## THE IMPACTS OF DISASTERS ON EXCHANGE RATES AND FOREIGN EXCHANGE RESERVES: IMPLICATIONS FOR PUBLIC SECTOR FINANCIAL RISK MANAGEMENT AND DEVELOPMENT LENDERS

DR YUEN LO AND PROFESSOR ULRICH VOLZ



#### **KEY POINTS**

- Global data set 2005-2021, quarterly time periods.
- Define a set of 204 Major Disaster Quarters where disasters (comprising floods, storms, earthquakes and wildfires) have caused 1% impact on GDP or population.
- Econometric tests find that for EMDEs disasters cause reserves and real effective exchange rate (REER) appreciation, but for a subset of IDA eligible borrowers they cause portfolio and other investment outflows, and REER decreases.

## **RESEARCH CONTEXT**

- Physical risks emanating from climate change have become a major driver of sovereign risk (Volz et al. 2020), increasing the cost of capital of climate-vulnerable countries (Buhr et al. 2018; Kling et al. 2018; Beirne et al. 2021a, 2021b).
- Rietz (1988) and Barro (2006) use uncommon disasters to predict high equity risk premium.
- Farhi and Gabaix (2015) and Hale (2022) build models that predict exchange rate depreciation for riskier countries.
- Both exchange rates (Strobl and Kablan 2017, Zhou et al. 2021) and reserves (Ta et al. 2022, Khan and Anwar 2022) have seen contradictory empirical results.

### **DATA AND VARIABLES**

#### Dependent variables

- Portfolio investment flows
- Other investment flows (e.g., bank lending)
- International reserves (difference in logs)
- Real effective exchange rates (difference in logs)

#### Controls

- Local consumer price index (except for REER)
- Four quarter rolling comparable GDP
- Euro US dollar exchange rate
- FX regime dummy (based on Harms and Knaze 2021)
- Net FDI flows
- Index of financial openness (Chinn and Ito 2006)

#### **COUNTRY GROUPINGS**

- Full sample
- Emerging Market and Developing Economies (EMDEs)
- International Development Agency (IDA) eligible borrowers

#### **ECONOMETRIC RESULTS**

#### Net portfolio investment flows

	(P1)	(P2)	(P3)
	Full sample	EMDE	IDA eligible
Major disaster dummy	-2,218.284	-338.815	60.574*
	(-1.19)	(-0.85)	(2.06)
L1(Major disaster dummy)	1,112.244	-244.460	-69.012*
	(0.67)	(-0.38)	(-2.13)
L2(Major disaster dummy)	-4,906.154	4.840	-56.125*
	(-1.51)	(0.01)	(-2.34)
L3(Major disaster dummy)	1,232.490*	1,427.298	37.870
	(2.49)	(1.54)	(1.85)
L4(Major disaster dummy)	2,554.114	589.679	-198.519
	(1.32)	(0.99)	(-1.42)
Observations	3,395	1,943	414
Countries	63	40	9

t statistics in parentheses. \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Net other investment flows (e.g., bank loans)

	(01)	(O2)	(O3)
	Full sample	EMDE	IDA eligible
Major disaster dummy	1,070.140	-1,469.750	-164.107
	(0.57)	(-1.82)	(-1.75)
L1(Major disaster dummy)	964.344	1,925.243	-53.928
	(0.64)	(0.99)	(-1.15)
L2(Major disaster dummy)	3,836.127	2,427.228	-209.894**
	(1.57)	(1.03)	(-2.67)
L3(Major disaster dummy)	-1,416.098	-1,725.795	-386.117
	(-0.69)	(-1.13)	(-1.70)
L4(Major disaster dummy)	-1,383.175	-217.604	-287.946
	(-1.74)	(-0.67)	(-1.43)
Observations	3,632	2,180	643
Countries	66	43	12

t statistics in parentheses. \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

#### **ECONOMETRIC RESULTS**

#### Real effective exchange rates

	(FX1)	(FX2)	(FX3)
	Full sample	EMDE	IDA eligible
Major disaster dummy	-0.006	-0.008	-0.030
	(-1.54)	(-1.29)	(-1.20)
L1(Major disaster dummy)	0.001	-0.001	-0.018*
	(0.59)	(-0.19)	(-2.12)
L2(Major disaster dummy)	0.003	0.005**	0.003
	(1.84)	(2.70)	(0.46)
L3(Major disaster dummy)	0.003	0.000	-0.011*
	(1.31)	(0.03)	(-2.33)
L4(Major disaster dummy)	0.001	0.004	0.006
	(0.35)	(0.67)	(0.58)
Observations dummy	2,437	1,169	409
Countries	44	23	9

*t* statistics in parentheses. \* *p* < 0.05, \*\* *p* < 0.01, \*\*\* *p* < 0.001

#### International reserves

	(R1)	(R2)	(R3)
	Full sample	EMDE	IDA eligible
Major disaster dummy	0.018**	0.021**	0.010
	(2.83)	(2.66)	(0.84)
L1(Major disaster dummy)	0.013	0.010	-0.010
	(1.54)	(1.04)	(-0.55)
L2(Major disaster dummy)	0.018**	0.018**	0.006
	(2.95)	(2.75)	(0.40)
L3(Major disaster dummy)	-0.005	-0.011	-0.007
	(-0.71)	(-1.30)	(-0.28)
L4(Major disaster dummy)	-0.003	-0.009	0.020
	(-0.40)	(-0.83)	(0.82)
Observations dummy	3563	2111	604
Countries	66	43	12

t statistics in parentheses. \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

#### **KEY FINDINGS**

- We find no statistically significant disaster impacts on high income countries (not shown).
- Full sample: portfolio investment inflows and reserve increases.
- EMDE subset: increase in reserves and REER appreciation.
- IDA eligible borrower subset: portfolio and other investment outflows, and REER depreciation.

## IMPACT OF MAJOR DISASTERS ON NOMINAL EXCHANGE RATE EVOLVES OVER TIME



Exchange rate around Major Disaster, Full sample 195 disasters. IDA eligible 67 disasters. Start value normalized to 100 and day 0.

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# IMPACT OF MAJOR DISASTERS ON NOMINAL EXCHANGE RATE VOLATILITY



## **DISASTERS COMPOUND EXISTING CHALLENGES**

- Disasters exacerbate existing economic vulnerabilities.
- For IDA eligible borrowers, which are struggling with currency risk anyway, the risk of sudden capital outflows and exchange risk increases further through the increase in the frequency and intensity of disasters.

## **POLICY RECOMMENDATIONS**

- Need to scale up investment in resilience and adaptation, strengthen PDM.
- MDBs should (continue to) support the mainstreaming of disaster risk / debt pause clauses.
- Support governments in raising the domestic savings rate and strengthening domestic financial resource mobilisation to reduce dependency on borrowing from abroad. Volz et al. (2024) highlight the potential of MDBs and international DFIs to work more closely with national development banks and bolster their capacity to issue local currency debt.
- MDBs and international DFIs should themselves lend more in local currency. They could raise local currency by issuing local currency bonds – eliminating foreign exchange risk altogether and the same time contributing to the development of local currency bond markets.
- If MDBs cannot raise local currency funding and lend in local currencies, they should make use of existing hedging markets or a cooperative hedging platform like TCX to reduce the overall currency risk exposure of IDA borrowers (Summers/Singh Triple Agenda Report Vol 2). This could be an effective short-term measure to facilitate a significant reduction in the currency risk vulnerabilities of IDA lenders and borrowers alike.

**THANK YOU** 

Questions?

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