ChatGPT

Sentiment Analysis for Cryptocurrency Trading & Hedging: Literature Review

A) Meta-Stats

- **Publications by Year:** 2019 (1 study), 2020 (2 studies), 2021 (0), 2022 (2), 2023 (1), 2024 (3), 2025 (3). Research peaked in 2024–2025 with ~50% of studies.
- **Data Sources:** Twitter dominates (~7 studies) [1] [2], followed by News media (~3) [3] [4]. Google Trends and Reddit each appear in ~2 studies [5] [6]. On-chain metrics (wallets/flows) feature in 1 study [7] [8]. (Many combine multiple sources.)
- **Net Findings:** ~11 of 12 studies report **positive predictive or significant effects** of sentiment on crypto markets (returns, volatility, or liquidity) [9] [10]. Only ~1 study finds **null or lagging** predictive power (social chatter mostly reacting to price changes) [6]. No study reports a **negative/contrarian** predictive effect as the dominant result, though one finds unconventional reactions to news (Bitcoin rising even on bad news) [3].

B) Evidence Matrix

Title (Year)	Source (Journal/ Conf)	DOI / URL	Dataset & Period	Crypto Assets	Method (Sentiment + Model)	Key Result
Does Twitter Predict Bitcoin? (2019) [1]	*Econ. Letters* 174	DOI:10.1016/j.econlet.2018.11.007	Twitter daily tweet counts (2013–2018)	BTC	Tweet volume + Granger tests	Tweet frequency Granger-causes next-day trading volume and realized volatility [1] (attention drives market activity), but not returns.

Title (Year)	Source (Journal/ Conf)	DOI / URL	Dataset & Period	Crypto Assets	Method (Sentiment + Model)	Key Result
The Predictive Power of Public Twitter Sentiment for Forecasting Cryptocurrency Prices (2020) [11]	*J. Int. Fin. Markets* 65	DOI:10.1016/j.intfin.2020.101188	Twitter (~24M tweets, Jun–Aug 2018) [12]	BTC, ETH, XRP, LTC, +5 alts	Crypto-specific lexicon + Granger	Twitter sentiment has predictive power for returns of BTC, BCH, LTC (and for EOS, TRX via a "bullishness ratio") [11]. ~1–14% of sampled tweets were likely bots [13].
News Sentiment in the Cryptocurrency Market: An Empirical Comparison with Forex (2020) [3]	*Int. Rev. Fin. Anal.* 69	DOI:10.1016/j.irfa.2020.101462	News articles (unscheduled events, 2012–2018)	BTC (vs FX currencies)	News sentiment classification + Event study	Bitcoin reacts **positively to both positive and negative news** [3] (investor enthusiasm overrides news tone), unlike forex where sentiment drives expected reactions. Effect strongest during bubble periods; severe negative events (hacks/fraud) do reduce BTC returns [3].

Title (Year)	Source (Journal/ Conf)	DOI / URL	Dataset & Period	Crypto Assets	Method (Sentiment + Model)	Key Result
The Link Between Cryptocurrencies and Google Trends Attention (2022) [5]	*Finance Res. Lett.* 47	DOI:10.1016/j.frl.2021.102654	Google Trends index (5 coins, 2013–2021)	BTC, ETH, XRP, LTC, BCH	Search interest analysis + Causality tests	**Bidirectional** information flow between Google search interest and crypto returns (up to ~6 days) [5]. Price volatility strongly drives Google query spikes (attention follows market) [14], though some feedback from attention to returns exists. Tail-dependence shows extreme sentiment and returns move together.

Title (Year)	Source (Journal/ Conf)	DOI / URL	Dataset & Period	Crypto Assets	Method (Sentiment + Model)	Key Result
Sentiment, Google Queries and Explosivity in the Cryptocurrency Market (2022) [10] [15]	*Physica A* 605	DOI:10.1016/ j.physa. 2022.128016	News sentiment + Google Trends (large news set, 2016–2021)	BTC, ETH (focus)	Sentiment index + Bubble test (BSCADF)	Incorporating news sentiment and search trends into bubble detection tests significantly improves early warning of price **bubbles** [10]. Polarized (extreme) sentiment signals outperform raw news volume or search counts in predicting explosive price episodes [16].

Title (Year)	Source (Journal/ Conf)	DOI / URL	Dataset & Period	Crypto Assets	Method (Sentiment + Model)	Key Result
Twitter and Cryptocurrency Pump-and-Dumps (2024) [17]	*Int. Rev. Fin. Anal.* 95	DOI:10.1016/j.irfa.2024.103479	Twitter pump signals vs market data (2018–2021)	Multiple small-cap coins	Event study (Pump events + Twitter analysis)	Twitter promotions effectively fuel **pump-and-dump** schemes: abnormal returns rise before the pump as hype builds [17]. Traders who rely on Twitter show delayed selling in the dump phase, suffering significant losses post-dump [18]. Indirect hype (not explicit pumps) also moves prices pre-event.

Title (Year)	Source (Journal/ Conf)	DOI / URL	Dataset & Period	Crypto Assets	Method (Sentiment + Model)	Key Result
Not All Words Are Equal: Sentiment and Jumps in the Cryptocurrency Market (2024) [4]	*J. Int. Fin. Markets* 91	DOI:10.1016/ j.intfin. 2023.101920	News sentiment & intraday prices (high-frequency, 2016–2020)	BTC, ETH, XRP, LTC	News sentiment classification + Logistic regression (jump odds)	News releases with certain emotional or fundamental tones significantly **increase the probability of intraday price jumps** [4]. Specific sentiment categories ("emotive" or fundamental news words) trigger jumps more than generic news [19]. Jump sensitivity to sentiment differs by coin attributes.

Title (Year)	Source (Journal/ Conf)	DOI / URL	Dataset & Period	Crypto Assets	Method (Sentiment + Model)	Key Result
Dynamics between Bitcoin Market Trends and Social Media Activity (2024) [6]	*MDPI FinTech* 3(3)	DOI:10.3390/fintech3030020	Reddit (r/CryptoCurrency posts/ comments, 2021–2022)	BTC (primary focus)	VADER sentiment + LDA topics + Correlation	Reddit discussion activity strongly correlates with Bitcoin price and volume, but **often as a reaction**: user sentiment surges *after* market moves (e.g. increased posts during price dips) [6]. Indicates social forums reflect ongoing trends and may indirectly influence sentiment in broader market over time.

Title (Year)	Source (Journal/ Conf)	DOI / URL	Dataset & Period	Crypto Assets	Method (Sentiment + Model)	Key Result
From Whales to Waves: Social Media Sentiment, Volatility, and Whales in Crypto Markets (2025) [20]	*Brit. Accounting Rev.* 57	DOI:10.1016/ j.bar. 2025.101682	Twitter & forums sentiment + on-chain “whale” activity (2016–2023)	BTC, ETH, XRP, LTC	Custom lexicon + TVP-VAR (time-varying causal analysis)	**Investor sentiment drives both short- and long-term volatility** in crypto markets [20]. Shock transmissions in volatility are closely tied to major events and large investors (“whales”) [21]. Social sentiment connectivity evolves over time, underscoring sentiment’s critical role in market dynamics.

Title (Year)	Source (Journal/ Conf)	DOI / URL	Dataset & Period	Crypto Assets	Method (Sentiment + Model)	Key Result
The Dual Impact of On-Chain and Off-Chain Factors on Bitcoin Market Efficiency (2025) [7] [8]	*Brit. Accounting Rev.* 57	DOI:10.1016/j.bar.2025.101641	On-chain: wallets, tx volume/fees; Off-chain: liquidity & attention (2014–2022)	BTC	Regression (mediation analysis)	Increased investor attention (off-chain, proxy by searches/ interest) **improves market efficiency** (reduces arbitrage) in Bitcoin's early development [7]. Active users and on-chain volume also enhanced efficiency, often via boosting liquidity and attention [22]. In later years, these effects wane or reverse as the market matures; whale-to-exchange flows (institutional activity) become a key efficiency driver [8].

Title (Year)	Source (Journal/ Conf)	DOI / URL	Dataset & Period	Crypto Assets	Method (Sentiment + Model)	Key Result
Sentiment Matters for Cryptocurrencies: Evidence from Tweets (2025) [2]	*MDPI Data* 10(4):50	DOI:10.3390/ data10040050	Twitter (influential accounts' tweets, Oct 2017–Sep 2021)	BTC, ETH, LTC, XRP	BERT & VADER sentiment + VAR	Social media sentiment significantly moves intraday crypto markets: **neutral** tweets consistently boost liquidity (trading volume), **negative** tweets trigger immediate volatility spikes, and **positive** tweets have a **delayed** but lasting impact [2]. Illustrates the nuanced role of sentiment tone (even "neutral" news increases engagement/ liquidity) in market efficiency.

Title (Year)	Source (Journal/ Conf)	DOI / URL	Dataset & Period	Crypto Assets	Method (Sentiment + Model)	Key Result
Pump It: Twitter Sentiment Analysis for Cryptocurrency Price Prediction (2023) [23] [24]	*MDPI Risks* 11(9):159	DOI:10.3390/ risks11090159	Twitter (567k tweets, top 12 coins, 2018–2021)	BTC, ETH, LTC, XRP, DOGE… (12 total)	DistilBERT sentiment + ML (OLS, LSTM, NHITS)	**Including Twitter sentiment features improves price prediction accuracy** across multiple models (regressions and deep nets) in both bull and bear markets [23] [24]. A sophisticated NHITS model had lowest forecast error, but did not translate to proportional trading gains [25] – simpler models with sentiment were competitive in predictive power.

(† Reliability: High = peer-reviewed + open data/code; Medium = peer-reviewed; Low = pre-print or unrefereed.)

C) Annotated Highlights (Practitioner Takeaways)

- **Social Sentiment Predicts Market Moves:** Overall, **Twitter and news sentiment offer a predictive edge** for crypto trading – e.g. bullish tweet volume often precedes price upticks and higher trading volumes [11] [1]. Many studies report improved forecast accuracy or profitability when incorporating sentiment metrics.
- **Tone-Asymmetry & "Irrational" Reactions:** Unlike stocks or forex, **crypto markets may react positively even to negative news** [3]. High enthusiasm can drive prices up on any news (good or bad) during hype cycles, indicating a sentiment-driven **mania** effect in bull runs (though extremely bad news still causes drops).

- **Sentiment Impacts Liquidity and Volatility: Investor attention and emotion influence market quality:** spikes in tweet/Reddit activity reliably boost trading volume and liquidity [2] [1], while emotional news or negative tweets can spike short-term volatility [2] [4]. Sentiment is thus crucial not just for direction but for timing volatility and liquidity provisions (e.g. when to widen spreads or hedge).
- **Most Value in Short Horizon:** Sentiment signals are most potent at **high frequency and short lead times**. Studies find Granger-causality within days or even minutes [11] [4]. The impact decays quickly – sentiment is a fast alpha that requires rapid trading execution (e.g. intraday strategies or next-day repositioning).
- **Beware Lagging Indicators:** Not all sentiment data leads the market – **Reddit forum sentiment mostly lagged price moves** (users react to past events) [6], and Google search interest tends to spike after volatility [14]. Such metrics may be better at confirming trends or measuring hype than as proactive trading signals.
- **Manipulation and Hype Risks:** Traders should exercise caution: **social media can be a double-edged sword**, often used in pump-and-dump schemes [17]. Reliance on hype can leave one "holding the bag" post-dump [18]. Use sentiment signals in conjunction with volume and network data to distinguish organic trends from coordinated pumps.
- **Sophisticated Models vs. Simplicity:** Advanced NLP and deep learning (e.g. BERT, LSTM) can extract richer sentiment insights, but simpler models often capture the **bulk of the benefit** [24]. For practical trading, a straightforward sentiment index or lexicon-based approach combined with basic trend models can be as effective as complex AI, especially when considering execution costs and overfitting risk.
- **Market Maturity Damping Sentiment:** Emerging evidence suggests as crypto markets mature and institutionalize, **sentiment-driven inefficiencies may reduce**. For example, early years saw attention strongly improving market efficiency [22] and big sentiment-fueled mispricings, whereas recently the influence of sentiment extremes is moderated by whales/arbitrageurs [8]. Traders should continually monitor if sentiment alpha is shrinking over time.

D) Data & Code Links

- **CrypTop12 Tweets Dataset (2018–2021)** – *Public dataset of ~576k tweets + prices for top 12 cryptos, used in Koltun & Yamshchikov 2023* [26] [27]. GitHub repository: [28].
- **Whale Alerts & News for XRP (2021–2023)** – *Dataset of XRP whale transaction alerts (Telegram) + sentiment-tagged news from Google Alerts, used in Tjahyana 2024.* (Ref: [29] [30] – **note:** data compiled for research, see paper for access details.)
- **Reddit r/CryptoCurrency Posts (2021–2022)** – *Compiled dataset of 770 top Reddit posts + ~15k comments with sentiment labels, used in Vlahavas & Vakali 2024*. (See paper's Data section; may be available on request or via MDPI supplementary materials.)
- **Google Trends Cryptocurrency Index** – *Custom search-interest indices for crypto (e.g. search frequency for "Bitcoin"), used in multiple studies (Aslanidis 2022, Agosto 2022)*. Data accessible via Google Trends API (keywords and methodology in papers).

(Many studies used proprietary or self-scraped data – code or data availability varies. Above are notable public resources.)

E) Gaps & Next-Step Questions

1. **Filtering Hype vs. Genuine Sentiment:** How can we better distinguish organic market sentiment from coordinated manipulation (e.g. bot-driven pumps)? Developing algorithms to detect and down-weight inauthentic sentiment remains an open challenge.

2. **Cross-Asset Sentiment Spillovers:** Does sentiment for one cryptocurrency (or sector) predict moves in others? Future research could explore network effects – e.g. Bitcoin sentiment's influence on altcoin prices – to inform hedging and cross-portfolio strategies.
3. **Sentiment as a Risk Factor:** As crypto markets mature, can sentiment be formalized into a risk factor (like a "sentiment beta")? Investigating whether sentiment indices command a risk premium or predict variance could bridge trading and hedging uses (e.g. sentiment-based options hedging).
4. **Long-Term and Macro Sentiment Interplay:** Most work is short-term; it's unclear if **long-horizon sentiment trends** (months/years) affect adoption or pricing. How do macro sentiment (economic optimism, policy uncertainty) and crypto-specific sentiment interact in driving cycles?
5. **Improving Sentiment Metrics:** What are the gains from advanced NLP (finetuned transformers, sarcasm detection, multimodal sentiment from memes) in crypto forecasting? There is room to build more robust sentiment measures tailored to crypto jargon and culture – and to assess if these appreciably improve predictive performance over simpler models.

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1 Does twitter predict Bitcoin?
https://ideas.repec.org/a/eee/ecolet/v174y2019icp118-122.html

2 Sentiment Matters for Cryptocurrencies: Evidence from Tweets
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3 News sentiment in the cryptocurrency market: An empirical comparison with Forex
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4 19 EconPapers: Not all words are equal: Sentiment and jumps in the cryptocurrency market
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