FTSE Global Digital Asset Index Series

A new standard of measurement for the digital asset universe

December 2022

FTSE RUSSELL

An LSEG Business

Introduction

Since the launch of the first cryptocurrency, bitcoin, in 2009, the digital asset universe has expanded (and sometimes unravelled) at a chaotic and bewildering pace. The virtual absence of any barrier to entry has incentivised the launch of many thousands of tokens, as well as hundreds of marketplaces on which to trade them.

While some digital assets have gained critical mass, as anyone in possession of a laptop has been able to launch a cryptocurrency exchange, others have proved short-lived as we see typical risks in unregulated markets play out. Many of these trading platforms have operated without adequate oversight, resulting in hacks, frauds and unreliable trade data.

Despite these formidable challenges, the market value of digital assets has ticked upward, reaching over $3trn in late 2021. Although a severe bear market brought this total down to under $1trn in 2022, the asset class has increasingly attracted interest from professional investors and traders.

Many of these market participants say they are attracted by the potential cost savings and the process reduction potential of digital assets' innovative technology for managing ownership records and transfer. Meanwhile, traditional financial institutions have entered the market and are developing a variety of products and services for digital asset owners and users.

Worldwide, governments and securities regulators are also introducing rules for the digital assets market, setting out standards for consumer and investor protection. Their aim to ensure financial stability, financial inclusion, responsible innovation and parity of treatment with traditional financial markets.

There has been a rising demand for the provision of indices and data tools that help investors better understand the digital asset universe. FTSE Russell's clients have communicated to us their desire for digital asset indices that screen the market with a transparent, rules-based methodology, applying a broad range of criteria to exchanges and assets, encouraging the development of best practices in the digital assets market and drawing upon foundational data to enable future index development.

In this paper, we introduce the FTSE Global Digital Asset Index Series, a new series of multi-asset indices covering the broad digital asset universe. The indices offer a dependable standard of measurement providing index benefits, such as:

Transparency

In common with other FTSE Russell indices, we use a transparent, rules-based methodology to calculate our digital asset index series.

Inclusivity

The index series selects its constituents by applying the same broad universe of criteria to both exchanges and the digital assets.

Capitalization-weighting

The indices within the series are defined by circulating supply of all eligible assets in the underlying universe. The top 98% of digital assets unlocked for trading are assigned as large-, mid-, small- or micro-cap.

Circulating supply or circulating weight

Circulating supply is defined as the total tradeable token supply (tokens that have been created and are unlocked, rather than those that have been created, but are still locked).

Rigorous vetting and monitoring

We use an innovative methodology, developed in association with Digital Asset Research (our partner in the administration of the index series), to vet both the exchanges used in the calculation of the indices and the digital assets themselves.

Accuracy and reliability

To counter the influence of potentially erroneous trade data, we filter prices from vetted sources at both the exchange and asset level, removing trades that occur above a specified level away from the average.

Free float adjustment

We ensure that the index series includes only those digital assets that are considered to be freely available for public purchase as defined by circulating supply.

Buffering to reduce turnover

To reduce unnecessary index turnover, constituents are subject to a series of 'buffer zones' at the cut-off points between large-, mid- and small-cap indices.

Professional index governance

The indices are administered and calculated within a governance framework that is designed to meet the requirements of the IOSCO Principles for Financial Benchmarks, the European Benchmark Regulation and the UK Benchmark Regulation.

The FTSE/Digital Asset Research partnership

FTSE and Digital Asset Research (DAR) started to work together in 2017 and signed a partnership agreement in 2018. Under the collaboration, FTSE and DAR aimed to create a set of vetting criteria that would enable professional investors and market participants to benchmark digital tokens while mitigating the risks specific to this largely unregulated financial asset class.

In 2020, we launched a new reference price data feed consolidating exchange and asset prices considered suitable to enter future indices that meet global regulatory standards. We also assigned 'SEDOL' security identifiers to over 160 digital assets, creating a taxonomy that integrates digital and traditional asset markets. In 2021, we created our first single asset indices.

In 2022, the FTSE/DAR partnership was extended to include the launch of the FTSE Global Digital Asset Index Series, a new series of multi-asset indices covering the broad digital asset universe which meet the demands of professional investors and traders.

Figure 1: FTSE/Digital Asset Research timeline

| 2018	2019	2020	2021	2022	Future
Market outreach/Risk approach	**Regulatory engagement/Testing**	**Infrastructure build – Reference, taxonomy and pricing**	**Index operation established – Single asset indices**	**Index family growth – Multi asset, market cap indices**	**2023**
Client consultation and identification of considered risks in the space namely reputational	Launched indicative indices and conducted heavy engagement with FCA, SEC and CFTC resulting in alignment to create the FTSE DAR Reference Price. This Benchmark Asset files the eligible universe for future EU BMR compliant indices	– Launched the FTSE DAR Reference Prices	Launched Single Digital Asset Index launch – An entry point to measurement of a 24/7 market:	Launched flagship multi asset, market cap index:	FTSE Real Time Indices
Developed the Vetting Criteria to control risks		– Assigned SEDOL to 160+ Digital Assets	– Bitcoin	FTSE Global Digital Asset Index Series	FTSE Proof of Stake Index
		– Integrated DAR Taxonomy	– Ethereum		**Thematics**
			– Cardano		Weighting methodologies
					Yield strategies
					Target volatility
					Multi-asset, risk weighting
					Factors
Exploration phase	DAR Partnership Agreement signed	Data integrity with Vetting to Jan 1, 2019 and historical prices to 2011		Our combined capabilities and data sets allows us to innovate and create deeper value for our clients	

Contents

The FTSE Global Digital Asset Index Series

The FTSE Global Digital Asset Index Series is designed to provide market participants with a better starting investment universe—a digital asset dataset that filters out questionable platforms, assets and trade information to meet demand for market liquidity and regulatory integrity. The index series segments the full digital asset universe, from large to micro cap.

Figure 2: FTSE Global Digital Asset (FDA) Index Series

FLAGSHIP	ALL CAP	TOTAL CAP	LARGE CAP	MID CAP	SMID CAP	SMALL CAP	MICRO CAP	
FGDA Index Our flagship index series covers the full vetted (liquid) universe, segmenting it from large cap to micro cap as defined by circulating weight	**FGDA All Cap Index**	**FGDA Total Cap Index**	**FGDA Large Cap Index**	**FGDA Mid Cap Index**	**FGDA SMID Cap Index**	**FGDA Small Cap Index**	**FGDA Micro Cap Index**	**LARGE |** TOP 70% / **MID |** NEXT 25% / **SMALL |** NEXT 4% / **MICRO |** BOTTOM 1%

The FTSE Global Digital Asset Index Series represents 98% of the identified asset universe. The bottom 2% of assets are excluded prior to ranking. For more information see the index series Ground Rules.

What's different about digital assets?

We define a digital asset as a cryptographically secured digital instrument for which the issuance, transfer and ownership is recorded on a data structure commonly referred to as a blockchain. Digital assets differ from conventional financial market instruments, such as equities, in a number of ways:

Trading

Although most digital asset trading now takes place on centralized exchanges, unlike traditional stock exchanges, there are no defined market opening and closing times in digital assets. This means there is also no concentration of liquidity around the opening and closing auctions. Instead, digital assets trade 24/7/365. At the same time, the underlying technology is dependent on the individual trading venue; it may be untested and it is not standardized. Individual digital asset exchanges may have had past records of significant downtime during periods of market volatility.

Clearing and settlement

In the equity market, trades are processed by clearing houses and records of ownership are kept at central securities depositaries (CSDs) or at custodian banks. Trade settlement takes place with a lag (usually T+2, or two days after trade date, as on the London Stock Exchange).

In digital assets, settlement periods tend to be much shorter[1] and take place on the native blockchain. Another difference is that in traditional financial markets, settlement is considered final (irrevocable and unconditional) once it takes place in the CSD—in other words, at a particular point in time. In traditional financial markets, this finality of settlement is also backed up by a comprehensive legal framework[2].In a digital asset like bitcoin, settlement is probabilistic—there is no time or place of settlement finality. In effect, by market convention, settlement is assumed to have taken place after a series of trade confirmations.

Implications for index design

These differences have significant implications for the design of an index of digital assets. If there is no closing stock exchange auction, which price should be used for the index calculation? And where should it be sourced?

In the FTSE Global Digital Asset Index Series, we take the view that it's best to address these questions by setting a series of quantitative and qualitative requirements for the exchanges where trading takes place—and for the digital assets themselves.

Why does vetting matter?

Accurate, responsive, reliable

Digital assets are new, and with the potential opportunity in this market come significant risks for investors to consider. While regulated equity exchanges have various controls in place to ensure the quality of listings[3], in digital assets there are no barriers to entry. We as index providers look to align index development to the needs of the investment market. To address this regulatory gap, FTSE Russell has developed processes to determine what data sources we can use for high-quality index pricing and which assets are robust enough for consideration by institutional investors.

The vetting of digital asset exchanges and of the underlying assets helps meet investor needs for accurate price discovery, transparency and consistency. However, in times of increased financial turmoil, vetting also helps pre-emptively identify and decrease exposure to new market risks by providing much needed technology, security and investability thresholds.

In our flagship digital asset indices, we have incorporated a series of data screens to elevate their quality and usability. By finding and eliminating market manipulation before data enters the index, we enable investors to choose safer trading venues and assets.

The FTSE/DAR vetting process aims to identify those digital assets (which we call 'benchmark assets') that can be used in financial instruments, financial contracts, in portfolio management and in measuring the performance of investment funds. This approach is designed to be compliant with the regulatory framework for benchmarks in the European Union[4].

The vetting process consists of two stages: first, we determine the eligibility of digital asset exchanges to be used as a pricing source; we then vet the assets for inclusion in digital asset benchmarks. We explain our exchange and asset vetting rules in detail in the next two sections.

---

[1] By market convention, bitcoin settlement is considered final after six blocks have passed (+/- one hour). In ethereum, settlement periods are much shorter—about a minute.

[2] See, for example, Europe's 1998 Settlement Finality Directive.

[3] For example, premium-listed companies on the London Stock Exchange must meet the requirements of the Financial Conduct Authority (FCA), the UK's securities market regulator, as set out in its Handbook. The first three FCA principles for premium listings require that: a listed company must take reasonable steps to enable its directors to understand their responsibilities and obligations as directors; a listed company must act with integrity towards the holders and potential holders of its premium-listed securities; and all equity shares with a premium listing must carry an equal number of votes on any shareholder vote.

[4] The EU Benchmark Regulation of 8 June 2016 on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds in the European Union, and the UK Benchmark Regulation (The Benchmarks (Amendment and Transitional Provision) (EU Exit) Regulations 2019 (which amends the European benchmark regulation in the United Kingdom).

Figure 3: Vetting exchanges and digital assets
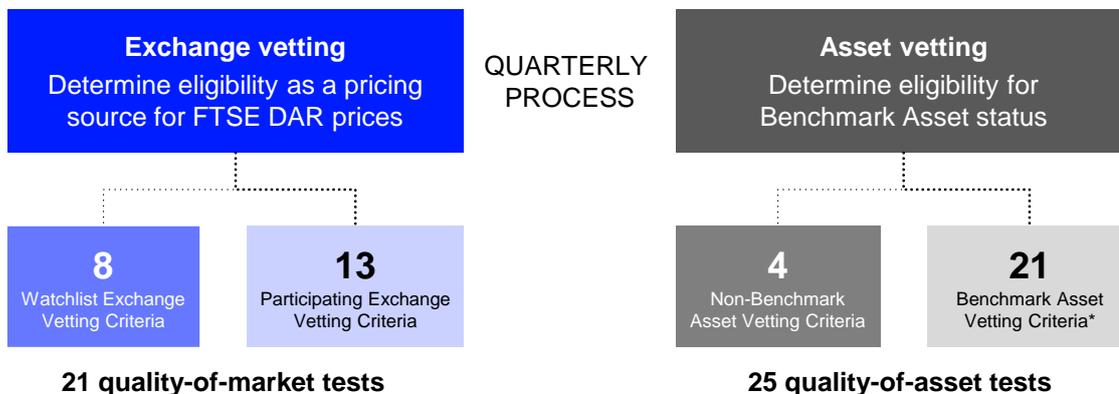
Source: FTSE DAR Guide to the Vetting of Digital Assets and Digital Asset Exchanges. Benchmark Asset Vetting includes the criteria for Tier 1 pricing.

Vetting digital asset exchanges

FTSE Russell's digital asset exchange vetting process aims to identify whether an exchange meets a critical baseline standard: for example, whether it is licensed appropriately to meet local regulations and whether it meets the necessary "Know Your Customer" (KYC) and "Anti Money Laundering" (AML) requirements.

Our process answers these questions and more via a rigorous exchange vetting process on an identified universe of approximately 450 exchanges. These exchanges are evaluated across 21 qualifying criteria in the following categories:

– Regulatory;

– Governance and Institutional;

– Technical;

– Data science.

In the past, some digital asset exchanges have been prone to the type of manipulative activity that is banned on regulated exchanges—this has included the posting of fictitious trade volumes, 'spoofing' and other attempts to artificially influence an asset's price or the behaviour of the markets.

In turn, this has resulted in a roadblock preventing the launch of the types of financial product that are commonplace in traditional markets.

For example, the US Securities and Exchange Commission (SEC) has repeatedly rejected applications by US asset managers to launch bitcoin exchange traded funds (ETFs). In its published rejections, the SEC has stated that US law requires a national securities exchange to prevent fraudulent and manipulative acts and practices and to protect investors and the public interest. In the SEC's view, digital asset exchanges have not yet met such a standard[5]. The November 2022 collapse of digital asset exchange FTX provides ample support for regulators' past caution.

Fortunately, data science enables us to spot some of the types of behavior that regulators are objecting to. In Figure 4, we compare what appears to be artificially smooth trading activity from a digital asset exchange that failed our vetting test with the trading data from another exchange that passed our test.

---

[5] See, for example, 'Order Disapproving a Proposed Rule Change to List and Trade Shares of the WisdomTree Bitcoin Trust', SEC, 11 October 2022.

Figure 4: Suspicious and expected trading activity (from exchanges BW and Gemini, respectively)

Random trading behavior that looks like coin toss

Expected behavior between real buyers and sellers

Bw Total Trades = 841718.0

Gemini Total Trades = 39023.0
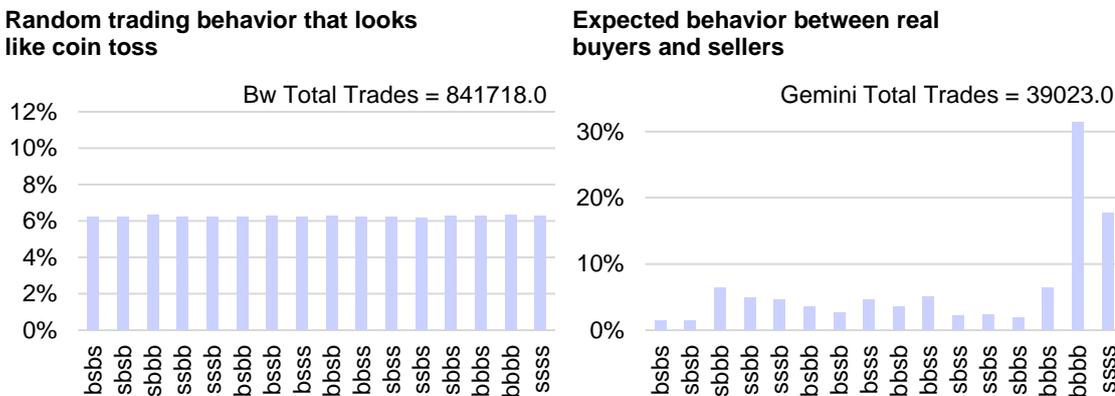
Source: FTSE Russell and DAR: BW is an exchange that failed our vetting criteria and Gemini is a Participating Exchange that passed our vetting criteria

Including data feeds from unvetted exchanges, in addition to their associated risks, can lead to significant differences in the way prices are calculated and reported. In Figure 5, we show the difference in the bitcoin price reported by a free price aggregator (which includes the price feeds from several unvetted exchanges) and the FTSE DAR Reference Price for bitcoin (which aggregates the price from vetted exchanges). Over a near-four-month period ending 25 January 2021, the difference in the reported daily closing bitcoin price reached as much as 2%.

Figure 5: Exchange vetting is important for an accurate bitcoin price

BTC
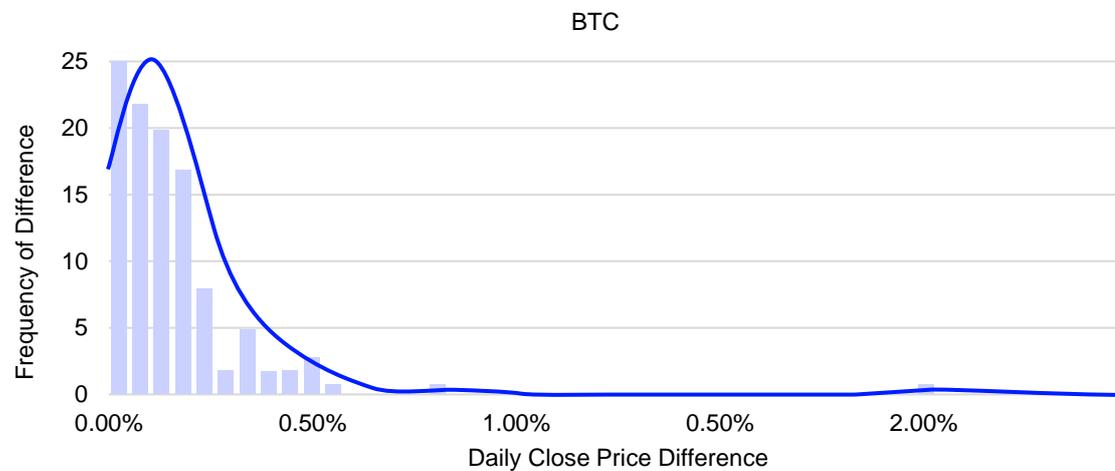
Source: FTSE Russell and DAR. Data shown is the percentage difference of the daily closing price (5pm Eastern) between the FTSE DAR Reference Price and CoinMarketCap from October 1, 2020 – January 25, 2021.

FTSE Russell vets digital asset exchanges each quarter in order to determine their eligibility as a pricing source for the FTSE DAR Reference Price calculation. The FTSE Russell digital asset exchange vetting process consists of two screens:

– Watchlist exchanges must meet specified criteria covering regulatory, governance, institutional and technical assessments, as well as a data science assessment to ensure an exchange is accurately reporting trading activity by real users;

– Participating exchanges must meet all the watchlist criteria, as well as additional regulatory, governance, institutional and technical assessments.

Watchlist exchanges meet eight vetting requirements. Participating exchanges meet an additional 13 criteria. We put contracts in place with participating exchanges to govern expectations and data use. These become the price providers of the FTSE DAR reference price (see below).

Full details of the exchange vetting process are published on the FTSE Russell website[6].

Vetting digital assets

There are thousands of digital assets in existence and each one has its own use case, leadership team, community, tokenomics, codebase and network activity. However, not all of them are suitable for inclusion in regulated benchmarks. In simple terms, the vetting process evaluates the health of the digital asset network that supports the tokens.

The FTSE/DAR digital asset vetting process is designed to provide a vital due diligence step for market participants interested in benchmarking digital assets, trading them or building financial products using them.

It consists of three steps:

STEP 1 – Eligibility of assets – Establish that assets meet baseline standards

All assets must pass minimum criteria to be eligible for price/index inclusion. These screens include minimum liquidity requirements, legitimacy and security checks.

STEP 2 – Pricing source and liquidity parameters – Asset ranking

Assets are filtered for minimum trading viability, including trading ecosystem and volume metrics, among others. Assets that pass the step two review are then placed in two groups, determining which reference price they are used in (in Step 3).

– **Tier 1** – Prices for these assets are only sourced from Participating Exchanges.

– **Tier 2** – Includes Eligible asset prices from Watchlist exchanges.

STEP 3 – Benchmark inclusion and universe creation – Our most rigorous review

The last step in the digital asset review is possibly the most critical. While the previous steps have been exclusionary, this final assessment provides the gates to benchmark inclusion. It consists of a series of final trading, technical, security, liquidity and regulatory checks and results in a division of the digital assets universe into two categories:

– **Benchmark Assets** – Tier 1 assets that meet all Benchmark inclusion criteria.

– **Non-benchmark Assets** – Tier 2 assets plus Tier 1 assets that don't meet Benchmark inclusion criteria.

The third step also helps address issues of potential concern for investors. For example, benchmark assets must not be subject to extraordinary surveillance or legal action by any regulatory body. A digital asset which is a member of the eligible universe and becomes subject to surveillance or legal action by any regulatory body may have its eligibility revoked at the next rebalance.

---

6 https://research.ftserussell.com/products/downloads/Guide_to_the_Vetting_of_Digital_Assets_and_Digital_Asset_Exchanges.pdf.

Figure 6: Vetting digital assets

STEP 3
Universe

Classify assets as
Benchmark or
Non-Benchmark

Test all Tier 1 assets for
Benchmark eligibility.

STEP 2
Pricing source

Classify assets as
Tier 1 or Tier 2

Pricing sources determine
Tier 1 and Tier 2 status.
Tier 1 are only sourced
from Participating
Exchanges. If Tier 2,
automatically included in
Non-Benchmark file only.

STEP 1
Eligibility

Pass all preliminary
criteria

All assets must pass
minimum criteria to be
eligible for a FTSE DAR
Reference Price to be
calculated, maintained
and distributed.

Source: FTSE Russell and DAR

Trade filtration

Before calculating our digital asset reference prices and indices, we conduct an additional due diligence step by filtering out erroneous or deviant trade data. This step acts as an important safeguard: based on past experience, the prices for the same token on different digital exchanges can vary widely.

In 2017 and 2018, for example, the dollar price for bitcoin on South Korean exchanges hit a premium of 40-50% when compared to the average price on other global exchanges. This so-called 'Kimchi premium' reflected trading limitations unique to the country's exchanges, as well as local capital controls.

Sometimes price divergences are short-lived and explained by a malfunctioning of an individual exchange's order book.

In February 2021, for example, the price quotation for ethereum on the Kraken exchange (ranked a participating exchange under the FTSE/DAR methodology) fell much more sharply than on other exchanges during the chaotic unwinding of leveraged positions—see Figure 7.

Figure 7: Divergent prices for the same digital asset; Kraken Crash on 22 February 2022
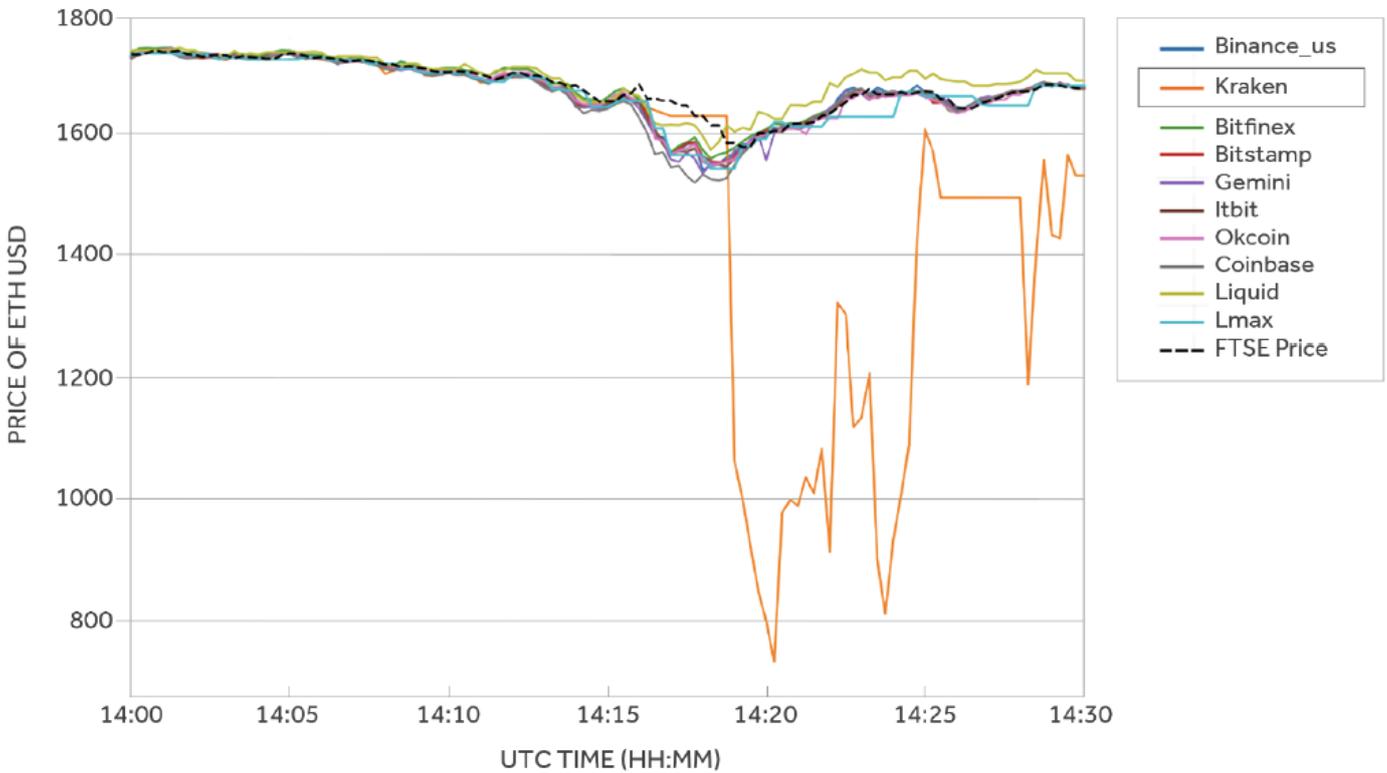
Source: FTSE Russell and DAR. Data from February 22 2021.

Kraken's trades during this period were filtered out of the FTSE DAR price and were automatically included again once the ethereum price had recovered.

Our trade filtration process is set out in Figure 8. First, we filter at the exchange level, then at the asset level, in each case removing data falling more than a specified interval from the mean of the dataset.

Figure 8: Trade filtration process

We filter on the exchange level	Then filter on the asset level
FOR EACH ASSET	FOR EACH ASSET
1. Take the last 15 seconds of trades and **create a VWAP** at each exchange	1. Gather the most recent 10 minutes of trade data and **convert all trade prices to USD**
2. Calculate **standard deviation and mean** of this dataset	2. Calculate **standard deviation and mean** of this dataset
3. **Final FTSE 15-second price**: Any exchange whose VWAP asset price is more than 1.5 standard deviations away from the mean has all trades for that asset removed from contribution	3. **Final**: Any trades 2.5 standard deviations away from the mean are removed from the dataset

Source: FTSE Russell and DAR

Building and maintaining the FTSE Global Digital Asset Index Series

Data and constituent eligibility

The index universe for the FTSE Global Digital Asset Index Series is defined as the investable universe of all eligible assets in the FTSE DAR Reference Price - Benchmark Assets universe. Asset and exchange eligibility is fully vetted on a quarterly basis according to a defined process and calendar of data capture and review. In addition to quarterly review, in extraordinary circumstances, asset and exchange eligibility can be taken away (or granted) if legal, regulatory or security concerns come to light.

Market cap segmentation

The top 98% of tradeable tokens, as defined by circulating weight, are selected and assigned to the large-, mid-, small- and micro-cap categories. To reduce index turnover, existing and potential constituents are subject to a series of 'buffer zones' to determine the cut-off points between the large-, mid-, small- and micro-cap segments (buffers specify different index inclusion and exclusion thresholds—see Figure 9). This parallels traditional index construction techniques in capitalization-weighted equity indices.

Index maintenance

The indices are reviewed quarterly in March, June, September and December (the review month) using market information for tradeable supply as at the close of the last day of the month prior to the review month (the data cut-off date) and price as at the close of the Wednesday after the first Friday of the review month. The review will be implemented at 22:00 UTC on the third Friday of the review month.

Figure 9: FTSE Global Digital Asset Index Series buffer zones

	Capitalisation bands (based on the Index Universe)	
	Eligible for inclusion	**Eligible for exclusion**
Large cap	76.00%	82.00%
Mid cap	93.00%	96.00%
Small cap	98.00%	99.5%

Source: FTSE Russell and DAR

For more details of the index construction methodology, including the index policies, digital asset eligibility, review procedures, network events and the calculation method, see the index series ground rules[7].

---

[7] https://research.ftserussell.com/products/downloads/FTSE_Digital_Asset_Index_Series_Ground_Rules.pdf.

Index governance

Industry regulation

Many of the existing providers of digital asset prices and indices are unregulated. In contrast, the major established index providers are supervised and regulated both directly and indirectly (for example, by means of funds regulation). Some of the most relevant global, regional and national regulations and guidelines for the provision of benchmarks and indices are:

– EU (and UK) Benchmark Regulation (EU BMR)

– IOSCO (International Organization of Securities Commissions) Benchmark Principles

– ESMA Guidelines on ETFs and other UCITS issues

– US ETF listing standards

– EU Markets in Financial Instruments Regulation (MiFIR)

In FTSE Russell's case, the UK's Financial Conduct Authority (FCA) has granted FTSE International Ltd. authorization as a benchmark administrator (and FTSE International Ltd. is listed on the FCA Benchmarks Register). FTSE Russell also issues a Statement of Compliance with respect to the recommendations made by the International Organization of Securities Commissions (IOSCO) in the Principles for Financial Benchmarks Final Report (the IOSCO Principles).

Creating and managing a governance framework is a core competency for index providers. Ensuring adequate governance and index oversight is especially important in the digital assets market, given the market's immaturity and the potential for manipulation and inadequate data quality.

Oversight and checks and balances

FTSE Russell has built a comprehensive framework and infrastructure that we describe as having three lines of defence. These combine specialist decision-making bodies with members drawn from first line executive management, an oversight committee with members drawn from second line (risk and compliance) and third line (audit) management, supported by a set of independent external advisory committees formed of market practitioners with specialist expertise on benchmark methodologies, input data and the underlying market.

Within the digital assets market, our work is coordinated internally by technical, methodology and operational forums. These forums operate under the supervision of FTSE Russell's Index Governance Board[8], which is responsible for maintaining the integrity of all index products, the development of index policies and guidelines, and ensuring they evolve according to changing market developments.

Combining infrastructure and expertise

The FTSE Global Digital Asset Index Series meets investors' and market participants' requirements by combining the infrastructure and governance framework of FTSE Russell with the digital asset market expertise of our partner, Digital Asset Research.

In the fast-evolving digital assets market, the FTSE Global Digital Asset Index Series combines a transparent methodology, thorough risk controls and a clear structure, providing users with a suite of capabilities for their future investment diversification needs and a trustworthy reference point for digital asset decision making.

Contact us about our vetted benchmark universe.

---

[8] The Index Government Board's Terms of Reference are available at
https://research.ftserussell.com/products/downloads/FTSE_Russell_Index_Governance_Board_Terms_of_Reference.pdf.

ABOUT FTSE RUSSELL

FTSE Russell is a leading global provider of index and benchmark solutions, spanning diverse asset classes and investment objectives. As a trusted investment partner we help investors make better-informed investment decisions, manage risk, and seize opportunities.

Market participants look to us for our expertise in developing and managing global index solutions across asset classes. Asset owners, asset managers, ETF providers and investment banks choose FTSE Russell solutions to benchmark their investment performance and create investment funds, ETFs, structured products, and index-based derivatives. Our clients use our solutions for asset allocation, investment strategy analysis and risk management, and value us for our robust governance process and operational integrity.

For over 35 years we have been at the forefront of driving change for the investor, always innovating to shape the next generation of benchmarks and investment solutions that open up new opportunities for the global investment community.

CONTACT US

To learn more, visit lseg.com/ftse-russell; email info@ftserussell.com; or call your regional Client Service team office:

EMEA +44 (0) 20 7866 1810

North America +1 877 503 6437

Asia-Pacific

Hong Kong +852 2164 3333

Tokyo +81 3 6441 1430

Sydney +61 (0) 2 7228 5659

FTSE RUSSELL
An LSEG Business