



# ESMA webinar: Social media influence on financial markets and crypto-assets trading

**Economics, Financial Stability and Risk Department**

ESMA webinar, 25 April 2024

ESMA PUBLIC USE

1. Introduction
- 2. Social media sentiment impact on EU equity prices**
3. Crypto assets: Market structures and EU relevance
4. Q&A

## Motivation

# Potential risks related to social media use

### Investor protection

- **Digitalisation:** Huge social media expansion. As of April 2023, 4.8bn social media users globally or 60% of the total global population, spending on average about 2.5 hours per day on social media
- **Social media** boosted immediacy and convenience with which information spreads
  - This makes it appealing especially for individuals. Interactions on social media have increasingly been influencing investment and trading decisions...
  - ...consumers are influenced and rely more and more on interactions with other amateur investors rather than seeking for expert advice (Chen and Xie, 2008)...
  - ...increasing consumers' exposure to large losses related to the possibility of receiving wrong or false information especially for less-informed investors or investors with limited means
- Potential for **market abuse** due to the scope of increased speculation<sup>1</sup>

### Orderly market

- Social media coupled with increased retail trading can have wider implications in terms of price dislocations

# Contribution

## EU analysis across different social media

### Focus on the EU...

- **Previous analysis - US focused:** Effects of social interactions on the financial decisions of individuals based on US related data (Ranco et al, 2015; Bailey et al., 2018; Sul et.al., 2014)

### ...across social media networks and across time

- **First attempt across several social media sources, time and countries in the EU:**
  - Previous analyses mostly focused on a single social media (e.g. Twitter, Tan and Tas, 2020)
  - Data based on Stockpulse allows for an analysis:
    - at the broad EU level across countries and companies;
    - over a number of years and across social media (Twitter, Youtube, Instagram, etc.)

## Research question

- Is social media sentiment linked to stock market dynamics?
  - Analysis on the correlation of social media sentiment and stock excess returns
  - Analysis focusing on whether the general interest in a particular stock is a factor that further contributes to a change in stock excess returns

## Main findings

- Correlation between social media interactions and excess return at day  $t$  and day  $t+1$ 
  - Very short-term nature of the effects. No indication of longer-term relationship
  - No significant gains from social media advices

# Data and sample

## Data used for the analysis

### Sample

- Approximately 300,000 observations (from roughly 640,000 initial observations), covering 580 stocks of the STOXX600 equity index

### Variables

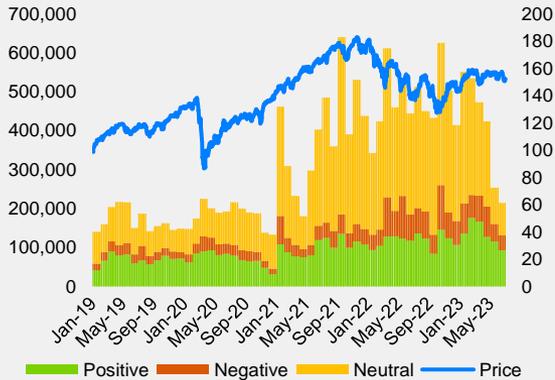
- Social media (Stockpulse): Total number of messages (neutral, positive, negative);
- Stock market data (Refinitiv Eikon): Closing/open price; volatility; market cap

### Period

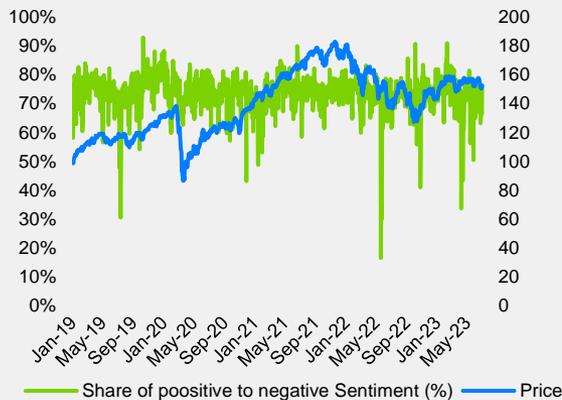
- January 2019 – June 2023

# Data and sample

## Social media interaction and sentiment



Note: STOXX 600 daily price index (100 = 01/01/2019) and social media messages mentioning constituents of the STOXX 600 Index, classified by sentiment type. "Neutral" messages are defined as the number of "Total" messages minus "Positive" and "Negative".  
Sources: Stockpulse, Refinitiv Eikon, ESMA.



Note: Daily STOXX 600 price index (100 = 01/01/2019) and share of positive to negative total daily messages on the constituents of STOXX 600 across social media platforms.  
Sources: Stockpulse, Refinitiv Eikon, ESMA.

### Sample:

- Total social media messages mentioning Stoxx 600 constituents are highly volatile
- Sudden peaks and drops in attention are mainly driven by individual stocks
- Movements between price and sentiment not closely aligned at aggregate level

## Methodology Panel regression with fixed effects

*Daily excess returns*  $s_{i,t}$

$$= \beta_0 + \beta_1 \textit{sentiment}_{i,t} + \beta_2 \textit{attention}_{i,t} + \beta_3 \textit{sentiment}_{i,t} * \textit{attention}_{i,t} + \delta \textit{Controls}_{i,t} + \alpha_i + u_i$$

Where:

- *Daily excess returns*  $s_{i,t}$  = Difference between stock and index (Stoxx 600) returns

- *Sentiment*  $s_{i,t} = (p - n) / t$

n = negative posts, p = positive posts, t = total messages (including neutral)

If ratio < 0, period of negative sentiment; period of positive sentiment otherwise

- *attention* = 1 if ISIN is in 90<sup>th</sup> percentile of distribution of total messages on day t

For t, t+5, t+10 we use sentiment at 5pm; for t+1 we use social media sentiment at 5am

- *Controls* = CAR (cumulative return of stock i from [t-n-5] to [t-n-1]), size (log of daily market cap); illiquidity (Amihud indicator, mean of previous 5 days); market historical volatility (VSTOXX index, mean of previous 5 days)

# Results

## Sentiment: short-term relevance

	Excess returns [t]			
	[t]	[t+1]	[t+5]	[t+10]
Sentiment [t-n]	<b>0.201***</b>	<b>0.0478***</b>	<b>0.00286</b>	<b>-0.0074</b>
Attention [t-n]	<b>-0.147***</b>	<b>-0.0482*</b>	<b>0.0175</b>	<b>-0.0435*</b>
Sentiment*Attention [t-n]	<b>0.684***</b>	<b>0.0871</b>	<b>-0.0964*</b>	<b>0.018</b>
Controls	Yes	Yes	Yes	Yes
N	295,985	230,258	171,057	173,369
ISINs	580	581	579	579

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Note: Control variables include CAR, Amihud illiquidity measure, VSTOXX volatility index over the five previous days and company size. Results remain robust when excluding stocks driving the number of total messages and when adding time dummies to control for day of the week.

- Positive social media Sentiment is correlated with higher returns only in the short-term. It loses predictive power after t+1
- Same correlation exists for stocks receiving high attention compared to the rest of the sample. The effects are even more transitory (loss of predictive power after t)
- Trending stocks are associated on average with lower same day excess returns

# Conclusion

## Only transitory reaction

### Investor protection

- Significant correlation between sentiment and excess returns in the short run, amplified by high overall attention for a given stock
- Social media activity does not lead to financial gains
- Not convenient for retail investors to predict and plan investment strategies based on social media advice
- Risk of investors excessively relying on information spreading on social media not necessarily related to fundamentals
- Increased exposure to risk of losses especially for investor with lower financial knowledge and resources
- Excessive risk taking (e.g. pump and dump strategies)

# Discussion

## Scope of the Supervisory Briefing

Promote, enhance and harmonise NCAs approaches in relation to:  
(i) social media content analysis;  
(ii) and ad-hoc or ongoing monitoring of social media\*.

- *Sharing Experience in monitoring of social media*

Define a set of harmonised supervisory standards regarding compliance with MAR requirements applicable to any person producing or disseminating investment recommendation on social media

- *assessment of investment recommendations and classification of the persons producing them*

mitigate the risks of abusive activities such as insider trading and market manipulation

- *raising awareness of possible market abuse practices which could take place through social media*

## State of play

- ESMA's Market Integrity Working Group agreed to have a handbook for NCAs only and at the same time work on another document for the public:
  - The Supervisory Briefing has been included in the ESMA Handbook for NCAs
  - The Warning has been published on the ESMA's website together with a short Video shared via ESMA's social media channels

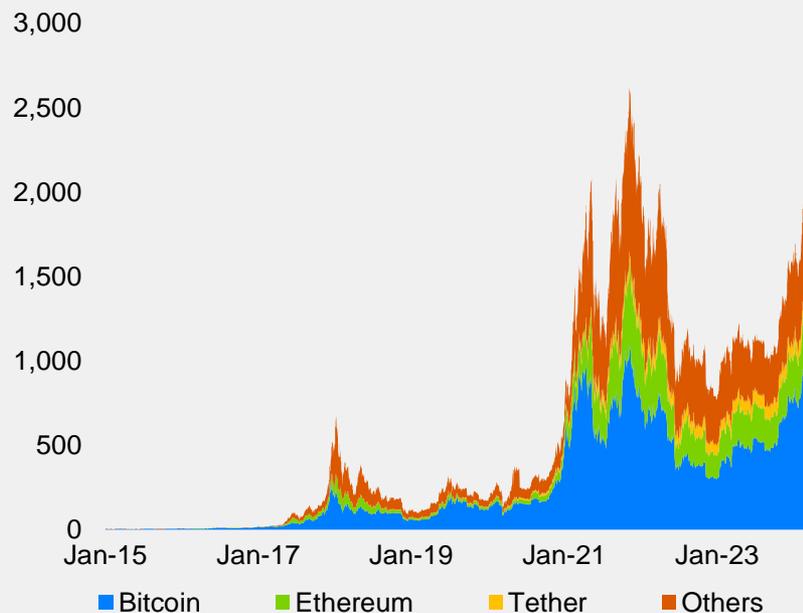
1. Introduction
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## Motivation

# Understand structure of crypto trading

## Crypto-asset market capitalisation

### Volatile market growth



Note: Market capitalisation of Bitcoin, Ethereum, Tether and other crypto-assets, in EUR bn.

Sources: CoinMarketCap, ESMA.

- Crypto markets are characterised by **volatile growth cycles**.
- **ESMA mandate** to ensure:
  - consumer protection
  - orderly markets; and
  - financial stability.
- We **monitor market** developments, **identify and warn about risks**.
- This report is based on **commercial data** comprising granular **off-chain trading and orderbook data**.

# Crypto assets

## Concentration and interconnectedness

### Top-10 crypto assets by market cap

Highly concentrated...

	Market Cap		Trading Volume	
	Billion USD	% Market Share	Billion USD	% Market Share
Bitcoin	850	51%	1,432	19%
Ether	269	17%	565	7%
Tether	93	6%	2,216	29%
Binance Coin	48	3%	41	1%
Solana	43	3%	101	1%
Ripple	31	2%	127	2%
USD Coin	25	2%	259	3%
Cardano	20	1%	29	<1%
Dogecoin	12	1%	47	1%
Toncoin	8	<1%	2	<1%
	<b>1,660</b>	<b>86%</b>	<b>4,820</b>	<b>64%</b>

Note: Top-10 crypto-assets as of December 2023 by market capitalisation and annual trading volume, in USD bn. Respective market shares in %.

Sources: CoinMarketCap, Kaiko, ESMA.

### Crypto-asset correlations

... and interconnected market

Bitcoin	1					
Ether	0.82	1				
Binance Coin	0.64	0.65	1			
Ripple	0.56	0.56	0.49	1		
Cardano	0.64	0.66	0.56	0.54	1	
Solana	0.55	0.61	0.54	0.46	0.52	1
	Bitcoin	Ether	Binance Coin	Ripple	Cardano	Solana

Note: Price return correlations of selected crypto-assets from January 2021 to December 2023.

Sources: Kaiko, ESMA.

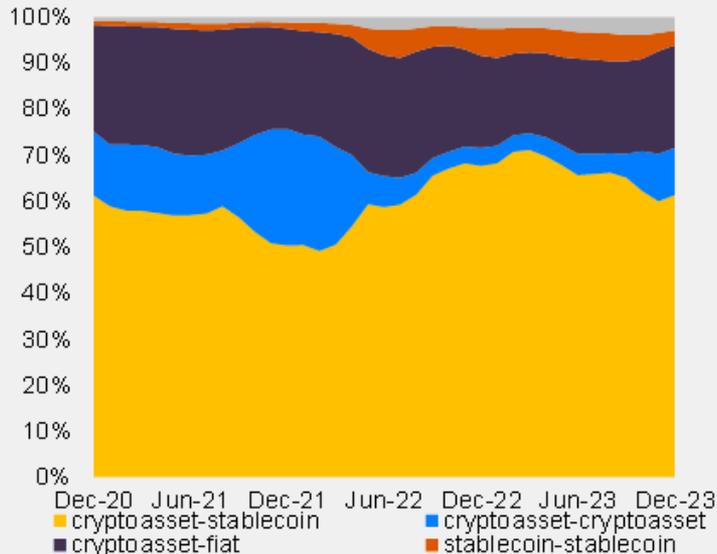
- **Three assets (BTC, ETH, USDT) account for ~75% of market cap and ~50% of trading volume (2023).**
- **Stablecoins are most liquid (relative to their market cap).**
- **High interconnectedness (positive correlations between 0.5 and 0.8).**

# Crypto assets

## High stablecoin and low fiat volumes

### Trading volume by asset pairs

High share of stablecoins

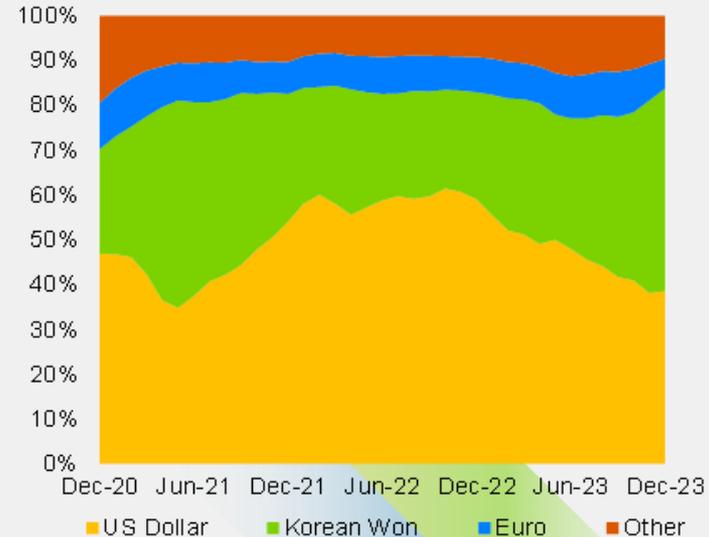


Note: Share of three-month rolling average trading volume by asset-pairs.

Sources: Kaiko, ESMA.

### Fiat-to-crypto trading volume

Korean Won gains in importance



Note: Share of fiat currencies' three-months rolling average trading volume.

Sources: Kaiko, ESMA.

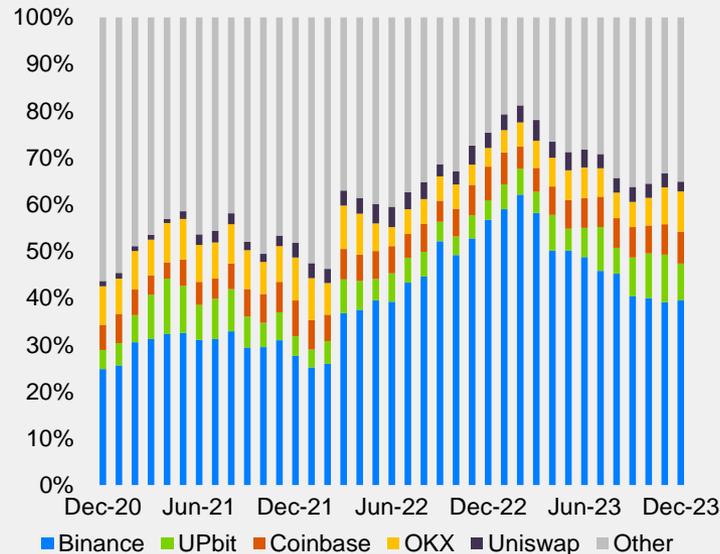
- Largest share in **crypto-stablecoin pairs (60%)** and relatively low share of **crypto-fiat pairs (20-30%)**.
- Within stablecoins: **Tether** with **~70% market cap** and **~80% of volume**.
- Fiat-to-crypto shares: **USD and KRW with 80%**, **EUR with 10%**.

# Crypto exchanges

## Market concentration in a few exchanges

### Volume by exchange

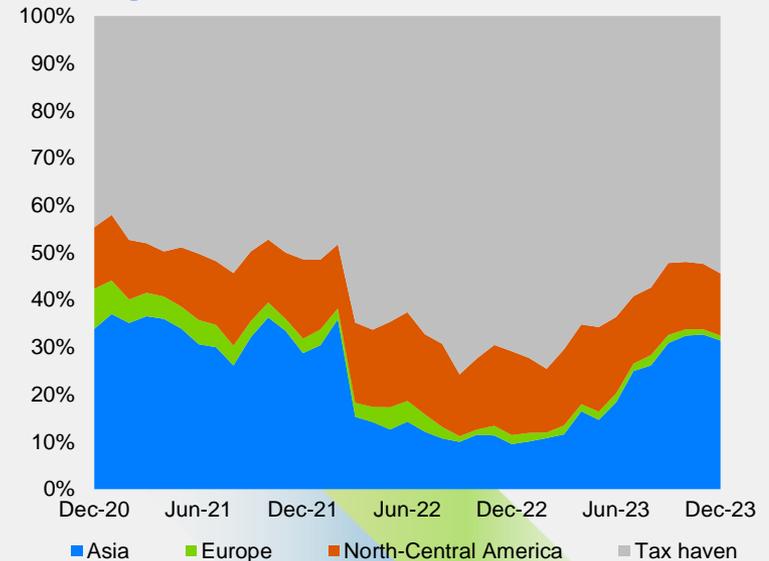
Binance market share receding



Note: Share of monthly trading volume (in USD) by exchange from 31/12/2020 to 31/12/2023.  
Sources: Kaiko, ESMA.

### Volume by exchange domicile

Exchanges often domiciled in tax havens



Note: Share of monthly trading volume (in USD) by geographic location of the exchange headquarter. Headquarter location manually identified from publicly available sources.  
Sources: Kaiko, ESMA.

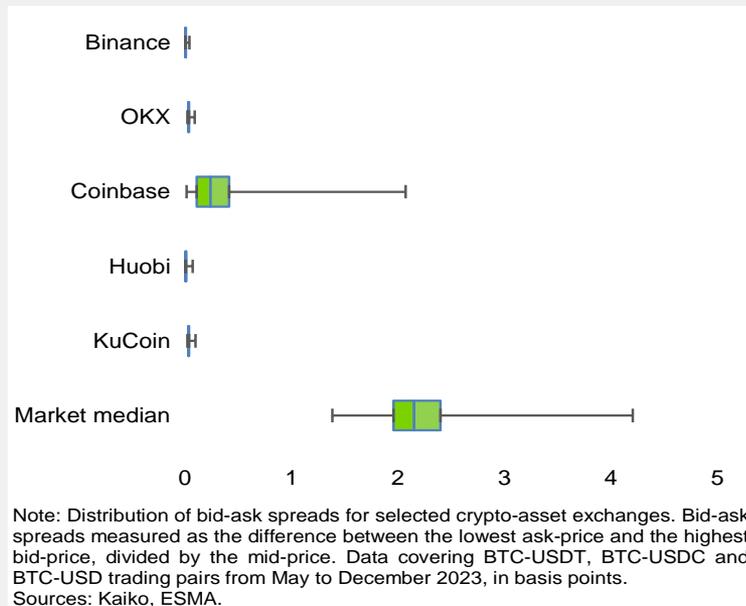
- **Concentration of trading in a few exchanges.** In 2023, top-10 exchanges processed 90% of global volume, with an HHI greater than 2,500.
- **Bitcoin remains the dominant platform,** although declining in 2023.
- Most transactions executed on **exchanges domiciled in “tax havens”.**

# Crypto exchanges

## Largest exchanges offer highest liquidity

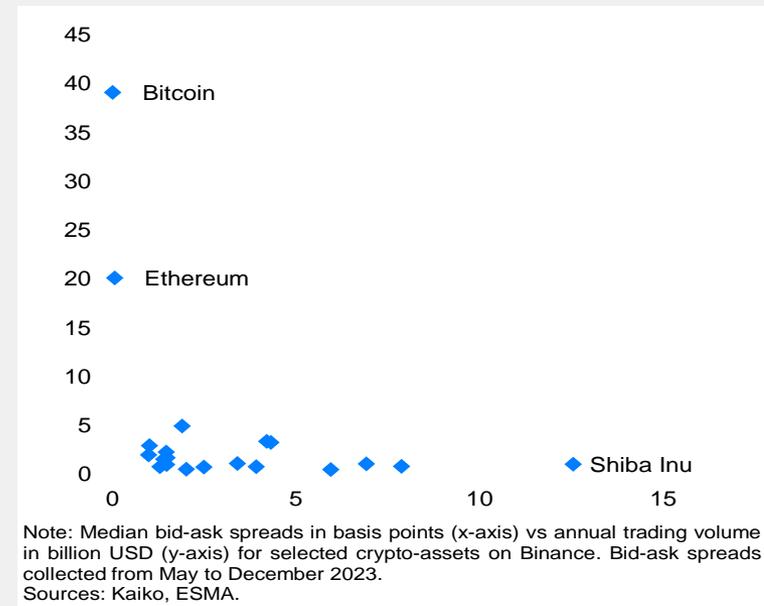
### Bid/ask spreads for Bitcoin

Spreads very low at largest exchanges



### Spreads vs volume on Binance

BTC and ETH with lowest spreads



- **Larger exchanges tend to have superior liquidity (spreads and depth).**
- **BTC and ETH are more liquid than other assets.**
- **Consistent with market concentration in a few assets and exchanges.**

## Conclusion

# A concentrated and volatile market

- Crypto assets are **highly volatile and strongly interconnected**. They tend to co-move with equity markets.
- The crypto market is **highly concentrated, both at the asset and exchange level**. This is also true for market liquidity.
- **Fiat involved in 20-30% of transactions** (most used: USD and KRW).
- **Stablecoins in over 60% of transactions**. But frequent deviations from their peg and Tether with >70% market share.
- It is **difficult to identify the origin of order flow or location of trading**. Most crypto exchanges are domiciled in “tax havens”.

ESMA will continue monitoring the crypto-asset market going forward!

# Discussion

## The crypto heatmap



# Discussion

## Which value proposition?

		Market cap (USD bn)	Description / Objectives
	Bitcoin <i>Meta</i> <b>1,245bn</b>	1,299	On-line payment without going through a financial institution
	Ethereum	387	Global platform for decentralized applications
	BNB <i>Axa</i> <b>84bn</b>	90	Bring new edge finance to the world, become the infrastructure services provider for the entire blockchain ecosystem
	Solana	69	Open source project to facilitate decentralized applications creation
	XRP	30	Open-source, permissionless and decentralized technology for payments, tokenization, DeFi, CBDCs and stablecoins
	Dogecoin <i>Societe</i>	23	Fun, light-hearted cryptocurrency, with greater appeal beyond Bitcoin's core audience, since it was based on a dog meme
	Toncoin <i>Generale</i> <b>22bn</b>	20	Decentralized layer-1 blockchain, easy-to-use application that allows users to buy/send/store funds
	Cardano	18	Proof-of-stake blockchain platform focused on building a scalable, secure and efficient decentralized network
	Shiba Inu	16	Global stable currency that plebs across all countries are able to use as both a store of value and method of payment
	Avalanche	14	Layer one blockchain that functions as a platform for decentralized applications and custom blockchain networks

## Areas for further research

- On-chain data
- MiCA's implementation in the EU
- Decentralised exchanges
- Tokenisation

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