V ■ Comparative Analysis: Iceland and SOEs (Outlier-Adjusted)

Capital Flow Volatility Patterns (1999-2025)

Research Focus: How do capital flow volatility patterns compare between Iceland and other small open economies with similar characteristics?

Methodology: Cross-sectional comparison of capital flow patterns between Iceland and comparable small open economies from 1999-2025.

Outlier-Adjusted Analysis: This analysis uses 5% symmetric winsorization to assess the robustness of statistical findings to extreme values. Data points below the 5th percentile are replaced with the 5th percentile value; data points above the 95th percentile are replaced with the 95th percentile value.

Key Hypothesis: Iceland and other small open economies may exhibit different capital flow volatility patterns despite similar economic structures and currency regimes.

Data and Methodology

Data Sources

- Balance of Payments Data: IMF, quarterly frequency (1999-2025)
- GDP Data: IMF World Economic Outlook, annual frequency
- Countries: Iceland vs 6 Small Open Economies (Aruba, Bahamas, Brunei Darussalam, Malta, Mauritius, Seychelles)

Data Limitations

- Bermuda Exclusion: Originally planned as 7th SOE country but excluded due to missing GDP data in IMF WEO database
- GDP Dependency: All indicators require GDP normalization for cross-country comparability

Methodology

1. Data Normalization: All BOP flows converted to annualized % of GDP

- 2. Statistical Analysis: F-tests for variance equality without directional assumptions
- 3. Volatility Measures: Standard deviation, coefficient of variation, comparative patterns
- 4. Comparative Framework: Neutral analysis of volatility differences between similar economies

Time Period Coverage

- Full Analysis Period: 1999-2025 (all available data)
- Crisis Exclusion Analysis: Excludes Global Financial Crisis (2008-2010) and COVID-19 (2020-2022)
 - ▼ Loaded CS3 data: 763 observations, 11 indicators

III Full Time Period Analysis

Complete temporal analysis using all available data

☑ Loaded CS3 data: 763 observations, 14 indicators

Observations Indicators Countries Time Period

763 14 7 1999-2025

Overall Capital Flows Analysis

High-level summary of aggregate net capital flows before detailed disaggregated analysis

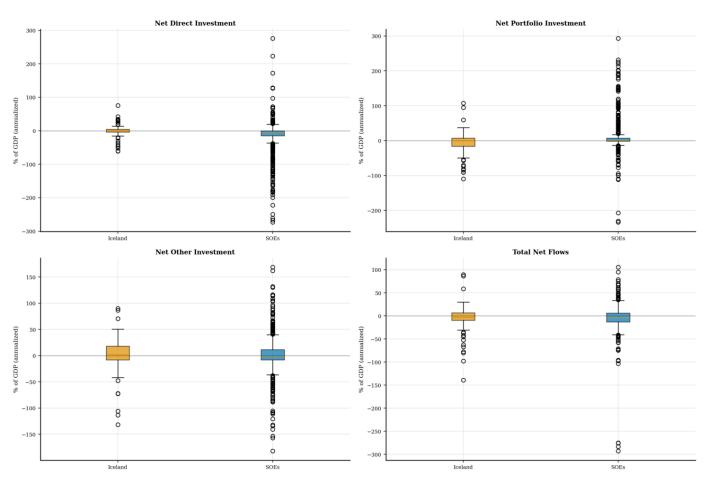
✓ Loaded CS3 data: 763 observations, 14 indicators

Summary Statistics by Group

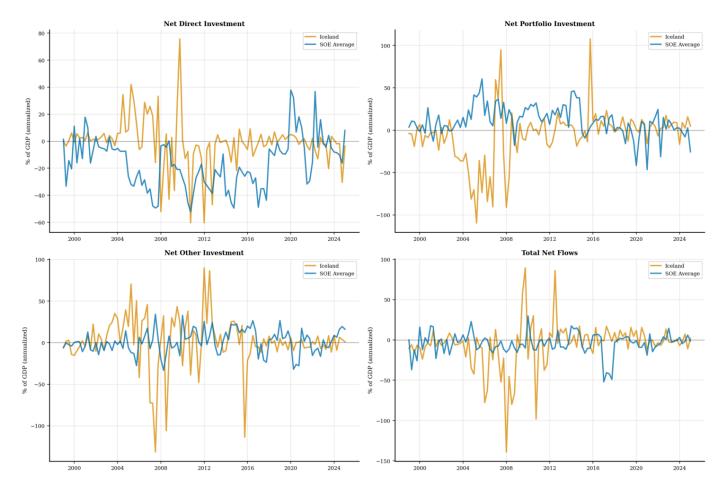
Indicator,	Mean, Iceland	Mean, Small	Median, Iceland	Median, Small	Std Dev, Iceland	Std Dev, Smal
Net Direct Investment	-0.83	-16.77	0.29	-4.55	18.04	48.70

Indicator,	Mean, Iceland	Mean, Small	Median, Iceland	Median, Small	Std Dev, Iceland	Std Dev, Smal
Net Other Investment	1.48	1.30	1.98	-1.33	31.84	35.44
Net Portfolio Investment	-6.42	11.47	0.49	0.76	31.12	48.63
Total Net Flows	-5.77	-4.42	-2.76	-4.22	28.63	32.00

Distribution Comparison by Group



Time Series by Group



Key Insights

Volatility Comparison (Standard Deviation)

• Net Direct Investment: SOE 2.7x more volatile

• Net Portfolio Investment: SOE 1.6x more volatile

• Net Other Investment: Similar volatility levels

• Total Net Flows: Similar volatility levels

Overall Pattern

Similar volatility levels between Iceland and SOEs

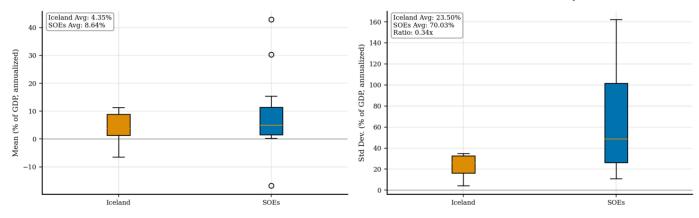
☐ Indicator-level Analysis

Detailed analysis by individual capital flow indicators

1. Summary Statistics and Boxplots



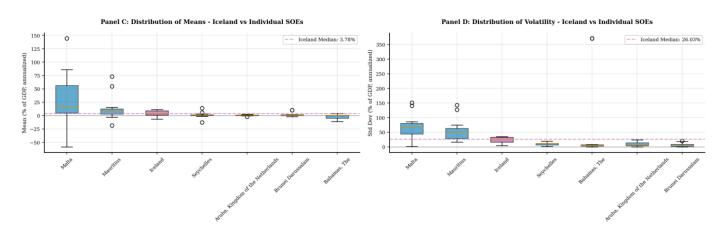
Panel B: Distribution of Volatility - Iceland vs SOE



Volatility Comparison: Iceland volatility is 0.34x higher than SOEs on average

1b. Individual Country Comparisons: Iceland vs Each Small Open Economy

Enhanced Analysis: Rather than comparing Iceland to Small Open Economies as an aggregate group, this section compares Iceland's values to each individual small open economy separately.



Disaggregated Analysis (Sections 2-6)

Detailed analysis by individual capital flow indicators

2. Comprehensive Statistical Summary Table

All Indicators - Iceland vs SOEs Statistics

Indicator	Iceland Mean	Iceland Std Dev	Iceland CV%	SOE Mean	SOE Std Dev	SOE CV%	CV Ratio (Ice/
Assets - Direct Investment	3.10	23.05	742.2	30.30	94.25	311.0	2.39
Assets - Other Investment (Debt)	7.97	34.77	436.5	7.57	162.22	2142.1	0.20
Assets - Other Investment (Banks)	10.35	29.01	280.4	0.29	158.85	55478.9	0.01
Assets - Portfolio (Debt)	1.21	12.96	1067.6	4.95	20.62	416.1	2.57
Assets - Portfolio (Equity)	3.62	9.93	274.0	11.30	44.34	392.4	0.70
Assets - Portfolio (Total)	4.84	18.45	381.4	15.37	50.65	329.6	1.16
Liabilities - Direct Investment	3.94	15.71	398.9	42.89	104.19	242.9	1.64
Liabilities - Other Investment (Banks)	9.16	33.15	361.9	1.96	159.19	8128.1	0.04
Liabilities - Portfolio (Debt)	11.07	32.85	296.8	1.37	10.92	798.4	0.37
Liabilities - Portfolio (Equity)	0.19	4.22	2234.6	4.01	19.45	484.9	4.61
Liabilities - Portfolio (Total)	11.26	33.88	300.9	4.96	22.98	463.5	0.65
Net - Direct Investment	-0.83	18.04	2165.0	-16.77	48.70	290.4	7.46
Net - Other Investment	1.48	31.84	2147.9	1.30	35.44	2724.8	0.79
Net - Portfolio Investment	-6.42	31.12	484.6	11.47	48.63	423.8	1.14

Summary: Statistics for all 14 capital flow indicators. CV% = Coefficient of Variation (Std Dev / |Mean| × 100). Higher CV% indicates greater volatility relative to mean.

3. Hypothesis Testing Results

F-Tests for Variance Equality Between Iceland and SOEs | H₀: Equal volatility patterns | H₁: Different volatility patterns | $\alpha = 0.05$

Indicator	F-Statistic	P-Value	Significance	More Volatile
Assets - Other Investment (Banks)	29.98	0.0000	***	Small Open Econo
Assets - Other Investment (Debt)	21.76	0.0000	***	Small Open Econo
Assets - Portfolio (Equity)	19.94	0.0000	***	Small Open Econo
Assets - Portfolio (Debt)	2.53	0.0000	***	Small Open Econo
Assets - Direct Investment	16.73	0.0000	***	Small Open Econo
Assets - Portfolio (Total)	7.54	0.0000	***	Small Open Econo
Liabilities - Other Investment (Banks)	23.05	0.0000	***	Small Open Econo
Liabilities - Portfolio (Equity)	21.26	0.0000	***	Small Open Econo
Liabilities - Portfolio (Total)	2.17	0.0000	***	Iceland
Liabilities - Portfolio (Debt)	9.04	0.0000	***	Iceland
Liabilities - Direct Investment	43.99	0.0000	***	Small Open Econo
Net - Direct Investment	7.29	0.0000	***	Small Open Econo
Net - Portfolio Investment	2.44	0.0000	***	Small Open Econo
Net - Other Investment	1.24	0.1761		Small Open Econo

Legend:

- F-Statistic: Ratio of variances
- P-Value: Statistical significance
- More Volatile: Which group exhibits greater volatility

Significance levels: *** p<0.001, ** p<0.01, * p<0.05

Iceland More Volatile

Significant (5%)

Significant (1%)

2/14

13/14

13/14

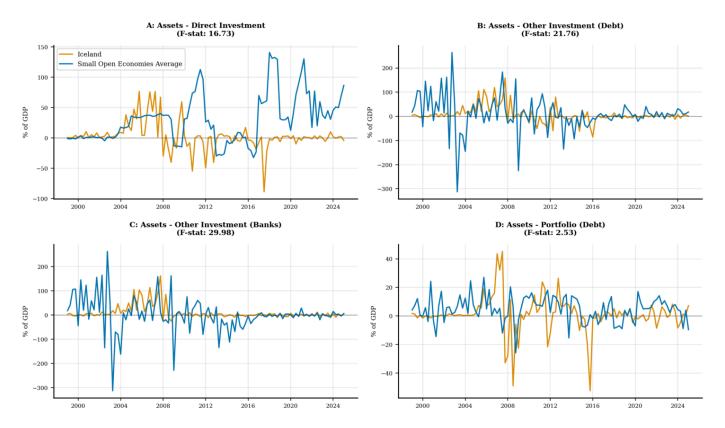
1 92.9%

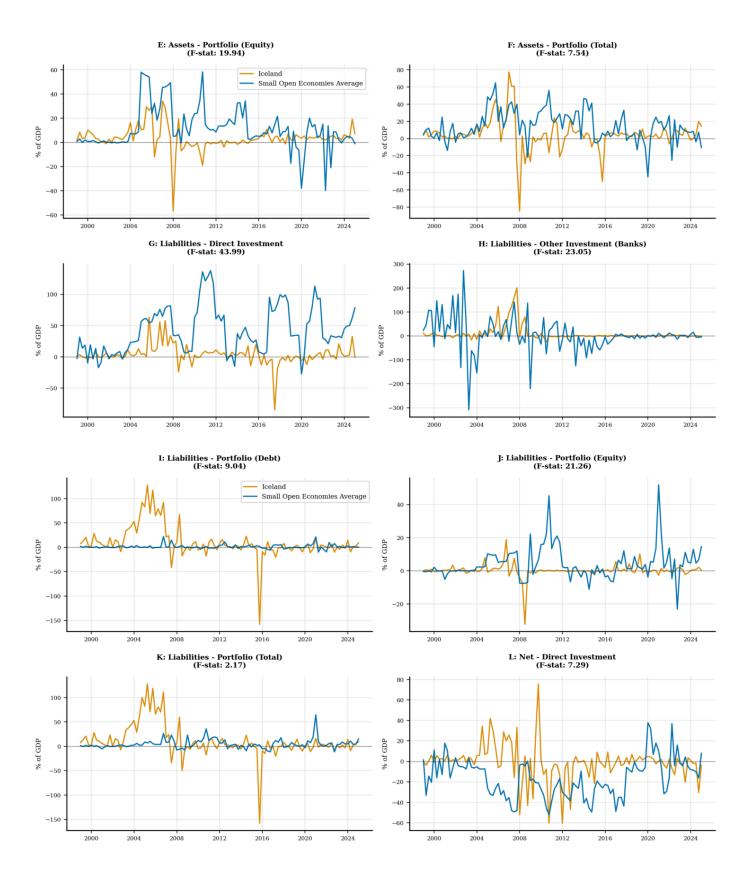
1 92.9%

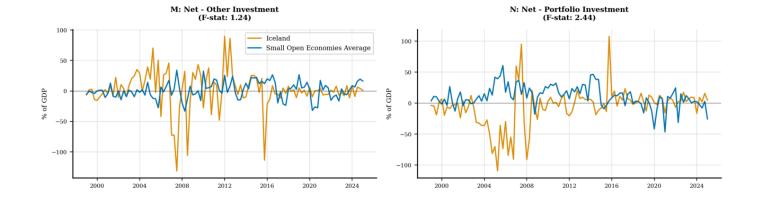
14.3%

Conclusion: Small Open Economies show higher volatility than Iceland in other small open economies across capital flow indicators.

4. Time Series Analysis







5. Key Findings Summary

Statistical Evidence:

- 14.3% of capital flow indicators show higher volatility in Iceland
- 92.9% of indicators show statistically significant differences (p<0.05)
- Volatility ratio (Iceland/SOE): 0.34x
- Pattern analysis: Capital flow volatility patterns are relatively similar between the two groups

Statistical Context:

- Sample characteristics: Both groups classified as small open economies
- Data quality: Full quarterly time series coverage
- Methodological approach: F-tests for variance equality comparison
- Result interpretation: Statistical differences observed in volatility patterns across groups

Excluding Financial Crises

Analysis excluding Global Financial Crisis (2008-2010) and COVID-19 (2020-2022) periods

✓ Loaded CS3 data: 571 observations, 14 indicators

Observations Indicators Countries

✓ Overall Capital Flows Analysis (Crisis-Excluded)

High-level summary of aggregate net capital flows excluding crisis periods

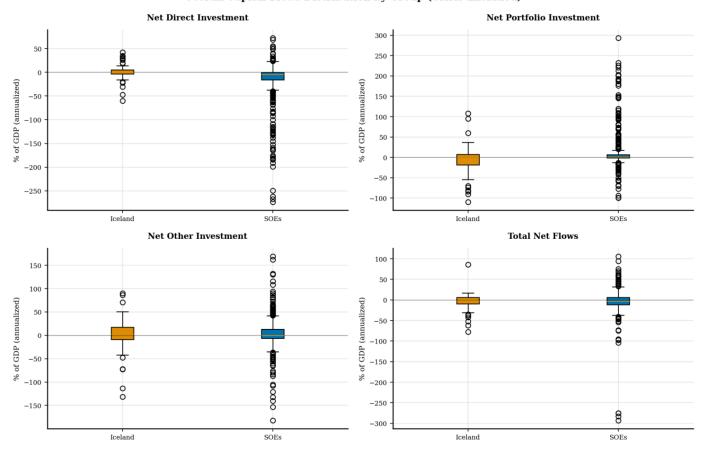
✓ Loaded CS3 data: 571 observations, 14 indicators

■ Summary Statistics by Group (Crisis-Excluded)

Indicator,	Mean, Iceland	Mean, Small	Median, Iceland	Median, Small	Std Dev, Iceland	Std Dev, Smal
Net Direct Investment	0.61	-19.89	0.29	-4.26	14.56	46.86
Net Other Investment	1.87	3.56	2.19	0.11	32.52	34.29
Net Portfolio Investment	-6.76	12.89	-0.57	0.67	33.03	47.77
Total Net Flows	-4.28	-4.06	-2.76	-2.96	19.76	35.25

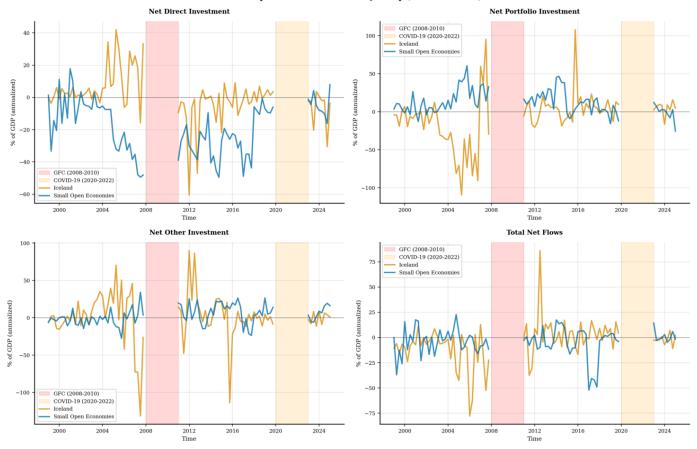
■ Distribution Comparison by Group (Crisis-Excluded)

Overall Capital Flows Distribution by Group (Crisis-Excluded)



✓ Time Series by Group (Crisis-Excluded)

Overall Capital Flows Time Series by Group (Crisis-Excluded)



◯ Key Insights (Crisis-Excluded)

Volatility Comparison (Crisis-Excluded)

• Net Direct Investment: SOE 3.2x more volatile

• Net Portfolio Investment: Similar volatility levels

• Net Other Investment: Similar volatility levels

• Total Net Flows: SOE 1.8x more volatile

Overall Pattern (Crisis-Excluded)

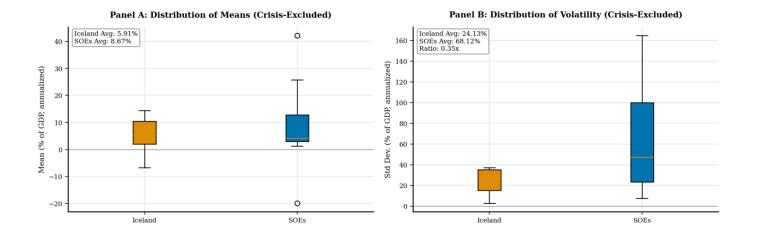
Similar volatility levels when crisis periods are excluded

□ Indicator-level Analysis (Crisis-Excluded)

Detailed analysis by individual capital flow indicators excluding crisis periods

1. Summary Statistics and Boxplots (Crisis-

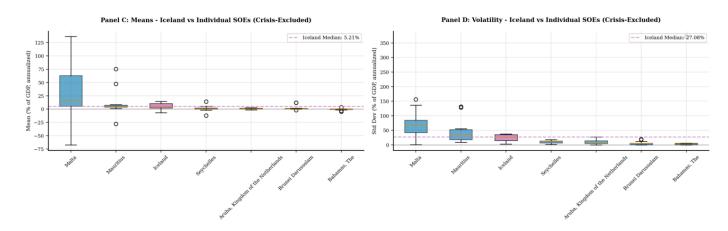
Excluded)



Volatility Comparison: Iceland volatility is 0.35x higher than SOEs on average (excluding crisis periods)

1b. Individual Country Comparisons: Iceland vs Each Small Open Economy (Crisis-Excluded)

Enhanced Analysis: Comparing Iceland to each individual small open economy separately, excluding crisis periods to focus on normal market conditions.



2. Comprehensive Statistical Summary Table (Crisis-Excluded)

All Indicators - Iceland vs SOEs Statistics (Crisis-Excluded)

Indicator	Iceland Mean	Iceland Std Dev	Iceland CV%	SOE Mean	SOE Std Dev	SOE CV%	CV Ratio (Ice/
Assets - Direct Investment	5.15	23.24	451.2	25.76	91.64	355.7	1.27
Assets - Other Investment (Debt)	9.84	37.27	378.6	10.46	164.69	1574.2	0.24
Assets - Other Investment (Banks)	12.72	30.93	243.2	2.18	160.75	7362.7	0.03
Assets - Portfolio (Debt)	2.38	12.67	531.9	4.11	19.57	476.0	1.12
Assets - Portfolio (Equity)	5.27	7.91	150.2	12.55	42.04	334.9	0.45
Assets - Portfolio (Total)	7.65	17.08	223.3	15.78	49.25	312.1	0.72
Liabilities - Direct Investment	4.54	16.82	370.4	42.17	102.67	243.4	1.52
Liabilities - Other Investment (Banks)	10.66	36.07	338.4	4.22	160.98	3817.2	0.09
Liabilities - Portfolio (Debt)	13.58	36.03	265.2	1.20	7.64	635.8	0.42
Liabilities - Portfolio (Equity)	0.83	2.89	348.9	2.72	11.33	415.9	0.84
Liabilities - Portfolio (Total)	14.41	36.83	255.6	3.66	14.21	387.8	0.66
Net - Direct Investment	0.61	14.56	2392.1	-19.89	46.86	235.6	10.15
Net - Other Investment	1.87	32.52	1737.5	3.56	34.29	962.0	1.81
Net - Portfolio Investment	-6.76	33.03	488.3	12.89	47.77	370.5	1.32

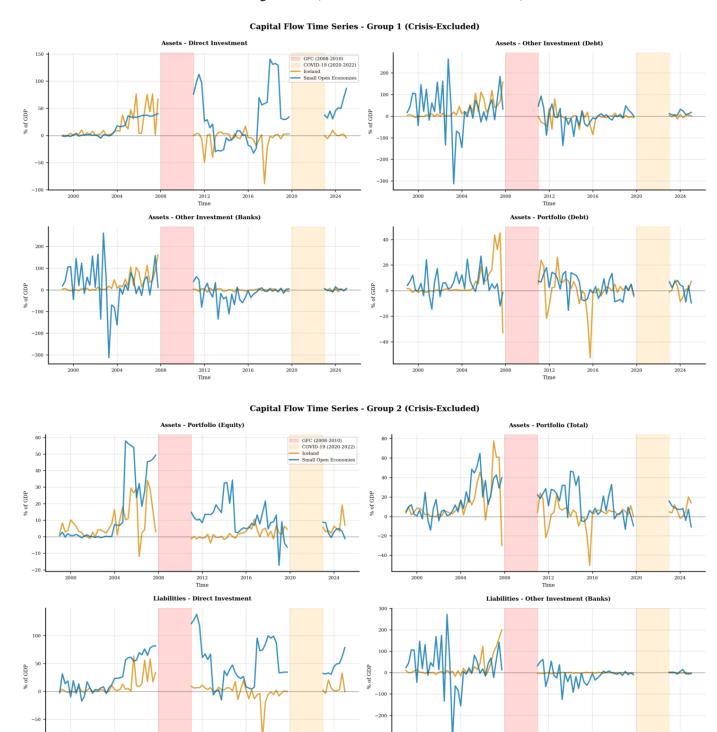
Summary (Crisis-Excluded): Statistics for all 14 capital flow indicators. CV% = Coefficient of Variation (Std Dev / $|Mean| \times 100$). Higher CV% indicates greater volatility relative to mean.

3. Hypothesis Testing Results (Crisis-Excluded)

F-Tests for Variance Equality Between Iceland and SOEs (Crisis-Excluded) | H_0 : Equal volatility patterns | H_1 : Different volatility patterns | $\alpha = 0.05$

Indicator	Iceland Std Dev	SOE Std Dev	F-Statistic	P-Value	Sig.
Assets - Other Investment (Banks)	30.930	160.750	27.010	0.0000	***
Liabilities - Other Investment (Banks)	36.067	160.978	19.921	0.0000	***
Assets - Other Investment (Debt)	37.270	164.693	19.526	0.0000	***
Liabilities - Portfolio (Equity)	2.889	11.330	15.376	0.0000	***
Liabilities - Portfolio (Total)	36.832	14.213	6.716	0.0000	***
Assets - Portfolio (Equity)	7.912	42.040	28.234	0.0000	***
Liabilities - Portfolio (Debt)	36.029	7.641	22.235	0.0000	***
Net - Direct Investment	14.556	46.861	10.364	0.0000	***
Net - Portfolio Investment	33.027	47.765	2.092	0.0001	***
Liabilities - Direct Investment	16.823	102.670	37.246	0.0000	***
Assets - Portfolio (Debt)	12.665	19.568	2.387	0.0000	***
Assets - Direct Investment	23.236	91.642	15.555	0.0000	***
Assets - Portfolio (Total)	17.079	49.252	8.316	0.0000	***
Net - Other Investment	32.520	34.293	1.112	0.5691	

4. Time Series Analysis (Crisis-Excluded)



Capital Flow Time Series - Group 3 (Crisis-Excluded)



Note: Red shaded areas indicate crisis periods (2008-2010 GFC, 2020-2022 COVID-19) that are excluded from the crisis-excluded analysis. Time series shows patterns during normal market conditions.

5. Key Findings Summary (Crisis-Excluded)

Statistical Evidence (Crisis-Excluded):

Methodological Notes:

 Crisis periods excluded: 2008-2010 (GFC) and 2020-2022 (COVID-19)

- 14.3% of capital flow indicators show higher volatility in Iceland
- 92.9% of indicators show statistically significant differences (p<0.05)
- Volatility ratio (Iceland/SOE): 0.35x (excluding crisis periods)
- Pattern analysis: Non-crisis volatility patterns are relatively similar between groups

- Comparison basis: Similar small open economy structures
- Statistical approach: F-test for variance equality without directional assumptions
- Interpretation: Focus on pattern differences rather than superiority/inferiority

6. Analysis Summary (Crisis-Excluded)

Complete outlier-adjusted analysis results are displayed above in the comprehensive tables and visualizations.

This crisis-excluded analysis using winsorized data provides insights into normal market volatility patterns by removing both periods of exceptional global financial stress (2008-2010 GFC and 2020-2022 COVID-19) and extreme outlier values.

Statistics Displayed in Section 4 tables above

Statistical Tests
F-test results
shown in analysis
sections

Group
Comparisons
Comprehensive
results in
visualizations
above

Complete
Analysis All results
integrated in this
report