



The Role of Market Sentiment and Economic Policy Uncertainty on the Excess Returns of Stock Portfolios: Evidence from Iran

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Abstract

The market sentiment and economic policy uncertainty in the capital market can have a significant impact on stock returns. Investors expect to achieve excess returns over bank deposit interest rates (as the risk-free rate) by investing in the stock market and accepting risks. Therefore, this study examines the relationship between market sentiment, economic policy uncertainty, and excess returns of investment portfolios on the Tehran Stock Exchange. To calculate the economic policy uncertainty and market sentiment index (based on the proposed composite index by Baker and Wurgler, 2006), the study employs principal component analysis (PCA) using the five-factor Fama-French variables along with the momentum factor. The research findings indicate that overall, the market sentiment index does not have a significant impact on the excess returns of stock investment portfolios. However, economic policy uncertainty has a positive and significant effect on excess returns. Furthermore, the study findings demonstrate that the impact of market sentiment and economic policy uncertainty on the excess returns of stock portfolios varies across different portfolios.

Keywords: economic policy uncertainty, excess returns, market sentiment.

JEL Classification: D80, E60, E70, G11, G18, G40, G41.

Introduction

One of the most important productive markets in the economy, especially in developing countries, is the capital market, which is the financial infrastructure for commercial, industrial, governmental, and private activities, and acts as a bridge between individual and institutional savers and capital-seeking enterprises. In this regard, the capital market plays a fundamental and significant role in achieving sustainable development in any country. A developed and dynamic capital market will attract more funds from investors to fundamental and productive economic

activities, and this in turn will cause increased gross domestic product (GDP) and employment in the economy.

On the other hand, the main objective of investors in the capital market is to achieve reasonable returns. Financial theories have presented two different approaches in recent decades: the first approach, known as the neoclassical approach, assumes that investors are rational and their demand for high-risk assets is based on prior information (Liston and Herath, 2012). They also believe that traders who act rationally seek to take advantage of mispricing opportunities that have removed emotional influences (Tran and Nguyen, 2013). Accordingly, changes in stock prices are related to systematic changes in the company's fundamental values, and irrational investor behavior does not affect returns. Even if some investors create shocks through speculative and irrational trading in supply and demand, rational arbitrageurs neutralize the effects of these shocks, and stock prices remain at fundamental levels. Over time, after conducting various studies, researchers have discovered many anomalies and inconsistencies in financial markets that cannot be justified using the theories related to efficient markets. This has led to the emergence of a behavioral revolution in financial discussions. The second approach is the behavioral finance perspective, which suggests that some changes in security prices have no fundamental reason and that the emotional biases of investors play a significant role in this regard (Kim and Ha, 2010). If investors are asked about their investment objectives, most of them will give a simple answer that they seek profit. Although their response seems clear, it is likely not the whole truth. They usually seek to satisfy those inner feelings (Chen et al., 2012). The specific characteristics of the market, the insufficient knowledge of investors about the market, and behavioral biases have led to the inefficiency and lack of dynamism in Iran's capital market. Investors, due to their insufficient knowledge of these factors, make mistakes in their investment decisions, which in turn provides a basis for their exit from the capital market.

On the other hand, economic policy uncertainty is a relatively new concept that has gained widespread attention in political and economic literature since the financial crises in Latin America, Southeast Asia, Russia, and Turkey in the late 1990s. One of the aspects of economic stability is economic policies that play an important role in the country's economy in such a way that if there is uncertainty about economic policies, it causes economic actors to become uncertain about the future of the economy. After that, capital owners will no longer be able to make decisions for the future, including investment, and will face problems in allocating their assets in the money market and capital market. This issue was first examined

by Frank H. Knight (1921), who defined economic uncertainty as the inability of persons to predict the occurrence of events. Economic uncertainty also increases the possibility of aggravating information asymmetry between economic actors. These conditions cause the allocation of economic resources to change and the state of macroeconomic variables to be affected, and depending on the initial conditions before the occurrence of uncertainties, a different perspective on economic conditions is put forward by economic agents. Empirical studies suggest that developing countries are more exposed to exogenous shocks (Koren and Tenreyro, 2007; Loayza et al., 2007).

In the analysis of the stock market, a crisis in a market or an economy may trigger investors to sell stocks, because the stock value is affected by various factors such as company performance, dividend yield, exchange rate, money supply, employment, and uncertainty in economic and political conditions. Pastore and Veronesi (2012; 2013) report that higher policy uncertainty leads to a decrease in stock prices contemporaneously and higher expected future returns. Economic conditions after the coronavirus pandemic and current international tensions between some countries have caused developing countries to witness high inflation. For this reason, their central banks have increased bank interest rates through contractionary policies to control inflation and prevent the fall in the value of its national currency. The increase in bank interest rates has caused investors to conduct more investigation to obtain excess returns. The close relationship between financial markets and macroeconomic variables leads not only investors and traders in these markets but also researchers to pay special attention and sensitivity to these changes (Karimzadeh et al., 2021).

According to the mentioned content, investment efficiency, investor sentiments, economic policy uncertainty, stock price, and obtaining excess returns are important topics in economics and finance, and the analysis of these factors has special importance. In this regard, attention should be paid to indicators such as the level of influence of sentiment in the stock exchange. The reaction of investors in the stock market affects the decision-making process, the allocation of monetary resources, the pricing, and the evaluation of the returns of the companies. Uncertain conditions and cognitive errors that are rooted in human psychology, cause investors to make mistakes in forming their expectations and as a result show certain performances when investing in the financial markets. Therefore, the main question of the current research is what is the relationship between investor sentiment, the uncertainty of economic policy, and the returns on stock portfolios? This article is organized as follows: Section 2 provides the literature review.

Section 3 presents the methodology and the related data. Section 4 shows the empirical results and conclusions are provided in Section 5.

Literature

Market Sentiment

According to the literature, market sentiment can be described as the aggregate of public opinions, views, feelings, attitudes, or general outlooks of market activists and actors that make up market psychology at any given point in time. Market sentiment, also called "investor sentiment," is not always based on fundamentals. Behavioral finance models seek to explain some financial phenomena in which factors do not seem completely rational or reasonable (Barberis and Thaler, 2003). Therefore, it is expected that investor sentiment plays an important role in describing the performance of the stock market (Baker and Wurgler, 2006).

In this way, researchers have sought to understand and explain the effects of human emotions in the decision-making process regarding investment. Yu and Yuan (2011) believe that in times when investors are optimistic about the future of the market, or in other words, investor sentiment is high, more irrational transactions are made in the market, which reduces the efficiency of the market and, as a result, exacerbates mispricing. Ling et al. (2014) investigated the relationship between investor sentiment and stock returns in both public and private markets. Their findings indicated that investor sentiment has played a continuous role in deviating asset prices from the fundamental value and hinders the use of opportunities by knowledgeable arbitrageurs in private markets compared to public markets.

Kim et al. (2017) report that when the market is booming, investors tend to buy stocks at even higher prices than their true value.

Aghababaei and Madani (2021) find that investor sentiment significantly affects the increase in stock return synchronicity. The findings also showed that the coefficients of positive and negative sentiments are not significantly different and as a result, positive and negative sentiments symmetrically affect the increase in stock return synchronicity. Aghababaei and Aliyan (2022), by examining the effect of investor sentiment on market liquidity and its volatility, state that positive shocks have a greater impact than negative shocks. Since positive market shocks reduce market volatility, it is possible to increase market liquidity and reduce market liquidity volatility by creating optimistic (positive) sentiments. Lin (2023) finds that investor sentiment has a significant and positive impact on firm innovation. Specifically, investor sentiment alleviates financing constraints and enhances R&D

investment, thereby positively impacting firm innovation. Abdosalami et al. (2024) examined the asymmetric relationship between investor sentiment and market returns on the Tehran Stock Exchange. According to the findings of this study, the joint probability distribution function between the Tehran Stock Exchange market and investor sentiment has two regimes, namely Regime 0 (bull market with optimistic sentiment) and Regime 1 (bear market with pessimistic sentiment). The study's findings indicate that the increase in investor sentiment during a bull market has no significant effect on the increase in stock returns and that the stock market influences investor sentiment.

Researchers use different methods to measure investor sentiment. There are three categories for measuring investor sentiment. The first group consists of survey-based measures that directly measure market sentiment. An example of this group is the Michigan Consumer Sentiment Index (MCSI). The second category includes indirect measures based on financial data rather than direct surveys. Examples of this group include measures of the Buy-Sell Imbalance Index, Barron's Confidence Index, and the Equity Market Sentiment Index (EMSI). The third category comprises composite measures, with the most well-known being the composite index proposed by Baker and Wurgler (2006).

Economic Policy Uncertainty (EPU)

Economic policies include monetary and financial, regulatory and tax affairs and the environments in which companies conduct their activities. In this way, economic policy uncertainty (EPU) refers to the instability caused by changes in the government's economic policies. This uncertainty may cause delays or changes in important decisions such as employment, investment, consumption, savings by companies, and other economic factors (Kang, 2015). According to Zhu (2015), economic policy uncertainty is an important and influential variable on the financial market and various assets. Ettayib (2022) examined the impact of COVID-19 and oil prices on economic policy uncertainty in the US, UK, and Brazil by using the panel-ARDL approach. The results show that economic policy uncertainty is positively correlated with COVID-19; this indicates that an increase in COVID-19 can enhance economic policy uncertainty, meaning that an increase in new cases raises the uncertainty of economic policy in the US and UK in the short-run and long-run. The results also show that economic policy uncertainty is negatively correlated with oil prices.

Many empirical studies have been conducted on the effect of economic policy uncertainty on the stock market. Antonakakis et al. (2013) showed that

increasing uncertainty in policy increases uncertainty in the stock market. Chen et al. (2017) believe that the process that affects stock prices through economic policy uncertainty is investors' expectations. Investors are uncertain about the timing, content, and potential impact of policy decisions, and how investors adjust their expectations will affect stock prices.

The latest findings of recent economic models also confirm the negative effects of uncertainty on the stock market. For example, Yan and Zhang (2020) state that companies experience a fall in stock prices as economic policy uncertainty increases; therefore, the uncertainty of economic policies has a positive and significant relationship with the risk of falling stock prices. Loni et al. (2021) show that the effect of the combined index of economic policy uncertainty as well as all uncertainty variables on corporate investment is negative and significant. In addition, the results showed that monetary policy uncertainty had a greater impact on corporate investment than fiscal policy uncertainty.

The results of studies on the effect of economic policy uncertainty on the stock market indicate two completely different effects in the present (current period) and the future. The study of Batabyal and Killins (2021) shows that economic policy uncertainty had significant negative effects on the Canadian stock market returns and the increase of this uncertainty in the current period has increased the market volatility and reduced the returns; however, based on studies by Kundua and Paul (2022), increasing the uncertainty of economic policies increases yields in the future period (because investors demand higher yields as compensation for uncertainty risk) and reduces market volatility. Yuan et al. (2022) have also shown that the increase in the uncertainty of economic policies has a negative effect on the stock markets of BRIC countries.

The review of studies shows the effective role of two variables, market sentiment and economic policy uncertainty, on stock returns. However, what distinguishes this research from other studies is the simultaneous investigation of the effect of two variables, market sentiment and economic policy uncertainty, on the excess returns of stock portfolios. Considering Iran's turbulent economic situation in recent years, as well as its capital market, which often experiences a lot of fluctuations under the influence of investors' emotions, it can yield useful insights in this regard.

In recent years, with the growth and expansion of Iran's capital market, this market has offered favorable returns compared to other markets. However, investing in this market also carries high risk. Therefore, investors need to be aware of potential market reactions in specific conditions, such as changes in market

sentiment. Additionally, considering that the government plays a major role in implementing economic policies, the fluctuations in economic variables significantly affect the stock market.

Moreover, the existence of long-term deposit interest rates (as a risk-free rate) in Iran has made this macroeconomic variable a competitor for stock market investments. As a result, market participants always use this rate as a benchmark for evaluating their investment performance. This research aims to examine the role of market sentiment and economic policy uncertainty in the excess returns of investment portfolios in the Tehran Stock Exchange. Therefore, the findings of this research will help market participants to make more informed decisions by identifying the factors affecting stock return volatility in different conditions. Economic policymakers will also gain awareness of how changes in economic policies, especially during sanctions and post-sanctions periods, can disrupt portfolio returns. Based on the research objective and the theoretical concepts and studies conducted by researchers in this area, the following hypotheses are proposed:

Hypothesis 1: Market sentiment has a positive and significant effect on the excess returns of stock portfolios in the Tehran Stock Exchange.

Hypothesis 2: Economic policy uncertainty has a negative and significant effect on the excess returns of stock portfolios in the Tehran Stock Exchange.

Data and Methodology

In this research, to investigate the relationship between variables and the effect of market sentiment and economic policy uncertainty on the excess returns of investment portfolios, the monthly data of 160 companies listed on the Tehran Stock Exchange over the period from April 2012 to March 2022 have been used. In addition, data on Iran's economy and capital market have been used to construct the two variables of market sentiment and economic policy uncertainty. The data for this research were obtained from the Central Bank of Iran's website and the database of the Securities and Exchange Organization of Iran.

Market Sentiment

This variable is calculated based on common changes in six underlying proxies for investor sentiment using the Principal Component Analysis (PCA) method, following Baker and Wurgler's (2006) sentiment index. Accordingly, investor sentiment is obtained using the following equation:

$$SENT_t = \beta_1 CEFD_t + \beta_2 TURN_t + \beta_3 NIPO_t + \beta_4 RIPO_t + \beta_5 P(D - ND)_t + \beta_6 S_t$$

In the above relation, $SENT_t$ is the market sentiment index at time t , $CEFD_t$ is the difference between the net asset value (NAV) of closed-end funds and their market unit prices, $TURN_t$ is a stock market turnover rate which is obtained by dividing the number of traded shares by the total number of company shares, $NIPO_t$ is the number of initial public offerings (IPOs) each month, $RIPO_t$ is the initial returns of IPOs, $P(D - ND)_t$ is dividend premium which obtained by the logarithm of the difference between the average of the market-to-book value ratios of companies that pay more 10% of dividends (the basis of 10% is because according to the laws of Iran, companies must pay at least 10% of dividends if they are profitable), S_t is corporate financing (the ratio of outstanding shares to total securities - stocks, and debt - issued).

Figure 1 shows investor sentiment in Iran's capital market. Alongside market-specific fluctuations, the investor sentiment index in Iran has become less trend-driven and more volatile due to structural changes in the market, such as modifications to the IPO process, the number and types of investment funds, and tax regulations related to capital raising. However, major market events, such as the 2013 crash and the extraordinary conditions of 2020, are reflected as historical highs and lows.

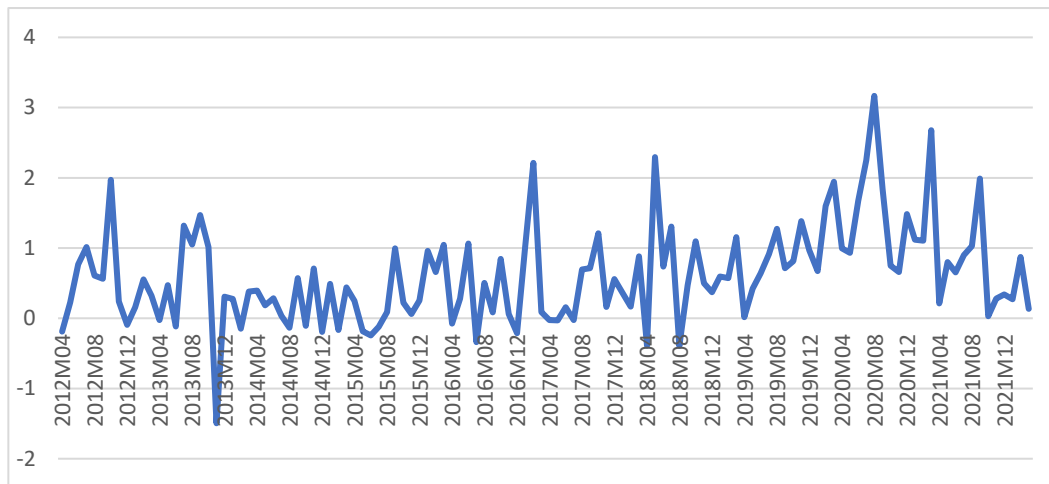


Figure 1. Trend of Market Sentiment Index In Iran's Capital Market (2012-2022)

Source: Research finding.

$$SENT_t = 0.11 * CEFD_t + 0.62 * TURN_t + 0.24 * NIPO_t + 0.11 * RIPO_t + 0.57 * P(D - ND)_t - 0.44 * S_t$$

The market sentiment index is constructed by weighting and examining six factors, including the closed-end fund discount, stock market turnover rate, the number of initial public offerings (IPOs) each month, the initial returns of IPOs, dividend premium, and share of equity issue.

Economic Policy Uncertainty (EPU)

Over the past four decades, Iran has been subject to varying degrees of economic and financial sanctions. As a result, its economy has faced severe and prolonged international restrictions, leading to economic instability. In this regard, the interest rate and the monetary base serve as key monetary policy variables; oil revenue fluctuations represent an important fiscal policy variable; the free-market exchange rate is a key foreign exchange policy variable; and the consumer price index reflects price changes in the goods and services market. These variables are used as the main indicators to examine Iran's economic policies. and according to prior studies, fluctuations in the above economic variables are important signs of uncertainty in a country's economic system. Using principal component analysis (PCA), this variable is calculated based on common variations in these five factors.

$$EPU = B_1 FOIL + B_2 MB + B_3 IR + B_4 CPI + B_5 ER$$

In the above relation, **EPU** is the economic policy uncertainty index, **FOIL** is the fluctuations in oil revenues that are the most important source of funding for Iran's budget, **MB** is monetary base which is notes and coins in public circulation, people's deposits with banks, and all the money saved by commercial banks in the central bank, **IR** is Iran's interbank interest rate, **CPI** is consumer price index: this index is the most widely used measure of inflation and in some cases the most widely used measure of the effectiveness of the government's economic policies. **ER** is the Free market's exchange rate which is the buying and selling rate of currency in the informal market.

This index is designed to reflect the level of economic policy uncertainty by capturing changes in these fundamental economic factors and weighting them accordingly. When the resulting index is examined, it aligns closely with major economic events in Iran.

Figure 2 presents Iran's economic policy uncertainty index. The lowest level of the index occurred in early 2012, prior to the intensification of international sanctions. Furthermore, the challenges surrounding the JCPOA (Joint Comprehensive Plan of Action) in 2018 and the disruptions caused by the COVID-19 pandemic in 2020 are clearly reflected in the index and correspond to significant upward movements.

$$EP = 0.19 * FOIL + 0.55 * MB - 0.21 * IR + 0.55 * CPI + 0.54 * ER$$

The Economic Policy Uncertainty (EPU) index is a composite index composed of five factors: oil revenues of the country, monetary base changes, Iran's interbank interest rate, consumer price index, and exchange rate in the free market.

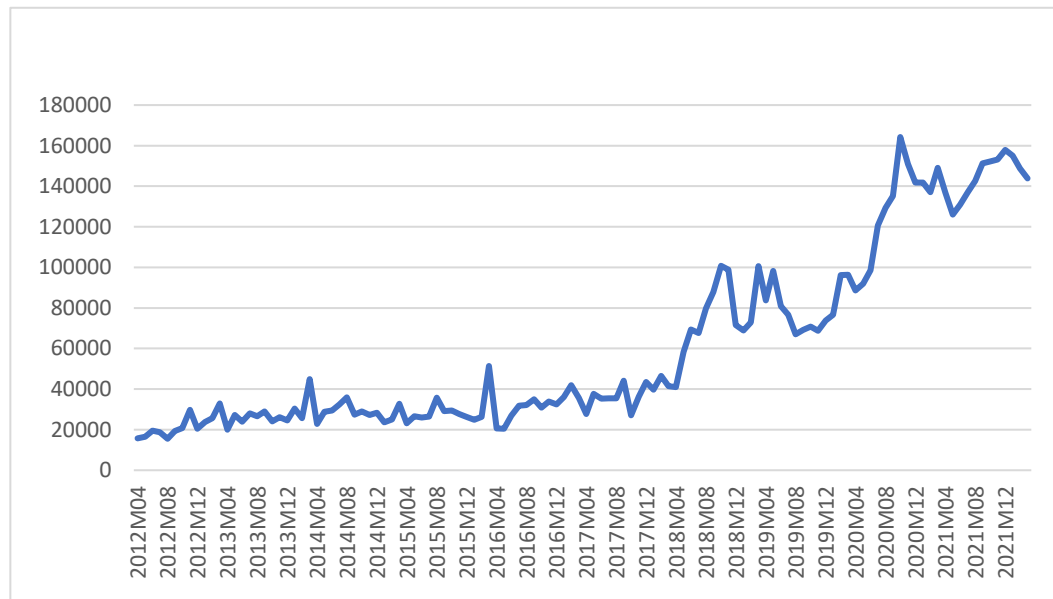


Figure 2. The Trend of Economic Policy Uncertainty Index in Iran's Economy (2012-2022)

Source: Research finding.

Control Variables

In this research, the control variables were selected according to Fama-French (2015) and Carhart (1997) research models.

MKT (Market risk premium factor): represents an excess return on the market portfolio. To calculate this variable, market return minus risk-free interest rate (Interest Rate on Deposit).

$$(R_{mt} - R_{ft})$$

SMB (Size factor): To calculate this variable, companies are classified into two categories, Big (B) and small (S); Also, companies are classified into three categories based on the ratio of book value to market value: high (H), medium (M) and low (S).

$$SMB = \frac{1}{3} \left(\frac{S}{L} + \frac{S}{M} + \frac{S}{H} \right) - \frac{1}{3} \left(\frac{B}{L} + \frac{B}{M} + \frac{B}{H} \right)$$

HML (Value factor): It is calculated from the difference between the average returns of companies with a high book value to market value ratio and companies with a low book value to market value ratio for each month.

$$HML = \frac{1}{2} \left(\frac{S}{H} + \frac{B}{H} \right) - \frac{1}{2} \left(\frac{S}{L} + \frac{B}{L} \right)$$

RMW (Profitability factor): It is calculated from the difference between the average returns of high-profitable companies and low-profitable companies. Companies are classified into two categories high profitability (RO) and low profitability (WE) in terms of profitability (the ratio of operating profit to average assets).

$$RMW = \frac{1}{2} \left(\frac{S}{RO} + \frac{B}{RO} \right) - \frac{1}{2} \left(\frac{S}{WE} + \frac{B}{WE} \right)$$

CMA (Investment factor): It is calculated from the difference between the average return of companies with high investment (aggressively) and companies with low investment (conservatively). Companies are classified into two categories high Investment (AG) and low Investment (CO).

$$CMA = \frac{1}{2} \left(\frac{S}{CO} + \frac{B}{CO} \right) - \frac{1}{2} \left(\frac{S}{AG} + \frac{B}{AG} \right)$$

MOM (Momentum factor): It is calculated from the difference between the average return of the winner portfolio and the loser portfolio. Stocks are ranked based on their 1-year performance from high to low, then companies that are in the top 50% of their past 12-month period are called the winner portfolio (W), and stocks whose past 1-year returns are in the bottom 50% are called the loser portfolio (LO).

$$MOM = \frac{1}{2} \left(\frac{S}{W} + \frac{B}{W} \right) - \frac{1}{2} \left(\frac{S}{LO} + \frac{B}{LO} \right)$$

The results of the descriptive statistical analysis of the variables are presented in Table 1.

Table 1. Descriptive Statistics of the Variables

Variable	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis	Jarque-Bera prob
RP	0.023	-0.001	0.738	-0.357	0.121	1.078	5.16	0.000
SENT	0.61	0.53	3.167	-1.495	0.694	0.826	4.66	0.000
EPU	10.765	10.486	12.009	9.649	0.689	0.423	1.788	0.000
MKT	0.025	0.009	0.496	-0.213	0.101	1.663	7.926	0.000
SMB	-0.002	-0.001	0.147	-0.203	0.05	-0.205	5.105	0.000
HML	-0.035	-0.027	0.081	-0.294	0.053	-1.236	7.14	0.000
RMW	0.005	0.005	0.157	-0.139	0.043	-0.099	5.274	0.000
CMA	-0.006	-0.008	0.116	-0.101	0.036	0.534	4.680	0.000
MOM	0.067	0.057	0.289	-0.012	0.048	1.342	6.078	0.000

Source: Research finding.

Given that the probability value of the Jarque–Bera statistic for all variables is less than 5%, none of the variables in this study follow a normal distribution.

Portfolio Classification

After constructing the market sentiment index, stocks are sorted into 10 equally weighted portfolios following the methodology of Hilliard et al. (2019), and the correlation between market sentiment and each portfolio is then examined. To form the portfolios, the monthly return of each stock is first calculated. Next, the correlation between the market sentiment index and each stock's return is estimated over a 24-month rolling window. Stocks are then ranked in ascending order according to the correlation coefficient and allocated to ten equally weighted portfolios. Consequently, Portfolio 1 exhibits the lowest correlation with market sentiment, while Portfolio 10 exhibits the highest.

To enhance the precision of the analysis, Portfolio 1 (lowest correlation) and Portfolio 10 (highest correlation) are each further subdivided into three sub-portfolios (A, B, and C). Within each of these portfolios, sub-portfolio A displays the lowest sensitivity and sub-portfolio C the highest sensitivity to market sentiment. In the following, to accurately examine the spread between the return of portfolio 1 and portfolio 10, the spread between portfolio C10 and A1 (the sub-portfolio with the highest correlation in the highest portfolio and the sub-portfolio with the lowest correlation in the lowest portfolio) is calculated. Finally, after portfolio formation, the monthly excess return of each portfolio is obtained by

subtracting the monthly risk-free rate (proxied by the bank deposit rate) from the respective portfolio return.

Descriptive statistics for the returns of the various portfolios are reported in Table 2.

Table 2. Descriptive Statistics of Portfolios

Portfolio	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis	Obs
P1	0.015	-0.001	0.561	-0.188	0.111	1.350	6.859	120
P1A	0.009	-0.027	0.738	-0.312	0.143	1.698	8.215	120
P1B	0.021	-0.007	0.469	-0.223	0.116	0.842	3.989	120
P1C	0.014	-0.002	0.494	-0.330	0.128	0.824	4.507	120
P2	0.015	-0.001	0.354	-0.201	0.108	0.959	3.561	120
P3	0.027	0.011	0.417	-0.176	0.108	0.906	3.927	120
P4	0.022	-0.004	0.425	-0.182	0.115	0.926	3.570	120
P5	0.020	-0.004	0.577	-0.220	0.120	1.313	6.203	120
P6	0.018	-0.004	0.378	-0.221	0.107	0.757	3.766	120
P7	0.015	-0.001	0.541	-0.188	0.113	1.430	6.553	120
P8	0.019	-0.003	0.357	-0.225	0.112	0.969	3.935	120
P9	0.024	-0.007	0.446	-0.232	0.124	1.305	4.864	120
P10	0.037	0.002	0.413	-0.193	0.117	1.028	4.092	120
P10A	0.031	0.000	0.588	-0.225	0.143	1.234	4.918	120
P10B	0.024	-0.008	0.437	-0.332	0.128	1.049	4.976	120
P10C	0.058	0.027	0.486	-0.252	0.153	0.759	3.277	120
P10-P1	0.009	0.000	0.188	-0.191	0.072	0.191	2.861	120
P10C-P1A	0.036	0.016	0.497	-0.357	0.134	0.098	3.527	120

Source: Research finding.

As seen in Table 2, Portfolio A1 has the lowest average return, and Portfolio C10 has the highest average return.

Regression Model

In this research, the excess returns of portfolios are considered as dependent variables, and market sentiments ($SENT_t$) and uncertainty of economic policies (EPU_t) as independent variables.

$$R_{pt} - R_{ft} = \alpha_i + \beta_1 SENT_t + \beta_2 EPU_t + \beta_3 MKT_t + \beta_4 SMB_t + \beta_5 HML_t + \beta_6 RMW_t + \beta_7 CMA_t + \beta_8 MOM_t + \epsilon_{it}$$

The above model seeks to capture the relationship between the excess returns of portfolios sorted by market sentiment and economic policy uncertainty. For this purpose, the model is specified on the basis of the Fama–French (2015) five-factor model augmented with the momentum factor (Carhart, 1997).

Empirical Results

One of the crucial considerations before fitting models is assessing the stationarity of research variables. Nonstationarity of variables can lead to spurious regression and falsely estimated regression models. If the time series variables used in estimating the coefficients of the model are nonstationary, and there is no meaningful relationship between the model variables, it can result in incorrect inferences about the degree of relationship between the variables. To test the stationarity of the variables, the Levin-Lin-Chu test has been applied to the data. In Table 3, this test has been conducted for all variables, and it can be observed that all variables exhibit stationarity based on this test. Consequently, the application of panel-data techniques is appropriate. It is noted that in unit root tests, the null hypothesis is the presence of a unit root (nonstationarity) and the alternative hypothesis is stationarity.

Table 3. Stationarity of Variables

Variable	Levin, Lin, and Chu test	
	Statistic value	Significance level
RP	-3.312	0.000
SENT	-3.469	0.000
EPU	-10.473	0.000
MKT	-2.464	0.000
SMB	-17.005	0.000
HML	-11.935	0.000
RMW	-15.486	0.000
CMA	-17.352	0.000
MOM	-5.627	0.000

Source: Research finding.

Another important preliminary step before estimating the models is to examine the relationships among the study variables. A strong correlation among variables indicates the presence of a linear association. One way to identify the existence of a linear relationship is to examine the correlation between independent variables, and one of the tools used to detect the relationship between two variables is the Pearson correlation coefficient. Table 4 presents the Pearson correlation

coefficients among the independent variables. The results in Table 4 indicate that none of the pairs of independent variables have a high strength of relationship (greater than 0.7). Therefore, simultaneously including them in the models will not cause collinearity issues.

Table 4. Pearson Correlation Coefficients

PROBABILITY	RP	SENT	EPU	HML	RMW	CMA	MOM	SMB	MKT
RP	1								
	-								
SENT	0.159	1							
	0.000	-							
EPU	0.097	0.411	1						
	0.000	0.000	-						
HML	-0.066	-0.219	-0.177	1					
	0.002	0.000	0.000	-					
RMW	-0.207	-0.081	0.077	-0.208	1				
	0.000	0.000	0.000	0.000	-				
CMA	0.046	0.078	0.132	0.095	-0.365	1			
	0.034	0.000	0.000	0.000	0.000	-			
MOM	0.282	0.067	0.126	-0.356	0.101	-0.001	1		
	0.000	0.002	0.000	0.000	0.000	0.969	-		
SMB	0.078	-0.059	-0.192	-0.022	-0.250	0.287	-0.029	1	
	0.000	0.006	0.000	0.318	0.000	0.000	0.176	-	
MKT	0.556	0.159	0.132	0.167	-0.060	-0.191	0.263	-0.375	1
	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	-

Source: Research finding.

To analyze the hypotheses, the first step is to use the F-Limmer. This test is employed to determine whether a pooled or a panel specification is appropriate for estimating the regression models. When estimating panel data, there are two general cases. The first case is when the intercept is the same for all periods, which corresponds to the pooled regression model. The second case is when the intercept varies across different periods, which is referred to as panel data. The F-Limer test is used to distinguish between these two cases. If the significance level of the F-test is less than 0.05, the panel data model will be used. If it is greater than 0.05, the pooled model will be used. According to the results reported in Table 5, the panel model is appropriate for estimation. Also, there are two methods of estimation with fixed or randomized effects models for estimation with panel data. The Hausman test is employed to determine whether the fixed- or random-effects specification should be adopted. The results of this test, also presented in Table 5,

indicate that, on the basis of the significance level, the fixed-effects model should be used.

Table 5. F-limer and Hausman Tests

	F Statistic	Significance level	The result
F-Limer test	1.646	0.046	According to the significance level, of less than 5%, the panel data model should be used.
	Chi-square Statistic	Significance level	The result
Hausman test	13.542	0.002	According to the significance level, of less than 5%, the fixed effects model should be used.

Source: Research finding.

The estimation results of the research model are reported in Table 6. Regarding the overall significance of the model, the p-value of the F-statistic is less than 0.05; therefore, the significance of the regression as a whole is confirmed at the 95% confidence level. The coefficient of determination (R-squared) indicates that 46% of the variation in the dependent variable is explained by the regressors included in the model, which constitutes a satisfactory fit. The estimated Durbin-Watson statistic results confirm the independence of error terms, with a value of 1.80 within the appropriate range of 1.5 to 2.5.

Table 6. The Estimation Results of the Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.	result of significant
SENT	-6.33×10^{-6}	0.003	-0.002	0.998	NO
EPU	0.010	0.004	2.586	0.010	YES
MKT	0.815	0.023	34.571	0.000	YES
SMB	0.694	0.044	15.612	0.000	YES
HML	-0.408	0.043	-9.429	0.000	YES
RMW	-0.321	0.050	-6.336	0.000	YES
INV	0.214	0.061	3.512	0.000	YES
MOM	0.143	0.046	3.058	0.002	YES
C	-0.062	0.033	-1.856	0.063	YES
R²	0.46	Durbin-Watson stat		1.81	
F-statistic	59.75	Prob(F-statistic)		0.00	

Source: Research finding.

The market sentiment factor (the first independent variable) does not exhibit a significant relationship with portfolio excess returns. This finding can be explained by the fact that portfolios are formed on the basis of the 24-month correlation between market sentiment and excess returns, while the reported estimates represent averages over the entire sample period (10 years / 120 months). Consequently, the effect of market sentiment tends to dissipate over the long run.

The economic policy uncertainty factor (the second independent variable) has a positive and significant relationship with portfolio excess returns. Given Iran's economic structure and the persistence of international sanctions—which have been accompanied by exchange-rate depreciation and elevated inflation expectations—an increase in economic policy uncertainty can lead to higher excess returns on stock portfolios.

Among the factors in the Fama–French five-factor model augmented with momentum, all factors except value and profitability exhibit a positive and significant relationship with stock portfolio excess returns. In other words, increases in the market, size, investment, and momentum factors are associated with higher portfolio excess returns, whereas higher value and profitability factors are associated with lower excess returns.

Table 7. OLS Estimation Results: The Impact of EPU and Sentiment Market on Portfolio Returns

Portfolio		(Constant)	SENT	EPU	MKT	SMB	HML	RMW	CMA	MOM
1A	Coeff	0.010	-0.019	-0.001	1.001***	0.600***	-0.598*	-0.579**	0.380**	-0.248
	Std	0.180	0.017	0.017	0.126	0.237	0.231	0.270	0.326	0.250
1B	Coeff	0.122	-0.015	-0.012	0.817***	0.650***	-0.655***	-0.439***	0.705**	0.050
	Std	0.133	0.012	0.013	0.093	0.176	0.171	0.200	0.241	0.185
1C	Coeff	0.169	0.003	-0.018	0.861***	0.729***	0.148*	-0.610***	-0.094	0.301
	Std	0.144	0.014	0.014	0.101	0.190	0.185	0.217	0.261	0.200
1	Coeff	0.102	-0.011	-0.013	0.888***	0.673***	-0.418**	-0.538**	0.354*	0.035
	Std	0.114	0.011	0.011	0.079	0.150	0.146	0.171	0.206	0.158
2	Coeff	0.011	-0.003	-0.004	0.892***	0.785***	-0.525***	-0.311**	0.368**	0.207
	Std	0.100	0.009	0.009	0.070	0.132	0.128	0.150	0.181	0.139
3	Coeff	0.101	-0.008	-0.010	0.926***	0.670***	-0.298**	-0.163	0.418**	0.210
	Std	0.101	0.009	0.010	0.070	0.133	0.129	0.151	0.182	0.140
4	Coeff	0.062	-0.013	-0.008	0.940***	0.640***	-0.551*	-0.387**	0.505**	0.252
	Std	0.110	0.010	0.010	0.077	0.145	0.141	0.166	0.199	0.153
5	Coeff	-0.022	-0.006	0.000	1.025***	0.945***	-0.500***	-0.447**	0.472***	0.061
	Std	0.107	0.010	0.010	0.075	0.141	0.137	0.161	0.194	0.149
6	Coeff	0.111	-0.004	-0.013	0.857***	0.820***	-0.511***	-0.123	0.355*	0.253*
	Std	0.105	0.010	0.010	0.074	0.139	0.135	0.158	0.190	0.146
7	Coeff	-0.035	0.001	0.001	0.884***	0.831***	-0.250*	-0.41**	-0.091	0.233
	Std	0.111	0.010	0.011	0.078	0.147	0.143	0.167	0.201	0.154
8	Coeff	-0.04	-0.007	0.003	0.969***	0.663***	-0.489***	-0.539***	0.052	-0.001
	Std	0.101	0.010	0.010	0.071	0.134	0.130	0.153	0.184	0.141
9	Coeff	0.137	0.001	-0.015	1.042***	0.723***	-0.754***	-0.306*	0.639***	0.059
	Std	0.118	0.011	0.011	0.082	0.155	0.151	0.177	0.213	0.163

10	Coeff	-0.265***	0.009	0.003	0.916***	0.787***	-0.441***	-0.316*	0.198	0.182
	Std	0.110	0.010	0.010	0.077	0.145	0.141	0.165	0.199	0.152
10A	Coeff	-0.196	0.014	0.016***	0.934***	0.611***	-0.410*	-0.139	1.051***	0.239
	Std	0.167	0.016	0.016	0.117	0.220	0.214	0.251	0.302	0.231
10B	Coeff	-0.223	0.002	0.019	0.922***	0.674***	-0.313*	-0.338	0.059	0.243
	Std	0.143	0.013	0.014	0.100	0.189	0.184	0.215	0.259	0.199
10C	Coeff	-0.384**	0.014	0.040**	0.89***	1.098***	-0.626**	-0.475*	-0.487	0.054
	Std	0.190	0.018	0.018	0.133	0.251	0.244	0.286	0.344	0.264
10_1	Coeff	-0.38***	0.02**	0.034***	0.028	0.114	-0.024	0.222	-0.155	0.147
	Std	0.104	0.010	0.010	0.073	0.138	0.134	0.157	0.189	0.145
10C-1A	Coeff	-0.408*	0.033*	0.037*	-0.111	0.453	-0.028	0.113	-0.867*	0.302
	Std	0.208	0.019	0.020	0.145	0.274	0.267	0.312	0.376	0.288

Source: Research finding.

Note: The symbols ***, **, and * denote the 1%, 5%, and 10% significance levels, respectively.

Based on the results obtained, the first hypothesis—positing a significant positive effect of market sentiment on portfolio excess returns in the Tehran Stock Exchange—is rejected. Overall, market sentiment does not exert a significant effect on excess returns, notwithstanding numerous studies that have typically documented a significant positive relationship between the two variables (e.g., Ni et al., 2015; Behink et al., 2022; Yan and Zhang, 2022; Wang and Daxbury, 2021; Shamsaldin et al., 2018; Dalika and Sizeram, 2015).

Although theoretical expectations pointed to a positive and significant relationship between market sentiment and excess returns, this finding can be attributed to the portfolio-formation procedure, whereby stocks are assigned to portfolios on the basis of their short-term (24-month) correlation with market sentiment. The reason for this selection is that market participants in Iran, considering the prevailing economic conditions, have short-term perspectives on the stock market and make decisions based on this criterion. Therefore, the impact of increasing or decreasing market sentiment on the excess returns of stock portfolios formed based on their correlation with market sentiment disappears in the long term (120-month average).

The second hypothesis, which suggested a significant positive effect of economic policy uncertainty on the excess returns of portfolios in the Tehran Stock Exchange, is also rejected. The overall results indicate a significant positive relationship between the excess returns of stock portfolios and economic policy uncertainty, while some studies have reported the opposite (e.g., Yuan et al., 2022; Nartea et al., 2020; Kang and Ratti, 2015; Kondova and Pilbeam, 2021; Batabyal and Killins, 2021; Amiri Pirdehbaran et al., 2019; Hematifar et al., 2020; Hashemi, 2021). This result can be attributed to the persistent upward trend in economic policy uncertainty and inflation expectations—commonly associated with the “hot money” phenomenon. Thus, with increasing uncertainties, people's demand for participating in the stock market and earning excess returns over bank deposits increases, leading to a booming market and higher stock returns. As incidental findings, the presence of asymmetric effects of both factors (market sentiment and economic policy uncertainty) on the excess returns of different portfolios was evident, and both factors had a significant positive impact on the difference between the 10 and 1 portfolios, and also the difference between the 10C and 1A portfolios. Thus, with the increase of each of these two factors, the difference between the return of the portfolio that has the highest correlation with market sentiments and the portfolio that has the lowest correlation with market sentiments also increases.

Moreover, whereas the market-sentiment factor is insignificant in all portfolios except the aforementioned spreads (10–1 and 10C–1A), economic policy uncertainty is positively and significantly related to the portfolios with the highest correlation with economic policy uncertainty (10C). In other words, with the increase in economic policy uncertainty, the excess returns of the portfolios that have the highest correlation with market sentiments also increase.

Conclusion

Consistent with the theoretical expectations and hypotheses, the results show that, overall, although market sentiment does not have a significant effect on excess returns, economic policy uncertainty exerts a positive and significant effect on excess returns.

The cause of this phenomenon can be related to the nature of portfolio construction, as stocks within portfolios are selected based on their short-term (24-month) correlation with market sentiment (the reason for this selection is that market participants in Iran, considering the prevailing economic conditions, have a short-term outlook on the stock market and make their decisions based on this). Therefore, the effect of increasing or decreasing market sentiment on the excess returns of portfolios formed based on their correlation with market sentiment will disappear in the long term (120 months).

Thus, the overall results indicate a positive and significant relationship between the excess returns and economic policy uncertainty. The cause of this can be attributed to the ongoing trend of increasing economic policy uncertainties and people's inflation expectations, referred to as the "hot money" phenomenon. With increasing uncertainties, people's demand to participate in the stock market and earn excess returns compared to bank deposits increases, leading to a flourishing stock market and higher stock returns.

As Side effects, the results obtained show heterogeneous and different effects of market sentiment and economic policy uncertainty on the excess. Specifically, these two factors only have a significant effect on the difference between the returns of Portfolio 10 (have the highest correlation with sentiment) and Portfolio 1 (have the lowest correlation with sentiment) and the difference between Portfolio C10 (the highest) and Portfolio A1 (the lowest). In other words, as these two factors increase, the difference in returns between the portfolio with the highest correlation with market sentiment and the portfolio with the lowest correlation also increases. Overall, the results indicate that market sentiment does not have a significant relationship with the excess returns, except for the differences between the high

and low portfolios. Additionally, the economic policy uncertainty factor (EPU) has a positive and significant relationship with the portfolio that exhibits the highest correlation with market sentiment, indicating that an increase in economic policy uncertainty leads to an increase in the excess returns of portfolios with the highest correlation with market sentiment.

Due to the significant positive relationship between economic policy uncertainty and excess returns of stocks, it is evident that portfolios aligned with market sentiment are more influenced by economic policy uncertainty compared to other portfolios. Therefore, investors should consider economic policy uncertainty alongside market sentiment when devising appropriate strategies to enhance their returns. By incorporating both factors, investors can capitalize on the potential increase in returns associated with economic policy uncertainty.

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