

13TH IMF STATISTICAL FORUM



MEASURING
CROSS-BORDER ECONOMIC
and **FINANCIAL LINKAGES**
in a Dynamic World

#StatsForum



DeFying Gravity? **An Empirical Analysis of Cross-Border Crypto Flows**

NOVEMBER 20, 2025

Ulf Lewrick
Bank for International Settlements

The views expressed are those of the author(s) and do not necessarily represent the views of the BIS, IMF, IMF Executive Board, or IMF management.

Why study crypto cross-border flows?

- **Rapid growth**
 - Cryptoasset markets and decentralised finance (DeFi) expanding quickly
- **Knowledge gap**
 - Macro-financial implications and spillover risks are poorly understood
- **Transparency paradox**
 - Public blockchains vs. (pseudo-)anonymous wallet ownership
- **Evidence base**
 - Empirical analysis of cross-border crypto activity remains patchy

Research questions

Cross-border flows in crypto assets:

- How do they compare to traditional financial flows?
- What drives them?
- How do capital flow management measures affect them?

Related literature

Drivers of international capital flows

- Beck et al. (2024), Coppola et al. (2021), Miranda-Agrippino and Rey (2020), Hoffmann et al. (2019) and Forbes and Warnock (2012), on global factors e.g. Obstfeld and Zhou (2023) and Bruno and Shin (2015)

Bilateral gravity frameworks

- Anderson and van Wincoop (2003), Anderson and Yotov (2016), Weidner and Zylkin (2021), application to financial flows e.g. Badarinza et al. (2022), Brei and von Peter (2018) and Portes et al. (2001)

Emerging literature on crypto markets and particularly cross-border flows

- Makarov and Schoar (2020,2021), on cross-border flows von Luckner et al. (2023), Cerutti et al. (2024) and Reuter (2025)

Crypto flows data

Scope

- Cross-border flows of Bitcoin, Ether, Tether USDT and USD Coin, spanning 184 countries from 2017 to 2024

Measurement challenge – wallet ownership and geographic attribution

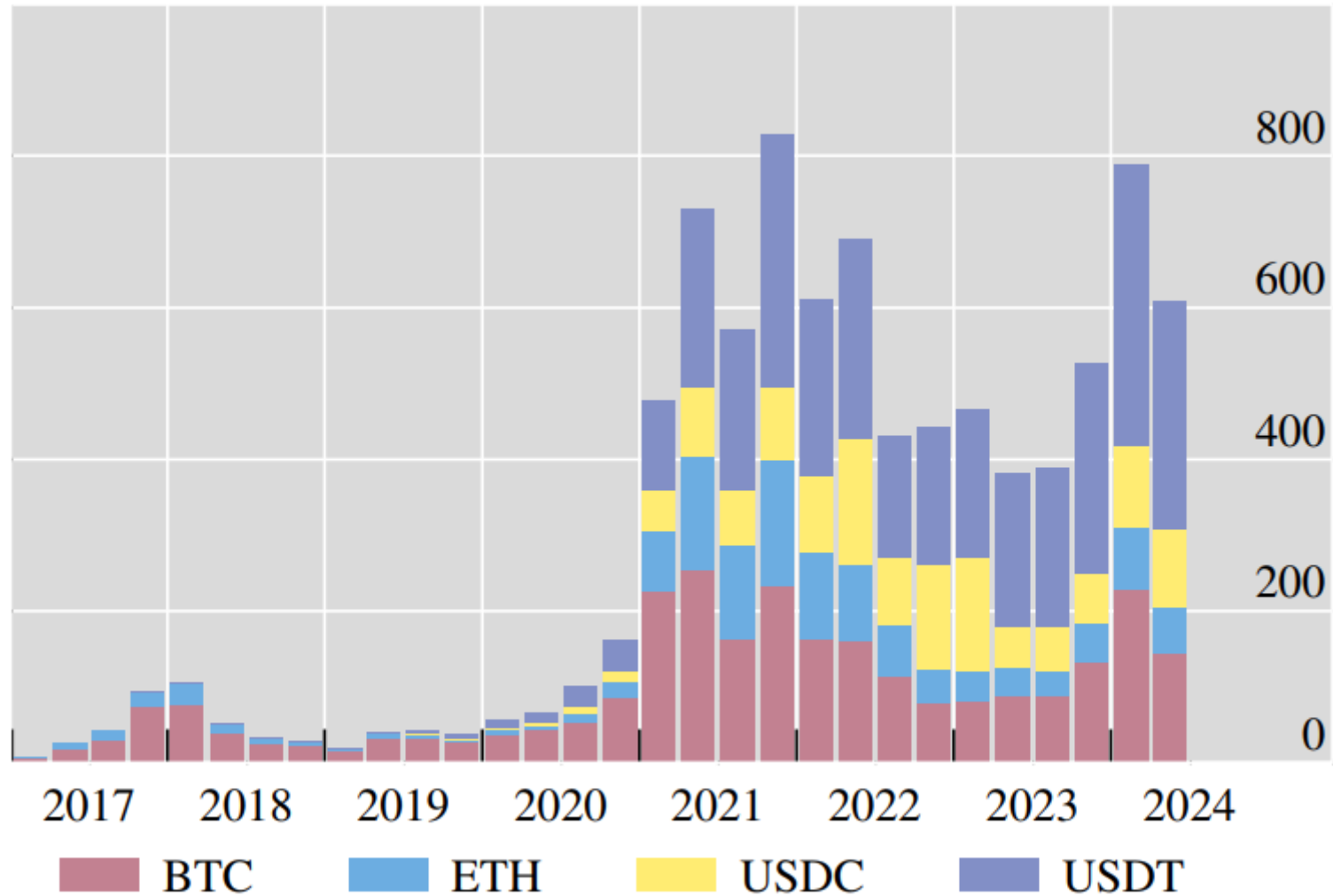
- Approach: Exchange-level flows assigned to countries based on web traffic and app usage (Chainalysis and Iknaio)
 - **Example:** If X% of Coinbase's app usage originates from German users, X% of Coinbase's in- and outflows are allocated to Germany

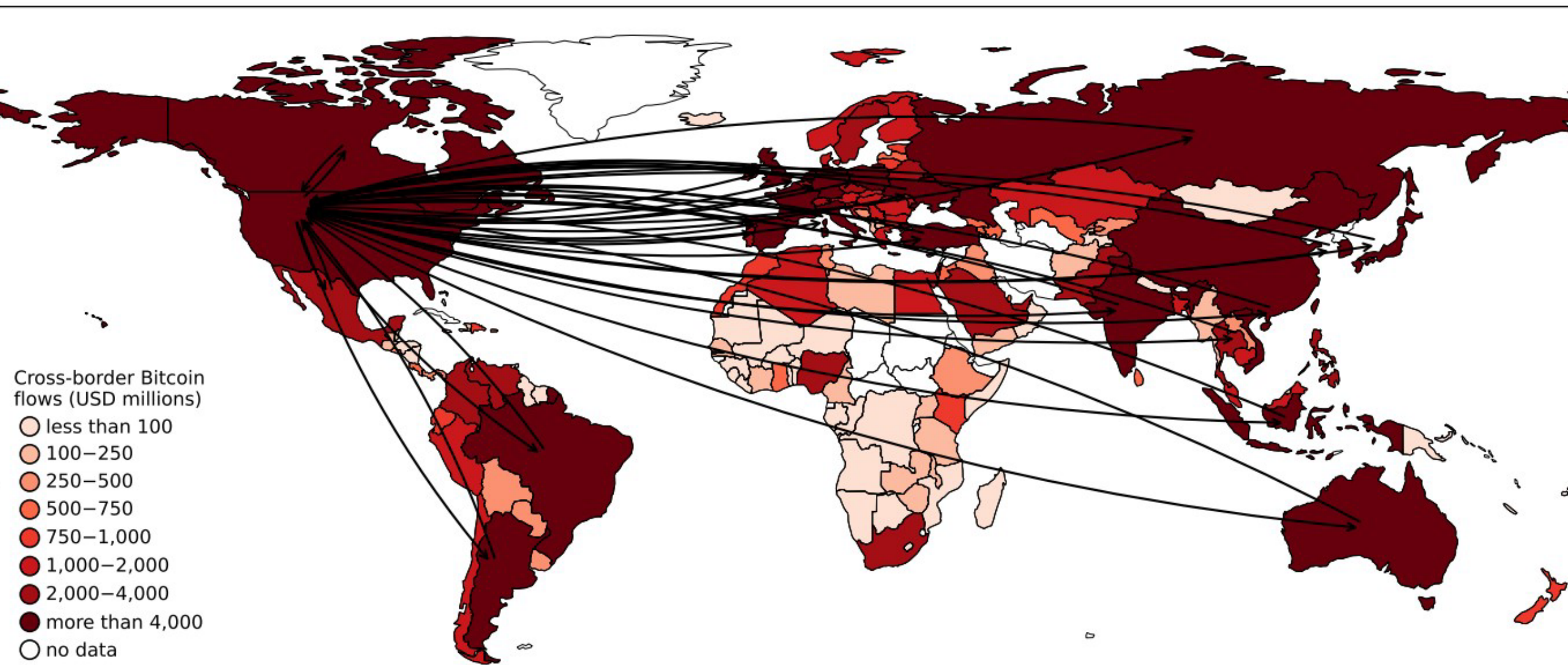
Caveats

- Use of VPNs, transaction sizes, unhosted wallets

Cross-border crypto flows over time

(billion USD)





Global Bitcoin flows map



Global Tether (USDT) flows map

Empirical approach

Objective: Understanding the drivers/motives of crypto flows

Crypto flows modelled using a bilateral gravity framework

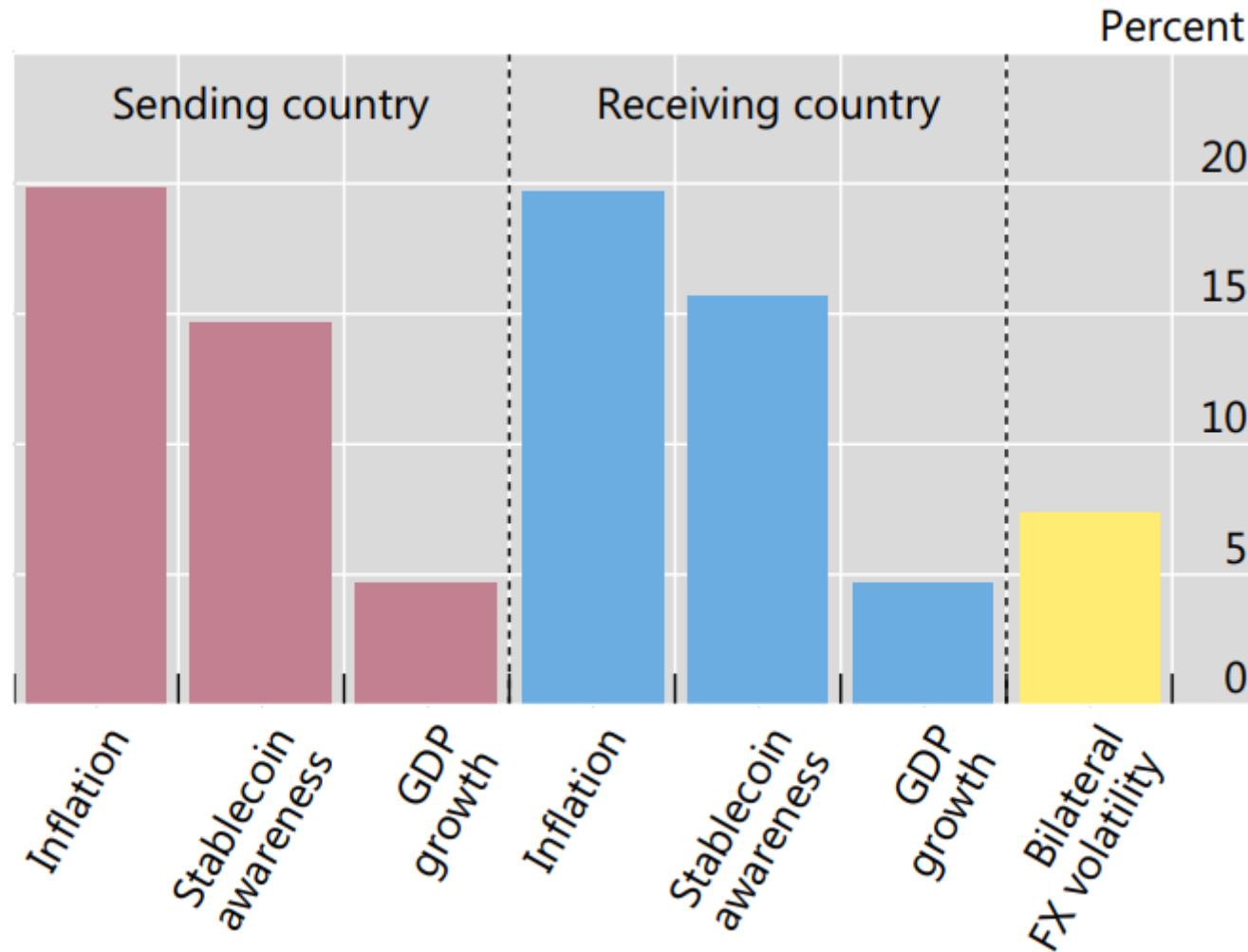
Controls for global factors, country-specific factors and bilateral frictions

Estimated using PPML (Poisson pseudo-maximum likelihood)

Drivers

Dependent variable:	IB claims (1)	Exports (2)	BTC (3)	BTC (6)	ETH (7)	USDC (8)	USDT (9)
Gravity							
Distance	−0.61*** (0.04)	−0.75*** (0.03)	−0.08*** (0.01)	−0.08*** (0.01)	−0.05*** (0.01)	−0.001 (0.00)	−0.02*** (0.00)
Common border	0.47*** (0.15)	0.68*** (0.07)	0.01 (0.03)	0.01 (0.03)	−0.02 (0.02)	0.01 (0.01)	0.01 (0.01)
Common language	0.33*** (0.11)	0.03 (0.07)	0.12*** (0.03)	0.13*** (0.03)	0.11*** (0.02)	0.03*** (0.01)	0.004 (0.01)
Global factors							
VIX _{t−1}				2.22*** (0.02)	3.23*** (0.03)	6.55*** (0.06)	6.95*** (0.04)
High-yield spread _{t−1}				−3.32*** (0.03)	−4.74*** (0.04)	−7.47*** (0.11)	−8.62*** (0.05)
Federal funds rate _{t−1}				−0.02*** (0.00)	0.04*** (0.00)	0.51*** (0.01)	0.57*** (0.00)
US growth				0.01*** (0.00)	0.06*** (0.00)	0.04*** (0.00)	0.06*** (0.00)
Crypto risk factors (not reported)							
N	148,969	586,777	700,635	697,241	686,419	505,374	571,733
Pseudo R2	0.887	0.928	0.992	0.946	0.942	0.922	0.912
FE: sender×t & receiver×t	Yes	Yes	Yes				
FE: sender & receiver				Yes	Yes	Yes	Yes

Country specific drivers: USDT example



Transactional motives: Remittance cost as driver

Dependent variable:	Remittances (1)	BTC (2)	ETH (3)	USDC (4)	USDT (5)	BTC<\$500 (6)	BTC<\$200 (7)
Remittance cost _{t-1}	-0.111*** (0.041)	-0.001 (0.004)	0.006 (0.004)	0.013*** (0.004)	0.016*** (0.006)	0.088** (0.034)	0.101*** (0.033)
N	2,029	8,766	8,766	6,705	7,755	5,232	5,232
Pseudo R2	0.869	0.996	0.998	0.999	0.999	0.985	0.985
Gravity controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE: sender×t, receiver×t	Yes	Yes	Yes	Yes	Yes	Yes	Yes

- 1 ppts increase in remittance cost (e.g. from 5% of transaction value to 6%)
⇒ decline in traditional remittances (>10%)
⇒ increase in cross-border stablecoin flows (+1.5%) and low-value BTC flows (+10%)

Effect of capital flow management measures in emerging markets

	IB claims (2)	BTC (4)	ETH (6)	USDC (8)	USDT (10)
CFMs _{t-1}	-0.102** (0.050)	0.235** (0.118)	0.055 (0.059)	0.027 (0.023)	-0.031 (0.028)
N	31,127	315,204	309,746	208,561	243,780
Pseudo R2	0.992	0.995	0.997	0.996	0.999
Fixed effects: pair, sender×t, receiver×t	Yes	Yes	Yes	Yes	Yes

- No traction on crypto flows, signs of circumvention via Bitcoin

Conclusion

New landscape of cross-border flows: Fast-paced and difficult to measure

Geographical factors are less relevant: Smaller friction on crypto flows

Country-specific effects: High inflation and FX volatility imply increased crypto use

Speculative and transactional motives coexist: Evidence points to both

Policy implications:

- Greater risks to monetary sovereignty in economies with more volatile currencies
- Potential threat to conventional capital flow management measures
- Regulatory and monitoring challenges given decentralised nature and global reach