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# Optimistic Sentiment of Investors and Its Impact on the Dynamics of Iran's Stock Market: "A Comparative Study of the JCPOA Period and the US Withdrawal"

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A B S T R A C T

**Objective:** Contrary to classical theory, which considers investors as rational decision-makers, behavioral finance theory assumes that individuals' behavior is not entirely rational and that there is a possibility of irrational behavior in decision-making, with a special emphasis on cognitive and emotional biases. The purpose of this study is to investigate the optimistic sentiment of investors and its impact on the dynamics of Iran's stock market.

**Methodology:** The research method is applied in terms of purpose and descriptive-post-event in terms of methodology. The statistical population of the study includes all companies listed on the Tehran Stock Exchange during the years 2016-2022 (during the two periods of the JCPOA and the US withdrawal from the JCPOA). The sample size was determined using the systematic elimination method, which resulted in 136 companies. In this study, panel data and dynamic least squares methods were used for data analysis. Additionally, the Arms Index was used to measure investor sentiment, and the two indices of bid-ask spread and market depth were used to measure stock market dynamics.

**Findings:** The results showed that optimistic sentiments have a significant and inverse impact on the bid-ask spread and market depth.

**Conclusion:** The results showed that investor optimism significantly impacts the bid-ask spread and market depth during the JCPOA and the US withdrawal from the JCPOA.

**Keywords:** *Investor Optimistic Sentiment, Bid-Ask Spread, Market Depth.*

## 1 Introduction

T he capital market is one of the most significant markets that reveals the economic development of countries, and one of the factors leading to the growth and development of this

market is the existence of international relations (Chen et al., 2020; Kim et al., 2005; Ma, 2017; Varahrami et al., 2020). Iran is among the countries where political and economic issues are intertwined with international developments, and its economy is influenced by such matters. This influence is particularly evident in Iran's capital market, as changes in stock indices after major political events, such as the JCPOA, provide credible evidence for this claim (Varahrami et al., 2020). Accordingly, examining the statistics shows that after the agreement and implementation of the JCPOA, there were significant impacts on business markets and the country's economic activities, including improved expectations for the future economy, changes in monetary and financial indicators towards improvement. The implementation of the JCPOA led to increased macroeconomic stability, and the Central Bank was able to control monetary variables such as deposit interest rates, loan interest rates, liquidity growth rate, and consequently, inflation (Varahrami et al., 2020). Therefore, as capital market stability increases, its attractiveness for investors to achieve the best returns will increase, encouraging them to invest their funds in this market (Utami et al., 2020).

Over the past three decades, liquidity has become a significant concept in the valuation of financial assets (Díaz & Escribano, 2020), attracting the attention of many specialists and academic researchers for two main reasons. First, liquidity is useful for risk protection and management, asset pricing, capital cost determination, and efficient capital allocation (Wang, 2013). Second, potential disruptions due to a lack of liquidity occur during financial crises and unstable financial and market conditions (Debata & Mahakud, 2018). Better stock liquidity makes investment more attractive for investors (Utami et al., 2020). Diaz and Escribano (2020) define liquidity as "the ability to absorb the flow of buy and sell orders smoothly." (Díaz & Escribano, 2020). In fact, liquidity means investors' ability to execute high-volume trades quickly and with a low price difference (Saikkonen, 1991).

Moreover, Elgayyar et al. (2021) showed that changes in market liquidity are a fundamental risk factor in the stock market. Under risky and complex conditions, investors make decisions based on mental shortcuts instead of objectively accessing and analyzing all available information. According to the behavioral finance perspective, investors' behavior is irrational concerning decision-making, and their behavior affects investment decisions such as buying and selling stocks (Parveen et al., 2020). This issue is of utmost importance in stock markets, which are heavily influenced by news and information related to companies, markets, and the macroeconomic environment. The problem is that preferences, tastes, and psychological factors often lead to shifts in the supply of capital and the direction of financial resources. This complicates the mechanism of fund flows in the capital market, making its analysis much more difficult (Hasanzadeh Diva & Blue, 2021). Numerous studies have acknowledged the influential role of sentiments on stock liquidity (Díaz & Escribano, 2020; Dunham & Garcia, 2021; Kumari, 2019). Investor sentiment refers to the overreaction or underreaction of asset prices due to irrational decisions and common behavioral biases of investors (Kim et al., 2019). Chiu et al. (2018) define sentiments as investor optimism or pessimism towards the stock market. They believe that sentiments reduce or increase the bid-ask spread and market depth, thereby improving stock liquidity (Chiu et al., 2014). Kumari (2019) states that investor sentiments can have direct and indirect effects on stock market liquidity. Directly, when investor sentiments are bullish, they influence liquidity through disruptive traders and irrational market makers. Indirectly, higher sentiments occur when many irrational market makers are present in the markets (Kumari, 2019). Higher sentiments indicate a higher level of false confidence in the markets, which increases stock market liquidity (Odean, 1998). This article examines the impact of investor sentiments on liquidity speed. The distinguishing feature of this study from previous literature is the focus on two crucial factors: the bid-ask spread and market depth as two components of liquidity speed, considered simultaneously based on the average of the best prices in the order book. This enriches the previous literature. Furthermore, this study examines two periods: the JCPOA and the post-JCPOA period, to identify the role of political crises in investor decision-making. Therefore, given the above, the researchers aim to answer the research question: How does investor sentiment impact stock market liquidity dynamics during the JCPOA and post-JCPOA periods?

## 2 Methods and Materials

Since the researchers of this study aim to investigate the impact of investor optimism on stock liquidity, this research is applied in terms of purpose and descriptive-post-event in terms of data collection. Considering that the dependent variable examines the likelihood of occurrence, it is a retrospective study. The statistical population of this study includes all companies listed on the Tehran Stock Exchange.



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The sample was selected using systematic elimination based on the criteria outlined below for the period 2016-2022, including 136 companies:

Companies listed on the Tehran Stock Exchange from 2016 and active until 2022;

Due to the lack of clear boundaries between operational and financial activities of financial companies (financial intermediaries and investment institutions, banks, and insurance), these companies were excluded from the sample;

Financial information must be fully available during the research period;

Companies should not have ceased operations for more than three months or changed their activity period.

### *2.1 Models and Research Variables*

#### *2.1.1 Dependent Variable:*

Based on the study by Chiu et al. (2018), stock liquidity speed is measured using illiquidity indices of the bid-ask spread and market depth.

Bid-Ask Spread: To examine the relationship between investor optimism and the bid-ask spread, regression model (1) was used, following the studies by Copeland & Galai (1983), Stoll (2000), and Chiu et al. (2018).

Market Depth: To examine the relationship between investor optimism and market depth, regression model (2) was used, following the studies by Ahn et al. (2001), Lepponen & Wang (2017), and Chiu et al. (2018), to control factors important in determining market depth.

#### *2.1.2 Independent Variable:*

Investor Sentiment: It represents the investor sentiment of company i in month t. The Arms Index (Arms) was used to calculate investor sentiment. This index is the ratio of the number of advancing stocks to the number of declining stocks, standardized by trading volume. Values greater than one indicate pessimism, while values less than one indicate optimism (Rezaeeti et al., 2016).

#### *2.1.3 Control Variables:*

Control variables are shown in Table 1.

#### *2.1.4 Estimation Method of Research Models*

The dynamic ordinary least squares (DOLS) method by Kao and Chiang (2001), based on studies by Saikkonen (1991) and Stock and Watson (1993), was developed for panel data estimation and avoids endogeneity and serial correlation problems. DOLS has less bias compared to fully modified least squares (FMOLS) and ordinary least squares (OLS) when N > T and the panel is heterogeneous (as in the present study).

**Table 1**

*Control Variables*

| Variable | Symbol | Measurement |
|---|---|---|
| Trading Volume | $V_{it}$ | Average trading volume of executed shares |
| Number of Trades | $N\ Trade_{it}$ | Average number of executed trades |
| Stock Return | $Ret_{it}$ | $PRet_{i,t} = \frac{P_{i,t}-P_{i,t-1}+DV_{i,t+1}}{P_{i,t-1}}$ |
| Stock Price Changes (Volatility-Parkinson) | $Vol_{it}$ | $Vol = \sqrt{\frac{\sum_{i=1}^{n}(H_i - L_i)/(H_i + L_i/2)^2}{n}}$ <br> $H_i$ represents the highest and $L_i$ the lowest stock price |

## 3 Findings and Results

To prevent the issue of spurious regression, stationarity tests for variables were conducted using the Levin, Lin, and Chu (LLC) and Im, Pesaran, and Shin (IPS) tests. In these tests, the process of checking stationarity is similar, and by rejecting the null hypothesis $H_0$, the non-stationarity or the presence of a unit root in the variables is rejected. According to the results of these tests presented in Table 2, the research variables are stationary at level; therefore, the long-term relationship between them is confirmed. After checking the stationarity of the variables, the F-Limer test statistic was used to test the significance of the panel data method. In this test, the null hypothesis $H_0$ is the feasibility of estimating the model as pooled data, and the alternative hypothesis $H_1$ is the feasibility of estimating the model as panel data. The model results showed that the data is suitable for model estimation with either fixed effects or random effects.



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**Table 2**

*Results of Unit Root Test*

| Variable | Symbol | Levin, Lin, Chu | Im, Pesaran, Shin | Integration |
|---|---|---|---|---|
| | | Statistic (p-value) | Statistic (p-value) | |
| Bid-Ask Spread | Spread | -48.5521 (0.0000) | -47.5292 (0.0000) | Stationary at level / I(0) |
| Market Depth | Depth | -15.5787 (0.0000) | -13.8761 (0.0000) | Stationary at level / I(0) |
| Investor Optimistic Sentiment | $SentimentOptimistic^{it}$ | -88.7020 (0.0000) | -83.0027 (0.0000) | Stationary at level / I(0) |
| Stock Return | Ret | -73.6449 (0.0000) | -67.3446 (0.0000) | Stationary at level / I(0) |
| Stock Price Changes | Vol | -44.9574 (0.0000) | -40.6914 (0.0000) | Stationary at level / I(0) |
| Trading Volume | V | -24.9951 (0.0000) | -22.8969 (0.0000) | Stationary at level / I(0) |
| Number of Trades | N trade | -20.8794 (0.0000) | -19.5880 (0.0000) | Stationary at level / I(0) |

Considering the p-value of the Hausman test, which is less than 0.05, the statistical hypothesis that the models have fixed effects is not rejected.

**Table 3**

*Panel Diagnostic Tests*

| Model | Test | Probability | Statistic | Result |
|---|---|---|---|---|
| Bid-Ask Spread Model | F-Limer | 0.0000 | 23.897033 | Confirmed Panel Data |
| | Hausman | 0.0019 | 20.890937 | Confirmed Fixed Effects |
| Market Depth Model | F-Limer | 0.0000 | 6.670891 | Confirmed Panel Data |
| | Hausman | 0.0000 | 97.798950 | Confirmed Fixed Effects |

Table 4 presents the estimation results of the bid-ask spread model, showing that during the JCPOA period, the coefficient of investor optimistic sentiment on the bid-ask spread is -24.16 with a t-statistic of -7.60 and a 95% confidence level. Furthermore, the coefficient during the US withdrawal from JCPOA is -0.09 with a t-statistic of -4.60 and a 95% confidence level, indicating that investor optimistic sentiment has a significant and inverse impact on the bid-ask spread. This means that the impact of optimistic sentiment on the bid-ask spread decreased by 62.7% with the US withdrawal from the JCPOA.

**Table 4**

*Estimation Results of Bid-Ask Spread*

| Situation | JCPOA | US Withdrawal from JCPOA |
|---|---|---|
| Variable | Probability | t-statistic |
| Investor Optimistic Sentiment | 0.0000 | -7.60e+16 |
| Stock Return | 0.0000 | 4.16e+42 |
| Stock Price Changes | 0.0000 | -1.17e+14 |
| Trading Volume | 0.0000 | 8.76e+16 |
| Adjusted R-squared | 0.716250 | |

Table 5 shows the estimation results of the market depth model, indicating that during the JCPOA period, the coefficient of investor optimistic sentiment on market depth is -0.281 with a t-statistic of -0.863 and a 95% confidence level. During the US withdrawal from JCPOA, the coefficient is -0.832 with a t-statistic of -3.297 and a 95% confidence level, showing that investor optimistic sentiment has a significant and inverse impact on market depth. This implies that the impact of optimistic sentiment on market depth decreased by 196% with the US withdrawal from the JCPOA.



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**Table 5**

*Estimation Results of Market Depth*

| Situation | JCPOA | US Withdrawal from JCPOA |
|---|---|---|
| Variable | Probability | t-statistic |
| Investor Optimistic Sentiment | 0.0000 | -0.863209 |
| Stock Price Changes | 0.0039 | 2.953198 |
| Number of Trades | 0.0000 | 6.440794 |
| Adjusted R-squared | 0.469652 | |

## 4 Discussion and Conclusion

Stock liquidity is a key criterion that can describe the stock market and should be considered by investors before conducting stock analysis from both technical and fundamental aspects. The stock exchange enables the conversion of savings into financial resources for the real sector, while the state of the stock market can affect or indicate social sentiment. How investors perceive and react to market conditions can significantly impact various market indicators, including the bid-ask spread and market depth, which act as liquidity metrics and can be influenced by factors such as investor sentiment. Therefore, this study aimed to investigate the impact of investor optimism on stock liquidity during periods of currency value changes. The results showed that investor optimism significantly impacts the bid-ask spread and market depth during the JCPOA and the US withdrawal from the JCPOA. The first hypothesis proposed that investor optimism has a significant impact on the bid-ask spread during periods of currency value changes. As shown in Table 4, this effect is significantly inverse with a 95% confidence level. This means that with the US withdrawal from the JCPOA, the decrease in investor optimism led to an increase in the bid-ask spread, resulting in reduced stock liquidity. This hypothesis can be explained by the fact that optimistic sentiments among investors can have positive and negative effects on the bid-ask spread and market depth. On one hand, when investors are optimistic about the future outlook of an asset or security, they tend to increase their demand for it. This increase in demand can lead to a reduction in the bid-ask spread as more buyers enter the market, narrowing the gap between bid and ask prices. Conversely, when investor sentiment turns pessimistic, they may reduce their demand for a specific asset or security. This reduction in demand can lead to a wider spread as sellers are unwilling to sell at lower prices. An increased spread between bid and ask prices indicates reduced market liquidity, making it more challenging for buyers to find willing sellers. These results align with the prior findings (Chiu et al., 2014; Messaoud et al., 2023). Therefore, it is recommended that organizations and relevant authorities establish additional disclosure rules to create information balance in the capital market and ensure supervisory intervention ensures information is available to users in a manner consistent with market efficiency, fairness, impartiality, and investor protection. Investors should also consider accounting information in their investment decisions.

The second hypothesis proposed that investor optimism has a significant impact on market depth during periods of currency value changes. This effect is significantly inverse with a 95% confidence level, meaning that with the US withdrawal from the JCPOA, the decrease in investor optimism led to reduced market depth. From the perspective of investors and stock market analysts, market depth, considered as a quantitative dimension of market liquidity, is very important. When investors are optimistic, they are more likely to place buy orders for stocks, increasing market depth. This increased depth makes it easier to execute trades at desired prices, providing more liquidity, making transactions cheaper and easier, and subsequently increasing market efficiency and dynamics. These results align with the prior findings (Chiu et al., 2014; Frino et al., 2019). When investors are more optimistic, they tend to trade more aggressively, and their optimism acts as a kind of lubricant, indicating that investor sentiment is a crucial driver of stock market liquidity. However, it is important to note that excessive optimism can have negative consequences. If investors become overly optimistic and drive prices up too high, it can lead to overvaluation of stocks, creating a speculative bubble. When the bubble bursts, it can lead to severe market corrections and declines in stock prices. Therefore, it is important for investors to be cautious and not let excessive optimism drive stock prices to unsustainable levels. This research has limitations due to the unique nature of the market and the socio-political environment. Firstly,



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excluding companies in financial, insurance, and banking industries reduces the generalizability of this research. Secondly, the inherent characteristics of semi-experimental research, such as the inability to control some factors affecting the research results, including the impact of variables such as economic factors, political conditions, global economic conditions, etc., which are beyond the researcher's control and may affect the research results. Thirdly, cultural differences and social attitudes towards investment can significantly influence how investors perceive and respond to market fluctuations.

## Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

## Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

## Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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## Declaration of Interest

The authors report no conflict of interest.

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## Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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