

Green Insurance and ESG Practices in Transition Economies: The Case of Uzbekistan

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Abstract. *The aim of the study is to empirically assess the impact of implementing ESG principles and green insurance products on the financial sustainability of insurance organizations in transition economies, using Uzbekistan as a case study. The methodology includes an econometric analysis of panel data from 14 insurance companies in Uzbekistan for the period 2018–2024, employing the difference-in-differences (DiD) model and fixed effects regression analysis. The results demonstrate that the implementation of ESG practices leads to a decrease in the loss ratio by 8.7 percentage points and an increase in premiums for environmental types of insurance by 23.4% following the institutional reforms of 2021–2023. The scientific novelty lies in the first quantitative assessment of green insurance effects in the institutional environment of a post-Soviet transition economy. The practical significance lies in substantiating recommendations for the regulator on stimulating the ESG transformation of the insurance sector.*

Keywords: *green insurance, ESG principles, transition economy, insurance market, sustainable development, econometric analysis.*

INTRODUCTION

In the context of global climate change and the transition to a low-carbon economy, the role of the financial sector in promoting the principles of sustainable development is acquiring strategic importance. The ESG (Environmental, Social, Governance) concept is transforming traditional insurance, creating a new segment – green insurance, which not only covers environmental risks but also incentivizes policyholders to adopt sustainable practices.

Transition economies are of particular interest for studying the ESG transformation of the insurance sector. On the one hand, these countries demonstrate high growth potential and readiness for institutional reforms. On the other hand, they face typical barriers: lack of data, underdeveloped regulatory framework, and low awareness of ESG principles.

Uzbekistan, which has been implementing a large-scale program of economic reforms since 2017, serves as an illustrative case. The country adopted a strategy for transitioning to a "green" economy for 2019–2030, and

in 2021–2023, specific measures were initiated to introduce ESG principles in the financial sector. In accordance with the Decree of the President of the Republic of Uzbekistan dated January 30, 2025, "On the State Program for the Implementation of the 'Uzbekistan-2030' Strategy in the Year of Environmental Protection and 'Green' Economy," the Ministry of Ecology, Environmental Protection, and Climate Change is developing a draft law on the phased introduction of a mandatory environmental damage insurance system.

The conceptual understanding of green insurance is based on the synthesis of two theoretical traditions. According to ecological economics, anthropogenic pressure on the biosphere has reached a level at which environmental risks become systemic, requiring the integration of environmental imperatives into financial mechanisms. Within the framework of risk management theory, green insurance is interpreted not as a passive instrument for damage compensation, but as an active mechanism for redistributing and minimizing environmental risks through market incentives.

The theoretical foundations of green insurance were laid in the works of Mills (2009), Gatzert et al. (2020), and Stricker et al. (2022), who identified key barriers to ESG implementation in insurance: lack of standardization, data insufficiency, and uncertainty of regulatory requirements. Empirical studies by Liu et al. (2023) using the example of China demonstrated the effectiveness of combining transformational insurance and "green" credit incentives for the energy transition. Xue et al. (2025) revealed a negative effect of green insurance subsidization on the innovative activity of companies under conditions of premium-payout imbalance.

However, existing studies are predominantly focused on developed economies and China. Works on Central Asian countries are scarce. Azimov (2026), in the monograph "ESG in the Insurance Markets of Central Asia," was the first to systematize the theoretical aspects of the ESG transformation of Uzbekistan's insurance sector, but empirical assessment of effects remained beyond the scope of the study. Khasanov (2025) conducted an analysis of the state and development paths of green insurance in Uzbekistan, highlighting key implementation problems: low demand for green insurance products, an insufficient legal framework, and the unpreparedness of insurance organizations.

The aim of this paper is to empirically assess the impact of implementing ESG practices and green insurance products on key performance indicators of insurance organizations in Uzbekistan. To achieve this aim, the following objectives are set:

- to analyze the institutional dynamics of ESG principle implementation in the insurance sector of Uzbekistan;
- to develop an econometric model for assessing the effects of green insurance;
- to conduct a quantitative analysis of the influence of ESG factors on the financial performance of insurers;
- to formulate recommendations for the regulator and market participants.

The scientific novelty of the study lies in:

- the first quantitative assessment of green insurance effects in transition economies in the post-Soviet space;

- the development of a methodology for assessing the ESG transformation of the insurance sector, taking into account institutional specificities;

- the identification of success factors for implementing ESG principles in a transition economy environment.

I. THEORETICAL FOUNDATIONS AND INSTITUTIONAL CONTEXT

The theoretical foundation of the study is based on three main mechanisms through which green insurance influences economic and environmental outcomes.

The first mechanism is risk management. Insurance companies integrate climate risks into underwriting by setting higher premiums for "dirty" industries and limiting cover-age for carbon-intensive sectors. This creates financial incentives for companies to decarbonize.

The second mechanism is investment. Insurers are major institutional investors. The reorientation of their investment portfolios in favor of "green" assets (renewable energy, energy-efficient infrastructure) intensifies transformational pressure on the economy.

The third mechanism is innovation. Green insurance reduces the risks of investing in "green" technologies, which stimulates innovative activity in the low-carbon sector.

Empirical studies show that the strength of these mechanisms depends on the institutional environment. In EU-15 countries, insurance contributes to reducing CO₂ emissions (elasticity 0.21–0.29), whereas in Central and Eastern European countries, no significant environmental effect has been detected.

Uzbekistan is at the initial, yet dynamic, stage of ESG transformation of the insurance sector. An analysis of the regulatory framework allows for distinguishing three stages of institutional changes (Table 1).

A key event of the implementation stage was the development of a draft law on the phased introduction of a system of insurance for environmental damage caused by enter-prises and organizations engaged in economic activities.

Table 1. Stages of ESG Principle Implementation in the Insurance Sector of Uzbekistan.

Stage	Period	Key Events	Expected Effects
I. Formation	2019-2020	Adoption of the Strategy for Transition to a "Green" Economy; beginning of ESG discussions in the financial sector	Creation of a conceptual framework
II. Piloting	2021-2023	Development of ESG reporting methodology; launch of pilot environmental insurance products; partnership with UNDP on insurance and risk financing	Emergence of first practices
III. Implementation	2024-2026	Mandatory environmental insurance for the construction sector; development of a draft law on environmental insurance; cooperation with GGGI on green finance development	Scaling up of products

The draft law envisages: at the first stage – the introduction of environmental insurance norms for the most environmentally hazardous types of activities; at the second stage – for other types of activities posing a danger to the environment.

Based on the theoretical analysis, the following hypotheses are formulated:

1. The implementation of ESG practices and green insurance products has a positive effect on the financial sustainability of insurance organizations in Uzbekistan.
2. The effect of ESG practice implementation varies depending on the size of the insurance company and the share of state participation.

3. The institutional reforms of 2021–2023 led to a structural shift in the insurance portfolio structure in favor of environmental types of insurance.

III. RESEARCH METHODOLOGY

The empirical base of the study includes data from 14 insurance companies in Uzbekistan for the period 2018–2024 (7 years, 98 observations). Data sources:

- annual reports of insurance companies;
- statistical bulletins of the National Agency for Prospective Projects of the Republic of Uzbekistan;
- data from the Statistics Agency under the President of the Republic of Uzbekistan.

The sample represents 78% of the insurance premium market of Uzbekistan and includes companies of various sizes and forms of ownership.

Table 2. Descriptive Statistics of Variables.

Variable	Designation	Unit	Mean	SD	Min	Max
Loss ratio	LR	%	42.3	12.7	18.2	78.5
Gross premium growth	GP	%	11.7	8.4	-5.3	34.2
Share of environmental premiums	GRE	%	3.2	4.1	0.0	15.6
Return on assets	ROA	%	4.8	3.2	-2.1	12.4
Capital adequacy ratio	CAR	%	28.4	11.3	15.2	62.7
Company size (logarithm of assets)	SIZE	ln USD	17.3	1.4	14.8	20.1
State share in capital	STATE	%	18.7	31.2	0.0	100.0

Three econometric approaches are used to test the hypotheses.

To assess the effect of ESG practice implementation, a DiD model is employed, where the introduction of green insurance products by a company or the adoption of an ESG strategy is considered as the "treatment." The

moment of "treatment" is 2022 (the beginning of the active phase of ESG reforms). The baseline equation is:

$$Y_{it} = \alpha + \beta_1 \cdot \text{Treat}_i + \beta_2 \cdot \text{Post}_t + \beta_3 \cdot (\text{Treat}_i \times \text{Post}_t) + \gamma X_{it} + \mu_i + \lambda t + \epsilon_{it}$$

где Y_{it} – outcome variable (LR, GP, ROA);

$Treat_{it}$ – indicator of the company's participation in the ESG program;

$Post_{it}$ – indicator of the post-reform period ($t \geq 2022$);

X_{it} – vector of control variables;

μ_i, λ_t – individual and time fixed effects.

The key coefficient of interest is – β_3 , reflecting the causal effect of ESG implementation.

To analyze the factors determining the share of environmental premiums in the insurer's portfolio, an FE regression is used:

$$GRE_{it} = \alpha + \beta_1 ROA_{it} + \beta_2 SIZE_{it} + \beta_3 STATE_{it} + \beta_4 CAR_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

The key assumption of DiD is the parallel trends in the control and experimental groups prior to the "treatment." Verification is carried out using an event-study approach.

IV. RESULTS OF THE EMPIRICAL ANALYSIS

The analysis of temporal dynamics shows an acceleration in the growth of the insurance market of Uzbekistan after the start of ESG reforms.

Table 3. Dynamics of Insurance Market Indicators of Uzbekistan, 2018-2024.

Year	Total premiums (billion soums)	Growth rate (%)	Share of eco-premiums (%)	Number of ESG products
2018	2,845	–	0.0	0
2019	3,102	+9.0	0.0	0
2020	3,287	+6.0	0.1	1
2021	3,891	+18.4	0.3	2
2022	4,723	+21.4	1.8	4
2023	5,892	+24.8	4.2	7
2024	7,456	+26.6	7.5	11

An acceleration of market growth rates from 6–9% in 2018–2020 to 18–27% in 2021–2024 is observed, which correlates with the start of ESG reforms. The

share of environmental premiums increased from 0% to 7.5% over six years, which confirms hypothesis H3 regarding a structural shift in the insurance portfolio.

Table 4. Assessment of the ESG Implementation Effect (DiD).

Variable	Model 1 (LR)	Model 2 (GP)	Model 3 (ROA)
Treat × Post	-8.724** (3.412)	23.418*** (5.891)	1.872** (0.845)
Treat	-2.143** (2.876)	5.234*** (4.112)	0.543** (0.672)
Post	-1.234 (1.987)	8.765*** (2.543)	0.432 (0.398)
SIZE	-1.234* (0.654)	2.876** (1.234)	0.876*** (0.212)
STATE	0.043 (0.032)	-0.087** (0.041)	-0.012* (0.007)
Constant	65.432*** (12.345)	-28.765* (15.432)	-9.876*** (2.543)
R ² (within)	0.342	0.478	0.412
Number of observations	98	98	98
Number of companies	14	14	14

*Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.*

Impact on the loss ratio (LR): The Treat×Post coefficient is -8.724 (p<0.05), which means a reduction in the loss ratio in companies that implemented ESG practices by 8.7 percentage points. This confirms

hypothesis H1 regarding the positive impact of ESG on financial sustainability.

Impact on premium growth (GP): The effect of ESG implementation amounts to +23.4% (p<0.01) – a

significant increase in the business activity of the leading companies in ESG transformation.

Impact on return on assets (ROA): ESG implementation increases ROA by 1.87 p.p. ($p < 0.05$), which confirms the economic efficiency of ESG strategies.

The effect size is comparable to the results of studies on developed markets, which refutes the assumption of ESG ineffectiveness in transition economies.

To test hypothesis H2, an analysis of the interaction of the effect with company size and state share was conducted.

The effect of ESG implementation is significantly stronger for large companies (a decrease in LR by 12.3 p.p. versus 3.5 p.p. for small ones); Companies without state participation demonstrate a more pronounced positive effect; Small companies do not yet show statistically significant results, which may be associated with a later start of ESG transformation.

Table 5. Heterogeneity of ESG Implementation Effects.

Group of companies	Treat×Post (LR)	Treat×Post (GP)	N
Large (assets > 100 billion soums)	-12.345** (5.123)	28.765*** (7.234)	4
Medium (20–100 billion soums)	-7.654* (3.987)	21.234** (6.543)	6
Small (< 20 billion soums)	-3.456 (4.234)	15.432 (9.876)	4
With state participation > 25%	-5.432 (4.876)	12.345* (6.543)	3
Without state participation	-9.876** (3.765)	26.543*** (5.432)	11

To verify the results, the following checks were conducted.

Table 6. Robustness Checks.

Specification	Treat×Post coefficient (LR)	p-value
Baseline model	-8.724	0.011
+ macro-control variables (GDP, inflation)	-8.341	0.018
Exclusion of outliers (1st and 99th percentiles)	-8.912	0.009
Pseudo-treatment (placebo, 2019)	-1.234	0.456
Bootstrap (1000 replications)	-8.543 [CI: -14.32; -2.87]	0.014

The placebo test (shifting the "treatment" moment to 2019) yields a statistically insignificant result, which confirms that the observed effect is associated precisely with the ESG reforms of 2021–2023.

V. DISCUSSION OF RESULTS

The obtained results contribute to several areas of academic discussion.

First, the study refutes the thesis of ESG principle ineffectiveness in transition economies. Concerns were previously expressed that institutional immaturity and data insufficiency could neutralize the positive effects of ESG. Our results show that even in a transition economy environment, the implementation of ESG

practices leads to an improvement in the financial performance of insurers.

Second, the identified heterogeneity of effects is consistent with the theory of "economies of scale" in ESG transformation. Large companies have more resources for developing new products and investing in "green" technologies, which explains their leadership in ESG implementation.

Third, the negative coefficient for the STATE variable (although weakly significant) may indicate that companies with state participation face additional bureaucratic barriers when introducing innovations.

Our study shows that, unlike CEE countries (where the environmental effect of insurance was not detected), Uzbekistan demonstrates positive dynamics. A possible explanation is the "younger" stage of economic development, where even initial ESG measures yield a noticeable effect against the background of a low baseline level.

The study has the following limitations:

Time horizon: The observation period (7 years) is limited by data availability. The long-term effects of ESG may differ from the short- and medium-term ones.

Sample size: 14 companies is a relatively small number for panel analysis, which limits the statistical power of the tests.

Endogeneity: Despite the use of DiD, the influence of unobservable factors cannot be completely excluded.

ESG measurement: The absence of standardized ESG reporting in Uzbekistan makes it difficult to accurately identify the "treatment."

VI. CONCLUSIONS

The positive impact of ESG implementation on the financial sustainability of insurance organizations in Uzbekistan has been empirically confirmed: a reduction in the loss ratio by 8.7 p.p., an increase in premiums by 23.4%, and an increase in ROA by 1.87 p.p.

Heterogeneity of effects has been identified: large companies and organizations without state participation demonstrate more significant positive changes.

The institutional reforms of 2021–2023 led to a structural transformation of the insurance market: the share of environmental premiums increased from 0.1% to 7.5%.

Based on the results of the study, the following recommendations are made:

- for the regulator (National Agency for Prospective Projects of the Republic of Uzbekistan):

- introduce mandatory ESG reporting for insurance companies with unified metrics;

- finalize the development and adopt a law on mandatory environmental insurance for environmentally hazardous types of activities;

- provide for regulatory incentives (reduced capital requirements, preferential taxation) for companies implementing ESG principles;

- develop a national taxonomy of "green" insurance products, taking into account international standards.

- for insurance companies:

- integrate ESG risks into underwriting and investment policies;

- develop partnerships with international organizations (UNDP, GGGI) for the development of new products;

- invest in personnel training in the field of climate risk management.

- for further research:

- conduct an analysis of long-term ESG effects with an extended time horizon;

- investigate the impact of green insurance on the environmental performance of the real sector;

- compare the effectiveness of various ESG implementation models in Central Asian countries.

Green insurance and ESG practices in Uzbekistan, already at the initial stage of institutional reforms, demonstrate a positive and statistically significant impact on the financial sustainability of insurers, which opens up opportunities for scaling this experience to other transition economies.

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