Online Appendix

Integrating Out Natural Disaster Shocks

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This online appendix provides information on data in Appendix A, additional tests of the identification assumption in Appendix B as well as additional sensitivity analysis in Appendix D.

A Data

We define the set of advanced economies as the OECD founders and all euro area countries. We exlcude Turkey from the advanced group although it is an OECD founder, as it has institutional and economic characteristics that are more similar to emerging market countries, and instead include South Korea. We add euro area countries given their similar financial institutions and because financial integration is particularly important for currency members for which the common monetary policy does not buffer country-specific shocks.

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Table A.1: List of countries

Advanced economies	Emerging economies	Financial centers
Australia	Argentina	Cyprus
Austria	Bolivia	Hong Kong (China)
Belgium	Brazil	Iceland
Canada	Bulgaria	Ireland
Denmark	Chile	Luxembourg
Estonia	Colombia	Malta
Finland	Croatia	Mauritius
France	Czech Republic	Singapore
Germany	Ecuador	Switzerland
Greece	Hungary	
Italy	India	
Japan	Indonesia	
Korea	Israel	
Latvia	Kazakhstan	
Lithuania	Mexico	
Netherlands	Nigeria	
New Zealand	Paraguay	
Norway	Peru	
Portugal	Philippines	
Slovakia	Poland	
Slovenia	Romania	
Spain	Russia	
Sweden	Serbia	
United Kingdom	South Africa	
United States	Thailand	
	Turkey	
	Uruguay	

Note: The table shows the countries included in different regression samples.

Table A.2: Variable descriptions

Variable	Definition	Source
Shock	Damage from natural disasters incurred within one quarter, in % of GDP; upper 50th percentile of reported damage; winsorized at the 97.5th percentile	EM-DAT, IMF-IFS
Disaster frequency	Running count of shocks by country	EM-DAT, IMF-IFS, OECD
Disaster intensity	Running sum of shock variable by country	EM-DAT, IMF-IFS
Disaster geography	Disaster frequency interacted with population density	EM-DAT, World Bank
$GDPpc^{1995}$	GDP per capita in 1995, nominal, in USD	World Bank
Institutions	Institutional quality indicator, defined over the interval [-2.5,2.5], with higher calues indicating higher effectiveness, available from 1996-2016, extrapolated	World Bank, The Worldwide Governance Indicators
GDP	Real per capita GDP growth, seasonally adjusted	OECD, WDI
Private consumption	Real private consumption growth, seasonally adjusted	IMF-IFS, OECD
Private investment	Gross capital formation, seasonally adjusted	IMF-IFS, OECD
Imports	Real import growth, seasonally adjusted	IMF-IFS, OECD
Exports	Real export growth, seasonally adjusted	IMF-IFS, OECD
Density	Population (thousand) per land area (square kilometers), annual frequency, interpolated	World Bank/WDI
Overall financial integration	Total external assets plus total external liabilities relative to GDP	EWN
Total external assets (% of GDP)	Claims by domestic residents on nonresidents (portfolio equity and debt, FDI, other investment, derivatives, reserves) relative to GDP	EWN
Total external liabilities (% of GDP)	Liabilities by domestic residents to nonresidents (portfolio equity and debt, FDI, other investment, derivatives) relative to GDP	EWN
Debt assets (% of GDP)	Portfolio debt assets (e.g. bonds) plus other investment (e.g. loans, deposits, trade credit) plus foreign reserves (central bank foreign exchange reserves excluding gold) to GDP.	EWN
Debt liabilities (% of GDP)	Portfolio debt liabilities plus other investment to GDP.	EWN
Equity assets (% of GDP)	Portfolio equity assets (e.g. stocks, shares) plus FDI assets (e.g. controlling stakes by domestic firms in overseas' affiliates) to GDP.	EWN
Equity liabilities (% of GDP)	Portfolio equity liabilities plus FDI liabilities to GDP.	EWN
Government effectiveness	Perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies	Worldwide Governance Indicators, World Bank
World Risk Index	Synthesis of various discourses and concepts on the phenomena of hazard, exposure, and vulnerability, the interaction of which is considered to be the main cause of disaster risks	Ruhr Universitaet Bochum, Germany
Adaptive capacities	Subindex of World Risk Index, Lack of adaptive capacities related to developments in education and research, reduction of disparities, investments, and disaster preparedness	Ruhr Universitaet Bochum, Germany
Capital account openness	Index of capital account openness	Chinn, Menzie D. and Hiro Ito (2006). "What Matters for Financial Development? Capital Controls, Institutions, and Interactions," Journal of Development Economics, Volume 81, Issue 1, Pages 163-192 (October)
Exchange rate regime	Index of exchange arrangements	Ilzetzki, Ethan; Reinhart, Carmen M.; Rogoff, Kenneth S., 2018, "Replication Data for: 'Exchange Arrangements Entering the 21st Century: Which Anchor Will Hold?'", https://doi.org/10.7910/DVN/IDEXPY, Harvard Dataverse, V1

Table A.3: Summary statistics

Variable	Obs.	Mean	S.d.	Min.	Max.
Disaster shock (in % of GDP)	6812	0.02	0.23	0.00	11.60
Disaster shock if > 0 (in % of GDP, winsorized)	526	0.25	0.44	0.03	2.46
External assets and liabilities/GDP (in %)	6791	205.62	240.26	16.64	2482.22
External assets/GDP (in %)	6791	91.04	124.33	3.27	1272.11
External liabilities/GDP (in %)	6791	114.58	118.56	8.29	1210.11
External equity assets/GDP (in %)	6772	35.41	75.50	0.00	941.18
External equity liabilities/GDP (in %)	6732	44.53	63.73	0.50	819.89
External debt assets/GDP (in %)	6784	55.75	60.33	2.90	514.67
External debt liabilities/GDP (in %)	6784	70.45	67.31	5.49	542.56
GDP growth (in %)	6812	0.75	1.45	-21.07	13.12
Consumption growth (in %)	6812	0.76	1.66	-16.45	19.67
Investment growth (in %)	6812	0.81	5.02	-63.68	95.97
Current account growth (in %)	5412	0.01	8.45	-285.56	239.63
Import growth (in %)	6738	1.33	5.19	-50.35	57.01
Export growth (in %)	6738	1.36	4.73	-60.89	55.96
GDP per capita	6812	15613.00	11546.66	415.49	36629.03
GDP size	6683	7.65e+11	1.86e+12	4.57e+09	2.06e+13
Institutional quality	6740	2.16	0.80	0.09	3.27
Exchange rate regime	5914	0.98	0.15	0.00	1.00
Public debt/GDP (in %)	4804	54.45	34.91	3.66	237.65
Domestic credit/GDP (in %)	6572	68.28	43.22	0.06	221.29
Financial development (index)	5915	0.49	0.21	0.00	0.96
Capital account openness (index)	6698	1.05	1.38	-1.91	2.36
Government effectiveness (index)	6740	0.99	0.81	-1.16	2.35
World risk index	6740	11.22	11.49	0.76	47.14
Lack of adaptive policies (index)	6740	31.90	12.36	2.48	74.04

Table A.4: Largest disasters

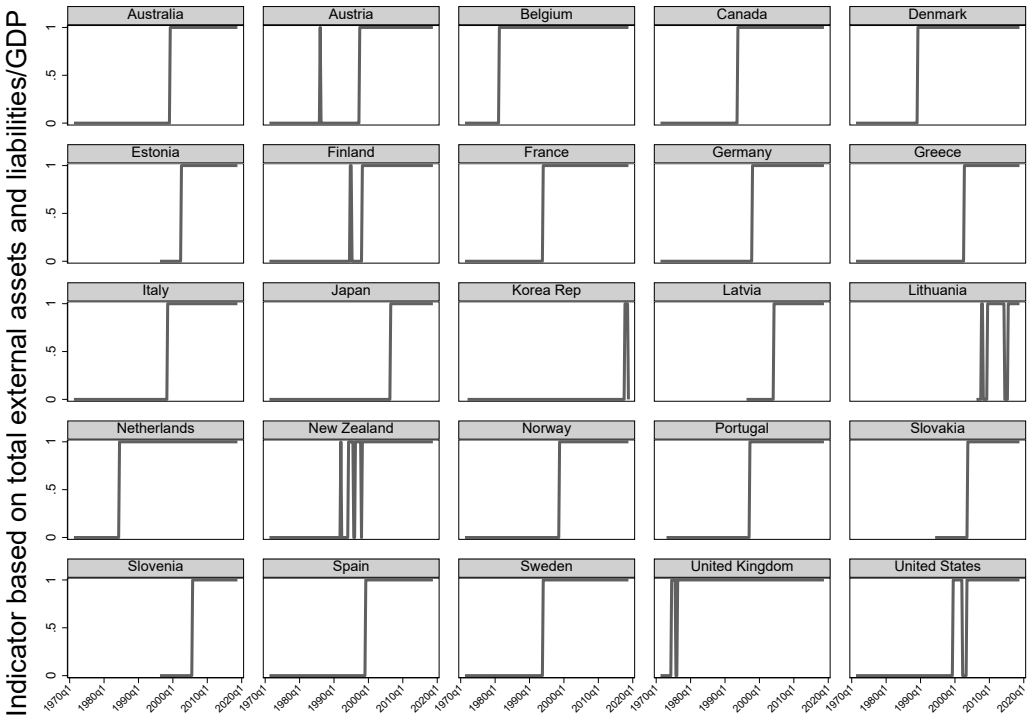
Country	Quarter	Advanced country	Shock (% GDP)	Winsorized shock
Chile	2010q1	0	11.60	2.46
Thailand	2011q3	0	7.49	2.46
New Zealand	2011q1	1	6.82	2.46
Turkey	1999q3	0	5.02	2.46
Italy	1980q4	1	2.92	2.46
Czech Rep	1997q3	0	2.87	2.46
Serbia	2014q2	0	2.84	2.46
Bolivia	1992q1	0	2.50	2.46
Philippines	2013q4	0	2.45	2.45
Latvia	2005q1	1	2.26	2.26
Poland	1997q3	0	2.19	2.19
Czech Rep	2002q3	0	2.14	2.14
Japan	1995q1	1	2.04	2.04
Ecuador	2016q2	0	2.01	2.01
Ecuador	2008q1	0	1.96	1.96
New Zealand	2010q3	1	1.62	1.62
Canada	1977q1	1	1.45	1.45
Bolivia	2001q1	0	1.44	1.44
Spain	1983q3	1	1.42	1.42
New Zealand	2016q4	1	1.40	1.40

Table A.5: Distribution of shocks by financial indicator

	Total	Assets	Liabilities
Advanced economies			
High financial integration	153	148	152
Low financial integration	141	144	140
Emerging economies			
High financial integration	102	115	103
Low financial integration	130	117	123

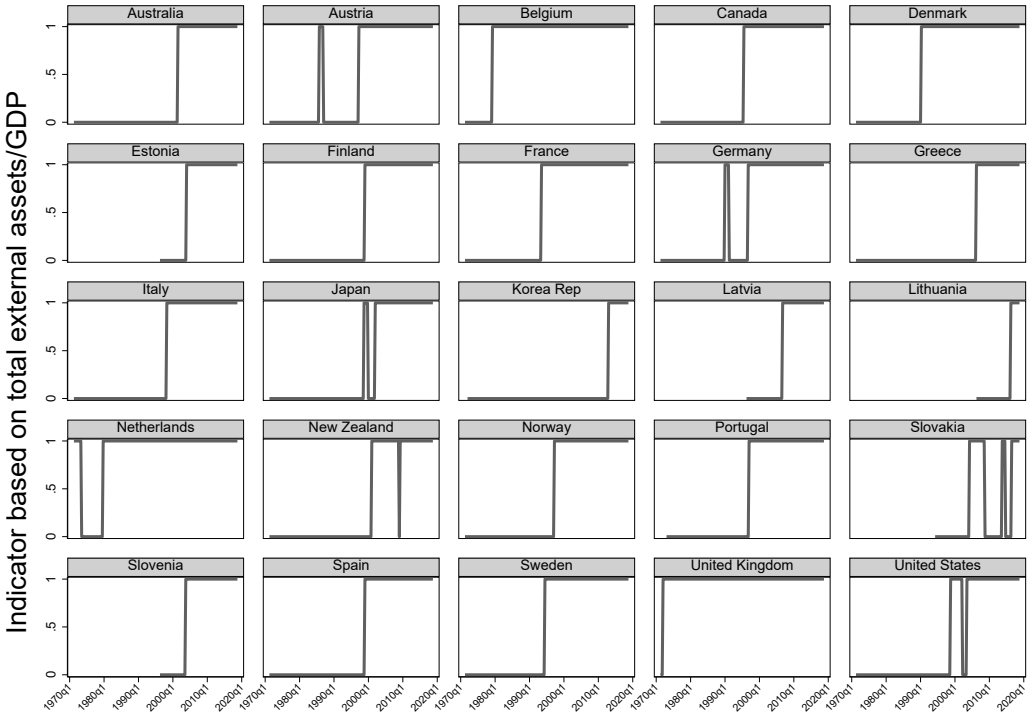
Note: The table shows the number of natural disasters in advanced and emerging economies in the high (above sample median) and low (below sample median) states of the three financial indicator variables. Total = (external assets + liabilities)/GDP, Assets = total external assets/GDP, Liabilities = total external liabilities/GDP.

Figure A.1: Indicator variable based on total external assets and liabilities, advanced economies



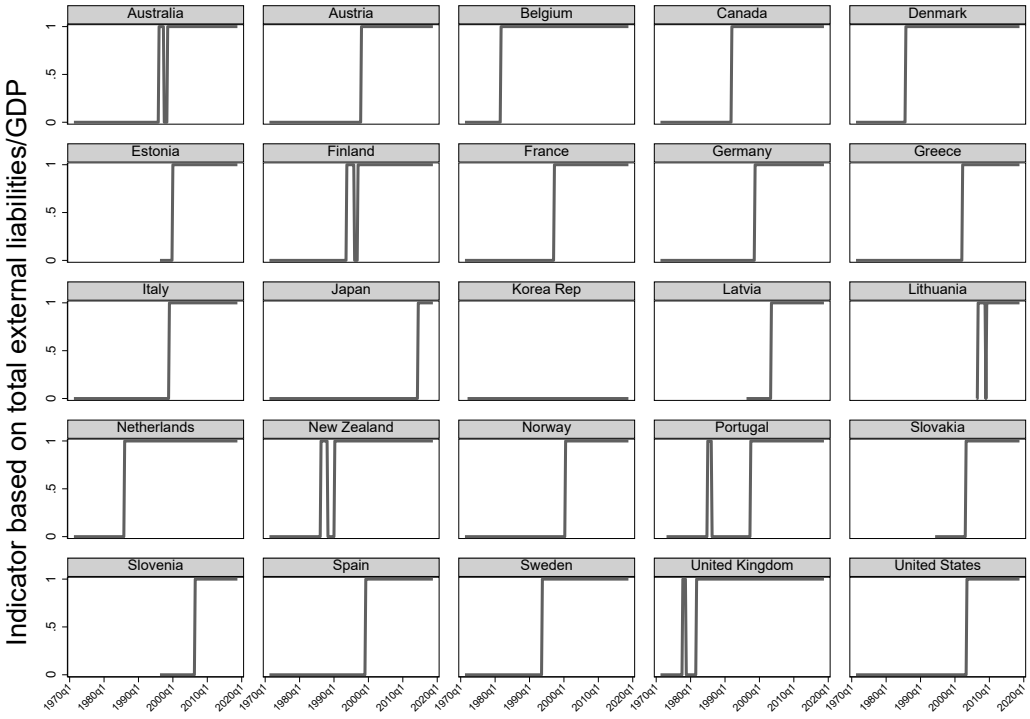
Notes: The figure illustrates the values of the indicator variable by country, based on total external assets plus liabilities relative to GDP. The sample is for advanced economies as listed in Tab. A.1.

Figure A.2: Indicator variable based on total external assets, advanced economies



Notes: The figure illustrates the values of the indicator variable by country, based on external assets relative to GDP. The sample is for advanced economies as listed in Tab. A.1.

Figure A.3: Indicator variable based on total external liabilities, advanced economies

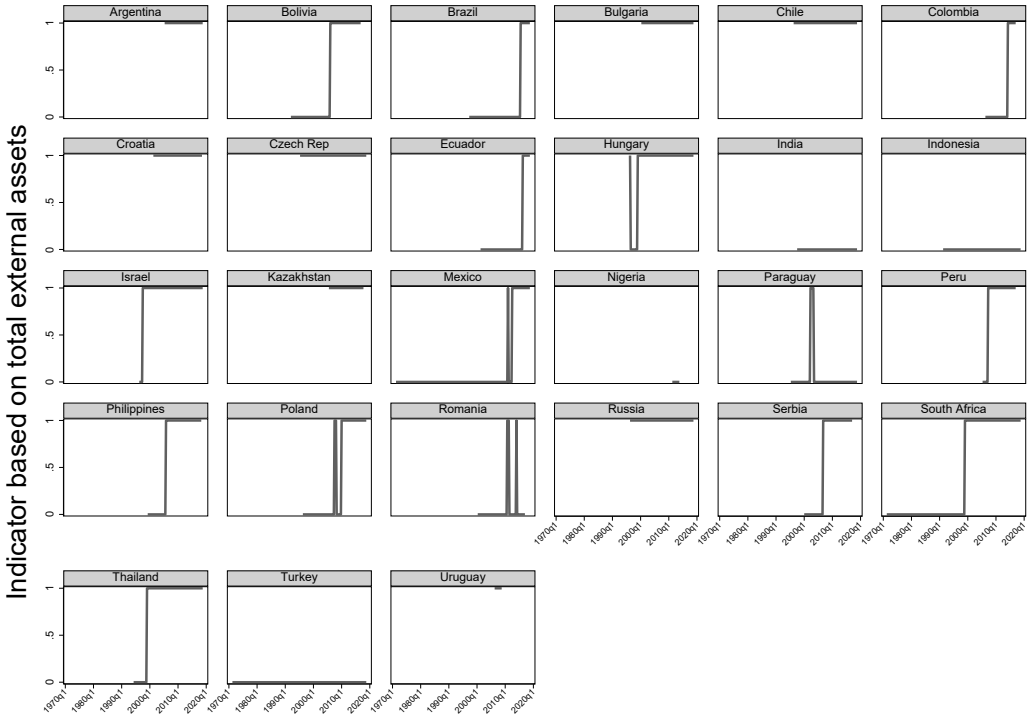


Notes: The figure illustrates the values of the indicator variable by country, based on total external liabilities to GDP. The sample is for advanced economies as listed in Tab. A.1.

Figure A.4: Indicator variable based on total external assets and liabilities, emerging economies

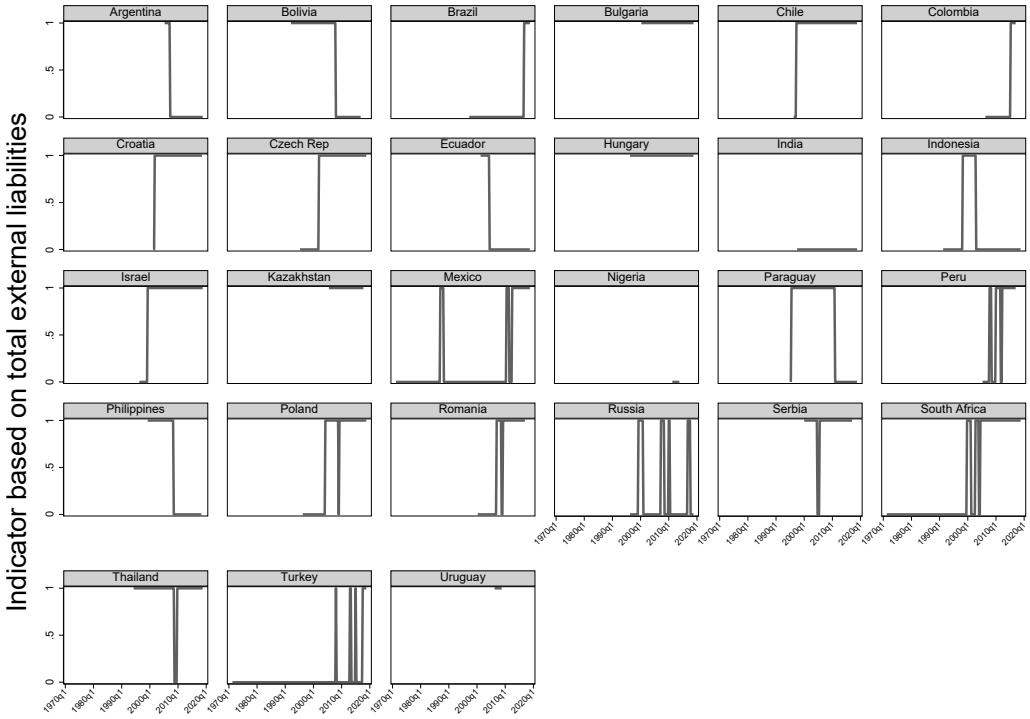
Notes: The figure illustrates the values of the indicator variable by country, based on total external assets plus liabilities relative to GDP. The sample is for emerging economies as listed in Tab. A.1.

Figure A.5: Indicator variable based on total external assets, emerging economies



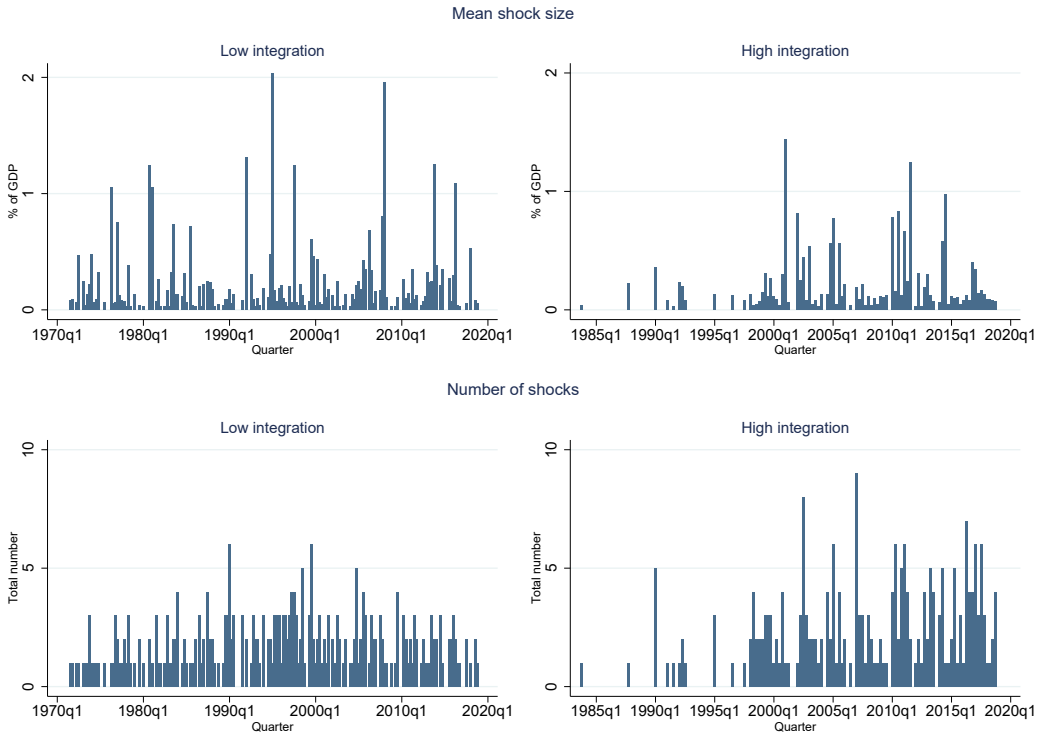
Notes: The figure illustrates the values of the indicator variable by country, based on external assets relative to GDP. The sample is for emerging economies as listed in Tab. A.1.

Figure A.6: Indicator variable based on total external liabilities, emerging economies



Notes: The figure illustrates the values of the indicator variable by country, based on total external liabilities to GDP. The sample is for emerging economies as listed in Tab. A.1.

Figure A.7: Distribution of shocks over time



Notes: The figure shows the distribution of natural disasters over time. The top panels show the mean shock size in % of GDP per quarter and the bottom panels the number of shocks per quarter in the sample of advanced and emerging market economies. The left panels refer to cases with low financial integration and the right panels to cases with high financial integration.

B Specification tests

Table B.6: Test of residual autocorrelation

Residual	GDP growth	Consumption growth	Investment growth
Residual $t-1$	-0.006	0.000	0.007
S.E.	(0.016)	(0.016)	(0.016)
Observations	4008	4008	4008
R^2	0.000	0.000	0.000
p-value F-test	0.711	0.977	0.643

Note: The table shows fixed effects regressions of the residuals of (1) on one lag of the residuals and a constant (not reported) when the dependent variable in (1) is country specific GDP growth, consumption growth, or investment growth, respectively. The p-value in the bottom refers to the F-test of significance of first order autocorrelation.

Table B.7: Granger causality tests

Granger causality of	GDP growth	Consumption growth	Investment growth
Point estimate	0.001	0.002	-0.000
p-value	(0.356)	(0.183)	(0.963)
Observations	4318	4318	4318
R^2	0.000	0.001	0.000
F-statistic GC test	0.852	1.770	0.002
p-value GC test	0.356	0.183	0.963

Note: The table shows Granger causality tests of the null hypothesis that natural disasters are Granger caused by, respectively, GDP growth, consumption growth, or investment growth. The model includes one lag of the potentially Granger causing variable and of the disaster shock as well as country fixed effects.

Table B.8: Determinants of state variables

	Fixed effects			Logit		
	(1)	(2)	(3)	(4)	(5)	(6)
	Total	Assets	Liabilities	Total	Assets	Liabilities
Lag 0 disaster	0.056	0.017	0.048	0.077	0.004	0.079
	(0.039)	(0.039)	(0.039)	(0.049)	(0.055)	(0.059)
Lag 1 disaster	0.049	0.017	0.049	0.072	-0.001	0.080
	(0.039)	(0.039)	(0.039)	(0.051)	(0.056)	(0.061)
Lag 2 disaster	0.033	0.012	0.035	0.054	-0.003	0.066
	(0.039)	(0.039)	(0.039)	(0.050)	(0.053)	(0.060)
Lag 3 disaster	0.019	0.010	0.027	0.030	-0.023	0.047
	(0.039)	(0.039)	(0.039)	(0.051)	(0.052)	(0.061)
Lag 4 disaster	0.018	0.002	0.024	0.033	-0.036	0.035
	(0.039)	(0.039)	(0.039)	(0.056)	(0.056)	(0.061)
Lag 5 disaster	0.027	-0.013	0.014	0.051	-0.044	0.028
	(0.039)	(0.039)	(0.039)	(0.054)	(0.054)	(0.061)
Lag 6 disaster	0.021	-0.017	0.012	0.039	-0.049	0.018
	(0.040)	(0.040)	(0.040)	(0.054)	(0.053)	(0.061)
Lag 7 disaster	0.022	0.028	0.021	0.034	0.008	0.023
	(0.039)	(0.040)	(0.040)	(0.055)	(0.055)	(0.060)
Lag 8 disaster	0.015	0.015	0.005	0.033	-0.006	0.023
	(0.039)	(0.040)	(0.040)	(0.054)	(0.055)	(0.066)
GDP growth	0.008**	-0.003	0.016***	-0.014***	-0.024***	-0.006
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
GDP (USD bn.)	0.002	0.006	-0.003	-0.006***	0.004	-0.011***
	(0.004)	(0.004)	(0.004)	(0.002)	(0.003)	(0.002)
Trade openness	0.040	-0.162***	0.114**	0.175***	0.094***	0.270***
	(0.047)	(0.047)	(0.047)	(0.021)	(0.021)	(0.024)
Capital account	0.063***	0.055***	0.066***	0.092***	0.092***	0.106***
opennes	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Institutional	0.126***	0.268***	-0.228***	0.263***	0.304***	0.272***
quality	(0.049)	(0.050)	(0.050)	(0.015)	(0.017)	(0.016)
Time FE	yes	yes	yes	yes	yes	yes
Country FE	yes	yes	yes	no	no	no
Observations	4062	4062	4062	3900	3937	3525
R2	0.68	0.66	0.66			
p-value F-test	0.714	0.998	0.800	0.594	0.987	0.797

Note: The table shows estimation results for regressions of the binary financial indicator variables on the disaster shock and its lags. Total = 1 if total external assets plus liabilities (to GDP) are larger than the sample median, 0 otherwise. Assets = 1 if total foreign assets (to GDP) are lager than the sample median, 0 otherwise, Liabilities = 1 if total foreign liabilities (to GDP) are larger than the sample median, 0 otherwise. Columns (1)-(3) show the results from a fixed effects model, while columns (4)-(6) present the average marginal effects of a logit model.

C Supplementary results main analysis

Table C.9: Regression results underlying Fig. 3

Horizon	GDP			Consumption			Investment		
	Mean	Confidence interval		Mean	Confidence interval		Mean	Confidence interval	
	Difference between states of high and low financial integration								
1	0.2	-0.2	0.5	-0.2	-0.5	0.1	0.1	-1.3	1.4
2	0.1	-0.4	0.6	0.0	-0.4	0.5	1.0	-0.7	2.8
3	0.9	0.3	1.5	0.9	0.3	1.5	1.9	-0.1	4.0
4	0.6	-0.2	1.3	1.1	0.4	1.9	2.5	0.0	4.9
5	0.9	0.1	1.8	1.6	0.7	2.4	3.8	1.0	6.6
6	1.2	0.3	2.2	2.1	1.2	3.0	3.3	0.2	6.2
7	1.4	0.4	2.3	2.5	1.5	3.5	4.6	1.3	7.7
8	2.2	1.1	3.2	3.5	2.3	4.5	4.0	0.7	7.4
	Difference between states of high and low external assets								
1	0.0	-0.4	0.4	-0.3	-0.7	0.1	-0.8	-2.2	0.6
2	-0.3	-0.8	0.3	0.0	-0.5	0.5	1.0	-0.8	2.8
3	0.3	-0.5	1.0	0.5	-0.2	1.1	1.8	-0.3	3.8
4	0.0	-0.9	0.8	0.6	-0.1	1.3	1.5	-1.0	3.9
5	0.5	-0.4	1.4	1.0	0.1	1.8	3.3	0.5	6.3
6	0.4	-0.6	1.4	1.0	0.0	1.9	3.3	0.1	6.5
7	0.5	-0.6	1.5	1.3	0.3	2.2	4.7	1.3	8.0
8	0.9	-0.2	2.0	0.8	-0.3	1.9	4.1	0.6	7.9
	Difference between states of high and low external liabilities								
1	0.4	0.0	0.8	0.2	-0.2	0.6	0.5	-1.1	2.0
2	0.5	-0.1	1.1	0.3	-0.3	0.8	2.0	0.0	3.9
3	1.1	0.4	1.9	0.9	0.2	1.6	2.9	0.3	5.3
4	0.5	-0.4	1.4	1.2	0.3	2.0	3.1	0.3	6.0
5	0.7	-0.2	1.7	1.4	0.6	2.3	4.3	1.2	7.5
6	1.1	0.0	2.1	1.9	0.9	2.9	3.1	-0.3	6.5
7	1.3	0.1	2.5	2.3	1.2	3.3	4.0	0.5	7.9
8	2.0	0.8	3.2	3.3	2.1	4.4	3.2	-0.7	7.3

Notes: The table shows the regression results underlying the figure referenced in the table caption. It contains the point estimates and one-standard deviation confidence bands based on 500 draws.

Table C.10: Regression results underlying Fig. 4

Horizon	Current account			Imports			Exports		
	Mean	Confidence interval		Mean	Confidence interval		Mean	Confidence interval	
	Difference between states of high and low financial integration								
1	0.3	-0.1	0.7	-0.9	-2.2	0.3	0.2	-1.0	1.3
2	-0.1	-0.7	0.4	0.4	-1.3	2.0	-1.1	-2.6	0.4
3	-0.4	-1.0	0.3	1.1	-0.9	3.1	-1.9	-3.7	0.0
4	-0.7	-1.4	0.0	2.3	-0.2	4.6	-3.8	-5.8	-1.6
5	-1.3	-2.1	-0.5	2.9	0.3	5.7	-3.5	-5.9	-1.3
6	-1.0	-1.9	-0.1	4.3	1.3	7.0	-2.1	-4.8	0.6
7	-1.3	-2.2	-0.4	3.6	0.5	6.7	-4.4	-7.4	-1.5
8	-1.2	-2.2	-0.1	3.1	-0.1	6.3	-3.2	-6.4	-0.2
	Difference between states of high and low external assets								
1	0.4	0.0	0.9	-1.4	-2.6	-0.1	-0.3	-1.5	0.9
2	-0.1	-0.6	0.4	-1.0	-2.7	0.7	-2.4	-3.8	-0.9
3	-0.3	-0.9	0.3	0.2	-1.9	2.3	-2.1	-3.9	-0.3
4	-0.5	-1.2	0.2	1.2	-1.0	3.6	-2.9	-5.0	-0.9
5	-1.1	-1.8	-0.4	2.6	-0.1	5.3	-3.0	-5.3	-0.6
6	-0.8	-1.6	0.0	2.2	-0.6	4.9	-2.6	-5.1	-0.2
7	-1.1	-2.0	-0.2	1.4	-1.5	4.3	-4.8	-7.5	-2.3
8	-1.1	-1.9	-0.2	1.6	-1.8	4.8	-2.9	-6.1	0.0
	Difference between states of high and low external liabilities								
1	0.3	-0.2	0.8	-0.6	-2.1	0.8	-0.1	-1.4	1.2
2	-0.2	-0.8	0.4	0.8	-1.1	2.7	-0.2	-2.0	1.5
3	-0.5	-1.2	0.3	1.4	-1.0	3.5	-2.1	-4.0	-0.1
4	-0.7	-1.6	0.1	2.4	0.0	4.7	-4.1	-6.3	-1.8
5	-1.4	-2.4	-0.6	2.7	-0.2	5.5	-3.8	-6.3	-1.1
6	-0.9	-1.9	0.0	3.8	0.8	6.9	-1.8	-4.5	1.0
7	-1.0	-2.2	0.0	2.6	-0.7	5.6	-3.5	-6.4	-0.3
8	-0.8	-1.9	0.2	2.1	-1.1	5.5	-1.7	-4.8	1.5

Notes: The table shows the regression results underlying the figure referenced in the table caption. It contains the point estimates and one-standard deviation confidence bands based on 500 draws.

Table C.11: Regression results underlying Fig. 5

	External equity assets			External debt assets			External equity liabilities			External debt liabilities		
Horizon	Mean	CI		Mean	CI		Mean	CI		Mean	CI	
1	-0.1	-0.6	0.3	0.0	-0.4	0.3	0.1	-0.3	0.5	0.1	-0.3	0.5
2	0.2	-0.4	0.8	0.4	-0.1	0.9	0.1	-0.5	0.8	0.2	-0.4	0.8
3	0.7	-0.1	1.4	1.2	0.5	1.8	0.9	0.1	1.7	0.8	0.1	1.5
4	0.8	0.0	1.6	1.7	0.9	2.4	1.0	0.1	1.9	1.0	0.3	1.9
5	1.2	0.4	2.1	2.2	1.3	3.0	1.4	0.4	2.3	1.5	0.6	2.5
6	1.1	0.1	2.2	2.8	1.9	3.8	1.8	0.8	2.8	1.8	0.8	2.8
7	1.6	0.4	2.6	3.1	2.0	4.1	2.1	1.0	3.2	2.3	1.2	3.5
8	1.0	-0.2	2.2	4.3	3.1	5.4	2.7	1.5	3.9	3.3	2.1	4.6

Notes: The table shows the regression results underlying the figure referenced in the table caption. It contains the point estimates and one-standard deviation confidence bands based on 500 draws.

Table C.12: Regression results underlying Fig. 6

Horizon	GDP			Consumption			Investment		
	Mean	Confidence interval		Mean	Confidence interval		Mean	Confidence interval	
	Difference between states of high and low financial integration								
1	-0.1	-0.5	0.4	0.4	-0.1	0.9	-1.1	-2.4	0.4
2	-0.7	-1.2	-0.1	-0.1	-0.8	0.6	-2.9	-4.9	-0.8
3	0.1	-0.7	0.8	0.2	-0.7	1.1	-1.8	-4.3	0.7
4	0.0	-0.8	0.8	0.3	-0.7	1.3	-2.7	-5.6	0.1
5	0.3	-0.7	1.2	0.5	-0.6	1.6	-1.6	-4.8	1.6
6	0.8	-0.2	1.8	0.8	-0.4	1.9	-0.6	-4.1	3.0
7	0.9	-0.2	2.0	0.7	-0.7	2.0	-1.5	-5.3	2.4
8	1.0	-0.1	2.2	0.6	-0.8	2.0	-2.1	-6.2	2.1
	Difference between states of high and low external assets								
1	0.0	-0.5	0.4	0.9	0.3	1.4	-1.0	-2.5	0.4
2	-0.7	-1.3	0.0	0.3	-0.5	1.1	-2.7	-4.9	-0.5
3	-0.2	-0.9	0.6	-0.3	-1.2	0.7	-3.5	-6.2	-1.0
4	-0.5	-1.3	0.4	0.1	-1.0	1.2	-4.2	-7.3	-1.3
5	-0.2	-1.1	0.8	0.4	-0.8	1.8	-3.1	-6.5	0.3
6	0.3	-0.7	1.4	1.4	0.0	2.8	-2.9	-6.6	1.2
7	1.1	-0.1	2.2	1.9	0.4	3.3	-0.9	-4.8	3.5
8	1.5	0.2	2.8	2.4	0.9	4.0	-0.3	-4.5	4.0
	Difference between states of high and low external liabilities								
1	0.0	-0.5	0.4	0.4	-0.2	0.9	-0.7	-2.3	0.8
2	-0.6	-1.2	0.0	-0.1	-0.8	0.6	-2.1	-4.4	0.1
3	0.2	-0.5	0.8	0.2	-0.7	1.1	-1.1	-3.7	1.4
4	0.2	-0.6	1.0	0.5	-0.5	1.5	-1.8	-4.9	1.0
5	0.4	-0.5	1.3	0.7	-0.4	1.8	-1.2	-4.5	2.2
6	0.9	0.0	1.9	0.9	-0.3	2.2	0.0	-3.7	3.9
7	1.0	-0.1	2.0	0.8	-0.4	2.0	-0.7	-4.5	3.2
8	1.0	-0.1	2.1	0.4	-0.8	1.8	-0.4	-4.6	3.9

Notes: The table shows the regression results underlying the figure referenced in the table caption. It contains the point estimates and one-standard deviation confidence bands based on 500 draws.

Table C.13: Regression results underlying Fig. 7

Horizon	Current account			Imports			Exports		
	Mean	Confidence interval		Mean	Confidence interval		Mean	Confidence interval	
	Difference between states of high and low financial integration								
1	0.5	-3.5	4.2	-0.8	-2.7	1.3	-3.1	-5.0	-1.3
2	-1.3	-5.8	3.1	0.6	-1.8	3.1	-1.6	-3.7	0.6
3	0.3	-4.6	5.2	-0.3	-3.1	2.6	-2.0	-4.4	0.3
4	-0.3	-6.1	5.7	-0.5	-3.5	2.7	-2.0	-4.6	0.3
5	0.3	-5.5	6.3	-0.7	-4.0	2.8	-0.7	-3.5	2.1
6	-2.4	-9.1	3.7	-0.1	-3.8	3.7	-1.8	-4.7	1.2
7	-1.5	-8.9	5.3	-1.7	-5.7	2.5	-1.5	-4.7	1.4
8	1.0	-0.1	2.2	0.6	-0.8	2.0	-2.1	-6.2	2.1
	Difference between states of high and low external assets								
1	-2.3	-6.6	2.3	-0.1	-1.8	1.6	1.0	-0.6	2.5
2	-3.8	-9.2	1.9	-1.6	-3.8	0.7	-1.5	-3.5	0.3
3	2.0	-4.1	7.8	-2.0	-4.8	0.7	-1.3	-3.4	0.8
4	-2.7	-9.4	3.8	-2.5	-5.7	0.7	-2.4	-4.9	0.1
5	-1.6	-8.8	4.7	-2.8	-6.2	0.7	-1.6	-4.1	0.9
6	-0.6	-7.8	6.7	-1.5	-4.9	2.2	-0.7	-3.5	2.1
7	-3.7	-11.1	3.6	0.8	-2.8	5.0	-1.7	-4.8	1.3
8	-3.2	-11.4	4.6	1.1	-2.7	5.1	-1.8	-4.9	1.5
	Difference between states of high and low external liabilities								
1	0.6	-2.6	4.1	0.1	-1.4	1.6	-1.2	-2.6	0.1
2	0.0	-4.3	4.1	0.1	-2.0	2.3	-3.1	-5.1	-1.3
3	-2.2	-6.8	2.0	1.6	-0.9	4.1	-1.9	-3.9	0.0
4	-0.1	-5.1	5.0	0.8	-1.9	3.6	-2.4	-4.8	0.1
5	-0.5	-5.9	5.0	0.6	-2.4	3.9	-1.8	-4.5	0.5
6	-0.9	-7.4	5.1	0.3	-3.0	3.8	-0.7	-3.5	2.2
7	-2.0	-8.8	4.4	1.1	-2.6	4.9	-1.8	-4.5	1.2
8	-2.5	-9.8	4.3	1.4	-2.5	5.2	-1.4	-4.5	1.4

Notes: The table shows the regression results underlying the figure referenced in the table caption. It contains the point estimates and one-standard deviation confidence bands based on 500 draws.

Table C.14: Regression results underlying Fig. 8

Horizon	External equity assets			External debt assets			External equity liabilities			External debt liabilities		
	Mean	CI		Mean	CI		Mean	CI		Mean	CI	
1	0.5	0.1	0.9	1.3	0.8	1.9	0.8	0.3	1.3	-0.8	-1.3	-0.3
2	0.3	-0.4	1.0	1.2	0.4	1.9	0.6	-0.1	1.2	-0.2	-0.9	0.4
3	0.3	-0.5	1.0	0.5	-0.4	1.5	0.4	-0.4	1.1	-0.7	-1.4	0.1
4	0.5	-0.4	1.3	1.3	0.3	2.2	0.5	-0.4	1.4	-0.9	-1.8	0.1
5	0.5	-0.5	1.5	1.3	0.1	2.4	0.4	-0.6	1.5	-1.4	-2.4	-0.4
6	0.7	-0.5	1.9	1.9	0.6	3.0	0.8	-0.3	1.9	-2.2	-3.4	-1.1
7	1.0	-0.2	2.3	2.4	1.2	3.7	1.0	-0.2	2.4	-3.2	-4.5	-2.1
8	1.3	-0.2	2.6	3.4	2.1	4.7	1.3	0.0	2.7	-4.1	-5.5	-2.9

Notes: The table shows the regression results underlying the figure referenced in the table caption. It contains the point estimates and one-standard deviation confidence bands based on 500 draws.

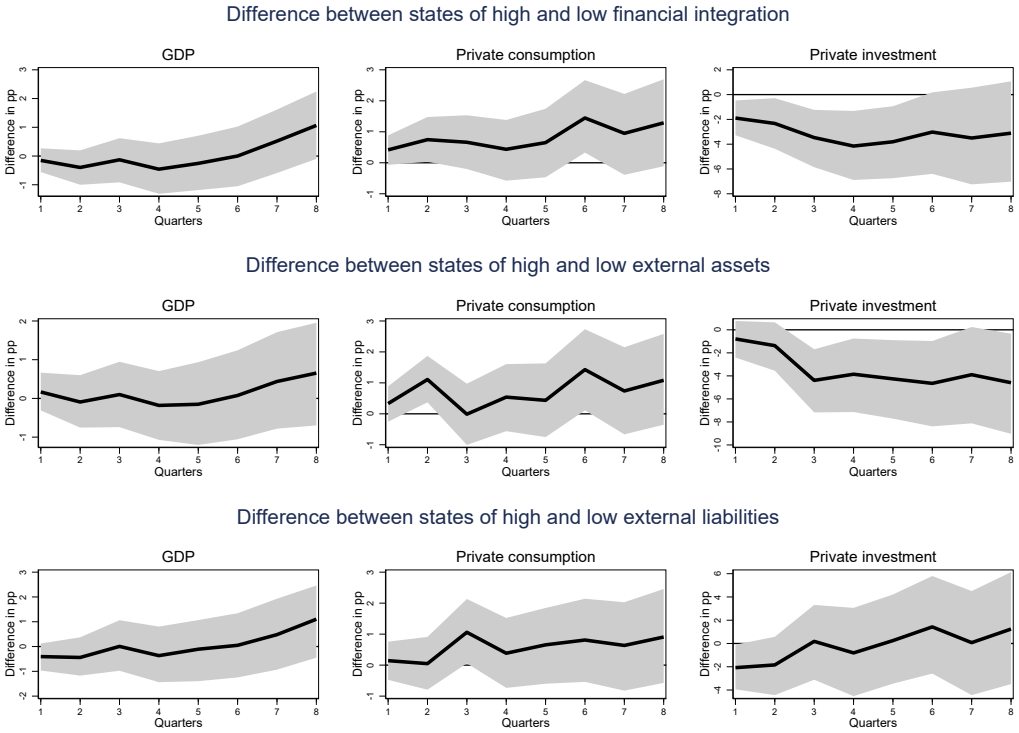
Table C.15: Regression results underlying Fig. 9

Horizon	GDP			Consumption			Investment		
	Mean	Confidence interval		Mean	Confidence interval		Mean	Confidence interval	
	Low institutional quality								
1	0.8	0.1	1.6	0.6	-0.3	1.4	0.8	0.0	1.5
2	-0.1	-1.0	1.0	0.4	-0.8	1.5	-0.3	-1.5	0.8
3	0.4	-1.0	2.1	0.6	-0.7	2.1	-0.2	-1.4	1.0
4	0.0	-1.8	1.5	0.7	-0.9	2.3	-0.8	-2.3	0.9
5	0.0	-2.1	2.0	0.4	-1.4	2.2	-1.0	-2.8	0.7
6	0.2	-1.9	2.3	0.7	-1.4	2.8	-0.9	-2.9	1.1
7	1.9	-0.1	3.9	2.6	0.4	4.9	0.6	-1.5	2.6
8	3.3	1.1	5.2	4.5	2.1	6.9	2.2	0.2	4.4
	High institutional quality								
1	0.1	-0.6	0.7	-0.4	-1.0	0.3	0.0	-0.7	0.7
2	1.3	0.3	2.2	0.3	-0.5	1.1	1.2	0.2	2.2
3	0.7	-0.4	1.9	0.3	-0.6	1.2	0.2	-0.9	1.3
4	1.7	0.5	3.3	1.1	0.1	2.2	1.1	-0.2	2.3
5	1.8	0.2	3.4	1.2	0.0	2.6	1.0	-0.6	2.3
6	2.3	0.6	3.9	1.3	-0.2	2.9	1.5	0.0	2.9
7	2.5	0.7	4.3	0.9	-0.6	2.3	1.6	-0.1	3.5
8	2.4	0.5	4.5	0.7	-0.9	2.3	1.6	-0.1	3.5

Notes: The table shows the regression results underlying the figure referenced in the table caption. It contains the point estimates and one-standard deviation confidence bands based on 500 draws.

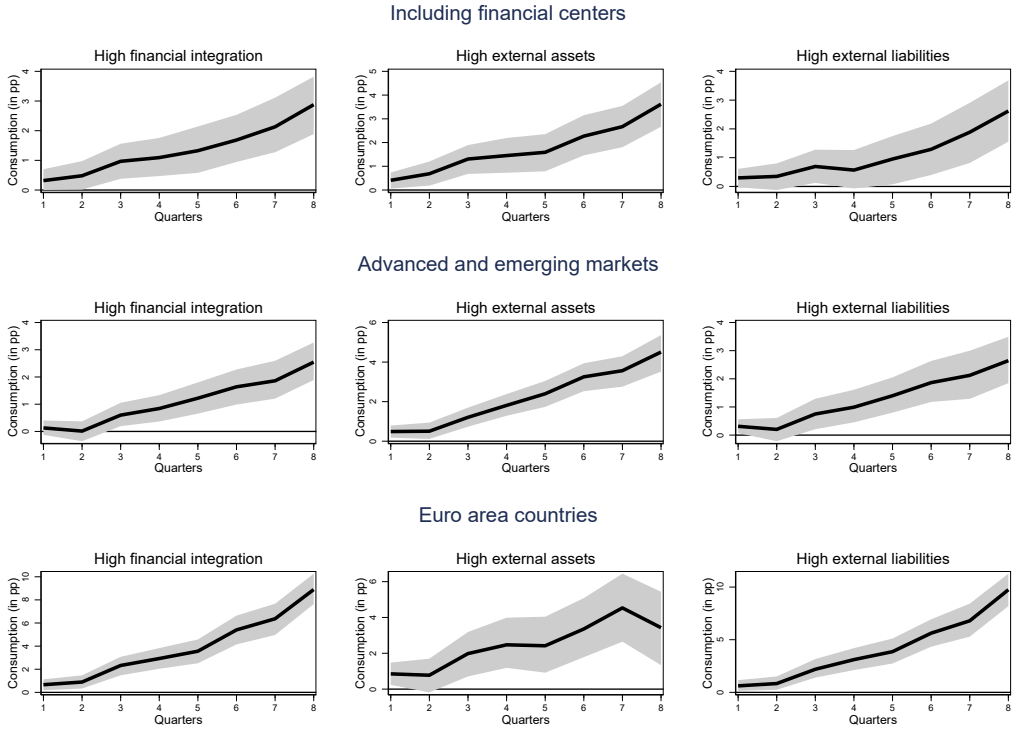
D Sensitivity analysis

Figure D.8: Fixed classification of emerging markets



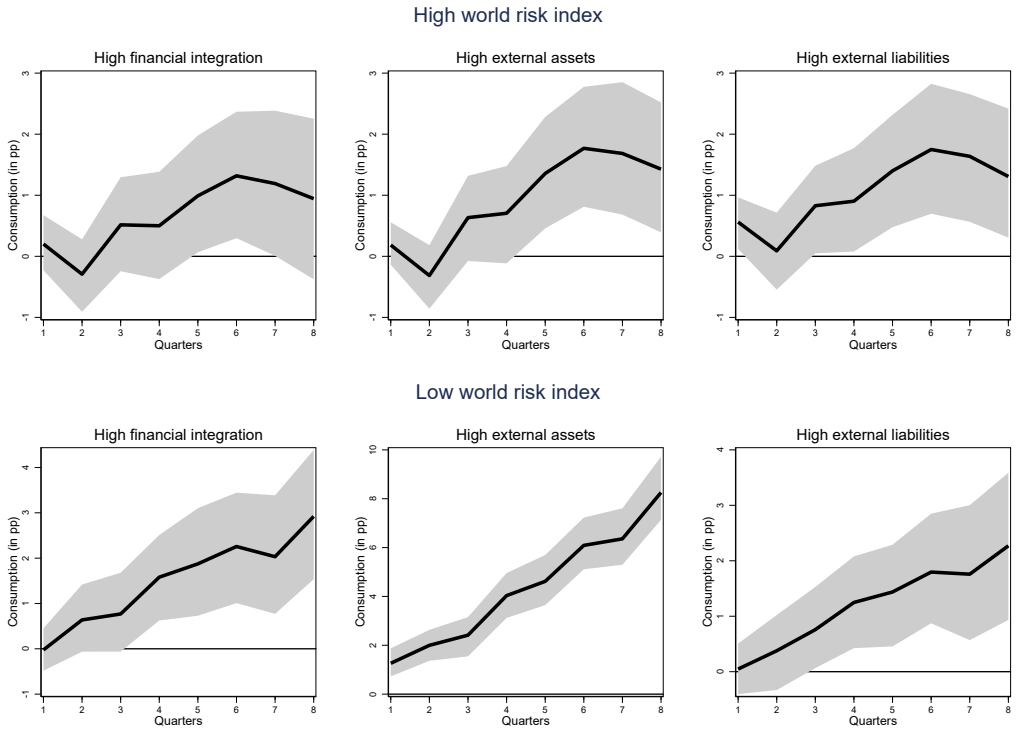
Notes: The figure shows the cumulative difference of GDP, private consumption, and private investment between countries with high and low external financial positions following a natural disaster for a sample of emerging economies. The financial indicators are based on total external assets and liabilities/GDP (top panels), total external assets/GDP (middle panels), and total external liabilities/GDP (bottom panels). The indicators are fixed per country. The indicator is 1 if the country mean of the financial integration variable is above the sample median; and 0 otherwise. Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.9: Sensitivity to sample composition



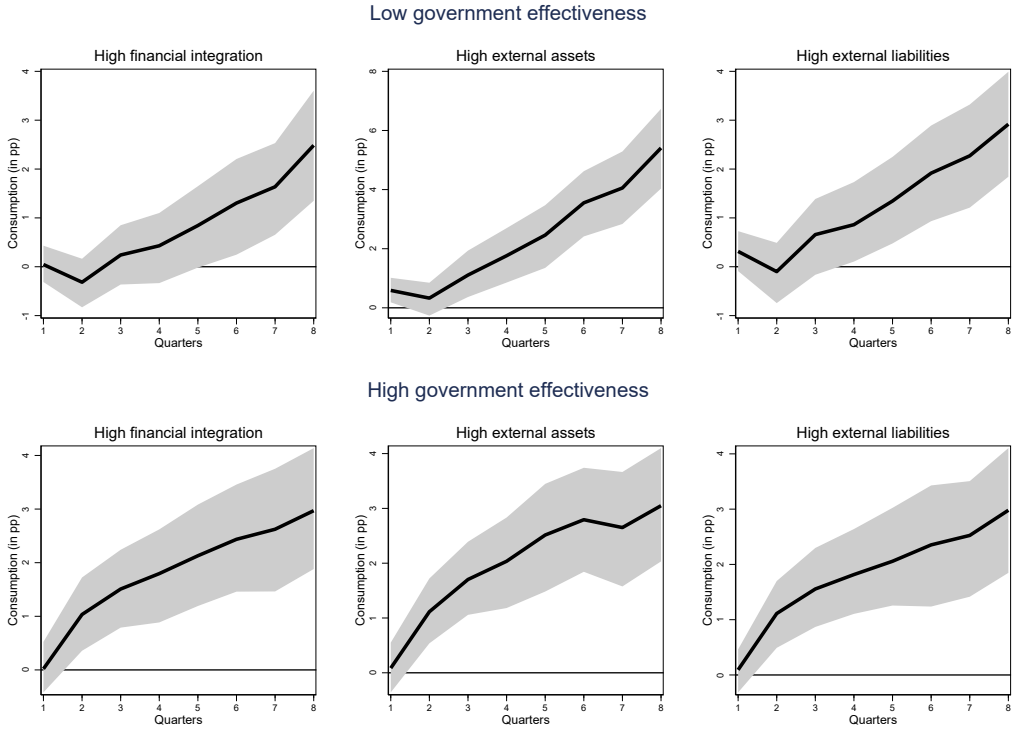
Notes: The figure illustrates the cumulative difference of private consumption between states of high and low external financial positions following a natural disaster for a sample of (a) advanced economies plus financial center countries, (b) advanced and emerging countries, and (c) euro area countries. Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.10: Sensitivity to level of disaster risk (policies)



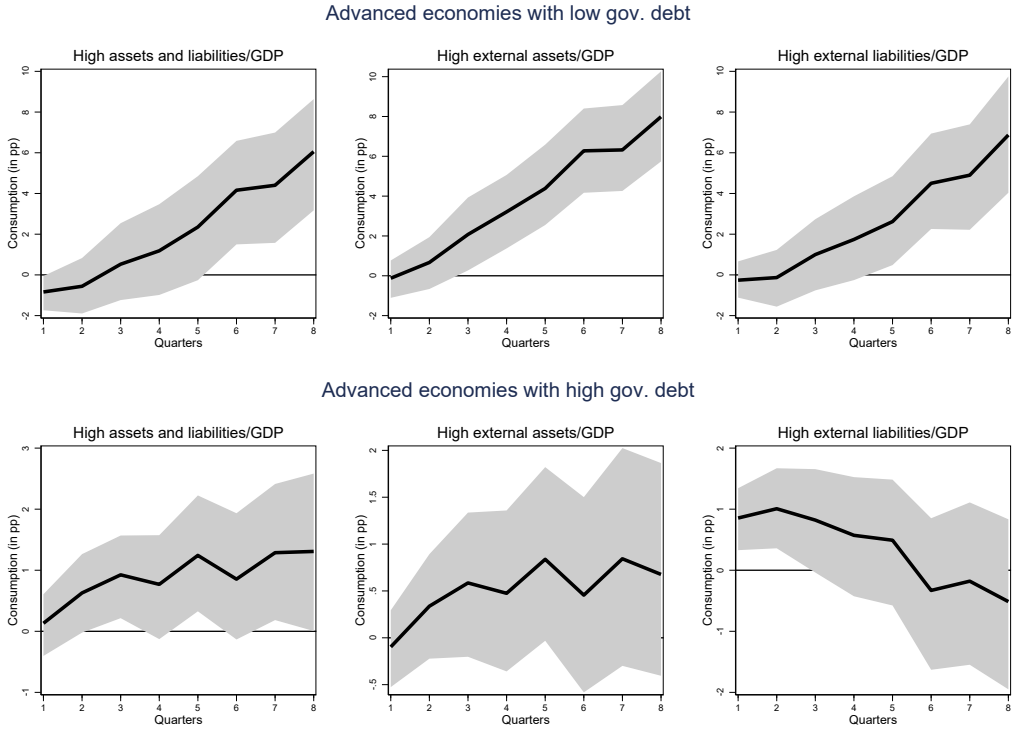
Notes: The figure illustrates the cumulative difference of private consumption between states of high and low external financial positions following a natural disaster for a sample of advanced and emerging market countries with high disaster risk (top panels) and low disaster risk (bottom panels). Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.11: Sensitivity to level of government effectiveness



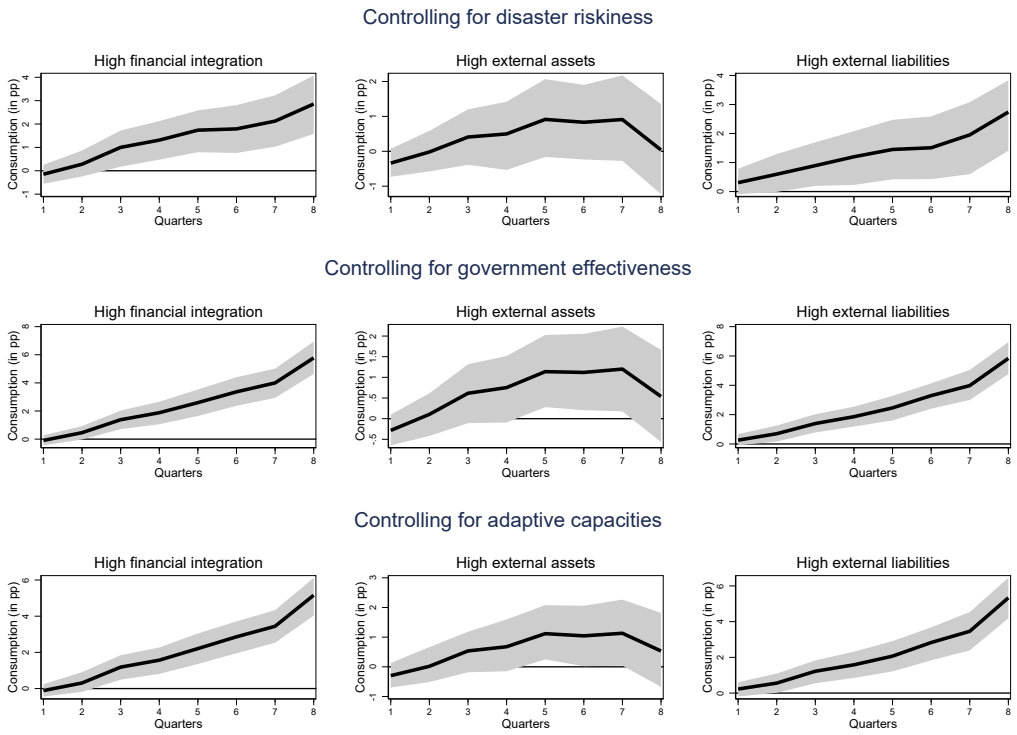
Notes: The figure illustrates the cumulative difference of private consumption between states of high and low external financial positions following a natural disaster for a sample of advanced and emerging market countries with low government effectiveness (top panels) and high government effectiveness (bottom panels). Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.12: Sensitivity to splitting sample based on government debt



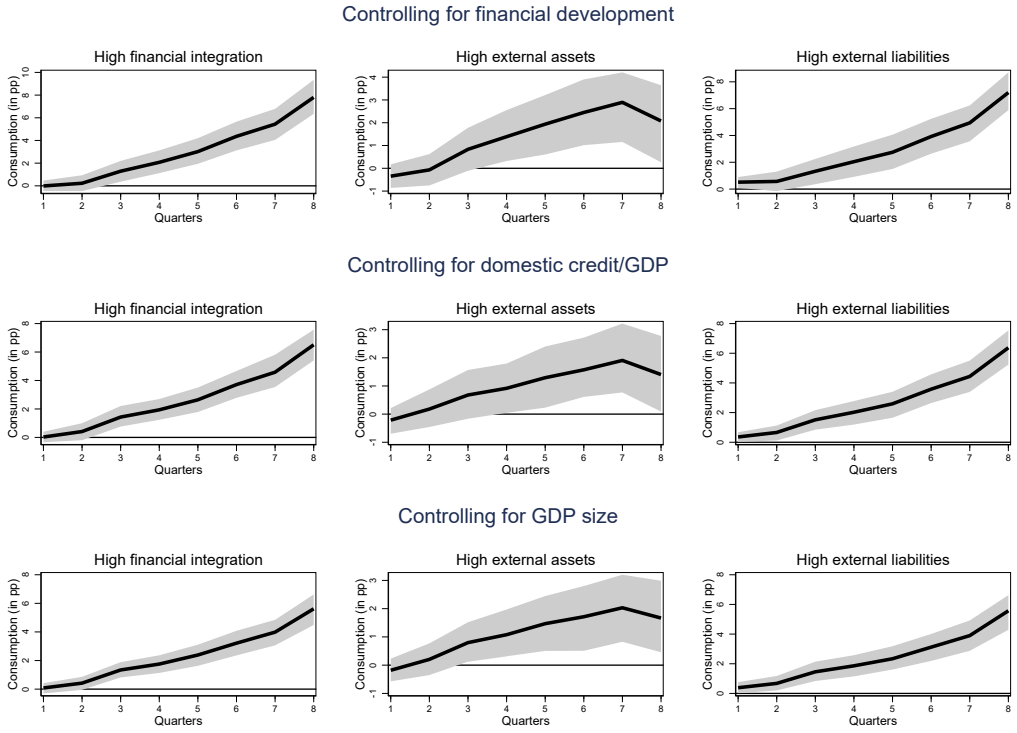
Notes: The figure illustrates the cumulative difference of private consumption between states of high and low external financial positions following a natural disaster for a sample of advanced economies with low government debt (upper panels) and high government debt (bottom panels). Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.13: Controlling for disaster policies



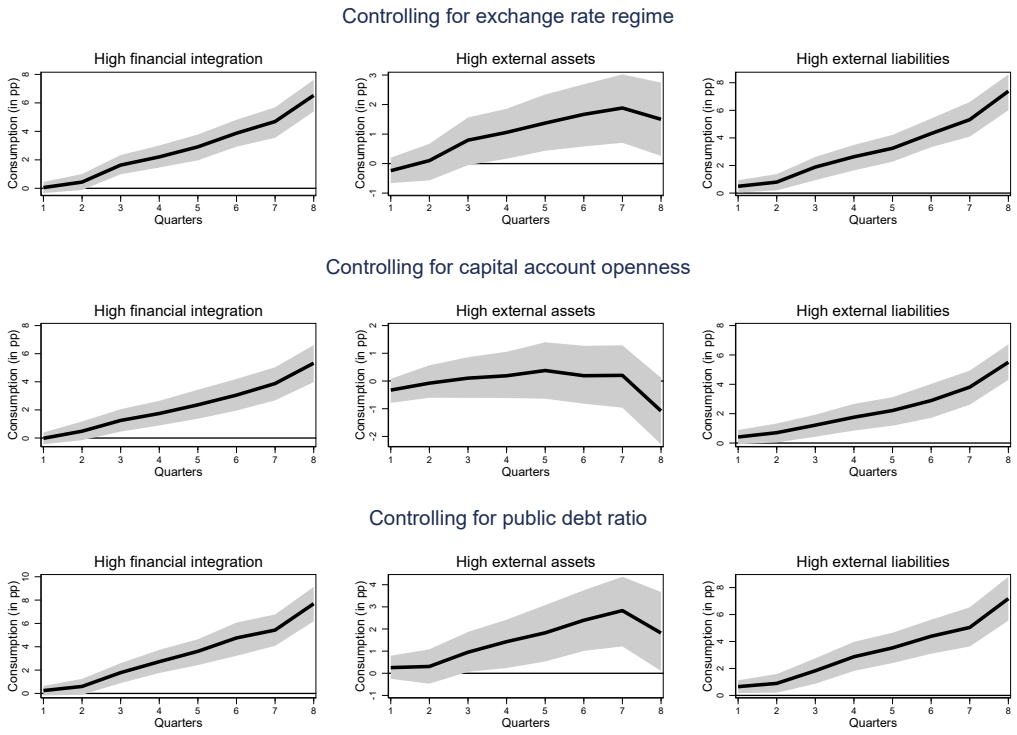
Notes: The figure illustrates the cumulative difference of private consumption between states of high and low external financial positions following a natural disaster for a sample of advanced economies. Model (1) is extended one-by-one with 0/1 indicators for below/above sample median country-specific means of disaster riskiness, government effectiveness, or an index of adaptive capacities, as well as with interaction terms between the indicators and the shock variable for 8 lags. Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.14: Controlling for domestic financial shock absorbers



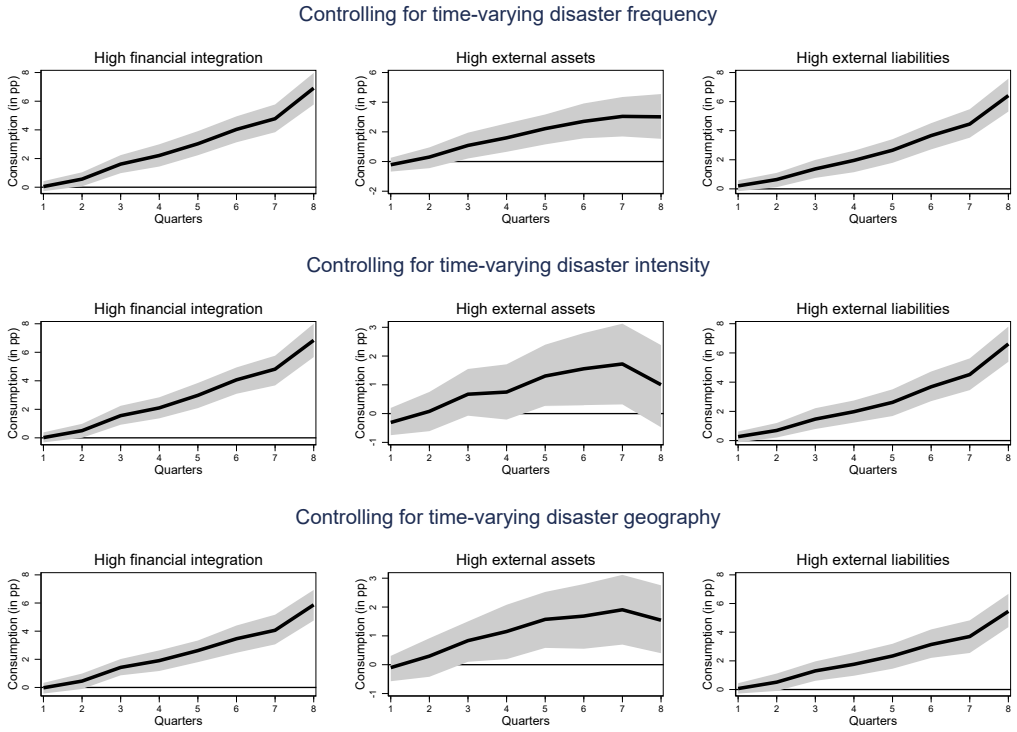
Notes: The figure illustrates the cumulative difference of private consumption between states of high and low external financial positions following a natural disaster for a sample of advanced economies. Model (1) is extended one-by-one with the level of financial development, the domestic credit/GDP ratio, or GDP size as well as with interaction terms between these and the shock variable for 8 lags. Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.15: Controlling for alternative economic shock absorbers



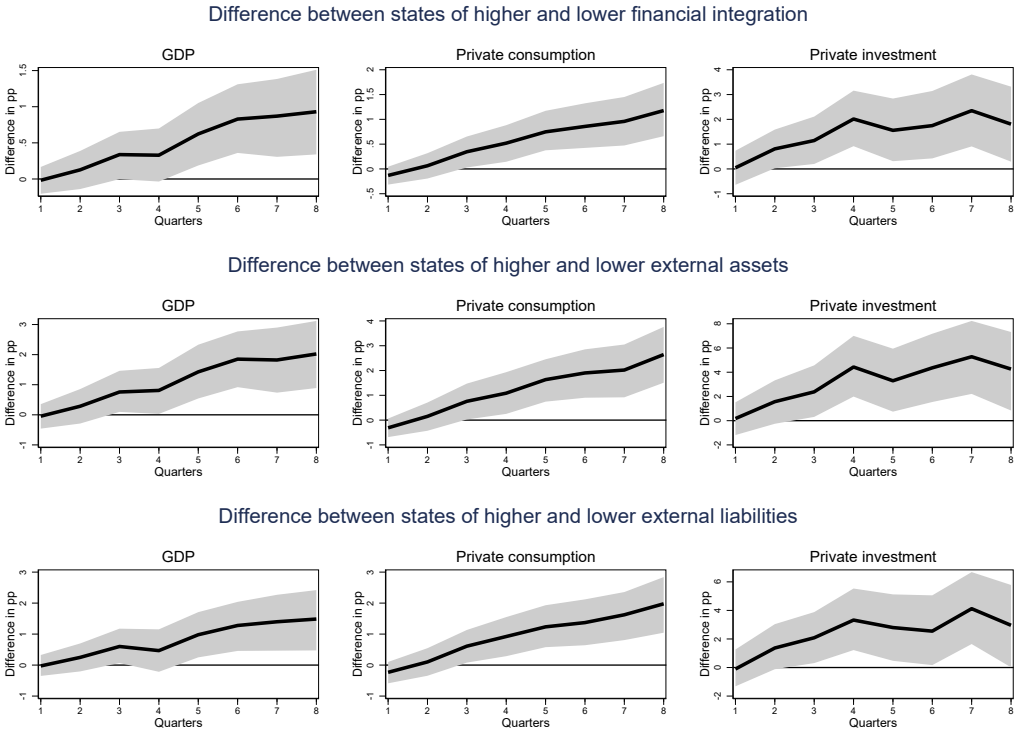
Notes: The figure illustrates the cumulative difference of private consumption between states of high and low external financial positions following a natural disaster for a sample of advanced economies. Model (1) is extended one-by-one with GDP, public debt to GDP, and the ratio of foreign reserves to GDP, respectively, as well as interaction terms between these variables and the shock variable for 8 lags. Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.16: Controlling for time-varying disaster exposure



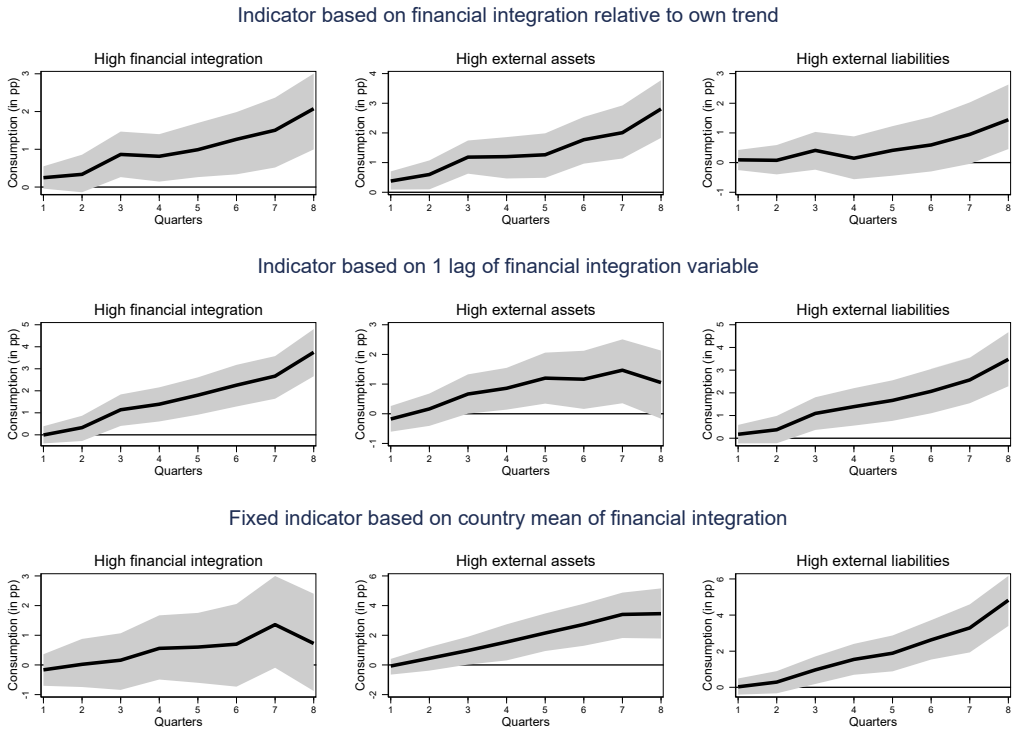
Notes: The figure illustrates the cumulative difference of private consumption between states of high and low external financial positions following a natural disaster for a sample of advanced economies. Model (1) is extended one-by-one with the country-specific cumulative sum of the disaster frequency (measured as the number of disasters), cumulative sum of the disaster intensity (measured as the damage of disasters in % of GDP), and geography (cumulative frequency $\times$ population density measured as persons per km^2), respectively, as well as interaction terms between these variables and the shock variable for 8 lags. Shaded areas are one-standard errors based on 500 draws.

Figure D.17: Sensitivity to using continuous financial integration measure



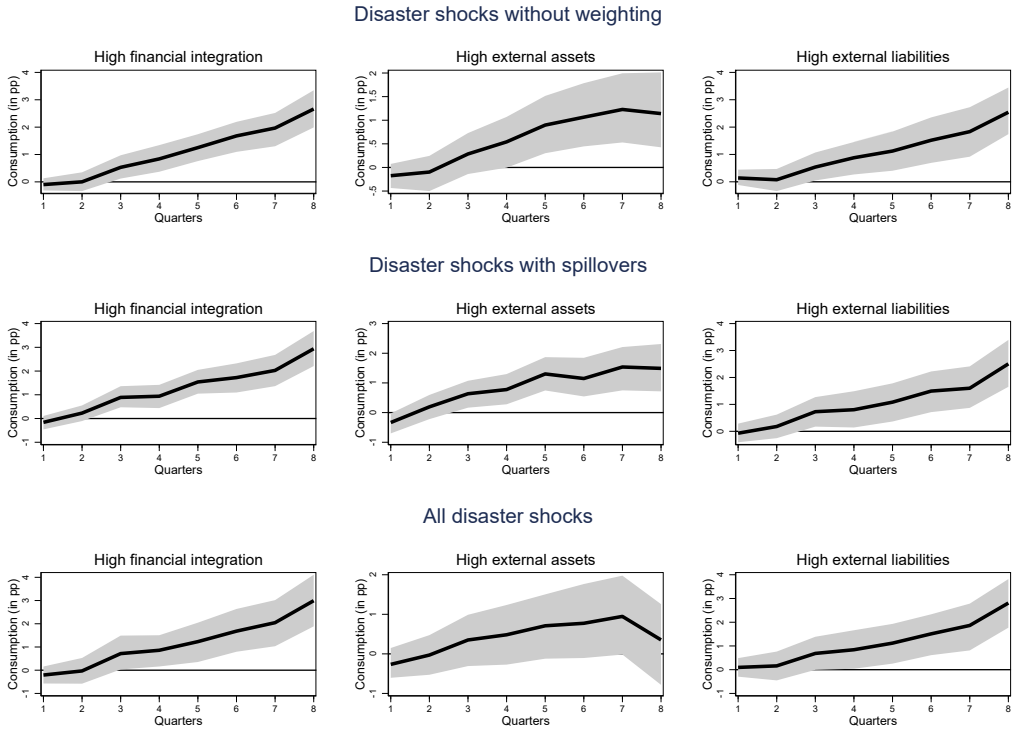
Notes: The figure shows the cumulative difference of GDP, private consumption, and private investment between countries with high and low external financial positions following a natural disaster for a sample of advanced economies. Financial integration is continuously measured as total external assets and liabilities/GDP (top panels), total external assets/GDP (middle panels), and total external liabilities/GDP (bottom panels). Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.18: Sensitivity to construction of state variable



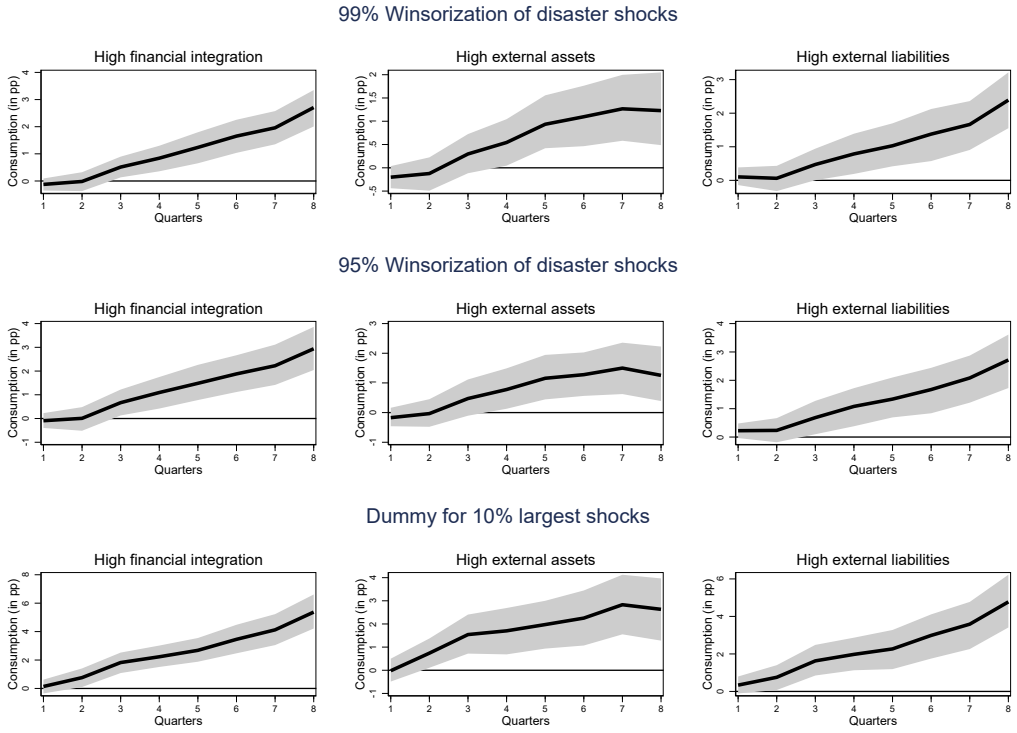
Notes: The figure illustrates the cumulative difference between the response of private consumption for high and low external financial positions following a natural disaster for the sample of advanced economies. The indicators of financial integration are computed based on whether (a) the two year trailing moving average of the continuous financial integration variable is above or below the country specific log trend of the variable, (b) the lagged financial integration variable is above or below the sample median, (c) the country-average of the financial integration variable is above or below the sample median, resulting in a time-invariant indicator by country. Shaded areas are one-standard error confidence bands based on 500 draws.

Figure D.19: Sensitivity to different shock measures



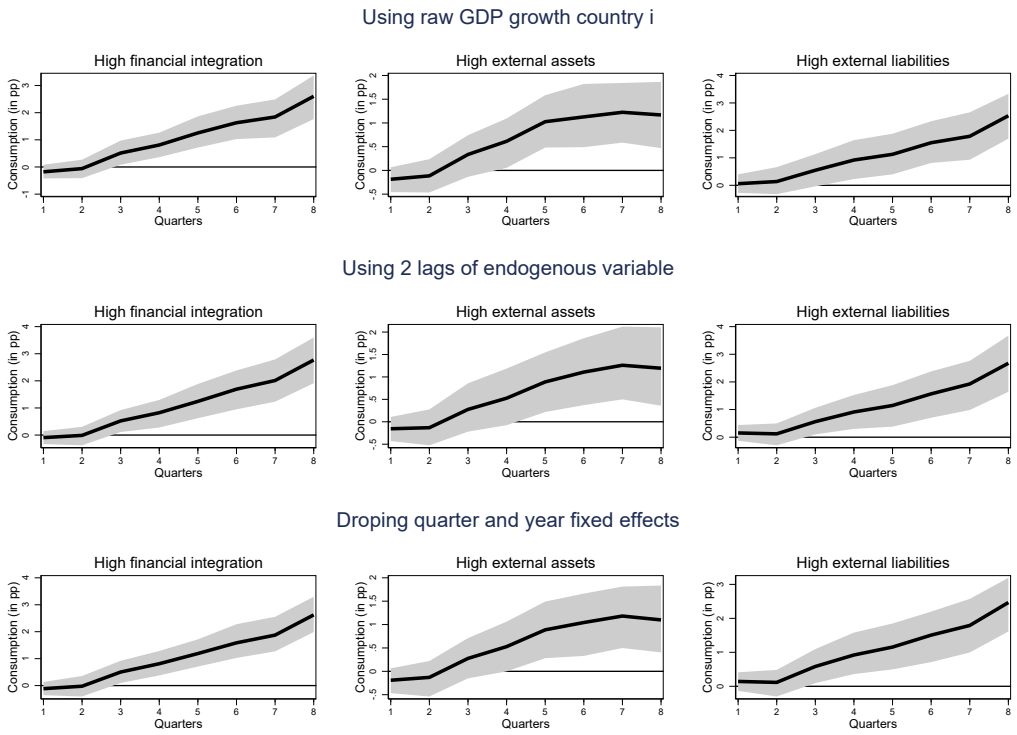
Notes: The figure illustrates the cumulative difference between the response of private consumption for high and low external financial positions following a natural disaster for the sample of advanced economies for alternative shock measures. The shocks are computed (a) without weighting by the onset month, (b) including spillovers into the next quarter, (c) using all shocks, not just the 50% largest ones. Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.20: Sensitivity to winsorization and indication of shocks



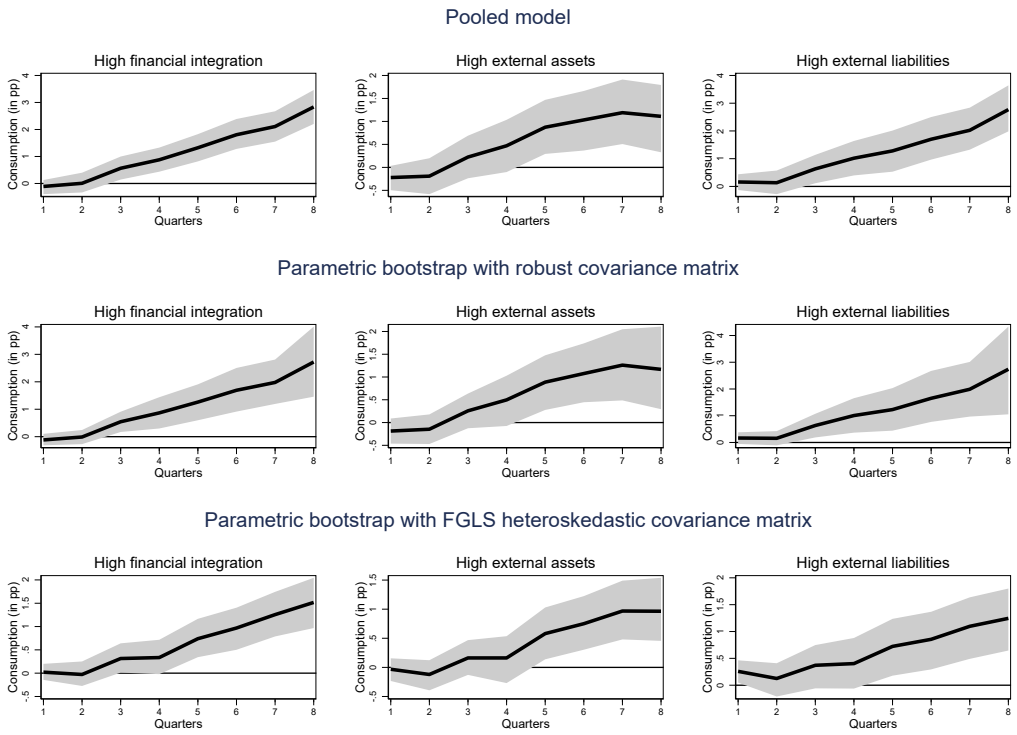
Notes: The figure illustrates the cumulative difference between the response of private consumption for high and low external financial positions following a natural disaster for the sample of advanced economies for alternative shock specifications. In the top and middle panels, the shocks are winsorized at the 99th and 95th percentile, respectively, while the bottom panel shows the responses based on a dummy variable for the 10% largest shocks. Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.21: Sensitivity to variable and model specification



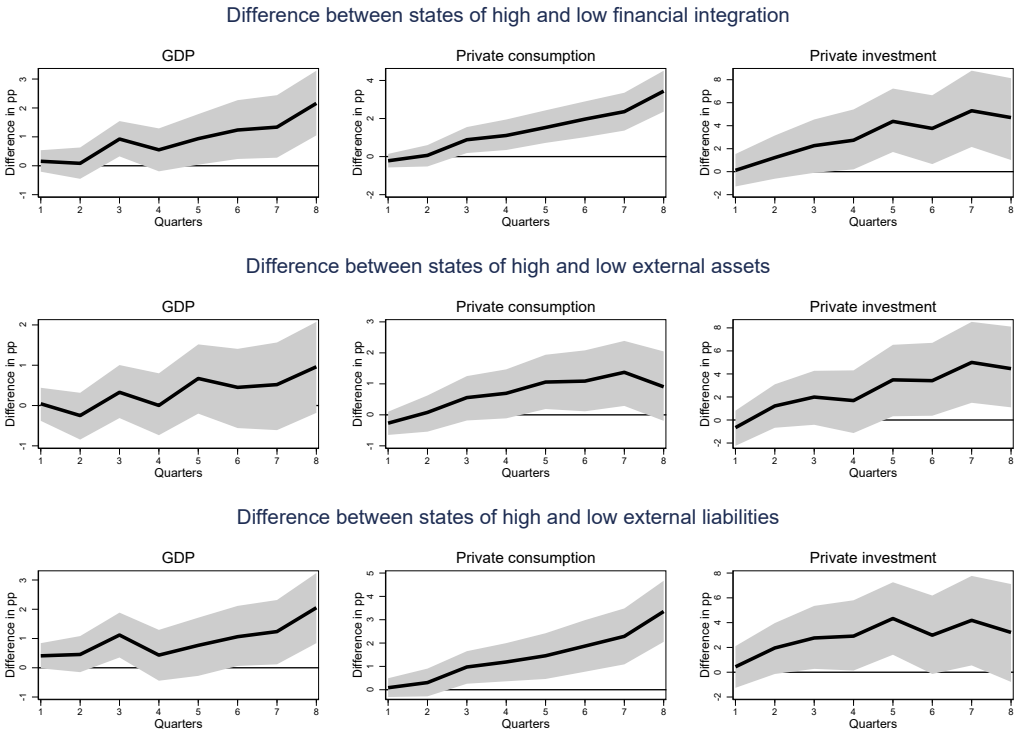
Notes: The figure illustrates the cumulative difference between the response of private consumption for high and low external financial positions following a natural disaster for the sample of advanced economies for alternative variable and model specifications. In the top panels, we use raw ouput growth instead its difference to average growth in that quarter. In the middle panels, the model contains two lags of the endogenous variable. In the bottom panels, we drop quarter and year fixed effects. Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.22: Sensitivity to alternative estimators



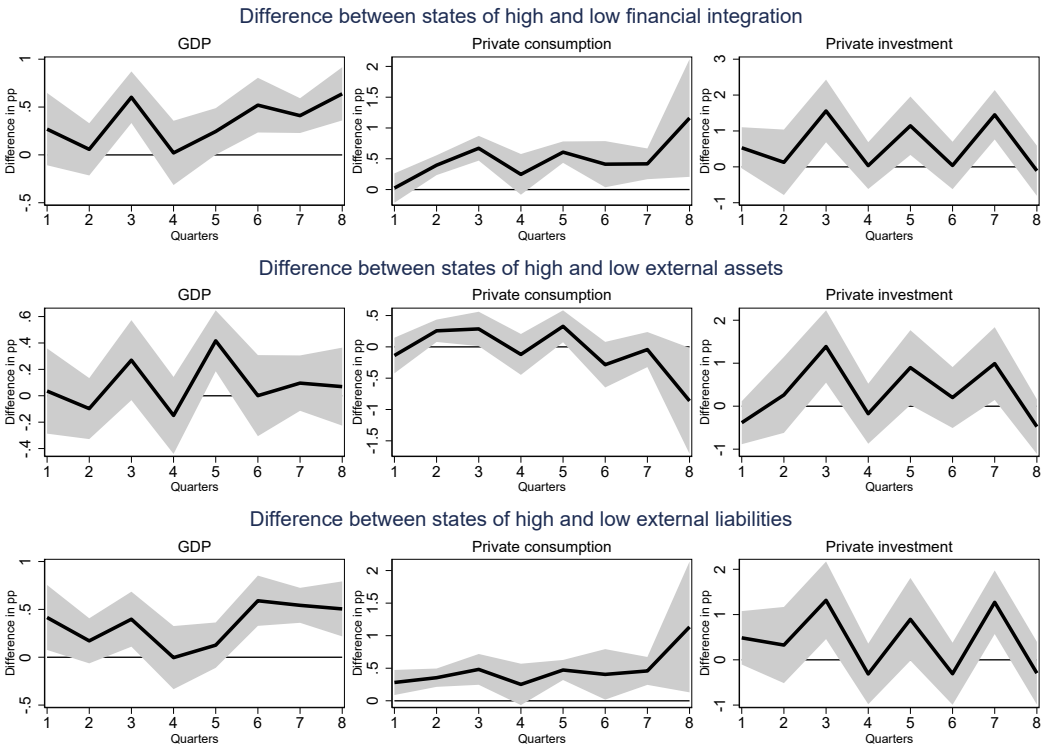
Notes: The figure illustrates the cumulative difference between the response of private consumption for high and low external financial positions following a natural disaster for the sample of advanced economies based on different estimators. The estimators are (a) a pooled model without country fixed effects, (b) the baseline model but with a Huber/White robust covariance matrix for the bootstrap, (c) the baseline model but with a FGLS covariance matrix for the bootstrap that accounts for cross-sectional heteroskedasticity. Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.23: Sensitivity to full set of quarter-time dummies



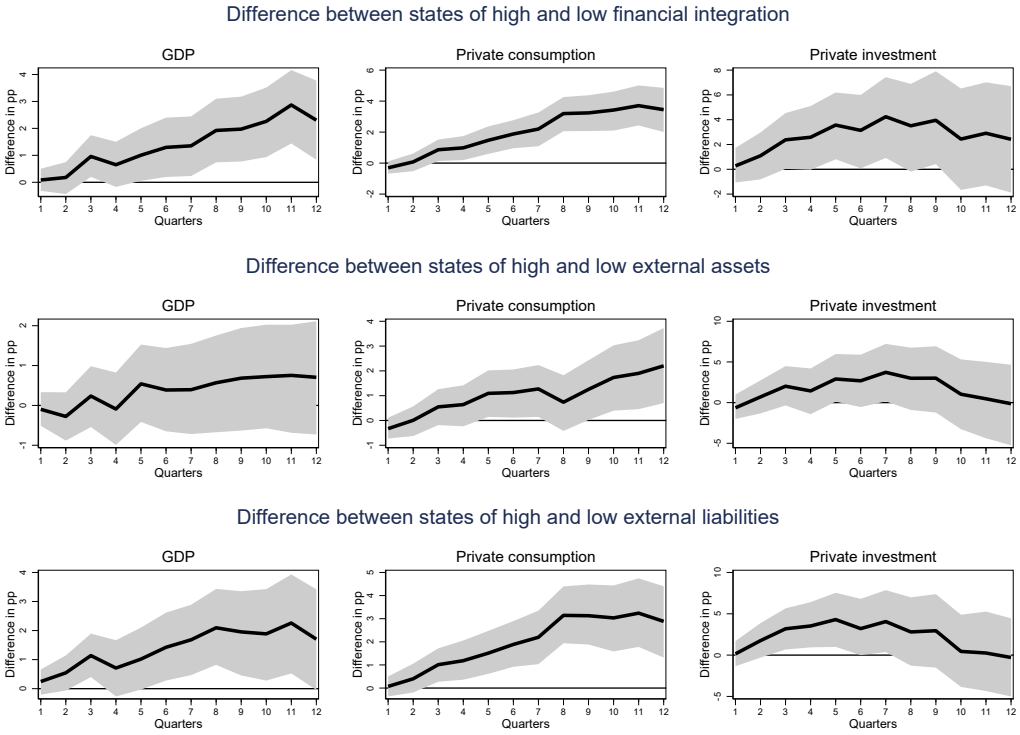
Notes: The figure illustrates the cumulative difference between the response of GDP, private consumption, and private investment for high and low external financial positions following a natural disaster for the sample of advanced economies based on a model that includes a full set of quarter-time dummies and excludes the year-time dummies. Shaded areas are one-standard deviation confidence bands based on 500 draws.

Figure D.24: Sensitivity to using local projections



Notes: The figure illustrates the cumulative difference between the response of GDP, private consumption, and private investment for high and low external financial positions following a natural disaster for the sample of advanced economies based on local projections. Shaded areas are one-standard deviation confidence bands based country clustered standard errors.

Figure D.25: Sensitivity to using 12 lags



Notes: The figure shows the cumulative difference of output, private consumption, and private investment between states of high and low financial integration over 12 quarters following a natural disaster based on model (1) in 25 advanced economies (in percentage points, y-axis). Shaded areas are one-standard error confidence bands based on 500 Monte Carlo draws. The x-axis displays the quarters after the shock.