

Research Article

The Impact of Corporate Sustainability Performance on the Relationship Between Economic Policy Uncertainty and Corporate Investment

Running title: ESG, Policy Uncertainty, and Corporate Investment

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ARTICLE INFORMATION

Manuscript ID

[IJFTGRS-XXXX]

Article type

Research Article

Received

5 August 2026

Revised

8 September 2026

Accepted

7 October 2026

Published

1 October 2026

DOI

<https://doi.org/10.22034/ijftgrs.2026.595645.1047>

KEYWORDS

Corporate investment;
Economic policy uncertainty;
ESG disclosure; Real options
theory; Sustainability
performance; Tehran Stock
Exchange

JEL CLASSIFICATION

D81; G31; M14

ABSTRACT

PURPOSE: This study examines whether corporate sustainability performance moderates the relationship between economic policy uncertainty and the investment of firms listed on the Tehran Stock Exchange.

DESIGN/METHODOLOGY/APPROACH: The study is applied in purpose and correlational, ex post facto in design. After applying the sample-selection criteria, 156 firms were analyzed over 2015–2024, yielding a balanced panel of 1,560 firm-year observations. Data were collected from financial statements, board of directors' reports, and other public disclosures. Economic policy uncertainty is constructed from four macroeconomic indicators using principal component analysis, sustainability performance is measured by content analysis of a 56-item environmental, social, and governance disclosure checklist, and the hypotheses are tested with fixed-effects panel regressions using heteroskedasticity-robust standard errors.

FINDINGS: Economic policy uncertainty has a negative and statistically significant effect on corporate investment, indicating that greater ambiguity in economic policy reduces firms' willingness to undertake new investment. The interaction between economic policy uncertainty and sustainability performance is positive and significant, indicating that sustainability performance weakens this negative relationship: firms with stronger environmental, social, and governance performance experience a smaller decline in investment when policy uncertainty rises.

RESEARCH IMPLICATIONS: Sustainability performance can serve as a mechanism that strengthens corporate resilience and mitigates the adverse effects of economic instability on investment, which is relevant to managers, investors, and policymakers in uncertain emerging-market environments.

ORIGINALITY/VALUE: The study provides evidence from Iran, a market characterized by persistent policy uncertainty, on the moderating role of sustainability performance in the uncertainty–investment relationship, a link that has received limited attention in prior research.

RESEARCH HIGHLIGHTS

- Economic policy uncertainty significantly reduces corporate investment in Iran.
- Sustainability performance weakens the negative uncertainty–investment link.
- Firms with stronger ESG disclosure sustain investment under policy uncertainty.

1. Introduction

Accelerating globalization, the growing interdependence of financial markets, and intensifying environmental and social concerns have made the effects of economic policy uncertainty on corporate investment decisions increasingly important (Jing *et al.*, 2023). In today's business environment, profitability alone is no longer regarded as a comprehensive criterion of organizational success and long-term continuity; sustainable performance, which encompasses economic, social, and environmental dimensions, has become a fundamental indicator of corporate performance. In addition to economic returns, this approach considers firms' commitment to social responsibility, environmental protection, and long-term objectives. A major challenge for firms pursuing sustainability, however, is economic policy uncertainty, which may arise from changes in laws and regulations, market fluctuations, political developments, and shifts in macroeconomic policy and which can profoundly influence corporate financing and investment decisions.

Corporate investment, which consists mainly of capital expenditures to acquire, expand, or replace capital assets and other long-term commitments, is a key determinant of economic growth and corporate success (Farooq *et al.*, 2022). Investment decisions shape production capacity, competitiveness, financial stability, future growth, and overall performance, so identifying the factors that affect the level and nature of corporate investment is important for managers, investors, researchers, and policymakers.

Economic policy uncertainty refers to a situation in which the future direction of economic policies, government regulations, and their consequences for the business environment is ambiguous and unpredictable (Baker *et al.*, 2016). Under such conditions, forecasting market trends, future costs, cash flows, and revenues becomes more difficult, which increases the risk of financial decisions. Managers may therefore be more cautious in undertaking long-term projects and postpone deferrable or irreversible investments until conditions become clearer. Because corporate investment plays a fundamental role in expanding production capacity, promoting growth, enhancing productivity, and generating employment, the effect of economic policy uncertainty on investment has become a major focus of economic and financial research (Farooq *et al.*, 2022).

Identifying mechanisms that can mitigate the adverse effects of policy uncertainty on investment is therefore important. Sustainability performance—the policies, commitments, and actions undertaken by firms in the environmental, social, and governance (ESG) domains—is a principal criterion for evaluating a firm's ability to create sustainable value, and firms with superior sustainability performance are generally perceived by investors and other stakeholders as more responsible, transparent, and resilient (Albitar *et al.*, 2020). ESG initiatives strengthen the confidence of investors, creditors, and other stakeholders and facilitate access to finance under difficult economic conditions. Sustainability-related operational initiatives—such as stronger risk management, more efficient resource use, reduced environmental impact, and better governance—can also reduce firms' vulnerability to economic risks and encourage more coherent, prudent, and long-term financial management. Such firms are therefore less likely to suspend or postpone profitable projects solely because of heightened uncertainty, and sustainability performance can be regarded as a risk management mechanism that reduces the sensitivity of investment to policy shocks.

Despite a growing body of research on economic policy uncertainty and ESG performance (Goodell *et al.*, 2024; Qureshi *et al.*, 2024; Wu *et al.*, 2024), relatively few studies have examined the interaction of these two factors in corporate investment decisions. Much prior research has focused either on the direct effects of economic policy uncertainty or on the independent consequences of sustainability performance, whereas the moderating role of sustainability performance in the uncertainty–investment relationship has received considerably less attention, particularly in emerging markets. This study contributes to the literature in three ways. First, it provides evidence from Iran, a market exposed to persistent policy uncertainty, on the effect of economic policy uncertainty on corporate investment. Second, it shows that sustainability performance attenuates this effect, extending the literature on the protective role of ESG under uncertainty. Third, it offers evidence relevant to managers, investors, and policymakers concerned with sustaining investment under economic instability. The remainder of the paper is organized as follows. Section 2 reviews the literature and develops the hypotheses, Section 3 describes the data and methodology, Section 4 reports the results, Section 5 discusses the findings, and Section 6 concludes.

2. Theoretical Background and Literature Review

2.1. Economic policy uncertainty and corporate investment

Corporate investment is one of the most important strategic decisions made by managers, because it shapes production capacity, long-term growth, competitive advantage, and firm value. Such decisions require reasonably accurate forecasts of future cash flows, financing costs, demand, project returns, and economic conditions, and rising economic policy uncertainty reduces the predictability of these factors. Policy uncertainty may arise from unexpected changes in fiscal and monetary policy, tax law, trade regulation, interest rates, exchange-rate policy, and other government decisions, which prevent managers from estimating the future costs and benefits of projects with confidence. Baker *et al.* (2016) identify economic policy uncertainty as a key determinant of corporate economic behavior and resource allocation.

The effect of economic policy uncertainty on investment can be explained by real options theory. Many corporate investments—particularly in fixed assets, capacity expansion, and long-term projects—are irreversible, meaning that committed resources cannot be fully recovered. As uncertainty increases, so does the value of postponing investment, because waiting allows managers to obtain further information about the direction of economic policy and market conditions; firms may therefore delay even projects with positive net present value until uncertainty subsides. Chen *et al.* (2019) show that rising economic policy uncertainty reduces both short-term and long-term investment, and Chen *et al.* (2020) find that its inhibitory effect on capital investment may persist for several periods.

Economic policy uncertainty also affects investment by tightening financial constraints and raising the cost of capital. In uncertain environments, investors and creditors face greater risk regarding repayment, cash-flow stability, and project success, and they therefore demand higher returns or become less willing to provide finance. Rising costs of debt and equity reduce the number of viable projects, and managers may preserve liquidity and avoid long-term commitments to cope with potential shocks. Izadinia and Fattahi Nafchi (2023) show that economic uncertainty significantly influences capital structure decisions and the speed of leverage adjustment, and Khalili *et al.* (2024) find that economic policy uncertainty affects trade credit and reduces firm value.

From a behavioral perspective, uncertainty heightens managers' concerns about failed decisions, declining profitability, and negative shareholder reactions, encouraging more conservative behavior, avoidance of high-risk projects, and allocation of resources to more liquid assets. Greater economic ambiguity may also reduce the reliability of managerial forecasts and disrupt capital budgeting. Jafari *et al.* (2024) find that the sensitivity of investment to economic policy uncertainty depends on the quality of corporate governance, and Shirzadeh (2024) reports that economic policy uncertainty alters the effect of financial reporting quality on investment decisions.

2.2. Corporate sustainability performance as a moderator

Corporate sustainability performance reflects how a firm manages the responsibilities and consequences of its activities across environmental, social, and governance dimensions. Strong performance may indicate efficient managerial structures, a long-term strategic orientation, effective internal controls, greater accountability, and a superior capability to identify and manage environmental risks. Sustainability performance is therefore not merely an ethical or social initiative but a strategic capability that enhances a firm's ability to withstand economic shocks. Firms that integrate sustainability principles into decision-making generally adopt a longer-term perspective on resource allocation and respond more flexibly to sudden changes in the economic environment. Zhang *et al.* (2024) argue that superior ESG performance enhances both the motivation and the capacity of firms to invest.

An important channel is the reduction of information asymmetry and the strengthening of the confidence of investors, creditors, and other stakeholders. Credible information about ESG activities gives stakeholders a clearer understanding of management quality, operational risk, and long-term prospects, which can alleviate capital providers' concerns during periods of high policy uncertainty and prevent substantial increases in financing costs. Gholami *et al.* (2023) report that stronger sustainability disclosure is associated with a lower cost of capital and lower idiosyncratic risk. Consequently, firms with stronger sustainability performance can maintain more stable access to finance during uncertain periods and continue their investment projects with fewer constraints.

Sustainability performance also reduces vulnerability to uncertainty by strengthening stakeholder relationships and organizational reputation. Respecting the rights of employees, customers, suppliers, society, and the environment generates social capital and stakeholder support, which can help maintain demand, supplier cooperation, employee loyalty, and access to critical resources during crises or policy changes; environmental initiatives such as reducing energy and raw-material use and controlling pollution can also lower operating costs and legal risks. [Chen and Xie \(2022\)](#) show that ESG disclosure improves corporate financial performance and that ESG-oriented investors strengthen this effect, and [Adomako and Tran \(2022\)](#) find that environmental collaboration enhances firm performance through responsible innovation.

The governance dimension further improves the quality of resource allocation by strengthening managerial oversight and risk management and reducing opportunistic decisions, so that investment decisions rest on more reliable information and a more comprehensive evaluation of risk and return. [Ahmad et al. \(2023\)](#) show that ESG performance moderated the adverse effect of the global financial crisis on firm performance, and [Zhang et al. \(2023\)](#) find that stronger ESG performance alleviated firms' financial constraints during the COVID-19 shock.

2.3. Hypothesis development

Economic policy uncertainty thus influences corporate investment by reducing the predictability of cash flows, increasing the value of waiting, tightening financial constraints, and reinforcing managerial conservatism. Accordingly, the first hypothesis is formulated as follows:

H1. Economic policy uncertainty has a significant effect on corporate investment.

By reducing the cost of capital, strengthening stakeholder confidence, improving risk management, and enhancing organizational resilience, sustainability performance can alter the magnitude of the effect of economic policy uncertainty on investment. Accordingly, the second hypothesis is formulated as follows:

H2. Corporate sustainability performance significantly moderates the relationship between economic policy uncertainty and corporate investment.

3. Data and Methodology

3.1. Research design and analytical framework

The study is applied in purpose and correlational in nature, and because it uses information from financial statements of prior years, it is classified as an ex post facto study. The hypotheses are tested with multivariate panel regressions, and the appropriate specification (pooled, fixed effects, or random effects) is selected using the F (Chow) and Hausman tests.

3.2. Population, sample, data sources, and study period

The population consists of all firms listed on the Tehran Stock Exchange (TSE) over the ten-year period from 2015 to 2024. Firms were included in the sample if they met all of the following criteria: (i) the firm was listed on the TSE before 2015 and remained listed through the end of 2024; (ii) the firm was not inactive at any time during the study period; (iii) the fiscal year ends at the end of Esfand (March), with no change in fiscal year-end during the study period; (iv) the required financial information is available; and (v) the firm is not a holding, insurance, leasing, banking, or investment company or another financial institution, because the nature of their operations differs substantially from that of manufacturing and commercial firms. Applying these criteria yielded a final sample of 156 firms and 1,560 firm-year observations. Data were collected from firms' financial statements, board of directors' reports, and other public disclosures.

3.3. Variables, constructs, and measurement

Corporate investment (CINV). Corporate investment is measured as cash payments for the acquisition or construction of tangible fixed assets, intangible assets, and other non-current assets, divided by total assets at the beginning of the period ([Hadian et al., 2017](#)).

Economic policy uncertainty (EPU). Following Dashtaki *et al.* (2022), economic policy uncertainty is measured using four indicators—the inflation rate, the interest rate, the exchange rate, and the economic growth rate—which are aggregated into a single index using principal component analysis (PCA). The variables are first normalized to the range between zero and one; the correlation matrix is then computed, its eigenvalues and eigenvectors are derived, and the weight of each indicator is determined from the eigenvector (Jolliffe & Cadima, 2016). The resulting index is given in Equation (1).

$$\text{EPU} = 0.529 \text{ INF} - 0.329 \text{ INT} + 0.601 \text{ EXR} + 0.501 \text{ GDPG} \quad (1)$$

where INF is the inflation rate, INT is the interest rate, EXR is the exchange rate, and GDPG is the economic growth rate, each normalized to the [0, 1] interval.

Sustainability performance (ESG). Sustainability performance is measured from firms' annual board of directors' reports using an ESG disclosure checklist and unweighted content analysis (Cooke, 1989), in which a coded checklist is used to encode the qualitative information disclosed in annual reports (Williams, 1999). The checklist comprises 12 components and 56 disclosure items covering the environmental, social, and governance dimensions (Table 2). Each item is scored one if it is disclosed and zero otherwise (Pourgholami Dafchahi *et al.*, 2023), and the ESG score is the proportion of items disclosed.

Control variables. Following Zhang *et al.* (2024), the models control for firm size (FRS), financial leverage (DER), cash holdings (COH), sales growth (SG), and growth opportunities (QTOBIN). Table 1 summarizes the definitions of all variables.

Table 1. Variable definitions and measurement

Variable	Symbol	Role	Definition
Corporate investment	CINV	Dependent	Cash payments for tangible fixed, intangible, and other non-current assets ÷ total assets at the beginning of the year
Economic policy uncertainty	EPU	Independent	PCA-weighted index of normalized inflation, interest rate, exchange rate, and economic growth (Equation 1)
Sustainability performance	ESG	Moderator	Proportion of the 56 ESG checklist items disclosed in the board of directors' report (Table 2)
Firm size	FRS	Control	Natural logarithm of total assets
Financial leverage	DER	Control	Total liabilities ÷ total assets
Cash holdings	COH	Control	Cash and cash equivalents ÷ total assets
Sales growth	SG	Control	(Sales in year t – sales in year $t - 1$) ÷ sales in year $t - 1$
Growth opportunities	QTOBIN	Control	(Market value of equity + book value of debt) ÷ total assets

Notes: PCA = principal component analysis; ESG = environmental, social, and governance.

Table 2. Sustainability disclosure checklist: dimensions, components, and items

No.	Code	Dimension / component / item
	SOC	Social dimension
	SOC1	Component: Human rights
1	SOC11	Number and percentage of major investment contracts and agreements containing human rights provisions
2	SOC12	Recruitment policies and procedures designed to prevent discrimination, child labor, and forced labor
3	SOC13	Number and percentage of operations affected by human rights regulations
4	SOC14	Human rights complaints filed, addressed, and resolved
	SOC2	Component: Society
5	SOC21	Non-financial assistance received from the government, organizations, and other institutions
6	SOC22	Legal actions related to anti-competitive, anti-trust, and monopolistic practices and their outcomes
7	SOC23	Significant fines and sanctions for non-compliance with laws, regulations, and directives
8	SOC24	Complaints filed, addressed, and resolved regarding impacts on society

No.	Code	Dimension / component / item
	SOC3	Component: Product responsibility
9	SOC31	Major products and services complying with health and safety standards that protect consumers and their rights
10	SOC32	Non-compliance with regulations on product specifications, labeling, communications, marketing, advertising, and sponsorship
11	SOC34	Customer satisfaction management systems and initiatives related to consumer rights protection
12	SOC35	Products prohibited or not authorized in certain markets
	ENV	Environmental dimension
	ENV1	Component: Raw materials, energy, and water
13	ENV12	Amount or percentage of recycled materials used in processes and operations
14	ENV13	Direct and indirect energy consumption and energy saved, by source and quantity
15	ENV14	Water consumption, recycled water, and treated water, by source and use
	ENV2	Component: Biodiversity and natural resources
16	ENV21	Significant impacts of activities, products, and services on biodiversity in protected and high-biodiversity-value areas
17	ENV22	Number of IUCN Red List and nationally protected species with habitats affected by operations
	ENV3	Component: Emissions, wastewater, and waste
18	ENV31	Total direct and indirect greenhouse gas and other significant emissions, by weight or quantity
19	ENV32	Actions to reduce greenhouse gas emissions, removal methods, and results achieved
20	ENV33	Emissions of ozone-depleting substances, by weight
21	ENV34	Procedures for waste transportation and environmentally appropriate disposal
	ENV4	Component: Products and services
22	ENV41	Environmental impacts of products on natural resources and methods for managing and monitoring them
23	ENV42	Quantity of products sold and environmentally friendly packaging materials used
	ENV5	Component: Transportation
24	ENV51	Environmental impacts of transporting products, raw materials, goods, and employees
	GOV	Corporate governance dimension
	GOV1	Component: Ownership
25	GOV11	Ownership concentration, ownership transparency, and institutional ownership
26	GOV12	Percentage of institutional, governmental, and largest-shareholder ownership
27	GOV13	Existence of a transparent and dispersed ownership structure
28	GOV14	Percentage of free-floating shares
	GOV2	Component: Shareholders' rights
29	GOV21	Voting procedures and shareholders' meetings
30	GOV22	Date and method of announcing the shareholders' meeting
31	GOV23	Requirements for shareholder attendance, absentee voting, and proxy voting
32	GOV24	Vote counting, opportunities for shareholders' questions at the annual general meeting, and recording of questions and answers
33	GOV25	Dividend policy and payment of dividends within the statutory deadline
34	GOV26	Equal treatment of shareholders
35	GOV27	Provision of financial statements and articles of association to all shareholders and timely access to reports
	GOV3	Component: Transparency
36	GOV31	Compliance with the disclosure regulations for listed companies
37	GOV32	Submission of the board report and auditor's opinion at least 10 days before the annual general meeting

No.	Code	Dimension / component / item
38	GOV33	Disclosure of future plans and annual forecasts at least 30 days before the new fiscal year
39	GOV34	Auditor's opinion on annual performance forecasts within 20 days of submission
40	GOV35	Disclosure of the investment portfolio of controlled companies within 30 days after each quarter
41	GOV36	Quality of annual reports on financial performance, competitive position, operations, and risks
42	GOV37	Cross-shareholdings, subsidiaries, ownership structures, and significant ownership changes
43	GOV38	Introduction of board members, their positions, experience, education, and committee memberships
44	GOV39	Board report on implementation of corporate governance principles and the internal control structure
45	GOV310	Audit-related information
46	GOV311	Details of related-party transactions
47	GOV312	Instances of non-compliance with the Securities and Exchange Organization checklist
48	GOV313	Reports of the audit committee, independent auditor, and internal audit to the annual general meeting
49	GOV314	Shareholdings of board members and executives and their trades in company shares
	GOV4	Component: Board effectiveness
50	GOV41	Structure, composition, and meetings of the board of directors
51	GOV42	Board size, non-executive and independent directors, and mix of skills and experience
52	GOV43	Separation of the roles of chairperson and chief executive officer
53	GOV44	Number of board meetings, agenda and minutes procedures, and attendance of each member
54	GOV45	Other board memberships of the CEO and directors and limits on the number of memberships
55	GOV46	Existence of audit, internal audit, nomination, compensation, investment, and financing committees
56	GOV47	Approval of the corporate governance code, including an internal audit charter

Notes: SOC = social; ENV = environmental; GOV = corporate governance. Item codes follow the original checklist numbering. Each item is scored 1 if disclosed and 0 otherwise.

3.4. Model specification and estimation procedure

The research models are adapted from Zhang *et al.* (2024). Model (2) tests H1, and Model (3) adds sustainability performance and its interaction with economic policy uncertainty to test H2:

$$CINV_{i,t} = \beta_0 + \beta_1 EPU_{i,t} + \beta_2 FRS_{i,t} + \beta_3 DER_{i,t} + \beta_4 COH_{i,t} + \beta_5 SG_{i,t} + \beta_6 QTOBIN_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$CINV_{i,t} = \beta_0 + \beta_1 EPU_{i,t} + \beta_2 ESG_{i,t} + \beta_3 (EPU_{i,t} \times ESG_{i,t}) + \beta_4 FRS_{i,t} + \beta_5 DER_{i,t} + \beta_6 COH_{i,t} + \beta_7 SG_{i,t} + \beta_8 QTOBIN_{i,t} + \varepsilon_{i,t} \quad (3)$$

where i and t denote firm and year; $CINV$ is corporate investment; EPU is economic policy uncertainty; ESG is sustainability performance; $EPU \times ESG$ is their interaction; FRS , DER , COH , SG , and $QTOBIN$ are the control variables defined in Table 1; and $\varepsilon_{i,t}$ is the error term. H1 is supported if β_1 in Model (2) is significant, and H2 is supported if β_3 in Model (3) is significant.

3.5. Validity, robustness, and reproducibility

Before estimation, the regression assumptions were examined. Because the models include an intercept, the residuals have a zero mean by construction, and given the large sample (1,560 firm-year observations), the sampling distribution of the estimators is approximately normal by the central limit theorem. Serial correlation was examined with the Durbin–Watson statistic, heteroskedasticity with the Breusch–Pagan test, and multicollinearity with variance inflation factors (VIFs). Because heteroskedasticity was detected, White's heteroskedasticity-consistent standard errors were used.

4. Results

4.1. Descriptive statistics and preliminary analysis

Table 3 reports descriptive statistics for the research variables based on a balanced panel of 156 firms over 2015–2024 (1,560 firm-year observations).

Table 3. Descriptive statistics

Variable	Mean	Median	SD	Minimum	Maximum
Corporate investment (CINV)	0.003	0.001	0.006	0.000	0.060
Economic policy uncertainty (EPU)	1.169	1.129	0.359	0.397	1.890
Sustainability performance (ESG)	0.445	0.440	0.083	0.200	0.760
EPU × ESG	0.519	0.502	0.185	0.113	1.153
Firm size (FRS)	15.235	15.008	1.681	11.407	21.424
Financial leverage (DER)	0.536	0.538	0.200	0.031	0.996
Cash holdings (COH)	0.034	0.023	0.038	0.0002	0.482
Sales growth (SG)	0.397	0.312	0.527	−0.467	6.555
Growth opportunities (QTOBIN)	2.531	1.913	1.648	0.567	9.337

Notes: $N = 1,560$ firm-year observations. SD = standard deviation. Variables are defined in Table 1.

Corporate investment has a mean of 0.003 and a standard deviation of 0.006; its small magnitude, the proximity of the mean to the median (0.001), and its range of 0.000 to 0.060 suggest relatively low capital expenditures among the sample firms. The economic policy uncertainty index has a mean of 1.169 and a standard deviation of 0.359. Sustainability performance has a mean of 0.445 and a standard deviation of 0.083, with a median of 0.440 and a range of 0.200 to 0.760, indicating that the sample firms disclosed on average about 45% of the checklist items. Financial leverage has a mean of 0.536 and a median of 0.538, indicating that more than half of corporate assets are financed by debt. Cash holdings average 0.034 (SD = 0.038), reflecting a relatively low proportion of highly liquid assets. Sales growth has a mean of 0.397 (SD = 0.527) and ranges from −0.467 to 6.555, and growth opportunities have a mean of 2.531 (SD = 1.648), indicating considerable heterogeneity in firms' growth prospects and operating performance.

Table 4 summarizes the diagnostic and specification tests. The Durbin–Watson statistics for both models fall within the range of 1.5 to 2.5, indicating no first-order serial correlation in the residuals. The Breusch–Pagan test rejects homoskedasticity ($p < 0.05$), so White's heteroskedasticity-consistent standard errors are used. The F (Chow) test rejects the pooled specification in favor of a panel specification for both models, and the Hausman test favors fixed effects over random effects.

Table 4. Diagnostic and specification tests

Test	: statistic	: p-value	: statistic	: p-value
Durbin–Watson	1.986	—	1.945	—
Breusch–Pagan	3,664.172	0.000	3,667.730	0.000
F (Chow) test	11.486	0.000	35.762	0.000
Hausman test (χ^2)	35.762	0.000	33.866	0.000
Selected specification	Fixed effects		Fixed effects	

Notes: The F (Chow) test compares the pooled and panel specifications; the Hausman test compares the fixed- and random-effects specifications.

Table 5 reports the VIFs. All values are below 5, indicating the absence of serious multicollinearity among the explanatory variables.

Table 5. Variance inflation factors

Variable	Symbol		
Economic policy uncertainty	EPU	1.001	3.083
Sustainability performance	ESG	—	4.488
EPU × ESG	EPU × ESG	—	4.272
Firm size	FRS	1.042	1.140
Financial leverage	DER	1.017	1.080
Cash holdings	COH	1.012	1.013
Sales growth	SG	1.054	1.072
Growth opportunities	QTOBIN	1.063	1.063

Notes: — = variable not included in the model.

4.2. Main findings

Table 6 reports the results for Model (2). The F-statistic is significant at the 5% level, indicating that the explanatory variables jointly explain a significant portion of the variation in corporate investment, and the adjusted R² of 0.313 indicates that approximately 31% of this variation is explained by the model. The coefficient on economic policy uncertainty is -0.001 ($t = -3.258$, $p = 0.001$), indicating a negative and significant relationship: a one-unit increase in the uncertainty index is associated with a decrease of about 0.001 (0.1 percentage points) in the investment-to-assets ratio. H1 is therefore supported.

Table 6. Results of Model (2): economic policy uncertainty and corporate investment (H1)

Variable	Symbol	Coefficient	Std. error	t-statistic	p-value
Constant	C	0.009	0.0006	14.204	0.000
Economic policy uncertainty	EPU	-0.001	0.0003	-3.258	0.001
Firm size	FRS	0.002	0.0006	2.691	0.008
Financial leverage	DER	-0.001	0.0002	-4.664	0.000
Cash holdings	COH	-0.0003	0.0005	-0.745	0.456
Sales growth	SG	0.217	0.028	7.723	0.000
Growth opportunities	QTOBIN	0.024	0.011	2.209	0.029
R ² = 0.370		Adj. R ² = 0.313		F = 15.358 ($p = 0.000$)	DW = 1.986

Notes: Fixed-effects estimates with White's heteroskedasticity-consistent standard errors. Dependent variable: CINV. Variables are defined in Table 1.

Table 7 reports the results for Model (3). The F-statistic is significant at the 5% level, and the adjusted R² of 0.393 indicates that approximately 39% of the variation in corporate investment is explained. The interaction term EPU × ESG is positive and significant ($t = 2.342$, $p = 0.019$), whereas the coefficient on economic policy uncertainty remains negative and significant ($t = -2.758$, $p = 0.006$). Because the two coefficients have opposite signs, the interaction reflects a buffering (attenuating) moderation effect: stronger sustainability performance weakens the adverse effect of economic policy uncertainty on corporate investment. H2 is therefore supported.

Table 7. Results of Model (3): moderating role of sustainability performance (H2)

Variable	Symbol	Coefficient	Std. error	t-statistic	p-value
Constant	C	0.014	0.0008	17.574	0.000
Economic policy uncertainty	EPU	−0.0008	0.0003	−2.758	0.006
Sustainability performance	ESG	0.002	0.0009	2.808	0.005
EPU × ESG	EPU × ESG	0.001	0.0007	2.342	0.019
Firm size	FRS	0.0008	0.0001	7.378	0.000
Financial leverage	DER	−0.001	0.0002	−7.606	0.000
Cash holdings	COH	−0.0002	0.0005	−0.570	0.568
Sales growth	SG	0.368	0.059	6.241	0.000
Growth opportunities	QTOBIN	0.081	0.023	3.393	0.000
R ² = 0.409		Adj. R ² = 0.393		F = 58.994 (p = 0.000)	DW = 1.945

Notes: Fixed-effects estimates with White's heteroskedasticity-consistent standard errors. Dependent variable: CINV. Variables are defined in Table 1.

5. Discussion

5.1. Interpretation relative to theory and prior evidence

The results of the first hypothesis indicate that economic policy uncertainty has a significant negative effect on corporate investment. As uncertainty about monetary and fiscal policy, tax regulation, trade policy, exchange rates, interest rates, and other macroeconomic decisions increases, firms become less willing to undertake investment projects, because managers cannot forecast future cash flows, implementation costs, and returns with sufficient confidence. This finding is consistent with real options theory: because many corporate investments are long-term and largely irreversible, rising uncertainty increases the value of postponing them. Higher policy uncertainty also raises financing costs and restricts access to external finance, and it reinforces managerial conservatism, leading managers to hold more cash and avoid long-term commitments, so that even projects with favorable returns may be postponed or abandoned.

These findings are consistent with Chen *et al.* (2019), Chen *et al.* (2020), Akron *et al.* (2020), Im *et al.* (2021), Jumah *et al.* (2023), and Zhang *et al.* (2024), who find that rising economic policy uncertainty reduces or distorts corporate investment by increasing risk, raising financing costs, and delaying investment decisions. By contrast, Bagh *et al.* (2023) document that economic policy uncertainty drives stock price movements in China, which suggests that its effects on financial outcomes are not uniformly contractionary.

The results of the second hypothesis indicate that sustainability performance significantly moderates the uncertainty–investment relationship: firms with superior ESG performance experience a smaller decline in investment during periods of heightened policy uncertainty. Strong sustainability performance enhances financial resilience by reducing information asymmetry and strengthening stakeholder confidence; comprehensive ESG disclosure gives investors and creditors a clearer view of management quality, internal controls, risk management, and long-term prospects, so such firms face smaller increases in the cost of capital and fewer financial constraints under uncertainty. Sustainability performance also enhances reputation, strengthens relationships with employees, customers, suppliers, and government institutions, and improves operational stability, which contributes to more stable cash flows and prevents managers from overreacting to policy shocks.

These findings are consistent with Albitar *et al.* (2020), Chen and Xie (2022), Adomako and Tran (2022), Ahmad *et al.* (2023), Zhang *et al.* (2023), Issa (2023), and Zhang *et al.* (2024), who document the role of sustainability performance in alleviating financial constraints, strengthening organizational resilience, and improving corporate decisions. Among the studies reviewed, none reports findings that directly contradict the moderating role of sustainability performance in the relationship between economic policy uncertainty and corporate investment.

5.2. Theoretical and methodological contributions

The study extends real options and stakeholder perspectives by showing that the sensitivity of investment to policy uncertainty is not uniform across firms but depends on their sustainability performance. Sustainability performance can thus be regarded as a strategic and protective mechanism that reduces perceived corporate risk, facilitates access to finance, strengthens investor confidence, and enhances organizational flexibility, thereby helping firms continue profitable investment under uncertain conditions.

5.3. Managerial, regulatory, investment, and policy implications

For managers, the results suggest that investing in sustainability practices and transparent ESG disclosure can help preserve investment capacity when economic policy becomes uncertain. For investors and creditors, sustainability performance provides information on which firms are likely to sustain investment during policy shocks. For policymakers and capital market regulators, the results highlight both the cost of policy uncertainty for corporate investment and the value of encouraging comprehensive sustainability reporting among listed firms.

6. Conclusion

This study examined the effect of economic policy uncertainty on the investment of firms listed on the Tehran Stock Exchange and the moderating role of corporate sustainability performance. Using 1,560 firm-year observations over 2015–2024, the results show that economic policy uncertainty significantly reduces corporate investment and that sustainability performance weakens this negative effect. Sustainability performance therefore contributes not only to firms' environmental and social standing but also serves as an instrument of risk management that helps preserve investment continuity during periods of economic instability.

6.1. Limitations and future research

The study has several limitations. First, the economic policy uncertainty index is constructed from macroeconomic indicators that vary over time but not across firms, so it may capture general macroeconomic conditions in addition to policy uncertainty; future research could use text-based or survey-based uncertainty measures. Second, sustainability performance is measured through disclosure in board of directors' reports, which reflects reporting rather than actual performance. Third, the sample is limited to TSE-listed non-financial firms that remained listed throughout the period, which may limit generalizability and introduce survivorship bias. Future studies could examine the separate environmental, social, and governance dimensions, use dynamic panel estimators to address endogeneity, and extend the analysis to other emerging markets.

Declarations and Transparency Statements

Author contributions (CRediT)

Conceptualization, Z.K. and H.K.; methodology, Z.K. and H.K.; data curation and formal analysis, Z.K.; writing—original draft, Z.K.; writing—review and editing, H.K. All authors approved the final manuscript.

Funding

This research received no external funding.

Conflict of interest

The authors declare no competing interests.

Ethics approval

Not applicable. The study uses publicly available firm-level and macroeconomic data and does not involve human participants, personal data, or animals.

Informed consent

Not applicable.

Data availability

The data were obtained from the publicly available financial statements and board of directors' reports of firms listed on the Tehran Stock Exchange. The compiled dataset is available from the corresponding author upon reasonable request.

Code availability

Not applicable; the analyses were performed with standard statistical software.

Use of generative AI and AI-assisted technologies

During the preparation of this manuscript, an AI-assisted tool was used for language editing, formatting to the journal template, and checking the bibliographic details of the references. The authors reviewed and verified all content and take full responsibility for the accuracy, originality, and integrity of the manuscript.

Acknowledgments

None.

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