regime one with a probability of 0.21 at time t + 1. If we are in regime 1 at time t, we will remain in regime 1 with a probability of 0.96, and at time t + 1, and with a probability of 0.021, we may go to regime 0 at time t + 1. In general, the tendency to change the regime at different times is low and tends to stay on the regime.

Table (15): Transfer probability matrix

	Regime 0 , t	Regime 1 , t
Regime 0, t+1	0.64	0.014
Regime 1 , t+1	0.21	0.86

Source: Research Finding

Figure (1) shows the disruption sentences of the estimated model. This diagram is normalized like the diagram of the previous equations. The diagram at the top left of the red line shows the actual value of the dependent variable, the blue line shows the fitted value of the model, and the more it matches the red line, the higher the explanatory power of the model. As you can see in the diagram above on the left, the amount of fluctuations in mode 1 is greater than in mode two.



Source: Research Finding

5- Conclusions and suggestions

This study investigates the effects of stock market prices on the value of the national currency in the period 1995 to 2021 using time series data using the Markov switching model. The research results show that for every one percent increase in stock prices, the exchange rate has decreased by 0.21 percent, which is both statistically and theoretically significant. Therefore, the results indicate the approval of stock-oriented models in the Iranian economy. In other words, the capital market determines the exchange rate. According to stock-oriented models, there is a negative relationship between exchange rates and stock prices. According to this model, lower stock prices reduce the wealth of domestic investors. This leads to a lower demand for money with lower interest rates. Lower interest rates cause capital outflows to overseas markets, assuming other conditions remain stable, causing the domestic currency to depreciate and the exchange rate to rise.

Based on the above results, it is suggested that the government pay special attention to the stock market and bonds and avoid suppressing them to strengthen the national currency and reduce the exchange rate. On the other hand, by relying on this market, stable incomes can be obtained so that the value of the national currency is strengthened.

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آیا تقویت بازار سهام می تواند بر ارزش پول ملی تاثیر بگذارد؟ بررسی مدل های سهام-محور در اقتصاد ایران

خلاصه:

هدف: بازار سهام و بازار ارز از بخش‌های حساس بازار مالی بوده‌اند. این دو بازار به سرعت تحت تأثیر نوسانات و چرخه های تجاری در اقتصاد قرار می گیرند و به سرعت تغییرات اقتصادی را منعکس می کنند. در عین حال، آشفتگی در یک یا هر دو بازار نگرانی‌هایی را در میان سیاست‌گذاران بازار ایجاد می‌کند. همچنین به این سوال می پردازیم که آیا می توان پول ملی را از طریق بازار سهام تقویت کرد؟

روش کار: این مطالعه به بررسی قیمت بازار سهام بر ارزش پول ملی ایران با استفاده از مدل‌های بازار سهام محور و روش سوئیچینگ مارکوف در بازه زمانی ۱۹۹۵ تا ۲۰۲۱ می‌پردازد. در این تحقیق از روش سوئیچینگ غیرخطی مارکوف برای برآورد استفاده شد. مدل، و از روش آزمون LR برای بررسی خطی بودن یا غیرخطی بودن مدل ها استفاده شد. از آزمون آکایک نیز برای تعیین تعداد رژیم های سوئیچینگ مارکوف استفاده شده است.

یافته ها: نتایج تحقیق نشان می دهد که به ازای هر یک درصد افزایش قیمت سهام، نرخ ارز ۰/۲۱ درصد کاهش یافته است. بنابراین نتایج حاکی از تایید الگوهای سهام-محور در اقتصاد ایران است. به عبارت دیگر بازار سرمایه یکی از عوامل تعیین کننده نرخ ارز است.

نتیجه‌گیری: بر اساس این مدل، کاهش قیمت سهام باعث کاهش ثروت سرمایه‌گذاران داخلی می‌شود که منجر به کاهش تقاضا برای پول با نرخ بهره پایین‌تر می‌شود. نرخ‌های بهره پایین‌تر باعث خروج سرمایه به بازارهای خارج از کشور می‌شود، با فرض اینکه سایر شرایط ثابت بماند و باعث کاهش ارزش پول داخلی و افزایش نرخ ارز می‌شود.