European Stability Mechanism

Linking Climate Vulnerability and Sovereign Debt Defaults

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Preliminary results

The views in this presentation are the authors' and not those of the ESM.

INTRODUCTION

- Climate vulnerabilities have significant implications for:
  - Long-run growth
  - Financial sector stability
  - Public finance
- With a focus on public finance
  - A growing literature studies the relation between sovereign borrowing and climate vulnerabilities
  - In contrast, less analysis has focused on the link between climate vulnerabilities and sovereign default

A THIN LITERATURE

- Phan and Schwartzman (2024)
- Mallucci (2022)
- Klomp (2017)

WHAT DO WE DO?

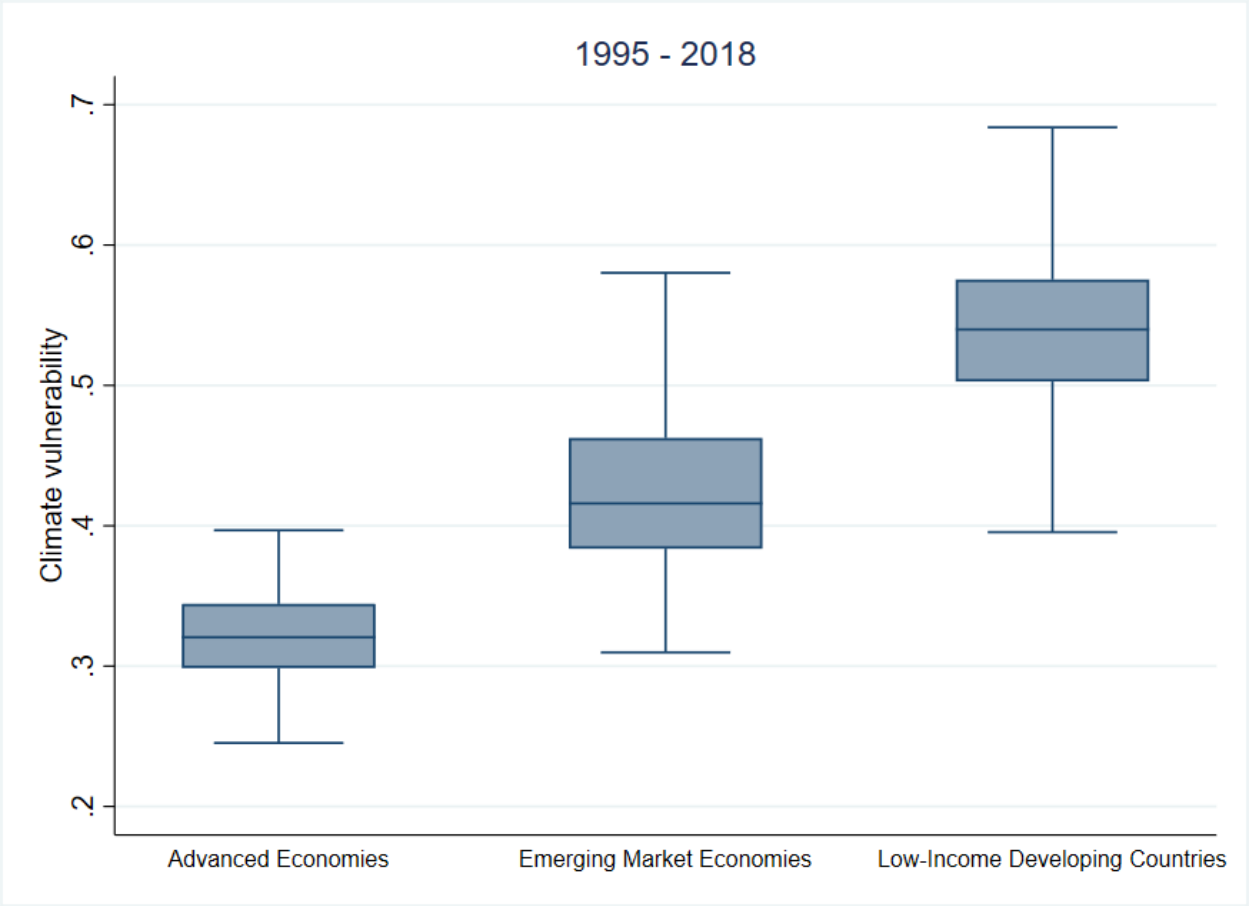
- We study empirically the link between climate-related vulnerabilities and sovereign defaults
- We assess ability of the IMF support to affect this link
- We discuss how the official programs can be designed to better support countries dealing with climate change-related disruptions

DATA

- Sample: all existing EMEs and LICs
- Time span: 1995-2018
- Data: annual frequency
  - Sovereign defaults from Erce et al. (2022) and Asonuma and Trebesch (2016)
  - Notre Dame Global Adaptation Initiative's country index:
    - Vulnerability to climate change
    - Resilience/readiness for climate change
  - IMF programmes from MONA database

NOTRE DAME INDEX: AN OVERVIEW

- Climate-related vulnerabilities are highest for LICs, then EMEs and AEs



ECONOMETRIC APPROACH

- Panel logistic regression with country random effects, robust standard errors

$$P(Y_i = 1|\eta_i) = \frac{\exp(x_i\beta + z_i u)}{1 + \exp(x_i\beta + z_i u)}$$

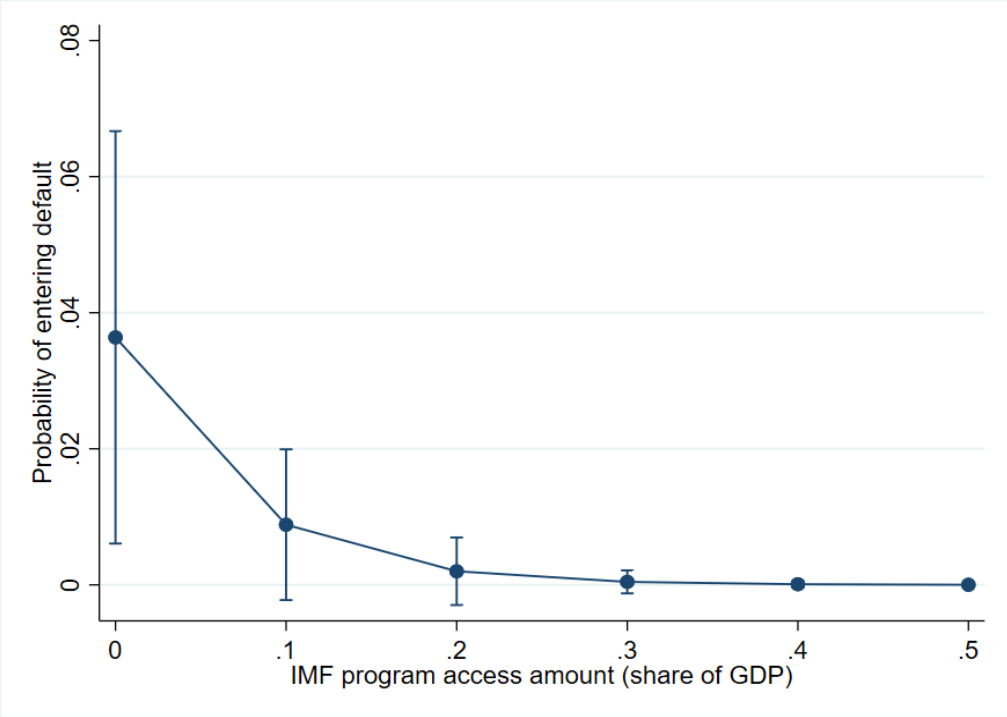
- Controls: real GDP growth rate (YoY), banking crises, currency crises, federal funds rate, real commodity index, population, trade, country's previous default history, country preparedness for climate change (Notre Dame)

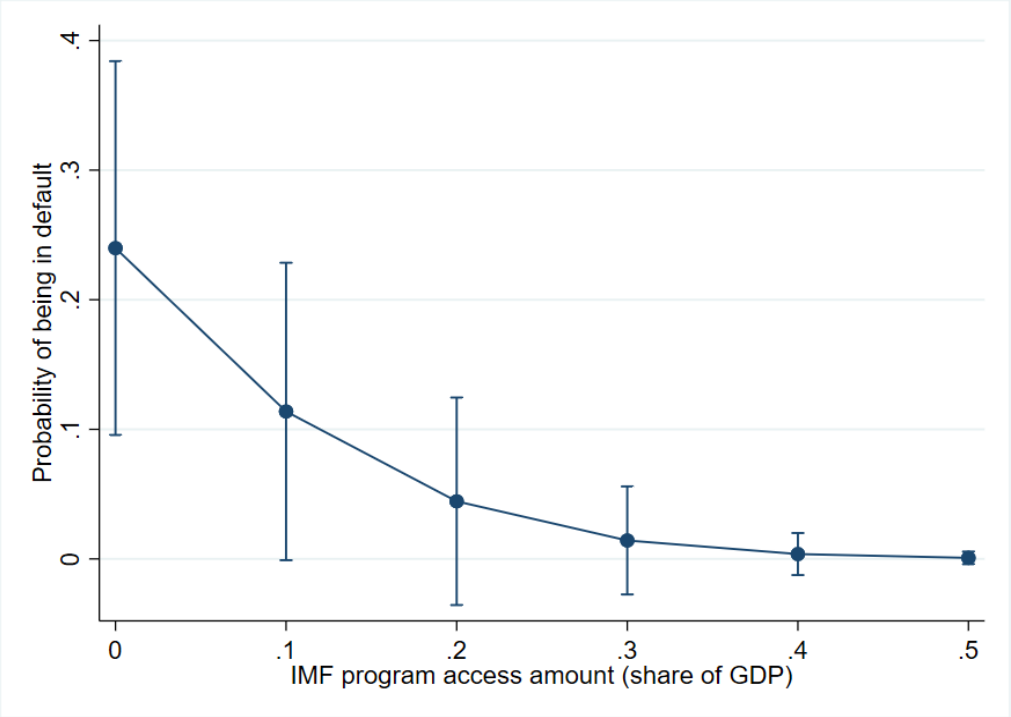
CLIMATE RISK AND IMF PROGRAMS

- Climate vulnerabilities can tip countries into default and drive them to remain there
- The larger the size of available IMF lending the less likely that climate vulnerabilities can trigger or perpetuate default

VARIABLES	Starting sovereign debt default				Being in sovereign debt default			
Climate vulnerability	1.078	2.562	3.472*	3.731*	23.247**	9.602**	9.662**	10.338**
	(1.834)	(2.111)	(2.035)	(2.266)	(9.316)	(4.134)	(4.167)	(4.199)
Start of IMF program dummy			4.290*				0.712	
			(2.411)				(2.239)	
Start of IMF program dummy x Climate vulnerability			-7.443				-1.014	
			(5.092)				(4.286)	
IMF program access amount at start (share of GDP)				94.784***				74.064**
				(30.034)				(32.960)
IMF program access amount at start x Climate vulnerability				-160.785***				-137.052**
				(51.109)				(56.810)
Constant	-5.115***	-5.621***	-5.862***	-6.209***	-15.892***	-7.983**	-8.057**	-8.556**
	(0.938)	(1.707)	(1.723)	(1.835)	(5.109)	(3.561)	(3.595)	(3.641)
Controls	NO	YES	YES	YES	NO	YES	YES	YES
No of obs	3,275	2,834	2,834	2,831	3,624	3,133	3,133	3,128
Number of countries	151	146	146	146	151	146	146	146

MITIGATING EFFECT OF IMF LENDING





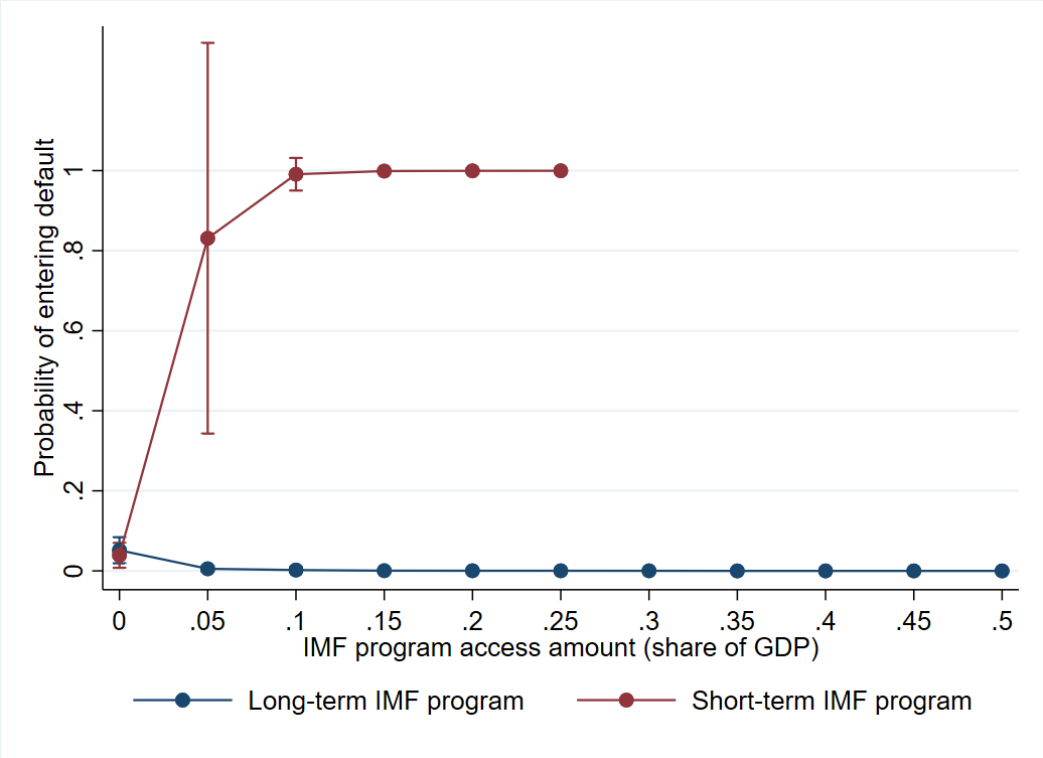
- Higher amounts of IMF lending mitigate risk that countries with high climate vulnerability **enter and stay in default.**
- Our estimates show **IMF program of about 8% of GDP can halve** the effect of climate vulnerability on probability of default.

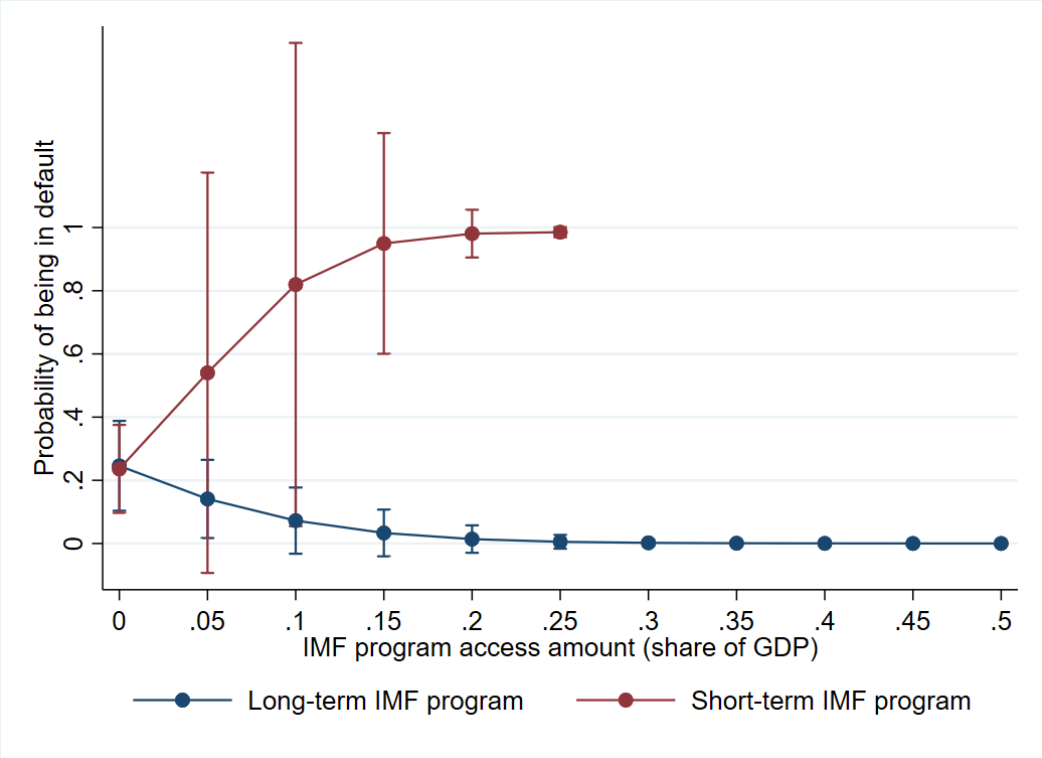
CLIMATE RISK AND MATURITY OF IMF PROGRAMS

VARIABLES	Starting sovereign debt default		Being in sovereign debt default	
Climate vulnerability	4.750**	4.772**	10.281**	10.597**
	(2.295)	(2.175)	(4.132)	(4.122)
Start of ST IMF program dummy	0.891		-1.178	
	(2.783)		(3.436)	
Climate vulnerability x Start of ST IMF program dummy	0.810		2.849	
	(6.480)		(7.393)	
Start of LT IMF program dummy	8.311**		4.237	
	(4.000)		(3.048)	
Climate vulnerability x Start of LT IMF program dummy	-15.161*		-7.477	
	(8.648)		(5.800)	
ST IMF program disbursement at start (share of GDP)		-108.914		-52.481
		(72.235)		(88.718)
Climate vulnerability x ST IMF program disbursement at start		336.137*		170.599
		(176.341)		(209.565)
LT IMF program disbursement (share of GDP)		247.437***		124.017**
		(85.243)		(62.666)
Climate vulnerability x LT IMF program disbursement at start		-493.480**		-226.820**
		(192.717)		(107.463)
Constant	-7.073***	-6.929***	-8.494**	-8.774**
	(1.955)	(1.857)	(3.586)	(3.574)
Controls	YES	YES	YES	YES
Observations	2,834	2,831	3,133	3,128
Number of groups	146	146	146	146

- Starting long-term IMF programs mitigates negative effect of climate risks on sovereign default.
- This cushioning effect increases with the size of the loan.

MITIGATING EFFECT OF LONG-TERM IMF LOANS





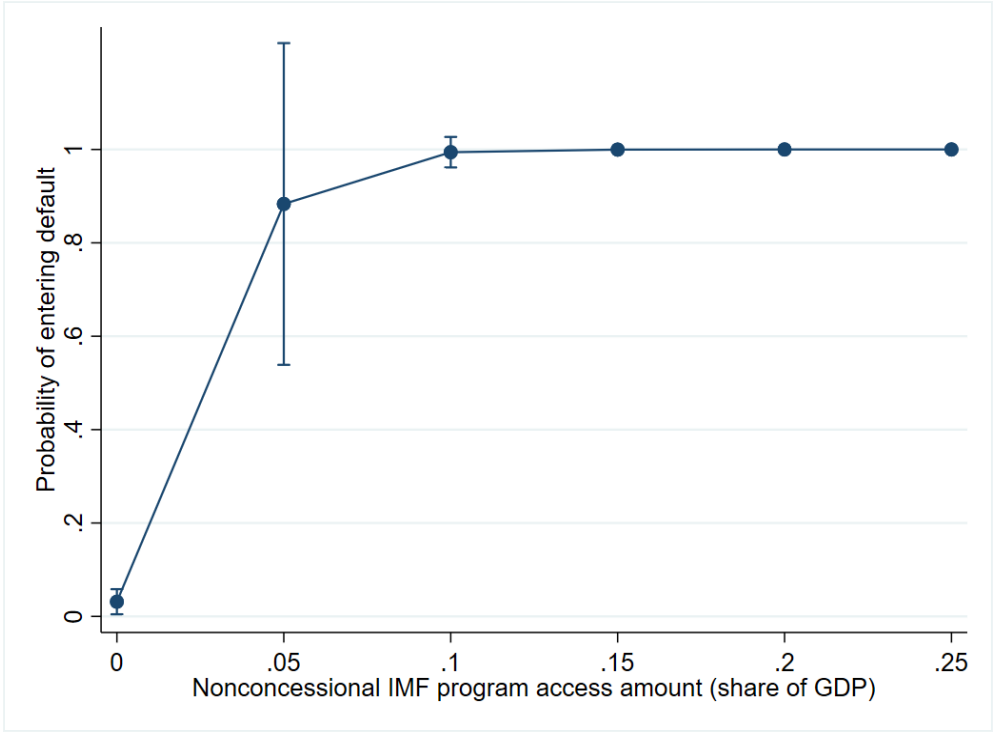
- **Longer maturity IMF loans mitigate risk** of climate vulnerabilities on starting and perpetuating defaults
- **Shorter maturity IMF loans aggravate risk** that climate-vulnerable countries enter default

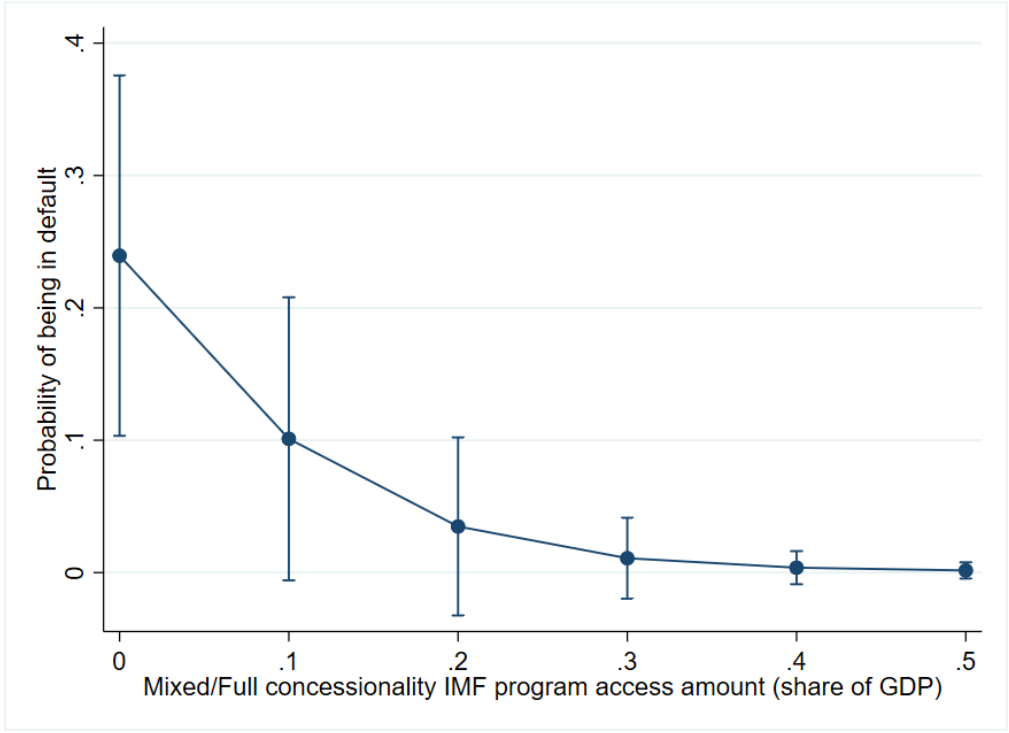
CLIMATE RISKS AND CONCESSIONALITY OF IMF LOANS

VARIABLES	Starting sovereign debt default		Being in sovereign debt default	
Climate vulnerability	3.504	3.272	9.624**	9.775**
	(2.318)	(2.250)	(4.121)	(4.146)
Start of nonconcessionality IMF programs dummy	2.738		-2.079	
	(3.582)		(3.853)	
Climate vulnerability x Start of nonconcessionality IMF programs dummy	-2.696		5.422	
	(8.551)		(8.399)	
Start of mixed/full concessionality IMF programs dummy	1.855		3.339	
	(5.374)		(2.185)	
Climate vulnerability x Start of mixed/full concessionality IMF programs dummy	-3.260		-5.935	
	(10.279)		(4.275)	
Nonconcessionality IMF programs access amount at start (share of GDP)		-96.068		-114.147
		(66.722)		(88.483)
Climate vulnerability x Nonconcessionality IMF programs access amount at start		336.629**		341.871
		(162.899)		(213.640)
Mixed/full concessionality IMF programs access amount at start (share of GDP)		83.045		76.988
		(71.776)		(46.926)
Climate vulnerability x Mixed/full concessionality IMF programs access amount at start		-177.145		-146.798*
		(152.734)		(79.692)
Constant	-6.148***	-5.722***	-8.000**	-8.096**
	(1.866)	(1.768)	(3.556)	(3.557)
Controls	YES	YES	YES	YES
No of obs	2,834	2,831	3,133	3,128
Number of countries	146	146	146	146

- Evidence that non-concessional IMF loans increase risk that climate vulnerabilities trigger defaults.

ADVERSE EFFECT OF NON-CONCESSIONAL IMF FINANCING





- **Non-concessional** IMF loans aggravate risk that highly climate-vulnerable countries **enter default**
- **Concessional** IMF loans lower risk that countries with high climate vulnerability **remain in default**

CONCLUSIONS AND POLICY IMPLICATIONS

- Climate vulnerabilities are positively correlated with sovereign defaults
- IMF financial support is more effective in attenuating this link if:
  - The amount disbursed is large
  - The maturity is long
  - Interest rates are concessional
- The IMF Resilience and Sustainability Trust:
  - Rightly lends long and cheap
  - For biggest effect, it must lend large enough
  - Should its concessional funding be offered also to EMEs?

European Stability Mechanism

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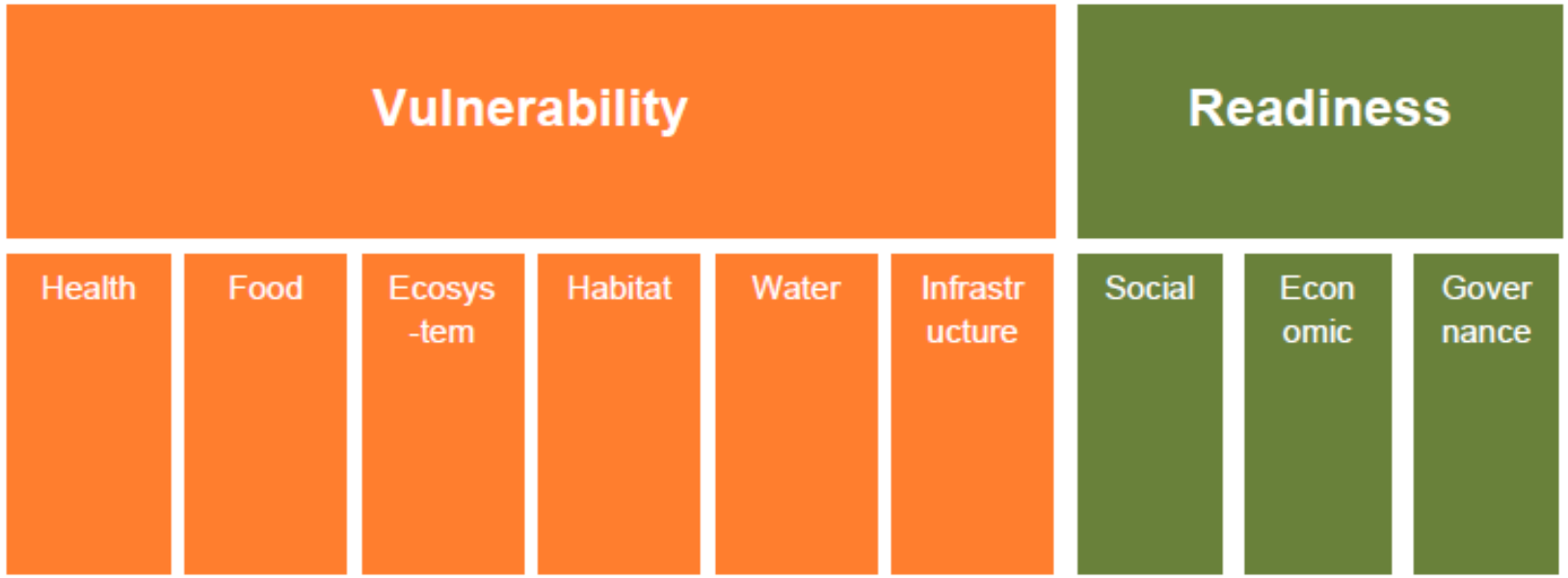
ANNEX – DATA SOURCE

Variable	Source
Real GDP growth rate (YoY)	World Bank
Banking crises	Laeven and Valencia (2018)
Currency crises	Reinhart and Rogoff (2010)
Federal funds rate (%)	Haver Analytics
Real commodity index	World Bank
Population	World Bank
Trade (imports + exports)	World Bank
Sovereign defaults	Erce et al. (2022); Asonuma and Trebesch (2020)
Previous default history	Erce et al. (2022); Asonuma and Trebesch (2020)
Vulnerability index	Notre Dame Initiative
Readiness index	Notre Dame Initiative
IMF programmes	MONA

ANNEX - IMF FACILITY: RESILIENCE AND SUSTAINABILITY TRUST

- **Objective:** To address longer-term challenges, including climate change and pandemic preparedness.
- **Eligibility**: All PRGT-eligible LICs, small states (population under 1.5 million, per capita GNI below 25 times the 2021 IDA cutoff) and all middle-income countries. Eligible countries need a concurrent financing or non-financing IMF program.
- **Duration**: 18 months minimum.
- **Repayment**: 20-year maturity, 10.5 years grace period (w/ no principal repayment).
- **Concessionality**: Yes. Borrowers pay an affordable interest rate with a small margin over the three-month SDR rate.

ANNEX – BREAK DOWN OF NOTRE DAME'S INDEX