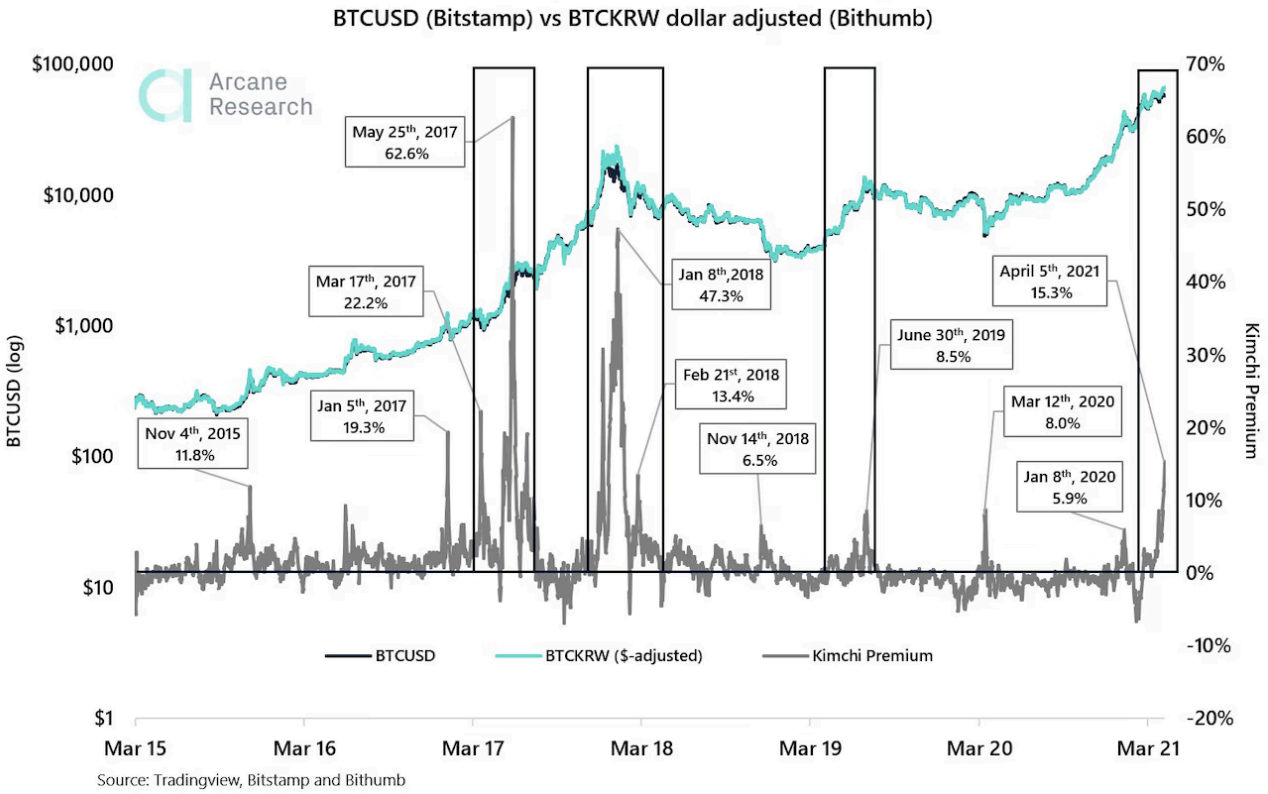
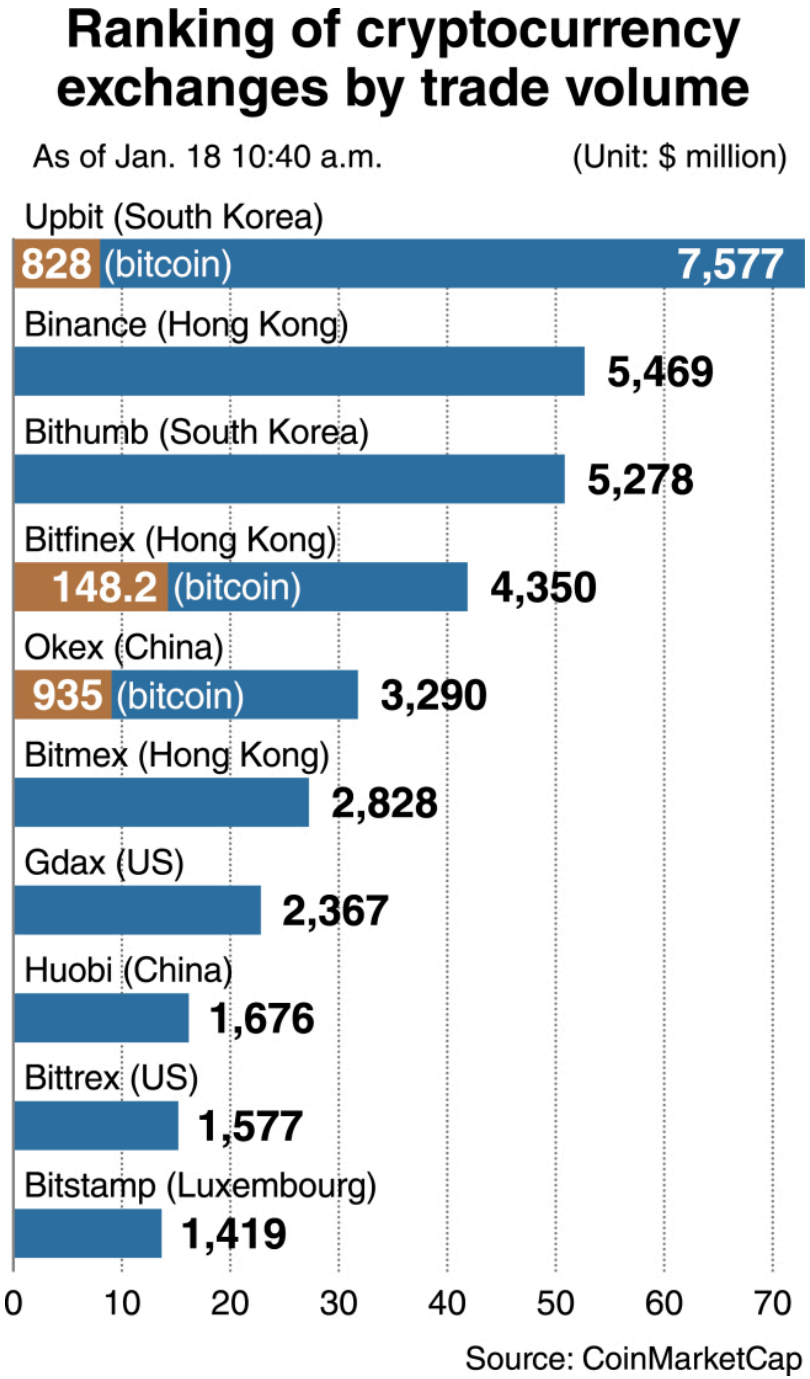
Stablecoins as cross-border settlement remittance: Evidence from Kimchi Premium

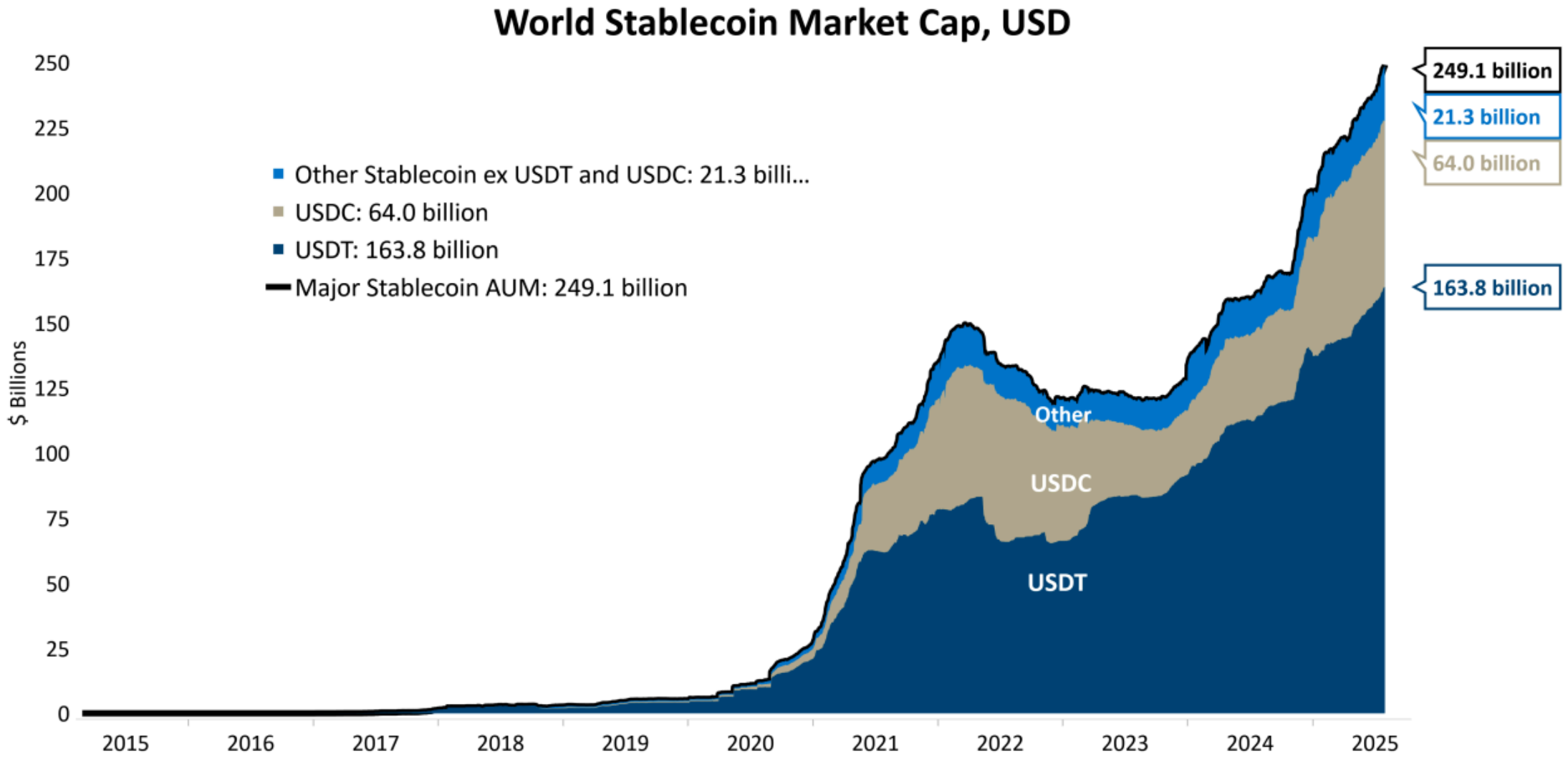


Source: Tradingview, Bitstamp and Bithumb



Source: CoinMarketCap

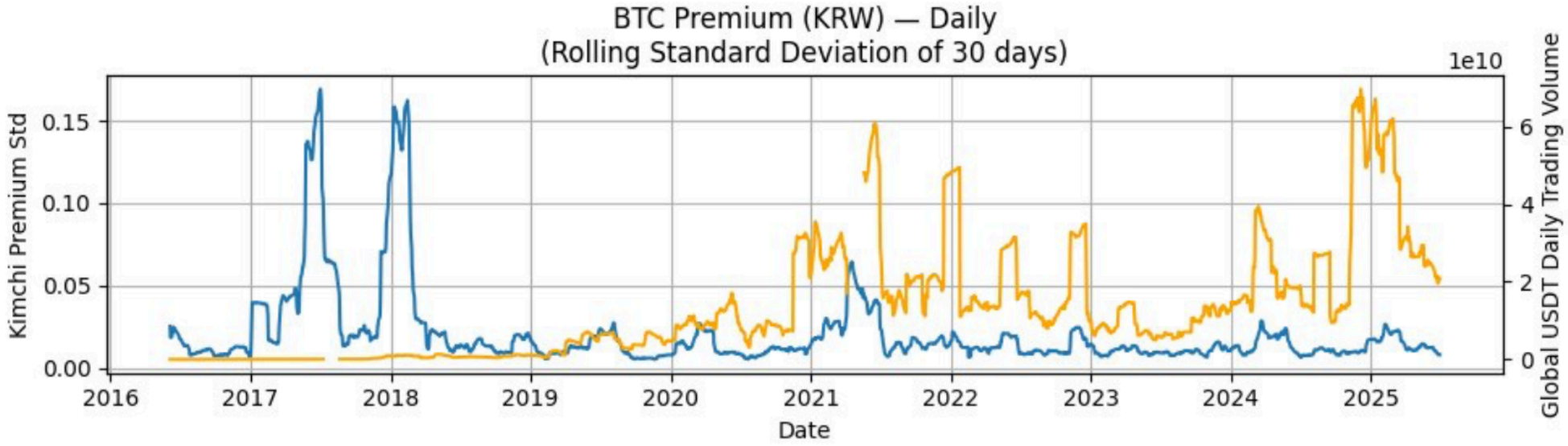
Stablecoin boom after 2020



Source: Doubleline, Coinmarketcap.com, Macrobond as of July 2025

Correlation between Kimchi Premium and ...

	Tether (USDT)	Bitcoin (BTC)
before 2020	-0.3882	0.3500
after 2020	0.5239	-0.0341



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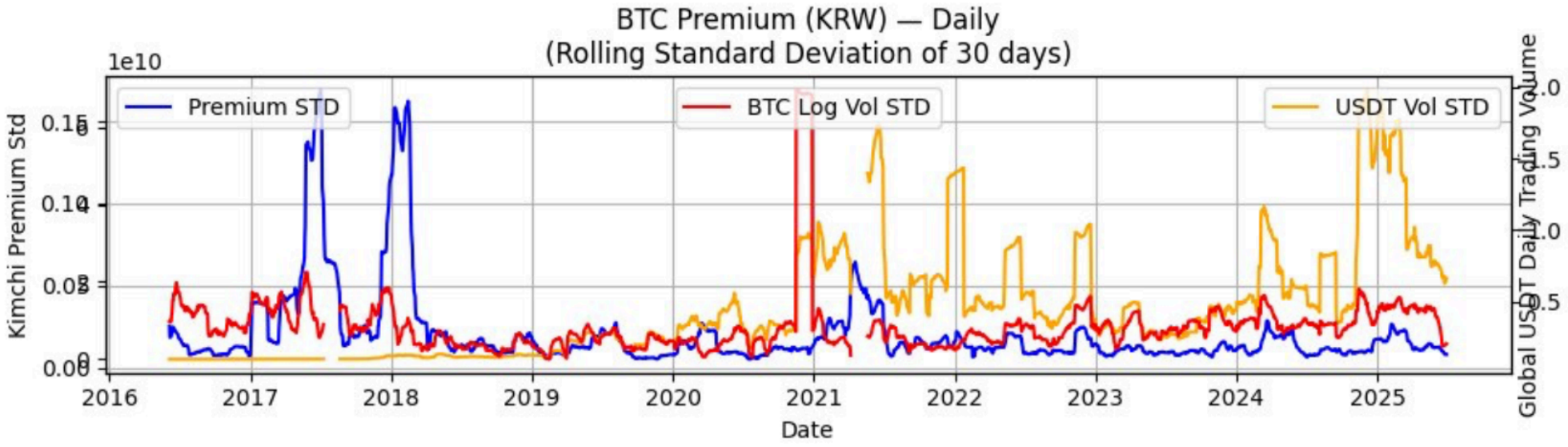


Research Question

> Do stablecoins function as effective cross-border settlement remittance that reduce price segmentation in cryptocurrency markets across countries?

Economic Implication

1. Stablecoins circumvent traditional capital controls, enabling rapid cross-border liquidity movements without banks, SWIFT, or FX desks.
2. Stablecoins shift how arbitrage operates globally, altering market segmentation and price discovery

Literature: Cryptocurrency Market and Stablecoin

- ***Regulatory Design***
  - ***Comparison to MMF - Flight to safety***
    Anadu et al. (2023, Fed); Arner, Auer, and Frost (2020, BIS)
- [v] ***Global Interconnectedness***
  - ***Systematic component in Cryptocurrency Market***
    Liu and Tsyvinski et al. (2022, JF); Makarov and Schoare (2020, JFE)
  - [v] ***On-chain Transaction Analysis***
    Griffin and Shams (2020, JF); Auer, Lewrick and Paulic (2025, BIS);
    https://tronscan.org/#/address/TV6MuMXfmLbBqPZvBHdwFsDnQeVfnmiuSi

Literature: Limits to Arbitrage

Stream of 'Mispricing(Anomaly)' Theories

1. [v] ***Rational structural uncertainty***: Coexistence of multiple “rational” models
2. ***Behavioral theories***: Irrationality of investors' psychological bias (Barberis et al., 1998; Daniel et al., 1998; Hong and Stein, 1999; Barberis and Shleifer, 2003)

Several factors of limits of arbitrage

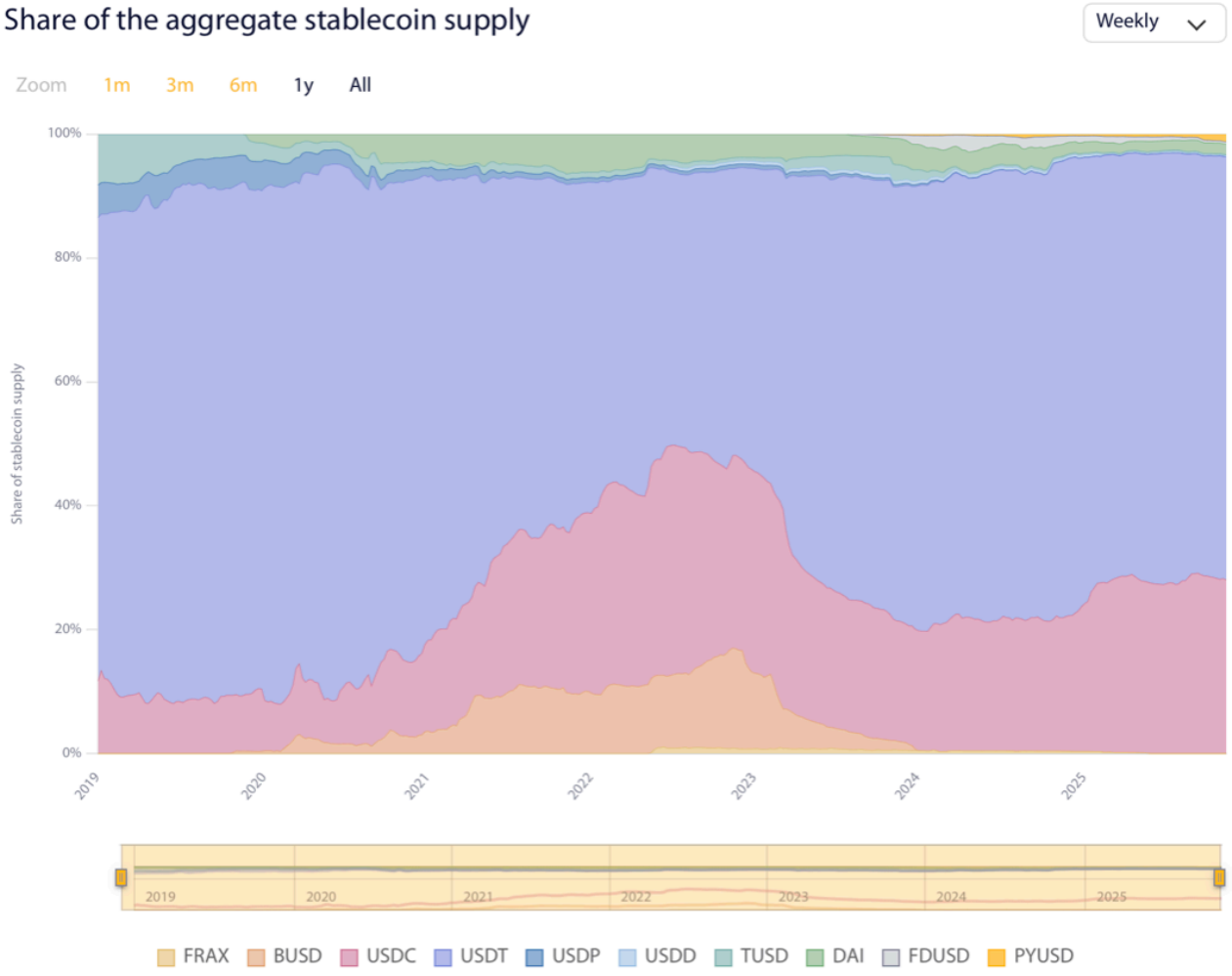
1. ***Fundamental risk***: He and Xiong (2008)
2. ***Implementation costs***, e.g., short-sales: Tuckman & Vila (1992, 1993), Miller (1977)
3. [v] ***Constraints in rasing equity capital***: Gromb & Vayanos (2002, 2009a), Brunnermeier & Pedersen (2009), Kondor (2009), Shleifer & Vishny (1997)

Missing in the Literature

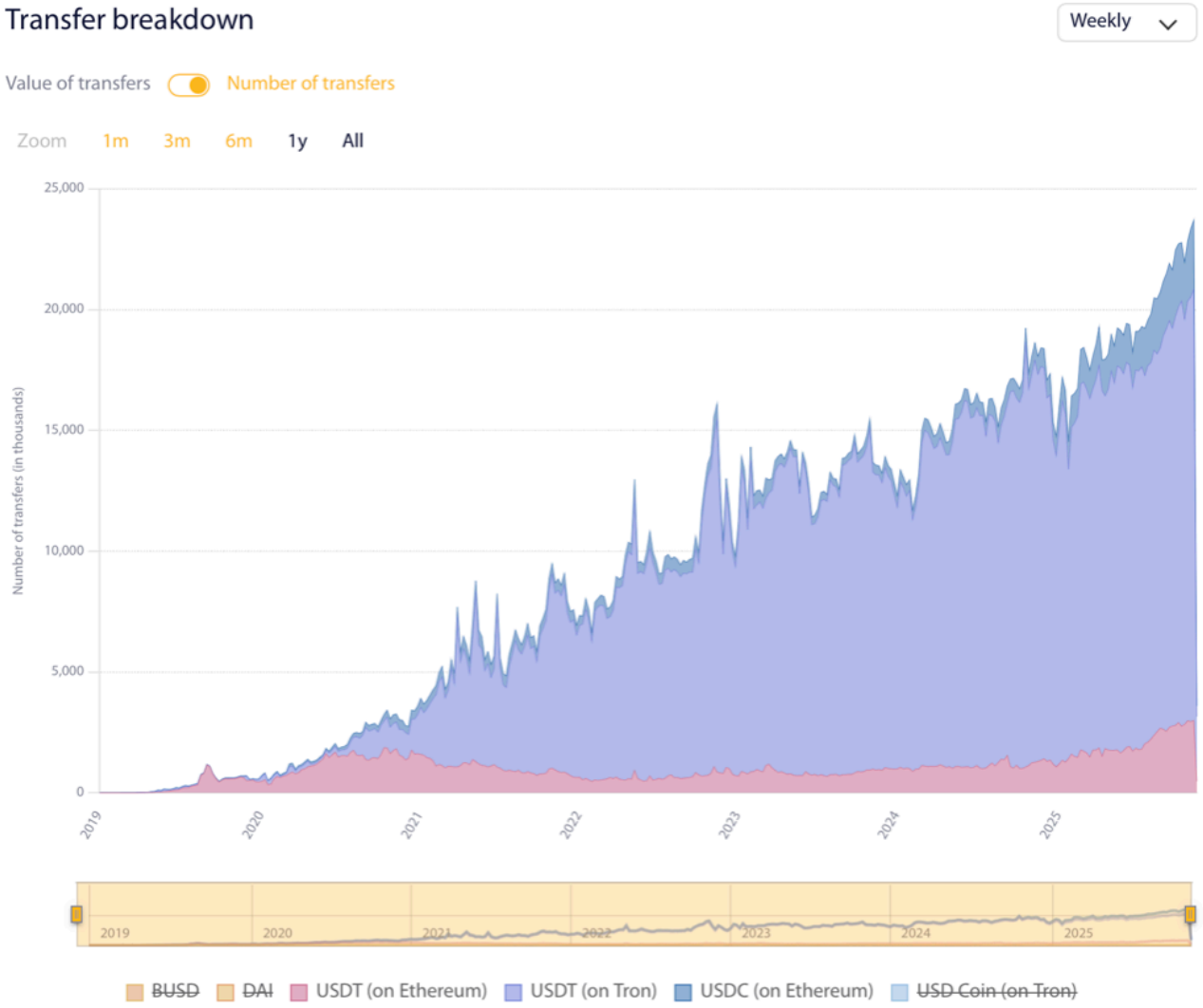
1. ***Correct empirical object*** for cross-border crypto arbitrage-***only Tether*** (USDT)
2. ***Transaction-level on-chain flows***, avoiding opaque vendor-aggregated datasets that blur addresses, merge flows, or lose directionality.
3. Tether flows on the ***Tron network***—the asset and chain where ***actual transaction occurs***.

Therefore, I reconstruct the full settlement dynamics across exchanges on major stablecoin Tether, enabling us to observe ***true signed flow***, ***exchange-to-exchange settlement paths***, and ***arbitrage-motivated liquidity movements*** at the microstructure level.

Share of the aggregate stablecoin supply



Transfer breakdown



Research Limitation

Ours: settlement mechanics of Tether-based cross-border arbitrage in the post-2020 market environment

Limitation 1. Unable to recover intra-market trading behavior

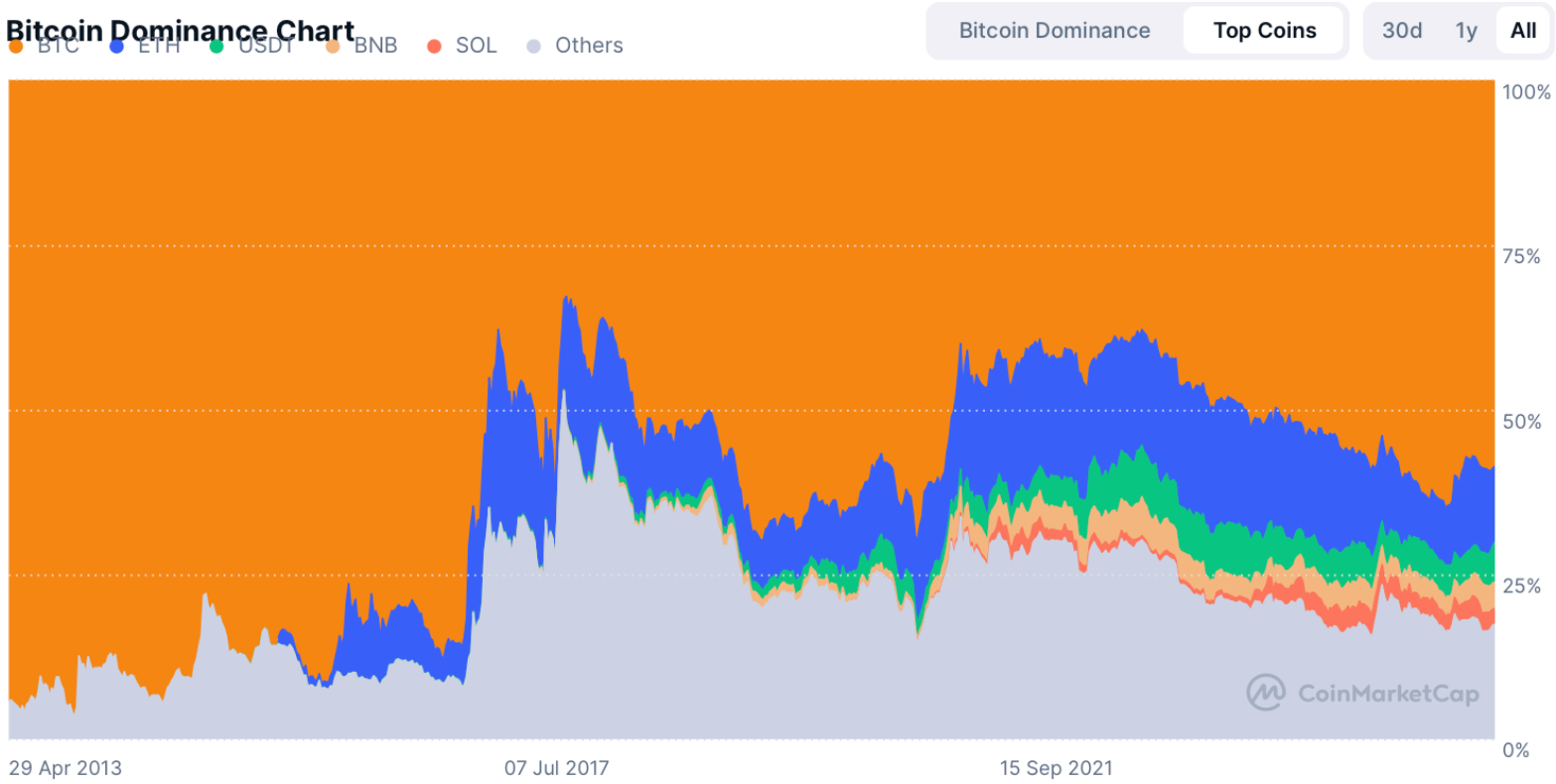
on-chain flows reveal only the settlement leg of arbitrage, not ***the underlying trading action inside the exchange***

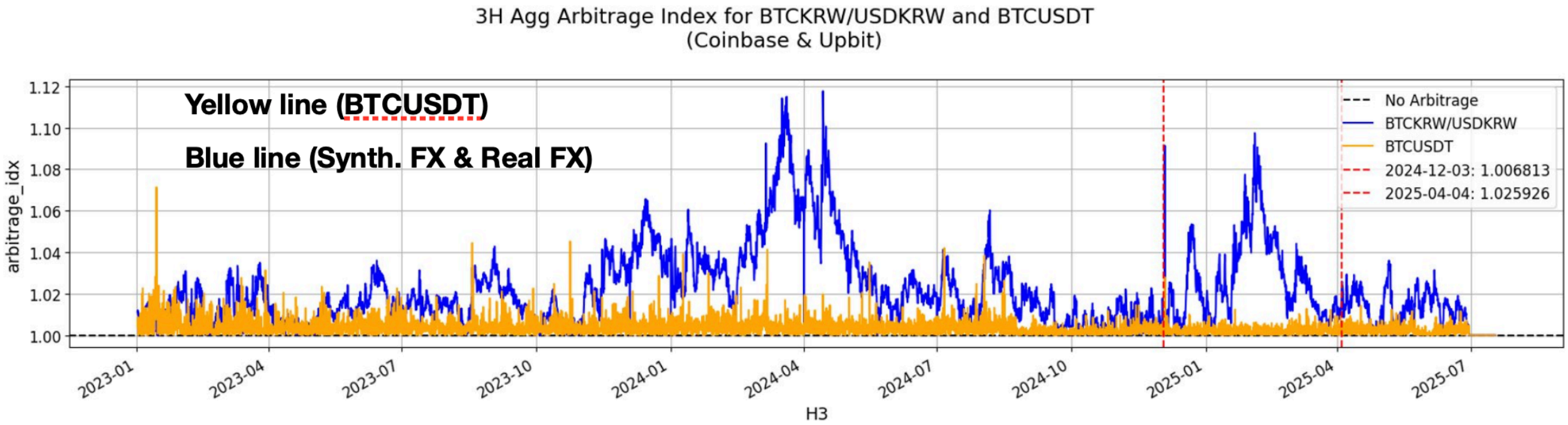
Limitation 2. Unable to explain pre-2020 through Tether flows

Tether's settlement infrastructure was ***not yet established in earlier market cycles***. In pre-2020, cross-border crypto arbitrage relied on alternative assets (most notably XRP) and operated under fundamentally different frictions, fee structures, and liquidity patterns.

Justification

1. Bitcoin as the dominant benchmark asset
2. During martial law in Korea, arbitrage spreads within USDT market widened more than corresponding USDT–KRW price deviations
3. Focus on the post-2020 regime


Bitcoin Dominance Chart
BTC
ETH
USDT
BNB
SOL
Others
Bitcoin Dominance
Top Coins
30d
1y
All
100%
75%
50%
25%
0%
29 Apr 2013
07 Jul 2017
15 Sep 2021
CoinMarketCap


3H Agg Arbitrage Index for BTCKRW/USDKRW and BTCUSDT
(Coinbase & Upbit)
Yellow line (BTCUSDT)
Blue line (Synth. FX & Real FX)
No Arbitrage
BTCKRW/USDKRW
BTCUSDT
2024-12-03: 1.006813
2025-04-04: 1.025926
arbitrage_idx
1.12
1.10
1.08
1.06
1.04
1.02
1.00
2023-01
2023-04
2023-07
2023-10
2024-01
2024-04
2024-07
2024-10
2025-01
2025-04
2025-07
H3

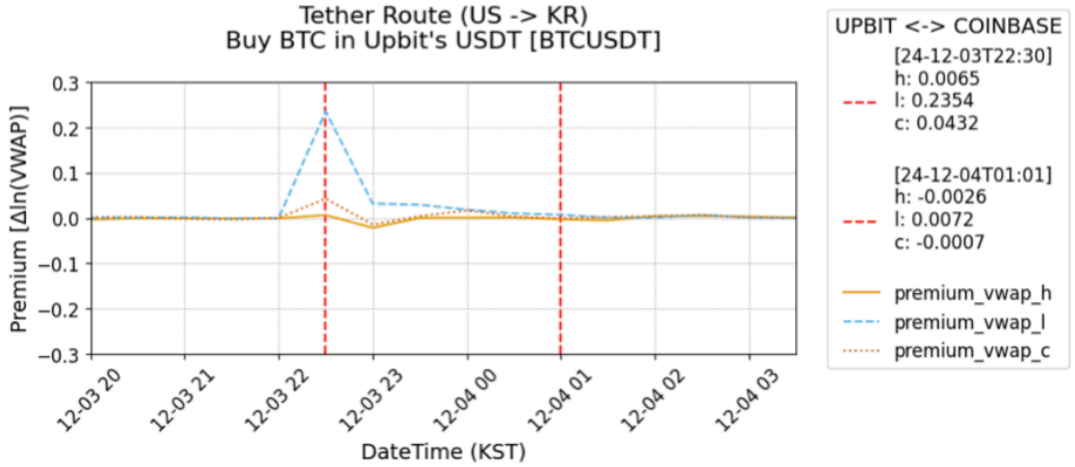
Upbit USDT market's scarce liquidity causes large arbitrage gaps.

1-1. BTC/USD (Tether)

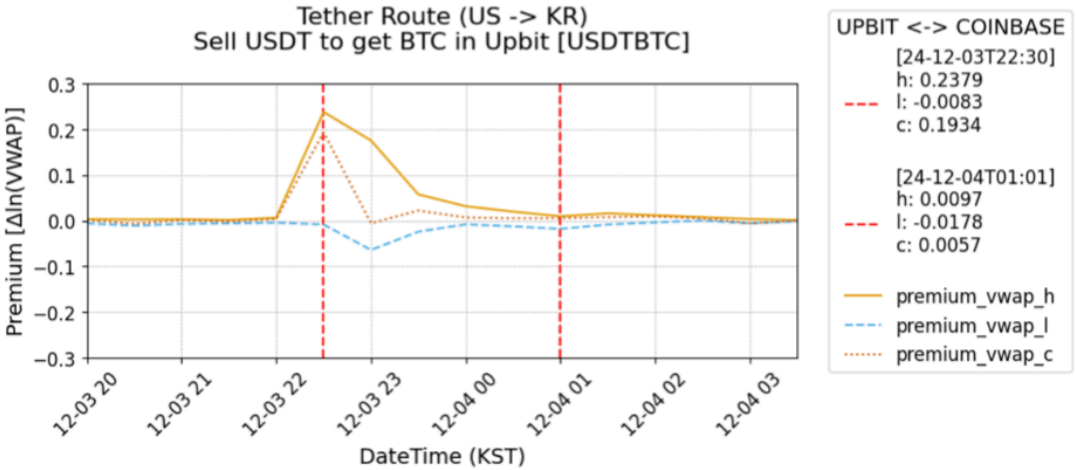
- $\frac{\text{BTC}}{\text{USD}} = \left(\frac{\text{USDT}}{\text{USD}} \times \frac{\text{BTC}}{\text{USDT}}\right)$
- LHS: Coinbase (Offshore): Buy BTC with USD
- RHS

  1) Coinbase (Offshore): Buy USDT with USD

  2) Transfer USDT cross-border → Upbit (Onshore): Buy BTC with USDT

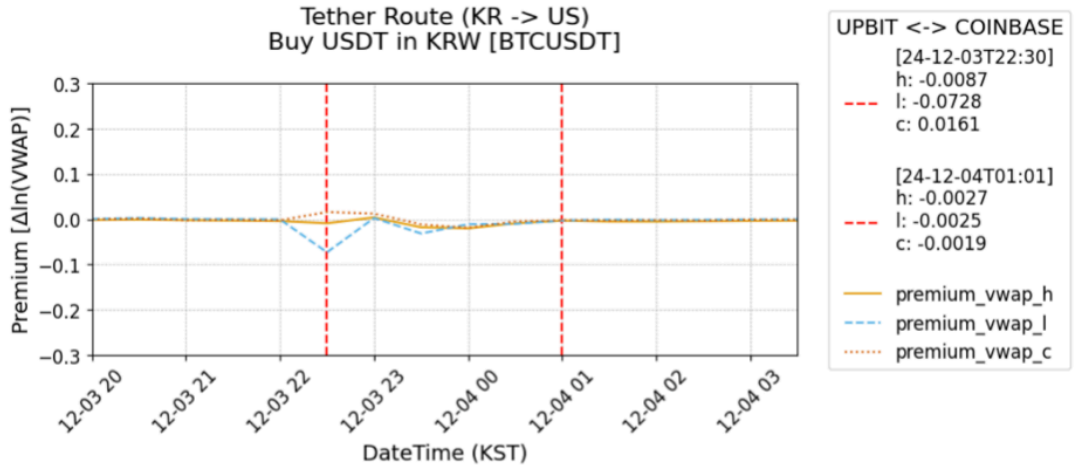


- $\frac{\text{BTC}}{\text{USD}} = \frac{\text{USDT}}{\text{USD}} \times \frac{\text{BTC}}{\text{USDT}}$



Upbit's KRW market has ample liquidity, thereby making arbitrage gaps much thinner.

- $\frac{\text{BTC}}{\text{KRW}} = \frac{\text{USDT}}{\text{KRW}} \times \frac{\text{BTC}}{\text{USDT}}$
- Similar pattern of Binance(US), Kraken



Hypothesis

1. Does on-chain stablecoin flow serve as a substitute for offline USD–KRW settlement, relaxing binding KRW capital-control frictions and thereby accelerate the convergence of the Kimchi Premium?
2. Is the arbitrage-facilitating role of stablecoins externally valid in other markets characterized by tight capital controls and FX market frictions?
3. How a on-chain transaction reduces market segmentation under fiat frictions?

Data

- Global Crypto Benchmark: CoinMarketCap
- On-chain Flow Data: https://tronscan.org/
- Off-chain Market Data: OHLCV of BTC-Fiat and USDT-Fiat pair in any crypto centralized exchange
    - Daily, hourly, and 15 minutes frequency
    - Cryptocompare, TradingView

Methodology

Table 5. Bitcoin Price Discrepancy and Onchain Tether Flow

		15 minutes market data (2024.12.01~)	Y. Tradable Volume Price Discrepancy						
		Lag length	t - 5			t - 15	t - 5	t - 15	
			Panel A: **HighFC Receiver & LowFC Sender**				Panel B: **LowFC Receiver & HighFC Sender**		
Objective	**X Category**	**Y. TVPD_ijt**							
	Tranditional Finance	**LN(FxRate_ijt)** largest and most liquid exchanges.	1.25***	1.25***	1.25***	1.25***	1.2**	0.7**	0.9**
	Onchain Transaction	**SenderInflowShare_ijt**	0.3***	0.8***	0.8***	0.8***	0.7*	0.001***	0.001***
		Flow_ijt	+***	**	*	Insignificant	Insignificant	***	*
		Flow_ijt X BanShort_i		+**		*	*	Insignificant	Insignificant
		Flow_ijt X Lending_j			+***	***	***		
	Onchain Transaction	**LN(‖SumOfTotalFlow_it‖)**							
Control Variable	**Offchain Market**	**Tether TVPD_ijt**							
		Other global factor…							
	Global Factor in Crypto	**WAvgUSDTVol_t**							
		WAvgBTCVol_t							
		N trading	60480	60480	60480	60480	20160	60480	20160
		R^2	0.7	0.73	0.80	0.90	0.80	0.4	0.3
FE	**Currency**	**Receiver & Sender**	YES	YES	YES	YES	YES	YES	YES

This table reports panel regressions of tradable volume price discrepancy variables on on-chain Tether flows and control variables at three off-chain data frequencies (15-minute). Tradable volume price discrepancy, $TVPD$, ... defined as a volume-constrained

김도연 Thu 23:43

Panel A: Kimchi Premium
-> Positive Crypto FX Premia

Panel B: Inverse Kimchi Premium
-> Negative Crypto FX Premia

김도연 Fri 15:23

Lending markets with the lowest and most immediate borrowing costs are likely to attract most arbitrageurs, generating a flow concentration.

FIN

4. Rational bubble

- Even if irrationality generates financial anomalies, their disappearance still may hinge on rational learning, that is, on the ability of rational arbitrageurs (Brav/Heaton, 2002, RFS)

Capital Immobility and segmentation from 'agency friction' (He and Xiong, 2008)

- Short-selling costs: Tuckman & Vila (1992, 1993), Miller (1977)
- Leverage and Margin Constraints: Gromb & Vayanos (2002, 2009a), Brunnermeier & Pedersen (2009), and Kondor (2009) Vayanos & Woolley (2008)