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The Effect of Environmental and Currency Uncertainty on Stock Return Volatility in Petrochemical and Petroleum Products Supplier Companies

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Highlights

- Environmental and currency uncertainties intensify the volatility of companies' stock returns;
- Uncertainties in the previous period have the opposite effect on the volatility of stock returns in the current period;
- When uncertainty is high in the market, traders are expected to move more toward stocks of safer companies;
- Uncertainty intensifies the stock return volatility of petrochemical and petroleum product suppliers' companies.

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Abstract

Market uncertainty is when investors have difficulty assessing current and future market conditions because of high market volatility. This research was conducted to investigate the effect of environmental uncertainty and currency uncertainty on the volatility of stock returns of companies listed on the Tehran Stock Exchange (TSE); these companies are active in all areas of the supply chain, from extraction to retailing. To achieve the research objectives, research hypotheses were tested based on a statistical sample of 13 companies for 10 years from 2012 to 2021 through the generalized method of moments (GMM) estimation with EViews. The research findings show that environmental and currency uncertainties intensify the volatility of companies' stock returns. These uncertainties in the previous period have the opposite effect on the volatility of stock returns in the current period. Further, the relationship between trading volume, stock price variables, and stock return volatility is negative because traders are expected to move more toward safer company stocks when market uncertainty is high. The greater volatility of returns in the previous period is expected to intensify the volatility of stock returns. Examining the volatility of stock returns can help analyze market participants' motivations.

Keywords: Environmental Uncertainty, Currency Uncertainty, Stock Return Volatility

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1. Introduction

In an efficient investment market, the price of securities reflects all available information, and investors react rationally to new information (Ehiedu and Obi, 2022). One of the main topics in financial research is the explanation of stock returns. This field's research was initially based on individuals' and entities'

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neoclassical and rational behavior theory (Ramiah et al., 2015; Schettkat, 2018; Brancaccio et al., 2022). Then, the behavioral finance theory, often referred to as psychology in financial science, appeared. It has challenged the fundamental principle of neoclassical economics and has played a critical and vital role in explaining the behavior and decision-making of investors in the market, as well as its effects (Gill and Bajwa, 2018; Antony, 2020; Yuan and Zhan, 2022).

Since the recent global financial crises, there have been growing concerns about political uncertainty, mainly related to economic policies and financial decisions (Baker et al., 2016). Numerous studies in capital markets indicate that changes in macroeconomic parameters significantly affect capital market indicators (Akbarzadeh and Jaimand, 2024). Uncertainty shocks in Iran's economy significantly impact various economic and financial indicators, including investment, stock returns, earnings management, and bank credits. Shocks are the primary source of unpredictable changes affecting commodity prices, inflation, interest rates, investment portfolios, savings, and loans (Morina et al., 2019). In recent years, Iran's economy has experienced solid and continuous cycles of inflation and currency fluctuations. Therefore, Iranian companies have faced more uncertainty compared to others. Existing literature shows that economic, currency, and environmental uncertainties have short-term solid adverse effects on inflation and production (Athari et al., 2022), employment (Caggiano et al., 2017), foreign investment (Canh et al., 2020), and economic and financial development (Scheffel, 2016; Lei et al., 2021). Some previous works also show the adverse effects of exchange rate fluctuations and uncertainty on exports, business, investment, capital market, inflation, and growth in concerned countries (Morina et al., 2019; Vo and Zhang, 2019; Hatmanu et al., 2020; Ioan et al. 2020).

One of the crucial effects of uncertainty is disrupting the performance of financial markets. Uncertainties may make market values unequal to present values (Beckert, 2020). In financial markets, due to uncertain prices, projects' earnings are as dependent on physical production as they are related to investors' expectations of future prices. Previous research on financial markets also shows that, generally, economic uncertainties cause a decrease in stock returns (Xu et al., 2021), financial stability (Phan et al., 2021), companies' political participation (Lei and Luo, 2023), and shrinking the economic performance of banks (Nguyen, 2021).

Stock returns are one of the performance metrics that show market participants' understanding of the company's status (Nadyayani and Suarjaya, 2021). According to economic theories, uncertainties will send negative signals to the market, and subsequently, the value and returns of companies will decrease (Asafo-Adjei et al., 2020). When a company's stock return differs from the market return, there is information in the market that is not symmetrically distributed. Generally, stock return volatility contains essential details on capital markets (Cremers and Weinbaum, 2010). In an efficient capital market, investors use the best conditional forecasts of variables such as stock return volatility, which affect their expected returns. The performance of financial markets is strongly dependent on the behavior of their investors. Ambiguous conditions such as uncertainties and cognitive mistakes, which are rooted in human psychology, affect the behavior of investors.

Iran has vast oil and gas reserves, and one of the primary sources of economic prosperity in Iran is the export of these energy sources. We can mention petrochemical, petroleum product refining, and supplier industries as the most significant parts of this area. These industries are heavily affected by economic uncertainties, primarily environmental and currency uncertainties, due to their dependence on petroleum feeds. Therefore, this research investigates the impact of uncertainties over stock returns of petrochemical and petroleum product supplier (PPS) companies on the Tehran Stock Exchange (TSE) that are active in all areas of the supply chain from extraction to retailing under the following three hypotheses:

- Environmental uncertainty leads to the intensification of stock return volatility in PPS companies;
- Currency uncertainty leads to the intensification of stock return volatility in PPS companies;
- Stock return volatility of PPS companies in the past period has a positive effect on their current period value.

2. Literature review and model specification

One of the markets in which investors invest and expect to earn profits is the stock market. By attracting and using stagnant funds, the stock exchange increases the amount of investment in society, establishes a relationship between suppliers and buyers, and regulates capital market transactions. Investors seek to profit by buying and selling stocks (Gudarzi Farahani et al., 2023). In every investment, the most critical factors are time and risk; the general importance of the mentioned factors is that investment requires spending now with a known amount, but the result will appear in the future with an unknown amount (Jafari et al., 2022).

The volatility of stock returns is one of the controversial financial issues that emerging markets have paid attention to in recent years because it is a risk measure for investors and policymakers (Hajiha and Safari, 2018).

Nowadays, there is a close relationship between financial markets and macroeconomics. On the one hand, economic uncertainties around the world have significant effects on financial markets, and on the other hand, financial market fluctuations directly impact macroeconomic stability. Stock market indices quickly react to new events. Previous studies have mentioned several important events to which stock market returns have responded (Díaz et al., 2016). Joo and Park (2021) and Liu et al. (2023) showed that uncertainties caused by oil price shocks affected stock market returns; Chung and Chuwonganant (2018) reported market uncertainties disturbed returns on stock as they reduced the supply of liquidity. Mamtha and Srinivasan (2016) demonstrated that factors such as information flow, volume of transactions, economic aspects, and investors' behavior were the causes of fluctuations in the stock market. Naeem et al. (2020) investigated the effect of optimism and happiness on predicting stock market fluctuation, and Yu and Huang (2021) stated that economic policy uncertainty led to stock market fluctuations.

This research uses the Fama and MacBeth (1973) regression framework to empirically test the relationship between stock return volatility, environmental uncertainty, and currency uncertainty. The Fama–Macbeth method has been widely used in empirical studies of stock pricing. Therefore, a cross-sectional regression is used to estimate the parameters related to the companies. Thus, the research model is in the form of Equation (1):

$$FSRV_{i,t} = \alpha + \beta_{1,t}EU_{i,t} + B_{2,t}EU_{i,t-1} + \beta_{3,t}EPU_{i,t} + B_{4,t}EPU_{i,t-1} + \gamma_t' X_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $i = 1, \ldots, N$, is company, $t = 1, \ldots, T$ indicates time, *FSRV* represents the stock return volatility, *EU* is the environmental uncertainty index, *EPU* stands for the currency uncertainty index, and *X* is the vector of control variables.

To calculate the stock return volatility for a specific company in the PPS industries, a standard method based on the R^2 statistic of the market regression model is used (Chen et al., 2007; Chang et al., 2014). In this regard, for company *i* at time *t*, Equation (2) is considered.

$$R_{i,j} = \gamma_{i,0} + \gamma_{i,1}R_{m,j} + \varepsilon_{i,j} \quad (2)$$

where $R_{i,j}$ indicates the return of company i at interval j (at time t) and $R_{m,j}$ is the market's return at interval j. Now, the return volatility of a particular company in the PPS industry is calculated in the form of Equation (3):

$$FSRV_{i,t} = log\left[\frac{\left(1 - R_{i,t}^2\right)}{R_{i,t}^2}\right] \tag{3}$$

where $R_{i,t}^2$ is the square of R statistic in Equation (3) for company i at time t. $FSRV$ provides unexplained return volatility after considering the effect of market returns.

In today's global era, environmental conditions have caused organizations to experience chaotic and uncertain situations as an open social system. In such conditions, focusing on the concept of uncertainty is very important (Laguir et al., 2022). Since managers react to the environment in which they operate, they are flexible and use professional opinions, so they adopt different strategies to deal with environmental uncertainties. Environmental uncertainty is defined as the rate of variability in the external environment of organizations, which includes significant customers, competitors, government laws, and labor unions (Habib et al., 2021). The environmental uncertainty is measured in terms of the coefficient of sales variation following Arieftiara et al. (2017).

$$CV(S_i) = \frac{\sqrt{\sum_1^t \frac{(S_i - \bar{S})^2}{t}}}{\bar{S}} \qquad ; \qquad EU_{it} = CV(S_i) \tag{4}$$

where $CV(S_i)$ is the coefficient of sales variation, EU_{it} indicates the variable of environmental uncertainty, S_i represents the number of sales and $\bar{S}$ is the company's average sales during the studied period.

Also, according to the research of Aizenman and Binici (2016), the currency market pressure criterion is used as a suitable index of currency market fluctuations to measure the imbalance of the economy and the conditions of economic uncertainty. In this regard, the standard currency market pressure criterion is used in the form of Equation (5):

$$EPU_t = \frac{e_t - e_{t-1}}{e_{t-1}} - \frac{ir_t - ir_{t-1}}{ir_{t-1}} \tag{5}$$

where EPU is currency market pressure, e denotes the exchange rate, and ir is foreign exchange reserves minus gold reserves. It should be mentioned that the currency market pressure index measures the amount of exchange rate change needed to remove the pressure on the currency market in the central bank, which may have a positive or negative value. The negative sign indicates an intense pressure and a decrease in the domestic currency value, and the positive sign indicates an increase in the domestic currency value; the number zero indicates no pressure in the currency market.

Here, following Amihud (2002) and Shamsoddini et al. (2017), the control variables vector includes the logarithm of average volume (VOL), the logarithm of stock price (PRC), and return on assets (ROA). Further, the lag of FSRV, VOL, and RET is considered in the control variables to consider short-term dynamics. As a result, the research model is presented in Equation (6):

$$FSRV_{i,t} = \alpha + \beta_{1,t}EU_{i,t} + B_{2,t}EU_{i,t-1} + \beta_{3,t}EPU_{i,t} + B_{4,t}EPU_{i,t-1} + \gamma_1'VOL_{i,t} + \gamma_2'VOL_{i,t-1} + \gamma_3'PRC_{i,t} + \gamma_4'RET_{i,t} + \gamma_5'RET_{i,t-1} + \gamma_6'FSRV_{i,t-1} + \varepsilon_{i,t} \quad (6)$$

3. Methodology

The current research is a multiple correlation research; it is also post-event research because it first examines the correlation between several variables and then takes data from past events. The statistical population of the research includes all PPS-listed companies in TSE that were active in the stock exchange from the beginning of 2012 to the end of 2021 (for 10 years). In this research, the screening method is used for sampling. For this purpose, three limiting criteria are considered:

- The company was listed on the TSE before 2012 and should be active on the stock exchange until 2022;
- The company does not change its fiscal year during the research period;
- Company financial information is available, and finance companies are excluded.

After considering the above criteria, 13 companies were left as research samples: Tabriz Oil Refinery, Bandar Abbas Oil Refining, Behran Oil, Isfahan Oil Refinery, Oil Industry Investment, Parsian Oil and Gas Development Group, Shazand Petrochemical, Pardis Petrochemical, Fan Avaran Petrochemical, Shiraz Petrochemical, Iran Chemical Industries Investment, Kermanshah Petrochemical Industries, and Petrochemical industries Investment. The data were gathered from the information website of the TSE and referred to the financial statements, notes, and reports of the PPS companies.

In the following, after providing the descriptive statistics table, Equation (4) is estimated using EViews software using the generalized method of moments (GMM) method with a constant.

4. Results

The definition of research variables is presented in Table 1

Table 1

Definition of Research Variables

Variable	Definition
Return volatility	It equals the stock return above the risk-free rate scaled by the FSRV.
Environmental uncertainty	It is the rate of variability in the external environment of organizations, measured in terms of the coefficient of sales variation.
Currency uncertainty	It is the sum of exchange rate depreciation and reserve outflows, and the currency market pressure criterion scales it.
Economic uncertainty	A situation in which the future economic environment is challenging to predict, and there is a high degree of risk. It is scaled by a composite index with (G)ARCH model.
Volume	It is the total quantity of shares for a specified security during a set period.
Stock price	It refers to the current price that a share of stock is trading for on the market.
Return on assets	The ROA is calculated by dividing a company's net income by its total assets.

The descriptive statistics of the research variables are presented in Table 2.

Table 2

Descriptive statistics of research variables

Variable	Average	Middle	Largest	Smallest	Standard deviation
Return volatility	0.104	0.051	0.549	–0.602	0.073
Environmental uncertainty	0.126	0.052	0.990	0.001	0.086
Currency uncertainty	0.034	0.035	0.064	–0.254	0.012
Economic uncertainty	0.521	0.438	0.990	0.001	0.192
Volume	6.770	6.263	7.145	6.185	1.218
Stock price	3.143	3.049	3.458	2.806	1.013
Return on assets	0.391	0.378	0.471	0.190	0.054

Here, the classic assumptions of linear regression are tested. As observations are more than 30, according to the law of large numbers, the normality of model errors can be approved. The Wooldridge test is used to examine the serial correlation. As the test p-value is more than 0.05, it can be concluded that there is no serial correlation problem. The Brush-Pagan test is used to investigate the assumption of heteroscedasticity; as the test p-value is less than 0.05, it can be concluded that the heteroscedasticity problem exists. The GMM estimator is used here to fix the heteroscedasticity problem, and the variance inflation factor (VIF) test is used to investigate the multicollinearity. As the amount of test statistics for all independent and control variables is less than 5, it can be concluded that there is no multicollinearity problem.

Before estimating the regression model, the co-integration of variables should be checked. The co-integration tests are used for this goal. The test results are tabulated in Table 3, which shows that all variables are co-integrated.

Table 3

The results of the co-integration tests

Co-integration test	Statistics	Prob.
Levin, Lin, and Chu	–116.24	0.000
Im, Pesaran, and Shin	–162.78	0.000
ADF-Fisher Chi^2	1358.21	0.000
PP - Fisher Chi^2	1182.23	0.000

Finally, Equation (6) is estimated using the GMM, and the results of this test are presented in Table 4. The results confirm the model's goodness of fit at 99% significant levels.

The first hypothesis: Environmental uncertainty leads to the intensification of stock return volatility in PPS companies.

The results show that the p-value of the environmental uncertainty variable (0.037) is less than 0.05, its statistic is greater than ±1.96, and its coefficient is positive. Accordingly, a positive and significant relationship exists between environmental uncertainties and stock return volatility. In other words, ecological uncertainty intensifies stock return volatility in PPS companies; therefore, the first research hypothesis is confirmed.

Table 4

The results of the regression model

$$\mathbf{SRV_{i,t} = \alpha + \beta_{1,t}EU_{i,t} + B_{2,t}EU_{i,t-1} + \beta_{3,t}EPU_{i,t} + B_{4,t}EPU_{i,t-1} + \gamma_1'VOL_{i,t} + \gamma_2'VOL_{i,t-1} + \gamma_3'PRC_{i,t} + \gamma_4'RET_{i,t} + \gamma_5'RET_{i,t-1} + \gamma_6'FSRV_{i,t-1} + \varepsilon_{i,t}}$$

Variable	Symbol	Coefficient	Standard deviation	t Statistic	Prob.
Intercept	C	–0.143	0.031	4.496	0.000
Environmental uncertainty	$EU_{i,t}$	0.017	0.007	2.079	0.037
Environmental uncertainty interval	$EU_{i,t-1}$	–0.077	0.008	–2.407	0.016
Currency uncertainty	$EPU_{i,t}$	0.022	0.018	–2.655	0.008
Currency uncertainty interval	$EPU_{i,t-1}$	–0.009	0.0006	1.973	0.048
Volume	$VOL_{i,t}$	–0.002	0.0008	2.916	0.003
Volume interval	$VOL_{i,t-1}$	–0.001	0.0006	1.946	0.138
Stock price	$PRC_{i,t}$	–0.003	0.0009	–5.174	0.000
Return on assets	$RET_{i,t}$	0.012	0.009	4.300	0.000
Return on assets interval	$RET_{i,t-1}$	–0.001	0.0008	–2.013	0.044
Return volatility interval	$FSRV_{i,t-1}$	0.011	0.010	2.617	0.009
R^2		F Statistic	Prob.	Wald Test	
0.613		20.465	0.000	193.82 (0.000)	

The second hypothesis: Currency uncertainty leads to the intensification of stock return volatility in PPS companies.

The results show that the p-value of the currency uncertainty variable is less than 0.05, and its coefficient is positive. Accordingly, a positive and significant relationship exists between currency uncertainties and stock return volatility. In other words, currency uncertainty intensifies stock return volatility in PPS companies; therefore, the second research hypothesis is confirmed.

The third hypothesis: The stock return volatility of PPS companies in the past period has a positive effect on their current period value.

The past period stock return volatility coefficient is positive, and its p-value (0.009) is less than 0.05. Therefore, it can be acknowledged that the stock return volatility of PPS companies in the past period positively affects their value in the current period.

The results show that environmental and currency uncertainty positively and significantly affect stock return volatility. The vital point is the negative effect of ecological and currency uncertainty in the past period on the stock return volatility in the current period. Moreover, there is a negative relationship between trading volume variables and stock return volatility because as the uncertainty of the market increases, traders are expected to move more toward the stocks of more reliable companies. The past period volume p-value is insignificant; therefore, its negative coefficient cannot be analyzed. The analysis of the negative coefficient of the price is similar to the effect of the exchange volume. According to Table 5, current stock earnings have a positive effect, and past period stock earnings have a negative impact on stock return volatility. As expected, stock return volatility in the past period

positively impacts stock return volatility in the current period, implying that the greater volatility of returns in the past period intensifies the stock return volatility in the current period.

4.1. Robustness of results

The economic uncertainty index has been used instead of environmental and currency uncertainty to strengthen the results. This index is a combined measure of government expenditures, tax revenues (as an indicator of the government's financial sector management), liquidity (as an indicator of the government's monetary sector management), and unofficial exchange rate (as an indicator of the government's foreign exchange sector management). The autoregressive conditional heteroscedasticity (ARCH) model is used to construct a composite economic uncertainty index. In recent years, autoregressive conditional heteroskedasticity models have been widely used by researchers to build a measure of uncertainty. Following Samsami and Ebrahimnejad (2020) and Mazinani and Mohammadian (2020), this research constructs a composite economic uncertainty index. Before estimating the (G)ARCH model, the OLS method should investigate the conditional variance heterogeneity for the error terms of the mean equation. The mentioned test checks whether the square of the error terms of previous periods can express the amount of error variance in the current period or not. As presented in Table 5, the significance of Fisher and Chi-square statistics shows that the error term of the mean equation has the problem of conditional variance heterogeneity, so the prerequisite for using the ARCH model is established.

Table 5

The results of the ARCH test

Index	F-Statistic	Prob. F	Obs* R^2	Prob. χ^2
Government expenses	33.716	0.000	26.272	0.000
Tax revenue	19.091	0.000	15.001	0.000
Liquidity	66.872	0.000	58.539	0.000
Unofficial exchange rate	16.183	0.000	14.982	0.000

In the next step, the number of optimal lags for ARCH and GARCH terms should be determined. With the help of the minimum amount of Akaike and Schwartz–Bayesian criteria, the ARCH (1) model was considered for government expenditures, tax revenues, and liquidity, and the GARCH (1, 2) model was considered for the unofficial exchange rate. Then, the variance of these models was extracted.

Table 6

Akaike and Schwartz–Bayesian information criterion for different combinations

Index	Criterion	(0,1)	(1,0)	(1,1)	(1,2)	(2,1)	(2,2)
Government expenses	Akaike	26.763	26.099	26.918	26.114	26.651	26.321
	Schwartz–Bayesian	26.891	26.291	26.995	25.635	26.870	26.673
Tax revenue	Akaike	25.882	25.091	25.421	25.680	25.172	25.690
	Schwartz–Bayesian	25.960	25.231	25.791	25.911	25.732	25.871
Liquidity	Akaike	35.726	35.183	35.448	35.626	35.320	35.007
	Schwartz–Bayesian	35.982	35.672	35.781	35.664	35.433	35.049
Unofficial exchange rate	Akaike	19.409	19.119	19.248	19.362	19.104	19.196
	Schwartz–Bayesian	19.550	19.293	19.546	19.633	19.382	19.563

As a rule, the coefficient of the importance of fluctuations in government policies will not be the same for financial information, so it is impossible to consider the same weight to combine fluctuations and create an index; for this purpose, the periodic element regression method is used. In this way, each of the variables used in constructing the economic uncertainty composite index is entered into the model separately, and the coefficient of determination of each model is specified. Then, according to Equation (7), the weight associated with each variable in constructing the uncertainty composite index is calculated:

$$C_J = \frac{R_J^2}{\sum_{J=1}^{4} R^2} \tag{7}$$

Next, to combine the four existing time series, according to Equation (8), the variances extracted in the previous step are set between zero and one, in which the most significant variance is assigned one and the smallest variance is zero.

$$A = \frac{X_t - X_{Min}}{X_{Max} - X_{Min}} \tag{8}$$

Finally, to create a composite economic uncertainty index, a four-time series of homogenized variances in the previous step are combined according to the calculated weights.

The robustness results are presented in Table 7.

Table 7

Robustness of research results with economic uncertainty index

$$\mathbf{FSRV_{i,t} = \alpha + \beta_{1,t}ECOU_{i,t} + B_{2,t}ECOU_{i,t-1} + \gamma_1'VOL_{i,t} + \gamma_2'VOL_{i,t-1} + \gamma_3'PRC_{i,t} + \gamma_4'RET_{i,t} + \gamma_5'RET_{i,t-1} + \gamma_6'FSRV_{i,t-1} + \varepsilon_{i,t}}$$

Variable	Symbol	Coefficient	Standard deviation	t Statistic	Prob.
Intercept	C	–0.143	0.011	–5.061	0.000
Economic uncertainty	$ECoU_{i,t}$	0.003	0.0007	2.091	0.036
Economic uncertainty interval	$ECOU_{i,t-1}$	–0.001	0.0006	–2.291	0.021
Volume	$VOL_{i,t}$	–0.050	0.019	4.183	0.000
Volume interval	$VOL_{i,t-1}$	–0.009	0.002	2.320	0.020
Stock price	$PRC_{i,t}$	–0.011	0.005	3.466	0.000
Return on assets	$RET_{i,t}$	0.035	0.011	4.514	0.000
Return on assets interval	$RET_{i,t-1}$	–0.001	0.007	–2.343	0.019
Return volatility interval	$FSRV_{i,t-1}$	0.014	0.009	7.565	0.000
R^2		F Statistic	Prob.	Wald Test	
0.582		57.917	0.000	295.13 (0.000)	

The results of the robustness test confirm the results of the leading research model. The probability of the F statistic is smaller than 0.05, affirming the goodness of fit of the robustness model. Also, according to Durbin Watson's statistics, the model has no autocorrelation. Like the primary model, the relationship

between economic uncertainty and stock returns volatility of PPS companies is positive and significant. The financial uncertainty in the past period leads to the reduction of stock return volatility in the current period, which can be related to the risk-averse behavior of market investors. Moreover, the lag of stock return volatility has a positive and significant effect on its current period value.

5. Discussion and conclusions

When uncertainty is high in the market, traders are expected to move more toward stocks of safer companies. Forecasts of earnings and returns significantly impact stock investors' incentives and, thus, stock prices. The primary purpose of this research is to investigate if uncertain market conditions, such as environmental, currency, and economic uncertainties, affect the stock return volatility of PPS companies on the TSE. Examining stock returns volatility may help analyze market participants' motivations.

The findings of the first hypothesis of the research showed that environmental uncertainty intensifies the stock returns volatility of PPS companies. The results of this hypothesis are consistent with the findings of Raiiszade and Ramezani (2018), Geng et al. (2021), and Wang et al. (2023). Moreover, the findings of the second hypothesis showed that currency uncertainty intensifies the stock returns volatility of PPS companies. The results of this hypothesis are also consistent with the findings of Bekiros and Uddin (2017), Kocaarslan and Soytas (2021), and Bachori et al. (2022). The critical point is that the lag of environmental and currency uncertainties has a negative effect on stock returns volatility in the current period. When traders trade based on their private information, they do not use homogeneous details, but after time, they realize their mistakes and find out the vital information that was not clear to them. This leads to the formation of traders' efforts to obtain more information about past periods. Therefore, using methods such as screening or paying more attention to market signs leads to forming conservative expectations, which reduces stock return volatility.

Furthermore, results showed that the effect of stock price and trading volume on stock return volatility is negative and significant. Usually, the error rate is expected to increase with the increased volume of transactions, and the stock return volatility will rise. Since the TSE is a new market with a relatively small amount of capital, there is no clear information about the market's performance, and private information significantly impacts the market's functions. Therefore, most traders are risk-averse in the market. As the sample of this research includes famous and stable companies in the market, when traders expect that a particular company's financial position is stable, the volume of transactions moves toward the company's stock, and this can be the reason for the reverse effect of the volume of transactions on stock return volatility of PPS companies. Since the selected companies are well-known, an increase in stock price is expected to decrease stock return volatility. It is important to note that in the stock market, smaller companies usually have a higher risk; therefore, it is generally expected that the stock return volatility of these companies is higher than that of the others.

It is expected that with increasing stock returns, the return volatility of that stock also increases. It can be stated that when the previous period's stock returns are high, two sets of positive and negative expectations are formed around this stock. The first is optimistic expectations, which make traders hope to repeat the previous performance and increase the trading volume. The second one is the pessimistic expectations, which state that traders are pessimistic about the continuation of stock returns in the current period due to the fluctuations and bubbles of TSE. The combination of these two expectations has led to the formation of conservative expectations, which predict a little bit of a decrease in stock return volatility. As expected, the findings of the third hypothesis of the research show that stock return volatility of the past period has a positive effect on stock return volatility in the current period. The results of this hypothesis are consistent with the findings of Case et al. (2012) and Dutta (2017). In

addition, the results of the robustness test of the research model show that economic uncertainties lead to the intensification of stock return volatility; the result is consistent with the findings of Liao et al. (2021).

Advances in financial theories and economic modeling have increased confidence in this field's ability to overcome future market uncertainties and moderate the systematic impact of dangerous levels of uncertainty in financial markets. Future research suggests that the interactive effect of uncertainties on investors' decisions affected by stock returns should be studied.

Nomenclature

$CV(S_i)$	Coefficient of sales variation
EPU	Currency uncertainty index
EU	Environmental uncertainty index
FSRV	Stock return volatility
PRC	Logarithm of stock price
R	Return index
ROA	Return on assets
VOL	Logarithm of average volume
X	Vector of control variables

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