The Impact of Geopolitical Risk and Economic Policy Uncertainty on Institutional Trading Behavior: Evidence from the Taiwan Stock Market

Master's Thesis Defense

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Summary

Executive Summary

Background

Taiwan's market is driven by three key institutional investors: Foreign Investors, Investment Trusts, and Proprietary Dealers

Recent spikes in Geopolitical Risk (GPR) and Economic Policy Uncertainty (EPU) have amplified market volatility

Investors are now more responsive to global risks, not just domestic ones

Objective

Investigate how these three investor types adjust their net trading behavior in response to changes in GPR, EPU, and WUI

Focus on

- Heterogeneity
- Reaction timing
- Evolving sensitivity

Research Process

Literature & Hypotheses

Build on institutional behavior, uncertainty, and risk-sensitivity research

Sample and Methodology

Monthly data (2008–2024)

- **OLS** — for baseline effects
- **IV-GMM** — control endogeneity
- **Dynamic Analysis** — study on spike/drop periods

Empirical Evidence

Interpret reactions across groups

Executive Summary (Contd.)

Key Findings	Foreign Investors	Delayed reactions to GPR
	Investment Trusts	Increasingly risk-averse and responsive to uncertainty
	Dealers	contrarian, opportunistic
Contribution	Reveals distinct institutional behavior under risk	
	Highlights growing global risk sensitivity	
	Offers insights for investment product design and market surveillance	

Agenda

Ch. 01
Introduction

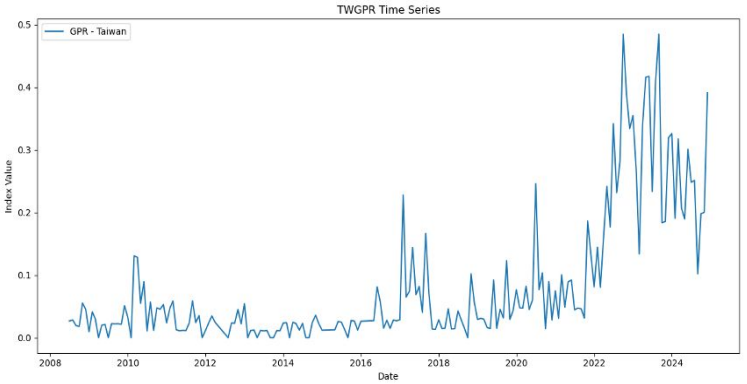
Research Background & Motivation

Role of Institutional Investors in Taiwan

Taiwan's equity market is dominated by three major institutional players: collectively drive a large share of trading volume and impact market trends

- Foreign Investors
- Investment Trusts
- Proprietary Dealers

Rising Global Risk and Local Sensitivity



Geopolitical tensions and economic policy uncertainty have become top risks for global investors

How do different types of institutional investors adjust their trading behavior in response to geopolitical and policy-related uncertainty?

Do geopolitical risk and economic policy uncertainty significantly influence the trading activities of institutional investors in Taiwan?

Are there heterogeneous responses among different types of investors when facing uncertainty?

Are the institutional responses immediate or lagged? Does potential endogeneity affect the reliability of such inferences?

Ch. 02

Literature Review and Hypotheses Development

Characteristics of the Three Major Institutional Investors

Attribute	Foreign Investors	Investment Trusts	Proprietary Traders
Capital Source	Globally diversified funds	Domestic capital	Proprietary capital of local institutions
Investment Region	Globally diversified allocation	Concentrated in domestic markets	Primarily domestic market
Objective	Global portfolio return enhancement, diversification	Stable domestic returns and asset preservation	Short-term profit maximization through tactical trading
Investment Strategy	Long-term allocation	Medium-to-long-term holding, Conservative	Short-term trading
Risk Management	Diversified	Risk avoidance	Flexible adjustment
Short-Term Shock Behavior	Rebalancing across regions	Risk reduction during market volatility	Rapid position adjustments

Foreign investors

Prioritize global diversification, rebalance portfolios across markets

Investment trusts

More conservative, with home bias and strong regulatory constraints, leading to quick reactions during uncertainty

Proprietary traders

Operate flexibly with their own capital, favoring short-term, high-frequency strategies

Institutional Investors Exhibit Distinct Structural and Behavioral Traits

Institutional Investment Behavior & Risk Perception

Chuang & Susmel (2011)	Institutional investors in Taiwan are highly responsive to macroeconomic fluctuations, adjusting portfolios based on interest rate and market signals
Shen (2023)	Risk indicators significantly affect market timing and magnitude of institutional responses; investor behavior has grown more sensitive to these signals
Hsieh (2023)	Global GPR fluctuations correlate with foreign capital flows and TAIEX returns. Geopolitical risk dampens trading activity and affects liquidity

Institutions now react not only to domestic macro signals (rates, GDP) but also to external geopolitical risk, reflecting multi-dimensional adjustments in sentiment, risk tolerance, and liquidity behavior.

Risk Indices Overview

GPR Geopolitical Risk Index	Caldara & Iacoviello 2022	Based on text analysis of global newspapers Measures frequency of terms like “war”, “terrorist”, “conflict” Available in global and country-specific versions
EPU Economic Policy Uncertainty Index	Baker, Bloom & Davis 2016	Tracks terms like “economy,” “policy,” and “uncertainty” in news Used in this study: GEPU (global) and USEPU (U.S.)
WUI World Uncertainty Index	IMF via EIU country reports	Measures frequency of “uncertainty” in EIU reports Reflects country-level policy uncertainty This study uses TWWUI from FRED as a Taiwan-specific regional proxy

Impact of GPR and EPU on Financial Markets and Institutional Investors

Shen (2023)	GPR shocks reduce Taiwan's TAIEX index returns, indicating local market vulnerability to global tensions
Constantinescu, Mattoo, and Ruta (2020)	Policy uncertainty discourages global value chain participation and dampens trade growth
Chiang (2021)	EPU and GPR negatively impact returns on stocks in China.
Liu, Chen, Lin, and Zhu (2024)	Mutual funds tend to reduce market exposure early during geopolitical shocks
Ma and Zhou (2024)	Some hedge funds adjust exposures based on GPR shocks
PwC (2024) and KPMG (2024)	Global risk awareness has intensified in recent years

GPR and EPU increasingly shape markets by affecting returns and capital flows. Institutional investors react to rising risks, with awareness of uncertainty shocks growing in recent years.

Literature Review Highlights & Hypotheses

Gaps

- Prior studies confirm GPR/EPU affect financial markets, but mainly focus on price impact, stock returns, or volatility, not trading behavior
- There is limited research on how different institutional investors respond behaviorally, especially in Taiwan's market structure
- Institutional reactions may vary based on their capital source, mandates, and risk strategies, but this heterogeneity remains understudied

Evidence

- Characteristics vary by investor type (foreign, investment trusts, dealers)
- Sensitivity to risk evolves over time

Hypotheses Development

Literature Review Highlights & Hypotheses

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- Institutional reactions may vary based on their capital source, mandates, and risk strategies, but this heterogeneity remains understudied

Evidence

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- Sensitivity to risk evolves over time

Hypothesis

Hypothesis 1 (H1):
Different types of institutional investors exhibit heterogeneous responses to geopolitical risk (GPR) and economic policy uncertainty (EPU)

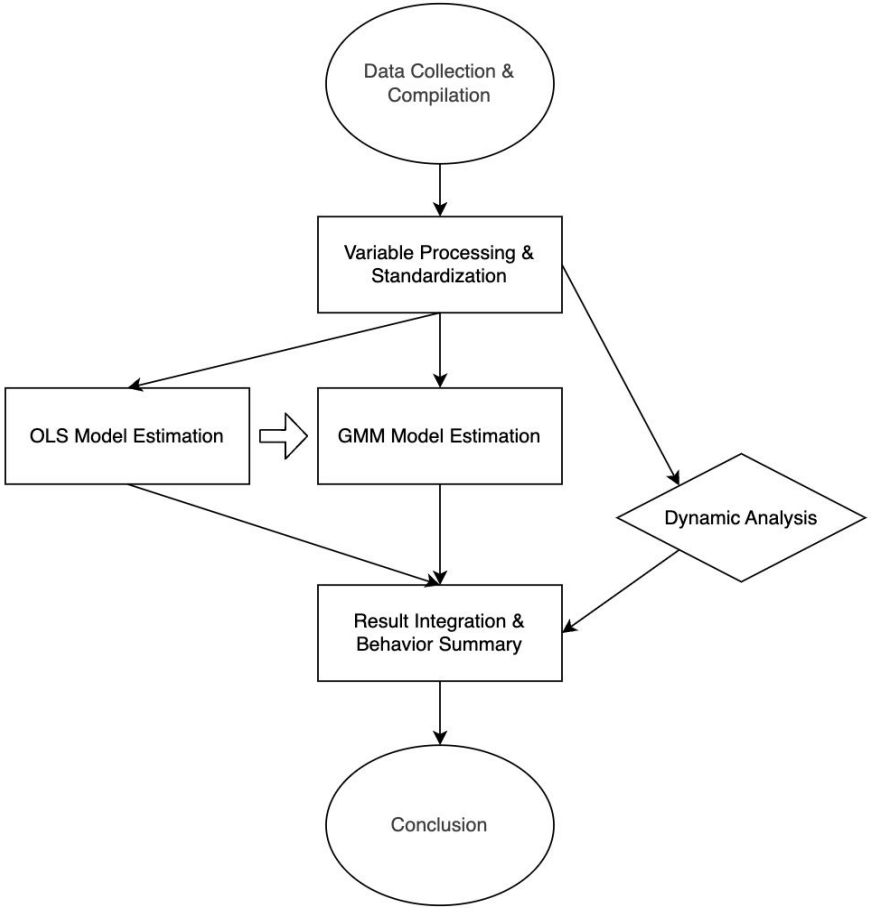
- Foreign investors: Globally diversified portfolios, delayed response to regional risk
- Investment trusts: Risk-averse behavior, reduce positions quickly during uncertainty
- Proprietary traders: Flexible capital use, event-driven

Hypothesis 2 (H2):
Investor sensitivity to risk indicators dynamically changes over time.

- Global tensions and macroeconomic shifts alter risk perception
- Responsiveness to GPR and EPU is time-varying, adapting to evolving environments

Ch. 03 & 04
Sample and Methodology & Empirical Evidence

Research Framework



Data Overview

Data Period	January 2008 – December 2024 (monthly frequency)	
Dependent Variables	Monthly net buy/sell amounts for foreign investors, investment trusts, and proprietary traders	+ indicates net buying – indicates net selling
Explanatory Variables	GPR Index	TWGPR, USGPR
	Economic Policy Uncertainty Index	GEPU, USEPU
	World Uncertainty Index	TWWUI
	Lagged Behavioral Variables	Foreign Investors_lag1, Investment Trust_lag1, Dealer_lag1
Control Variables	Equity returns (TAIEX, S&P 500, Nikkei, HSI) Volatility index (VIX), exchange rates, gold prices	
	US–TW Interest rate spread, business cycle signals, CPI	
Data Processing	Winsorization	1st and 99th percentile
	Missing Value Handling	Handled via row-wise deletion

OLS Methodology Overview

General form of the control variable set

$$\text{Controls}_t = \text{LogReturn}_{t-1},\ \text{Volume}_{t-1},\ \text{VIX}_t,\ \text{Business\_Signal}_t,$$
$$\text{SP500}_t,\ \text{HSI}_t,\ \text{Nikkei}_t,\ \text{USD/TWD}_t,\ \text{Gold}_t,$$
$$\text{InterestRateSpread}_t, \log(\text{CPI}_t)$$

Four key combinations of risk indices used

1. Taiwan GPR (GPRHC_TWN) + Global EPU (GEPU_current)
2. Taiwan GPR (GPRHC_TWN) + U.S. EPU (USEPU)
3. U.S. GPR (GPRHC_USA) + U.S. EPU (USEPU)
4. Taiwan GPR (GPRHC_TWN) + Taiwan WUI (TWWUI)

Sample Period Segmentation

Pre period: May 2008 – July 2016 (Month 1–99)
Post period: August 2016 – December 2024 (Month 100–200)
Full period: May 2008 – December 2024 (Total: 200 months)

Model specification

$$Y_t = \beta_0 + \beta_1 \cdot \text{GPRHC\_TWN}_t + \beta_2 \cdot \text{GPRHC\_TWN}_{t-1} + \beta_3 \cdot \text{GPRHC\_TWN}_{t-2} + \beta_4 \cdot \text{GEPU\_current}_t + \beta_5 \cdot \text{GEPU\_current}_{t-1} + \beta_6 \cdot \text{GEPU\_current}_{t-2} + \beta_7 \cdot \text{Y}_{t-1} + \sum_{k=3}^{n} \beta_k \cdot \text{Controls}_t + \varepsilon_t$$

$$Y_t = \beta_0 + \beta_1 \cdot \text{GPRHC\_TWN}_t + \beta_2 \cdot \text{GPRHC\_TWN}_{t-1} + \beta_3 \cdot \text{GPRHC\_TWN}_{t-2} + \beta_4 \cdot \text{USEPU\_current}_t + \beta_5 \cdot \text{USEPU\_current}_{t-1} + \beta_6 \cdot \text{USEPU\_current}_{t-2} + \beta_7 \cdot \text{Y}_{t-1} + \sum_{k=3}^{n} \beta_k \cdot \text{Controls}_t + \varepsilon_t$$

$$Y_t = \beta_0 + \beta_1 \cdot \text{GPRHC\_USA}_t + \beta_2 \cdot \text{GPRHC\_USA}_{t-1} + \beta_3 \cdot \text{GPRHC\_USA}_{t-2} + \beta_4 \cdot \text{USEPU\_current}_t + \beta_5 \cdot \text{USEPU\_current}_{t-1} + \beta_6 \cdot \text{USEPU\_current}_{t-2} + \beta_7 \cdot \text{Y}_{t-1} + \sum_{k=3}^{n} \beta_k \cdot \text{Controls}_t + \varepsilon_t$$

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OLS Results – Key Findings

OLS Results – TW GPR + Global EPU (Full Period)

This table reports OLS regression coefficients and t-statistics for the effect of Taiwan's GPR index and Global Economic Policy Uncertainty on investor trading behavior (Full period). Coefficients are shown with t-statistics in parentheses. Stars denote statistical significance.

Variable	Foreign	Investment	Dealer	Retail
GPRHC_TWN	−303.89	−362.13	450.08*	138.66
	(−0.34)	(−1.55)	(1.71)	(0.15)
GEPU_current	−2.66	−0.53	−0.15	3.20*
	(−1.48)	(−1.16)	(−0.28)	(1.69)
GPRHC_TWN_lag1	−211.77	−156.76	140.81	109.57
	(−0.22)	(−0.63)	(0.49)	(1.01)
GEPU_current_lag1	11.77	−0.54	−0.42	−0.83
	(0.88)	(−1.05)	(−0.71)	(−0.39)
GPRHC_TWN_lag2	1571.06*	340.44	−216.89	−1673.79*
	(1.66)	(1.41)	(−0.78)	(−1.68)
GEPU_current_lag2	11.69	0.43	1.47***	−3.30*
	(1.15)	(0.43)	(2.97)	(−1.85)
Foreign_Investors_lag1	0.0708	–	–	–
	(0.92)			
Investment_Trust_lag1	–	0.1391	–	–
		(1.43)		
Dealer_lag1	–	–	0.3234***	–
			(4.28)	
Retail_Investors_lag1	–	–	–	0.0814
				(1.11)
R^2	0.471	0.508	0.530	0.496
Adj. R^2	0.415	0.456	0.480	0.442

Note: *** p < 0.01, ** p < 0.05, * p < 0.1.
Values in parentheses are t-statistics.
Dependent variable (Net buy/sell) is scaled by 1 million.
Index variables are multiplied by 100.

OLS Results – TW GPR + US EPU (Full Period)

This table reports OLS regression coefficients and t-statistics for the effect of Taiwan's GPR index and US Economic Policy Uncertainty on investor trading behavior (Full period). Coefficients are shown with t-statistics in parentheses. Stars denote statistical significance.

Variable	Foreign	Investment	Dealer	Retail
GPRHC_TWN	−249.96	−388.40	463.08*	105.30
	(−0.28)	(−1.65)	(1.73)	(0.11)
USEPU	−0.56	−0.41	0.40	0.28
	(−0.41)	(−1.19)	(1.42)	(1.43)
GPRHC_TWN_lag1	−247.43	−155.86	191.24	99.41
	(−0.25)	(−0.61)	(0.65)	(0.10)
USEPU_lag1	0.29	−0.55	0.42	0.51
	(0.21)	(−1.52)	(0.33)	(1.51)
GPRHC_TWN_lag2	1713.57*	28.85	−123.05	−1860.52*
	(1.79)	(0.12)	(−0.43)	(−1.83)
USEPU_lag2	1.26	−0.14	0.38	1.34
	(0.90)	(−0.44)	(0.86)	(1.34)
Foreign_Investors_lag1	0.0872	–	–	–
	(1.13)			
Investment_Trust_lag1	–	0.1544	–	–
		(1.58)		
Dealer_lag1	–	–	0.3222***	–
			(4.09)	
Retail_Investors_lag1	–	–	–	0.1001
				(1.35)
R^2	0.461	0.499	0.510	0.480
Adj. R^2	0.404	0.446	0.458	0.425

Note: *** p < 0.01, ** p < 0.05, * p < 0.1.
Values in parentheses are t-statistics.
Dependent variable (Net buy/sell) is scaled by 1 million.
Index variables are multiplied by 100.

OLS Results – Key Findings

OLS Results – US GPR + US EPU (Full Period)

This table reports OLS regression coefficients and t-statistics for the effect of US GPR index and US Economic Policy Uncertainty on investor trading behavior (Full period). Coefficients are shown with t-statistics in parentheses. Stars denote statistical significance.

Variable	Foreign	Investment	Dealer	Retail
GPRHC_USA	−77.88	−18.68	10.79	101.99
	(−0.68)	(−0.62)	(0.31)	(0.84)
USEPU	−0.63	−0.40	0.52	0.41
	(−0.47)	(−1.15)	(1.29)	(1.43)
GPRHC_USA_lag1	243.82*	−16.41	33.13	−269.45**
	(1.09)	(−0.61)	(0.87)	(−1.98)
USEPU_lag1	0.06	−0.60	0.15	0.27
	(0.05)	(−1.64)	(0.35)	(0.18)
GPRHC_USA_lag2	−208.72*	38.43	−36.91	205.55
	(−1.73)	(1.26)	(−1.03)	(1.60)
USEPU_lag2	1.29	−0.13	0.08	−1.31
	(1.02)	(−0.41)	(0.20)	(−1.35)
Foreign_Investors_lag1	0.1234	–	–	–
	(1.59)			
Investment_Trust_lag1	–	0.1501	–	–
		(1.55)		
Dealer_lag1	–	–	0.3706***	–
			(4.77)	
Retail_Investors_lag1	–	–	–	0.1383
				(1.86)
R^2	0.464	0.491	0.500	0.481
Adj. R^2	0.407	0.437	0.447	0.426

Note: *** p < 0.01, ** p < 0.05, * p < 0.1.
Values in parentheses are t-statistics.
Dependent variable (Net buy/sell) is scaled by 1 million.
Index variables are multiplied by 100.

OLS Results – TW GPR + TW WUI (Full Period)

This table reports OLS regression coefficients and t-statistics for the effect of Taiwan's GPR index and Taiwan's World Uncertainty Index on investor trading behavior (Full period). Coefficients are shown with t-statistics in parentheses. Stars denote statistical significance.

Variable	Foreign	Investment	Dealer	Retail
GPRHC_TWN	−779.71	−500.55**	570.68**	612.20
	(−0.85)	(−2.02)	(2.04)	(0.62)
TWWUI	792.15*	59.85	−228.25	−612.40
	(1.74)	(0.49)	(−1.65)	(−1.26)
GPRHC_TWN_lag1	−358.57	−269.98	315.49	176.58
	(−0.36)	(−1.00)	(1.03)	(0.17)
TWWUI_lag1	189.92	13.58	4.17	−194.76
	(1.60)	(0.44)	(0.02)	(−1.15)
GPRHC_TWN_lag2	2309.46**	197.35	18.17	−2516.38**
	(2.39)	(0.76)	(0.06)	(−2.44)
TWWUI_lag2	−354.39***	48.25	−45.10	356.33***
	(−2.84)	(1.47)	(−1.21)	(2.68)
Foreign_Investors_lag1	0.1310	–	–	–
	(1.72)			
Investment_Trust_lag1	–	0.2068**	–	–
		(2.12)		
Dealer_lag1	–	–	0.3440***	–
			(4.48)	
Retail_Investors_lag1	–	–	–	0.1423
				(1.92)
R^2	0.487	0.478	0.513	0.501
Adj. R^2	0.433	0.422	0.461	0.448

Note: *** p < 0.01, ** p < 0.05, * p < 0.1.
Values in parentheses are t-statistics.
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OLS Insights

Period	Foreign Investors	Investment Trusts	Proprietary Traders	Retail Investors
ALL	TWGPR lag2 (+) ** TWWUI (+) * TWWUI lag2 (-) *** USGPR lag1 (+) * USGPR lag2 (-) *	TWGPR (-) **	TWGPR (+) ** GEPU lag2 (+) ***	TWGPR lag2 (-) ** TWWUI lag2 (+) *** USGPR lag1 (-) ** GEPU (+) *
Pre	TWWUI lag2 (-) *	Not significant	TWWUI (-) **	TWWUI lag2 (+) *
Post	Not significant	TWGPR lag1 (-) ** GEPU (-) *	GEPU lag2 (+) **	Not significant

Note: *** p < 0.01, ** p < 0.05, * p < 0.1

Foreign Investors

Lagged responses to GPR

Investment Trusts

Immediate negative response to risks

Post-period significance indicates growing risk awareness in recent years

Increase focus on global policy uncertainty in recent years

Proprietary Traders

Positive and significant responses to GPR/EPU

Become more responsive to global uncertainty in recent years

Literature Review - GMM Modeling & Instrumental Variable Design

Institutional trading behavior shows persistence and dynamic adjustment

Grinblatt, Titman, and Wermers (1995)	Momentum trading and herding cause repeated patterns
Sias (2004)	Past behavior influences future decisions

Handle endogeneity caused by lagged dependence and omitted variables using GMM

GMM

Generalized Method of Moments

Hansen (1982)	Uses moment conditions to estimate parameters
	Optimal weighting matrix *W* W minimizes estimator variance
Baum, Schaffer, and Stillman (2003)	Addresses bias in traditional OLS
Roodman (2009)	Lagged instruments (lag 2) enhance exogeneity

Empirical Applications

Guizani, Talbi, and Abdalkrim (2023)	GMM applied to firm cash holdings & geopolitical risk
Farooq, Tabash, Anagreh, Al‐Faryan (2022)	GMM used to analyze EPU effects in Asia

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$$\text{InterestRateSpread}_t, \log(\text{CPI}_t)$$

Four key combinations of risk indices used

1. Taiwan GPR (GPRHC_TWN) + Global EPU (GEPU_current)
2. Taiwan GPR (GPRHC_TWN) + U.S. EPU (USEPU)
3. U.S. GPR (GPRHC_USA) + U.S. EPU (USEPU)
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Sample Period Segmentation

Pre period: May 2008 – July 2016 (Month 1–99)
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Full period: May 2008 – December 2024 (Total: 200 months)

Model specification

$$y_t = \beta_0 + \alpha y_{t-1} + \beta_1 \cdot \text{GPR}_t + \beta_2 \cdot \text{GPR}_{t-1} + \beta_3 \cdot \text{GPR}_{t-2}$$
$$+\gamma_1 \cdot \text{EPU}_t + \gamma_2 \cdot \text{EPU}_{t-1} + \gamma_3 \cdot \text{EPU}_{t-2} + \delta^\top X_t + \varepsilon_t$$

- y_t: Monthly net buy/sell value of the institutional investor
- y_{t-1}: One-period lag of the dependent variable, treated as endogenous
- y_{t-2}: Instrumental variable for y_{t-1}
- GPR: Geopolitical Risk Index (GPRHC_TWN, GPRHC_USA, etc)
- EPU: Economic Policy Uncertainty Index (GEPU_current, USEPU, TWWUI, etc)
- X_t: A vector of control variables including:
  - Log return of TAIEX, trading volume, VIX, business signal change,
  - Returns of S&P 500, Hang Seng, Nikkei 225,
  - USD/TWD exchange rate, interest rate spread, gold price, and CPI

GMM Results – Key Findings

GMM Results – TW GPR + Global EPU (Full Period)

This table reports GMM estimation results for the effect of Taiwan's GPR index and Taiwan's Economic Policy Uncertainty on investor trading behavior (Full period). Coefficients are shown with t-statistics in parentheses. Stars denote statistical significance.

Variable	Foreign	Investment	Dealer	Retail
GPRHC_TWN	−276.14	−569.60	446.38	−21.28
	(−0.21)	(−1.57)	(1.06)	(−0.02)
GEPU_current	−4.52	−0.18	−0.31	4.80*
	(−1.51)	(−0.28)	(−0.55)	(1.74)
GPRHC_TWN_lag1	−532.67	135.19	235.10	411.79
	(−0.41)	(0.44)	(0.42)	(0.30)
GEPU_current_lag1	1.65	−0.50	−0.43	−0.70
	(0.73)	(−1.18)	(−0.76)	(−0.31)
GPRHC_TWN_lag2	1751.0	399.07	−214.23	−1822.4
	(1.36)	(1.04)	(−0.57)	(−1.33)
GEPU_current_lag2	2.10	0.13	1.48**	−3.30*
	(0.98)	(0.24)	(2.23)	(−1.65)
Foreign_Investors_lag1	−0.19	–	–	–
	(−0.35)			
Investment_Trust_lag1	–	0.60**	–	–
		(2.14)		
Dealer_lag1	–	–	0.07	–
			(0.26)	
Retail_Investors_lag1	–	–	–	−0.13
				(−0.31)
Instrumental Var	Foreign_Investors_lag2	Investment_Trust_lag2	Dealer_lag2	Retail_Investors_lag2
Endogenous var	Foreign_Investors_lag1	Investment_Trust_lag1	Dealer_lag1	Retail_Investors_lag1

GMM Results – TW GPR + US EPU (Full Period)

This table reports GMM estimation results for the effect of Taiwan's GPR index and US Economic Policy Uncertainty on investor trading behavior (Full period). Coefficients are shown with t-statistics in parentheses. Stars denote statistical significance.

Variable	Foreign	Investment	Dealer	Retail
GPRHC_TWN	−154.17	−567.46	497.19	−164.63
	(−0.11)	(−1.62)	(1.10)	(−0.11)
usepu	−1.41	−0.19	0.70	0.95
	(−0.85)	(−0.66)	(1.43)	(0.58)
GPRHC_TWN_lag1	−755.48	110.92	355.00	575.75
	(−0.51)	(0.36)	(0.56)	(0.38)
usepu_lag1	0.44	−0.47*	0.32	−0.23
	(0.29)	(−1.86)	(0.82)	(−0.14)
GPRHC_TWN_lag2	2025.80	355.74	−99.06	−2119.0
	(1.44)	(0.91)	(−0.26)	(−1.42)
usepu_lag2	1.07	−0.02	0.16	−1.01
	(0.90)	(−0.05)	(0.44)	(−0.85)
Foreign_Investors_lag1	−0.31	–	–	–
	(−0.48)			
Investment_Trust_lag1	–	0.57**	–	–
		(2.08)		
Dealer_lag1	–	–	−0.06	–
			(−0.18)	
Retail_Investors_lag1	–	–	–	−0.21
				(−0.44)
Instrumental Var	Foreign_Investors_lag2	Investment_Trust_lag2	Dealer_lag2	Retail_Investors_lag2
Endogenous var	Foreign_Investors_lag1	Investment_Trust_lag1	Dealer_lag1	Retail_Investors_lag1

GMM Insights

Period	Foreign Investors	Investment Trusts	Proprietary Traders	Retail Investors
ALL	TWGPR lag2 (+) * TWWUI (+) *	TWGPR (-) * USEPU lag1 (-) **	TWGPR (+) * GEPU lag2 (+) **	TWGPR lag2 (-) * TWWUI lag2 (+) * GEPU lag2 (-) *
Pre	TWWUI lag2 (-) ** USGPR lag2 (-) *	Not significant	Not significant	TWWUI lag2 (+) **
Post	Not significant	Not significant	Not significant	Not significant

Note: *** p < 0.01, ** p < 0.05, * p < 0.1

Foreign Investors

Mixed and lagged responses to global and local risks

Investment Trusts

Immediate negative response to risks

Proprietary Traders

Positive and significant responses to GPR/EPU

Fewer significant variables under GMM reflect a more conservative, yet endogeneity-adjusted estimation

OLS vs. GMM Comparison

	OLS				GMM			
Period	**Foreign Investors**	**Investment Trusts**	**Proprietary Traders**	**Retail Investors**	**Foreign Investors**	**Investment Trusts**	**Proprietary Traders**	**Retail Investors**
ALL	TWGPR lag2 (+) ** TWWUI (+) * TWWUI lag2 (-) *** USGPR lag1 (+) * USGPR lag2 (-) *	TWGPR (-) **	TWGPR (+) ** GEPU lag2 (+) ***	TWGPR lag2 (-) ** TWWUI lag2 (+) *** USGPR lag1 (-) ** GEPU (+) *	TWGPR lag2 (+) * TWWUI (+) *	TWGPR (-) * USEPU lag1 (-) **	TWGPR (+) * GEPU lag2 (+) **	TWGPR lag2 (-) * TWWUI lag2 (+) * GEPU lag2 (-) *
Pre	TWWUI lag2 (-) *	Not significant	TWWUI (-) **	TWWUI lag2 (+) *	TWWUI lag2 (-) ** USGPR lag2 (-) *	Not significant	Not significant	TWWUI lag2 (+) **
Post	Not significant	TWGPR lag1 (-) ** GEPU (-) *	GEPU lag2 (+) **	Not significant	Not significant	Not significant	Not significant	Not significant

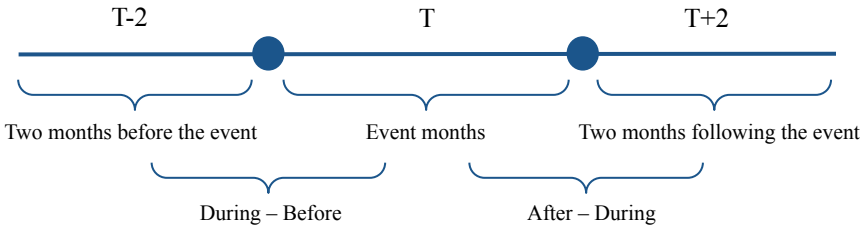
OLS	Reveals more responsive and varied trading patterns, but may suffer from endogeneity bias
GMM	Fewer significant variables, but largely consistent with OLS findings. This confirms the robustness of results

GMM strengthens the credibility of the results by controlling for endogeneity

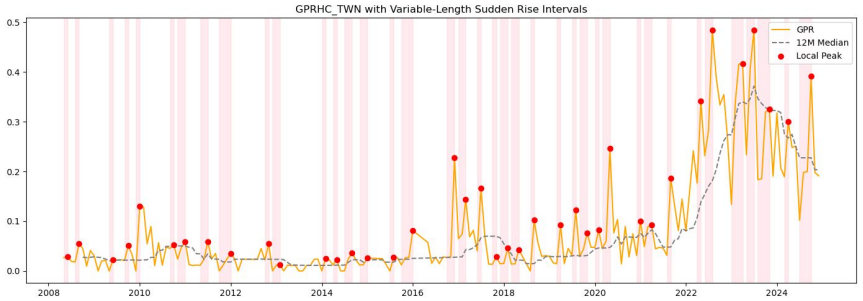
Dynamic Analysis Design

Event Types	Surge	Sustained rise in GPR/GEPU, ending at a local peak
	Drop	Sustained decline from a local peak

Outputs Tracked:



Metric	Median net trading by investor type
Selected Indices	Taiwan GPR
	Global EPU

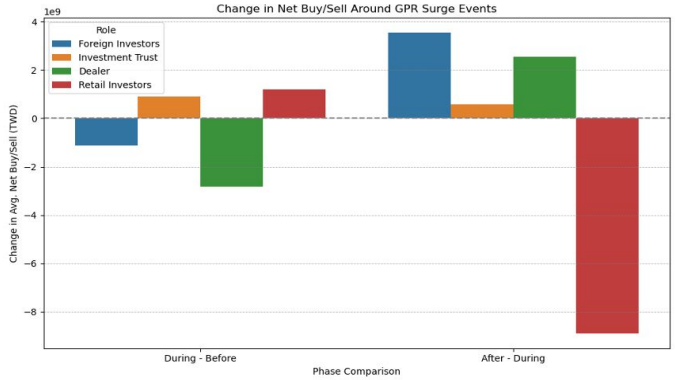


Column	Description
Role	Institutional investors (Foreign, IT, Proprietary traders)
Before Median	Median value in the “before” period
During Median	Median value in the “during” period
After Median	Median value in the “after” period
During – Before	Change between “during” and “before”
After – During	Change between “after” and “during”

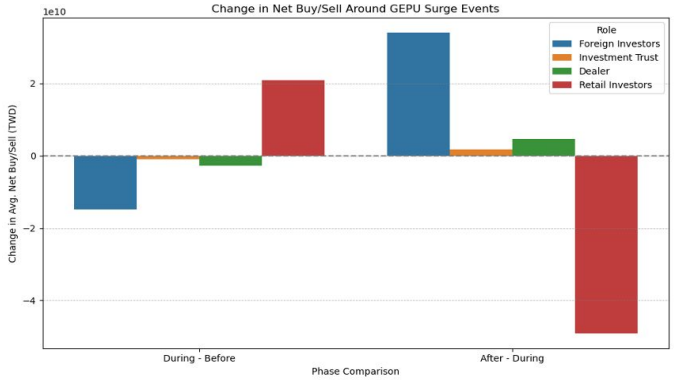
Complements OLS/GMM findings by showing short-term behavioral shifts

Dynamic Analysis– Visuals

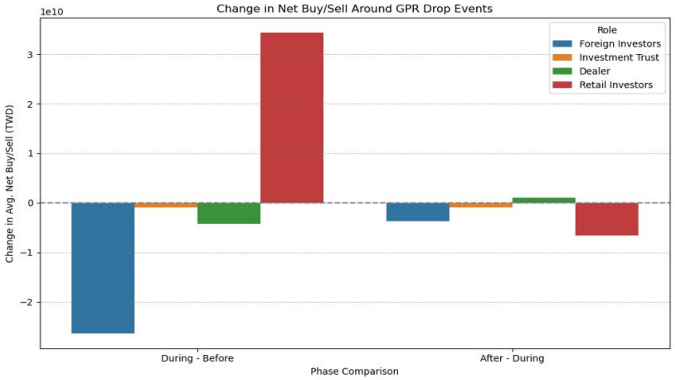
TWGPR Surge



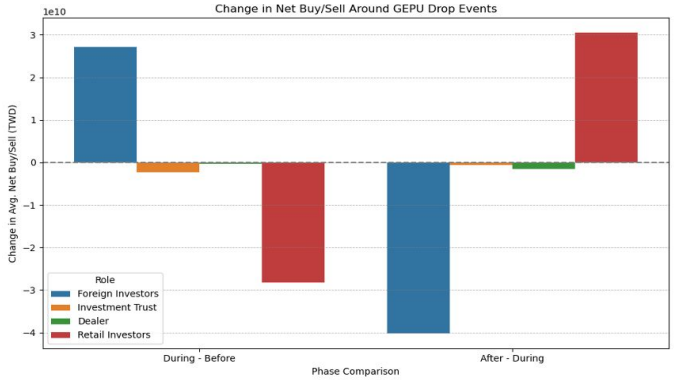
GEPU Surge



TWGPR Drop



GEPU Drop



Foreign Investors

Increase buying significantly after risk events; responses are delayed but strong

consistent with lagged effects found in regressions

Proprietary Traders

Rebuild positions after risk events, tactical and opportunistic behavior

in line with positive and event-driven regression findings

Retail Investors

Behavior contrasts with foreign investors

05
Conclusion

Hypotheses Validation

Hypothesis

Hypothesis 1 (H1):
Different types of institutional investors exhibit heterogeneous responses to GPR and economic policy uncertainty EPU

- Foreign investors: Globally diversified, delayed response to regional risk
- Investment trusts: Risk-averse, reduce exposure quickly
- Proprietary traders: Flexible, event-driven

1. Behavioral heterogeneity is evident

- Foreign investors adjust late but strongly
- Investment trusts act defensively
- Proprietary traders act tactically during risk

Hypothesis 2 (H2):
Investor sensitivity to risk evolves over time

- Global and macro shifts reshape risk perception
- Responses to GPR/EPU are time-varying

2. Sensitivity has increased over time

- Reactions to risk rose post-2016, especially for investment trusts

3. Global risks now matter more

- GEPU and global shocks increasingly shape investment decisions

Conclusion and Implications

Research Focus

Investigate how these three investor types adjust their net trading behavior in response to changes in GPR, EPU, and WUI

Conclusions	1. Taiwan's three major institutional investors exhibit distinct trading responses to GPR and EPU shocks 2. Risk sensitivity is dynamic and evolves with changing macroeconomic conditions over time
Implications	• Investors should continuously reassess their risk preferences and positioning as sensitivity evolves with shifting global dynamics, not just domestic conditions • The growing impact of global risk indices on institutional trading suggests rising sensitivity to international uncertainties, especially after 2016, underscoring the need to factor global risks into investment decisions • Retail investors may benefit from global or multi-market ETFs and mutual funds that mirror institutional allocation strategies, reducing exposure to emotional or herd-driven trading

> "Taiwan's three major institutional investors respond differently to uncertainty, with behaviors evolving over time, revealing growing global risk influence and the need for adaptive investment strategies"

Future Research

Incorporate higher-frequency data for deeper behavioral insight

- This study uses monthly data, which captures broad patterns but may miss short-term reactions
- Future work could employ daily or intraday data to better understand how institutional investors respond in real-time to news shocks or geopolitical events.

Uncover Underlying Drivers of Institutional Heterogeneity

- Exploring deeper institutional mechanisms—such as capital source diversity, regulatory constraints, or internal risk control frameworks—could enhance understanding of why different investor types exhibit heterogeneous reactions to uncertainty

Incorporate Nonlinear and Adaptive Modeling Techniques

- Traditional econometric approaches assume linearity and static relationships, which may overlook complex behavior patterns.
- Machine learning models such as XGBoost, Random Forest, or LSTM could uncover nonlinear dynamics, regime shifts, or lagged dependencies in institutional trading responses.

Thanks !

Q & A

Appendix

參考文獻:地緣政治風險、外資買賣與台股之連動

- 全球GPR, 台灣GPR 變動率僅受到自身變數前一期反向影響
- 影響外資淨買賣超的關鍵:景氣對策信號變動率、加權股市成交值(景氣好壞、股市成交量大小)

GPR 變動 **(-)** → 加權指數成交值 **(-)** → 外資淨買賣金額

"全球 GPR 變動率與台灣 GPR 變動率皆僅受自身過去一期結果反向影響, 不受台灣總體經濟指標影響, 顯示金融領域變數較難影響地緣政治指標結果"

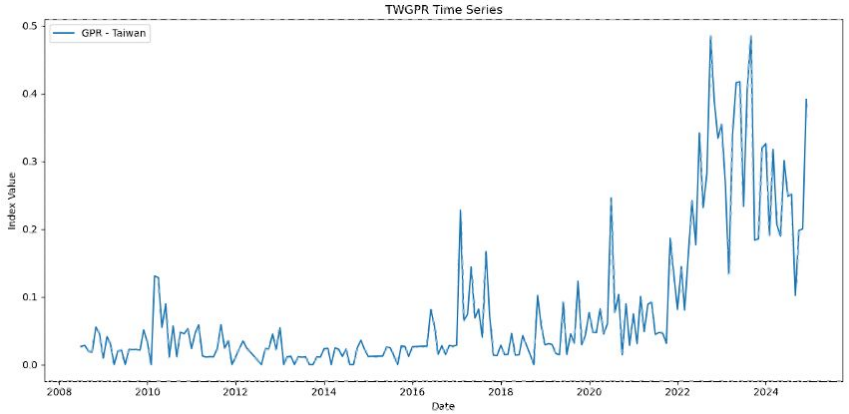
"加權指數成交值受全球 GPR 變動率反面影響, 顯示當全球地緣政治局勢緊張, 全球 GPR 急速上升、GPR 變動率增加, 將使加權指數成交量下滑"

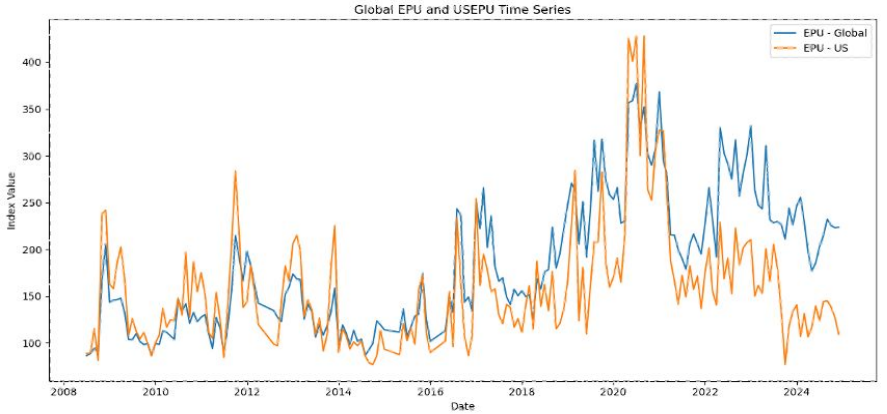
"(1) **外資淨買賣金額** 受加權指數成交值反面影響, 當指數成交量下滑、股市停滯冷卻, 反而促使外資大量買入。

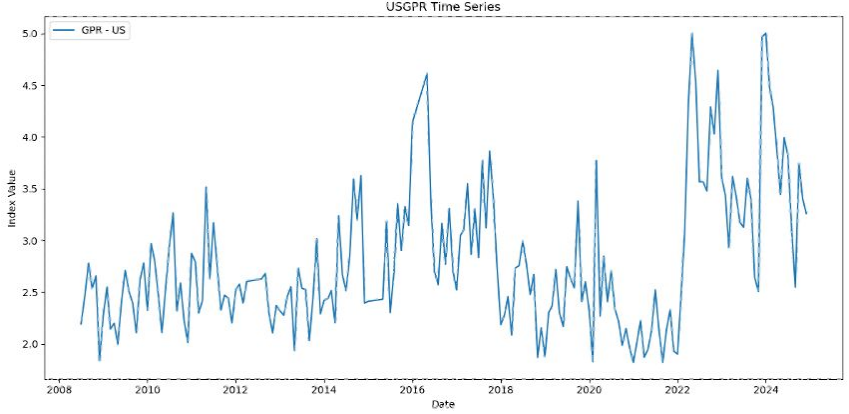
(2) **外資淨買賣金額** 受景氣對策信號變動率正向影響, 當景氣熱絡, 帶動景氣對策信號快速上升, 將能吸引更多外資投入"

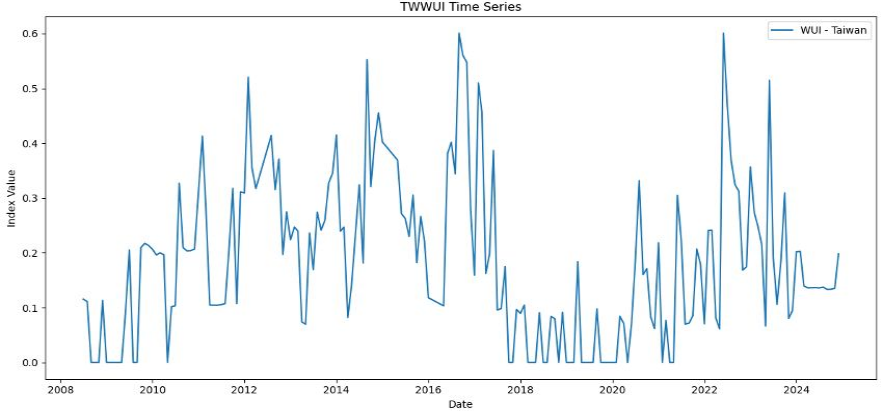
參考資料: 地緣政治風險、外資買賣與台股之連動__臺灣博碩士論文知識加 值系統

Data Visualization









VAR

Selected lag order (AIC): 2

Summary of Regression Results

Model:	VAR		
Method:	OLS		
Date:	Sun, 20, Jul, 2025		
Time:	14:17:29		
No. of Equations:	6.00000	BIC:	-2.72784
Nobs:	189.000	HQIC:	-3.52371
Log likelihood:	-1146.87	FPE:	0.0171733
AIC:	-4.06571	Det(Omega_mle):	0.0115217

Results for equation GPRHC_TWN

	coefficient	std. error	t-stat	prob
const	-0.061267	0.031353	-1.954	0.051
L1.GPRHC_TWN	0.404588	0.073877	5.476	0.000
L1.GPRHC_USA	0.027486	0.009421	2.918	0.004
L1.usepu	-0.000030	0.000157	-0.192	0.848
L1.GEPU_current	0.000145	0.000207	0.698	0.485
L1.twwui	-0.078909	0.039949	-1.975	0.048
L1.LogReturn	0.080907	0.106834	0.757	0.449
L2.GPRHC_TWN	0.265749	0.073465	3.617	0.000
L2.GPRHC_USA	-0.007879	0.009637	-0.818	0.414
L2.usepu	-0.000216	0.000156	-1.388	0.165
L2.GEPU_current	0.000256	0.000205	1.251	0.211
L2.twwui	0.082803	0.039945	2.073	0.038
L2.LogReturn	-0.177954	0.103099	-1.726	0.084

Results for equation GPRHC_USA

	coefficient	std. error	t-stat	prob
const	1.205808	0.254154	4.744	0.000
L1.GPRHC_TWN	0.199117	0.598871	0.332	0.740
L1.GPRHC_USA	0.504234	0.076365	6.603	0.000
L1.usepu	-0.001640	0.001272	-1.289	0.197
L1.GEPU_current	0.001594	0.001682	0.948	0.343
L1.twwui	-0.647960	0.323834	-2.001	0.045
L1.LogReturn	0.242496	0.866025	0.280	0.779
L2.GPRHC_TWN	0.594430	0.595525	0.998	0.318
L2.GPRHC_USA	0.058175	0.078124	0.745	0.456
L2.usepu	-0.001354	0.001261	-1.074	0.283
L2.GEPU_current	0.000485	0.001660	0.292	0.770
L2.twwui	0.917106	0.323808	2.832	0.005
L2.LogReturn	0.015696	0.835749	0.019	0.985

Results for equation usepu

	coefficient	std. error	t-stat	prob
const	66.214054	23.945440	2.765	0.006
L1.GPRHC_TWN	-39.798133	56.423262	-0.705	0.481
L1.GPRHC_USA	-6.091326	7.194837	-0.847	0.397
L1.usepu	0.510707	0.119849	4.261	0.000
L1.GEPU_current	-0.023967	0.158474	-0.151	0.880
L1.twwui	1.448982	30.510357	0.047	0.962
L1.LogReturn	-104.570926	81.593532	-1.282	0.200
L2.GPRHC_TWN	15.559387	56.108070	0.277	0.782
L2.GPRHC_USA	-1.389629	7.360545	-0.189	0.850
L2.usepu	-0.017634	0.118779	-0.148	0.882
L2.GEPU_current	0.270602	0.156423	1.730	0.084
L2.twwui	-35.613580	30.507943	-1.167	0.243
L2.LogReturn	-118.822700	78.741041	-1.509	0.131

VAR

Results for equation GEPU_current

	coefficient	std. error	t-stat	prob
const	37.752002	17.851042	2.115	0.034
L1.GPRHC_TWN	38.700062	42.062874	0.920	0.358
L1.GPRHC_USA	-0.725041	5.363666	-0.135	0.892
L1.usepu	-0.020294	0.089346	-0.227	0.820
L1.GEPU_current	0.647106	0.118141	5.477	0.000
L1.twwui	-41.513590	22.745110	-1.825	0.068
L1.LogReturn	-73.622443	60.827012	-1.210	0.226
L2.GPRHC_TWN	-3.634749	41.827903	-0.087	0.931
L2.GPRHC_USA	-0.675871	5.487199	-0.123	0.902
L2.usepu	-0.137729	0.088548	-1.555	0.120
L2.GEPU_current	0.343221	0.116612	2.943	0.003
L2.twwui	1.905396	22.743310	0.084	0.933
L2.LogReturn	-66.228109	58.700514	-1.128	0.259

Results for equation LogReturn

	coefficient	std. error	t-stat	prob
const	-0.015398	0.022258	-0.692	0.489
L1.GPRHC_TWN	-0.071980	0.052446	-1.372	0.170
L1.GPRHC_USA	0.007375	0.006688	1.103	0.270
L1.usepu	0.000106	0.000111	0.954	0.340
L1.GEPU_current	-0.000044	0.000147	-0.295	0.768
L1.twwui	-0.017617	0.028360	-0.621	0.534
L1.LogReturn	0.357826	0.075843	4.718	0.000
L2.GPRHC_TWN	0.085013	0.052153	1.630	0.103
L2.GPRHC_USA	-0.010583	0.006842	-1.547	0.122
L2.usepu	0.000040	0.000110	0.363	0.716
L2.GEPU_current	0.000041	0.000145	0.285	0.776
L2.twwui	0.039004	0.028358	1.375	0.169
L2.LogReturn	0.002796	0.073191	0.038	0.970

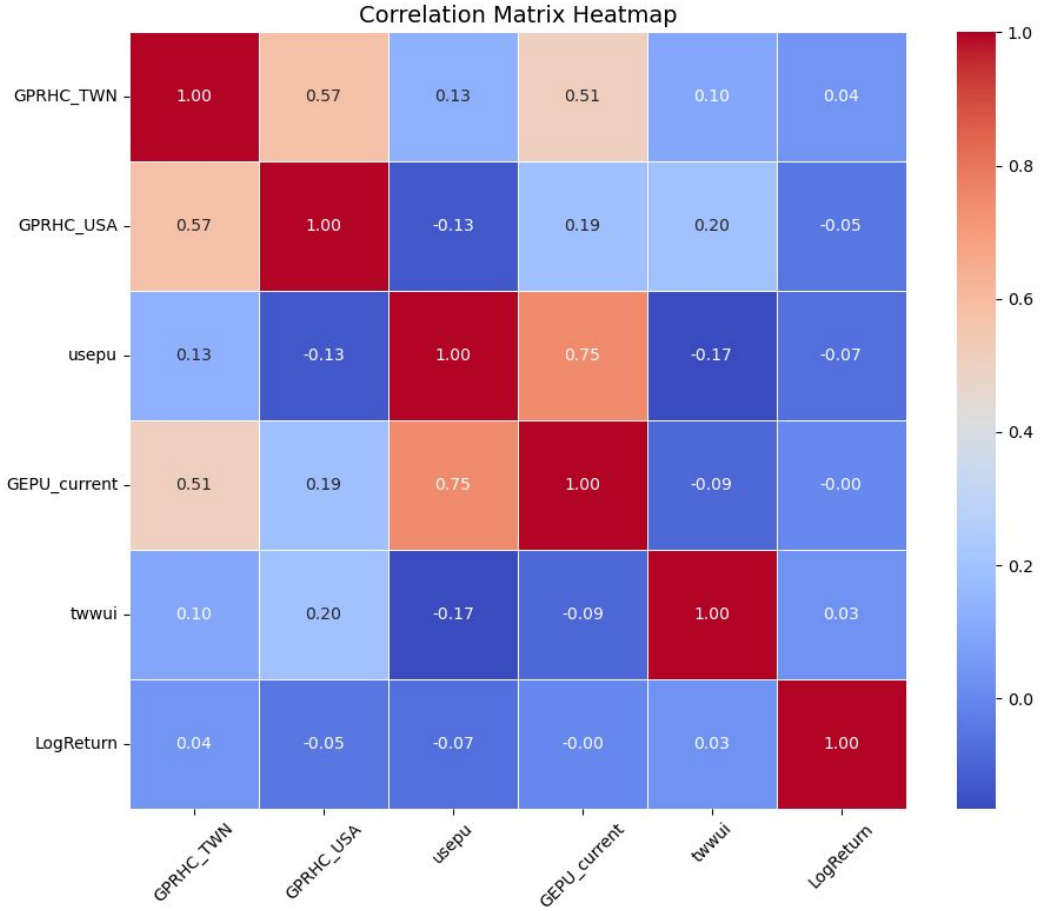
Results for equation twwui

	coefficient	std. error	t-stat	prob
const	-0.035453	0.053979	-0.657	0.511
L1.GPRHC_TWN	0.205803	0.127192	1.618	0.106
L1.GPRHC_USA	0.022706	0.016219	1.400	0.162
L1.usepu	-0.000169	0.000270	-0.626	0.531
L1.GEPU_current	0.001423	0.000357	3.984	0.000
L1.twwui	0.513346	0.068778	7.464	0.000
L1.LogReturn	0.379883	0.183932	2.065	0.039
L2.GPRHC_TWN	-0.267158	0.126482	-2.112	0.035
L2.GPRHC_USA	0.013367	0.016593	0.806	0.420
L2.usepu	0.000419	0.000268	1.565	0.118
L2.GEPU_current	-0.001684	0.000353	-4.777	0.000
L2.twwui	0.191429	0.068773	2.784	0.005
L2.LogReturn	-0.196052	0.177502	-1.105	0.269

Correlation matrix of residuals

	GPRHC_TWN	GPRHC_USA	usepu	GEPU_current	twwui	LogReturn
GPRHC_TWN	1.000000	0.223129	0.033292	0.003302	0.074543	0.005717
GPRHC_USA	0.223129	1.000000	-0.022937	-0.003266	0.070457	-0.053207
usepu	0.033292	-0.022937	1.000000	0.780295	-0.106428	-0.264675
GEPU_current	0.003302	-0.003266	0.780295	1.000000	-0.023688	-0.264310
twwui	0.074543	0.070457	-0.106428	-0.023688	1.000000	0.058035
LogReturn	0.005717	-0.053207	-0.264675	-0.264310	0.058035	1.000000

Correlation Matrix



GMM Model Specification

GMM Estimation Framework

Given a set of moment conditions,

$$E[g(Z_t, \theta)] = 0$$

Where $g(Z_t, \theta)$ represents the product of the instrument variables and the error terms, GMM estimates the parameters by minimizing the following objective function:

$$\min_{\theta} \left(\frac{1}{n}\sum_{t=1}^{n} g(Z_t, \theta)\right)^{\top} W \left(\frac{1}{n}\sum_{t=1}^{n} g(Z_t, \theta)\right)$$

Here, W is a weighting matrix. If W is set as the inverse of the covariance matrix of the error terms, the result becomes the optimal GMM estimator.

- y_t: Monthly net buy/sell value of the institutional investor
- y_{t-1}: One-period lag of the dependent variable, treated as endogenous
- y_{t-2}: Instrumental variable for y_{t-1}
- GPR: Geopolitical Risk Index (GPRHC_TWN, GPRHC_USA)
- EPU: Economic Policy Uncertainty Index (GEPU_current, USEPU, TWWUI)
- X_t: A vector of control variables including:
  - Log return of TAIEX, trading volume, VIX, business signal change,
  - Returns of S&P 500, Hang Seng, Nikkei 225,
  - USD/TWD exchange rate, interest rate spread, gold price, and CPI

Model Equation in this Study

$$y_t = \beta_0 + \alpha y_{t-1} + \beta_1 \cdot \mathrm{GPR}_t + \beta_2 \cdot \mathrm{GPR}_{t-1} + \beta_3 \cdot \mathrm{GPR}_{t-2}$$
$$+\gamma_1 \cdot \mathrm{EPU}_t + \gamma_2 \cdot \mathrm{EPU}_{t-1} + \gamma_3 \cdot \mathrm{EPU}_{t-2} + \delta^{\top} X_t + \varepsilon_t$$

Instrument Validity Condition

Orthogonality constraint:

$$\mathrm{Cov}(y_{t-2}, \varepsilon_t) = 0$$

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