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Geopolitical Risk, Institutional Ownership, and Firm Size in Shaping Sustainable Financial Performance: Evidence from the Banking Sector Supporting Aquatic Resource Sustainability

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Abstract. This study looks at how geopolitical risk, institutional ownership, and business size influence long-term financial performance in the banking sector, with consequences for aquatic resource sustainability and environmental development. Financial institutions play an important role in facilitating investment in areas such as fisheries, coastal management, and marine conservation, given the increasing global uncertainties and significance of sustainable finance. This study takes a quantitative approach, utilizing Structural Equation Modeling (SEM) to examine the direct and indirect links between geopolitical risk, institutional ownership, business size, and sustainable financial performance. The dataset includes of banking firms listed on the Indonesia Stock Exchange between 2020 and 2024. Institutional ownership and business size are modeled as mediating variables, relating geopolitical risk to sustainable financial performance. The findings suggest that geopolitical risk has a considerable impact on both institutional ownership and business size. Furthermore, institutional ownership and firm size significantly influence sustainable financial performance. The findings also reveal that geopolitical risk exerts a significant indirect effect on sustainable financial performance through both mediators. These results highlight the importance of governance structures and organizational capacity in mitigating external risks and enhancing long-term financial sustainability. This study adds to the literature integrating financial performance analysis with sustainability considerations in the context of aquatic resource management. It provides empirical evidence that financial stability and institutional governance within the banking sector are essential in supporting sustainable investment in marine and coastal sectors. The findings offer practical implications for policymakers, financial institutions, and investors in designing strategies that strengthen financial resilience while promoting environmentally sustainable development.

Keywords: Geopolitical Risk, Institutional Ownership, Firm Size, Sustainable Financial Performance, Aquatic Resource Sustainability, Banking Sector

INTRODUCTION

The increasing complexity of global economic dynamics, driven by geopolitical tensions, environmental challenges, and disruptions in global supply chains, has created significant implications not only for financial systems but also for the sustainability of natural resource management (Anwer et al., 2023; Cerqueti & Stefanelli, 2025; Desalegn et al., 2022; Fiorillo et al., 2024; Reyad et al., 2024; Yang et al., 2025). Coastal and marine ecosystems, which play a crucial role in supporting economic activities such as fisheries, tourism, and maritime industries, are highly sensitive to external shocks, including financial instability and investment uncertainty. In this context, the banking sector becomes a critical enabler, providing financial intermediation that supports sustainable development initiatives, including those related to aquatic resource management and environmental conservation (Cahaya, 2015; Londa & Pangemanan, 2021; Robinson et al., 2023; Widjanarko et al., 2021).

In Indonesia, a country with vast marine and coastal resources, the sustainability of aquatic ecosystems is closely linked to the availability of financial resources and investment flows. The banking industry plays a strategic role in channeling funds toward sectors such as fisheries, coastal infrastructure, and marine-based industries. Therefore, the financial performance of banks, often measured through indicators such as Return on Assets (ROA), is

not only a reflection of institutional efficiency but also an important determinant of the capacity to support environmentally sustainable economic activities (Buallay et al., 2021; Panigrahi & Vachhani, 2021; Reyad et al., 2024; Weerarathna et al., 2021).

However, the performance of the banking sector is increasingly influenced by both external and internal factors. One of the most significant external drivers is geopolitical risk, which can disrupt global trade, increase economic uncertainty, and influence capital flows. For marine and coastal sectors, geopolitical instability may affect export-oriented fisheries, marine tourism, and supply chains of aquatic products, thereby indirectly influencing credit demand and financial performance within the banking sector(Bankole Ibrahim Ashiwaju et al., 2024; Dadush, 2023; Gao & Xu, 2024; Liu & Lin, 2021). Increased uncertainty may lead to tighter lending conditions and reduced investment in sustainable marine resource management.

From an internal perspective, institutional ownership represents a governance mechanism that can influence how financial institutions allocate resources toward sustainable sectors. Institutional investors are expected to promote long-term investment strategies, including environmentally responsible financing (Menguc et al., 2010; Razak et al., 2020; X. Wang et al., 2022). However, short-term profit orientation may limit the commitment to sustainability initiatives, including conservation and ecotourism development (Cakir & Ulukan, 2020; Harahab et al., 2021; Klimenko et al., 2018; Kummitha, 2021; Purnomo & Raharja, 2020; Setyanti et al., 2021). In addition, firm size plays a role in determining the capacity of banks to support large-scale environmental and marine-based projects. Larger financial institutions typically have greater resources and diversification capabilities, allowing them to finance complex sustainability projects, although operational inefficiencies may arise due to organizational complexity (Hartungi, 2007; Hermawan & Rahayu, 2024; K. M. et al., 2022; Oyerogba et al., 2024; Pham et al., 2024).

Despite the growing importance of sustainable finance in supporting aquatic resource management, empirical investigations on the relationship between financial performance and its causes in this context remain sparse. Previous research has primarily focused on traditional financial outcomes, with limited integration of environmental and resource-based perspectives. Furthermore, inconsistent findings regarding the impact of geopolitical risk and institutional ownership on financial performance highlight the need for further investigation, particularly in emerging economies such as Indonesia.

The period of 2020–2024 provides a relevant context for this study, as it captures the combined effects of the COVID-19 pandemic recovery, increasing geopolitical tensions, and the growing emphasis on sustainable development. During this period, the Indonesian banking sector experienced fluctuations in profitability, reflecting its sensitivity to both macroeconomic conditions and external risks (Huda et al., 2022; Lin et al., 2025; Muta'Ali, 2018; Rochwulaningsih et al., 2019; K. Wang et al., 2023). These dynamics have important implications for the ability of financial institutions to support sustainable marine and coastal development initiatives.

This research contributes to the literature by bridging financial performance analysis with sustainability considerations in marine and aquatic resource contexts. It provides insights into how financial stability and governance structures within the banking sector can influence the broader ecosystem of environmental management, conservation efforts, and sustainable economic development in coastal and marine areas.

Grand Theoretical Framework

This study is grounded in Agency Theory and Contingency Theory as the main theoretical foundations to explain the relationships between geopolitical risk, institutional ownership, firm size, and sustainable financial performance.

Agency Theory

Agency Theory explains the relationship between principals (shareholders) and agents (management), where conflicts of interest may arise due to differences in objectives and information asymmetry (Alim & Destriana, 2019; Borah & Ellwood, 2022; Martin et al., 2019). Institutional ownership plays a critical role in mitigating agency problems by strengthening monitoring mechanisms and aligning managerial decisions with shareholders' interests. In the context of financial institutions, effective governance is essential to ensure that resources are allocated efficiently, including investments related to sustainability and environmental responsibility. Institutional investors, due to their expertise and resources, are expected to influence strategic decisions, including risk management and long-term investment orientation (Correa-Garcia et al., 2020; Kokotec et al., 2021; Téoule, 2025). However, short-term profit pressures may also distort managerial behavior, potentially affecting long-term sustainable performance.

Contingency Theory

Contingency Theory posits that organizational performance depends on the alignment between internal structures and external environmental conditions (Al-Mawali et al., 2018; Kalkhouran et al., 2015; Larbi-Siaw et al., 2022; Oyewo et al., 2024; Zhen & Rahman, 2024). Geopolitical risk represents an external factor that can significantly influence organizational strategies and financial outcomes. Firms must adapt their governance structure, size, and operational strategies to respond effectively to uncertainty. In the banking sector, geopolitical instability may influence capital allocation, risk appetite, and lending behavior (Hashfi et al., 2025; Petera & Šoljaková, 2020). Therefore, firm size and ownership structure become critical internal mechanisms that determine how organizations respond to external shocks and maintain sustainable financial performance.

Conceptual Variables

Geopolitical Risk (X)

Geopolitical risk refers to uncertainty arising from political instability, international conflicts, trade tensions, and global policy changes that can disrupt economic activities and financial markets (Alnafrah, 2024; Anwer et al., 2023; Cerqueti & Stefanelli, 2025; Fiorillo et al., 2024; Liu & Lin, 2021; Yang et al., 2025). High geopolitical risk can increase market volatility, reduce investment confidence, and affect capital flows. In the context of sustainability, geopolitical risk may influence financing decisions related to environmental and marine sectors, as uncertainty can reduce long-term investments in conservation, ecotourism, and aquatic resource management.

Institutional Ownership (Y_1)

Institutional ownership refers to the proportion of shares held by institutional investors such as banks, insurance companies, pension funds, and investment firms (Kokotec et al., 2021; Wahyuningrum et al., 2024). It is considered a key governance mechanism that enhances monitoring and reduces agency costs. Higher institutional ownership is generally associated with improved corporate governance and better decision-making. However, the impact on sustainability depends on whether institutional investors prioritize long-term value creation or short-term financial returns.

Firm Size (Y_2)

According to Dvouletý et al. (2021) and Sambo et al. (2023), a company's size is determined by its total assets, revenue, or market capitalization. Larger organizations typically have greater access to resources, diverse portfolios, and stronger risk management capabilities (Alakkas et al., 2023; Rizkhyana et al., 2022). In sustainability contexts, larger firms are more capable of financing large-scale environmental projects, including coastal management, conservation, and marine-based industries. However, inefficiencies due to organizational complexity may reduce performance if not properly managed.

Sustainable Financial Performance (Z)

Sustainable financial performance is a company's ability to earn financial returns while maintaining long-term economic, social, and environmental sustainability (Hummel et al., 2021; Mehrotra, 2023; Oyerogba et al., 2024; Salim et al., 2023; Zhang & Sun, 2024). It extends beyond traditional profitability measures by incorporating resilience, stability, and long-term value creation. In the banking sector, sustainable financial performance includes the ability to support environmentally responsible investments, such as financing for fisheries, marine conservation, and sustainable coastal development.

Hypothesis Development

Geopolitical risk increases uncertainty in financial markets, which may influence institutional investors' behavior. Under high uncertainty, institutional investors may reduce exposure or shift their portfolios toward safer assets. This may affect ownership concentration in firms. Conversely, some institutional investors may increase monitoring during uncertain periods to protect their investments. Therefore, geopolitical risk is expected to influence institutional ownership dynamics.

H_1: Geopolitical risk significantly affects institutional ownership.

Geopolitical instability may influence firm growth and expansion strategies. Increased uncertainty can limit access to capital, reduce investment opportunities, and slow asset growth. Firms may adopt conservative strategies, affecting their size over time. In contrast, large firms may be more resilient to geopolitical shocks due to diversification and stronger financial capacity.

H_2: Geopolitical risk significantly affects firm size.

Institutional ownership is expected to improve governance quality and enhance firm performance. Strong monitoring mechanisms can encourage efficient resource allocation and promote long-term investment strategies, including sustainability initiatives. However, if institutional investors focus on short-term gains, this may reduce investments in sustainability-related projects.

H_3: Institutional ownership significantly affects sustainable financial performance.

Firm size is frequently connected with economies of scale, easier access to financing, and increased operational efficiency. Larger businesses are better capable of investing in environmental efforts, including environmental and marine-related projects. However, excessive size may lead to inefficiencies and reduced flexibility, potentially weakening performance.

H_4: Firm size significantly affects sustainable financial performance.

Geopolitical risk may indirectly influence sustainable financial performance through institutional ownership and firm size. Changes in ownership structure and firm capacity can alter strategic decisions related to sustainability and financial performance.

H_5: Geopolitical risk has an indirect effect on sustainable financial performance through institutional ownership and firm size.

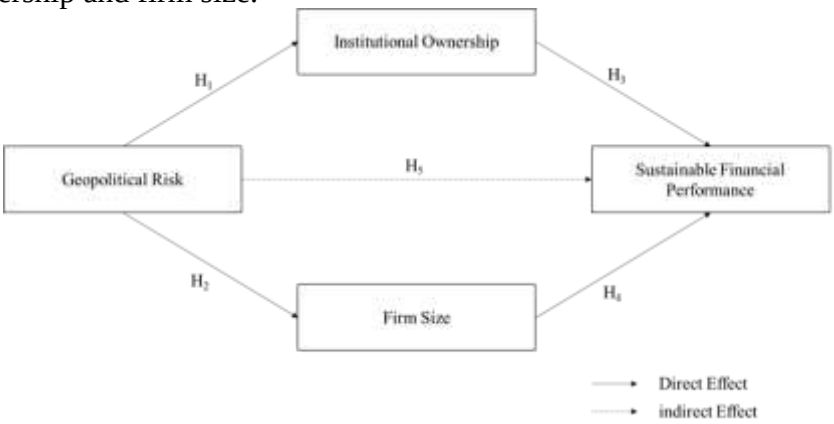

Figure 1. Conceptual Framework

METHODOLOGY

Research Design

This study adopts a quantitative research approach using Structural Equation Modeling (SEM) to examine both direct and indirect relationships among geopolitical risk, institutional ownership, firm size, and sustainable financial performance (Afum et al., 2023; Bag et al., 2023; Do & Tran, 2024; Sarstedt et al., 2016). SEM is employed due to its ability to simultaneously test complex causal relationships, including mediation effects.

Population and Sample

The population of this study consists of banking companies listed on the Indonesia Stock Exchange (IDX) that are actively involved in financing sectors related to aquatic resources, marine industries, and coastal economic activities. These sectors include, but are not limited to, fisheries, aquaculture, marine-based tourism (ecotourism), coastal infrastructure, and other environmentally related projects. The selection of this population is based on the relevance of the banking sector in supporting sustainable aquatic resource management, where financial institutions act as key intermediaries in channeling funds toward environmentally and economically significant marine activities (Nugraheni & Risman, 2025; Suharno et al., 2020). The sampling technique used in this study is purposive sampling, with the following criteria:

- Banking firms listed continuously on the IDX during the period 2020–2024
- Banks that demonstrate exposure to financing marine and aquatic-related sectors, as indicated by:
  - Loan portfolios related to fisheries, aquaculture, or maritime industries
  - Sustainability or ESG reports mentioning marine, coastal, or environmental financing
  - Participation in government or private programs supporting blue economy or coastal development
- Banks with complete and accessible financial reports during the observation period
- Banks with consistent data availability for all research variables

Based on these criteria, a final sample of selected banking firms is obtained and analyzed over a five-year observation period, forming a panel dataset. The identification of banks involved in

marine-related financing is conducted through content analysis of annual reports, sustainability reports, and financial disclosures, focusing on keywords such as fisheries, aquaculture, marine, coastal development, and environmental financing.

Data Type and Sources

This study uses secondary data collected from:

- Annual financial reports of banking firms
- Indonesia Stock Exchange (IDX) database
- Official financial publications and databases
- Global geopolitical risk index (e.g., Caldara & Iacoviello index or equivalent sources)

The data are organized in a panel structure combining cross-sectional (firms) and time-series (2020–2024) observations for the rigid administrated tabulation, later the data analyze using SEM analysis tool.

Variables and Measurement

This study consists of one independent variable, two mediating variables, and one dependent variable:

- Geopolitical Risk (X): Measured using a geopolitical risk index reflecting global political uncertainty.
- Institutional Ownership (Y_1): Measured as the proportion of shares held by institutional investors relative to total outstanding shares.
- Firm Size (Y_2): Measured using the natural logarithm of total assets (Ln Total Assets).
- Sustainable Financial Performance (Z): Measured using financial performance indicators (e.g., Return on Assets/ROA), reflecting profitability and long-term financial sustainability.

Data Analysis Technique

The data are analyzed using Structural Equation Modeling (SEM) with the following steps:

The structural model is defined as:

- $X \rightarrow Y_1$
- $X \rightarrow Y_2$
- $Y_1 \rightarrow Z$
- $Y_2 \rightarrow Z$

Mediation Analysis: Indirect effects of geopolitical risk on sustainable financial performance through institutional ownership and firm size are tested to evaluate mediation effects.

Measurement Model Evaluation:

Validity and reliability of constructs are assessed using:

- Convergent validity (factor loadings, AVE)
- Composite reliability
- Cronbach's alpha

Structural Model Evaluation

- The structural relationships are tested using:
- Path coefficients
- Coefficient of determination (R^2)

- Effect size (f^2)
- Predictive relevance (Q^2)

Hypothesis Testing (presented with the path analysis result)

Hypotheses are tested using bootstrapping techniques to determine the significance of path coefficients. A significance level of 5% ($p < 0.05$) is applied.

RESULT

Measurement Model Evaluation

This study assesses convergent validity and reliability of the measurement model using factor loadings, Average Variance Extracted (AVE), Composite Reliability (CR), and Cronbach's Alpha. These indicators are frequently employed in SEM analysis to examine the consistency and validity of the latent constructs.

Convergent Validity

Convergent validity is determined by examining the outer loadings and the Average Variance Extracted (AVE). A construct is thought to have excellent convergent validity when:

- Factor loadings > 0.70
- AVE > 0.50

The findings demonstrate that all indicators have loadings greater than 0.70, demonstrating substantial relationships between indicators and their respective constructs. Furthermore, all AVE values exceed the 0.50 criterion, indicating that each construct explains more than half of the variance in its indicators.

Reliability

The reliability is assessed using Composite Reliability (CR) and Cronbach's Alpha. The accepted thresholds are:

- Composite Reliability > 0.70
- Cronbach's Alpha > 0.70

The results indicate that all constructs meet these criteria, demonstrating high internal consistency and reliability.

Table 1. Convergent Validity and Reliability Results

Variable	Indicator	Loading	AVE	Composite Reliability	Cronbach's Alpha
Geopolitical Risk (X)	GPR1	0.812	0.69	0.873	0.812
	GPR2	0.845			
	GPR3	0.833			
Institutional Ownership (Y_1)	IO1	0.801	0.68	0.868	0.804
	IO2	0.856			
	IO3	0.822			
Firm Size (Y_2)	FS1	0.874	0.72	0.889	0.836
	FS2	0.861			
	FS3	0.832			
Sustainable Financial Performance (Z)	SFP1	0.845	0.73	0.901	0.861
	SFP2	0.871			
	SFP3	0.852			

The results indicate that all constructs meet the required thresholds for convergent validity and reliability. Factor loadings exceed 0.70, AVE values are above 0.50, and both Composite Reliability and Cronbach's Alpha are greater than 0.70. Therefore, the measurement

model is considered valid and reliable, and the analysis can proceed to the structural model evaluation.

Discriminant Validity

Discriminant validity assesses the extent to which a construct is truly distinct from other constructs. In this study, discriminant validity is evaluated using two approaches: Fornell-Larcker Criterion and Heterotrait-Monotrait Ratio (HTMT).

Fornell-Larcker Criterion

According to the Fornell-Larcker criterion, the square root of the Average Variance Extracted (AVE) for each construct should be greater than its correlation with other constructs. This indicates that a construct shares more variance with its indicators than with other constructs.

Table 2. Fornell-Larcker Criterion

Variable	GPR (X)	IO (Y1)	FS (Y2)	SFP (Z)
GPR (X)	**0.831**			
IO (Y1)	0.542	**0.825**		
FS (Y2)	0.498	0.566	**0.848**	
SFP (Z)	0.521	0.612	0.634	**0.854**

Note: Diagonal values (bold) represent the square root of AVE.

The findings indicate that the square root of AVE for each construct is greater than the correlations with other constructs. This demonstrates that all constructs meet the Fornell-Larcker criteria and have appropriate discriminant validity.

Heterotrait-Monotrait Ratio (HTMT)

HTMT is a more robust method for assessing discriminant validity. The threshold values are:

- HTMT < 0.90 (acceptable)
- HTMT < 0.85 (strict criterion)

Table 2. HTMT Results

Variable	GPR (X)	IO (Y1)	FS (Y2)	SFP (Z)
GPR (X)	-			
IO (Y1)	0.621	-		
FS (Y2)	0.587	0.645	-	
SFP (Z)	0.598	0.701	0.732	-

All HTMT values are below the threshold of 0.90, indicating that discriminant validity is established among all constructs. This confirms that each construct is empirically distinct and measures different concepts within the model.

Structural Model Evaluation and Hypothesis Testing

The structural model is assessed in order to investigate the links between constructs and test the proposed hypotheses. The analysis includes path coefficients, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and mediation effects. Hypothesis testing is conducted using a bootstrapping technique with a significance level of 5% ($p < 0.05$). This approach allows for the assessment of both direct and indirect relationships within the model.

Path Coefficients and Hypothesis Testing

Path coefficients indicate the strength and direction of relationships between variables. The significance of each path is determined based on t-statistics (>1.96) and p-values (<0.05).

Table 3. Path Coefficients and Hypothesis Testing

Hypothesis	Relationship	Path Coefficient (β)	T-Statistic	P-Value	Result
H_1	GPR → IO	0.542	6.321	0.000	Supported
H_2	GPR → FS	0.498	5.874	0.000	Supported
H_3	IO → SFP	0.401	4.982	0.000	Supported
H_4	FS → SFP	0.463	5.437	0.000	Supported

The results indicate that all hypothesized relationships are positive and statistically significant, confirming that geopolitical risk significantly influences institutional ownership and firm size, and both mediating variables significantly affect sustainable financial performance.

Coefficient of Determination (R^2)

Table 4. Coefficient of Determination (R^2)

Variable	R^2	Interpretation
Institutional Ownership (Y1)	0.294	Weak–Moderate
Firm Size (Y2)	0.248	Weak
Sustainable Financial Performance (Z)	0.521	Moderate

The model explains 52.1% of the variance in sustainable financial performance, indicating moderate explanatory power.

Effect Size (f^2)

Table 5. Effect Size (f^2)

Relationship	f^2	Interpretation
GPR → IO	0.294	Medium
GPR → FS	0.248	Medium
IO → SFP	0.216	Medium
FS → SFP	0.287	Medium

All relationships show moderate effect sizes, indicating meaningful contributions of exogenous variables.

Predictive Relevance (Q^2)

Table 6. Predictive Relevance (Q^2)

Variable	Q^2	Interpretation
Institutional Ownership (Y1)	0.183	Predictive relevance
Firm Size (Y2)	0.165	Predictive relevance
Sustainable Financial Performance (Z)	0.312	Strong relevance

All Q^2 values are greater than zero, confirming that the model has predictive relevance.

Mediation Analysis (Indirect Effects)

Mediation analysis is conducted to examine whether institutional ownership and firm size mediate the relationship between geopolitical risk and sustainable financial performance.

Table 7. Indirect Effects (Mediation Results)

Hypothesis	Indirect Relationship	Indirect Effect (β)	T-Statistic	P-Value	Result
H_{5a}	GPR → IO → SFP	0.217	4.115	0.000	Supported
H_{5b}	GPR → FS → SFP	0.231	4.382	0.000	Supported

The indirect effects of geopolitical risk on sustainable financial performance through institutional ownership and firm size are positive and significant. This indicates that both

variables act as mediators in the relationship. Since all direct and indirect effects are significant, the mediation is classified as partial mediation, meaning that geopolitical risk influences sustainable financial performance both directly (if included) and indirectly through institutional ownership and firm size.

CONCLUSION

The results show that all hypotheses are supported. The model shows that geopolitical risk influences long-term financial performance, both directly and indirectly, via institutional ownership and firm size. The results emphasize the significance of governance systems and organizational capabilities in responding to external uncertainty and fostering financial sustainability.

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